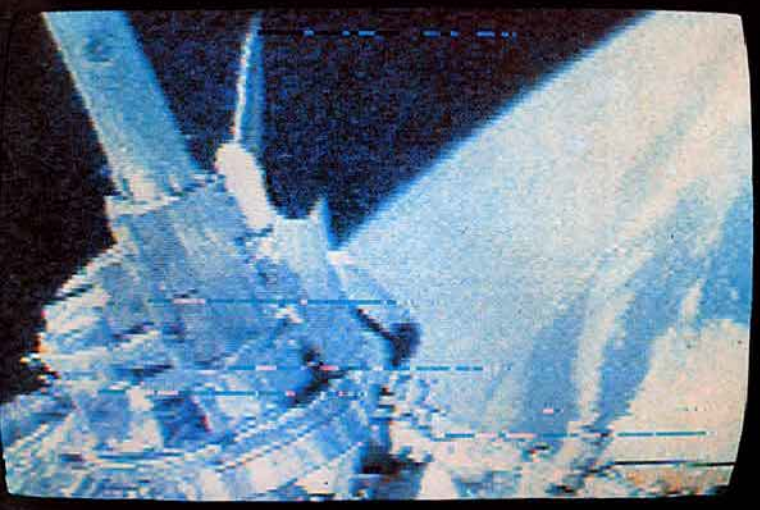
September 1985

RADio COMmunication



WOORE / *CHALLENGER*

A STUNNING SUCCESS ON SSTV

Left: a view from *Challenger* showing the earth and part of the space lab instrumentation. Received at RSGB HQ on 4 August 1985 during Orbit 93

Bottom left: the *first* amateur sstv picture received in Europe from a manned spacecraft. The picture was received at RSGB HQ on Thursday 1 August 1985 during Orbit 49

Below: Dr Tony England, W0ORE, received at RSGB HQ on Orbit 79 during a two-way voice and sstv contact with GB3RS on 3 August 1985

Equipment used at GB3RS: two Jaybeam 10 XY Yagis with switchable polarization, Yaesu FT726R transceiver and a Robot 1200C sstv converter

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CONTENTS

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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.

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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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introducing a new **HF** transceiver from TRIO, the **TS940S**,

The TRIO TS940S is a first class competition HF transceiver 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 within the range of the control 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 whilst operating 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 acccordingly.

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 information is backed up by an internally fitted 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 VS1 board (optional), a digitally encoded girl's voice will announce the operating frequency.

Combine the comprehensive receiver controls, advanced operating features and an ergonomically designed front panel and there is little more to say, except that, once again, TRIO have produced the world's finest HF rig, tomorrow's transceiver today, the TS940S!

TS940S HF transceiver..... **£1695.00** inc VAT.

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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.
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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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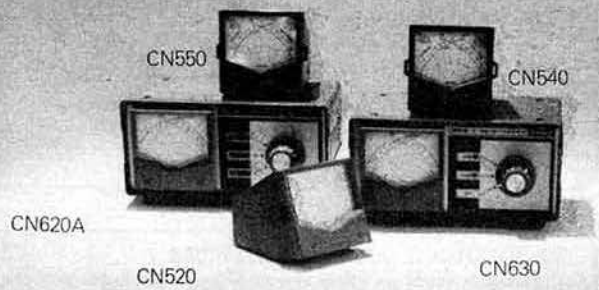
for "cross needle" metering, DAIWA



What's so special about "cross needle" metering? Well, it's typically Daiwa to go direct to the heart of the matter and develop a system which will give you the true value of forward power, reflected power, and SWR all at a single glance. The elegant simplicity of the idea hides a great deal of thought, which of course is the hallmark of Daiwa products.

You will see from the photographs that the meter displays have two scales, one reading forward power, the other reflected power. Since SWR is calculated using these two values, Daiwa have arranged the meter pointers so that SWR is shown at the crossing point of the two meter needles.

Why don't other makers use the idea? Basically it's a question of power meter accuracy. The usual type of single or twin meter "SWR/power meter" uses a simple strip line to measure the VSWR on the transmission line. You will note that I have said "VSWR", and this is important. These so-called power meters are in fact only measuring the voltage standing wave and in order to display power, you need to monitor both voltage and current in the line. Daiwa meters of course, do just that, and consequently are very accurate indeed. The cheaper so-called power meters depend for their accuracy in being terminated in a load, and exhibit wild inaccuracy when terminated in a reactive load. In other words, when the indicated VSWR on the meter is other than 1:1, their accuracy is quite badly affected.

To summarise; the Daiwa cross needle power meters give you easy, unambiguous readings at a glance, and what's more those readings are accurate even in lines displaying high SWR, and since Daiwa meters measure true power, they are accurate at any point in the feedline from transmitter to aerial.

As with all Daiwa products, their meters show the Daiwa approach design, combining accuracy, ease of use and interpretation, and that indefinable feel of quality which is the sure sign of a good product. Once owned, never discarded.

CN410M	3·5–150MHz		£48.00 inc VAT
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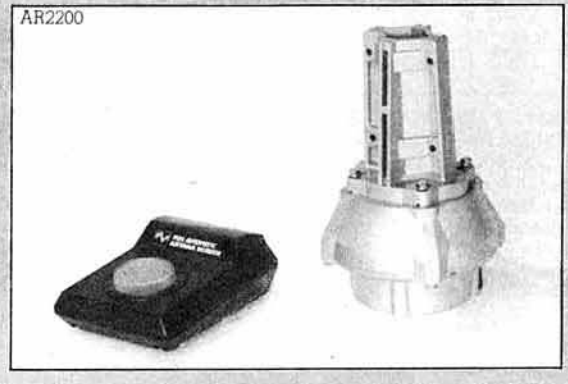
Carriage on "4 & 5" series meters £1.50, on "6" series £2.50.

lightweight rotators, the MTV7000 & AR2200....

There has always been a need for a lightweight rotator, the simple one aerial system or one on seventy and one on two metres. Simple systems that don't need the house turning ability of a larger rotator. The MTV7000 and AR2200 are such pieces of equipment. The MTV7000 is the smaller of the two and will accept from 22 to 40 mm diameter masts, the AR2200 being larger takes masts from 38 to 50 mm. Both rotators have drive motor voltages of 24 volts AC and use 3 core cable. The MTV7000 comes complete with top and bottom clamps, the AR2200 with top set for base plate mounting. Additional clamps are available as an option for the AR2200.

MTV7000 . . . **£39.50** inc VAT AR2200 . . . **£89.50** inc VAT Carriage £7.00


MTV7000


AR2200

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"as I said to John"

This series of articles on technical topics starts with a look at receivers; how their performance is specified, and what can be expected of a good receiver.

SENSITIVITY first. not because it is the most important, but it is oft quoted and is familiar to most. The sensitivity represents the smallest level of signal that a receiver can resolve under ideal conditions—with no other signals present, and it is usually quoted as the signal required at the antenna input of a receiver to produce a certain signal-to-noise ratio at the audio output. The nature of the signal depends on the mode of the receiver, but would generally be normally modulated AM or FM as appropriate, or an unmodulated carrier for single-sideband receivers.

The input signal level can be quoted as voltage (in microvolts) or as power level (usually in dBm). Zero dBm is defined as 1 milliwatt, so for a 50 ohm antenna input, 1 uV is equivalent to −107 dBm, and 0.1 uV is equivalent to −127dBm. Voltages are mostly specified as PD − the potential across the input of the receiver, but occasionally EMF is specified, which is the voltage before the 50 ohm source impedance is taken into account. The EMF value is always twice the value of the PD voltage.

Signal-to-noise ratios are usually chosen to represent signals that would be easily readable for phone communication, thus 10 dB S/N is normally specified for AM and SSB operation and 12 dB S/N for FM. Weak FM signals often produce large amounts of distortion in receivers, and for this reason FM sensitivity is quoted at 12 db SINAD. The SINAD ratio is similar to the S/N ratio, but distortion is included as noise and not signal. In the case of AM or SSB, the S/N and SINAD ratios are very similar.

Another commonly used S/N ratio is 3dB; also known as the minimum determinable signal (MDS)—this is the limit of an intelligible phone signal on AM or SSB. CW signals can, of course, be read at lower S/N ratios than this. Because the S/N is the ratio of SIGNAL + NOISE to NOISE, a value of 3 dB (ie 2 times in terms of power) means that the signal and noise powers are equal. This means that the input signal required to produce a 3 dB S/N ratio is of equivalent power to the noise generated within the receiver, and is thus equal to the NOISE FLOOR of the receiver.

How can the results at different S/N ratios be compared? FM is not obliging, and sensitivity figures should be compared at equal SINAD values. With AM and SSB receivers, however, the output signal level rises proportionally with the input signal, until the receiver gain is reduced by AGC action, so the input required for, say, 10 dB S/N can be calculated if we know the signal level at the input to produce 3 dB S/N: At 3 dB S/N the output noise and signal powers are equal. At 10 dB S/N the output signal power is 9 times the noise power. It is reasonable to assume that the noise power remains constant, so the input power for a 10 dB S/N ratio will be 9 times that for a 3 dB S/N ratio. This is equivalent to a factor of 3 times in input voltage, or about 9.5 dB. To summarise:-

In microvolts;
MDS = Noise Floor = (3 dB S/N sens) = 1/3 (10 dB S/N sens)
In dBm;
MDS = Noise Floor = (3 dB S/N sens) = (10db S/N sens)—9.5 dB

What determines receiver sensitivity?
There are two main factors—the amount of noise generated in the receiver's RF and IF amplifiers and the bandwidth of the receiver. The stages at the front end contribute most to the total noise in a receiver since the noise that they generate is amplified by subsequent stages. The overall gain of a receiver is not a primary factor affecting sensitivity, and for this reason an RF pre-amplifier will only result in a more sensitive system if it generates less internal noise than the first stage in the receiver.

The noise present in receivers behaves as 'white' noise, in that it contains components at all frequencies at equal levels. The bandwidth filters in a receiver allow only a small portion of the frequency range to contribute to the output noise, but the wider the filters are, the more noise gets through. We would expect to get about twice as much noise power through a 2 kHz filter than through a 1 kHz filter, so a signal that would pass through either filter would have a higher S/N ratio with the 1 kHz filter than with the 2 kHz one. The sensitivity of a receiver improves as the filter bandwidth is reduced, provided that the signal will pass through the filter. The sensitivity of a receiver with a 500 Hz CW filter fitted should be about 6 dB greater (half the input voltage) than with a 2.4 kHz sideband filter, so be careful to compare sensitivities at similar bandwidths, or apply a correction.

A measure of sensitivity that does not involve bandwidth is NOISE FIGURE. All receiving systems have an inherent noise floor that is produced by thermal agitation of electrons. This is THERMAL NOISE or JOHNSON NOISE. The power of thermal noise is dependent on bandwidth in the same way as noise in a receiver, and is also dependent on temperature. The NOISE FIGURE of a receiver is the ratio of its noise floor to the thermal noise floor. It is usually expressed in dB. At room temperature, the thermal noise power is about −144 dBm in a 1 kHz bandwidth, and about −141 dBm for a typical SSB filter bandwidth.

A receiver with a 10 db S/N sensitivity of 0.15 uV (−123 dBm) would have a noise floor of −133 dBm and a noise figure of about 8 dB.

Next month
More on noise figure, and how sensitive should a receiver be?

AE

AUTHORISED YAESU

AMATEUR ELECTRONICS

510/512 Alum Rock Road Alum Rock Birmingham B8 3HX

FRG-9600

The FRG-9600 all mode scanning receiver covering 60 through 905MHz continuously, with 100 keypad programmable memory channels.

FM wide, FM narrow and AM wide and narrow, SSB (single sideband) reception up to 460MHz, and the new ACSB mode. Seven tuning/scanning rates between 100Hz and 100kHz.

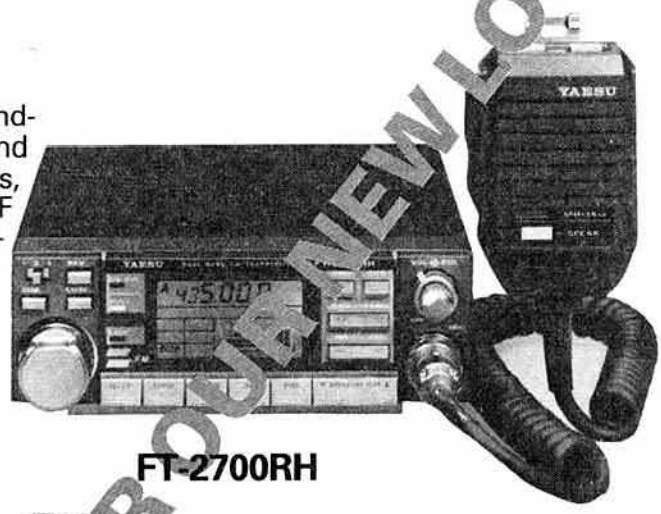
Scanning system allows full or limited (keypad programmed) band scanning memory scanning, with auto-resume. Carrier sensing scan stop, audio scan stop sensing. Scanning steps selectable. Signal strength indicated by a two-colour graphic S/meter. A 24-hour clock timer recorder output automatic power on/off switching and recording Multiplexed (FM wide) output, AF and RF mute.

Yaesu CAT System provides a direct control link to the cpu allowing operators with personal computers to add virtually unlimited customized control functions.

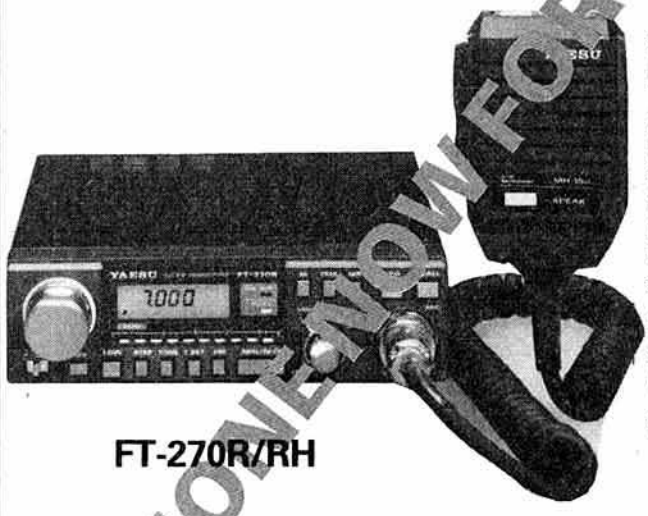
12VDC, using the optional PA-4B/C AC adapter from the AC line.

£475.00

FT-2700R 2M and 70cm Dual Bander. True full duplex cross band working. Dual receiver front ends, local synthesisers, IFs and Tx RF stages. Two 4-bit microprocessors. Ten memories. Programme mem scanning. Reverse repeater. Priority function. 25W continuous either band. Full duplex or simplex. Distinctive graphical two colour PO/S meter. Optional voice synthesiser. **£559.00**



FT-2700RH



FT-270R/RH

2m FM Transceiver. Dual 4-bit microprocessors. Dual VFOs. Ten memories. Programmable band scan limits. Priority function. Two scan modes, fixed (6 sec's) or carrier controlled scan resume. High visibility back lit LCD, 5mm digits. Unique aluminium die cast ducted heat sink.

Power outputs: FT-270R 25W and 3W, FT-270RH 45W and 5W (fan assisted cooling).

Optional voice synthesiser.

R £349.00 **RH £399.00**

The new and ultimate Handhelds on 2M and 70cms.

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FT-726R/2M

All mode base station. Inbuilt AC power supply. Three modules can be installed at once for cross band operation or pushbutton band selection. 70cm module includes GaAs FET preamp. HF module for 21, 24.5 and 28MHz (make your 726R into a Five Bander). Dual VFOs, tuning 20Hz/Step or local channel steps. Speech processor for SSB and for CW optional 600Hz Narrow filter. IF shift/width. Eleven memories (Store mode as well as band). Scanning. Programmable limited band scan. Priority Function. Full duplex cross band (with sattelite IF unit fitted). Independent tuning/mode and meter functions for Tx/Rx. Dual meters. Seven digit display plus two digit clarifier display. AGC. Noise blanker. RF gain tone/squelch for all modes. Continuously adjustable power, 10w full output. **£869.00**

ALL MODE HF COMPUTER AIDED TRANSCEIVER

- Gen. coverage receiver.
- 12 memory channels. • LSB, USB, CW, AM, AFSK, FM. • Two VFOs.
- Personal computer compatible.
- Tuning steps. 10Hz. 5KHz. + 500KHz (Band). • Centre zero meter.
- CW. Full break-in. • AGC speed.
- Power out SSB. CW. 100w(PEP) AM 25w, FM. FSK 50w.
- IF notch and Audio peak filters. **£1650.00**

FT-980

FRG-8800

FRG-8800. All band all mode Gen coverage receiver. 150kHz to 30MHz. Large liquid crystal display. 100Hz frequency resolution. S/SINPO "bar graph" type indicator. 21 button keypad. 12 internal memories and multi function scanner. AM, SSB, CW and FM. Wide and narrow bandwidths. All mode data/freq can be stored in mem's. Selectable AGC rates. Two 24 hr clocks. 8-bit CPU. Three scan modes. Yaesu CAT system comparable with most personal computers. Programme scanning.

FRV-8800 optional VHS converter (mounts inside) adds 118MHz to 173.999MHz coverage to the 8800 with full frequency readout.

FRV-8800 £90.00 **£559.00**

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Uppington, 12-14 Pennywell Rd., Bristol. Tel: 0272 557732

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Thanet El

ICOM ICOM

IC-735, The Complete HF Radio

This new HF transceiver from ICOM is compact enough to make mobile or portable use a possibility. The IC-735 covers all Amateur frequencies from 1.8MHz to 30MHz including the three new bands 10, 18 and 24MHz. Modes include SSB, CW, AM and FM, all circuits are solid-state and output is approximately 100 watts.

Tuning ranges from 100kHz to 30MHz, made continuous by using a high-side IF and a CPU control system. RTTY operation is also possible. Dynamic range is 105dB with a 70.451 MHz first IF circuit. The direct feed mixer rejects spurious response and gives higher sensitivity and wider dynamic range. Pass-band tuning and a sharp IF notch filter provide clear reception even under duress. Preamp is 10dB and attenuator 20dB.

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.

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.

You can scan the whole band between VFO's/scan memories and VFO's. Adjustable scan rate 144 to 146 MHz, remote tuning with IC-HM10 and HM11 microphones. Digital frequency display, Hi/Low power switch. Optional Nicad battery system allows retention of memory.

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ICOM ICOM

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.

HS-10 Headset also available, with earphone and boom microphone, which operates with either of the following:- HS 10-SB Switch box with pre-amplifier giving biased toggle on, off and continuous transmit. HS 10-SA Voice operated switch box, with pre-amplifier, mic gain, vox gain and delay. The IC-2E and 4E continue to be available.

Authorised Icom dealers in the UK

Alyntronics, Newcastle, 0632-761002.
Amateur Radio Exchange, London (Ealing), 01-992 5765.
Amcomm, London (S. Harrow), 01-422 9585.
A.R.E. Comms. Earlstown, Merseyside, 0952-29881.
Arrow Electronics Ltd., Chelmsford, Essex, 0245-381673/26.
Beamrite, Cardiff, 0222-486884.
Booth Holding (Bath) Ltd., Bristol, 02217-2402.
Bredhurst Electronics Ltd., W. Sussex, 0444-400786.
Dressler (UK) Ltd., London (Leyton), 01-558 0854.
D.W. Electronics, Widnes, Cheshire, 051-420 2559.
Hobbytronics, Knutsford, Cheshire, 0565-4040. Until 10pm daily.
Photo Acoustics Ltd., Buckinghamshire, 0908-610625.
Radcomm Electronics, Co. Cork, Ireland, 01035321-632725.
Radio Shack Ltd., London NW6, 01-624 7174.
Ray Withers Comms. Warley, West Midlands, 021-421 8201.
Scotcomms, Edinburgh, 031-657 2430.
Tyrone Amateur Electronics, Co. Tyrone, N. Ireland, 0662-2043.
Reg Ward & Co. Ltd., S.W. England, 0279-34918.
Waters & Stanton Electronics, Hockley, Essex, 0702-206835.

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.

You can get what you want just by picking up the telephone. Our mail-order dept. offers you: free, same-day despatch whenever possible, instant credit, interest-free H.P., telephone Barclaycard and Access facility and a 24 hour answering service.

Please note that we have a retail branch at 95, Mortimer Street, Herne Bay, Kent. Tel: 369464. Give it a visit, BCNU.

STOP PRESS» Contact us regarding 50MHz equipment for new issued band!

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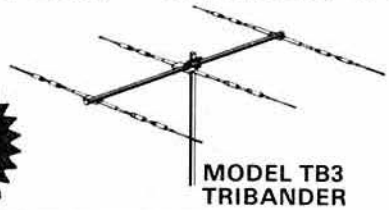

Almost half the price of Hygain TH2!*

MODEL TB3 TRIBANDER

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.

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All our tested trade-ins carry 3 months warranty.

NEW

WELZ CP5
80-10M £149
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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

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1-8-200MHz
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Twin meters
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SP425
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5/15/150 watts
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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.

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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.

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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! **£2.95**

NEW UK CONFIDENTIAL FREQUENCY LIST

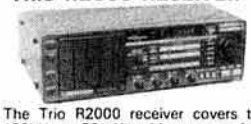
A must for the keen shortwave listener. It gives comprehensive details of thousands of stations, their frequency and location, from 2-30mHz. We can thoroughly recommend this publication as super value. **£4.95**

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

£178 + 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

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SP350 1-8- 500MHz
£79.00

WELZ SP200 £87
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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

£349 INCLUDES FREE NICADS & CHARGER

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.

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SEVENTYCEMS!

My first activity on 432MHz was in the days of what G8AGU rightly calls 'advanced modulation'. The few watts of crystal controlled a.m. and the home-brew converter that I ran in those days got into places under lift conditions that I'd never have dreamt possible. Later, in the early '70s, I devoted a whole winter of evenings to building an ssb transmitter for the band. This coincided with the availability of reasonably priced low-noise uhf amplifier transistors like the BFR90, and the improvement in performance was spectacular! By 1978, I was active on 70cm eme, and I'd managed to get my hands on a GaAsfet. At that time that in itself was quite a feat, and with a certain amount of trepidation, I put together one of the very first GaAsfet amplifiers to be used 'off the Moon' in Europe. I also managed to be one of the first eme'ers in Europe to blow a GaAsfet! Ask G3WDG.

The reason for this history is really to make the point that our GaAsfet preamplifiers are what our colonial cousins might call a 'mature product', and benefit from our experience. We've two very nice amplifiers for the Gentlemans Band: the GLNA 432e, and the GLNA 433e. Both provide excellent performance, and are proving to be VERY much more reliable than my early attempts!!

I was in the strange position (for me) a few days ago of attending a local rally as a private individual. It was an interesting experience to be able to spend my time talking to friends about our hobby without having to think about the business! I also spent a while wondering about the trade show.

After five seasons of attending rallies with our firm, I've developed considerable respect for most of the people who spend their weekends trying to make an honest crust by selling radio amateurs the goodies for which we all crave. I was a bit shocked, therefore, to hear the representative of another UK manufacturer trying rather hard to sell a 144MHz preamp to somebody who was actually looking for a preamp for a general coverage scanning receiver!

Needless to say, it's not our way of doing things. If you ask us a question, we hope that we'll always give a straight answer, even if it does sometimes mean that we lose a sale! We care what people think about both our trading practices and products, and we value a good night's sleep!

Chris Bartram G4DGU

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TVHF 230c	Very high performance 2m to 9 hf bands transverter	334.90
TVVF 50a	Very high performance 10m to 6m transverter	239.90
TVVF 50c	Very high performance (again!) 2m to 6m transverter	199.90
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SLNA 145sb	Transceiver optimised preamplifier for the FT 290	29.90
SBLA 144e	Masthead-mounting 2m low-noise high dynamic range preamplifier. 250W through-power	89.90
GFBA 144e	Ultra-high performance masthead-mounting GaAsFet 2m preamplifier using advanced noiseless negative feedback for low noise figure and superb dynamic performance. 1000W pep (ssb) through-power. Supplied with ATCS 500 sequencer-controller	149.90
GLNA 432e	Masthead-mounting 430-440MHz high performance GaAsFet preamplifier. 0·9dB typical noise figure, 250W through-power. Supplied with ATCS 500 sequencer-controller	149.90
GLNA 433e	Masthead-mounting 430-440MHz high performance GaAsFet preamplifier. 1dB typical noise figure. Rf switching, 50W through-power	79.90
TLNA 432u	Unswitched bipolar 430-440MHz preamplifier. 1·5dB typical noise figure	29.90
TLNA 432ub	Unboxed version of the TLNA 432u	22.40

		£
BLNA 432ub	Sub-miniature 430-440MHz preamplifier. 1·3dB typical noise figure. Requires external filtering.	13.70
BBBA 500u	20-500MHz high dynamic range broadband preamplifier. Ideal for scanners	34.90
RPCB 144ub	Complete replacement front-end for the FT221 and FT225	79.90
RPCB 251ub	Complete replacement front-end for the IC211 and IC251	84.90
RPCB 271ub	Complete replacement front-end for the IC271 (e and h)	89.90
GDIF 107ub	Gunn diode WBFM back-end processing board	49.65
LBPF 144u	Low-loss 144-148MHz two-pole bandpass filter. 0·3dB typical insertion loss, 120W power handling	22.40
LBPF 432u	Low-loss 430-440MHz two-pole bandpass filter. 0·3dB typical insertion loss, 100W power handling	22.40
XBPF 700ub	Microstripline bandpass tvi filter	2.95
ATCS 500	Sequencer-controller	33.90
VFAT 206	25W 6dB attenuator suitable for use with the TVHF 230c	19.65

Carriage/postage rates

GFBA 144e, SBLA 144e, GLNA 432e, GLNA 433e	2.50
TVHF 230c, TVVF 50a, TVVF 50c	5.00
All other products above	1.50

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AMT-2

AMTOR/RTTY/CW/ASCII TERMINAL UNIT

Still the ultimate way to get on the air with all popular data communication modes.
Use it in conjunction with your home computer; electric typewriter/terminal, or surplus VDU—in fact, you can use anything with a 300 Baud, full duplex, serial interface.

British designed and manufactured, the AMT-2 has a built-in frequency analyser type tuning indicator; full front panel status indication and both wide/narrow filter selection and tone invert front panel switches. Interfacing to any commercial transceiver is easy: Just connect to the Microphone, PTT and Speaker lines.

For most popular personal computers, we can offer very user friendly software together with ready made connection cables.

With thousands of AMT series terminal units in use world wide, there are now plenty of people to work on AMTOR. Once you have tried the mode, you will be as inclined to go back to RTTY as you would be to move from SSB back to AM!!

Price: £245.00 inc VAT P&P: £2.50

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AMT-2/CBM-64	Applications Software, cable	**£51.75** £1.00
AMT-2/BBC-B	Applications Software, cable	**£44.85** £1.00
AMT-2/Apple II	Applications Software, cable	**£35.00** £1.00
AMT-2/IBM-PC	Applications Software, cable	**£23.00** £1.00
Mk II/Kit D	AMTOR PC board (Assembled and tested)	**£110.00** £2.50
CP-1/CBM-64	RTTY/ASCII/CW Software, cable	**£39.00** £1.00
CP-1/VIC-20	RTTY/ASCII/CW Software, cable	**£39.00** £1.00
CP-1/BBC-B	RTTY/CW Software, cable	**£39.00** £1.00
CP-1/Apple II	RTTY/ASCII/CW Software, cable	**£51.75** £1.00
CP-1/IBM-PC	RTTY/ASCII/CW Software on disc. Requires RS232 option for CP-1	**£51.75** £1.00 **£32.95** £1.00
MBA-TOR-64	AMTOR/RTTY/CW/ASCII Software, cable for CP-1 and CBM-64	**£69.00** £1.00
MBA-TOR-20	AMTOR/RTTY/CW/ASCII Software, cable for CP-1 and VIC-20	**£69.00** £1.00

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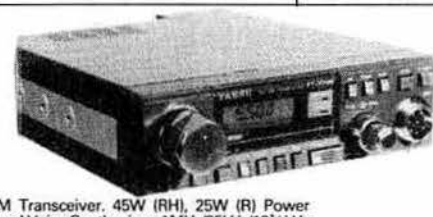
Bernie & Brenda

FT270RH



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ICR71	Gen. Cov. Receiver	£675
IC271	VHF Base Station	£689
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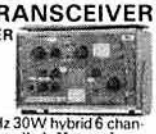

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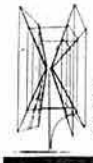

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Zone B	*(Regions 3, 4 and 5)*	H S Pinchin, BSc, MBIM, G3VPE
Zone C	*(Regions 7, 8, 16 and 19)*	W J McClintock, MSc, G3VPK
Zone D	*(Regions 6, 9, 17 and 20)*	J N Gannaway, G3YGF
Zone E	*(Regions 10 and 11)*	E J Case, GW4HWR *(co-opted)*
Zone F	*(Region 15)*	J T Barnes, GI3USS
Zone G	*(Regions 12, 13 and 14)*	F Hall, GM8BZX

REGIONAL REPRESENTATIVES

Region 1 B Donn, G3XSN, tel 051-722 3644
(Cheshire, Cumbria, G Manchester, I o Man, Lancs, Merseyside)
Region 2 P R Sheppard, G4EJP
(Humberside N of Humber; N, S and W Yorks)
Region 3 G Ross, G8MWR, tel 0203 616941
(Hereford & Worcs, Salop, Staffs, Warks, W Midlands)
Region 4 M Shardlow, G3SZJ, tel 0332 556875
(Derbys, Humberside S of Humber, Leics, Lincs, Notts)
Region 5 J S Allen, G3DOT, tel 0582 21151
(Beds, Cambs, Northants)
Region 6 F S G Rose, G2DRT, tel 0494 814240
(Berks, Bucks, Oxon)
Region 7 R Sykes, G3NFV, tel 0372 372587
(G London S of Thames, Surrey including part of London N of Thames administered by Surrey)
Region 8 M Elliott, G4VEC, tel 0795 70132
(Kent, E Sussex, W Sussex)
Region 9 A H Hammett, G3VWK
(Cornwall, Devon)
Region 10 E J Case, GW4HWR, tel 0222 810368
(Dyfed, Gwent, Powys; Mid, S and W Glam)
Region 11 B H Green, GW2FLZ, tel 0492 49288
(Clwyd, Gwynedd)
Region 12 M R Hobson, GM8KPH, tel 0796 2140
(Grampian, Highland, Island Authorities, Tayside)
Region 13 A Givens, GM3YOR, tel 0592 200335
(Borders, Fife, Lothian)
Region 14 T G Wylie, GM4FDM, tel 0505 22749
(Central, Dumfries & Galloway, Strathclyde)
Region 15 R R Parsons, GI3HXV, tel 0232 612322
(Northern Ireland)
Region 16 A Owen, G4HMF
(Essex, Norfolk, Suffolk)
Region 17 T M Emery, G3KWU, tel 0703 812435
(I o Wight, Channel Is, Dorset, Hants, Wilts)
Region 18 I Gibbs, G4GWB, tel 0670 790090
(Cleveland, Durham, Northumberland, Tyne & Wear)
Region 19 R J Broadhurst, G3AAJ, tel 01-989 6741
(G London N of Thames, Herts)
Region 20 N F O'Brien, G3LP, tel 0452 34890
(Avon, Gloucester, Somerset)

HONORARY OFFICERS

Aerial Planning Panel co-ordinator: (c/o MSO, RSGB HQ)
Audio Visual Library co-ordinator: R G Auckland, G2PA
Awards managers. HF: P Miles, G3KDB; **VHF:** Jack Hum, G5UM
HF manager: E J Allaway, G3FKM
Microwave manager: D S Evans, G3RPE
Observation Service organizer: R J Osborne, G4FJN
Slow morse practice transmissions organizer: *(Post vacant)*
VHF manager: K A M Fisher, G3WSN

Correspondence to RRs and honorary officers should be addressed directly to them (QTHR), not to RSGB HQ

ANNUAL SUBSCRIPTION RATES

Corporate member: UK and overseas (*Radio Communication* by surface mail): **£16.50.**
UK associate member under 18: £6.20. Family member: £6.60
UK students over 18 and under 25: £9.30 (Applications should give applicant's age at last renewal date and include evidence of student status)
Affiliated club or society/registered group (UK): £16.50 (including *Radio Communication*); **£9.90** (excluding *Radio Communication*)
(Subscriptions include VAT)

EDITORIAL

SPECTRUM ABUSE—THE RADIO INVESTIGATION SERVICE

As noted in this month's *RSGB News Bulletin*, the role of the Radio Investigation Service is to change. The Parliamentary announcement of this news on 26 July has both good and bad implications for the radio amateur.

The good part is that the RIS workforce, depleted by about a third when the service was transferred from BT to the DTI last year, is to devote more of its resources to dealing with the "pollution of the radio spectrum by people who either operate without a licence or abuse their licences". If reality matches the sentiment, this is music to the ears of every law-abiding user of the spectrum. It is precisely the sort of action which the Society has been advocating for years. Indeed, we recently wrote to the Prime Minister about it (*Rad Com*, August 1985, p612).

The bad news is that, in devoting more time to its enforcement role, the RIS will carry out a "phased withdrawal from dealing with the time-consuming problems of domestic and radio reception". No longer will the radio amateur simply be able to refer their neighbour(s) to the RIS for a solution to the problems of breakthrough. Instead the RIS/DTI are to publish a "comprehensive booklet" which will enable people to carry out "simple and safe diagnoses" of their tv or radio reception problems. Many experienced radio amateurs would balk at the idea of a neighbour carrying out the sort of investigation which would provide a solution to breakthrough, for in itself such problems are not just technical. They all too often revolve around a multitude of social considerations, and in such cases the RIS Officer, simply by being there, has been regarded as both a mediator and a provider of a positive frame of reference. In most cases he has been able to explain to the non-technically minded neighbour that the real problem is within their own tv or radio set.

The neighbour will still be able to summon assistance from the RIS, but only if a £21 call-out charge is made. The reflex action of most laymen will be to wonder why on earth they are being asked to pay to sort out a problem which to them is not of their making. ("The RIS", *Rad Com* March 1984, p198).

Although the RSGB was consulted during the RIS review process, we had not received any further feedback from the RIS/DTI. The RSGB was not consulted with regard to the "comprehensive booklet". This in itself is alarming, simply because the experience of the Society in dealing with the problems associated with breakthrough is second to none.

Perhaps, though, we can take some comfort in the fact that BS905—a document which sets, for the first time, immunity standards for tv receivers—will be incorporated into legally-binding regulations as soon as possible. It will become an offence to sell, manufacture or import tvs which do not comply with the standard. Although BS905 only provides minimum immunity standards, it is at least a start.

The Society, through its EMC Committee, will wish to see these legal regulations improved, and will also be considering other ways of assisting radio amateurs, such as the formation of local self-help groups now that the RIS is to withdraw from the domestic scene.

David Evans, G3OUF

Amateur Radio News

RSGB PRESIDENT 1986

At its meeting on 27 July 1985, Council elected Mr W J McClintock, G3VPK, to be the Society's President in 1986.

Mr McClintock has been Zone C Council member since June 1980, and is this year's executive vice-President.

Nominations for election to the 1986 RSGB Council

The attention of members is drawn to the notice on page 606, *Rad Com* August 1985.

Following the election of Mr W J McClintock, Zone C Council member, as President for 1986, nominations are also now required for the position of Council member for Zone C (see page 683 for zone definition).

The closing date by which nominations must be received at RSGB HQ is 10 October 1985.

Raised in the House

From the point of view of the radio amateur, one of the most important statements for some years was that made in the House of Commons on 28 June 1985: this was, of course, the one in which Mr Geoffrey Pattie announced that an allocation at 50MHz would be made to UK radio amateurs. Other parts of his written reply are also of interest. He stated that frequencies in the middle sub-band of Band 3 would be allocated to users who had been displaced from Band 2 and the PMR mid-band, and that a block of frequencies around 139 and 148MHz would be made available for the fuel and power industries. A new specification was being prepared for the associated equipment. Frequencies in the middle sub-band of Band 3 would also be allocated to other users, notably five blocks each of 1MHz for use with cordless PABX equipment. Services ancillary to broadcasting, such as radio microphones, would also be allocated six blocks of 0·7MHz in Band 3.

With regard to Band 1, Mr Pattie said: "The demands on the spectrum within Band 1, which was also released by the cessation of 405-line black-and-white tv services on 6 January of this year, have not yet emerged to as firm or full an extent that we are able to settle the whole future of the bands. Moreover, my department has only recently been able to begin discussions with neighbouring administrations about the use of the band.

"Accordingly, I have decided to allocate only a limited number of frequencies to new Band 1 users at this stage. First, as with Band 3, the study of the frequency requirements of the services ancillary to broadcasting has identified a need for 4MHz and two other allocations of 0·35MHz each in Band 1, and I intended to allocate these for this purpose. Second, I am conscious that the interim Merriman report recommended that the radio amateur service should be given an allocation on the band, and I am therefore proposing to fulfil that recommendation by allocating the band 50–50·5MHz to radio amateurs. Third, I intend to allocate 0·5MHz within the band to satisfy the demand for further spectrum for on-site paging services. Finally, I intend to allocate the band 49·82–49·9MHz for the use of general low-power devices which have minimal potential for causing interference, such as toys and telemetry equipment. It is the intention that such low-powered devices would be permitted to operate with the minimum of restriction, and my department will consider how to achieve this. Other claims for usage of Band 1 are also being considered: for instance discussions are being conducted with industry to make an allocation for long-range security and other alarms, and the band will also have attractions for mobile radio services."

It is understood that "considerable interest" in frequencies in Band 1 is also being shown by various Defence users.

On the same day, 28 June, the Secretary of State for Trade & Industry was asked whether he would introduce legislation to prohibit the sale of cordless telephones and citizens band radio apparatus which it was an offence to use in the UK. Mr Pattie replied that he hoped to introduce orders later in 1985 for both classes of equipment under Section 7 of the Wireless Telegraphy Act 1967 (as amended by Section 77 of the Telecommunications Act 1984) which gave power to restrict manufacture, sale, hire and importation of specified wireless telegraphy apparatus. The restrictions would apply to all cordless telephones which were not exempt from licensing requirements in the UK. The restriction would also apply to cb equipment which could not be licensed in the UK, with the exception of amplitude-modulated equipment designed to operate in the 26·96–27·41MHz band and which met the technical specifications contained in Recommendations T/R 20-02 of the Conference of European Posts and Telecommunications Administrations (CEPT). This exception would be made because the UK was moving towards harmonization with the rest of Europe in regard to the specification of cb equipment. However, because of the requirements of existing radio services the cb service in the band could not be introduced until 1987 at the earliest, and use of such equipment would therefore remain an offence until the band could be cleared of existing users and made over to cb.

Shocking rotator

A member has reported a problem with his Kenpro KR600/KR400 series rotator. He received an electric shock from the rotator's control box and discovered that it was live: no fault was found on dismantling and the unit worked correctly on reassembly. Some weeks later another severe shock was received, and it was discovered that the printed circuit board in his particular unit was only 0·125in (3mm) from the metalwork of the control box. The mains lead from the fuse had been run under this panel, and the screw of the rear foot had penetrated the insulation of the lead, thus making the cabinet live.

It is suggested that members owning this type of rotator check their own control units carefully: if in doubt, contact the retailer. The Society intends to contact the manufacturers in order to establish whether this is a generic fault or a "one-off" problem.

The UK main distributor for Kenpro, South Midlands Communications, has considered the circumstances of this incident and believes that it is almost certainly an isolated case due to careless assembly. SMC has further stated that the Kenpro models imported by them have standard three-wire mains cabling with proper earthing, and the fuse position was also altered some years ago to improve safety. These arrangements have applied to all Kenpro rotators imported by SMC for the past two years.

QSL Bureau news

The sub-manager for the G0AAA-AZZ callsign series has changed his address to: 23 Wilmington Close, Townhill Park, Southampton SO2 2RD.

The sub-manager for the G0DAA-DZZ callsign series has changed his address to: 115 Shrub End Road, Colchester, Essex CO3 4RB.

A sub-manager for the G0CAA-CZZ callsign series has been appointed: he is Mr P F Jobson, G3HLF, 52 Old Road West, Gravesend, Kent DA11 0LN.

Members' book prices

As from 1 August 1985 the discount on RSGB books for members of the Society was increased from 10 to 15 per cent.

Planning appeals

In order to assist the work of the RSGB's Antenna Planning Panel, it would be most helpful if members who have been successful in planning appeals connected with amateur antennas could forward a copy of their letter of decision to RSGB headquarters, marked for the attention of the Senior Membership Services Officer.

In addition, the panel would welcome more members, particularly in Scotland, Wales and Northern Ireland. Anyone who is professionally concerned with planning problems and who is also familiar with amateur radio is invited to contact RSGB

headquarters if they would like to contribute some time to assist in the work of the panel.

Old-timers 3·5 and 7MHz annual event

For the eleventh successive year, the Radio Amateur Old Timers Association (RAOTA) and the Dutch Old Timers Club have arranged an activity programme for two days in October. This year there will be two morning sessions only, from 0830 to 1130gmt on Monday and Tuesday, 6 and 7 October, with first contacts on 3,600kHz. Individual ssb and cw contacts follow elsewhere in both bands according to conditions. All old-timers are invited to take part, but anyone wishing to join in will find a welcome.

Leo Van der Toolen, PA0NP, president of the Dutch Old Timers Club for 21 years, in his shack at Voorkout

JOTA news

The 1985 Jamboree-on-the-Air takes place on 19/20 October. Several applications for special event callsigns have already been received, and well over 400 are expected. The closing date for completed application forms is Friday 20 September, after which **NO** applications will be considered. Please use the correct form, which is available from the membership services department at RSGB headquarters, and if you are intending to apply for a special event callsign and have not yet done so, it would be advisable to obtain the form almost as soon as you have read this item.

A special event callsign is issued for use at one specified location only and is valid for 28 days inclusive. Simultaneous operation on all licensed bands is permitted, so it is not always necessary to have both a Class A and a Class B callsign.

Stolen equipment

On 12 June from a car in Hemel Hempstead: Yaesu FT480R, s/n 1K141583; and BNOS UJ100PL linear amplifier, s/n 67491. Information to G6KHD, QTHR, or Hemel Hempstead police station.

On 6 June from the premises of Communications Specialists, 33 High Street, Gorseinon, Swansea: Yaesu FT7B, s/n 9K070497; Yaesu FT101ZD, s/n IL280863 (mains trans u/s); Uniden CR2021 s/n 33002646; Trio TR8300 s/n 560761; Standard C58, s/n EO30095; Welz AC38, s/n 381366; SMC Radiophone 1015L1, s/n 3D030191; KDK2030, s/n 6875; Yaesu FT230R, s/n 2L070071; Trio TR2300; BNOS LPM144-10-100; Ritron Airband transceiver, made in USA. Information to Swansea police, tel 0792 897171, or any police station.

WELSH AMATEUR RADIO CONVENTION

Oakdale Community College, Blackwood, Gwent

10am-5pm, 6 October 1985

*** Trade exhibits * Convention station * RSGB stand * Bring-and-buy stand**
Prize draw—£300 in cash prizes

Official opening at 11am by Mrs J Heathershaw, G4CHH, President of the RSGB

LECTURE PROGRAMME

"The 5th Generation of Transverters", Chris Bartram, G4DGU, of Mutek
"Oscar 10 Video", Werner Hass, DJ5KQ
HF dx feature—"Hams Wide World"

Morse test facilities available—contact Mr G Williams, BTI Radio Station, Worston Lane, Highbridge, Somerset TA9 3JY.

Talk-in from 9am on S22 **Take exit 27 off M4**

Full information from B Davies, GW3KYA, 16 Vancouver Drive, Penmaen, Blackwood, Gwent NP2 0UQ, tel 0495 225825.

"A solidstate 30W ssb transceiver for 1·8MHz"

The author of this article has notified us of the following errors in Fig 1, p531, of the July issue of *Radio Communication*.

1. The primary of T102 should not go to earth as shown, but to the junction of D102 and D104.

2. The source and drain connections on TR101 should be reversed.

Sidebands

One report on the recent special GB2RS news broadcast transmissions on 3,650kHz, received on one particular evening when the band was phenomenally noisy: ". . . you're five and nine plus in five and nine plus plus plus QRM, QRN and every other Q in the alphabet. But I still heard every word".

Another report on the 145MHz transmission: ". . . you're nine over fifty, readability two and I never give reports on tone because all fm sounds the same to me . . ."

Best of all: ". . . oh, are you GB2RS? I thought you were a sprog from a broadcasting station because you were so loud I could hear the script rustling".

St Vincent & Grenadine Amateur Radio Club has applied for IARU membership.

SECOND YEOVIL QRP CONVENTION—GB2LOW

(YEOVIL AMATEUR RADIO CLUB)
The Preston Centre, Monks Dale, Yeovil
(Via Preston Road and Larkhill Road. Maps available from the secretary)

Sunday 13 October 1985

Entrance: £1, including free programme with lucky-draw number

Programme

0900 Talk-in commences on S22 (G8YEO/A)
0930 Convention opens
1030 Lecture "Can we work VK on QRP?", G3MYM. (Followed by a discussion)
1200-1400 Lunch break.
1400 Lecture "The World of QRP", G4FAI. (Followed by a discussion)
1600 Prize draw
1700 Convention closes

Attractions: GB2LOW operating QRP on the hf and vhf bands. Equipment display (Bring yours along too!) Retail kits and components stands

Refreshments: Light refreshments at the convention. Nearby are "The Bell" and "The Preston Plucknett" public houses.

Further information from E H Godfrey, G3GC, 60 Chilton Grove, Yeovil, Somerset BA21 4AW. Tel 0935 75533 or 21246

RAE Courses 1985-6

(see also *Rad Com* August, p610)

Aldershot. North East Hants Adult Education Institute, St Albans Hall, Lynchford Road, North Camp, Aldershot GU11 2HH. Thursdays commencing 26 September. Further details contact Mrs S Phillips, tel 0252 518305 or 0252 540084.

Borehamwood. De Havilland College, Elstree Way, Borehamwood, Hertfordshire. Tuesdays, 7-9pm, commencing 17 September. Enrolment 9, 10 September, 2-8pm. Details from course tutor, G L Benbow, G3HB, tel 01-953 6024.

Bradford. Bradford & Ilkley Community College, Dept of Electrical and Electronic Engineering, Great Horton Road, Bradford BD7 1AY. RAE and new course in construction for the radio amateur. Commences September, enrolment 10 September. Details from course tutor, P Nurse, c/o the college.

Chichester. Chichester College of Technology, Westgate Fields, Chichester PO19 1SB. Wednesday evenings commencing September. Course fee £42.50. Contact Adult Education, c/o the college, tel Chichester 786321.

Derby. Derby College of Further Education, Wilmorton DE2 8UG. RAE and advanced radio amateurs course commencing September. Enrolment 9, 10 September. Further information from F Whitehead G4MLL, course tutor, c/o the college, tel Derby 73012 ext 52.
Glasgow. Glasgow College of Nautical Studies, 21 Thistle St, Glasgow. Tuesday and Thursday evenings. Enrolment was 27 August but can enrol after this date. Course fee £36, except if over 65, under 18, or unemployed. Details from the college, tel 041-429 3201.
Grantham. Grantham College of Further Education, Stonebridge Road, Grantham NG31 9AP. Wednesdays and Thursdays, 6.30-9pm, commencing September. Details from the college, tel Grantham 63141.
Hailsham. Southdown ARS, Hailsham Leisure Centre, Vicarage Lane, Hailsham, East Sussex. Classes 7.30pm, commencing 17 September. Details Jan Alblas, G4XNL, tel 0323 638653.
Hemel Hempstead. Dacorum College, Marlowes, Hemel Hempstead HP1 1HD. Wednesdays, 6.30-9pm, commencing 25 September. Enrolment 9 September. Details from the college, tel 0442 63771.
Kingston. Kingston College of Further Education, Kingston Hall Road, Kingston-upon-Thames, Surrey. Mondays, 7-9pm, commencing 16 September. No previous knowledge assumed. Students are advised to obtain copy of *Radio Amateurs' Examination Manual* from RSGB at Potters Bar. Details from Dave Chambers, G4SYT, or J Harris, c/o the college. Commencement of the course is subject to sufficient attendance.
Leamington Spa. Mid-Warwickshire College of Further Education, Warwick New Road, Leamington Spa CV32 5JE. Thursday evenings commencing 19 September. Enrolment 5, 6 September, 9am-12 noon, 2-4pm and 6-8pm. Details C A Smith, tel Leamington Spa 311711.
Liverpool. Riverside College of Technology, Dept of Electronic & Radio Engineering, Riversdale Road, Aigburth, Liverpool L19 3QR. Mondays and Thursdays, 7-9.30pm, commencing 16 September. Enrolment 9-11 September. Further details G3DVW, tel 051-727 1685.
London. Clapham and Battersea AEI, Balham Branch, Chestnut Grove SW12. Thursdays, 7.15-9.15pm, commencing 26 September. Enrolment at first class. Details from branch, tel 01-673 2613, or course tutor, Bob Crane G4PHS, tel 01-977 4157.
London. Hackney Adult Education, De Beauvoir Evening Institute, Tottenham Road, Dalston. Wednesdays, 7.30-9.30pm, commencing 25 September. Enrolment, week starting 16 September, 7-9pm. Details from course tutor, T C Clark G4BZW, tel 01-249 1843.
London. Islington Institute, 86 Agar Grove, Camden Town NW1. Mondays, 6.30-9.30pm, commencing 16 September. Enrolment one week earlier. Details from course lecturer, Brian Bond, G3ZKE, tel 01-485 7065.
Orpington. Ramsdon School, Tintagel, Orpington, Kent. Thursday evenings. Details from Alan Betts G8TKV, tel 0689 31123.
Portsmouth. Education Centre, Drayton Road, North End, Portsmouth. Tuesdays and Thursdays, 6.30-8.30pm, commencing September. Details from G6NZ, Radio, Further Education Centre, Cosham Park House, Cosham Park Avenue, Portsmouth PO6 3BG.
Stockport. Reddish Vale Evening Centre, Reddish Vale Road, Stockport, Cheshire SK5 7HD. Mondays, 7-9pm. Enrolment 16, 17 and 19 September, 7-9pm. Details Dave Wood, G4UJD, tel 061-477 3544 between 9am and 4pm.
Tonbridge. Adult Education Centre, Avebury Avenue, Tonbridge. Course commences mid-September. Details from the Adult Education Centre or tel 354313.
Welwyn Garden City. De Havilland College, Applecroft Road, Welwyn Garden City, Herts. Thursdays, 7-9pm, commencing 19 September. Enrolment 9, 10 September, 2-8pm. Details from the college, tel Welwyn Garden 26318 or 31344.

MORSE CLASSES

Beckenham. Beckenham Adult Education Centre, 244 Croydon Road, Beckenham, Kent BR3 4DA. Commencing Tuesday 17 September, 7.30-9.30pm. Further details from the college, tel 01-650 4208 or 01-464 5745.
Bradford. Bradford & Ilkley Community Centre, Dept of Electrical and Electronic Engineering, Great Horton Road, Bradford BD7 1AY. Enrolment 10 September. Details from course tutor, P Nurse, c/o the college.
Glasgow. Glasgow College of Nautical Studies, 21 Thistle St, Glasgow. Thursdays, 7-9.30pm, commencing 5 September. Course fee £15. Details from the college, tel 041-429 3201.
Stockport. Reddish Vale Evening Centre, Reddish Vale Road, Stockport, Cheshire SK5 7HD. Thursdays, 7-9pm. Enrolment 16, 17 and 19 September. Details Dave Wood, G4UJD, tel 061-477 3544 between 9am and 4pm.

Mobile Rallies Calendar

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

1 September
Cambridge Amateur Radio Rally, Kelsey Kerridge Sports Hall, Gonville Place, Cambridge. 10.30am-5pm (disabled, 10am). Adjoining multi-storey carpark. Details G6MIF, tel 0298 6174.
8 September
Lincoln Hamfest, Lincolnshire Showground, on A15 four miles north of Lincoln. From 10.30am to 5.30pm. Talk-in on 144 and 432MHz (S22 and SU8). Details G4STO.
8 September
Telford Mobile Rally, Town Centre, Telford, Shropshire. Open 11am (disabled 10.30am). Arrive via M54 (junction 10A off M6) or via A442 from N or S. Morse tests available; apply in writing to G3YCP, QTHR (Burnham). Details G8UGL, tel Telford 584173; or G3UKV, tel Telford 55414.
8 September
Open Day organized by Galashiels & District ARS, Focus Centre, Livingstone Place, Galashiels. Open 11am. Details GM3DAR.
15 September
Vange Mobile Rally, Nicholas School, St Nicholas Lane, Basildon, Essex. From 10am to 5pm. Talk-in on 144MHz, GB4VMR. Details G4OJN, QTHR.
15 September
Peterborough Mobile Rally, Wirrina Sports Stadium, Bishops Road, Peterborough. 10.30am-5pm. Details G3EEL, tel Peterborough 62881 after 6pm.
21 September
National Amateur Radio Car Boot Sale. Shuttleworth Collection, Old Warden Aerodrome, Nr Biggleswade, Beds. From 10am to 5pm. Talk-in on GB4SC. Details G6EES, tel Dunstable 607623.
21 September
Ballymena & DARC Annual Mobile Rally, Ballee High School. Talk-in on S22. Open 12 noon to 5pm. Details G14HCN.
22 September
Harlow Mobile Rally, Harlow Sports Centre, Hammarskjold Road, Harlow, Essex. Open 10.30am. Talk-in on S22. Details tel 0279 725876 or 0279 22365 (daytime).
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.
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.
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.
23 March 1986
19th White Rose Rally, University of Leeds. Details G4NDU, or Box 73, Leeds LS1 5AR.
22 June 1986
Denby Dale Mobile Rally, Shelley High School, nr Skelmanthorpe, Huddersfield. Talk-in on S22 and SU8. Details G3FQH, tel 0484 862390.
3 August 1986
Rolls Royce ARC Mobile Rally. Details G4ILG, tel 0282 812288.

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.
7 September, GB2BOB
Doncaster & D Raynet Group will operate this station at RAF Finningley, where they hope to meet anyone interested in joining Raynet. Details G4ZWQ, tel Doncaster 857526.
7 September, GB2HW
Chiltern ARC will be operating from High Wycombe-on-the-Rye to celebrate the 700th Mayoral anniversary. Details G2DRT, tel 049481 4240.
7 September, GB0CSR
This station will be operated by the Civil Service ARS, 9am-8pm from the Central Ordnance Depot, 38 Base Workshops REME, Chilwell, Notts. It celebrates the occasion of their annual open and sports day and will operate on hf 3·5-28MHz and hopefully 144MHz. Details K R Hawkins, G4OFL.
8 September, GB0CSR
This station will be operated by the Civil Service ARS, 9am-8pm from the Civil Service Sports Ground, Wilford Lane, Nottingham, on the occasion of the Civil Service regional annual sports day. Operation will be on hf 3·5-28MHz and hopefully 144MHz. Details K R Hawkins, G4OFL.
8 September, GB2SMW
Swindon & DARC will be operating from the Science Museum Open Day at Wroughton Airfield, Wilts. Numerous exhibits. Details from Ken, G8SFM, tel 066689 307 (home) or 0453 810451 ext 231 (work).
Swindon & DARC celebrated the 30th anniversary of its formation in August, and GB3SRC will be on the air on several occasions throughout the year. It would be pleased to contact former club members and ex-Swindonians. Details G8SFM.
12-14 September, GB4BPC
Bishop Auckland BARC is setting up a station from the battlements of Brancepeth Castle in Co Durham to celebrate the 900th anniversary of Brancepeth village church. It is hoped to operate on hf and vhf. QSL cards will be heraldic in design and carry a brief history of Brancepeth. Details Ian Gibbs, G4GWB.
14 September, GB2AB
Oxfordshire area RAFARS will be operating from Royal Air Force Abingdon, as part of the Battle of Britain "At Home" day. Operation will be on 3,710kHz ssb and 144·550MHz (S22) fm. Details G6ZH, tel 0491 651259.
14-15 September, GB0TSA
Ten Squadron Association will be operating this station from the wartime airfield, Melbourne, Yorkshire, to commemorate the Dedication Stone Ceremony for those of the squadron who lost their lives. Special QSL cards. Details G4XGK, tel 06284 3488.
15 September, GB2NM, G2NM
Chichester & DARC will operate this station from Amberly Chalk Pits Museum, Near Arundel, West Sussex, to commemorate the radio pioneering of Gerald Marcuse, G2NM, who started Empire Broadcasting in 1927. Details G4EHG, tel Chichester 789589.
20 September to 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.

21 September, GB2ME
Supported by the Cheshunt and D ARC, this station will be operational on hf and 144MHz from the annual exhibition at the Royal Ordnance Model Railway Club, Enfield Lock, Enfield, Middx. Details G4YYL or G6WIT.

21-28 September, GB4XXX
The 'X' Net Dxpedition to Wales, will be operating on all hf bands and 70MHz. Details G4AUX, G4LAX, and G4LPX.

22 September, GB8SOT, GB4SOT, GB6SOT, GB0SOT
Operated by North Staffordshire ARS from Stoke-on-Trent to mark the 75th anniversary of the amalgamation of the six towns of the potteries, and the 60th anniversary of the granting of city status to Stoke-on-Trent. From 9am to 6pm on hf, vhf, rtty, fstv and cw. Details G6MLI, tel 0782 332657.

28-29 September, GB2BTC
Thornton-Cleveleys ARS will operate this station from their club QTH as part of the celebrations to mark the centenary day of the tramway system in Blackpool. Operation will be on all bands from 10am-4pm. Special QSL cards. Details G4BFH, tel 0253 853554.

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.

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.

13-14 March, 1986, GB4PHT
Operating from the Portland Heritage Trust during Portland Carnival, operation will be on 3·5, 14 and 144MHz ssb, cw, rtty, Amtor. A special effort will be made to contact amateurs in the other Portlands worldwide. Details G4RAK, tel 0305 822753.

Other Events

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

2 September
Scottish Amateur Radio Convention, SARCON 85, Dundee.

29 September
RSGB HF Convention, Belfry Hotel and Conference Centre, just outside Oxford on the M40.

6 October
Welsh Amateur Radio Convention. Details later.

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" Exhibition, Floral Hall, Hornsea. Details G4NJP, tel 0262 673635.

25-26 October
Leicester Amateur Radio Show, Granby Halls, Leicester. Facilities to take cw test at exhibition. Details G4PDZ, tel Leicester 553293.

16 March 1986
Pontefract & DARS Components Fair, 11am-4.30pm, Carleton Community Centre, Pontefract, mid-way between Pontefract and Darrington on the A1.

OBITUARIES

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

Mr R Butcher, ex GC3FCN
Ray Butcher died on 2 June, aged 58. Originally active on both hf and vhf from Bel Royal, Jersey, Ray gave up amateur radio when he moved to England in the late 'fifties. His callsign will continue in use, as it is now held by his nephew, Alan.

Mr G C Butler, GW6YKM
George Butler died on 2 May, aged 74 years. An engineer by profession, he was a man of many interests but after becoming licensed in 1983, construction and 144MHz activity were his main pursuits. He had a wide knowledge of amateur radio, and his skilful and kindly help was readily available to other amateurs. George had also served as a committee member of Alyn and Deeside ARS.

Capt. E Clarke MBE, G8AO
Edward Clarke died in July, aged 75. A keen amateur radio enthusiast since 1935, his call sign G8AO was well known to his fellow "hams". In 1952 he was granted the first licence in the British Commonwealth to broadcast from aboard ship. He had a distinguished 45-year career at sea and at retirement was commodore for the South-Eastern Gas Board's collier fleet.

Mr G E Clothier, BRS31665
Gerald Clothier died 27 June 1985, aged 83 years. Gerald regularly attended meetings of the Bristol RSGB group and was a very keen swl on both hf and vhf.

Mr J Henney, GM2MP
Jack Henney died on 28 May. He had held his licence since 1927 and was a popular operator on local bands. He was well-known for his dx achievements. Jack served in the RAF radar branch in WW2.

Mr J Oldham, G3NTC
J Oldham died on 30 May. He was completely blind but, being an accomplished Braille reader was able to keep abreast of developments. Most of his test equipment (with audio readout) was home-made, a recent addition was "BROMA", built from the *Rad Com* article.

Mr J Paterson, GM3COB
John Paterson died on 8 June. He served in the RN during the war as a PO Telegraphist, continuing after the war as an operator in the merchant service. On leaving the sea John joined International Marine Radio; latterly until ill-health forced his retirement, he worked in the radio workshops of Strathclyde Police where he was known for his innovative approach to problems. Throughout his life he was actively associated with Glasgow Cathedral, and through its youth groups, spread the "gospel" of amateur radio to many who are now active amateurs. His expert "fist" will be missed on hf by his many friends in Scotland and throughout the world.

Mr L Pickford, ZL4AV
Leslie Pickford died on 24 June, aged 71. He was a most active dx operator on 3·5 and 7MHz and undoubtedly one of the most well heard ZL's in the UK. Leslie was always willing to give reports to dx callers and acted as a 'beacon' for lf antenna experimenters.

Mr T Read, G2FFQ
Tom Read died on 29 June, aged 74. He had been interested in amateur radio for 60 years, mainly as a cw operator. He used his homebrew equipment until shortly before his death. Tom was a member of the pre-war CWR and served for six years (1939-45) in the RAF, servicing and installing radio equipment on fighter airfields in the UK and later in North Africa and Greece. He also served on air-sea rescue launches.

Mr F Rennison, G3GSL
Frank Rennison died on 25 June, aged 56. A former RAF wireless instructor and a broadcasting engineer for 23 years, Frank had recently renewed his interest in amateur radio. His impeccable cw and phone signals were a pleasing feature of the hf bands in the past few years.

Mr W G Rose, G5RJ
Bill Rose died on 30 March, aged 80. He was a member of the Axe Vale ARC and operated on 144 and 3·4MHz. Bill was licensed as 2AJA in 1924 and as 5RJ in 1926. He joined the ARRL in 1922 and the RSGB in 1927.

Mr R Scott, G4EQF
Ron Scott died aged 46. A long standing member of South Birmingham ARS, he was very knowledgeable both in theory and practice. Ron was particularly helpful to unsighted operators, and cured many problems that arose with members' equipment, particularly homebrew. He worked in the automobile industry and collaborated with Sir Alec Issigonis in the design and production of the original Austin Mini.

Mr J A Sey, GM8MJ
Jimmy Sey died on 16 May, aged 80. He was a member of The West of Scotland ARS and for many years the QSL Bureau sub-manager handling the GM4's. He was a great cw enthusiast and was active on the lf bands.

Mr J T B Smith, G3CKY
Tom Smith died on 25 May, aged 68. He had been an RSGB member since 1947 and was in the Royal Signals during the war. He was also a member of the Cannock Chase ARC.

Mr R Taylor, G3LKK
Dick Taylor died on 23 May, aged 45. Licensed at the age of 16, he was known as the founder and organiser of the Mercury Rescue Safety and Medical Network, operating on 86MHz during major car rallies and providing "on stage" communications in case of emergencies. He was a popular and well-known member of the White Rose ARC and an accomplished radio man. He was joint engineer-in-charge of electronic maintenance at Yorkshire Television.

Mr H Turner, G8VN
Harold Turner MIEE, died on 1 July, aged 81. He was an RSGB member and had been licensed for almost 50 years. He had great enthusiasm for 50 and 70MHz, on which bands he was a pioneer. Until retirement his life was spent in the electrical industry. During the war he was identified with the early work done at Rugby on microwave radar. Recently after several spells in hospital he returned to activity on 50 and 70MHz.

Mr R B Williamson, G5RW
Robert Bonner Williamson died on 5 May, aged 75. He joined the Society in the early 'twenties and was BRS68 until he was licensed. Bonner was a keen experimenter, particularly in the early days of vhf; an early member of AMSAT (UK), and a first class cw operator. A member of the Derby & DARS, he gave the first post-war lecture there on crystal grinding for the amateur. He was RSGB representative for Derbyshire for many years, and served as a voluntary interceptor during the war. He was a former national president of the British Ophthalmic Association, past-chairman of the Association of Ophthalmic Practitioners, a liveryman of the Worshipful Company of Spectacle Makers, a Freeman of the City of London, and a widely-respected freemason.

Mr F Wilson, GW4JKR
Frank Wilson died on 1 April, aged 64. He had been a keen cw operator.

Also:
Mr A Dalley, G8SVH on 8 July 1984;
Mr V L J Delnevo, G3HC on 8 May;
Mr T W Hurst, RS51653;
Mr A J Kindness, GM4JPH, on 3 February;
Mr L McGlade, VE7HN, ex G3MG;
Mr J Moorhead, GI4NKN, on 3 December 1984;
Mr J Walker, G1EJN

RSGB NATIONAL HF CONVENTION

Belfry Hotel, Milton Common, Oxford

Sunday 29 September 1985

Doors open 10am Admission £2

- ★ One-day convention with lecture programme
- ★ BYLARA
- ★ QRP display
- ★ Official 12wpm cw tests
- ★ Dxpedition videos
- ★ CW pile-up competition
- ★ Testing booth (Amtor switching speed, power meter calibration, transceiver frequency checking etc)
- ★ RSGB bookstall
- ★ Launch of new RSGB hf awards programme
- ★ Presentation of trophies
- ★ DX quiz
- ★ RNARS QRQ cw tests
- ★ Car boot sale (£2 per pitch)
- ★ QSL checking for awards (not DXCC or IOTA)
- ★ QSL Bureau posting box
- ★ Bars
- ★ 1·8MHz get-together
- ★ Worked All Britain stand
- ★ QSL arrivals board
- ★ RSGB committee displays
- ★ HF demonstration station (GB2HF) by Chiltern Amateur Radio Club
- ★ Talk-in on SU8, S22, 29.550 fm by Mid-Thames Raynet (GB2MTR)

PROVISIONAL LECTURE PROGRAMME

TIME	STREAM A	STREAM B
1100	"HF Propagation & the USSR Satellites", Pat Gowan, G3IOR.	"An Introduction to Contesting", RSGB HF Contests Committee
1200	"The ATU—Least Understood Part of an Amateur Station", Peter Chadwick, G3RZP	"The Sunspot Minimum—Is It Here to Stay?", Ray Flavell, G3LTP TVI Forum, RSGB EMC Committee
1300	"Planning Applications", John McFall, G4HFX. (Member of RSGB Planning Panel)	DX Forum. "Navassa Island Dxpedition", Neville Bethune, G3RFS
1400	G-QRP Club: "Simple Sideband", Ian Keyser, G3ROO "Milliwatting", Chris Page, G4BUE "Life Begins on 40", Colin Turner, G3VTT	
1500		HF and HF Contests Committees Question & Answer Forum Presentation of Trophies

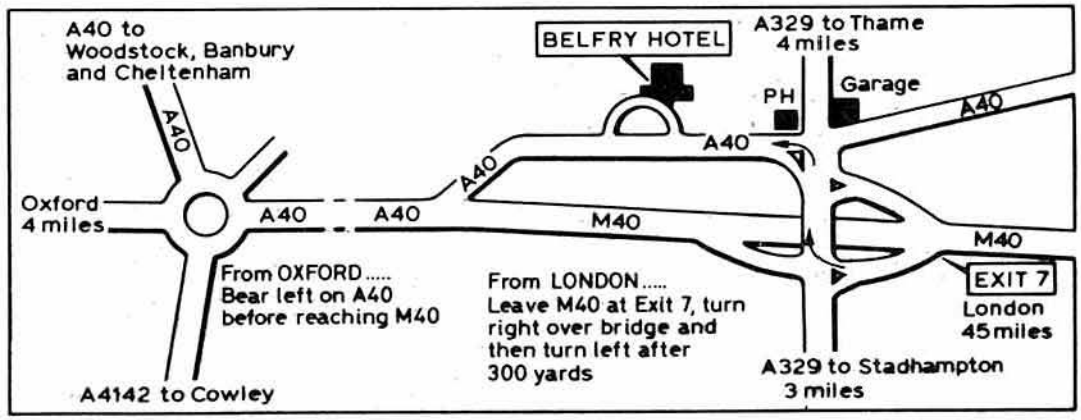
The Belfry Hotel can be reached by hourly bus service (Nos 290 and 790) from Oxford Bus Station.

Please note that those wishing to take morse tests should make prior arrangements with Gavin Williams, G3YCP, BTI Radio Station, Worston Lane, Highbridge, Somerset TA9 3JG. (Fee of £15 payable on the day).

Non-amateur members of the family may wish to visit Oxford (10 miles) or Blenheim Palace (20 miles).

Ploughmans and quiche lunches will be available at the hotel for £1.50. Dinner, bed & breakfast is available for Saturday night at the hotel for £25 per person. Bed & breakfast £16 per person.

HOW TO GET THERE



Members' Mailbag

KEEP SSB OFF 10MHz

Sir—I know that what I am about to write will make me a few enemies, but provided we stop the rot on the 10MHz band I don't care. As a recently-retired teacher, I am all too aware of the point at which law and order shows signs of breaking down unless some one makes a stand.

Just because there is a loophole permitting the use of ssb in certain circumstances in VK-land, this does not justify anyone in this country communicating with them in that mode. There are a number of quite senior G-licensees who do this regularly in spite of the fact that it says clearly in the IARU Region 1 HF Band Plan: "ssb may be used on the 10MHz band during emergencies involving the immediate safety of life and property, and only by stations actually involved in the handling of emergency traffic."

I deplore this attitude for two reasons:

(1) It is selfish. There are only 50kHz available, at least half of which are used by commercials. To occupy a band of 3kHz, as was done recently by a large group including two /MMs (who were not in any kind of an emergency but just closing in for a holiday in Portugal) is to hog 12 per cent of the whole available spectrum and make it useless for cw.

(2) It shows up this country in a bad light. Are we the only country in the northern hemisphere unable to exercise a little self-discipline? Is the RSGB the only national radio organization which is so "wet" that it cannot take any sanctions against these people for the benefit of the vast majority of law-abiding members who just want to get on with dx QSOs, away from the QRM on the other bands, with their dipoles and 100W input? Don't tell me that one needs 1kW (or more) to test propagation conditions to VK, and that it has to be done on ssb.

In two years' operation on the new bands I have only heard one non-British operator breaking the band plan, and that was a lone Frenchman from Guyana. There may be sociological reasons why self-regulation appears to be breaking down in this country, as evinced by recent happenings in the City, the Stock Exchange and insurance, but I may be pardoned for thinking that these ssb merchants did not go to the right school.

Donald Shirreff, G3BGM

Mr Shirreff's point should be taken to heart by the tiny minority of UK stations insisting on using ssb in the 10MHz band. It is emphatically **not** *in the best long-term interests of amateur radio that this very narrow allocation is used in this way, and it remains an IARU recommendation that the 10MHz band is only used for narrowband modes. The amateur service has access to 10MHz on a grace-and-favour basis only, and any foolish acts by a minority could jeopardize its retention in the long term.*

Perhaps it should be stressed that the IARU has not made the request for the use of narrowband modes only without proper consideration of all the factors involved and the best long-term interests of all radio amateurs.

COLLAR HEAT!

Sir—I have no great passion for seeing my name and callsign in print below a letter on a controversial subject, but often I feel compelled to write so that certain views do not go completely unchallenged. With disappointment, however, I am sending a copy of this letter to RSGB headquarters, along with a formal complaint about your criteria for selecting letters for publication in "Members' Mailbag".

I replied recently to the letter by disabled member W Guy, G4ZSD, which you printed in your April issue, to offer some constructive ideas for discussion about an alternative route to a full licence; second, to make a plea on behalf of the "invisible disabled" among radio enthusiasts; and third, to counter vigorously a statement which W Guy made which I and others consider to have been outrageous. In your June issue I notice that you have printed two letters *re-stating* G4ZSD's point (not to mention *another* letter from G4ZSD). In fact the letter from G3JDK is nothing more than a quotation from G4ZSD's letter.

So much, as I have said before, for "Members' Mailbag" as a forum for members' views. It is obvious by this particular editorial decision that the views have to be orthodox before they merit printing!

Mr Editor, it is just not good enough. I will not be fobbed off with platitudes, in this case, neither by you nor by HQ in any reply that they make. I regard the situation as deplorable, intolerable and tantamount to editorial censorship of unorthodox views, and I expect to see nothing less than a total reversal.

P Thompson, G6MEN

Mr Thompson should perhaps learn temperance. There is limited space in "Members' Mailbag" for the development of debate in a given month: it had been planned to publish his original letter this month as a different view from those of G4ZSD and G3JDK, along with another which could be said to have been expressing another variation on Mr Thompson's side of this particular debate. However, the published letter summarizes the points originally raised.

The chief criteria for selection of letters for publication is that they are (a) interesting, (b) contribute towards on-going debates or raise fresh topics for discussion, and (c) are not simple restatements of previously published correspondence on why there should or should not be a morse test/novice licence/easier RAE/ more difficult RAE etc. Letters are more likely to be published if they raise points of general interest and are not merely of the "Why can't I have a . . .?" variety!

CONTINENTAL QSLS

Sir—After reading G4LZD's comments in your June issue regarding the reluctance of our nearest Continental neighbours to QSL, for vhf/ uhf contacts, I thought I would search my own records to ascertain how my own QSL return stands regarding squares worked and confirmed on 144MHz. The result was the following 'league table':

	Worked	Confirmed	Percent
Guernsey	1	1	100
Jersey	1	1	100
IOM	1	1	100
Belgium	3	3	100
W Germany	5	5	100
E Germany	1	1	100
Norway	1	1	100
England	19	17	89
Holland	7	6	86
Scotland	5	4	80
Denmark	5	4	80
Wales	6	3	50
Sweden	2	1	50
France	20	9	45

Even allowing for the fact that some of the above countries only occupy one square, this would seem to bear out the comments made, although it would seem also that my return may be better than some. Incidentally, one of the French amateurs who has sent me his card has stamped on it the words "Remember: F - - - = QSL 100%!" Clearly the gentleman concerned is sensitive about his countrymen's poor reputation in this respect. Do they consider us not worth the trouble since they are our nearest neighbours? Or have they never forgiven us for Waterloo?

Graham P Brooker, G4XVJ

Sir—I was filled with indignation, then consternation, on reading the letter of G4LZD. I QSL 100% myself and, all bands included, I get around 70% replies.

However, I just wanted to be sure of my facts, so I checked back for the last three years (only for QSOs on 144MHz, since that was the band to which G4LZD referred). The results were:

DL	100percent	ON	65percent
PA	100percent	F	46percent
G/GW/GU	75percent	HB	33percent

While making allowances for the possible reluctance to bother about a QSL for "inter-F" QSOs (despite receiving mine!), I must admit that 46 per cent is not a very good score—poor consolation that we should have one neighbour even worse than us!

Sorry about that. I will wait for some sporadic-E and point my beam towards G and give the JN17CN square to those who need it—and the QSL is guaranteed!

Hugues de Laistre Banting, F6GPA

GV0DAY

Sir—The operators of the above special call would like to express their thanks to all the amateurs who worked or tried to work the station. Due to the exceptional amount of interest in the event, list operation seemed the most efficient system, if not the best. As we are a very new club with little experience, the patience and understanding shown by all was very much appreciated, and helped to make our week of operation a most enjoyable experience. We thank you all.

C D S Rodgers, GM4NNC
Secretary, Maxwelltown ARK

Sir—I would like to thank all the GV stations who took the trouble and effort to operate on vhf and uhf; and to the stations who didn't, thanks for nothing.

Why is it that you couldn't come on to vhf and uhf for a couple of hours each day? Is it because the prestige of working the odd rare country isn't there? Surely it wouldn't deflate your egos so much, or is it that the log looks better with rows of 59s on 3·5MHz. If you are only capable of "rubber stamp" QSOs I'm sure vhf and uhf operators have the intelligence to comply; one local station on the Wirral did very well with "rubber stamps" on vhf and uhf.

With regard to the operation on hf, it left quite a bit to be desired. Why, oh why, isn't more use made of a net controller, as one station did with very great success? I don't know how many stations I listened to struggling to pull a callsign out of the QRM, which means the station with the most power wins 99 per cent of the time, giving the QRP operator little or no chance. I also imagine taking lists gives the "main" station time to take a break.

Paul F Fletcher, G6PZW

Quite a few GV stations were operational on 144 and 430MHz, including our own from headquarters: our log shows seven worked on 144MHz and three on 430MHz. Mr Roger's letter is typical of several, although one correspondent felt that there was too little cw operation.

AN UNEXPECTED CONTEST BONUS

Sir—Having had a similar experience to that of G4XTM ("Mailbag", May) while taking part in the CQ WPX contest but with a certain G2 gentleman(?), I beg space to suggest that contests can have a very useful purpose totally unconnected with competition.

I was taking part in a contest a few months ago and had a contact with Gianna, I1IEP, who sent me her QSL card. When my father-in-law saw this card he announced he had been a prisoner of war in Gianna's small village, so I wrote to Gianna to see if anything remained of the camp. In reply I received from her two photographs of the camp and much information obtained from the local mayor, who happened to be the adjutant to the camp commandant.

This has made an old soldier very happy, and he is now in touch with the mayor and is looking forward to getting photocopies of camp records still in the mayor's possession. So perhaps some of the anti-contest brigade could show a little more patience with those enjoying their choice of radio participation. You never know whom you might meet by chance.

On closing I would like to thank the VE-day stations and the members of the various Services radio societies for their help and co-operation during the celebrations.

Christine M Brown, GM4WEW

MORE ON THE "BLACK DEATH"

Sir—Having read various comments on the "Black Death", ie corrosion of the conductors within flexible cables, I would like to offer the following, based on several years' experience of flying radio-controlled model aircraft, and hope it will be of assistance.

First, the corrosion is the result of electrolyte seepage from the cells, caused by a buildup of internal pressure and "venting". This condition occurs with either overcharging, or reverse-biasing some cells by discharging below their recommended voltage when cells are connected in series—the first cell to become fully discharged will have a reverse potential applied across it by the remaining cells, causing excessive gassing and possible cell damage. The electrolyte is potassium hydroxide (KOH). This substance being deliquescent means it will absorb moisture, so once leakage starts, a comparatively large amount of potentially corrosive alkaline liquid is produced. This has the ability to "creep" along the conductors of a cable for several feet. Corrosion is enhanced by the use of dissimilar metals—tin and copper—and will result in complete disintegration of all the conductors. The electrolyte is eventually converted to potassium carbonate (K_2CO_3) in the presence of carbon dioxide, and hence the formation of white crystals, which are similar to household washing soda, around the ends of the cells etc.

Prevention is better than cure, so the best solution is to treat the cells with respect—avoid overcharging, and reduce the amount of discharge when several cells are used in series. To prevent the corrosion of conductors in cables connected to the batteries, I leave a small length of uninsulated stranded conductor and generously soak the strands and cable end with "Waxoyl" or similar compound. This will prevent the "wicking" action of the inner conductors, and prevent electrolyte from entering the cable. The use of unplated copper conductors may help, although I have not tried this yet.

The letter from G3MMG is not quite correct, but his assumptions made in the last paragraph are partially valid. All batteries will attract negative ions to the positive electrode, or any metal or conductive plate connected to the positive electrode. If the negative ions can combine with the positive metal ions in the presence of moisture to produce a soluble compound, corrosion or discolouration will result. Atmospheric pollution, and road salt provide just these conditions, and hence the extensive corrosion found on early positive-earth vehicles around the bodywork, where this was connected to the positive battery terminal. The negative-earth connection on modern vehicles repels the corrosive negative ions and results in less corrosion.

I have not found the "Black Death" to be confined to the negative leads only—this may be a result of the position of cell vents allowing electrolyte to enter this lead first—but have certainly found, as G4WAL did, that plugs, sockets and switches do not form a break or barrier. I would suggest that the application of "Waxoyl" to the cable ends would prevent this problem. Good luck and happy flying!

Mark Robertson, G6CMS

(*See also* Technical Topics *August*—Ed)

TAKE A BOW, STC

Sir—Having just read Pat Hawker's always interesting column in your June issue, I am sufficiently motivated to write in support of his comments on the most helpful attitude displayed by STC Components Ltd when dealing with small orders from the general public. I do not consider G3VA needs to apologise for devoting a whole section to promoting the services of this particular firm.

I have also had the most superb treatment, and would quote just two examples when, on both occasions, I telephoned orders using my credit card number, for speed of delivery.

(1) An order telephoned at 10am one weekday was delivered by the village postman into my hands only 22h later!

(2) An enquiry relating to a particularly-difficult-to-get wire-wrap 24-way double-sided 0·1in-pitch edge connector was offered, free of charge, as a production sample by their product assembly department, even though I had stated my quantity requirements were for only one for this item. I have placed many subsequent orders with this firm, with whom it is a pleasure to do business.

As a result of my experience with STC in a purely private capacity, I now intend to make more use of their services in my business connections at the expense of less helpful organizations.

It is probably worth noting that Verospeed will also deal with small orders from the public, and are now offering both Access and Barclaycard facilities as do STC. I am sure this will be invaluable, since any product-line inadequacies on the part of one company are often covered by the other. An example of this is with photo-resist-coated double-sided pcb material which, when I enquired six months or so ago, was not available from STC but was listed in the Verospeed catalogue.

My thanks go to both firms for their helpfulness—may this spirit continue and flourish.

B R Abrams, G0BII

Headquarters staff know of many amateurs who use STC's services a good deal and have always been impressed both by their range of stock and by their service: many hard-to-find components can be obtained from them. A comprehensive catalogue is obtainable by telephoning 0279 26777.

LEARNING MORSE

Sir—Permit me to make a few observations regarding the use of morse code, and the present experimental use thereof by those who hold Class B licences.

You asked in the May editorial for members to pass on some of the secrets of success in learning morse code. Well, I learned to use the code actually on the air some two years before I held an amateur licence—on the Army Cadet Force Network. Having taught myself the basic code in the first instance, I then found that the learning process thereafter was both swift and much fun over the air, making many friends in the process, with most of whom I still maintain contact 20 years later!

It is my opinion that the magic ingredient was *incentive*. At school we often had only the most simple and basic of equipment with restricted power and restricted antennas, so morse code made possible numerous contacts which would otherwise not have been possible using telephony. All the operators, or at least the vast majority, were at a similar stage of learning, so no-one was in the least embarrassed to send as slowly as was necessary for everyone in the net to copy each transmission. Gradually all our speeds increased, the number of people joining the morse net grew, and so the element of enjoyment became greater. In fact, by the time the group was ready for the test, it was quite happy using speeds in excess of 20wpm.

There are two points which I would like to highlight here: first, we all *encouraged* each other to master the code; second, and most important, that we were all *patient*. This second point brings me to the reason why I am now writing. Personally I am delighted that the whole amateur population of the UK now has the opportunity to learn morse code in a way that I believe gives a lot of satisfaction—over the air. As I write this letter, there has just been a modest 24h lift in 144MHz conditions, and there were three G1 and G8 stations who called me on morse when I was on ssb, and established perfect two-way contacts over the duration of the lift—two-way communication on telephony had proved impossible because of the restricted facilities at the remote stations, coupled with the very variable propagation.

I spend some 80per cent of my operating time chasing dx on 1·8MHz cw, the remainder being spent on activities above 30MHz. Now that this experimental cw facility has been extended, I hope to have many more two-way contacts with Class B licensees. I am always delighted to send as slowly as is necessary for the other station to copy 100per cent of each transmission. I have had occasion to assist many amateurs through the morse test—a lot of those concerned were utterly convinced that they could *never* pass the test but, given the right encouragement along with enjoyment, each and every person passed it comfortably, and most have gone on to enjoy dxing, contests, or just communicating with others through the art of morse code, and having much more fun and enjoyment along the way.

I appeal to all my fellow Class A licensees—try and make a point of helping at least one Class B licensee over the course of this experimental year to achieve competence in the art of morse code: make it an aim to enable one more person to be in a position to enjoy the whole amateur frequency spectrum at the end of the year. Show how much fun it can be, and give real encouragement. This is a golden opportunity for us all to put to sleep forever this rather unbecoming A versus B argument which seems to be aired one way or another with monotonous regularity.

To the Class B licensees—when you hear me on 144MHz (or cw) this summer, please call in on cw if you're having problems getting through: I promise that you'll be pleasantly surprised at the result.

See you on the air!

M L Kinnersly-Taylor, GM3WTA

Sir—The observations on learning morse, made by David Evans, G3OUF, in your May issue, made interesting reading. It seems to me to be very heartening that such a high proportion of Class A licensees make use of cw on a regular basis, and it is particularly pleasing to hear so many Gs and newly-licensed G4s making use of the mode.

G3OUF asked members to pass on details of learning methods which they used. In my case I don't think the word "method" is appropriate, as I put it down just to sheer enthusiasm on my part when I was a very young swl back in the 'thirties. After committing the characters to memory I just used to listen, and as time passed I progressed from being able to read the word "test" (then used by Gs as a general call) to reading callsigns, copying signal reports and QRAs (I don't think QTH was much used in those days). Names were not passed around much either, the expression "om" being used until operators were more familiar with one another. I very quickly became familiar with all the usual abbreviations, eg 73, bcnu, tnx, dx etc, and the use by the rest of the world of CQ. The point I am trying to make, of course, is that it did not take one long to be able to make sense of a cw QSO.

Things have not changed much over the years. The basic framework of a QSO is just about the same, and it is only when a QSO develops into a rag-chew that the listener has to be on his toes. There seems to be, to me, therefore, no reason why morse cannot still be learned in the same manner if one is enthusiastic enough.

My greatest pleasure in the use of morse is the great satisfaction which it gives me. To conduct a QSO with a good operator is a stimulating experience which cannot be obtained when using a microphone. Recently, I heard a new operator compare cw and ssb operation. He likened his preference for cw to the delights of driving a manual gearbox car compared with driving an automatic.

Reading cw can very soon become no problem at all with perseverance, even up to high speeds, but the real skill comes in sending morse. The great beauty of the art is that we can all listen and hear operators who are superior in skill to ourselves. This sets a challenge to endeavour to emulate their skills. We find that some operators are very difficult to copy, even at speeds as low as 12wpm because they form characters and jumble the letters and words together, which can make deciphering it very tedious. At the other side of the scale we have keyboards which can produce perfect morse which many of us find easy to read even at speeds as high as 40wpm or more. Even with the use of electronic keyers, however, sending can be given an individual touch, and certain operators become instantly recognizable by their fists.

There is a very good cw operator, a G3, whose QSL card bears the legend, "The charms of Bach are a cacophony compared to the sweet melodies of morse . . ." As a music lover I would not quite agree with that observation, but he makes a good point!

I think most, if not all cw operators would admit that we have our "off" days, when our sending seems to lack rhythm and errors constantly occur. Recognising such human weaknesses in ourselves tends to keep us on our toes.

I accept that there will always be others who will never share my enthusiam for morse, but I really feel that their experience of amateur radio will always lack a vital ingredient of enjoyment.

Richard Johnson, G2FFO

AERONAUTICAL MOBILE

Sir—I would endorse the view of G3OGK/VP8LZ about the undesirability of the captain of an aircraft operating in flight as a radio amateur. In addition, I would require cast iron assurances that the operation of, say, a 144MHz transceiver would in no way affect any of my aircraft's avionics.

Is there any evidence about the effects of, say, 2 to 10W of rf inside the cabin, and perhaps close to vital electronic gear such as the radio compass, VOR/distance measuring equipment, SSR transponder etc? As a pilot I would be far from happy knowing that locally generated rfi might adversely affect any of these pieces of vital electronic equipment.

When the going gets rough and the work load builds up it is then that a fully-occupied pilot has to put his faith, his life and perhaps the lives of others in the avionics system. It is no time to be thinking about amateur radio.

J N S Miller, GM4AGS

Sir—I write in response to the letter from G3OGK, as a professional pilot for 19 years and an amateur for 22 years.

I spent my early years as a long-haul pilot in aircraft with high quality HF equipment, which prompted me then to apply to the Home Office for permission to use this equipment for personal use. I received a flat **NO** which they were not even prepared to discuss. I dropped the subject—this was the early 'seventies. G3OGK's letter set me thinking of the reasons, and I must say that I agree that there really is no place for amateur activities in the environment of the work place of the aircraft. I had not bothered to analyse the decision when first delivered to me.

There are two cases to be considered. First, the commercial aircraft where the amateur would be using equipment designed for aeronautical communications. This is clearly not acceptable because both pilots have a job at all times which does not permit time for amateur activities. Should a period of rest be available, then the equipment is not, because the hf equipment is either in use or watching on Selcal.

Second, the amateur who wants to install equipment in the back of aircraft and let a pilot fly. Assuming that it is possible to install the equipment, antennas etc within the limitations of the airworthiness authorities' regulations, then this would be acceptable. However, the problem must be that not everyone is as honest as we would like to think, and inevitably equipment is going to get used which was installed for aeronautical purposes, and this will undoubtedly cause inconvenience or even danger to other aviators.

I am not one for the introduction of legislation nor for the suppression of people and their harmless activities, but, I feel now, as an experienced aviator, this one should not be allowed.

Keith G Manktelow, GD3SKZ

CB GEAR

Sir—Imagine that, due to a world surplus, a large number of solidstate synthesized transceivers appeared on the UK market. Let us pretend that they worked on a.m., fm and ssb and were suitable for modification to any of our upper hf or lower vhf bands. Now let us be silly and pretend that they could be made to work on one of our hf bands merely by changing a couple of crystals and re-aligning. Finally, being ridiculous, just suppose these transceivers were changing hands in working condition for as little as £30! Would you expect a society devoted to encouraging amateur radio to:

(a) Try and supply us with the necessary technical back-up and establish us with a source of supply for these sets and spare parts for them.

(b) Refuse to advertise them in the society's magazine and generally pretend that they did not exist?

Hands up all those that thought "B"—and why?

For the record, the operational side of amateur radio and what the cb users call dxing are identical hobbies, and no amount of wishing it were otherwise will ever change this. Given the same factory-made transceivers there is nothing we do on the operational side that cb operators could not also do. What differentiates between the cb dxer and the radio amateur is that we are interested in *radio*, not operating radios. There is no other difference. It is sad that new holders of the amateur licence, many of whom already have these all-mode cb sets end up selling them to people like myself in order to secure the deposit on the latest offerings, from Yaesu, Icom and Trio, so moving the dividing line between cb and amateur band activities still ever closer.

Is this really what the RSGB wants?

Stephen Dyke, G3ROZ

Superficially, Mr Dyke has a point. We should reiterate that the Society is not anti-cb radio, or any other form of radio for that matter; our chief concern has always been that the good name of amateur radio should not suffer in any way from the disproportionate amount of media attention given to cb. Regrettably, there is still evidence of media confusion between cb and amateur radio, often to the detriment of the latter. Faced with this situation, the Society took a blanket decision not to permit advertising of cb radio-related equipment in Radio Communication *in any shape or form, feeling that we simply did not wish to blur the dividing line any further.*

The decision was carefully considered and finally adopted as one of several alternatives; as with most things in life, there was no "perfect" solution to the problem. It may be time to reconsider the policy concerning the conversion of legal cb equipment for use on amateur bands, and it is fair to raise that issue. While it is also fair to make the point that the Society does not publish information on how to modify equipment which cannot be used legally on the frequencies and modes allocated for cb radio in the UK, it should be noted that there are legal implications relating to the importation of this equipment—basically, it cannot be or have been legally imported—and the Society does not feel that it should publish information which could be construed as implicitly condoning this particular breach of the law. However, does anyone have any comments on Mr Dyke's letter?

CROSSBAND WITH 50MHz

Sir—I would welcome any comments regarding crossband working between Class B licence holders and 50MHz licence holders, while a Class B licence holder cannot crossband with the hf bands because he isn't licensed for those bands. Neither are the majority of Class A licence holders licensed for 50MHz, yet they can crossband with 50MHz licence holders. I would like to see it made possible for Class B licence holders to have this facility. I feel sure it would promote a lot more interest in the band, and it would be especially useful for the lucky few who have the licences.

F G Peel, G6MZX

The Society is currently awaiting clarification from the DTI on several aspects of crossband operation.

HAPPY WE ARE

Sir—Much is written in these pages regarding bad operating standards and general "liddery" among experienced and non-experienced "hams" alike. The reverse can be the case though, and I write to tell you that all is not lost!

Instead of importing the usual group of experienced contest operators with their high-tech keys and black boxes, we—a group of us strictly non-contest members with very little cw experience, and straight keys—gathered together under the guidance of two experienced operators and took part in the HF Field Day. We were very apprehensive about reading high-speed callsigns, let alone working them, but we were assured that the fastest operators would slow down for us. Despite our scepticism, this is exactly what happened! I don't think we sent one QRS during the whole 24h.

Through these pages may I thank all stations who worked us at a steady 12wpm (or thereabouts), including of course our friends and neighbours G3ZRS and G4EKT for their patience, forbearance and above all impeccably good manners. We enjoyed ourselves and learnt a lot—which is what we set out to do. Thanks again.

Ken Kirby, G4VKK,
for the G4GGD HF Field Day Group

A LID EXPLANATION

Sir—I seldom find the urge to write to magazines, but I do so now in answer to the letter from G3JMD regarding the term "lid" as applied to some inept operators.

A lid in common parlance refers to something which goes over the top and overlaps the edges, and back in the days of a.m. (oh for those days of good quality transmissions) some operators would crash in over the top of weaker stations and also operate on 3·8MHz dead etc. These were the lids referred to, and rightly so.

The nearest equivalent we have today is the "Hullo-goodbye" or QRZ fraternity who populate our bands ever more, and vie with each other to see who can go the longest without sleep, or perhaps they are proving that 1kW on a hilltop goes farther than 1W down a coalmine, a fact that first-class operators already know.

Hope this explanation clears the air a little with regards the term "lid" and let's hope those "lids" who read it, that is if you dare print it, will react, to the benefit of others on the amateur bands.

P J Cooper, G3CXI

Sounds like one explanation, although we think the term pre-dates a.m. transmitters!

RUSSIAN HOSPITALITY!

Sir—Having just returned from a study-tour of museums in the USSR I can still only gasp at the hospitality shown to me by the Russian radio amateurs—it was so over-whelming.

For instance, on entering the electronics exhibition which takes place every two years in the vast Economics Achievements Park on the outskirts of Moscow, my RSGB badge was immediately recognized by a band of smiling amateurs. I was whisked to the exhibition transmitting station, seated in the operator's chair, and invited to "take over."

This makes me wonder what our bureaucrats would say if a Russian radio amateur visited an English GB station, was handed the mic and invited to contact Moscow!

Lee, UA3CR, travelled several miles, especially to give me a cake—with the Kremlin in chocolate icing!

Douglas Byrne, G3KPO/GB3WM.

SIXTY GLORIOUS YEARS

Sir—The article "Sixty Glorious Years" by Pat Hawker was most enjoyable, and reminds us always to remember the great names of the past and those who, happily, are still with us. Several come readily to mind: Marcuse, Clarricoats, Forsyth, Milne, Edwards, Heightman, Simmonds, Thornley, Jessop; and we amateurs owe much to their dedication and skill.

A list like this leaves out very many illustrious names, but one other needs special mention—Pat Hawker! For 27 years he has used his wide knowledge to distill for us, from a multitude of sources, interesting "Technical Topics". It could not have been better named. May his contributions long continue.

Thank you, Pat!

Stanley J Sparks, G3JLY

DO YOU READ . . . ?

Sir—I have been awarded a year's free subscription to *Radiotechnika*, the monthly magazine of the Hungarian national society. The quality seems to be good; unfortunately I do not speak the language but I will gladly send the magazines to anyone who does.

Anthony Stokes, G3ZRH QTHR, tel 0277 221465

3·5 7 10 14 18 21 24·5 28 28·5 29

ALL BANDS FOR THE MODERN HF TRANSCEIVER

G N FARE, G3OGQ*

(PART 1)

Introduction

Following the publication of the design for an hf transceiver [1] I received a number of requests for an all-band version. The original design was limited to 3·5 and 14MHz mainly to ensure that the transceiver would be comparatively easy to construct.

A large number of these transceivers have been constructed and this article explains how to modify the existing equipment to cover all bands from 3·5 to 28MHz. The transceiver can, of course, be built from scratch to cover all bands, if this article is read in conjunction with the original. A great deal of effort has gone into making as little of the original transceiver redundant as possible, and very few of the components originally fitted are not reused.

General

In order to make the transceiver cover additional bands, it is necessary to provide injection to the mixer of a different frequency for each band. This can be accomplished in a number of ways. In a single-conversion receiver or transmitter, the classical way is to provide a crystal oscillator for each band which is mixed with the vfo frequency to provide the necessary injection frequency, but most modern commercial transceivers use a synthesizer instead of crystal oscillators to produce the required frequencies.

The advantages of a synthesizer are, first, the cost should be less than that of a large number of crystal oscillators. Second, if the function of the vfo is included in the synthesizer, it is not necessary to fit a bandpass filter for each band between the local oscillator and vfo and the mixer, as the output will, hopefully, be on one frequency only, without an image frequency which is always present in a mixing process. Third, the physical space occupied by a synthesizer can be very much less than is needed by other methods. A synthesizer also lends itself readily to control by computer and to the ease of providing scanning and memory facilities etc, although the present design does not incorporate these features, mainly because I believe these to be predominantly sales gimmicks.

The disadvantage is that considerable care must be exercised in the design and construction to reduce the noise inherent in the system. In addition to the provision of a synthesizer, new bandpass and lowpass filters must be installed for each band and the counter must be modified to display the new bands.

This article describes the construction of all the required modifications.

Synthesizer

As many amateurs may not be too familiar with the basic principles of synthesizers, perhaps a few words of explanation of how they work may be in order. A typical single-loop synthesizer is shown in Fig 1, and operates as follows.

A voltage-controlled oscillator (vco) capable of oscillating at the required frequency has its output divided by a number N which will produce a frequency which is equal to the reference frequency. The reference frequency is usually provided by a stable oscillator, and this, along with the output from the divider, is fed to a phase comparator. The phase comparator compares the frequency and phase of the two signals, and, if there is a difference, a voltage proportional to the error is fed back to the vco via a lowpass filter. This voltage is applied to a varicap diode which adjusts the frequency of the vco until the output from the divider is the same as the reference. The loop is said to be in lock when this voltage is stable.

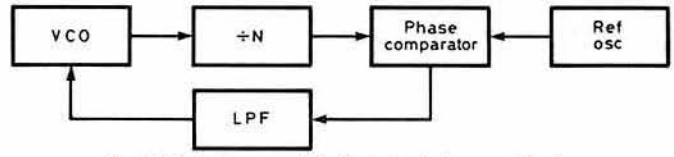


Fig 1. Block diagram of typical single-loop synthesizer

If the vco drifts, an error voltage will again be produced and the vco will be retuned until it relocks, and the same thing will happen if the divisor is changed. The vco will only lock in steps which coincide with the reference frequency. For example, if the vco is running at 10 to 11MHz and the reference frequency is 1kHz, then the output will be in 1kHz steps from 10,000 to 10,999kHz with a divisor of 10,000 to 10,999.

1kHz steps are not very satisfactory for hf, especially for cw and rtty signals, and many commercial transceivers and receivers use 10Hz steps. This is very difficult to achieve with a single loop because the required divisor is very high (eg, a 10MHz signal would have to be divided by 1,000,000) and it is difficult to filter out 10Hz sidebands. In addition, the lock-up time (ie, the length of time taken by the loop to re-lock after a change of frequency) would be very long because of loop filter requirements.

One solution is to adopt a higher reference frequency and adjust the reference oscillator to provide the lower frequency steps. The necessary change in reference frequency is quite small. Taking the example quoted previously of a 10MHz vco with a reference frequency of 1kHz and a divisor of 10,000; if the reference frequency is changed by 5 to 1,005Hz then the vco will, when in lock, oscillate at $1{,}005 \times 10{,}000 = 10{,}050$kHz. In other words, a 5Hz change in reference frequency has given us a 50kHz change in the vco output frequency. It will be evident from this how important it is to have a stable reference frequency.

However, even the adoption of a 1kHz reference frequency can cause problems in a home-constructed synthesizer, which, if poorly designed or constructed can lead to so-called "synthesizer whine" due to the fact that the 1kHz sidebands are well within the passband of an ssb receiver filter. It is therefore a very great advantage to have as high a reference frequency as possible, making it much easier to filter out sideband and phase noise without incurring the penalty of a long lock-up time.

The design of the synthesizer to be described was adopted with the following features in mind:

1. It must have a high reference frequency.
2. It must be continuously tunable.
3. Sidebands and phase noise in the output must be very low, with a target of −60dB.
4. It must be comparatively simple to construct.

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

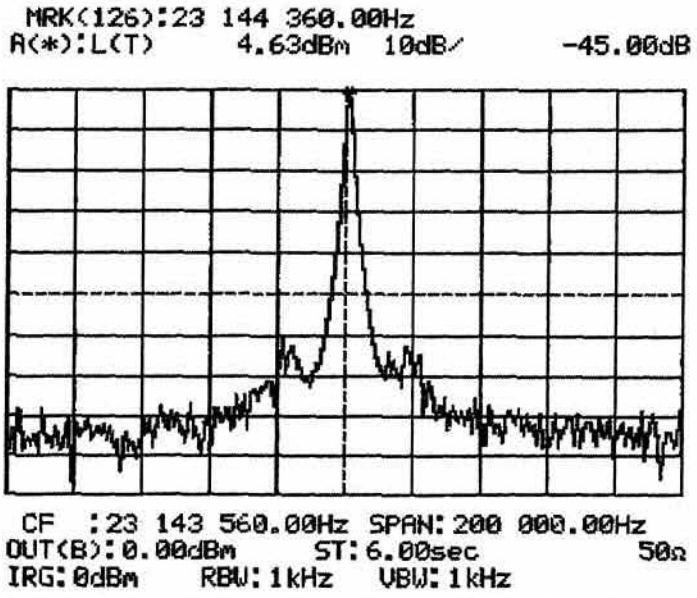


Fig 2. Printout from digital spectrum analyser of output from the synthesizer. Horizontal scale 20kHz/div. Vertical scale 10dB. Resolution bandwidth 1kHz. Highest spurious signal – 61dB at 18kHz below carrier

5. It must be capable of being incorporated within the existing case with a minimum of "surgery".
6. The performance of the transceiver must not be affected adversely.

All these criteria have been met, and Fig 2 shows a printout from a spectrum analyser used to examine the output of the synthesizer. Spurious responses are – 61dB and – 62dB at approximately 18kHz removed from the signal frequency. The noise pedestal around the carrier is that generated by the spectrum analyser. These results are quite satisfactory and approach those of much more sophisticated commercial designs. The block diagram is shown in Fig 3.

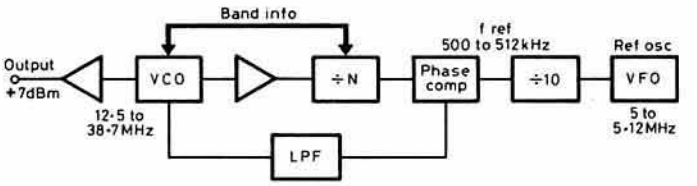


Fig 3. Block diagram of synthesizer as designed

The frequency of the vco ranges from 12·5 to 38·7MHz which, when subsequently mixed with an i.f. signal of 9MHz gives outputs on all bands from 3·5 to 29·7MHz.

To explain the functions of the circuit, let us take an example of the vco running at 12,500kHz. After dividing by 25 to give a frequency of 500kHz, the signal is fed to the phase comparator where it is compared with the reference frequency, which is derived by dividing the existing vfo, tuned to 5,000kHz by 10 to give 500kHz. Any error voltage produced is filtered and applied to the vco as a correction voltage. The loop will lock when both the frequency and phase of the two signals are equal. If we now retune the vfo to 5,010kHz (giving a reference frequency of 501kHz) the vco must change to 501 × 25 = 12,525kHz, to remain in lock, and so on until at a vfo frequency of 5,120kHz it will give a vco frequency of 12,800kHz, which corresponds to the top of the 3·5MHz band.

A great deal of time and effort went into producing a stable variable reference oscillator, and the design presented here provides two alternative approaches. The first uses the existing vfo modified to cover 5,000 to 5,120kHz which is then divided by 10 to give the reference frequency. This approach has the advantage of simplicity and makes maximum use of the existing circuitry.

The existing vfo had a drift of 100Hz after warm-up. When this is divided by 10, this gives a drift of 10Hz which, when multiplied by the divisor for 3·5MHz (ie, 25) would give a drift of 250Hz. On the highest band, with a divisor of 76, the drift would be 760Hz. As will be explained later, this drift was eventually reduced considerably, and a cw signal can be held for very long periods without adjustment. It is my contention that, while the drift performance is not absolutely perfect, it is quite satisfactory and compares very well with many commercial transceivers.

Measurements taken on two well-known commercial transceivers are not markedly superior, and were both inferior to the published specifications —which were probably obtained under laboratory conditions and not those of the average domestic environment.

Of course, such simplicity must have its drawbacks, and the greatest of these is the fact that the tuning rate (ie, the number of kilohertz change in frequency caused by one revolution of the tuning knob) varies from band to band. In practice this is not very important due to the use of a digital frequency readout, and the difference in tuning rate is very much lower than it used to be in the days when a vfo running at 3·5MHz was multiplied by eight to arrive at 28MHz. In fact, the tuning rate on the highest band is only about three times the tuning rate on the lowest (52kHz/rev compared with 17kHz/rev).

The second approach uses a synthesized crystal vfo. This has the advantage of crystal oscillator stability and a better noise performance than the vfo described above. It consists of a fixed crystal oscillator running at 15,800kHz, which is mixed with a variable crystal oscillator tunable from 15,300 to 15,288kHz to produce a difference frequency of 500 to 512kHz.

Measurements of drift and noise have been taken using a spectrum analyser locked to a Rubidium frequency standard. The drift was measured at 20Hz maximum over a 2h period, and the noise performance was better than – 95dB. The noise performance is over 25dB better than the original modified vfo.

This approach is recommended to the amateur who wishes better than average performance, although it is stressed that the original vfo will give quite acceptable results.

Details of the synthesized vfo are given towards the end of the article.

Circuit

A circuit diagram of the complete synthesizer is given in Fig 4. The vco actually consists of five separate oscillators, four of which have capacitors switched in to provide nine bands. Each oscillator can cover a range of 500kHz except for vco 5A which covers a range of 1,200kHz. The oscillators are fed from a separately-regulated supply. The use of so many separate oscillators obviates the need for a large voltage swing on the varactor diodes, which would have meant providing a supply voltage in excess of the 12V used in the transceiver. It also ensures that small voltage changes have minimal effect on the frequency of oscillation and less likelihood of noise and/or frequency modulation of the vco due to ripple on the control-voltage line.

The output of the selected oscillator is fed to two separate amplifiers, one gives a ttl output and the other provides an output for the mixer of over + 7dBm.

The divider consists essentially of two 74196 integrated circuits which are programmable decade dividers. The programming data from the diode switching board is loaded into the counters by a pulse from the JK flip-flop. The counters count up from the loaded number until they reach a count of 90, at which point the JK flip-flop produces a pulse of two clock periods in duration and thereby restarts the whole process. For example, if 67 is loaded into the counters, 23 clock pulses later the count will be 90. The JK flip-flop then goes low for two clock periods and the process is complete. Thus 25 clock pulses are required to produce one complete cycle.

The phase comparator consists of a single cmos integrated circuit, the 4046. The signal from the divider is applied to pin 14, and the signal from the reference frequency is applied to pin 3. This is the opposite way round to that shown on the data sheet, but must be connected this way as the type of lowpass filter used inverts the output voltage from the phase comparator. When the signal input frequency is higher than the reference frequency, an error voltage is produced from pin 13. This will be a high voltage of about 11·5V. If the signal input frequency is lower than the reference frequency, the error voltage will be low. The lowpass filter which follows the phase comparator inverts the voltage so that when, for example, the phase comparator produces a low error voltage, a high voltage will be fed to the varactor diodes in the vco. A high voltage on a varactor diode has the effect of reducing the capacitance, and the vco will therefore tune higher in frequency until the signal input frequency rises to equal the reference, when the error voltage will disappear and the capacitor in the lowpass filter will hold the charge, maintaining the voltage on the varactor diodes. The design of the filter is something of a compromise, as it would be very difficult to ensure that each vco had the same gain (ie volts change/kHz). As the vco gain must be taken into account in designing the filter, some compromise between attenuation, lock-up time and overshoot must be made. The filter as designed provides quite acceptable performance over the whole of the vco ranges.

The reference frequency, as already mentioned, is obtained from the existing vfo, which is modified from 5,000 to 5,500kHz as originally

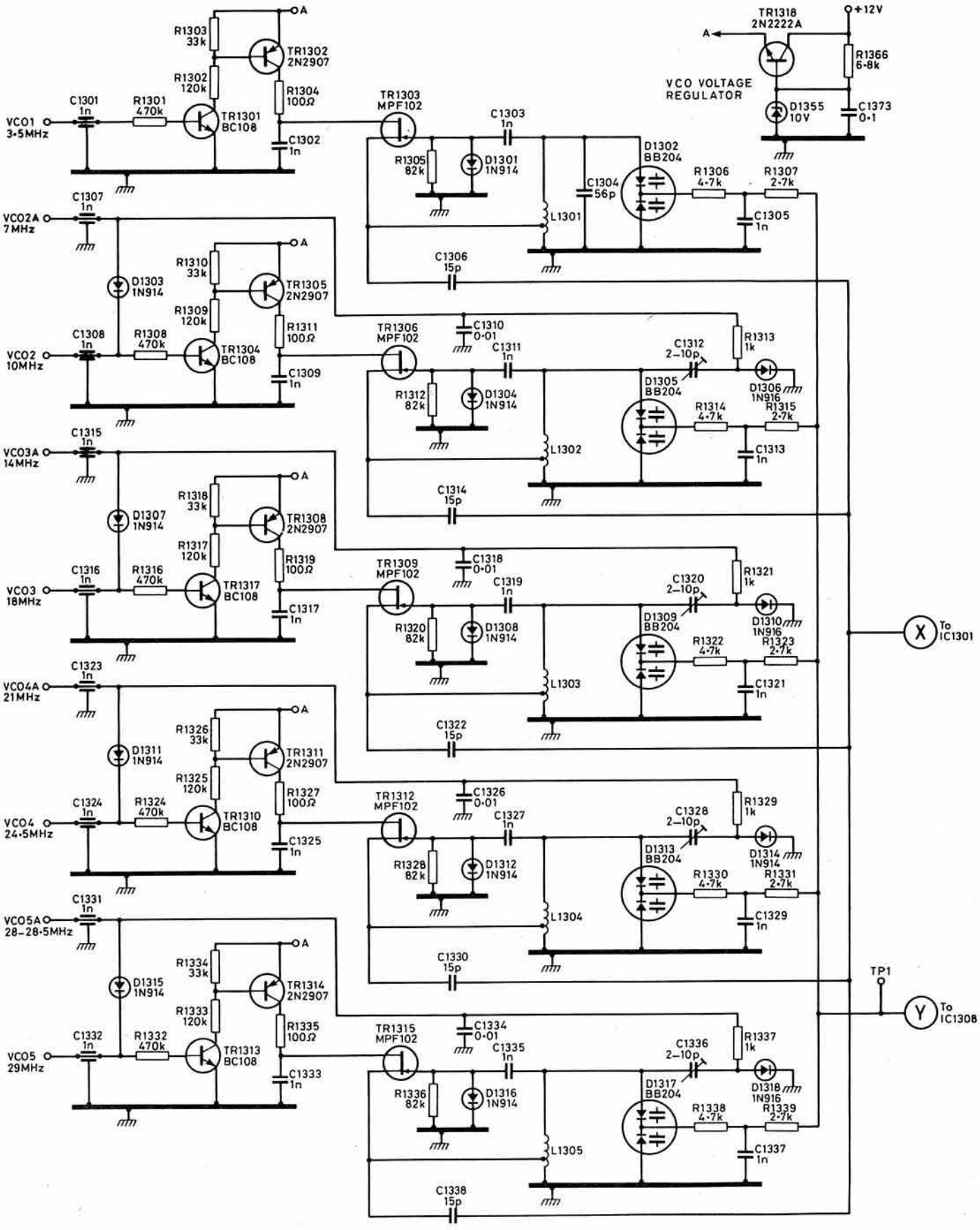


Fig 4(a). Synthesizer circuit diagram, Part 1. Voltage-controlled oscillators

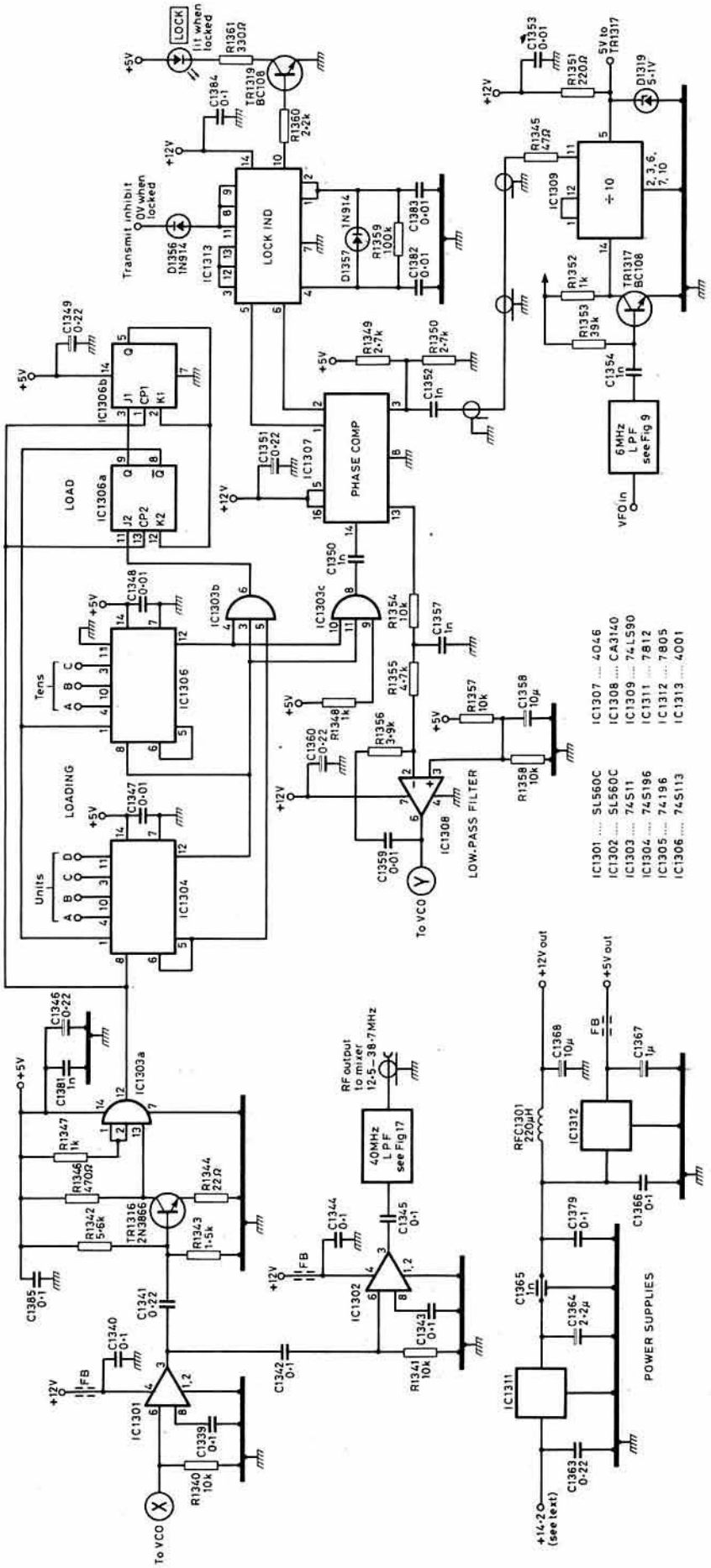


Fig 4(b). Synthesizer circuit diagram, part 2

designed to cover 5,000 to 5,120kHz. The output is filtered to attenuate any harmonics, and is divided by 10 by means of a 74LS90. The opportunity was also taken to introduce incremental transmit/receive tuning as well as the original rit, and this has proved very useful as a "fine tuning" control.

An "out-of-lock" indicator samples the voltages at the phase pulse output (pin 1 of the 4046) and the phase comparator 1 output (pin 2). When in lock, pin 1 is at a high level apart from phase pulses resulting from the inherent phase difference between the signal and reference inputs. Pin 2 is low when in lock except for small phase pulses resulting from the same phase difference.

The output from IC1313c will be high when the loop is unlocked, and this voltage is fed to the p.i.n. diode attenuator on the pre-driver board. This inhibits transmit when the loop is unlocked, avoiding the possibility of inadvertent out-of-band transmission. The output from section d is used to turn on an l.e.d. when the loop is locked, as a visual indication.

Counter

The existing frequency counter covers only two bands, and to extend the band coverage would entail providing a filter following the mixer for each band. Apart from the fact that there just isn't enough space on the board to accommodate the extra filters, it is not a very elegant method. The vco output alone could be counted, but it would give an error equal to the sideband displacement and it is not possible to programme the existing lsi counter to allow for i.f. offsets.

The solution adopted, therefore, is to employ a digital mixer which will give an output equal to the difference between two applied frequencies. However, the circuit (Fig 5) consists of two digital mixers which are switched by means of the 74LS157 which operates in the same fashion as a two-pole two-way switch (in fact, the ic contains four separate switches). When pin 1 (select) is low, a signal at A will be passed on to the output (Y), and when pin 1 is high then a signal at B will be passed on.

IC1406 therefore selects the mixer to be used. The first mixer consists of IC1405b which is a D-type flip-flop mixer. It is clocked by the highest input frequency and has the lowest frequency applied to the D input. The output, Q, is the difference between these two frequencies and is switched through IC1406b to the counter. This occurs when the select pin of IC1406 is taken high. A characteristic of this type of mixer is that the lowest frequency may not be less than about 75 per cent of the highest frequency, otherwise the mixer will respond to harmonically-related frequencies and the output will be ambiguous. We can get round this by making sure that the applied signals are fairly low in frequency, taking advantage of the propagation delay, but this will only lower the percentage to about 55 per cent. This is, however, suitable for our purpose.

This mixer can be used with the 3·5 and 7MHz inputs, which have a ratio of 72 and 56·25 per cent respectively. For the other bands a different type of mixer is used, based on an idea by KH6HJZ [2], which will give an unambiguous output with the lowest frequency ranging from 0 to about 48 per cent of the highest frequency. This mixer is switched in when the select pin of IC140b is taken low. The output is fed to the existing counter, consisting of the 7216C.

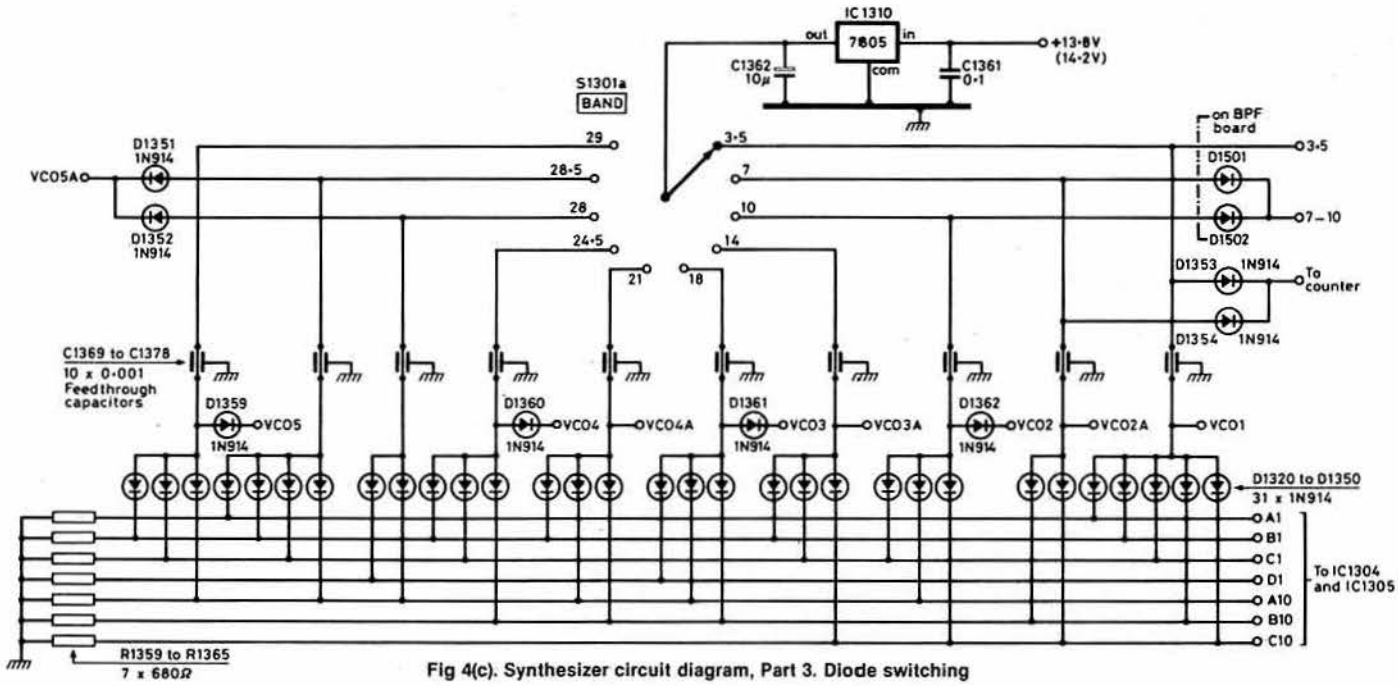


Fig 4(c). Synthesizer circuit diagram, Part 3. Diode switching

Bandpass filters

Filters are required for the additional bands, and originally bandpass filters were installed (similar to the existing) for each band. However, this is rather an expensive method, and it was decided to make use of the lowpass filters following the final amplifier in the receiver antenna circuit to form part of the bandpass filters. This considerably eases the problem and, in fact, only two new filters are now required. The 3·5MHz bandpass filter is retained, and the two new filters cover 6 to 12MHz for the 7 and 10MHz bands and 13 to 30MHz for the 14 to 29·7MHz bands. These, used in conjunction with the existing lowpass filters, provide excellent attenuation of unwanted signals. A study of the various products produced as a result of mixing the local oscillator (f1) with the carrier oscillator (f2) shows that the filtering now provided is satisfactory except for the product of 2f2–f1 at 21MHz and above. Fortunately this product does not appear in the transmit spectrum, probably because the f2 injection level is much lower than the f1 injection level.

The only remaining problem was the presence of the 9MHz bfo signal on the 10 and 18MHz bands, and a simple series trap tuned to 9MHz was therefore fitted in place of the 14MHz bandpass filter which is now redundant.

The antenna changeover relay is now fitted between the final amplifier and the lowpass filter, and the antenna socket is connected directly to the output of the swr meter board. The relay, as originally specified, will not fit in. The replacement should have contacts rated at 3A to be on the safe side.

Fig 6 shows the block diagram of the new filtering and antenna changeover arrangement, and Fig 7 gives the circuit diagram and layout of the new filters. An additional advantage of this circuit configuration is that the insertion loss is less than occurred with the original bandpass filters, being less than 1dB on any band, an improvement of 2dB or more on the higher frequency bands. The signal-to-noise ratio is therefore also improved.

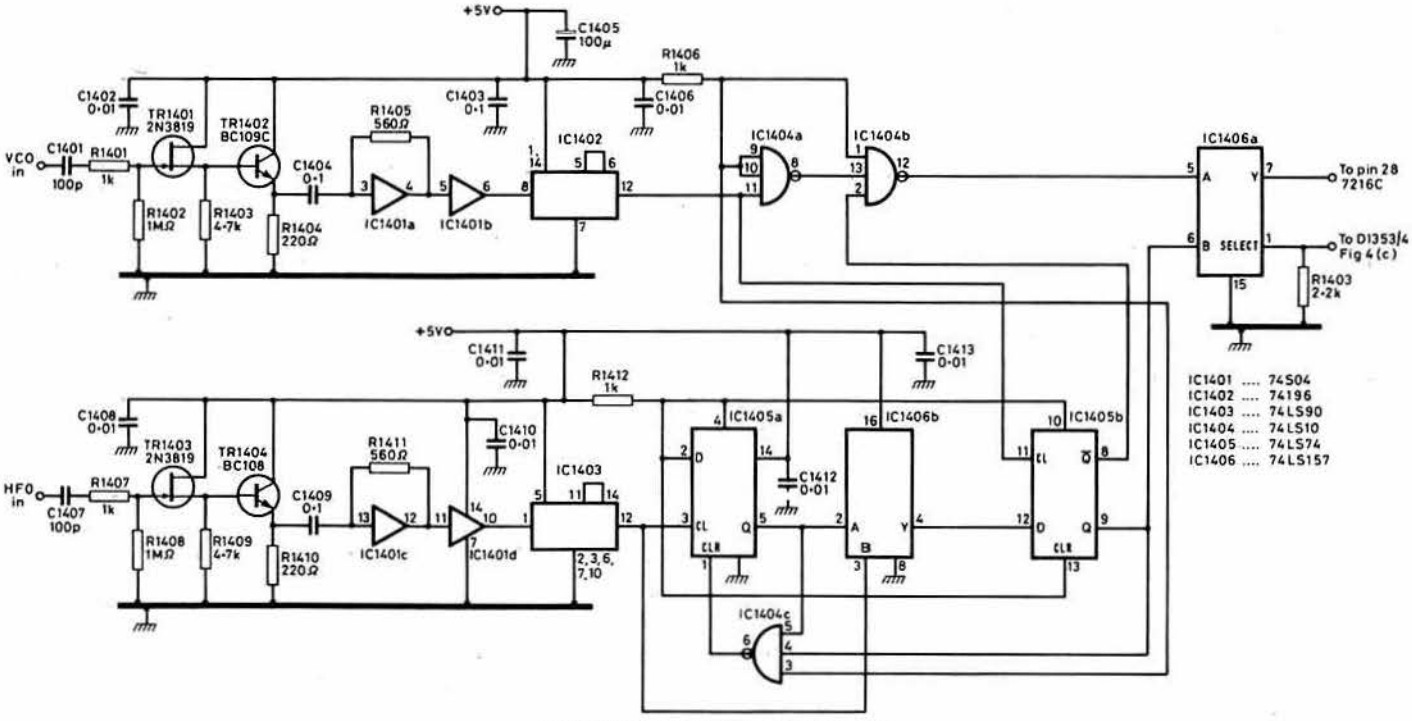
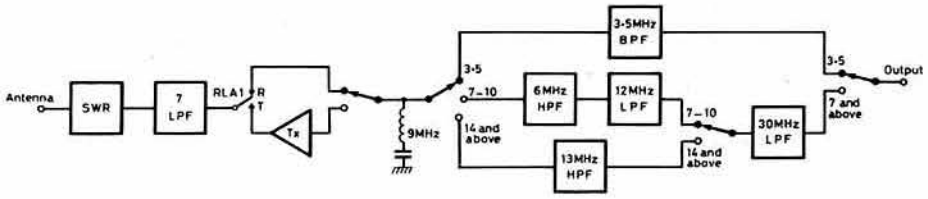


Fig 5. Circuit diagram of counter mixer

Fig 6. Block diagram of filtering arrangements



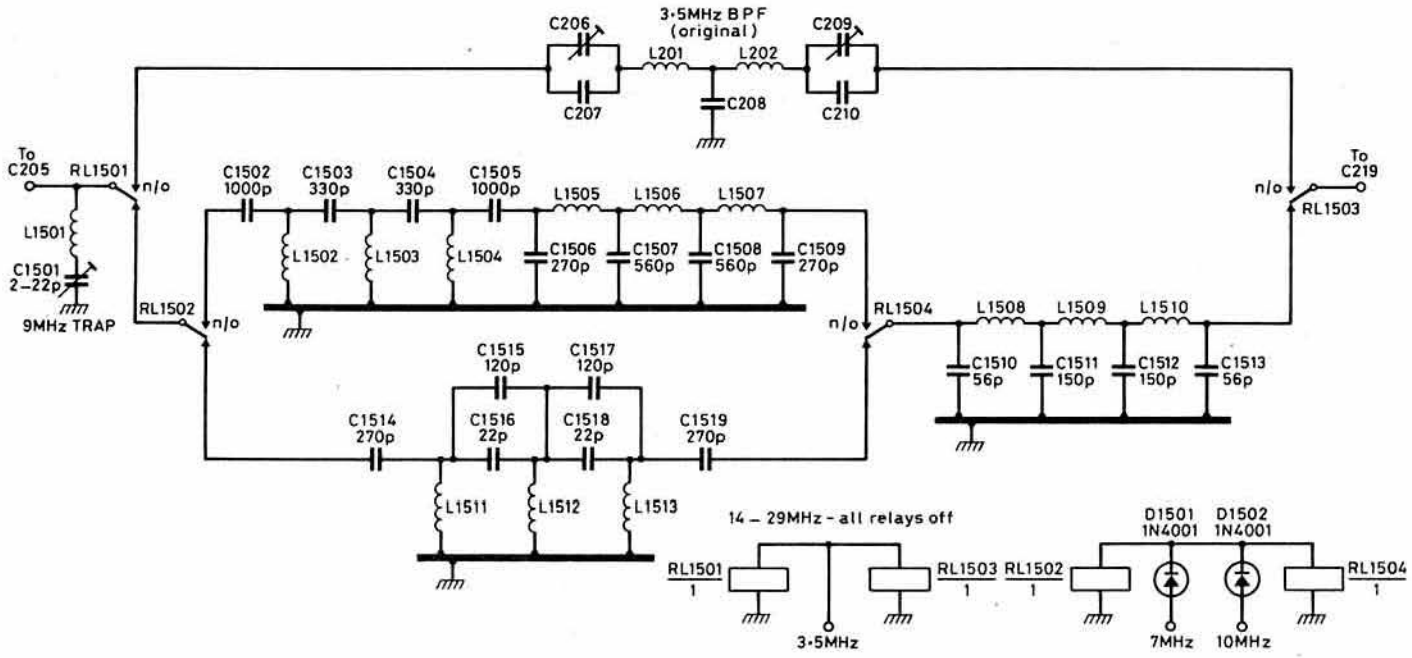
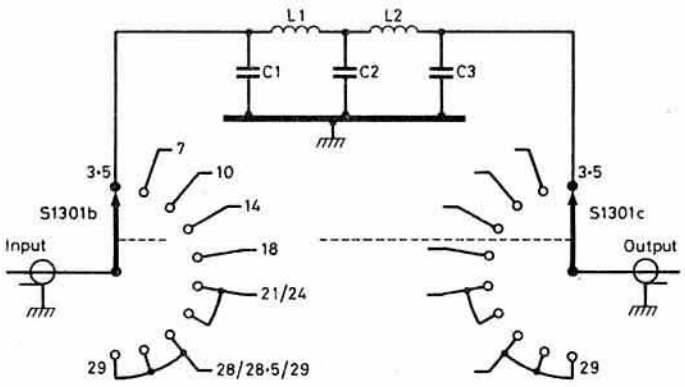


Fig 7. Bandpass filters circuit diagram

Lowpass filters

The existing lowpass filters are retained and five new filters are fitted. Each one has a frequency cut-off above an amateur band, except that one filter is used for the 21 and 24MHz bands, and another one for the 28, 28·5 and 29MHz bands. The configuration is the same as the original which, used with a class AB final amplifier, as in this case, gives harmonic attenuation of 45dB. The additional filters are shown in Fig 8.



Band (MHz)	L1, L2 (μH)	24swg on T50-6 (turns)	C1, C3 (pF)	C2 (pF)
7	1·32	18	330+30	680
10	0·835	15	150+10	330+56
18	0·504	12	100+10	220+20
21	0·414	10	100	220
24·5				
28	0·334	9	27+47	150+10
28·5				
29				

Fig 8. Additional lowpass filters

Construction

Intending constructors, especially those who have not built a synthesizer before, are warned to keep exactly to the layout given. This especially applies to the grounding points. For example, the vco is grounded at one point only. This is deliberate. Noise on synthesizers can arise due to the presence of currents in the groundplane, and these must therefore be minimized.

The order of construction as described should be followed so that step by step checks can be made. I am a great believer in checking each section of a module as construction proceeds, rather than building the whole thing first and expecting it to work.

VFO

If you are intending to modify the existing vfo rather than constructing the synthesized vfo (described later) then the coverage must be changed to the new range of 5,000 to 5,120kHz.

To do this, the value of the tuning capacitor (C103) must be lowered and an additional fixed capacitor wired in parallel. A 10pF npo ceramic capacitor should be connected across C102. C103 should be replaced with a variable capacitor of 10pF. Vanes should be removed until, with the capacitor fully in mesh, the lowest frequency should be 5,000kHz, obtained by adjustment of C102. In my case, I was left with two fixed and two moving vanes. Rotating C103 should provide a coverage up to 5,120kHz, and a little judicious bending of a vane should ensure this. The actual coverage was set at 4,999 to 5,120kHz; there is a distinct advantage in restricting the range to within these limits, as on the upper bands you may find, with larger coverage, that the synthesizer will go out of lock due to the lack of range of the vco.

The tuning coil (L101) should be rewound with 30 turns 26swg and remounted in a vertical position. This not only shortens the leads but lessens the effect on the inductance caused by the synthesizer box which is subsequently mounted on top of the vfo box.

The stability of the vfo must be checked. After allowing about half-an-hour to warm up, the output frequency should be monitored and a graph plotted. It is worth mentioning at this stage that a stable frequency counter is essential; this should be checked, if possible, before using it to check the vfo, as we are concerned with drifts of only a few hertz. When checking the

(Continued on page 700)

TRANAP

A Transistor Network Analysis Program

P L Woods, G8HHZ*

Introduction

This article describes an ac electrical network analysis program which may be used to predict the performance of active and passive circuits over any frequency range. The program is about 680 lines of ISO Pascal, and avoids non-standard language features, so may be easily implemented on any home computer for which a Pascal compiler is available.

The advent of the home computer has given the radio amateur access to many numerical techniques to increase the performance of his station. Programs are available to calculate component values for standard circuits, such as filters, meeting the user's specified performance. The purpose of this article is to describe TRANAP, which is a circuit analysis program to model a circuit's performance given its component values.

A circuit analysis program such as TRANAP is used after the filter (or whatever) design program. The design program has given the values of the perfect components to produce the desired response. TRANAP then predicts the circuit performance using the available practical component values. Allowance can be made for the impedances of the driving and driven stages, also for components which have only medium or high Q, rather than perfect Q.

The circuit's predicted response from TRANAP can be compared to the required response. In a good design they will be close to one another, but a mismatch means the design must be re-done. A circuit analysis program is a method of finding out the performance of a circuit without building and measuring it.

Theory of operation

Circuit analysis is really an automated method of applying Ohm's Law, Norton's Theorem and Kirchoff's Current Law to each node (connection between components) of an electrical circuit. A number of simultaneous equations are obtained which, when solved, yield the voltage at each node. Because reactive elements (capacitors and inductors) as well as resistive components are usually present, this has to be done with complex

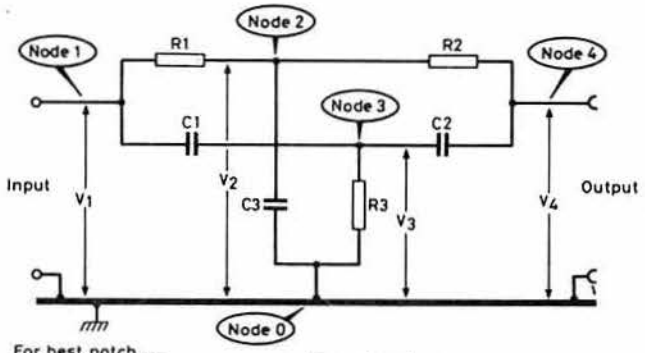


Fig 1. T-notch filter circuit

arithmetic.

To illustrate the way TRANAP works, look at Fig 1, a parallel T-notch filter. This is meant to be driven from a low impedance source and to drive a high impedance load. First, all the nodes have been given numbers. In this example, node 1 is the input, node 4 the output and nodes 2 and 3 are used for internal connections. Node 0 is always the ground node, and all voltages are measured with respect to this point. The input signal is simulated by injecting a current I into node 1. The current is removed from node 0, ground.

Then Kirchoff's Current Law (the sum of the currents at a node is zero) is applied to each node in turn. By Ohm's Law, the current through a component is the voltage drop across it multiplied by its admittance. Using YR1 to denote the conductance of resistor R1 $\frac{1}{R1}$ and YC1 for the susceptance of capacitor C1 ($j.2.\pi.f.C1$) at frequency f) the sum of the currents at node 1 is

$$I + (V2 - V1).YR1 + (V3 - V1).YC1 = 0 \quad \ldots \quad (1)$$

where V1 is the voltage at node 1, and similarly for V2 etc. Rearranging this gives:

$$(YR1 + YC1).V1 - YR1.V2 - YC1.V3 = I \quad \ldots \quad (2)$$

Extending the notation for YR1 to give YR2 etc, similar equations may be written down for the other nodes:

node 2:

$$-YR1.V1 + (YR1 + YR2 + YC3).V2 - YR2.V4 = 0 \quad \ldots \quad (3)$$

node 3:

$$-YC1.V1 + (YC1 + YC2 + YR3).V3 - YC2.V4 = 0 \quad \ldots \quad (4)$$

node 4:

$$-YR2.V2 - YC2.V3 + (YR2 + YC2).V4 = 0 \quad \ldots \quad (5)$$

An equation could also be written for node 0, but as node 0 is ground it will cancel out so it can be ignored.

Equations (2) to (5) are a set of simultaneous equations describing the circuit. They can be solved algebraically to give V4 in terms of V1, which is the transfer function (frequency response) of the circuit.

Algebraic solution is only practical for simple circuits, so TRANAP adopts another method. At a given frequency, it evaluates all the admittances in the equations and solves them numerically to obtain the response at that frequency. To obtain an overall picture of the network response, TRANAP has to repeat its work at several other frequencies.

This method of solution means that circuit imperfections such as stray capacitances and low Q components may be allowed for by simply adding the equivalent components to the circuit.

Program specification

From the above, the requirements of TRANAP become clear. It must take a stylized circuit description and check that all component values are reasonable. Then it must construct the equations for each node.

At a spot frequency, all the equations must be evaluated and solved. TRANAP prints two quantities to describe the response of the circuit at that frequency, the input impedance and voltage response. For convenience, the latter is printed in both decibels, and voltage and phase.

TRANAP must be able to repeat its actions over a range of frequencies so that a picture of the overall frequency response may be built up.

Using TRANAP—an illustrated example

The circuit to be analysed must be described with a special notation because computers cannot read circuit diagrams. In this the component type is first named (R for resistor, C for capacitor, L for inductor, T for transistor and O for op-amp) then the nodes it is connected between listed. (Two nodes for resistors, capacitors and inductors, three nodes for transistors and op-amps). The component value is given last. (eg 1E3 for a 1kΩ resistor, or 36E-12 for a 36pF capacitor). Transistors and op-amps both need four values to describe them; they will be covered later. Examples of typical commands are shown in the listings.

A node is simply the joint, or connection, between two or more components. Physically it is the leaf on the tag strip to which connections are made, or the pcb track to which the components are soldered.

To continue with the example of Fig 1, the circuit is prepared by numbering all the nodes on the diagram. By convention the ground line is always node 0. The node numbers are indicated in Fig 1.

TRANAP is started up and prompts for each command with a "?". Give an "I" command to initialize TRANAP: I.

This erases any previous commands to TRANAP, so clears mistakes and makes TRANAP ready for a new circuit. This command, like all others, is ended by pressing the carriage return key.

TRANAP is then told the number of nodes in the circuit, not counting the ground node, followed by the numbers of the input and output nodes. The "N" command does this, so for the example: N 4 1 4. Here, as is frequently the case, the input is the first node and the output the last node.

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Then the component descriptions may be entered in any order. For the example circuit they are:

R 1 2 10E3	C 1 3 10E-9
R 2 4 10E3	C 3 4 10E-9
R 0 3 5E3	C 0 2 20E-9

Finally, the circuit may be analysed at either a spot frequency with the "F" command: F 1.591E3, or over a range of logarithmically spaced frequencies with the "G" command: G 600 6000 20. This "G" command instructs TRANAP to analyse between 600 and 6,000Hz at 20 points.

The results are printed in tabular form; see Listing 1 for an example. "Line" is simply the line number in the table. "Frequency" is the frequency, in hertz, at which the response was evaluated. The circuit "Input Impedance" is printed next, as resistive and reactive components, in ohms. The frequency response is then given as three numbers. The "Gain" is the amplification factor in decibels, a negative "Gain" means an attenuation. "Av" is the output voltage for 1V input, and "Phase" the angle in degrees between the input and output signals.

Two further examples

A second example, Fig 2, shows how TRANAP deals with transistors and inductors. The circuit is taken from (1).

The circuit is modified in two ways before being analysed. The + 12V rail

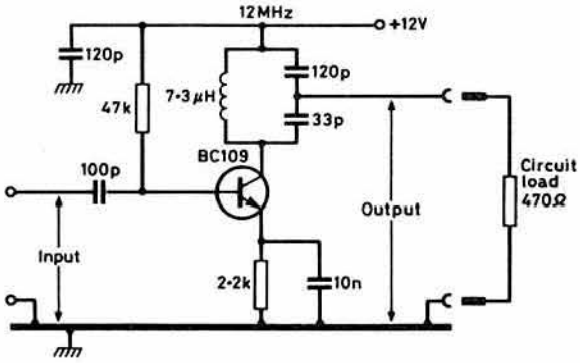


Fig 2. RF amplifier

should have 0V ac on it if the decoupling is adequate. So any component connected to it may instead be connected direct to ground without affecting the ac circuit. This decreases the number of nodes by one and allows the decoupling capacitors to be omitted from the analysis.

To allow for a lossy inductor, take a reasonable value for the Q, say 100, and add the equivalent series resistor to one of the inductor's leads. This may be calculated from:

$$\text{Series } R = 2.\pi.f.\frac{L}{Q} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

Where L is the inductance and f the operating frequency of the circuit (cutoff frequency for a filter). In certain circuits, mainly high performance high frequency designs, the equivalent parallel resistance should be used for the Q. If needed, this may be calculated from:

$$\text{Parallel } R = 2.\pi.f.L.Q \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (7)$$

This change leads to Fig 3, in which the nodes are also marked.

The transistor is entered with the "T" command. It is followed by the nodes of the collector, base and emitter. Then the four h (hybrid) parameters for the transistor are given in the order hie, hre, hfe and hoe.

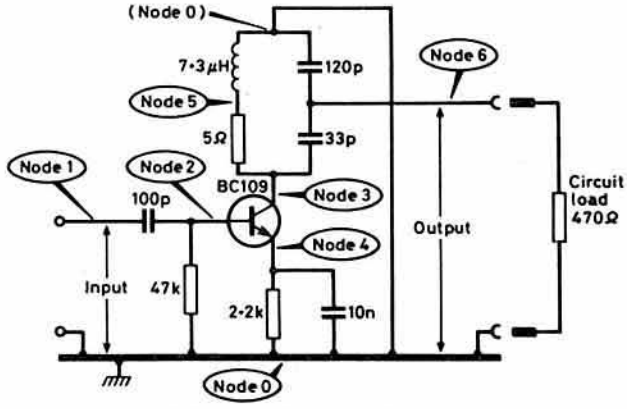


Fig 3. RF amplifier, modified circuit

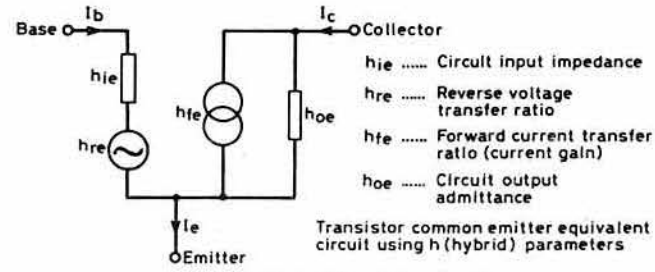


Fig 4. Equivalent transistor circuit

The common emitter equivalent circuit of a transistor is shown in Fig 4, together with the meanings of the h parameters. For the BC109 in this circuit the command is: T 3 2 4 7.6E3 1.2E-3 450 2E-5

The circuit is entered into TRANAP following the lines of the previous example. The full set of commands, together with output generated, are shown in Listing 2.

A third example, in Fig 5, is of a two-pole Sallen and Key audio filter using an op-amp. The nodes are indicated in the figure, and the full notational description and output table are in Listing 3.

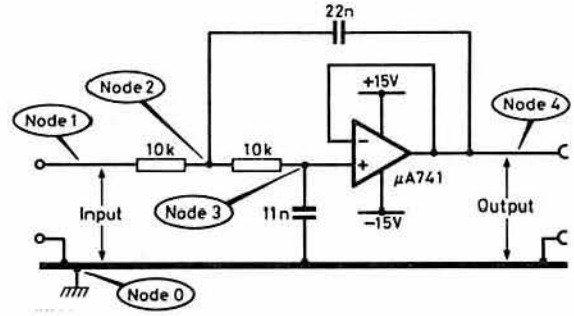


Fig 5. Sallen and Key filter

The op-amp is entered with the "O" command. The nodes of the positive and negative inputs and the output are given, followed by the input resistance, the output resistance, the open loop voltage amplification, and the cut-off frequency of the open loop voltage amplification. This latter number is the frequency at which the open loop gain begins to drop off and is typically 10Hz. See Fig 6 for the equivalent circuit of an op-amp. In the example the op-amp output is connected directly to its negative input. This causes no problems, both points are simply given the same node number.

TRANAP has three further commands. The "H" command may be used at any time to print a list of all commands together with a brief explanation. "D" is provided to dump certain internal storage areas—this is only of use when debugging the program. "Q" will return control from TRANAP to the monitor.

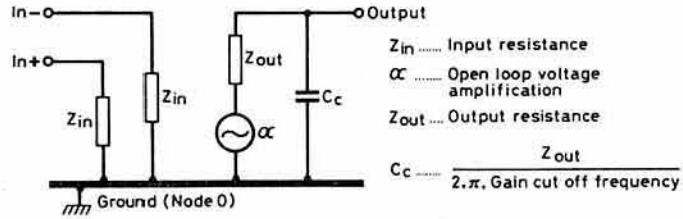


Fig 6. Op-amp equivalent circuit

Installing TRANAP

TRANAP is a 682-line program written in ISO Pascal. As such, it should run without modification on any computer which has a Pascal compiler conforming to this international standard.

The program was originally written to run under "Hisoft" HP4T Pascal, [2], which is available for the Sinclair Spectrum computer and certain other Z80-based computers. Suitable compilers are also available from other sources for CP/M machines and BBC and Commodore PET computers.

TRANAP's source code should be compiled according to the instructions with the Pascal compiler chosen. All comments (remarks between "{" and "}") may be safely omitted.

One symbol will need setting up depending on the memory size of the computer. This is "maxnodes" at line 6, which is presently 40 and sets the maximum number of nodes that TRANAP will accept; ie, how big a circuit

it will handle. It should be set as large as possible such that the program will work without running out of memory. With a 64k CP/M computer, values of "maxnodes" of around 45 should be possible, though perhaps only half that with a ZX Spectrum.

This program is large, and quite complex, and so, as with all computer programs, care will be needed in typing it in, followed by close proof-reading. Should difficulties be encountered, the author will be pleased to give what assistance he can to clear the trouble. A good, clean, listing of the program as entered on the reader's computer should be sent to the author, together with a further listing showing the manifestation of the problem itself (eg, the compiler error messages or the output which fails to reproduce the examples in the listings).

Conclusion

In this article, a program to assist in circuit design has been presented and demonstrated with examples from several fields of amateur radio. The program is very fast in operation, one of the consequencies of using a modern, compiled, language. On the author's 2·5MHz Z80-based system, a test run of a 17-node audio filter, [3], took only 17s/solution.

References

[1] *VHF—UHF Manual*, 3rd edn, D S Evans and G R Jessop RSGB, 1976. Fig 5.88, p 5.41.

[2] *Hisoft HP4T Pascal*. Messrs Hisoft, Suite E, 180, High St North, Dunstable, Beds LU6 1AT.

[3] *VHF—UHF Manual*, 3rd edn, D S Evans and G R Jessop RSGB, 1976. Fig 5.101, p 5.47.

PROGRAM AVAILABILITY

A copy of Listings 1, 2 and 3 and the program can be obtained by sending a self-addressed A4 size envelope bearing an 18p stamp, to: The Editor, *Radio Communication*, 88 Broomfield Road, Chelmsford, Essex CM1 1SS. Mark the envelope "TRANAP program".

ALL BANDS FOR THE MODERN HF TRANSCEIVER

(continued from page 697)

drift, a metal lid should be placed on the vfo box. This will not only protect it from draughts but will also give the same conditions as those under which it will eventually be operating.

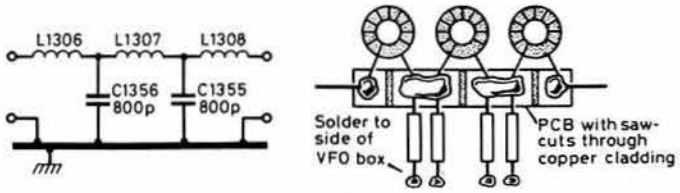
The measured drift should be very low. In my case the drift was reduced from the original 100Hz in 30min to 30Hz in 30min, solely due to the reduction in size of the variable capacitor. By trying different temperature coefficient capacitors in place of C104, this drift was reduced to less than 20Hz.

It is well worth spending some time over this part of the project as stability of the vfo is all-important, and the vfo should be allowed to return to ambient temperature by waiting half-an-hour or so after soldering components within the vfo box before starting to take drift measurements again.

The lowpass filter and the decade divider boards should now be constructed. Fig 9 shows the construction of the lpf, which is built on a small piece of pcb with saw cuts to divide it into four pads. The toroids and capacitors are mounted, and the pcb is fixed in position on the left-hand side of the box with instant adhesive. The capacitors are then soldered to the side of the box and all components are solidly fixed in place with adhesive. The divider board is constructed as shown in Fig 10, and is mounted on two 0·25in (6mm) pillars to the inside face of the back of the vfo box.

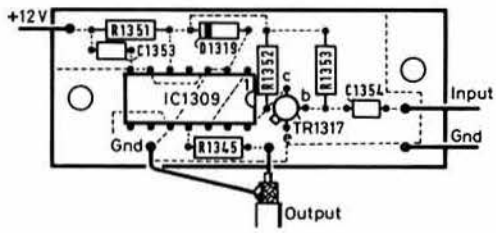
Connect the output of the vfo to the filter, and the output of the filter to the divider board, with short lengths of miniature 50Ω coaxial cable. The supply to the divider board may be obtained from the existing feedthrough capacitor, which should be repositioned on the back of the box to give clearance for the new counter board which will subsequently be installed. When all is installed, check the output from the divider board, which should be a square wave at least 2·4V peak and measuring 500 to 512kHz.

The remaining work to be done consists of adjusting the rit coverage. This is adjusted so that one rotation of the rit knob will change the frequency on the 18MHz band by about 3kHz. This change will be more on the 29MHz band and less on 3·5MHz, but is a reasonable compromise. The 100kΩ potentiometer (R101) is taken out and replaced with a 2·2kΩ with fixed 10kΩ resistors taken to ground and 12V. The remainder of the rit controls are modified as shown in Fig 11. S101 is removed and replaced with a double-pole single-throw, centre-off switch, and the relay connections are modified as shown in the circuit.



L1306, 8 .... 7 turns of 26swg wire on T37-2
L1307 ..... 9 turns of 26swg wire on T37-2
C1355, 6 .... 470pF + 330pF each in parallel

Fig 9. Details of lowpass filter on vfo output



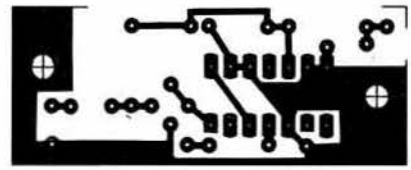


Fig 10. VFO divider board. PCB track layout, single-sided, and components layout

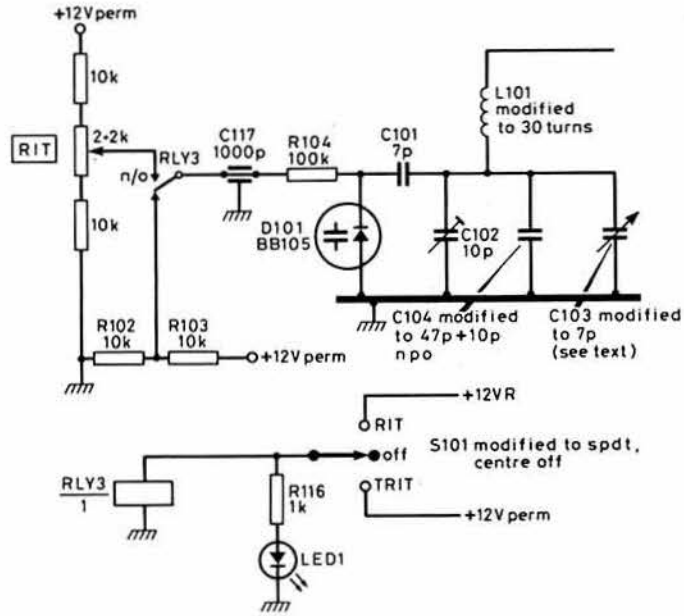


Fig 11. Details of rit and vfo modifications

On completion of the whole of the modifications, it was found that the frequency changed by a few hertz when switching from receive to transmit. This was traced to a drop of a few millivolts in the 12V regulated supplies. This was not of any importance in the original design, but the frequency change is now multiplied by the value of the loop divisor. The problem was resolved by increasing the voltage from the psu to the transceiver to 14·2V, which improves the regulation. This is easily effected by an adjustment of R1205. If battery operation is contemplated, it would be better to provide a 10V regulated supply to R101 and R103.

A lid should be fitted to the vfo box, and this may be made of tinplate. Apart from shielding, it helps to stiffen the box.

(TO BE CONTINUED)

A SURVEY OF VHF/UHF PROPAGATION MODES

Quentin Campbell, G4OEU*

(Part 1)

Quentin Campbell first became interested in electronics while at school. After more than 20 years "thinking" about getting licensed, he was encouraged by colleagues to finally do something about it and obtained a G4 call in 1982. Always fascinated by telegraphy, he concentrated on reaching required proficiency in morse before attempting the RAE. Activity is now mainly centred on 144MHz cw dxing and investigating the application of digital techniques to certain vhf propagation modes. An Australian by nationality he is permanently resident in the UK.

Introduction

Most radio amateurs interested in vhf and uhf welcome "lift" conditions and those other quirks of nature that allow dramatic dx QSOs that sometimes span thousands of kilometres. At the same time they are often hard-pushed to give anything but the haziest description of what changes in the upper and lower atmosphere allow this to come about.

This article introduces the reader to the fascinating field of vhf/uhf propagation, and seeks to give him some insight into the underlying mechanisms. It is also a comprehensive survey of the current range of vhf/uhf propagation modes, and shows how many of these modes are exploited by amateurs as well as by some novel systems developed for use in military and professional applications.

We first look at the generally-understood model of line-of-sight propagation in an homogeneous atmosphere, and introduce some basic terms and concepts. We then look at deviations from this "simple" model; ie when irregularities and inhomogeneities occur in the lower atmosphere or when ionospheric effects are considered.

Some of these phenomena are very important from a communications engineering point of view, and in fact provide the only *reliable* means of long distance radio communications available today. They give rise to the regular propagation modes which include:

- Line-of-sight communications
- Tropospheric scatter
- Knife-edge diffraction
- Ionospheric scatter

Other phenomena are only short-lived and infrequent and therefore cannot be used for regular commercial communications, but can be exploited by the amateur to provide vhf communications at distances often spanning many thousands of kilometres. Some are man-made for scientific or military use. These are together called the anomalous propagation modes (also referred to as the irregular or abnormal modes) and include:

- Super-refraction and ducting in the troposphere
- Sporadic-E propagation
- Field-aligned scatter
- "Chaff" and needles

The first two are important because they can be major sources of interference to the regular propagation modes. The last two have special scientific or military uses.

These regular and anomalous propagation modes are dealt with here in an unorthodox way. Rather than categorizing them as either tropospheric or ionospheric modes, they are grouped according to the underlying mechanism involved. Thus the first group, and by far the most important, encompasses those modes that involve scattering of the radio waves due to irregularities in the transmission medium. The second group includes the strong but unstable propagation due to specific meteorological or ionospheric conditions that do not involve substantial scattering. Also included here are the enhanced propagation due to unusual geographical features and reflections from the moon.

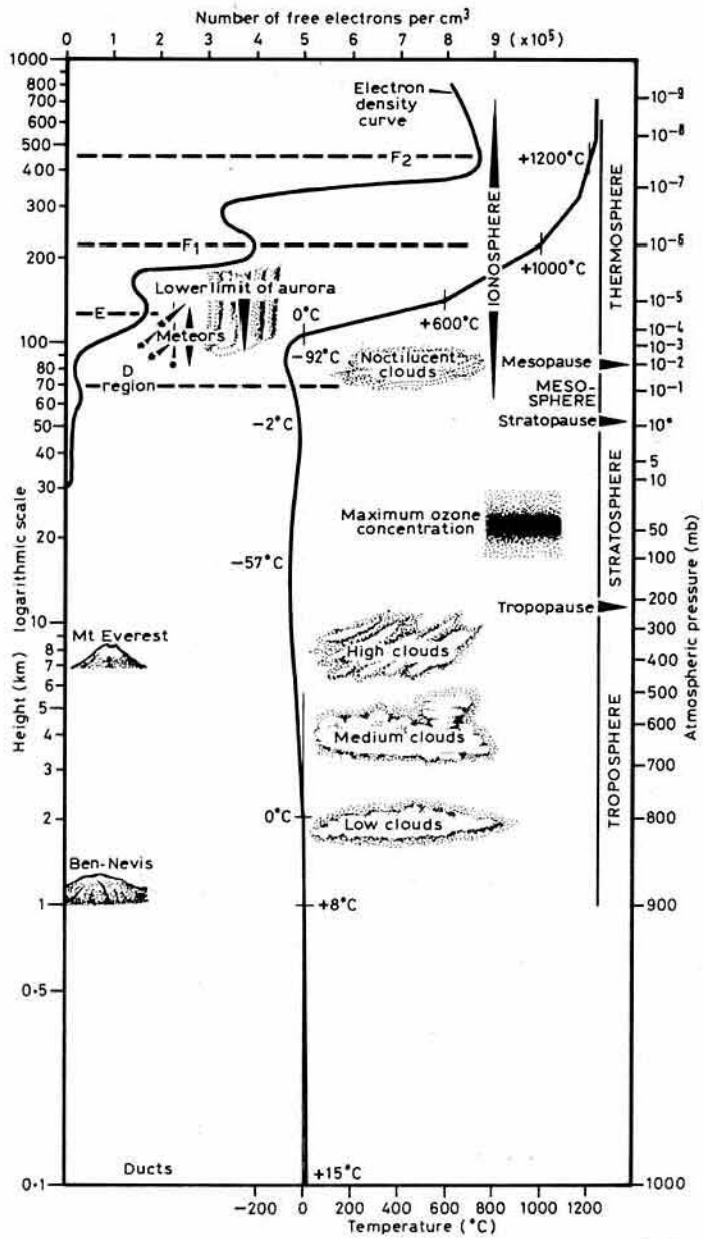


Fig 1. Some features of the earth's atmosphere. The height scale is logarithmic beginning at 100m asl. The equivalent pressure scale on the right is not regularly spaced because the relationship between pressure and height depends on temperature, which does not change uniformly with height (from *Radio Communication Handbook*, Vol 2)

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Line-of-sight propagation in the troposphere at vhf/uhf

The vhf band is usually defined as the frequency range 30 to 300MHz, and the uhf band as 300 to 3,000MHz (3GHz). The choice of these limits is purely arbitrary, although the lower limit of the vhf band is based on the observation that the maximum electron densities in the ionosphere are rarely sufficient to reflect radio waves on frequencies much above 30MHz except for short periods.

The most important mechanism affecting vhf/uhf propagation and performance has its origins in the troposphere, which is defined as the lower part of the atmosphere, in which the temperature decreases with altitude. It is limited on its upper boundary by the tropopause, a zone where the temperature remains more or less constant. The thickness of the troposphere varies, but is on average about 10km.

Changes in refractive index occur in the troposphere due to variations in density. On average, the refractive index of the troposphere decreases with altitude. A general consequence of this is that, in terms of geometric optics, radio waves do not propagate in straight lines. The radio waves will bend towards the region of highest refractive index. Thus, with a decrease of refractive index with height, the radio waves will bend towards the earth's surface and over the visual horizon. The result is a lengthening in the line-of-sight path.

However, Nature is never constant, and anomalies or irregularities in the troposphere as well as ionospheric effects cause interesting deviations from this simple definition of vhf/uhf propagation.

Non-line-of-sight propagation in the vhf/uhf region

It was often the discovery of unexpected signal propagation that led to the recognition and consequent investigation of the underlying phenomenon. Conversely, studies of the phenomenon have greatly helped to provide quantitative data that has been used by designers of communications systems. Sometimes the study of these phenomena has suggested man-made irregularities that might be created and utilized to further propagation studies or to provide more reliable propagation conditions.

These non-line-of-sight vhf/uhf propagation modes can be classed into two broad groups: scatter modes and non-scatter modes. As we shall see later, the scatter modes can be further usefully divided into man-made scatter conditions and naturally-occurring scatter phenomena.

Scatter modes of propagation at vhf/uhf

So far we have only looked at large-scale height gradient changes of refractive index in the troposphere and the way it can cause a bending of the path of a radio wave. If the refractive index gradient at a horizontal boundary between two large air masses is sufficiently abrupt compared with the radio wavelength it may cause partial reflection, in the optical sense, of incident radio energy. This is dealt with later under "Tropospheric ducting and reflection".

Small-scale variations of refractive index due to local pockets of differing density are also important. These have a scale too small for their effects to be treated adequately on a simple refraction basis. If these refractive index irregularities are of sufficient intensity they will scatter radio energy, and the amount and direction of this scattering will depend on the spatial distribution and the radio wavelength. It can be shown that those parts of the wave scattered in the forward direction maintain their "coherence" (ie, remain in the same phase) and thus add together to produce a strong wave. Those parts of the wave scattered in the other directions add together out of phase and thus their combination produces only a weak wave.

An analagous effect occurs in the ionosphere, but here the scattering mechanisms are collections of charged particles or other conducting media, such as copper needles, as we shall see later.

VHF/UHF scatter communications thus rely on reflection by forward scattering of the radio wave, caused by small irregularities and inhomogeneities in the propagation medium, rather than by the refractive effects of large-scale changes. Scatter systems work because the average intensity of these signals is sufficiently high to provide usable communications links. To ensure this, the communications system must do one of two things:

(i) Use high transmitting powers, sophisticated receivers and high-gain antennas as in troposcatter systems;

(ii) Adapt to the intermittent nature of the communications channel as in meteor-burst systems.

Most of these irregularities causing scatter involve quite small disturbances in the surrounding conditions. Two exceptions are the greatly-enhanced ionization of meteor trails and the highly conducting strips of "Chaff". Typical sources of the irregularities are:

(a) random inhomogeneities in the troposphere in which the refractive index differs from the mean value of surrounding areas;

(b) turbulent mixing of the electron density distributions in the D-region of the ionosphere;

(c) ionized trails due to the passage of meteors through the atmosphere; and

(d) spread-F phenomenon, particularly in equatorial regions.

The man-made scatter conditions are:

(a) "Chaff" and needles;

(b) Field-aligned scatter.

These irregularities and man-made scatter conditions give rise to the following recognized scatter modes of vhf/uhf radio wave propagation.

Ionospheric scatter propagation (ionoscatter)

The possibility that radio waves might be transmitted by scattering due to irregularities in the ionosphere was suggested as far back as 1913. Little interest seems to have been shown until high-frequency communications came into general use, when T L Eckersley began to investigate the possibility of E-region scattering of radio waves in 1932 [1, and refs therein]. More recent work has demonstrated a regular but weak scattering from irregularities in the D-region. These irregularities are produced by the action of turbulence, wind shear etc on the electron distribution in this region and result in corresponding fluctuations in refractive index [2].

Ionoscatter propagation requires that a strong, narrow, beam of radio waves be transmitted nearly horizontally to meet the ionosphere at a height of some 100km at a distance of about 1,000km from the transmitter. The frequency used must be high enough so that it can escape into space instead of being reflected, and a typical frequency might be 35MHz. These high frequencies are one factor that distinguish ionoscatter from conventional hf ionospheric reflection propagation. The ionospheric irregularities, of a size comparable to the wavelength used, scatter a small part of the wave in all directions, but with a preference for the forward direction. Using a sensitive receiver, this regular but weak forward scattering is useful for single-frequency communication in the 30 to 60MHz range over distances up to 2,000km.

The main advantage of ionoscatter propagation was thought to be its relative immunity from disruption by fadeouts, ionospheric storms and polar blackouts. This last phenomena, called polar cap absorption (pca), can lead to an almost complete break in communications in the polar regions. Long-lasting blackouts occur which are not associated with auroras (see "Auroral scatter propagation" later) or magnetic storms. They appear to be caused by the expulsion of high energy particles from solar flares on the visible hemisphere of the sun. The start of the pca event follows from one to several hours after the appearance of the flare and lasts about three days; however, it may be as short as one day and as long as 10 days. Strong ionization descends to an altitude of 70 or even 50km, causing extremely strong absorption of radio signals, particularly at hf. It is believed that pca events occur simultaneously at both poles [2, 22].

As the frequencies used in ionoscatter links are much higher than in conventional hf propagation, the radio waves are not unduly absorbed by the extra ionization that is present in the lower ionosphere during these events; and storm effects in the upper ionosphere are of little importance because the waves are scattered from lower down. Since the 'fifties, however, interest in ionoscatter systems seems to have diminished for two reasons. The main factor is its inefficiency, since high powers and large antenna systems are needed if reasonable circuit capacity is to be achieved. A secondary factor has been its disappointing performance in Arctic regions, where its immunity to blackouts from pca effects was less than expected. In spite of these problems Nato has continued to experiment with transportable and fixed systems using this mode [3].

However, under certain traffic conditions, the mode discussed next offers some useful operational advantages over ionoscatter systems.

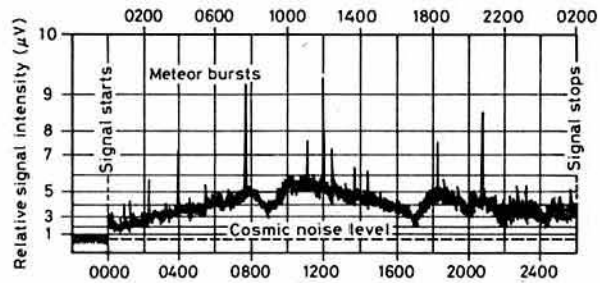


Fig 2. Ionospheric scatter signal level is low, punctuated by stronger signals reflected from meteor trails (from [25])

Meteor-burst propagation (meteor-scatter)

If you look at a tracing of the received signal on an ionoscatter link, it will show irregularly spaced bursts of appreciably higher signal strength, whose durations are of the order of one second. These are due to reflections from the ionized trails left by meteors as they pass through the earth's atmosphere in the region 80 to 120km high. Because of the intermittent nature and variable duration and strength of these signals, it is usual to refer to "meteor-burst" and to "meteor-burst-systems".

As would be expected, the variability of signal levels reflected from the ionized trails of meteors is much greater than the variability arising in ionoscatter systems. However, meteor trail signals are, on average, much stronger than the corresponding ionoscatter signals, although far fewer in number. Therefore, systems using meteor trails can operate at lower power levels and lower antenna gains than ionoscatter systems over the same route. The penalty which has to be paid is that reception is only intermittent with duty cycles that could be as low as one per cent; but if such a duty cycle can be tolerated, then a gain of some 20dB can be achieved with respect to the average equivalent ionoscatter case. This can result in a useful reduction in size, cost and complexity of the alternative meteor-burst system [4].

All this might seem surprising to the casual observer of the night sky who may see very few meteors streaking across the heavens. In fact, many thousands of millions of these trails are produced daily: only a very few of these meteors are large enough to leave a trail that can be seen by the naked eye. The ionized trail is the result of conversion of the kinetic energy of the meteor as it is slowed down by collisions with the molecules of the earth's atmosphere. The resulting ionization is distributed in the form of a long, thin column, typically 15–20km long, with the meteor at the head of it. The electron density per unit length of the trail is proportional to the mass of the meteor; the largest number of these are tiny particles less than one-fifth of a millimetre in diameter. Trails with electron densities in excess of 1×10^{13} electrons/m^3, produced by the larger particles, are termed "overdense" and can considerably modify the incident radio wave, owing to interaction between electrons in the trail. "Underdense" trails, on the other hand, provide scattered signals which are remarkably space- and time-coherent. This can provide an extremely high coherent bandwidth, with the instantaneous 3dB bandwidth being as high as 7MHz at an operating frequency of 30MHz [10].

A small fraction of meteors incident on the atmosphere occur in showers. Called shower meteors, these are due to groups of particles moving in well-defined orbits around the sun, and their arrival can thus be predicted. However, the vast majority of the total number of meteors entering our atmosphere are accounted for by sporadic meteors, which are particles moving in random orbits. The arrival rate is random, with a 4:1 variation between the maximum in August and the minimum in February. There is also a 4:1 diurnal variation, with a maximum in the morning and a minimum in the early evening, which is due to the earth's rotation.

During their brief existence, however, these ionized columns will reflect vhf radio waves, particularly in the frequency range 20 to 100MHz. Although few professional studies have been done on reflections at frequencies much above 100MHz, amateur meteor-scatter communication is common in the 144MHz band. Meteor trails therefore support what is essentially a satellite-type system where Nature continuously provides a multitude of unscheduled, short-lived, low-altitude passive satellites.

Meteor-burst propagation has been used, with varying success, in four operational communications systems. The random nature of these meteor trails means that they can be used only for rather special types of transmission. It is necessary to wait until a trail is formed in the proper position to reflect, and then to send the message very rapidly before the trail decays. The message is therefore inputted on a teleprinter keyboard and stored in electronic memory. A continuous probing signal is emitted: when a meteor trail is formed in the right place it reflects the probing signal strongly to the receiver, which is then caused to send a signal back to the transmitter where it initiates a rapid transmission of the stored message. If there are still more messages to be sent, it is transmitted when the next suitable trail is formed. This was the essential nature of the first meteor-burst system called Janet, a product of the Defence Board of Canada, which was developed in the late 'fifties. After extensive testing by Nato of a modified version of this system called Janet-B, they decided to develop their own approach. The resulting communications system was code-named Comet and became an operational Nato system in 1968.

Comet is capable of supporting up to eight 50-baud teleprinter channels in the 36 to 39MHz frequency range over distances up to 2,000km. This system uses a full-duplex technique; station "1" sends out a continuous probing signal on frequency "A" while listening for the probing signal from station "2" on frequency "B". Likewise, station "2" is sending out a continuous probing signal on frequency "B" while listening for station "1's" probing signal on frequency "A". When either station hears the other's probing signal, it transmits a section of any stored message it might be holding. In this way the information is transmitted over the circuit in both directions at an instantaneous rate of 2,000 bauds (using fsk with ±3kHz deviation) whenever a radio path is established by reflection from a meteor trail. The control of the flow of information is not based on an assessment of the signal strength as in the Janet system. Instead, it uses an error-detection scheme with automatic request for retransmission (ARQ) where, every time an error is detected at one or the other terminals, a repetition of the mutilated character is requested [4, 5, 6, 7, 8].

More recently, two non-military systems have been developed. The first of these networks, called Snotel (SNOwpack TELemetry), was set up for the Soil Conservation Service of the US Department of Agriculture. It consists of over 500 remote, unattended "data sites" which have instruments to measure the weight and volume of the snow pack and hence to determine its water content. Other instruments measure temperature, snow and rainfall. This data is digitized and stored in a buffer for later transmission. All the sensing instruments, microprocessor and communications gear at the remote site are powered by a single 12V gel accumulator. This is continuously charged by solar cells, and the power system is designed for a one-year maintenance-free duty cycle.

Two monitoring stations receive the data. Every day during the winter, the two monitoring stations poll each "data site" in turn. Transmission from the site takes about 100ms. If a contact is not successfully made on the first attempt, it is put on a list of sites to be contacted on the next hourly schedule. Within three hours, 90 per cent of the "data sites" will have responded, transmitting the stored environmental data as well as date, time and battery voltage. The purpose of this data collection system is to obtain a very accurate estimation of the amount of water that will be available from the mountain watersheds as the snow melts. Today, Snotel is the largest automatic data acquisition network of this sort in the world [9].

The second non-military network, developed by a Finnish company for remote sensing of weather data, is similar in operation to Snotel.

From a military communications point of view, some of the primary attractions of meteor-burst systems are their simplicity and inherent secrecy, the latter feature resulting from the restricted "footprint" of reflections from meteor trails. This arises because a communication link is established only during the brief interval when a meteor trail occurs with the proper geometric orientation with respect to the transmitter and receiver. The proper orientation is such that the angles of incidence and reflection in the transmitter–meteor–receiver path are equal. This geometric condition, known as specular reflection, is satisfied whenever the trail is tangent to one of a family of spheroids having the transmitter and receiver as foci. Due to this specular scattering requirement, signals propagating between a specific transmitter and receiver can normally be detected by an eavesdropping receiver only if the latter is located in an elliptically-bounded "footprint" in the vicinity of the intended receiver. For related reasons, meteor-burst systems also have a lowered vulnerability to jamming from beyond-the-horizon transmitters [10].

Obviously these characteristics are also of benefit to amateurs. The low probability of intercept and immunity to jamming means that many stations can use the same frequency with low probability of causing mutual interference. The simplicity of the transmitting equipment, and the modest power levels and antenna gains needed, means that useful data rates can be achieved at transmitter powers well within the limits of the amateur licence, and at costs well within the reach of most amateurs who already own a home microcomputer.

Auroral scatter propagation

Visible aurora arises when streams of electrons projected from the sun collide with the atoms or molecules of gas in the upper atmosphere. Due to the nature of the earth's magnetic field, these streams of electrons are deviated and concentrated in roughly circular rings around the poles known as the auroral zones.

These streams of electrons occur at times of unusual disturbances on the sun, when the expulsion of charged particles is more energetic and streams of mainly electrons and protons travel through the solar wind towards the earth. As they impinge on the earth's magnetosphere they alter its shape, giving rise to a sudden increase in the geomagnetic field at the ground: this is the first indication of a magnetic storm, and is most intense near the auroral zones. During the main phase of the storm, an increase in the magnetic field is noticed around the equator, and energetic particles also leave the magnetosphere and enter the ionosphere along the night side of the auroral oval. These excite the light of the aurora and increase the currents flowing in the ionosphere, particularly over the auroral zones. These strong currents, called the "auroral electrojet", may also influence the occurrence of one form of sporadic-E cloud (see "Sporadic-E propagation" later). The increase in the intensity of the light of the aurora

means that there is an increase in the ionization in the auroral zone. This ionospheric ionization, associated with magnetic storms, gives rise to radio wave reflection.

It is important to be clear about the distinction between visible aurora and radio aurora before dealing with auroral propagation phenomena. Visible aurora is a manifestation of atomic excitation and ionization in the form of visible and invisible radiation. Radio aurora, on the other hand, is made up of the electrons and ions separated during this ionization process. These charged particles form reflecting regions that tend to align themselves along the lines of geomagnetic latitude with very little extension in the transverse direction. These field-aligned irregularities (see also "Field-aligned scatter propagation (fas)" later) cause reflection and scattering of the radio wave, but they are aspect sensitive so the transmitter and receivers must be in the correct positions to be able to "see" the radio aurora. Thus, from a given position, one may observe visible aurora but not radio aurora. On the other hand, radio aurora may be observable during the day when visible aurora cannot be seen.

During auroral disturbances the zone of activity extends further from the polar regions than is normally the case. The average height from which the radio waves of powerful transmitters are scattered is in the E-layer at about 110km; for this reason it is sometimes called auroral-E. The field-aligned irregularities present during these storms may also cause reflection of the weaker amateur signals. The reflection of radio waves by sporadic-E clouds of auroral origin may also be important.

Auroras follow a seasonal pattern, peaking around March and September, although they may occur at any time. In the northern hemisphere the zone of maximum occurrence swings across northern Norway, Greenland and central Canada and back across Alaska, Siberia and European USSR. During periods of increased auroral activity, propagation on the 28, 50, 70 and 144MHz amateur bands generally shows two phases of activity, with two-way transmission paths favouring stations on similar latitudes, each beaming well north of the great-circle path between them. The activity then generally extends southward, often ceasing abruptly while the longest paths are open.

Auroral propagation seems to reach a peak around sundown or early evening, and again around 2am, and the further north a station is situated, the more frequently it will encounter auroral propagation. The propagation of signals is common at frequencies between 28 and 440MHz, and it is possible to communicate at distances up to 2,000km although ranges of several hundred kilometres are more common. East-west transmission paths are usually favoured. Characteristically, radio aurora imparts a rapid flutter to signals and an unmistakable tone caused by multi-path effects and doppler shift. This flutter, which is not constant, may vary between 50 and 2,000Hz, and makes cw the preferred mode for communications, as most ssb signals can be difficult to read unless signal levels are very strong. The higher one goes in frequency to work during an auroral opening, the longer the doppler flutter becomes. To try to overcome this, a stronger ssb signal is needed in order to be readable.

During all this increased vhf activity, however, auroral disturbances can be causing severe disruption to hf communications. This disruption is due to the almost total absorption of hf radio waves that can occur in the D-region near the auroral zone during magnetic storms. For this reason these hf radio blackouts are often referred to as auroral absorption or auroral blackout. (This is not to be confused with polar cap absorption.)

Although it will be poor consolation for the amateur hf devotee, the monitoring of the characteristic auroral-flutter distortion on signals in the 2 to 5MHz range may be evidence that vhf auroral propagation could soon be possible.

Tropospheric scatter propagation (troposcatter)

During the second world war, it had been observed that there were many incidents of radar signals being reflected from objects well beyond the radio horizon. These cases could be explained at the time by super-refraction and ducting in the atmosphere (see below). However, after the war experiments were made showing that beyond-the-horizon signal levels existed which, though not as powerful as ducted signals, were well in excess of the levels that could be accounted for by gradual refraction. These signals were explained as the effect of scattering from irregularities which exist in the troposphere.

Viewed more critically, the troposphere is not homogeneous; its refractive index varies randomly from one point to another around the mean value determined by altitude. This produces two kinds of result:

(i) Strong but unstable propagation, due to specific meteorological conditions of short duration, which cannot be used for regular communications. These give rise to super-refraction and ducting which are dealt with later.

(ii) Weak but permanent propagation, due to ever-present small irregularities causing tropospheric scattering. The result of this scatter refraction is a signal illumination of the ground well beyond the horizon. The average intensity of these signals, however, is sufficiently high to provide consistently-usable communication links over large distances.

The mechanism of a tropospheric scatter circuit is as illustrated in Fig 3. Both ends of the circuit are equipped with high-gain, highly-directive antennas. The transmitter emits a high power density into the narrow cone formed by the antenna beam. The receiver collects the energy scattered by the volume that is common to the beams of both antennas.

Attenuation is less when the altitude, h, of the common volume, as well as the angle, Θ, between both beams, are smaller. For a given distance, this will be achieved if the horizons of both antennas are completely clear and their beams are tangential to the ground. The rapid increase in attenuation on a path when the antenna beams are directed well above the horizontal, occurs because the common volume is at a height where the refractive index fluctuations that cause scatter are less intense, and because the effective common scattering volume is also reduced.

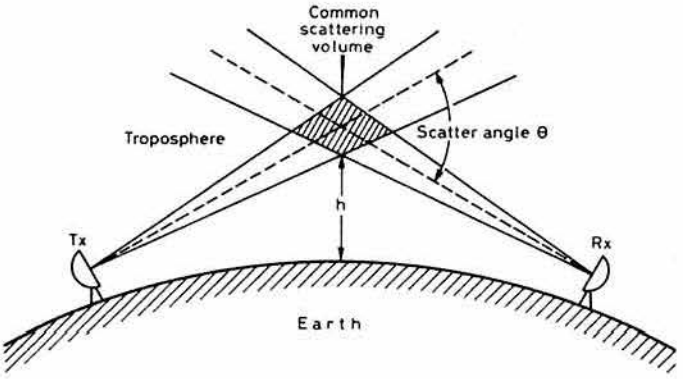


Fig 3. The forward scatter mechanism involves a large transmission loss and requires high gain, narrow beam attennas at both ends of the circuit. The scatter angle is kept as small as possible by careful choice of antenna sites (from [25])

The available bandwidth is related to the antenna's radiation pattern. In simple terms, if the antenna has a broad beam, the paths of the various rays through the common volume will be very different in length and therefore in transmit time. In this case, it is only possible to transmit signals varying so slowly that the difference in transmit times for the different paths becomes insignificant; this means that only a narrowband signal can be reliably received. To receive wideband signals reliably, it is necessary to use antenna having such a narrow beam that the difference in transmit time for the various paths through the common volume remains small in relation to the reciprocal of the desired bandwidth.

Obviously, tropospheric scattering exists even when the antennas are in line of sight. In this case the scattered field is, relatively speaking, usually much weaker than the main field, so its effects are swamped by the latter. During periods of strong fading, however, the scattered field is less affected and the received signal can show characteristics similar to those of a troposcatter link.

Troposcatter links may be established over distances up to 1,000km for the transmission of small-capacity multiplex-telephony signals without relay stations, and over medium-distance ranges of 200 to 300km for the transmission of a large number of telephony or tv channels. As signal fading is normally severe and the losses due to the forward-scattering mechanism involved are large, troposcatter systems require high-power transmitters, high-gain antennas, sensitive receivers and usually some means of diversity reception to overcome signal fading. High-gain antennas require large reflecting surfaces, so the lower frequency limit to practical operation has been about 200MHz. The upper frequency limit of about 5GHz is set by the increase in attenuation with frequency and attenuation due to rain etc which becomes appreciable on long paths. Since the effect of the scatter angle between the receiving and the transmitting beam antennas is significant, it is kept to a minimum by choosing transmitting and receiving sites so as to have an unobstructed view of the horizon.

Due to the equipment and power requirements described above, this mode is not normally open to amateurs. However, it is possible for two well-sited stations equipped for eme operation (see "Earth-moon-earth propagation" later) to establish regular communication at vhf over hundreds of kilometres using tropospheric scatter.

Judged simply on the number of operational circuits, troposcatter is by far the most important form of scatter communications.

TO BE CONCLUDED

PRESENTATIONS AT THE 1984 RSGB AGM

The 1984 RSGB President, Bob Barrett, GW8HEZ, presenting RSGB awards for the year to the members shown in the following three rows of photographs

L to r: The Wortley Talbot Trophy to Paul Elliott, G4MQS; the Ostermeyer Trophy to T P Hopkins, G8TYY, also on behalf of R Bolton, G8UQC; and the Norman Keith Adams Prize to Ian Braithwaite, G4COL

The Founders Trophy to Mike Dennison, G3XDV

The Calcutta Key to Eric Godsmark, G5CO

L to r: Terry Barnes, GI3USS, Council member for Northern Ireland accepts the ROTAB Trophy on behalf of D Gibson, GI3OQR; members of Square Bashers Expedition Group receive the Fraser Shepherd Award; and P Best, G8CQH, receives the Raynet Trophy

In addition, the following non-RSGB presentations were made

Charles Suckling, G3WDG, (r) accepts the Marconi Medal, on behalf of the DF0EME Group, from Frank Dutton of the Marconi Research Centre

L v d Nadort presents the IARU Region 1 Medal to Eric Godsmark, G5CO

Technical Topics

by Pat Hawker, G3VA

LAST MONTH'S NEWS that the DTI has accepted the recommendation of the interim report of the Merriman independent advisory panel and is to allocate the band 50 to 50·5MHz to British radio amateurs should indeed be music to the ears of all experimentally-minded amateurs. For it is not just a question of a little more vhf spectrum to relieve the often overcrowded 144MHz band. It needs to be stressed that 50MHz is uniquely suitable for all those interested in the exploitation of an unparalleled number of different propagation modes. For 50MHz, rather than 30MHz, stands at the critical junction between hf and vhf and is a frequency more responsive to the ionosphere than the lower troposphere that dominates propagation on 70 and 144MHz and higher frequency bands. We will be acquiring a band that combines many of the features of hf and vhf. The external noise levels are significantly below those found on 28MHz, the antenna arrays more compact, yet suitable for equipment that is less critical and less demanding than for the vhf and uhf bands.

50MHz—a valuable acquisition

Perhaps only those radio amateurs who have also some professional involvement in the use of the limited radio spectrum will fully appreciate the significance of the award of this 500kHz to British radio amateurs. For they will be more aware of the ever-increasing pressure on the hf/vhf/uhf radio spectrum, much of which is already bursting at the seams, particularly in the European Region 1 area. At the recent IEE conference on hf systems, it was indicated how difficult it is during the present sunspot minimum and at some times of the day and night to locate *any* usable "gaps" of more than a couple of hundred hertz during sunspot minimum periods.

Similarly, the intense pressure from mobile users and industry for more radiotelephony and data channels in the vhf spectrum is still acute despite the banishing of all UK television broadcasting from Bands 1 (41–68MHz) and 3 (174–216MHz). Broadcasters have even had to fight hard to obtain a limited number of vhf allocations for their many "ancillary services" that range from radio microphones to outside-broadcast programme and communications links.

The success of the RSGB in convincing the 1982 "Independent review of the radio spectrum (30 to 960MHz)" that there was a real need for a UK amateur band at 50MHz is comparable only to the success achieved by the RSGB representatives (Stan Lewer, G6LJ, and John Clarricoats, G6CL) at the 1947 Atlantic City conference in saving for UK amateurs access to the 1·8MHz band.

There is, unfortunately, the disadvantage that the prospects of transmission (at least during television hours) on 50MHz by the many thousands of experimentally-minded amateurs in Continental Europe must be regarded as dim. For most countries (Norway is an exception) 50MHz is, and likely to remain, firmly in the heartland of television broadcasting, swallowed up in Channels E-2, E-2A and the East European R-1. There will thus be a dearth of medium-distance stations at work, and the international obligation for British amateurs to avoid causing interference to television reception in any of those countries. Nevertheless the shape of our islands does provide paths stretching from the Channel Islands to the Shetlands —and there is plenty of 50MHz activity across the Atlantic, in Australia, Japan etc.

In the UK it will also be necessary to ensure that 50MHz transmitters have low harmonic output. The second harmonic between 100 and 101MHz is a part of the spectrum due to be used for one of the two new national vhf/fm sound radio networks planned for when the broadcasting Band 2 is extended up to 108MHz during the next few years, and still used in many parts of the country for the emergency mobile radio service (police, ambulance and fire services).

But just consider the possibilities offered by the following basic propagation modes:

(1) Worldwide F2 ionospheric propagation in daylight at periods of very high sunspot activity, with occasional, though possibly rare, openings towards the south in most phases of the cycle.

(2) Transequatorial and field-aligned F2 propagation (te) in the evenings, even though the UK is often considered too far north for this to be at all common.

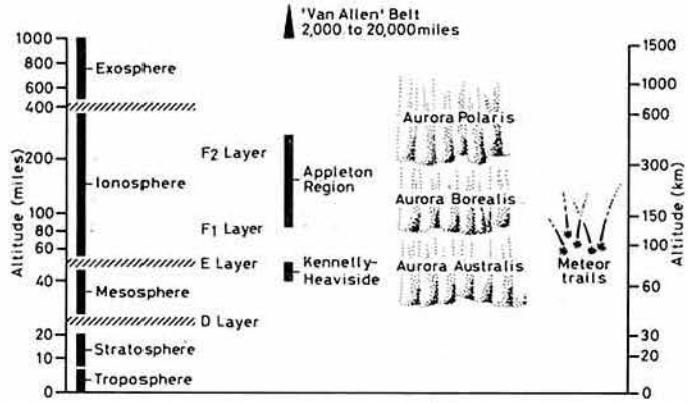


Fig 1. The atmospheric and ionized layers that play a vital role in the propagation of all radio waves. At night the F1 and F2 layers combine, resulting in dawn and dusk "tilts" that give rise to chordal hop rather than multi-hop propagation of long-distance signals. Meteor-trail reflections, auroral reflections and sporadic-E reflections all occur about 85 to 115km above the earth so that the maximum range of all these forms of hf/vhf propagation is roughly the same, about 2,000km

(3) Ionospheric scatter modes (with very high power) can provide reliable 24h communication over distances of from 500 to 2,000km.

(4) Almost the optimum frequency for sporadic-E and meteor-burst communications.

(5) Reasonable for auroral propagation.

(6) Some degree of tropospheric bending, ducting and tropospheric scatter modes, though less pronounced than at 144MHz and above.

(7) Significantly better propagation over hills and down into valleys than at 144MHz.

HF operators can expect to be reliably warned of sporadic-E and/or high muf on 50MHz by the presence of "short skip" signals on 14, 21 and 28MHz.

Antennas and 50MHz

The dipole element length for 50·25MHz is about 9ft 3·5in (282·2cm). While this may seem massive to 144MHz operators, it will seem welcomingly small to hf operators, making two, three and four-element Yagis, two and three-element Quads, delta loops etc practical for most locations. But it should also be recognised that 50MHz also lends itself to high-gain, fixed beams such as rhombics and V-beams. It is a matter of history that the first experimental radio relay system for television distribution links from London to South Wales was around 50MHz and used rhombic antennas.

There are also the benefits that accrue from the larger elements, compared to 144MHz and even 70MHz, as well as the lower losses in coaxial cable feeders.

The signal voltage delivered by a receiving antenna depends on: (a) the *frequency* of the signal; (b) the gain of the array; (c) the loss in the feeder cable, which in turn depends on the cable characteristics, the frequency and the length of the cable; (d) the field strength of the signal; and (e) the height of the antenna. Similar considerations apply to the use of an array for transmission.

It is sometimes forgotten by newcomers that the voltage developed by a dipole element decreases inversely with frequency. For a given field strength a 50MHz dipole will provide about three times as much signal as a 144MHz dipole. The hf operator will also appreciate the fact that a 50MHz array just about 18ft high will nevertheless be a full-wavelength above ground and should be capable of providing excellent low-angle radiation to exploit the ionospheric propagation modes.

While there is no call on 50MHz for the degree of receiver sensitivity that we associate with 144MHz and above, we can still significantly improve on 28MHz where it is seldom possible to obtain any advantage from a noise factor of less than about 7–8dB. For 50MHz we can usefully aim at around 4–5dB well within the capabilities of low-cost devices.

Thus, in general, the techniques suitable for 50MHz can have as much or more affiliation with those used at hf than at 144MHz. It is also more logical to concentrate on the narrower-band modes such as cw, rtty and ssb than channelized nbfm(though nbfm may prove a useful cure for rfi). It will be a pity if the band is viewed primarily as an "overflow" band for 144MHz, although with a 500kHz allocation and a little goodwill by users, there should be space for both weak-signal and local operation. But there is surely some obligation to take every opportunity to exploit to the full the many possible modes of propagation and to uphold our claim, as experimental amateurs, to this valuable stake in the spectrum.

Scatter modes of propagation

The scatter modes of vhf propagation have been used for some 25 years to provide reliable 24h communication for commercial and defence systems. Many of these have been tropospheric scatter systems between about 400MHz and 5GHz, with hops of about 100 to 700 miles. A typical example of the use of tropo scatter is to provide communication with many of the North Sea oil rigs.

But there have also been a number of very high power ionospheric scatter systems operating between about 35 and 50MHz, and used to provide continuous 24h multi-channel rtty communication over single-hop distances of up to about 1,200 miles. For example, ionospheric scatter was adopted to provide the links between the American "dew" (distance early warning) radars within the Arctic Circle and continental USA. Such installations often have enormous "billboard" antennas (about 20dB gain) and around 50kW transmitter power. This does not mean however that ionospheric scatter or tropo scatter is not possible for amateur operation, at least for intermittent, narrowband operation at favourable times.

It is interesting to recall that the early pioneers of vhf scatter propagation included Dr Eric Megaw, G6MU, of GEC Research Laboratories, "Scattering of electromagnetic-waves by atmospheric turbulence", *Nature* 166, 1100 (1950), and the English-American team of H G Booker and W E Gordon, "A theory of radio scattering in the troposphere" *Proc IRE,* Vol 38, 401 (1950).

The first recorded observations of tropospheric scattering are usually ascribed to Katzin in 1945, who noted that even when ducts were not present the signals did not disappear altogether or fall to diffraction levels. New vistas of extended range, over-the-horizon working on vhf opened up in the late 'forties and early 'fifties when radio scattering theories were combined with the idea of irregular and patchy structures in the troposphere, stratosphere and ionosphere.

Megaw established a link from Wembley to Cornwall. In the USA a number of prominent physicists, including Booker and Gordon, and with the co-operation of a number of radio amateurs recruited by the ARRL, established an experimental ionospheric scatter link between Cedar Rapids, Iowa and Sterling, Virginia, a distance of some 1,250km, roughly half the span of the USA, on a frequency just below the 50MHz band.

From this work, several interesting and important findings emerged. For instance, the signal strengths of 50MHz scatter signals tend to decrease at lower sunspot levels (but never entirely vanish), apparently as a result of a decrease in the ionization of the D region. However, the *opposite* effect is observed during the sudden ionospheric disturbances (sids) which result from solar flares and which can black out communication at hf as a result of the increased absorption in the D region. But at these times 50MHz ionospheric scatter signals peak up: Fig 2 is taken from "Radiowave propagation and the ionosphere" by Ya L Al'pert, first published in Moscow in 1960.

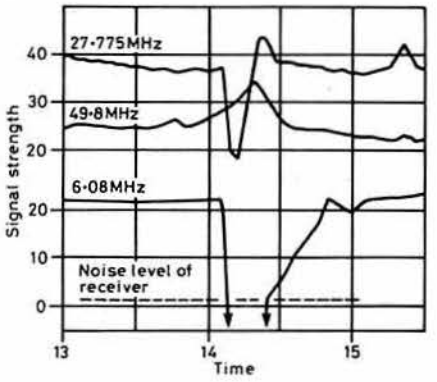


Fig 2. Variation in signal strength at 6·08, 27·775 and 49·8MHz over a 1,243km path during a sudden ionospheric disturbance. Whereas the low hf signal blacks out completely, and the 22MHz signal shows a marked reduction, the 49·8MHz scatter signals rise appreciably (After Al'pert)

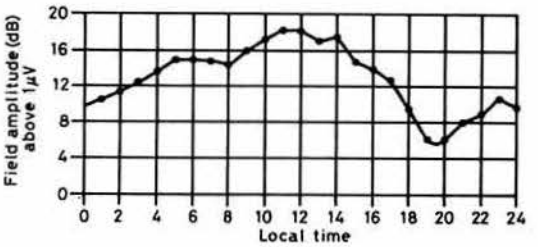


Fig 3. Diurnal variation in the strength of 49·8MHz ionospheric scatter signals over a 1,243km path as recorded in April 1951 (After Al'pert)

Al'pert points out that propagation due to scattering by ionospheric irregularities needs to be distinguished from two other propagation modes which play just as important a role at around 50MHz and permit reception at about the same distances. These are reflections from ionized meteor trails and ionized auroral formations where the propagation path passes through the polar region.

Ionospheric scattering can be distinguished from meteor-trail reflections by the less pronounced and smoother amplitude variations. Then again, the optimum time for ionospheric scatter is around local noon (Fig 3) when the lower regions of the ionosphere tend to be more ionized. On the other hand, the optimum period for bursts from meteor trails is during the morning when meteor activity is at a maximum.

It should thus be possible on 50MHz to communicate over distances of the order of 1,000 miles by noting various optimum periods spread conveniently through the day: meteor burst in the mornings; ionospheric reflections in periods of high sunspot activity or ionospheric scattering around noon; transequatorial effects possibly in the evenings, auroral effects in the evenings and night; and of course *frequent* sporadic-E openings during the summer months and with a less pronounced mid-winter season at the end of December and early January. Remember that meteoric activity tends to be a minimum around twilight.

Al'pert was perhaps treading on thinner ice when he stated: "Good correspondence was also observed between the intensity of reflections from auroras, the frequency of occurence of the sporadic-E layer, and the ionospheric propagation of (50MHz) vhf". Subsequent work has tended to discount the idea of any clear correlation between sporadic-E and the sunspot cycle.

Meteor bursts on 50MHz

Much of the early work (in the mid-'fifties) by the Canadian Defence Research Board ("Project Janet") on meteor-burst communication systems was carried out at approximately 50MHz, and the 30 to 50MHz range is still regarded as the optimum band for operational Defence or commercial meteor-burst systems designed to exploit even the very short (typically 0·2s) bursts that result from the billions of small meteorites that enter the upper atmosphere every day. This differs from normal amateur practice where, at least up to now, most effort has been concentrated on the much longer-lasting highly-ionized trails that tend to be associated with the regular "shower" periods, on the less favourable frequency of 144MHz.

Project Janet showed that with a 100W transmitter and five-element Yagi antenna arrays it is possible to communicate over distances of about 600 miles, in bursts of 600wpm transmission, at an average rate of 60wpm. More recent systems tend to use computer-controlled systems with burst rates of around 4,800 or 9,600 bits/s over distances of up to 2,000km and usually experience maximum periods between bursts of just a few minutes. Transmitter powers are of the order of 1kW with about five-element Yagi antennas. *Reliable* meteor-burst communications are thus possible with installations relatively modest when compared with the enormous Defence ionospheric scatter systems. There is clearly great scope for amateur work at 50MHz, particularly in the development of systems capable of exploiting the far more numerous short bursts, rather than relying on the occasional long bursts of the major shower periods. Remember that 50MHz is the *ideal* band for this mode of propagation.

Experimental results on 50MHz

The availabiltiy of 50MHz (outside of tv hours and with limited power) to a relatively small number of British amateurs since February 1983 has amply confirmed the interesting propagation modes to be found in this unique part of the spectrum. An illuminating summary, compiled by Ray Cracknell, G2AHU (and former ZE2JV of te-propagation fame) on behalf of the RSGB Propagation Studies Committee, has recently been published in the journal of the IARU Region I Division. Without wishing to trespass on G8VR's *4-2-70* preserves, the technical aspects of this report should encourage widespread use of 50MHz once it becomes available to us all.

For example, transatlantic contacts have been made on 50MHz in June 1983, June 1984 (and June 1985) by what is often believed to be multi-hop sporadic-E. However, such openings seem to be limited to a very few days each year, at this phase of the sunspot cycle.

In general, reliable ranges of about 200 miles (320km) seem possible on most days,with up to about 1,000 miles (1,600km) in favourable tropo conditions. 50MHz has been shown to be "pre-eminently" suitable for sporadic-E propagation, "frequently disappointing" for auroral propagation, "excellent" (better than 70MHz and much better than 144MHz) for meteor-burst communication. Some F-layer ionospheric openings have been observed despite the unfavourable sunspot conditions. Field-aligned/ te-modes hae not yet been positively identified.

The report makes no mention of ionospheric or tropospheric scatter modes, but it is of course difficult for amateur observers to identify with any degree of certainty the various propagation modes, particularly since there can be mixed-mode signals. The power limits of 16dBW (22dBW p.e.p.) also mitigate against scatter modes. These limits have always applied to the British 70MHz band (which, like 50MHz in Region 1, is a national rather than international assignment) and it remains to be seen whether the DTI will give us the 4dB power gain that would bring 50MHz into line with most hf/vhf bands, and be extremely useful for scatter modes.

7MHz sloping delta loop antenna

The full-wave 7MHz loop antenna has been shown by G3UML and others to be an effective dx antenna but tends to require a fairly high support in the form of a tree, pole or building. From Kjell Norlich, SM6CTQ, in his Swedish dx column in *QTC* (Nr 3, 1985, p112) comes the sloping form of delta loop shown in Fig 4 that he reports to be a useful dx performer and with a more modest height requirement. The impedance match is improved by the quarter-wave transformer (though this will tend to make such an antenna a one-band antenna). The formulas used were: loop (1,005 × 0·305)/f where the length is in metres and *f* in megahertz, and for the transformer (246 × 0·305)/*f* multiplied by the velocity factor of the cable (0·66 for RG59/U). Omission of the 0·305 factor gives the result in feet.

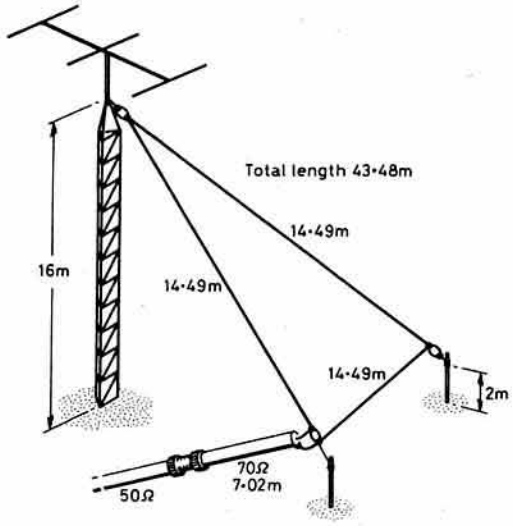


Fig 4. 7MHz sloping delta-loop antenna

Radiation wrongly blamed?

In a follow-up to the correspondence in *The Lancet* (6 April, 1985) reported in the August *TT* (p628) on the statistical studies that apparently link electronic equipment assembly, radio and tv servicing and amateur radio with some leukaemia and cancers, a letter from J Seager of Arrowe Park Hospital, Upton (*The Lancet* 11 May, 1985, pp1095-6) stresses that the possible environmental hazard found in these studies is most unlikely to have anything to do with the presence of electromagnetic fields.

He writes: "As pointed out by Bonnell (the New Zealand study of electrical workers), there are many possible hazards such as fluxes and the tin/lead alloy used in soldering to which the amateur radio enthusiast (and the other two categories—*G3VA*) is exposed. Electrical components and synthetic materials used for tagboards and insulators may all overheat and emit fumes when soldering is being done. The radio amateur has traditionally not only operated but also built much of his equipment. This tends to be done in far from ideal workshop conditions, though allergy to resin flux may limit exposure to solder fumes in some . . . . A more precise analysis of the risk factors is needed, but in the meantime it might be advisable for readers of *QST* and other electronics periodicals to do their soldering in short sessions in a well-ventilated room or out of doors."

This letter thus echoes the suggestion made in *TT* several years ago (based on advice in the *British Medical Journal*) that extraction fans or other good ventilation are advisable during soldering sessions—although this was in connection with a clear tendency for electronic assemblers using cored solders to develop asthma-type coughs and wheezes.

In general there does appear to be a tendency today for "radiation" (ionized or non-ionized) to be labelled as the likely cause whenever there is any statistical evidence of an apparent health hazard that cannot be clearly identified. A notable example is the long-standing controversy over the alleged effects of using visual display units over long periods. Many investigations have shown that the radiation from vdus, monitors and tv sets of modern design is miniscule.

In my purely layman's opinion, a far more likely cause of headaches, nervous strain etc often reported as symptoms by vdu operators is the degree of 25Hz inter-line flicker on the closely-observed screens. Undoubtedly a small proportion of the population is sensitive to various optical effects such as flicker, and this has been found to act as a trigger for those who suffer from epilepsy, and there is some evidence that flicker can also trigger migraine headaches.

Water-loaded antennas

Alan Williams, G3KSU, draws attention to an intriguing UK patent application (GB 2, 001, 804A) filed by Plessey (inventor J G Brett) in 1978 for "improvements in or relating to aerial systems."

It has often been pointed out in amateur journals that if we could submerge antenna elements in water, the resonant length would be greatly decreased. In effect, the idea proposed in this patent is a variation of this principle of dielectric loading which can also be implemented by cladding the element with ferrite material.

The application points out that "it has been proposed to submerge an antenna consisting, for example, of a metallic rod in water, but this has been found to suffer from the practical disadvantage that through contamination and absorption of CO_2 into the water, degradation results and the antenna efficiency rapidly deteriorates."

It is therefore proposed to use an antenna structure surrounded by water or similar acceptable liquid by including a sealed container shaped so that the element is completely surrounded by the liquid. This can take form of a sealed glass or plastics container filled with water (some anti-freeze can be added for low temperature conditions): Fig 5. The process of filling and sealing the container is preferably carried out under chemically-clean conditions.

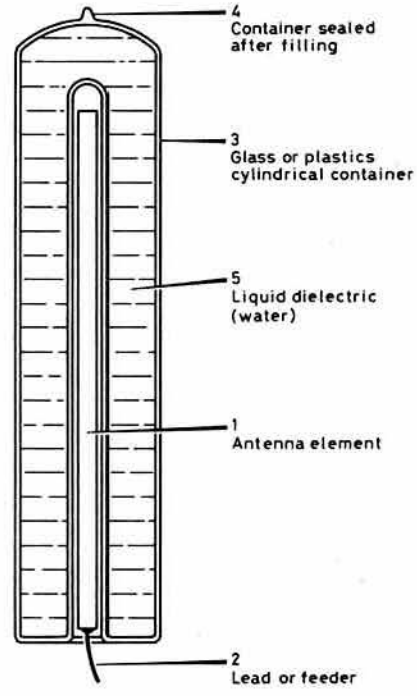


Fig 5. Short "water-jacketed" dielectric-loaded antenna as disclosed in UK Patent Application GB 2,001 804 by the Plessey Company

It is claimed that, for example, an antenna rod length of 15cm used at a frequency of 100MHz gave an increase in signal strength of over 200 per cent compared with a rod of the same length in free air. Where the sealed container is not completely filled, any remaining air space should be substantially evacuated.

While one needs to view patent claims with some reservation, there is little doubt that dielectric loading has been shown to be an effective method of achieving reasonably-efficient antennas with miniature resonant elements. The construction of a sealed water container might present problems, but perhaps there is someone able to overcome the problems and give the idea a trial on the amateur bands.

The idea of surrounding an element with water reminds me of a problem known to exist with some wideband television receiving arrays: a significant fall-off in performance on the higher-frequency channels when it rains and water collects on the elements. Clearly what is happening is that the resonant frequency of the array is being lowered by the rain—further proof of the effects of dielectric loading.

The idea of a 1·5m rod antenna at 10MHz is sufficiently attractive to encourage practical experimentation. Remember that it is entirely permissible for an amateur to use the ideas of any patent provided that no attempt is made to market the resulting product.

But one foresees an unhappy operator reporting: "Sorry, om, signals are fading, my antenna has sprung a leak." Shades of Tony Hancock!

Solidstate polarity protection

To protect solidstate equipment from being accidentally connected to a battery with the polarity of the leads reversed, it has long been common practice to connect one or more diodes in series with the load: Fig 6. This, however, results in voltage drops of about 0·3V (germanium diode) or 0·7V (silicon diode) or twice these figures where the current passes through two diodes as in Fig 6 (c).

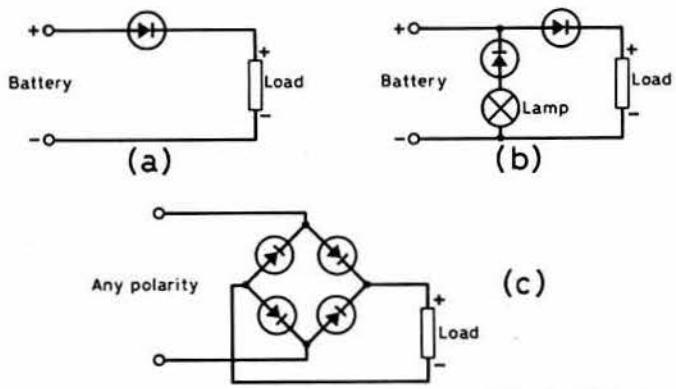


Fig 6. Polarity protection using diodes in power supply line. In (b) the lamp lights if the battery is wrongly connected. In all arrangements there will be a fixed voltage drop due to the diodes

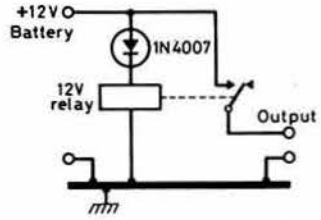


Fig 7. Polarity protection combining a relay with a diode in such a way that there is no voltage drop to the load

In some applications even these modest voltage drops may be unacceptable. Fig 7 shows a variation of diode protection reported by Winfried Mederer, DL4RW (*cq-DL*, Nr 6/85, p315) that provides protection without incurring any significant voltage drop. In this case the diode ensures that a suitable relay closes only when the battery is correctly connected.

Spark hazards from transmitters

Several references have been made in *TT* to the work of Dr Peter Excell and others at the University of Bradford on the controversial subject of the risk of spark ignition of flammable substances by very strong local radio transmissions (eg *TT*, September 1984, p774). Some of his papers drew particular attention to the fact that some amateurs, particularly those working hf mobile, use transmitter powers considerably in excess of those normally associated with commercial vhf/uhf radiotelephones etc.

It is therefore interesting to learn that, together with Dr Alfred Keller, he has been awarded a £33,572 SERC grant to carry out further studies, with emphasis on taking into account "probabilistic factors" when determining realistic safety margins, on the grounds that some current BSI standards relating to "hazard zones" have proved "unrealistically onerous", being based on the assumption that a number of unlikely events will occur simultaneously. It is now claimed that: "By themselves, each of these events may be seen to be 'just possible', ie at the limit of reasonable probability. In fact, for a sequence of such events to occur simultaneously the probability would be so low as to be negligible compared with numerous other generally-accepted risks: the costs involved in elimination of the radio-frequency hazard on oil rigs and large chemical plants etc might be better spent on more urgent safety matters, such as improved scaffolding, or road safety."

Refraining from the comment that Dr Excell appears to be attempting to disprove Murphy's Law, the announcement of this work does offer some other useful background information:

"Radio waves from high-powered transmitters can sometimes cause sparks to form on metal structures (unintended receiving antennas) located in a zone around the transmitter. Potentially hazardous conditions exist, for example, around oil and gas plants should these be co-incidentally located within the predicted 'hazard zone' of a transmitter. The purpose of the work is to determine viable safety margins within which transmitters can be built and operated. This will be done by assessing the 'probabilistic factors'—in other words, the likelihood of an explosion occurring, since a number of conditions must simultaneously exist, such as appropriate orientation, a spark-gap of the correct size, and flammable mixture at the optimum concentration around the spark-gap at the time of the spark."

Fleeting history

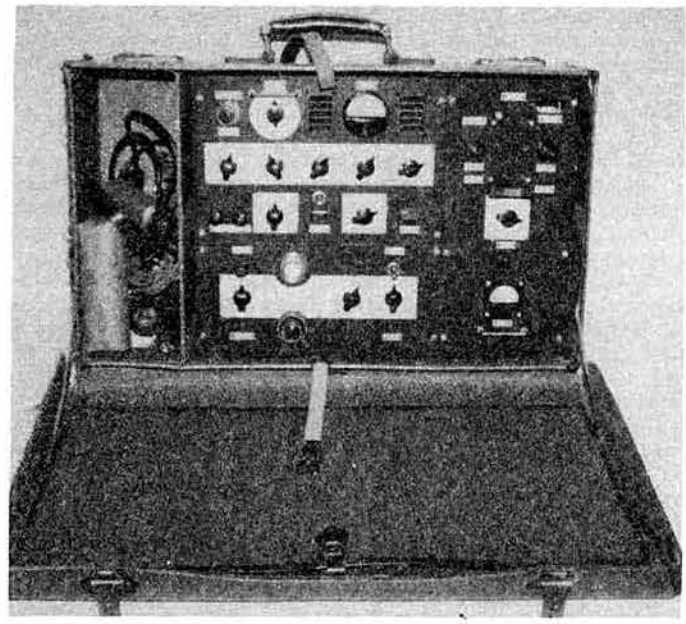
Although, basically, *Technical Topics* is dedicated to the advancement of new technology, it has always been my firm contention that the future cannot be disassociated from the past. Even though amateur radio is now well into its third era of solidstate, the influence and value of the ideas that abounded and were pioneered in the earlier eras of valve and spark are still important—right back to such classic patents as the Marconi Company's "7777" that introduced the concept of tuning and so opened the way to there being more than one usable transmission at a time!

There is, I find, a growing appreciation that the history of technology is important, and that more care needs to be taken to collect, preserve and display not only the fascinating hardware of yesteryear but also archival material in the form of documents, publications and the like. British amateurs should be grateful for the efforts of the Science Museum (not forgetting the associated new Film and Television Museum at Bradford); the various Service displays at Blandford, Hendon etc; Douglas Byrne, G3KPO, and his National Wireless Museum on the Isle of Wight; Ron Ham; George Jessop, G6JP; and a growing number of other private museums and collections. There is, for instance, an extensive private collection of early radio and television sets and memorabilia in West Dulwich, south London, and similar collections are being built up elsewhere. Unfortunately various attempts to set up a broadcasting museum at Alexandra Palace or in BBC buildings still seem to be stymied by lack of funds; the IBA has long had a "broadcasting gallery" at 70 Brompton Road (prior appointment required) though this is mainly concerned with the establishment and organization of Independent Broadcasting. However, there is a small but interesting historical section. In 1982, I was fortunate enough to have a chance to look round a broadcasting museum in Dallas, Texas, that included a significant number of amateur radio exhibits, not behind glass but open virtually to "hands on" examination.

The recent diamond jubilee issue of *Radio Communication* prompted Arthur Milne, G2MI, to make a renewed plea that the RSGB, itself, should do more to establish its own museum or collection, and to appoint an official archivist. G2MI, like others, is concerned that various gifts and bequests of historic radio material that have been made over the years to the Society, are nowhere on display. I recall the unique collection of early equipment donated by Mr Maurice Childs of the London Telegraph College and an early vice-president of the Society. G2MI mentions a model made by Professor G G Blake (one of the first historians of radio) showing the principles of the valve, a Marconi magnetic detector in working order, a working syphon recorder, various Post Office telegraph keys, a coherer, his own 3·5MHz transmitter used for GB2RS, and many other artefacts.

Unfortunately, museums and archivists (unless volunteers) cost money and space, and the same can be said of library collections, and tend to be given low priority. But let us hope that the Council will not overlook the

Gerry Marcuse, 2NM, the founding father of the *T&R Bulletin* in his elaborate early station. This shows his equipment about 1922 and is probably a "440m" set-up in the days before he became one of the most successful of the pioneers of the "short waves". (Photographed from a radio display at the IBA Broadcasting Gallery by Adrian Good)



One of a 100 or so "suitcase sets" made by Telefunken in 1952 as "amateur radio apparatus" but most likely meant for "unofficial" diplomatic communications. This equipment is now in the possession of HB9AQS of Gstaad, Switzerland and still performs well on the amateur bands

need to do something positive before the bits and pieces are scattered and lost—and I feel certain that, if displayed, they would soon encourage others to find a permanent place for fast-vanishing equipment and components of historical significance. Perhaps the RSGB could co-operate with one of the smaller London museums to arrange a special exhibition —I was much impressed last December to see a display of Alfred Midgeley's pioneer work in radio, electronic music, car electrics etc organized at the Watford museum, not all that far from Potters Bar!

G W Thomas, G5YK, has written to say that the "unidentified" member of the early editorial committee in one of the illustrations in "Sixty Glorious Years" was Archie Alliston, G5LA, and that he and the others were a great help in putting together the *Bulletin*.

It had also been my intention to provide an illustration of the unforgettable Gerry Marcuse, G2NM, who initiated Empire Broadcasting, was an outstanding dx operator, an RSS Group Leader etc, all in addition to his being "the father of the *Bulletin*", but the print arrived too late. It shows Gerry's impressive station about 1922–3 at a time when he was still interested in "440m" as well as the opening of the short waves.

The suitcase-set mystery

For those who share my enjoyment of the John Le Carré (David Cornwell) novels of post-war intelligence intrigue, Hans Zimmermann, HB9AQS (ex G5EIH, DJ0RW etc) sets a poser worthy of the Master. He has a hefty "suitcase set" that was clearly strongly influenced by SOE's wartime B-2 as designed by John Brown, G3EUR, including a two-stage co-pa (6AG7-6L6G), a four-stage, three-waveband superhet receiver (two ECH42, two EAF42) covering 3 to 16MHz and similarly built in three sections, though with rather more controls and with a suprising lack of miniaturization that would have been technically possible at the time it was built.

It would appear that a batch of at least 100 of these equipments was built by Telefunken at Hannover in 1952 and were intended for, and used by, diplomatic radio networks for a number of years. So far so good, but why, asks HB9AQS, were the Telefunken drawing office circuit diagrams clearly marked "Amateurgerät Empfänger" and "Amateurgerät Sender" when it seems certain that they were not designed or ever intended for the amateur radio market? HB9AQS has found that, like the B-2, they can still form an effective cw rig.

My own guess is that these sets were never "clandestine" equipments for agents or paramilitary purposes, but for diplomatic networks in the days before the Vienna Convention finally made such communications entirely legal once the consent of the host country is obtained. For many years before that, Foreign Offices, including our own, set up extensive hf radio networks on an "unofficial" basis and under the control of Intelligence Services rather than the pukka Foreign Offices.

Thus the "amateur" designation on the Telefunken diagrams may have been to keep the true purpose of the sets from Telefunken employees, or possibly from any over-inquisitive British officials of the Civilian Control

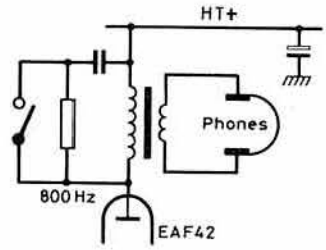


Fig 8. The switchable 800Hz audio filter used in the mystery Telefunken 1952 "amateur receiver" for the suitcase set

Commission that still, in 1952, wielded some power over the emerging Federal Republic of Germany.

But one final element of the mystery defeats me. Why, if they were for German government communications, were the instruction manuals printed in French?

Technically, the Telefunken sets have at least two features not found in the B2. A voltage-regulator tube in the screen-grid supply to the 6AG7 apparently to improve keying characteristics, and a simple switched 800Hz af filter in the receiver output (Fig 8) that HB9AQS reports finding "suprisingly effective" and must help to overcome one of the major problems with the receivers used in British, German, Polish and American wartime suitcase sets: the absence of a crystal filter.

As a long-time admirer of the Polish AP and BP clandestine sets, it was only recently that I appreciated that the compact, high-power BP3 equipment used one of the 829 double-tetrodes in the power amplifier, very advanced technology for 1943!

Tips and topics

Hector Cole, G3OHK, queries whether there is any simple but effective way of paralleling several low-cost, medium-current power supply units so as to provide a high-current, voltage-regulated and protected output with the aid of a single "magic" mixer-regulator.

John Wilson, ex-G8KIS, notes a comment from British Telecom Research at Martlesham (*Electronic Letters* 20 June, 1985, page 553) which indicates that the flash from a strong photographic flash-gun or a laser used close to some forms of cmos memory devices can result in a destructive latch up, and less serious latch-up problems at lower light levels.

George Cripps, G3DWW, commenting on the principle of using narrow bandwidths and good rf selectivity as an aid to weak-signal reception (*TT* July) writes: "If we accept the desirability of introducing a narrow bandwidth as early as possible in the receiver chain, then the use of a signal-frequency Q-multiplier was used to good effect by W1DX in his "Miser's Dream" receiver (*QST* May 1965 and *Amateur Radio Techniques*, 7th

edition, p78). He very neatly utilized the normal antenna coupling and first tuned circuit coils. It seems to me that this technique could now be exploited using a low-noise fet device." The 1965 receiver was a valve model with a 6C4 Q-multiplier directly before a 7360 beam deflection mixer capable of a very wide dynamic range.

In connection with the signal-frequency crystal filters developed by G3IPV (*TT* July), he has further refined his units based on shunt rather than series crystals, and it is hoped to return to this subject later.

Dr Constantino Feruglio, IV3VS, adds to his comment on using plastic hosepipe to protect 300Ω twin-feeder by pointing out that his hosepipe is dark-yellow and probably acts as an effective filter against u-v radiation. The hosepipe itself, as well as the ribbon feeder, remains in excellent condition even after four years in the strong Italian sunlight.

A A Butcher, G4SIB, who owns a Trio 930S transceiver, suggests that owners of this or similar equipment may be interested to learn that memories can be stored without using batteries to form a non-volatile memory since the large, low-leakage capacitor alongside the battery can retain a charge for 24h or more. He writes: "I went on a week's holiday and the frequencies remained stored. The rig has been used for 18 months and this arrangement has the advantage that the owner does not have to worry about battery leakage." It should perhaps be stressed that it would be unwise to rely on charged capacitors for those rigs where the memory is essential for the functioning of the equipment, and not just for storing frequencies.

I "priced" the Rockwell-Collins HF2050 receiver (*TT* May) in the plus-$6,000 price range on the basis of the first $6-million Canadian order for almost 1,000 receivers. An unsigned note from an "swl" complains that he received a quote for a single receiver which puts it in the £16,000-plus-options category. It only goes to show that things come cheaper when you buy in large quantities. In practice many current high-performance *professional-grade* communication receivers tend to be priced in the £10,000 to £20,000 range depending on the options etc. Thus, basically, it would seem that digital signal processing is already roughly cost-competitive with analogue designs, and offers considerable scope for becoming more so. That is not to deny that there is still a lot to be said for sets based on analogue crystal filters etc.

John Stocking, G4INI, ran into interference on all hf bands (KW2000 at about 90W p.e.p.) on all tv signals passing through his Panasonic NV333 video cassette recorder. He traced the problem to the wideband rf amplifier in the vcr, and fitted a Labgear CM9700 cb-type highpass filter in the tv antenna coaxial cable feeder lead as close as possible to the vcr antenna socket. He reports "This effected an immediate and complete cure to the problem, proving cheap and easy to install".

The Spalding & DARS has now published an enlarged second edition of its useful "Digest of horizontal wire aerials" compiled by Dennis Hoult, G4OO, and containing some 91 different designs of simple wire antennas and 14 antenna tuning units, including an appreciable number that have appeared over the years in *TT*. A handy 46 pages, it can be obtained, £3 post free, from D Hoult, Chespool House, Gosberton Risegate, Spalding, Lincs PE11 4EU.

4-2-70

*by Ken Willis, G8VR**

Is Maidenhead here to stay?

The comments in *Dubus* 2/85, by Klaus, DL7QY, on the new QTH locator system (Reported fully in *Microwaves—Ed*) have aroused some controversy. There are those who will argue that if we had been reared on Maidenhead it would all be just as easy as with the old system. Be that as it may, European operators have had several years' experience with a system which suited their needs, and I must say that whereas I know that I still need to work NO square, it will be a long time before I can associate this with KO34. I suppose that as compiler of *4-2-70* I ought to be the first to support a decision taken by the IARU, but I have never attempted to steer operators one way or the other. I have to confess that in a recent Es opening when I worked my first-ever SV station on 144MHz, and my 50th country on that band, I was not going to have the contact spoiled by having to spell out a long locator to a man at the other end who spoke very little English, so I told him I was in "Alpha Lima" and he responded with "Lima Alpha" and we both knew where we were. Better than JO01DJ and KN10LO do you think? There may be another LA square or two around the globe, but I know of only one which sports an SV prefix.

David Johnson, G4DHF (Lincs), thinks that DL7QY summarizes the feelings of the majority of dx-orientated operators throughout Europe, that it is "about time that the VHF Contests Committee fed back grass-roots opinion to Region 1 and had the old system retained and ratified by its use in contests". He goes on: "It is a situation of *Vox Populi*, and the voice of the majority of *active* dx-operators will be heard".

Bill Hodgson, G3BW (Cumbria) "the only ms operator active in YO square", writes in similar vein. He says: "The whole of the British Isles with the exception of three squares has the prefix IO in the new system" and goes on to say that in a recent contest he was almost driven mad by the continued repetition of IO. He also makes the point to which I referred above, namely that "we know the difference between IT9 in HX square and SM3 in HX square" and that "90 per cent of operators in Europe were happy with the way things were before the change.

This controversy will no doubt go on for a long time. The USA operators who have never known anything other than Maidenhead are generally delighted at the way in which the "grids game" has increased activity on their vhf/uhf bands. Europe, on the other hand, boasts literally thousands of "battle-hardened" vhf veteran operators who know a weak signal when they hear one, and it may be that *vox Populi* will eventually decide what happens. For contests, operators will have to abide by the rules if they wish to enter; other than that, provided they conform with their licence conditions which say nothing about locators, they are free to define their whereabouts in any way they choose. Let's have some views from readers.

Repeater news

One of the many advantages of compiling *4-2-70* each month is the wealth of information received from all types of source which enables me to keep in touch with what is happening on the vhf/uhf scene. Among regular inputs are the excellent newsletters published by many of the repeater groups, and it might be in the interests of all repeater "buffs" if someone drew up a list of which newsletters are available on a general basis, their cost and where they might be obtained. For example, *LENS*, the publication of the Leicestershire Repeater Group, which appears four times each year is a magazine in its own right containing much of interest of a topical and technical nature to those who prefer repeaters or fm operation. Its cost is quite nominal. Another quoted here frequently is the Central Scotland FM Group's *FM News*, and there are several others. There must be many operators who would gain by having access to these publications if they knew that they existed, while repeater groups could swell their funds by modest subscriptions from readers as opposed to users of particular repeaters. If information of the type I am suggesting is already available, someone please tell me.

From this month's intake some glimpses of what is in the minds of repeater groups by way of future developments show how complex and sophisticated some of the installations are today, while the implied organization behind some of these groups is quite an eye-opener. For example, Leicestershire Repeater Group is budgeting for an expenditure of more than £3,000 on new projects, making a total of nearly £7,000 in a two-year period, all of which has to be found from paid-up members (about 200 at present) plus other activities organized by the group to provide funding —since as Jack Hum, G5UM, says in an editorial: "In life, if you want any sort of service you must be prepared to pay for it." Among Leicester's plans are some mentioned here before, an inter-repeater link, microwave video beacon, mailbox, database packet radio pilot, phone patch etc, all forward-looking projects involving a high level of technical competence on the part of the designers (and users!).

Central Scotland and Borders also report some innovations and thoughts for the future. These include provisional thoughts for a new vhf repeater for the Solway Firth area on the Scottish side, serving Dumfries and Galloway where the signal from GB3AS (Anglo-Scottish Repeater Group) is weak in places. A favoured site for this project would be Cambret Hill, and negotiations have already commenced. The same group has fitted new two-element Yagis to GB3EV to improve M6 motorway coverage and link-up coverage between GB3AS and GB3LD. This has resulted in an erp of 10W. Another antenna replacement which proved most successful was at GB3SS near Elgin, said to have given the system a new lease of life with coverage including Aviemore, Kingussie and Wick, John O'Groats and the Moray

NOTE NEW ADDRESS
*6 Lerryn Gardens, Broadstairs, Kent CT10 3BH

coast from Nairn to MacDuff. Anyone who has travelled through these areas will know just how difficult it must be to provide consistent coverage in this sort of terrain. Another proposal from this active group is for a repeater (GB3NG) near Peterhead to fill an area in the north east corner of Scotland around Fraserburgh where mobile reception is currently patchy.

In Kirkwall, the logic has been modified to prevent problems which arose from a poor electricity supply, GB3OC having previously to be reset manually every time a mains supply "glitch" occurred. This is another machine for which antenna modifications are scheduled, the present system being a groundplane. On 432MHz, Speyside Repeater Group would like to supplement its 144MHz system (GB3SS) by the addition of 432MHz facilities in the Speyside area. A proposed repeater on Benbecula on channel RB10 is still under consideration and being progressed, and more recently an interest has been expressed for repeaters with data facility in West Central Scotland. A Glasgow-based group has proposed a 1·3GHz tv repeater, while in Crieff there has been a suggestion for a 29MHz repeater. Clearly the repeater situation in Scotland is flourishing, and I suspect that as the growth of data-transmission and storage techniques by amateurs progresses, there will be many uses for repeaters in the future which only a few years ago would have seemed like pure science fiction. And for those who disparage the use of repeaters (usually those in super-locations!), spare a thought for the technology to be found in many modern installations and give credit where it is clearly due.

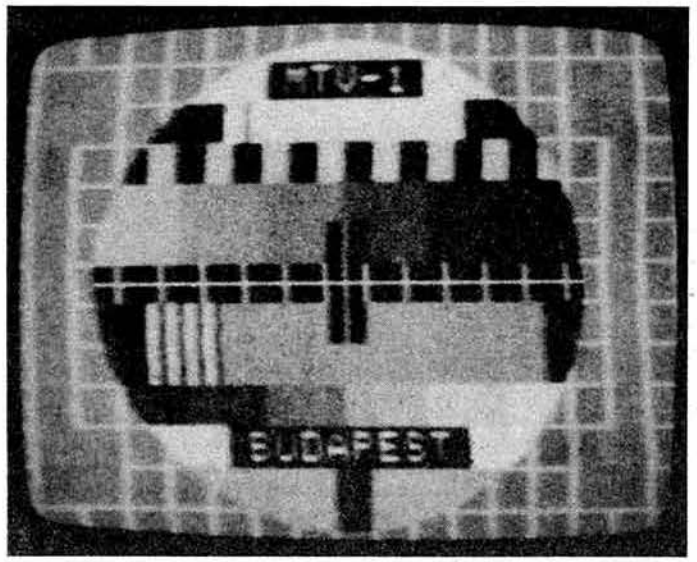
Aurora

There has not been much in the way of auroral activity as far as stations located towards the south are concerned, though John Dunlop, GM6LNM, has sent his regular and diligent report which now includes 50MHz monitoring. He also watches 28MHz and sometimes 14MHz, both of which provide auroral warning at times. John refers to recent comments on the signals from the Russian satellites on north-south passes "going auroral", and says he has noticed on several occasions that their 28MHz downlink was tone-A prior to an aurora on 144MHz, which typically would occur during the afternoon if the satellite had shown these characteristics the previous night between 2100 and 2400gmt. John also recommends 48·255MHz as a good spot to listen for video carriers going auroral, but tone-A signals on this frequency may not always be followed by an aurora on 144MHz. He hears GB3LER aurorally very frequently, and comments that something appears to be wrong with its keying—has anyone else noticed this?

Alex Allan, GM3ZBE, also advocates listening on 48·250MHz, plus or minus a few kilohertz, since he says there is always a signal of some sort there which makes it an excellent spot to monitor for not only auroral conditions but also sporadic-E and meteor activity. He uses an IC720 tuned to 26,250kHz with a receiving converter built for 50MHz, and says that the detuning does make the sensitivity fall off somewhat but not to any serious degree. For a long time G8VR has used a 50MHz converter into a FRG7 general-coverage receiver which makes it possible to tune over a quite wide range of frequencies around 50MHz, though the FRG7 can produce a few "birdies" when used in this way. GM3ZBE regards the entire area 40 to 50MHz useful for monitoring most forms of propagation, while John Dunlop hears numerous carriers on the 50MHz band when sporadic-E is about. A simple 50MHz receiving converter is a useful tool to have around, quite apart from the fact that this band is going to loom large in the future.

Recent references to auroral-E propagation had several readers looking back into their log books. Jeremy, G31MW, recalls that during an aurora on 21 April last, LA6QBA worked GW3LDH with a T9 note, and at the time thought it was tropo. In retrospect it was probably auroral-E, and the band was 50MHz. Back in 1983 I was waiting for a sked with an expedition in EI to come up around 1400gmt. There was a thunderstorm raging overhead, with deafening crashes in the receiver (not a sensible time to be on the air, but with a new square at stake . . .). Out of the blue off the back of the beam came "CQ" from an OZ station at 569, and we had an excellent contact. Whatever mode made this possible, it certainly wasn't tropo with all that turbulence going on.

Charlie Newton, IARU auroral co-ordinator, has responded to criticisms levelled by John Branegan, GM4IHJ, of the auroral forecasts and reports given over the GB2RS newscasts. To show that there is no malice in this exchange of comments, Charlie congratulates John for raising the point because it indicates the importance of making detailed observations and assessment. The event used by John to illustrate his point was that of 28 February this year. Charlie says this was indeed caused by the disintegration of a solar filament, some 4° in length in a position on the sun some 9° north of an active region. It occurred not on 28 February but at 1300gmt on 23 February. The effects were not felt on earth, radio-wise, until 2127gmt on 27 February, and they "rumbled on" until 1 March. This, however, was only one event; there had been others occurring between 5 and 10 February



No doubt where this sporadic-E transmission on 49·75MHz is coming from. This picture taken by G4GLT shows the value of a small tv set with European standards when used for Es monitoring (Hungary; Channel R1)

which repeated 1 to 7 March and 26 March to 2 April, these being due to coronal holes, but the 28 February event was "one on its own, occurring suddenly with an index figure higher than any since November 1984". What Charlie is getting at is that several events can be occurring on the sun at the same time, so interpretation can be difficult. This is another reason for maintaining observation of the sun and its auroral effects if our knowledge of the phenomena is to increase and make for even better forecasting in the future; this is why dedicated Scottish aurora-watchers play such a useful role.

50MHz

Undoubtedly the most significant development in vhf circles as far as the UK is concerned is the news that an allocation in the 50MHz band can be expected in the near future. Critics of the "50MHz experiment", which was based on the issue of a limited number of permits to operate on this band, may now feel that it was well worthwhile in indicating to the licensing authority that orderly and sensible operation in this part of the spectrum —with minimum effect on other services—was not only possible, but also that there was much to be learned about propagation by having well-equipped and dedicated operators on this band. So far, some of the results obtained have been quite remarkable.

In passing, let me mention again the now well-established "Six Metre Group". This group, set up initially by a handful of operators for whom the 50MHz band has always had a fascination, has now flourished to the point where it boasts well over 100 members, both UK and overseas, and has recently published issue No 11 of *Six News*, which is a really first-class publication both in its content and in its high-grade printing and presentation, and has a full-colour cover picture of the G3NOX-GM3WOJ meteor scatter tv exchange, shown in monochrome in *4-2-70* July 1985. For those wishing to join this group, which will surely go from strength to strength once we have a 50MHz allocation on a more general basis, the secretary is Alan, GW3LDH, ably assisted by his wife Maureen, GW8ZCP, who edits *Six News* so effectively, so drop a line to them for further details.

In the July *4-2-70* I said: "USA sporadic-E data for the past three years suggests that the best time for multiple-hop paths across the Atlantic on 50MHz would be between 4 and 8pm, USA time (9pm to 1am here) during the first week in July". This was a remark made to me by W2CAP, whom I was fortunate to meet in May at the North-Eastern VHF Conference in Nashua, New Hampshire. Subsequent events have shown beyond doubt that when it comes to 50MHz operation, those Yankees know a thing or two learned from their own long-time operation on this band, and numerous UK special permit holders benefited greatly from this fact.

The action really started during the weekend of 22/23 June when K1TOL heard GB3NHQ and GB3SIX beacons, while over a much longer path, K7KV in Auburn, Washington State, also heard GB3NHQ. Not bad dx for a tiny erp from a simple vertical antenna!

Gordon Pheasant G4BPY, was monitoring the band every day in June, and has sent details of all he heard, including beacons 5B4CY (20, 21, 22, 23, 24 and 26 June) and FY7THF (11, 16 June). He also heard ZB2VHF on several occasions. On 29 June at 1700gmt, Gordon heard a cw station calling CQ on 50·101MHz which could have been W3ZR operating from

Florida, but he was not certain, though W4 stations were audible on 28MHz at the time. (Note for newcomers to 50MHz listening: 28MHz can be a very good indicator of what might happen on 50MHz, especially during the Es season). I have no first-hand report, but it is believed that SM6PU worked a W3 crossband 50/28MHz about this time.

On the evening of 2 July, starting around 1950gmt, several UK stations heard signals from across the Atlantic. G4BPY heard nothing until 2200 when K2MUB appeared on cw at 429, but no contact was made crossband. From 2208 until 2228, G4BPY had seven crossband contacts with W1, W2, W3, and then from 2230 until 2302, had a further 15 USA contacts two-way on 50MHz with W1, 2 and VE1YX. Last signals heard by Gordon were at 0008 on 3 July from W2CAP/1 on Cape Cod. G3UNM (Staffs) heard much of the action with a two-element parasitic antenna at 60ft and heard VO1MP in St John Newfoundland, but was not quite able to make a crossband contact with him.

Dave Newman, G4GLT (Leics), started to hear beacon VE3TEN on 28,175kHz at 1945 on 2 July, and shortly after, states-side signals on 50·104MHz were heard, including WB5MPX (Texas—some uncertainty about the call), while W1AW, the ARRL headquarters station on 28,080kHz, was heard sending its slow morse programme. Dave recommends W1AW as a beacon signal, its operating schedules for slow morse being published regularly in *QST*. At 2123gmt, Dave copied beacon K1NFE (Connecticut) on 50·440MHz at 559, and at 2138 he managed a difficult crossband contact with WA1OUB 28/50. The floodgates opened for Dave at 2212gmt, when he had nine crossband contacts with W1, 2, and 3 up to 2230gmt, followed by 17 two-way contacts on 50MHz with W1, 2 and VE1YX, all on ssb. At this point Dave had to leave the QTH, but when he returned at 2320gmt the band was still wide open to the USA, and he worked AD1C and W1QXX. The band was more or less dead by 2330gmt, but he continued to hear weak signals (KS2T and N2BOW) until 0050. Dave makes many interesting points which must await space in a future issue of *4-2-70*. Many other UK stations were active and had successful contacts, though the opening appears to have been somewhat "patchy" with, for example, G3TCT hearing G3OSS giving a 59 report to WA1OUB when that station was unreadable at Graham's QTH.

The mechanism of propagation for an opening such as this needs much further study. It is not enough, in my view, to write it off simply as another "multi-hop sporadic-E event". This only emphasizes how little we know about Es generally. The prediction by W2CAP about openings, which was correct both for times and dates, indicates a phenomenon which seems to recur each year; an intriguing problem.

Just to wind up on 50MHz for this month, the growth of interest in this band throughout Europe is illustrated by a list of stations worked by G4IJE crossband on meteor scatter, implying that these stations are equipped for reception on this band. They are: CT1WW, YO2IS, EA4CGN, SM6PU, OZ9QV, OH5IY and EA6FB, and there are many others. EA4CGN has been heard on 28MHz late at night working UK stations crossband when his own tv closes. YU50MHZ is clearly an unlicensed station, heard by several UK stations. This being so, don't risk your licence by working a station known to be unauthorized, though we all know how frustrating it must be to be at the receiving end of a string of dx signals and not be able to respond!

Expedition news

Newport (Gwent) ARS plans an expedition to Lundy Island between 21 and 28 September 1985. They say this could be one of the last major expeditions to Lundy, since the helicopter service to the island is being discontinued and in future only boat travel will be available from the mainland. Thirteen operators from the society will operate all bands 1·8 to 432MHz, and 24hr operation will be attempted, with WAB contacts being particularly welcome. Callsign will be GB4LIE, and equipment on vhf/uhf will be FT480 plus linear, Icom 290H and FT790 plus linear. For the several beam antennas, a 60ft mast is being transported by boat. Skeds prior to departure date can be arranged via PO Box 33, Newport, Gwent, or by telephoning 02912 6867. A special QSL card will be issued through the above box number or via the RSGB QSL bureau.

Beacon notes

A letter from Geoff Holland, G3GHS (Cornwall), states that he is secretary of the newly-formed Mid-Cornwall Beacon & Repeater Group, established following the sad death of Bill Colclough, G3XC, who was beacon-keeper in those parts. Key-holders have been elected for beacons GB3CTC on 70 144, and 432MHz, and repeaters GB3NC (144MHz) and GB3HB (432MHz). These are G4JYF, G4NTX, G3GHS and G3VVB. Geoff says that "the 70MHz beacon was missing, but after enquiries it was traced". The group hopes to have it back on the air as soon as possible. More news from this site will appear next month.

SM6AFH/SM6EOC in their 144MHz news-sheet say that a new beacon is operating in northern Norway, callsign LA6VHF, on 144·865MHz using 30W with antenna pointing 210°.

For 50MHz listeners wanting to keep an ear open for a difficult one, beacon K1NFE is operational from Connecticut on a frequency of 50·440MHz. Dave Newman, G4GLT, telephoned K1WHS in Maine at the end of June to ask if it was still QRV, and when told that it was, promptly heard it at 559 during the opening to the USA on 50MHz.

432MHz activity

The attempt by the VHF Committee to encourage activity on 432MHz by initiating the "Monday Night Award" seems to be succeeding. Jack Hum, G5UM, vhf awards manager, announced the first claim for this award submitted by Mike Webb, G6ICR (Liverpool), who included in his list contacts with six different countries worked on this band on the first 10 Mondays since the award was announced. Mike commented: "It is nice to see so much activity on a band I love". The award continues until 31 March 1986.

Dave Ackrill G6MVQ (Birmingham), comments on growth of activity of another sort on this band, by Class B licensees using cw. In about four months operating, Dave has worked 37 different stations on cw, 12 of them being Class B operators. He finds 144·155MHz to be a good spot (with voice identification), and to-date best dx was with GD3YDB in Douglas using a long-wire antenna into a 144MHz atu. Dave requests other stations to monitor 144·155MHz since he is seeking contacts with at least 50 different stations to qualify for the G-QRP Club Novice Award.

Another station back on 432MHz after a long absence is John Parkin, G4KZV (ex G8CRK), who with "a few watts and quite a lot of feeder loss to a 15 year-old multibeam" heard several Scandinavian stations and worked SM6EAN, finding operation on this band "a considerable pleasure".

Harold Turner, G8VN

It is with much sadness that we have to record the death of a great vhf old-timer Harold Turner, G8VN, of Mickelover, Derbys. He was a frequent contributor to these pages who will be missed by all who knew him (see "Obituaries" in this issue).

From here and there

If you use two coaxial relays in series to protect a front-end device from leakage of transmitter power which might destroy it, you will probably connect the relays by a double-ended adapter to keep the lead lengths short. In fact this provides not much more isolation than a single relay, but if the two are connected together by a piece of coaxial cable a quarter wavelength long at the frequency in use, then the high impedance at the open end of the system will produce low impedance at the other end, which effectively shuts off the second relay and protects the device. Thanks to John Reisert, W1JR, for this very interesting tip.

On the subject of 28MHz meteor scatter working, G3IMW has had a successful crossband contact with OZ9QV (26 May). G3IMW used ssb on 50MHz into a three-element Yagi 20m agl. OZ9QV used cw at about 25wpm with 60W into a HB9CV antenna. Jeremy says that he would like skeds with stations outside normal (28MHz) range, which he considers to be about 200km, and he can be found on 3,718kHz between 0700 and 0745 on most days (or write QTHR). He says this might be of particular interest to those wanting to use this mode to achieve the 28MHz counties award, since he can then give them London.

John, GW3MHW, says that on 7 July in his area the RSGB newscast was deliberately interfered with, at least three stations being involved in the attempt. He has it all on tape. He says that some licensed amateurs known to him will purposely get into a net to jam it by having discussions about unrelated topics simply to disrupt the net conversation. It is unfortunate that there are people whose interests in a wonderful hobby are so minimal that they get their "kicks" out of ruining it for others. They are to be pitied in my view, but on the other hand any amateur who can provide first-hand and positive information which relates to someone operating illegally or infringing his licence conditions should make this known through proper channels so that appropriate action can be taken.

Also from GW3MHW, the comment that in the 70MHz contest he heard no bad signals nor poor operating procedure. John says, however, that 70MHz is rather quiet these days (due probably to the activity on 50MHz), but during the contest he heard stations from Sark, GI, EI, and GM, many of them portables and all at good strength, nicely spread out between 70·1 and 70·2 (cw) and up to 70·3 for ssb. It reminded him of 7MHz a long time back when he was a schoolboy.

Various sources suggest that Norwegian amateurs are to get an allocation on 70MHz. □

Microwaves

by Mike Dixon, G3PFR*

From another publication

Dubus 2/85, unusually, contained only one technical item of direct interest to microwave operators: that is a simple two-stage amplifier for 1·3GHz using MRF981 transistors. Otherwise, the major technical contribution is a detailed design for a dual-band (144/432MHz) ssb/cw transceiver with programmable output power—100mW to 10W in 1dB steps—and transverter facilities for all bands from 1·3GHz up. This would represent considerable technical and constructional effort but would provide the builder with excellent facilities for the two primary bands, plus the transverter facilities. Kits will be available from the publisher in due course.

A letter included in that issue said that after six years as agent, Bob McHenry, G3NSM, was handing over the distribution to Ken Hatton, G4IZW: the new address for subscriptions and enquiries is Thorneycroft House, Shield Hill, Haltwhistle, Northumberland NE49 9NW.

Regular readers of the publication will, I'm sure, join me in thanking Bob for his efforts over the past six years—he intends to keep in touch with many of the past and present subscribers "over the air".

Claus, DL7QY, publisher and editor of *Dubus*, has come out strongly against the use of the "Maidenhead" locator system, claiming to have the support of 83 per cent of his readers for retaining the "old" system, on the basis that the old system "is easier to put across under difficult reception conditions and allows quick reference to actual location". He is therefore strongly urging all European operators to continue to use the old system regardless of IARU policy. My personal view is that this is a somewhat short-sighted proposition, because the old system is neither capable of the precision of the new system, is not of worldwide application (without repeats), nor does it readily adapt to the writing of simple computer programs. To my mind these are three very valid arguments in support of Maidenhead, and the excuse "But I haven't got a computer" is hardly valid in this day and age, especially when a programmable calculator or pocket computer costs less than £50 and is capable of doing so many other tasks around the shack when not calculating locators! After all, the unambiguous Maidenhead locator is only one character longer than the old QTH! Personally, I prefer to use the new system, but will also offer the "old" one if it is asked for, either in contests or home-station work.

Operating news

Inevitably, having laid down the pen in very early June with the remark that although the weather had taken a turn for the better, conditions had not yet taken a significant turn, Murphy's Law came into full operation! The very next day, 4 June, brought a lift in conditions on 432MHz towards Scandinavia, and local, well-sited stations were heard working northern European stations on 1·3GHz, although the "usual" beacons (Emley Moor and Clee Hill) did not really indicate anything out of the ordinary. On 5 June the lift yielded LA stations on 144MHz, and it appeared to be limited to a southwest to northeast corridor stretching roughly from East Anglia and Yorkshire to cover parts of northern Germany and Scandinavia—the areas west of the Pennines seemed less-well served.

Some quite remarkable microwave contacts resulted. John, G4BYV, gave the following details of contacts heard/worked by himself and Simon, G3LQR, during the period 2/3 June. G3LQR worked DC9XO (EM14a, JO42) on 5·7 and 10GHz, QRB 500km; DC9XG (EN37f, JO43) on 5·7 and 10GHz, QRB 545km; DC4BK (EN65d, JO43) on 3·4GHz, QRB 521km; DF9LN (FO61a, JO54) on 5·7 and 10GHz, QRB 620km. Simon also heard SM6HYG and SM6ESG on 5·7GHz but no contacts resulted. John said "the only dx I worked was on 2·3GHz—LA8AE (FT72h, JO59) and LA6LCA/P (also in FT square) both at 915km".

Jan-Martin, LA8AK, confirmed these contacts and gave the following details of Norwegian microwave beacons:

Callsign	QRA	Frequency	Power	Antenna
LA8UHG	FT05g	1,295·995	2W	Omni, 364m asl
LA3UHG	DS80c	1,295·996	2W	10dB Yagi, 200°, 5m asl
LA1UHG	FT63g	1,295·999	3W	Omni, 75 asl
LA1UHH	FT63g	2,320·86	2W	7dB horn, 180°, 75m asl
LA1SHF	FT63g	5,760·86	1W	10dB horn, 180°
LA1SHG	FT63g	10,368·0	100mW	17dB horn, 180°

Jan-Martin added that LA6LCA had also worked PA0CRA on 5·7GHz during the same opening. He, himself, is QRV 2·3 and 5·7GHz, with 10GHz (5mW NB) ". . . soon. I have sold my WB-rig for 3cm since there is no-one to work within 300km!".

Dave, G6LEU, has indicated that he is QRV on 1·3GHz with 10W of ssb to 4 × 23 element Yagis, 11m above ground. His QTH (IO70ME, XK66j) is 100m asl and very close to the coast at Carne in Cornwall. In his first eight weeks on the band he had logged and worked nine squares with the best dx at over 400km under "flat conditions". He said: "It is further and more difficult to work from AL square to my QTH than from ON or PA"—the inference being that he would welcome skeds from the eastern side of the UK! His address for skeds is Parc Cottage, Carne, Veryan, Truro, Cornwall TR2 5PG. Later Dave reported that on 29 June, following 144MHz contacts with Salvador, EA8XS (starting at 5/2 in the early evening and ending up with 5/9 signals at around 8pm), the two stations attempted and made a contact on 1·3GHz, albeit a fairly marginal contact with 3/1 reports. The contact has since been confirmed with QSL cards and may constitute a G/EA8 "first" and, possibly, a Region 1 dx record? Dave said that the evening was "capped" by working two more EA stations on 1·3GHz, "both in VD square at 5/9 armchair copy". Like Dave's station, EA8XS is only running QRP (7W) to stacked Yagis, but the path is entirely over sea. It will be most interesting to see whether this contact can be repeated—cw would greatly improve readability! Reports were exchanged and acknowledged with the 1·3GHz signals exhibiting short "bursts" (of several seconds duration) of signal enhancement, again indicating a very marginal path: a sked with G4DGU failed to yield results no doubt due to the somewhat longer path, some of which lies over land.

Jack, G5UM (microwave awards manager), sent details of the latest batch of awards, nearly all of them for the lower bands, some to new operators and some to well-established stations who are steadily climbing up the squares-worked ladder. Briefly the awards are these: G1DOX 10 squares on 1·3GHz (No 44); G1HGJ 10 squares on 1·3GHz (No 45); G3DY 40 squares on 1·3GHz (No 8); G3XDY 45 squares on 1·3GHz (No 3); G4LRT 55 squares on 1·3GHz; G4LRT 25 squares on 2·3GHz (No 2); G4K1Y 70 squares on 1·3GHz.

Both G1DOX and G1GHJ remarked on the speed with which the necessary QSL card arrived, a feature which both appreciated in getting the certificates and stickers. Jack concluded his report with the comment: "Trade has been quiet this year as far as 10GHz is concerned, but will doubtless pick up with the advent of the portable season, plus more contests". □

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

QRP

by Rev George Dobbs, G3RJV*

QRP news

The Yeovil QRP Convention will take place on Sunday 13 October 1985, and details appear elsewhere in this issue. Many of the successful events of last year will be repeated, and the G QRP Club will be represented with a talk from Tony Smith, G4FAI.

The G QRP Club Autumn CW Activity Weekend

This weekend is an activity period, not a contest. The idea is to come on the specified bands at the specified times and work as many other QRP stations as possible. Anyone is invited to participate using a power of 5W dc input or 3W rf output, and reports or logs would be welcomed by Chris Page, G4BUE, Alamosa, The Paddocks, Upper Beeding, Steyning, West Sussex BN4 3JW. The following times and frequencies will be in use:

GMT	Frequency (kHz)	GMT	Frequency (kHz)
0900-1100	14,060/21,060/28,060	1700-1900	3,560/7,030
1100-1300	3,560/7,030	1900-2100	14,060
1300-1400	10,106	2100-2300	3,560/7,030
1400-1700	14,060/21,060/28,060		

Other contests which include QRP sections in the autumn are:
5 October: AGCW Straight Key Party—Class for QRP.
12, 13 October: QRP ARCI Fall QSO Party.
20 October: RSGB 21MHz CW Contest—Class for QRP.
26, 27 October: CQ World Wide SSB Contest—Class for QRP.
1-7 November: HA 80m QRP CW Contest.

*St Aiden's Vicarage, 498 Manchester Road, Rochdale, Lancs OL11 3HE.

16-17 November: VK Versus The Rest of The World QRP Contest.
23-24 November: CQ World Wide CW Contest—Class for QRP.
The details and rules of all of these contests can be had from the organising groups or from the radio amateur press.

The RSGB HF Convention 1985

The G QRP Club is to provide a series of lectures during this event. These will include a lecture by Chris Page, G4BUE, on his transition from QRO commercial operation to QRP and homebuilt equipment; Ian Keyser, G3ROO, on simple ssb low-powered equipment, and a lecture by Colin Turner, G3VTT, with the intriguing title "Life begins on 40 metres". There will be an opportunity for QRP operators to meet and exchange ideas, gossip and circuits. If you intend to be present, try to bring along a piece of homemade equipment.

Two books for the QRP operator

The Joy of QRP—Strategy For Success, by Adrian Weiss, W0RSP.
We have waited for this book for a long time! When the *G QRP Club Circuit Handbook* was first published in 1982, we thought it would be out about the same time as a major book on QRP operation by W0RSP. The book has now appeared and is soon to be available in the UK. Adrian Weiss is perhaps the best-known figure among QRP operators in the USA. He is the QRP editor of *CQ* and was for many years the publisher of the *Milliwatt*, the first amateur radio magazine devoted to low-power operation. He is also the sponsor of the Milliwatt DXCC awards for under 5W and under 1W.

The book attempts to give an overall treatment of the subject of low-power working on the hf bands. It includes an historical introduction to low-power radio communication, and goes on to describe how to approach operating on the amateur bands with QRP. The book also has a section on converting QRO equipment for low-power operation and building QRP equipment, including some practical circuits backed up with a pcb service. There is an excellent section on techniques for operating with low power, and strategy and planning for hf band operation. The book concludes with a chapter on measurements with circuits for building suitable instruments for QRP operation.

I am most impressed both with the scope and content of the book. Anyone thinking of trying low-power operation on the hf bands, or even currently using QRP, should benefit from reading this book. The sections on objectives, planning operating techniques, band selection and propagation would help any radio amateur, whatever power is being used by his station. It is good practical advice of the type more often acquired by experience or through the advice of others, than seen in an amateur radio publication.

I commend the book as good reading for any amateur who uses the hf bands. I can do this without any fear of bias. I do know Adrian personally and have admired his work for some time, but personal favour has probably been cancelled out by the fact he has been rude to the G QRP Club in this book! He suggests that the club needs to catch up with the modern world. We can forgive him; he's a good fellow and this book is a good read. Unfortunately it is expensive; like all American books on specialist subjects, the UK price is quite high. The book can be obtained through the G QRP Club for £10 plus 55p postage by writing to Norman Field, G4LQF, 14 Regent Road, Harborne, Birmingham 17. Cheques to "G QRP Club".

Digest of Horizontal Wire Aerials, edited by D Hoult, G400.
Readers of *Radio Communication* asked for this book; now they have got it! In *QRP* March 1985 I described the cone antenna and suggested some reading on wire antennas. Among the books listed was the cheap and cheerful first edition of this book published and produced by the Spalding & District ARS. Readers then proceeded to seek this out-of-print publication from hapless traders who could not help. The demand was such that a reprint has been produced. It is not as cheap but it is just as cheerful and useful.

The book is simply drawings and notes on a whole range of horizontal wire arrangements for hf band antennas. There are the classics and the oddities, the old and the new, side by side. A grand source book for those, like me, who enjoy playing around with bits of wire in their back gardens. The new edition arrived just in time, as my old copy was beginning to fall apart from being thumbed on rainy days in the garden and borrowed by other radio amateurs.

The book is a very useful item to add to the bookshelf of any radio amateur active on the hf bands. It is privately produced by the Spalding club and is a worthy local club effort. The price of the new book is £3, post paid, from Dennis Hoult, G4OO, Chespool House, Gosberton Risegate, Spalding, Lincolnshire PE11 4EU. Cheques to "Spalding & District Amateur Radio Society". There is a discount of 50p for members of the G QRP Club. □

The Month on The Air

*by John Allaway, G3FKM**

IN RESPONSE to the comments in May *MOTA* concerning 7MHZ "dx segments", Ian Shepherd, G4LJF, draws attention to the embarrassing number of UK stations who form nets at the top end of 3·5MHz after dark in spite of the recommendation that the top 25kHz of the band should be reserved for intercontinental working. Many people seem to be unaware that other European countries copy dx signals much earlier than we do and that inter-UK QSOs can cause much QRM to them. Ian also mentions that it might be a good idea also to try listening more carefully for dx stations who might be calling Europe. Maybe a case for more questions on operating procedure in the RAE?

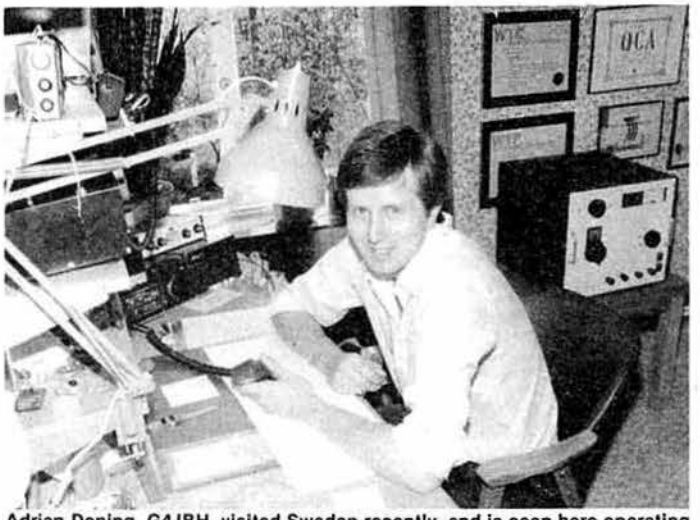
Last month it was your scribe's sad duty to report the death of W6AM. This month there is news of the death of Father Dave, CE0AE. Dave provided the first Easter Is QSO to many and had nearly achieved his own 5BDXCC. According to P29JS he loved his work on the island, and in Jim's words he was one of the "anchor men" of dx.

Miscellaneous news items

G8OTG recently spent two weeks in Malta, and passes along the good news that portable and mobile operation is to be allowed. He asks all those who have held a 9H3 callsign to notify MARL (PO Box 575, Valletta) of their home callsign—or better still send some saes and a few ircs to collect their QSL cards.

Latest news on activities in Turkey was given recently by DJ0UJ, who reported that TA1A to TA1H have already been issued and that 10 more intending amateurs have recently passed the qualifying exam. Turkish amateurs have two licences, one for the operator and another for the equipment. No foreign nationals are being issued with licences at present.

The Egyptian ARS now has a list of 21 call holders, seven of whom are ladies. SU1ER's list gives SU1s AA, AB, AH, AL, AW, AZ, BA, CR, ER, FR, HK, IA, IM, MA, MI, MK, MR, RR, RW, SR and SW as members, and mentions that 1700 to 2100 on Friday and Saturday around 3,750, 7,075, 14,175, 14,275, 21,375 and 28,575kHz might be the right times and places to find SUs.



Adrian Dening, G4JBH, visited Sweden recently, and is seen here operating the station of SM4EMO, his host. He also operated the stations of several other Swedish amateurs

*10 Knightlow Road, Birmingham B17 8QB.

G3KPO presenting callbooks and copies of *Radio Communication* "Rad-Coms" to UL7GP for use by members of the Moscow Radio Club during his recent visit. (See his letter in "Members Mailbag"—Ed)

The Madeira DX Group reported on their expedition to the Ilhas Selvagens (160 miles SE of Funchal) but unfortunately too late for publication before the intended date for the visit in August. The island is the property of the Portugese government and visitors are strictly limited because it is an area of great ecological interest. The group consists of CT3s, AR, BD, BM, BP, CW, YA, YD, YF and CR, and any financial help would be appreciated—it should go to PO Box 490, 9006 Funchal Codex, Madeira.

Recent changes in Netherlands licensing arrangements mean that an old friend, PA0AA, no longer exists but is now identifying as PI4AA.

As part of their 10th anniversary, members of Newport ARS (GW4EZW) will be visiting Lundy Is from 21 to 28 September. Operation will be on all bands 1·8 to 432MHz. (Further details appear in *4-2-70*—Ed).

Expeditions

A bulletin received from Jim Smith, P29JS, reads: "The good news is that there is a very good possibility of another visit to Heard Is in this coming summer season. Most of you will understand that Heard Is is only really available during January/February/March—miss that slot and it is another year to wait. ANARE are at this time looking into the idea of a visit in 1986, and will carry out the usual scientific and other activities. For example, the weather station that HIDXA put there in 1983 may need retrieval and replacement.

The main area of interest is that Big Ben has been very active of late. Towards the end of March activity was reported by a French research vessel in the area. There have been continuing reports from the French base at Kerguelen.

These are early days, but in order to get all the logistics together a decision will be made fairly soon. The tentative details are the use of the *Nella Dan* for the trip. This vessel is the main means of supporting Australian Antarctic bases, and it and other similar vessels call routinely at Heard Is on the way back to the mainland from Antarctica. Whether there will be any amateur radio activity is not known at this time. However, Kirsti and I will try to go along if at all possible."

DXpress describes a three-year around-the-world sailing trip by Max, PA3DDB, and wife, which was due to commence last month. They will go in a 44ft sailing yacht *En Passant,* and an IC720A will be taken. He hopes to get on the air from several rare countries, and the schedule is roughly as follows: (1985) CT1, ZB2, VP2, FM, J7, KP2, KP4, HI, and 6Y; (1986) HP, HC8, FO, A3, ZL; (1987) YB, 3B8, ZS, PY, YV; (1988) VP9, CT2. More information later.

Mike Parks, G4UPD, will be in Madeira from 28 August until 11 September and will be active on 28MHz. He will have a small multimode transceiver with 15W output and possibly a small linear. The location will be Arieiro (1,810m asl). Some operation from CT3AF and CT3BM may take place. QSLs (with sae) to the address in "QTH Corner".

10MHz

	All-time	1985
G3IGW	93	65
G4UZN	68	45
G4VDX	26	25
5B4DN	31	22
G4OBK	—	2
G4YWG	—	2
G5LP	46	—
G3UYR	33	—
G4RWP	4	—

28MHZ TABLE

		1985	
G3XQU	— 96 (ssb)	GW4TEJ	— 35
G3VOF	— 78	G4NXG/M	— 31
G4JBR	— 77	G0AGP	— 25
G4RAB	— 75 (ssb)	G4VPD	— 24
G4XAH	— 65 (ssb)	G2FQR	— 21 (ssb)
G4MUW	— 56	G4YWG	— 16
5B4DN	— 55	G4FVK	— 9
G4DXW	— 45	G4RWP	— 5
G4OBK	— 39		

CURRENT ALL-TIME BAND TABLE

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3KMA	**121**	**230**	**302**	332	**333**	**318**	1,636
G3GIQ	63	196	248	334	332	310	1,483
G3MCS	49	204	255	321	322	306	1,457
G3UML	29	211	223	334	297	255	1,349
G4DYO	56	161	214	310	303	285	1,329
G3XTT	112	184	217	277	276	247	1,313
G2DMR	47	159	171	300	309	264	1,250
G3ALI	2	204	212	313	275	233	1,240
G3XQU	39	143	167	283	269	241	1,142
GW4BLE	23	149	172	268	266	242	1,120
G3TXF	59	162	181	257	250	209	1,118
G3NOF	4	84	80	**343**	324	278	1,113
G3RUR	1	142	179	284	259	225	1,090
G3IGW	98	140	228	224	197	181	1,068
G3YMC	73	92	157	229	234	184	969
G3VJP	14	110	161	255	238	184	921
G4LJF	1	131	149	235	207	188	911
GW4OFQ	50	174	152	201	188	135	900
GM3YOR	61	105	151	200	190	177	884
GM3PPE	45	122	146	182	167	138	800
9K2BE	41	70	84	127	175	181	678
Average	47	151	183	267	258	228	1,132

Scores for the next "current all-time" table to reach G3GIQ by **15 October** please.

1985 ALL BAND TABLE No 3

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G4OTU	32	51	89	**115**	**81**	**89**	457 (cw only)
G4OBK	**78**	49	73	100	52	36	388
G3KDB	30	43	71	100	62	21	327 (cw only)
G3SXW	—	58	69	84	42	9	212 (cw only)
GM3YOR	—	**65**	95	45	20	24	249 (cw only)
GW4RHW	—	6	**98**	67	38	16	225
G3TXF	20	42	43	66	23	14	208 (cw only)
G4XKR	19	13	25	94	43	5	199
G4GOF	12	20	23	45	47	45	192

Band leaders in bold type. Scores for next table to reach G3GIQ no later than **15 September** please.

DX news

NZART advises that, to mark the occasion of the 6th IARU Region 3 Conference which is taking place from 13 to 17 November in Auckland, New Zealand amateurs will be allowed to use the ZM prefix. This will cover the period 1 October to 31 December. A special station will be on the air from the conference venue in the period 9 to 18 November and will have the callsign ZM6ARU. Special approval has been given for those taking part to receive callsigns in the ZL0ZAA series for use with hand-held transceivers during their stay.

The *DX Family Newsletter* sheds light on BT0NMN who has been worked on 14MHz cw. The station is operated by a joint Chinese/Japanese mountaineering team which is climbing Mt Namunani in Xizang Zizhiqu and is sited at their base camp. This is located in *CQ* zone 23. BY0AA has also begun operation from Wulumugi, also in zone 23. The period

Geoff Petit, GU0BGP, who achieved rates of up to 24 cw QSOs/h when operating the Guernsey ARS "A" station GU3HFN/P during HF NFD, five weeks after being licensed on his 14th birthday. *Photo:* GU3MBS

QTH CORNER

CE0FFD	PO Box 4 Easter Is, Chile.
CT3/G4UPD	PO Box 73, Leeds LS1.
GB4LIE	PO Box 33, Newport, Gwent.
IS0CPU/IM0	via IS0WON, A Cocco, Via Parini 29, I-09045, Quartu Sant Elena, Sardinia.
ZC4CW	G4JFI, 4 Uplands Av, East Ayton, Scarborough, N Yorks.
9H3EB	L Cannon, 111 Brangbourne Rd, Bromley, Kent BR1 4LP.

1400-1500 seems to be the favourite operating time of both stations. BY8AC, 3H8C, XS2MC, XS2PC, 3H0P and BY2LP have also been mentioned as possible newly-active Chinese stations.

S92LB reappeared on the bands early in June, mostly in the 14,175-14,185kHz area around 2000. Most QSOs are in Portugese or Spanish, and non-stop callers make it almost impossible to make contact. FT8XB has added 14,224kHz at 2100 to his list of appearances.

DX'press reports that FW8AF schedules F8RV daily at 0800 on 14,275kHz, and that another station on Wallis Is has been heard—this is FW8AW who was on 14,110kHz at 0700. Another new operator, this time on Willis Is, is called Kim, and he will be using the VK9ZB call until the end of the year. Sharad, formerly FG7AS, is now in New Caledonia and on the air as FK0AT. He favours high-speed cw and is hoping to be active on 1·8, 3·5 and 7MHz during his two-year stay.

ZL1AMO is believed to have said that Chris, operator of ZL4OY/A and ZL7OY, expects to be going to Kermadec Is in October as a member of the meteorological crew, and hopes to be on the air as ZL8OY. F6APG (ex-FB8XX) will be in Adelie Land late this year and should be active from FB8YY.

According to *DX-NL* JT1 stations are in central Mongolia, JT2s in eastern, JT3s in southern, and JT4s in western Mongolia. The JT0 prefix is used by visitors.

G3LCS (who has been operating from A61AA) left the UK at the end of June for a six-month stay in Saudi Arabia. He is hoping to be able to operate /HZ, but no firm information was available at the time of writing.

Any UK station still requiring a QSL card from ZC4CW can get one by return by sending QSO information, together with a large sae to the address in "QTH Corner".

Welcome

To the following who joined the Society during June: A4XKI, EI3DY, HA8XX, JY5CI, LA1WCA, LA5QK, SK2QI, VK1MM, W2CXY and ZS6BYB. New non-licensed members are J E Young (A4) and I Lederer (4X).

IARU Region 1 band plan

This plan appeared in July *MOTA*, but unfortunately the explanation of some of the indicator letters was omitted.

The various letters have the following meanings:

B = International beacons
C = Contest preferred segments
DX = Segments recommended to be reserved for intercontinental working
S = SSTV
T = RTTY

Expedition to Guernsey

A dxpedition to Guernsey for licensed young RSGB members (aged 17 and under), sponsored by the Guernsey ARS with the support of the RSGB HF Committee, will take place during half-term (19-27 October) and will offer an opportunity to improve operating skills and to take part in the 48h CQWWDX Phone Contest. Further information is available from Andy Hamon, GU4WTN (17), c/o Guernsey ARS, PO Box 100, Guernsey, Channel Is, tel 0481 65633.

RSGB hf awards

The Society's new hf awards programme will be unveiled at the HF Convention at the Belfrey Hotel later this month. A revised Commonwealth call areas check list has been drawn up and is now available from RSGB HQ. The main differences from the old one are the deletion of Bhutan (A5) and Gozo and Comino (9H4).

Awards

Victoria 150 Award

The period for this special award to mark the 150th anniversary of European settlement in Victoria has been extended to 31 December 1985. Applicants need to work (or log) one VK3 station between 1 November 1984 and 31 December 1985. A QSL for a single qualifying QSO, endorsed with a congratulatory message on Victoria's 150th anniversary, plus A$2 or equivalent should be sent to: Victoria 150 Award, WIA, 412 Brunswick St, Fitzroy, 3065, Australia.

The IARU Region 3 Association Conference Award

This is to publicise the forthcoming Region 3 Conference, due to take place in Auckland from 13 to 17 November 1985. It is necessary to contact the conference station ZM6ARU plus two other stations using the ZM prefix—five other ZM stations may be substituted for the QSO with ZM6ARU—during November. Any band or mode may be used, and the award is available to listeners. Send log details plus three ircs (surface) or six ircs (air mail) to NZART Awards Manager, ZL2GX, 152 Lytton Rd, Gisborne, New Zealand.

Diploma Citta di Firenze 1985

Licensed amateurs and listeners may apply. Award begins at 0000 1 September and finishes 2400 31 October. 3·5 to 28MHz ssb, cw, rtty, and sstv. QSO or log members of the Florence Radio Club who will give a progressive number for each contact. European hf applicants need 10 QSOs or loggings on cw or ssb, or two on rtty or sstv. Above 28MHz one QSO/report is sufficient. Send list and QSLs confirming the QSOs plus L10,000, 20ircs, or US $5 to: Sez ARI (Firenze), PO Box 511, 50100 Florence, Italy, no later than 28 February 1986.

Contests

Results of the **1984 VK/ZL/Oceania Contest** show **G3WPF** (1,224 points), G5MY (360) and G3KSH (32) in the cw section, and **G5MY** (256) and G3KSH (56) in the telephony.

The 1985 VK/ZL/Oceania Contest

1000 5 October to 1000 6 October (phone)
1000 12 October to 1000 13 October (cw)

Two points/QSO with VK/ZL/Oceania. The multiplier is the number of call areas worked on each band added together. Exchange RS/T plus serial QSO number (from 001). Logs should show date, time, station worked, and numbers sent and received. Each new multiplier should be underlined, and a separate sheet should be used for each band. A summary sheet must be included, and this should give name and callsign (in block capitals), details of equipment used, and details of QSO and multiplier totals for each band. The usual signed declaration must be included, and the entry must be posted to arrive by 31 January 1986 at: WIA VK/ZL/Oceania Contest Manager, VK3BGW, 1 Noorabil Court, Greensborough, Vic 3088, Australia. There is a listener section (RS44083 scored 744 points in 1984). Listeners should log date, time, callsign of VK/ZL/Oceania station heard, station being worked, RS/T of station heard and number being sent. Scoring is similar to the transmitting section, but cw and phone are one contest.

Scandinavian Activity Contest

1500 21 September to 1800 22 September (cw)
1500 28 September to 1800 29 September (phone)

3·5 to 28MHz according to IARU band plans (ie 3,560-3,600, 3,650-3,700, 14,060-14,125 and 14,300-14,350kHz should be kept clear of contest traffic). Exchange RS/T plus serial number from 001. Each QSO with Scandinavia counts one point for European entrants, and the multiplier is the total number of Scandinavian call areas worked on each band. Portable stations count as 0; eg G3FKM/LA = LA0. Logs should give date, time, station worked, sent and received numbers, band, and if multiplier, and duplicate sheets must be sent if more than 200 QSOs have been made on any band. Summary sheets must be submitted showing callsign category, name, and address, number of QSOs per band, number of duplicates per band, QSO points and final score. Post no later than 30 October to: NRRL Contest Manager, LA9XG, Terje Roghell, Aspv 14, N-8200 Fauske, Norway. Note that there are single-operator multi-band, single-operator multi-band QRP, multi-operator single-transmitter and listener sections.

Results of the **1984 CW WW WPX CW Contest** are as follows:

Callsign	Band	Points	Callsign	Band	Points	Callsign	Band	Points
G4UPS	All	539,448	G4OKN	All	98,527	GW4HBK	7MHz	36,464
G3ESF	All	343,728	G3TXF	All	39,872	**G3XTT**	1·8MHz	9,638
G2AJB	All	143,130	G4CNY	21MHz	1111800	G4OBK	—	6,300

In the multi-operator single-transmitter section, **GB2MM** was world seventh with 2,712,892 points and **GU3HFN** twelfth with 2,128,734. **G4CNY** was world second on 21MHz, and in the QRP section **G3CWL/A** scored 3,094 on 21MHz, and G3VMY 33,759 and G3DOP 9,682 on 14MHz.

Around the bands

A most interesting event in early July was the sudden discovery by several reporters that the 28MHz band was open into the USA after midnight—so it certainly pays to look at unlikely times, and to call "CQ". . . .

The following kindly supplied logs this month: G2HKU, G3YY, G5s BM, JL, LP, GJ3EML, G3s GVV, KSH, LPS, YRM, G4s DXW, EHQ, FVK, LRS, MUW, OBK, RAB, SFU, GW4TEJ, G4s UOL, UYR, VDX, XAH, XRR, and RSs 10906 and 84869.

As always, stations listed in italics were on A1A.

1·8MHz. 0400 LU9FFA. **2300** *G6ZY/EA6, RA9AKM, VK6HD,* Z21EV, ZS4PB.

3·5MHz. 0000 *EH9IA, UL7GWB.* **0100** *FR5DX, K1ZM, LU3DL.* **0200** *VP2VCW.* **0400** *PY7ZZ, VP2VCW, ZL1AIZ.* **2100** LX1EA. **2300** *UA9SA, 3H8C.*

7MHz. 0000 *CE3GRH, EH9IA, FM5WU, LU9HBJ.* **0100** *TR8IG.* **0200** HH7PV, HR3JRR, *VP2VCW.* **0300** *HZ1AB.* **0400** *CE0ZIG, HK, HI, OA, PZ, VK3, YV, ZL.* **0500** *TI9RCD, 6Y5RA.* **0600** *CE0ZIG,* VK. **2100** *FH4AA, JY9WR.* **2200** *PY1XQ, TK/DJ0SI, UJ8JR, I0SNYIZB2, ZP5EC, ZS1AAZ.* **2300** *LU5UO/Z, PS8DX, RL7GDR, UA0AG, VP2VCW, 3H8C.*

10MHz. 0000 *VE2LI, W2, 4X4WF.* **0500** *OA4IU, W3, W7.* **0600** *CT2FN, K2KTT/PJ7, VK, W7UV, ZL.* **0700** *C30BAN, OY1R, ZC4HMS.* **1400** *5B4OG.* **1700** *J28EI, 9J2BO.* **2000** *KF6ME/DU2, 5N7HKR.* **2100** *3D6AK.* **2200** *FG5XC, V2AJI, VK6JQ.* **2300** *EA8AGF, V2A, ZB2HS.*

14MHz. 0000 T47AM (= CO). **0600** *AL7FQ, JA, KH6IJ,* T31AT, VR6JR, *W6-W7.* **0700** *FO8BI,* VE8RCS. **0800** *C56/G3DQL,* FW8WF, *KL7HT, KV4AM.* **1400** *JW0EQ.* **1700** G4DUW/DU1, J20CU. **1800** HS0A, JY9MG, KL7NT, 5T5PP, 9M2DF. **1900** A71AD, *C5B/G,* 9Q5MA. **2000** KP2AH, P29JS, *ZL1AH.* **2200** *CE0FFD, V2ACW,* ZL4s BX, JO. **2300** *FG7XC, T47FM, TI0RC.*

18MHz. 0700 *C30BAN*. 0800 *OY1R*. 1200 *CT1LN*.
21MHz. 1000 TU4BR. 1800 *FG5DL/FS, HH2VP,* TA1C. 1900 CE3DFD, TI1W. 2000 *V2ACW*.
24MHz. 0000 *N4NO*. 0700 *DL, F, HB, I, OE, OZ, SM*. 1100 *DL, EI*. 1400 *F, LU1DOW, LU5DJO, OZ, VK, ZL, ZS6*. 1800 *OE*. 2000 *W3GG*. 2300 *N4SU, W1XX, W5GEL*.
28MHz. 0600 *A4XJZ*. 0700 UH8EAA, UL7AWA. 0800 HV2VO. 0900 IS0CPU/IM0, 4X6BP. 1000 3A2AH, VU2ISV. 1100 OD5AS, OH0RJ. 1200 HV1CN. 1400 RA9FCB. 1500 TK/DK4CG. 1600 *OY1CT*, DL5KL/ST2. 1700 5N3RTF, 5T5RG. 1800 ZP5LOY. 1900 C31LBL, JW5NH, LU2FEP, TU2OK, 6W1NQ. 2200 CE0FQU, EA9IB, 8P6AW.

Acknowledgements to the following for items extracted: *DXNL* (DL3RK), *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), and *CQ Magazine* (W1WY).

Please send everything for the **November** issue to reach the writer no later than **26 September.** □

HF F-layer propagation predictions for September 1985

Using the table
The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie ♀ = 0000, ♀ = 0200, ♀ = 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	.	.	.	.	.	1	111	.	.	456	667	73	12	655	556	884	755	322	224	688	†52	.	.	3††
Malta	.	.	.	.	.	11	111	2	.	367	667	86	321	665	567	895	886	532	234	689	††5	2	.	4††
Gibraltar	.	.	.	.	.	.	.	1	.	56	555	86	1	376	566	894	774	643	334	689	†††	42	.	3††
Iceland	.	.	.	.	.	.	.	.	.	3	444	53	.	146	666	783	633	543	334	678	†††	32	.	34†
ASIA																								
Osaka	.	.	.	.	.	1	.	.	.	244	421	.	.	232	223	22	.	1	1	451	.	.	.	3
Hong Kong	.	.	.	.	1	11	.	.	.	245	443	31	.	22	224	661	.	.	1	473	.	.	.	4
Bangkok	.	.	.	.	12	21	.	.	.	235	451	11	.	12	223	571	1	.	1	476	.	.	.	244
Singapore	.	.	.	.	12	222	1	.	.	235	456	73	1	12	224	78	1	.	1	473	.	.	.	243
New Delhi	.	.	.	.	112	221	.	.	.	334	456	42	1 1	2	224	774	51	.	1	478	3	.	.	24†
Teheran	.	.	.	.	123	233	1	.	1	434	456	84	313	211	224	786	841	.	1	478	†2	.	.	24†
Colombo	.	.	.	.	123	231	.	.	.	224	456	12	1	1	224	575	31	.	1	478	2	.	.	24†
Bahrain	.	.	.	.	123	334	1	.	1	433	456	731	523	1	224	787	851	.	1	478	†2	.	.	4†
Cyprus	.	.	.	.	245	445	41	.	1 1	666	667	982	756	433	345	798	985	211	112	589	†52	.	.	25†
Aden	.	.	1	.	134	455	1	.	1 1	322	356	722	623	1	124	777	861	.	1	478	†3	.	.	4†
OCEANIA																								
Suva (S)	.	.	.	.	.	.	.	.	.	113	33	41	.	432	221	62	.	31	1	4	.	.	.	.
Suva (L)	.	.	.	.	.	.	.	2	.	41	.	5	.	631	1	331	.	31	.	41	.	.	.	.
Wellington (S)	.	.	.	.	.	.	.	.	.	232	21	.	.	532	221	13	.	31	1	41	.	.	.	.
Wellington (L)	.	.	.	.	.	.	.	.	.	1	.	21	11	51	.	142	1	31	.	31	.	.	.	.
Sydney (S)	.	.	.	.	11	.	.	.	.	454	221	.	1	332	223	32	.	11	1	441	.	.	.	.
Sydney (L)	.	.	.	.	.	.	.	.	.	1	.	12	11	13	.	53	.	11	.	31	.	.	.	.
Perth	.	.	.	.	123	.	.	.	.	455	321	.	1 1	132	223	43	1	.	1	473	.	.	.	242
Honolulu	.	.	.	.	.	.	.	.	.	.	1	41	.	222	1 3	31	2	31	1	1	.	.	.	.
AFRICA																								
Seychelles	.	.	11	.	.	134	455	4	.	322	456	862	522	.	124	787	841	.	1	478	†2	.	.	4†
Mauritius	.	.	11	.	.	134	556	5	.	333	456	872	322	1	124	787	841	.	1	478	†	.	.	4†
Nairobi	.	1	122	1	.	134	567	5	1	422	356	871	613	1	24	787	863	.	1	478	†5	.	.	4†
Harare	.	1	123	1	.	134	577	71	.	533	356	881	522	3	24	687	884	.	1	478	††	.	.	4†
Capetown	.	.	132	.	.	44	677	51	.	543	356	88	211	421	123	686	775	1	1	478	††3	.	.	4†
Lagos	.	.	133	3	.	44	568	82	.	442	236	891	45	52	3	686	785	2	.	478	5†4	.	.	4†
Ascension Is	.	.	2	4	.	43	346	84	.	64	324	791	35	131	1	587	882	31	.	268	††4	.	.	4†
Dakar	.	.	11	3	.	34	446	85	.	164	234	791	352	531	1	487	787	41	.	168	††4	.	.	3†
Las Palmas	.	.	.	1	.	34	434	74	1	176	667	893	563	664	334	688	998	531	111	379	†††	2	.	4†
S AMERICA																								
South Shetland	.	.	1	.	.	.	356	51	.	3	456	661	332	222	123	345	687	31	.	124	4†4	.	.	.
Falkland Is	.	.	1	3	.	2	445	74	.	5	455	572	332	422	122	246	787	41	.	15	5†4	.	.	2
Rio de Janeiro	.	.	1	3	.	4	434	75	.	15	433	572	452	132	1	257	887	31	.	27	††4	.	.	4
Buenos Aires	.	.	.	2	.	4	334	75	.	5	443	463	453	3 2	111	136	887	41	.	15	††4	.	.	2
Lima	.	.	.	.	.	.	212	43	.	1	432	343	452	22	21	14	787	31	.	2	4†5	.	.	.
Bogota	.	.	.	.	.	.	211	33	.	3	432	244	542	22	2	15	786	31	.	2	4†4	.	.	.
N AMERICA																								
Barbados	.	.	.	.	.	2	211	43	.	5	422	364	552	22	2	37	887	31	.	4	††5	.	.	2
Jamaica	.	.	.	.	.	.	111	22	.	1	432	243	541	2	21	14	686	21	.	2	3†4	.	.	.
Bermuda	.	.	.	.	.	.	111	22	.	3	433	354	531	2	21	136	786	21	.	13	4†4	.	.	.
New York	.	.	.	.	.	.	11	11	.	1	443	353	431	2	221	135	685	1	.	2	3†4	.	.	.
Mexico	.	.	.	.	.	.	11	11	.	.	243	222	321	.	221	2	365	21	.	.	44	.	.	.
Montreal	.	.	.	.	.	.	1	11	.	1	343	453	42	2	221	235	685	1	.	12	3†4	.	.	.
Denver	.	.	.	.	.	.	.	.	.	.	133	221	21	.	122	112	255	2	.	.	34	.	.	.
Los Angeles	.	.	.	.	.	.	.	.	.	.	13	221	11	.	22	111	145	31	.	.	24	.	.	.
Vancouver	.	.	.	.	.	.	.	.	.	.	2	221	1	.	123	212	134	21	.	1	4	.	.	.
Fairbanks	.	.	.	.	.	.	.	.	.	.	111	22	.	322	123	331	112	31	.	1	.	.	.	.

The provisional mean sunspot number for June 1985 issued by the Sunspot Index Data Centre, Brussels, was 24·2. The maximum daily sunspot number was 66 on 11 June, and the minimum was 0 on 2 June. The predicted smoothed sunspot numbers for September, October, November and December are, respectively: (classical method) 11, 9, 8 and 7; (SIDC adjusted values) 3, 2, 0 and 0.

SWL News

by Bob Treacher, BRS 32525*

Change of QTH

A most important item to note this month is my new QTH; all correspondence should now be sent to 93 Elibank Road, Eltham, London SE9 1QJ.

Overseas news

An interesting letter from Tony, A4XJQ, was a result of his comments regarding worst QSL cards in an earlier issue. This time he redressed the balance by enclosing the two best reports he had received: one was from Nick, BRS32388 (yet again prompting excellent comments from the amateur fraternity); the other was from NK6F/4W, who could not obtain a transmitting licence and was taking the opportunity of at least listening from his rare location while there on business. A4XJQ remarked that unfortunately most listener reports were uninformative, especially as some take two years to arrive in A4. Most from the East are of a poorer quality than the rest he receives. One particularly bad example being the receipt of several swl reports reporting on the same QSO which all quoted the wrong callsign! If anyone needs A4X, Tony can be found regularly on 14,083·8kHz rtty every Friday at 0600 with OD5NG.

Good to hear again from Stan Porter, ORS45992. It seems that his last letter mysteriously failed to find the famous address in Granby Road. I hope we have no problems with the Post Office at this new QTH—one dissatisfied customer is one too many! Stan had taken part in the UBA all-year-round contest and had put in his halfway score of 77,000 points. At the time of writing, 5X5GK was doing brisk business; it seems that he is very active. Recent QSLs received included goodies from JT1BG and XX9DX, the latter's pictorial QSL being familiar, as some time had been spent in Macao. Stan has now topped the 80 per cent barrier on QSLs received—a very good return indeed, and he has had some good press in USA journals complimenting him on his reporting. An interesting net which is worth looking for is the Durban MM net which meets on 14,318kHz at 1130 daily with ZS5MU as net controller. Various /MM stations check into the net as they pass around the African continent. John Lord, 7Q7-002, is currently back in the UK on vacation, and Stan will be home early in 1986 and hopes to meet up with myself, other well-known swls, G3VIE and G4LJF, among others. I will have to see what we can arrange.

Newcomers

New contributors this month include Michael Hudson, BRS87259, Joy Stirling, a yl from Glenrothes who will be joining the Society, and Ron Clarke, BRS87725. Michael uses a Trio 9R59DS and longwire. He is located 200yds from the cliffs at Folkestone, so has a particularly good QTH. Ron has a DX-100L general-coverage receiver, a homebrew atu, a C4 28-14MHz vertical and a half-sized G5RV. All reports are logged on an Amstrad CP464 computer, plus DMP1 printer. He has G4VNG to thank for getting him into amateur radio.

HF news

The early deadline for this issue caught many of our contributors. However, a few managed to beat it to get their news into print. Dick Stanbridge, BRS31879, had been particularly busy on 7MHz at some unearthly hours to log 3H8C (a special callsign for China apparently—hope the card comes through), CE0ZIG, OA4ASY, CE3DNP, VK2WC and ZL2ANR—all these early in July.

Douglas Johnstone, BRS54163, reported mainly on his recent QSL returns, noting in particular one from VK6RU/M, his first QSL from VK.

Dave Hasney, BRS86386, had favoured 14MHz, also at a very early hour to pull through 7Q7LW, VK6RU(!), YI1BGD and XE1VIC. Much of his time had been spent on 3·5MHz logging WAB squares, a pastime I enjoyed during the summers of 10 or so years ago!

Another Dave, this one the well-known Whitaker, BRS25429, had been very lucky knocking off three more ssb countries on 1·8MHz. At the end of his stint on 432MHz in VHF NFD at 0130, he decided to have a quick look at 1·8MHz to see how loud the static crashes were. To his amazement there was no static, just signals from LU8DPM (0144), CE8ABF (0215), ZP5JCY (0220) all on 1,837kHz. He quickly forgot the poor conditions at his QTH on 432MHz! Also of note was Dave's No 239 on 3·5MHz ssb in the shape of TT8AQ, and 9U5JB provided him with the remaining country on 14MHz to make the complete set of all the current 316 DXCC countries.

Philip Lancaster, BRS85124, had monitored 14MHz to good effect, logging KH6s, KL7s, 9V1VG, 4S7PVR and several HL stations. On 3·5MHz VK6, KP4 and CP8 were the best dx logged during July.

Maurice Wilcox, BRS50930, was another to receive a QSL from YI1BGD. Since his last report to *SWL News*, cards had also been received from H44IA, TZ6FS, VK9XG and ZK2JS.

Robert Small, BRS8841, had a quiet month to report, by his standards. VR6JR and S92LB, both on 14MHz, were the pickings of the bunch. Other good dx—listed in callsign order—included CE1-7 on 7MHz, and HZ1HZ, TT8AQ and ZS1Z on 3·5MHz. Higher in frequency, 3X0HAB and 9J2YM were good signals on 21MHz, while 28MHz provided OE3HGB/YK and 5B4OA, and rarer European signals in the shape of GU4WRP, IS0CPU/IM0 and 4U1ITU. On the QSL front DP0GVN (West German base in Antarctica) and ZL8AFH on 7MHz were the most acceptable, followed by one from VK6HD on 1·8MHz. Robert and his father, G3ALI, had the pleasure of entertaining VO1FG for a few days in June. Maurice is one of the most consistent signals out of the North American continent on 3·5MHz.

ALL-TIME COUNTRIES LIST

(Entry score 750)

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	260	314	337	258	239	105	1533	ssb
BRS32525	268	306	320	262	260	96	1512	ssb
BRS8841	256	293	317	232	216	61	1375	ssb/cw
BRS48909	216	253	291	198	165	63	1166	ssb
BRS52543	193	238	258	197	184	80	1150	ssb
BRS1066	194	210	269	169	118	79	1039	ssb/cw
ORS45992/7Q7	212	252	268	136	125	12	1005	ssb
BRS18529	155	210	263	177	139	50	994	ssb
BRS44395	168	219	235	138	78	59	897	cw
FE8957	203	197	232	75	98	33	838	ssb
ARS53844	127	180	165	128	116	45	761	ssb
ARS85951	122	181	234	119	103	0	759	ssb
Average	200	238	266	174	153	57	1088	

This table will next appear in the December issue. Please ensure updates are sent to arrive by 22 October.

1985 HF COUNTRIES TABLE

No starting score, new entries and updates only

Station	DXCC	28	21	14	7	3·5	1·8	Total
BRS52543	192	47	93	146	121	134	61	602
BRS25429	194	44	73	149	112	137	70	585
BRS31879	176	47	101	137	103	94	55	537
BRS32525	171	22	39	94	89	130	73	447
ORS45992	182	47	95	159	60	70	5	436
BRS1066	145	33	71	113	93	70	51	431
BRS87259	127	13	27	99	33	82	13	267
BRS86386	122	6	9	99	34	77	8	233
BRS20249	84	2	24	51	28	46	7	158
BRS62088	61	0	0	38	14	36	16	104
BRS87725	45	0	4	38	0	7	0	49

UHF/VHF news

Martin Parry, BRS52543, is certainly raking in the dx on the uhf/vhf bands in 1985. His latest report mentions yet more sporadic-E: on 11 June he heard DG8ZP/OZ, SM7GWU (both at 1110), while from 1616 to 1732 IV3HWT, YU2RCS, YU3ES, I3LGP (yes, Martin, he is a very active dxer), I4ERN, HG8CE, HG8UG and OK3CBU/P found their way into his log. On 27 June YU4VID was heard at 1358 from JN93ET. The only other Es mentioned was from Joan, BRS62088, who, while the om was at work, heard a YU but did not copy the full callsign. The om had been fairly inactive. The only notable dx from JO01AK were two HB9s operating from the old DH square early in July. While penning this, my xyl has just heard GJ4HXJ/P (ON4ASL in disguise) on 144MHz for a new country in 1985.

VHF NFD was reasonably interesting. Martin, Dave and I all "had a go". Dave was quite disappointed at conditions. No OZs, HB9s etc, just the old faithfuls: PE0MAR/P etc using exotic-sounding, but really quite boring, Maidenhead locators. I certainly prefer the old system. If you heard a guy in BF square you knew that was good dx, but hearing him giving JN15 requires a look at the locator map first. What do others think? Dave was claiming approximately 1,050 points on 144MHz and 182 on 432MHz. Martin had not got as far as calculating a score at the time of his letter, but had logged stations in IO74, 75, 80 and 90 among his 42 contacts on 432MHz. 144MHz loggings included stations in IO53, 63, 64, 70, 76, 77 and 86, while on 70MHz IO70, 86 and 90 were heard, giving him 30 squares heard on that band all-time. I fared rather better, catching a useful "lift" to mid and northwestern France during the Sunday morning. Stations heard included F6FMR/P (IN98), FC1JBH/P (IN98), F6DDV (IN78), F6CJG/P and F6GZC/P (both JN15). Also heard were PA0RU/LX/P (JO30BC) and

*93 Elibank Road, Eltham, London SE9 1QJ.

1985 UHF/VHF TABLE

Updates only

Station	70MHz		144MHz		432MHz		
	Squares	DXCC	Squares	DXCC	Squares	DXCC	Total
BRS25429	0	0	56	18	36	9	119
BRS52543	13	2	54	20	19	9	117
BRS32525	0	0	35	11	11	4	61
BRS62088	0	0	15	8	2	1	26

LX1JA (JN29XV). On 432MHz HB9/F1FHI/P (JN36GU) was particularly welcome, being the first HB9 logged on that band. The results were awaited with interest.

I was pleasantly surprised by a tropospheric lift on 12/13 July. Signals from NW France and PA0 were heard, culminating in one EA being heard from the old YD square. Stations to the southwest were particularly strong —GU0/PA3DHR, F6CGJ, F6DDV, GJ6OZB, F6DBI were all well over 59. G8YYB/A on the Scillies being particularly welcome for a new square all-time. Later in the evening and early the following morning, signals from PA0 were good; PE1BTX, PA0HIP, PE1KNA and PA3DNM being easy copy. The EA was EA1CYE heard at 0007 from YD42F. Signals were copied from France on 14, 15 and 17 July, but only as far south as JN18.

Late news

G4KGT has a collection of old QSL cards, the property of the late JY1AJ. He would like to pass these on to a bona fide collector of old QSL cards. There are some interesting prefixes in the cards on offer, eg FF8, OO5, VQ8, VS2, VS7 and 9B3, going back to 1952. If anyone is interested, G4KGT is QTHR. A donation to the Prestwood Scout Radio Group, G4PSG, would be appreciated in return.

Finale

Please remember to send your news, views, table scores for inclusion in the November issue to the new address quoted in the text and at the bottom of page 719 by 16 September with late copy by 23 September.

Those hoping to catch my If dx talk at the HF Convention in Oxford will, I'm sorry to say, have to wait until 1986. □

EPHEMERIS

Satellite news and views

*by R. O. Phillips, G4IQQ**

Oscar 10

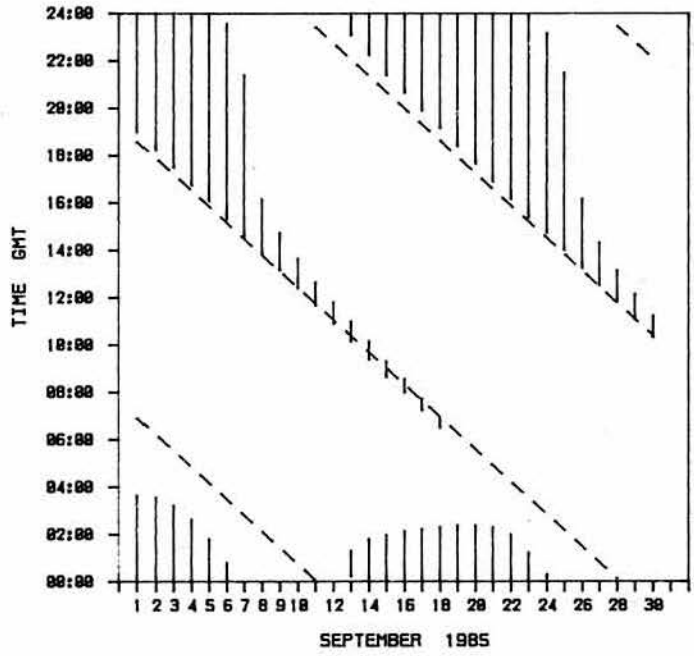
All being well, the interim schedule introduced on 1 August for the eclipse season is about to be changed for one that provides rather more operating time on the satellite. It was originally planned that the schedule would be in operation for the duration of August but, at the time of writing, there has been no indication as to what the new schedule would be or when it would be introduced. I can only repeat the suggestion given last month to monitor the various bulletin transmissions from the satellite or to check with one of the satellite information nets.

Without knowledge of the transponder switching times it is difficult to be specific about how the month will be from an operating point of view. The availability chart shows the satellite comes into view within about an hour of perigee (ie, MA = 0). The maximum elevation to the satellite starts off the month at 38° rising to 43° on the 5th. The lowest maximum (13°) occurs on the early morning pass of the 15th, after which the value increases to 41° on the 24th. By the end of the month the maximum elevation is down to around 26°. As a reminder, the sloping dashed line on the diagram represents the times of the perigees for every orbit. With this information it is straightforward to determine whether the satellite should be in transponder mode or not by reference to the revised MA switching sequence.

Data for the first perigee of the month are as follows:

Date	1 September 1985
Orbit number	1669
Reference perigee	0702gmt
Argument of perigee	41°

*170 Shirehall Road, Hawley, Dartford, Kent DA2 7SN.



Availability of Oscar 10 (London area)

RS satellites

In spite of the continuing expectation of the imminent demise of RS8, the satellite is still in operation in the middle of July. Having survived the latest eclipse period it is likely that all should remain well for at least another few months. Although rather inconsistent as to whether the transponders are switched on or not, operation of the RS satellites has reverted back to the schedule of earlier this year:

RS5	Monday and Friday
RS7	Tuesday and Saturday
RS8	Thursday and Sunday

There has been no reported change to the schedule for launch of RS9 and RS10, and we can expect to see both satellites in orbit by the end of the year.

Uosat

There is little to say about Uosat 1 except that it continues to operate very well and that the number of people receiving and decoding its various transmissions appears to be increasing. Uosat 2, or to be more precise Uosat Oscar 11, continues to be used in a variety of experimental roles both in terms of the on-board experiments themselves as well as the method of transmission of the sampled data. Trials using 4,800bit/s data transmission on the 435·025MHz downlink frequency have proved to be successful, but these will only be carried out when the satellite is in range of the control station in Surrey unless interest is received from other parts of the world. One of the problems I have noted even at 1,200bit/s is the sheer quantity of data collected. Given a few more hours in the day it would be very interesting to carry out some detailed analysis. This is perhaps an area where the University of Surrey might consider providing some published information.

Other news

I am grateful to those readers who have sent me sample outputs from the various computer programs used to decode and display digital telemetry transmissions from certain of the satellites. In particular, Tony Ferneyhough, G8AVH, provided printouts obtained using the Timestep software for Uosat via a BBC micro. The results are very readable and the program appears to offer very good value for money.

For those like myself who use a Microwave Modules 2001 to receive digital telemetry from both Uosats, the latest issue of *DATACOM* from the British Amateur Radio Teleprinter Group (BARTG) provides some very useful help. As I found out to my annoyance, most low-cost printers, such as the EPSON RX80 series, will not accept continuous data at 1,200bit/s, so it is not possible to get hard copy from the MM2001. A short article by G3GKV in *DATACOM* suggests the use of a parallel-to-serial data converter which then provides the data stream in a format acceptable to many micros. A configuration using a 6402 uart is given with a clear description of how to get it going. An alternative is to build the G3RUH 1,200 baud telemetry decoder which does the entire job of decoding and RS232 output. □

Contest News

7MHz Contests 1985 results

The number of entries for the 1985 contests showed a significant improvement over the 1984 event, despite mixed conditions. The ssb event attracted comments about poor conditions, but it was generally felt that the conditions for the cw event were quite good. Scores overall showed a marked improvement over 1984.

The standard of log-keeping was generally good, although most lost points through inaccuracies. The number of stations submitting logs with unmarked duplicates is still too high, and three were disqualified for having in excess of the maximum of five unmarked "dupes".

Congratulations to Dave Vizard, G3UKS, for taking G3RRS to the lead position in both sections of the contest. He wins the G6QB trophy for the cw event. Winners and runners-up in each section will receive certificates.

G3OZF

Equipment used by leading stations

G3RRS TR7A + SB220 (SSB); 3 element yagi at 90ft & beverages
G4CNY TR7 + SB200 (SSB); 2 element yagi at 80ft

Summary of multipliers worked by leading stations

G3RRS (SSB) CE, CM, CN8, CP, CT1, CT2, CX, DL, DU, EA, EA6, EA8, EI, F, FM, HA, HB9, HH, HK, I, IS0, JA, JY, LA, LU, LX, LZ, OE, OH, OK, ON, OY, OZ, PA, UA, UA2, UC, UB, UG, UH, UL, UO, UP, UQ, UR, UA9, V2, VK1,2,5,7, VP9, VU, Y, YI, YN, YO, YU, Z2, ZL1,2,4, ZS, ZP, 3A2, 5B4, 5Z4, 6Y5, 9H.

G4CNY (SSB) CE, CM, CN, CT, DJ, EA, EA6, EI, F, FM, HA, HB, HH, HK, I, JA, JY, LA, LX, LZ, OA, OE, OH, OK, ON, OY, OZ, PA, PY, SM, SP, SV, TG, TI, TR, UA, UA1, UA2, UA9, UB, UC, UG, UH, UL, UP, UQ, UR, V2, VE2, VK2, Y2, YO, YU, YV, ZL1,2,4, 5B4, 5Z4, 6W, 6Y.

G3RRS (CW) C6A, CE, CO, CT1, CT3, CX, DJ, EA, EI, F, FM, HA, HB9, HK, HP, I, IS, IT, JA, J7, KH6, KP4, LA, LU, LZ, OE, OH, OK, ON, OX, OZ, PA, PY, SM, SP, TI, UA, UA9, UA2, UB, UC, UD, UH, UJ, UL, UO, UP, UQ, UR, V2, VE1,2,3, VK2,3, VP2E, VP2M, Y, YO, YU, YV, W1-0, ZC4, ZL1,2,3, ZS, 4Z4, 6Y.

G4CNY (CW) A9, CT, CT3, CX, DK, EA, EI, F, HA, HB, HK, HP, I, IS, J7, JA, KH6, KP4, LA, LU, OE, OH, OK, ON, OZ, PA, PY, SM, SP, TI, UA, UA2, UA9, UB, UC, UD, UH, UJ, UO, UP, UQ, UR, V2, VE1,2,3, VK2,3,4,6, VP2E, VU, W1-0, XE, Y, YO, YU, ZC, ZL1,2,3, ZS, 6Y.

UK SSB TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
1	G3RRS	250,677	8	GW4RHW	32,760	15	G3UHU	8,375
2	G4CNY	171,166	9	G4OTU	25,017	16	GW4HBK	7,800
3	GW4UZL	78,144	10	G4MET	23,560	17	G3PEK	7,370
4	G3NAS	67,050	11	G3CCZ	19,530	18	G4PPR	6,875
5	GW4BLE	54,780	12	G3FNM	13,440	19	G3GUP	6,375
6	G4OBK	51,804	13	GM5AXY	11,760	20	G3SJX	6,210
7	G2QT	34,254	14	G4PKE	9,045	21	G4AFJ	2,610

EUROPE SSB TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
1	4N3E	35,700	27	SP5DRH	1,480	53	RR2RN	240
2	UA2FJ	19,570	28	HA4XX	1,323	54	Y31PA	225
3	OZ5KG	16,086	29	UZ3AXH	1,305	55	Y22VI	224
4	UA1DZ	13,808	30	ON8DG	1,170	56	YO2AXG	220
5	YU2NA	11,440	31	HB9DX	990		Y24GF	220
6	DJ3HJ	7,950		UC2AA	990	58	OH6DK	215
7	YU2BST	7,686	33	FE6BVB	861	59	SM3CBR	200
8	LX1RQ	7,112	34	CT1AW0	725	60	YO9AHX	184
9	SM5IMO	6,720	35	RB4IWK	690	61	YO9CUF	180
10	ON5WL	6,305	36	DK5KJ	660		FE8WE	180
11	ON7TH	5,460	37	YO8BSE	588	63	RB5MA	164
12	DL1EK	4,730	38	YO9CZW	510	64	Y23TD	160
13	PI4DEC	4,550	39	LZ2KIM	490	65	EA2CR	150
14	OZ1IJP	3,905	40	UC1CWA	455	66	CT1CLU	140
15	HA5LV	3,424	41	OZ4HW	426	67	UB4MZA	140
16	HA5KDS	2,907	42	YO3AIS	425	68	CT1TM	135
17	ON6R	2,745	43	OZ7DX	420	69	DF5DK	120
18	ON6JG	2,585	44	EA3ELM	375	70	YU7SF	120
19	RB5AL	2,430		EA5JC	300	71	HA1XR	114
20	EI7CC	2,340	45	PA3DWD	300		DL8AAM	105
21	UP2OU	1,888		Y28XL/A	300	72	OZ6PI	105
22	LZ2KHM	1,755	48	PA3COA	300		Y64YG	105
23	OK1KZ	1,710	49	EA2RCF	270	75	UA3AJK	100
	UA1AHZ	1,710	50	OH7NW	265	76	YO9DIA	60
25	FE6EXQ	1,704	51	LA5TBA	260	77	YO9BVG	50
26	EA6VQ	1,530	52	CT1TH	240	78	UA10T	26

REST OF WORLD SSB TRANSMITTING

Posn	Callsign	Points
1	UH8EAA	17,138
2	UA9TS	1,950
3	UA9CG	1,710
4	UL8LWZ	720

REST OF WORLD CW RECEIVING

Posn	Station	Points
1	UA4095171/9	9,045
2	UL7023497	5,250
3	UF6014100	3,795
4	UF601494	1,200

EUROPE SSB RECEIVING

Posn	Station	Points	Posn	Station	Points	Posn	Station	Points
1	ONL383	3,420	7	Y211246/F64	945	14	UO5039770	700
2	OK313095	1,880	8	UP20381732	855	15	UB5068459	570
3	Y24406/G51	1,560	9	Y29540/A55	780	16	LZ1L73	525
4	UP20381318	1,395	10	UC20067	750	17	HA8811	425
5	UC200643	1,305	11	Y211100/F66	720	18	OY104	325
6	Y211249/F49	1,040		Y2EA14402/F59	720			
				UA4095620	720			

REST OF WORLD SSB RECEIVING

Posn	Station	Points
1	UF6014100	3,795
2	UA9084172	2,160
3	UA9134128	675

UK SSB RECEIVING

Posn	Station	Points
1	BRS32525	42,640
2	BRS28198	24,190
3	BRS86204	6,600

UK CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
1	G3RRS	492,492	19	G3NKS	83,025	36	G3OLU	29,240
2	G4CNY	412,158	20	G4UPS	80,835	37	G3DOT	27,240
3	G3UJE	271,950	21	G3FKH	78,960	38	G4XFB	21,420
4	G4EDG	228,690	22	GW3MPB	75,440	39	G3OLB	21,125
5	G3JKS	200,942	23	G4KRS	69,520	40	G3WKS	17,500
6	G3SXW	192,287	24	G4KGK	69,445	41	G4SMN	14,950
7	GM3YOR	174,006	25	G3ESF	68,800	42	G3AWR	13,230
8	G3UFY	171,060	26	G3SWH	68,540	43	GW4HBK	12,880
9	G4OBK	155,290	27	G3FYQ	66,880	44	G4WQI	12,705
10	G3PSM/P	141,930	28	GM4SID	62,370	45	GW4PXQ	12,555
11	G3YEC	140,980	29	G4IQM	58,400	46	GM8SQ	12,285
12	G3CCZ	138,825	30	G4FAS	46,930	47	G4OKN	12,040
13	G4OTU	127,170	31	G4BUO	43,870	48	G4EBK	10,250
14	G3TBK	117,750	32	GW4RHW	40,755	49	G2AJB	7,670
15	G2QT	117,425	33	G4UOL	39,975	50	G4ECI	7,035
16	G5MY	111,435	34	G3KSH	31,540	51	G3GMM	5,555
17	GW6TM	108,270	35	G4XTM	31,110	52	G3ILO	1,300
18	G3WVG	106,750						

EUROPE CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
1	UA1DZ	11,760	57	DF3QN	3,300	111	Y38ZB	1,350
2	UP2NK	11,284		DJ0WW	3,300	112	OZ1IPP	1,290
3	LZ2AX	10,800	59	CT3ET	3,285		OK1DXW	1,225
4	DK0TU	9,730	60	SM0BVQ	3,100	113	RA1CZ	1,225
5	4N3E	9,689	61	OK2KPS	3,000		OZ1KHZ	1,225
6	YU2BST	9,045	62	Y48UJ	2,970	116	UB5FAN	1,170
7	HA8QZ	8,229	63	UQ2GFD	2,900	117	OH6RC	1,155
8	UC2AA	8,050	64	EI7CC	2,835	118	OK1KZ	1,120
9	YU4EJC	7,930	65	DL1SN	2,790	119	UC2CFQ	1,110
10	OZ3ON	6,720		PA0VLA	2,790	120	LZ1FW	1,050
11	Y22YO	6,420		YU7AGD	2,790	121	Y83ZN	1,025
12	OK1DKW	6,175		Y35ZK	2,790	122	FD1JOA	1,000
13	HA30U	6,132	69	SK2AU	2,750	123	Y42ZB	960
14	LA1IE	6,110	70	OZ1III	2,700	124	HA8KWG	910
15	HA8IH	5,533		OH7NW	2,700	125	Y22DK/A	900
	RA1AO	5,533		Y37ZB	2,700	126	OH2DE	875
17	G3TXF/OE9	5,500	73	HA0HG	2,650	127	EA1KC	870
18	YO3CD	5,328	74	HA5CW	2,610	128	PA0DIN	840
19	LZ2KHM	5,280		Y54ML	2,610		RA4PC	840
20	LA2EG	5,220	76	HB9DX	2,585	130	Y62NN	825
	RB5AL	5,220	77	SM6ORZ	2,565		OH1OW	825
	UB5IFZ	5,220	78	Y45YA	2,520	132	OH5MX	800
23	UP2BAX	5,196	79	UA4HKJ	2,500	133	UA3QBX	770
24	DJ0YZ	5,170		Y24YH	2,500		Y51YJ	770
25	YU4EZC	5,135	81	ON5CW	2,450	135	Y24YH	750
26	YU7RA	5,100	82	SP7EWL	2,385		RA3RD	750
27	UR2QD	5,005		Y34SE	2,385	137	Y59WF	735
28	YU7SF	4,950	84	UP2BN	2,340	138	Y23GB	720
29	Y36VM	4,940	85	PA0UV	2,280	139	UV3DN	650
30	LZ2RS	4,920		Y24YG	2,280	140	YU7BDA	580
31	ON5WL	4,800	87	OK3CEL	2,250	141	YO2BKK	540
32	PA0GT	4,680	88	OH1PS	2,200	142	HA4XX	500
33	Y35UJ	4,675		Y21NE	2,200		LA1PBA	500
34	OH3YS	4,620	90	OK1EV	2,160	144	YO2CJX	450
35	ON6NW	4,510		UB5VK	2,160	145	Y49RF	440
36	Y26SO	4,455	92	OZ4HW	2,115		UA1AUA	440
37	UP2BZ	4,440		LZ2RF	2,115	147	YU7ORQ	400
38	DL1OO	4,320	94	YO3YC	1,935	148	DL9VDQ	385
39	SM5IMO	4,300	95	UB5GBN	1,890	149	OK1DZD	375
40	Y32KE	4,250	96	YU2WJ	1,855	150	UP2BLV	350
	OZ4RS	4,250	97	OZ8ZB	1,750	151	UB5KAG	300
42	Y26JD	4,235		SM7LAZ	1,750		Y37RB	300
43	UA3AGX	4,150	99	Y21YA	1,720	153	SM3CBR	260
44	EI5DI	4,100	100	Y47ZG	1,710	154	LZ1HY	240
45	SM0NBC	4,070	101	YO8DDP	1,680		UY5GG	240
46	UB5QBC	4,015	102	UT5UEW	1,640	156	Y26HH	225
	Y24MI	4,015		UB5QMA	1,640	157	Y23GD	220
48	SM6DED	4,000	104	DL5JQ	1,540	158	OZ1W	195
49	DL6BBT	3,900	105	DL1OW	1,500	159	SM7CZC	160
	SM6EUZ	3,900	106	OH4RH	1,440	160	OK2BBJ	150
51	HB9AGH	3,795		OU5OO	1,440	161	DF5DK	100
52	SM7ERC	3,700	108	UQ2GP	1,400	162	UA3TG	80
53	DL9OT	3,650		UB5EEP	1,400		OX3OA	80
54	UA4HNP	3,575		OH6YF	1,400			
55	EA2CR	3,465						
	Y23CM	3,465						

REST OF WORLD CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
1	UH8EAA	32,175	9	UJ8JA	3,780	17	W8VSK	1,500
2	NC2V	16,042	10	UA9CR	3,240	18	VK2BQQ	1,300
3	UA9FAL	12,485	11	UA9WYL	3,150	19	UA9FII	1,200
4	RA9SUV	11,080	12	TI4BGA	3,060	20	UA9FGO	315
5	K4KQ	9,855	13	UA9AIA	2,835	21	NB9K	30
6	UD6CN	9,515	14	HP1XKR	2,700	22	JR7BTI	15
7	VO1AW	6,480	15	PP2BT	1,800		JA1JPM	15
8	K2SX	5,280	16	W3ARK	1,620			

EUROPE CW RECEIVING

Posn	Station	Points
1	UA3142198	3,700
2	Y210280/B45	3,245
3	UP20381162	2,520
4	UT5186100	1,620
5	UA4095620	750
6	HA8811	640
7	UC200643	525
8	Y20742/F23	180

UK CW RECEIVING

Posn	Station	Points
1	BRS1066	82,150

Check logs from too many stations to list are gratfully acknowledged.

48th Commonwealth Contest 1985 results

It appears that the VE stations still prove a threat to those who challenge for the honours in this contest, and this year sees a return of a Canadian winner in the form of Lee Sawkins, VE7CC, who wins the Senior Rose Bowl, and Nigel Hoyow, 6Y5HN, as runner-up who receives the Junior Rose Bowl. Rolf Salme, SM5MX, operated from the Swedish Embassy in Nairobi as 5Z4MX. Al Slater, G3FXB, was ousted from the top UK spot for the first time in 12 years by F Handscombe, G4BWP, who receives the Col Thomas Rose Bowl. Eric Trebilcock, BCRS195, entering his 45th BERU (is that a record?) took the Receiving Rose Bowl.

Conditions were the worst many had experienced for a long time, perhaps shown best by the lack of activity on 28MHz. Even 14MHz which can usually be relied upon to provide plenty of communication succumbed to the dismal conditions with no long path opening from the UK to VK/ZL, while 21MHz was generally poor. This resulted in lower scores and bonus points for all concerned, although some of the leaders managed to pick up many areas which others missed through well timed operation and good ears.

Once again 14MHz carried most traffic, 45 per cent of the total QSOs being made on this band, with 32 per cent on 7MHz and 22 per cent on 3·5MHz. 21MHz had little support except from 9J2BO and Z23JO.

Unfortunately, the WIA decided that 10 March would be a good day to celebrate their 75th anniversary, with a 24h cw contest. This caused some confusion, with many VK stations being called in the Commonwealth and the WIA contest. A special station, VK75A, operating from VK3 was worked by many, and claimed as VK7. The adjudicator decided to bend to this overwhelming support for VK7 and adjusted logs accordingly. The added complication of ZL call areas did not seem to manifest itself, and fortunately the error of omitting ZL2 from the call areas list did not deter entrants from claiming for ZL2.

Just under half the Commonwealth call areas, 51, were active and worked. It is interestng to note that 3B8 and 3B9 were worked once only, and from the UK! This contest relies upon good support from the Commonwealth call areas and it would be far more interesting if more areas could be activated. Does anyone have any contacts with those rare areas for next year's contest?

Many entrants used Trio equipment this year, with the TS830s proving to be the most popular rig. Dipoles were used by most entrants on the lower and higher frequencies, although some stations made the most of their land with very large arrays indeed, particularly VE7CC.

Once again almost 300 UK stations appear in the logs, but not in the list of entrants! The HF Contests Committee is anxious to improve UK participation, particularly among the more newly-licensed amateurs. This contest is not like the "hammer and tongs" of AFS or NFD, it requires a great deal of skill, knowledge of band conditions and patience. Thanks again to John Tutton, VK3ZC, and Eric Trebilcock, BCRS195, for their publicity "down under", and to the following for their check logs: G3WP, G6NK, G3GMM, G3VDL and VE3EK.

TRANSMIT SECTION

Posn	Callsign	Areas	Bonus	QSOs	Total	Posn	Callsign	Areas	Bonus	QSOs	Total
1	VE7CC	28	148	295	4,265	60	VK8HA***	18	39	114	1,330
2	6Y5HN	24	104	411	4,062	61	VK3YK	16	50	58	1,240
3	5Z4MX	31	104	406	3,954	62	G3ESF	19	46	56	1,195
4	G4BWP	39	139	220	3,793	63	G3SWH	23	47	48	1,180
5	G3FXB	37	128	215	3,514	64	VK3LC	15	45	55	1,159
6	VE5RA	27	110	279	3,501	65	G2HLU	19	44	51	1,135
7	P29PR	22	120	254	3,499	66	VK3MJ	19	44	50	1,122
8	VK4XA	22	107	261	3,365	67	VE1NG***	9	14	180	1,115
9	VE3CRG	24	81	341	3,135	68	VK7GB	12	44	50	1,100
10	ZL2BR	21	103	214	3,115	69	G3KSH	19	41	54	1,082
11	G3MXJ	33	114	156	3,019	70	Z23JO	13	25	116	1,050
12	ZL1AIZ	23	104	187	3,010	71	G5MY	19	41	55	1,045
13	VK2AYD	22	101	207	2,947	72	VK5RG	9	38	54	1,030
14	G4BUQ	32	106	151	2,867	73	VK7RY	10	40	67	1,027
15	VK7BC	21	101	149	2,740	74	VK3XF	11	40	51	1,022
16	VK2BQQ	20	95	170	2,737	75	G4OTU	18	42	46	1,015
17	G3PEK	34	100	143	2,685	76	G3EBH	20	39	43	995
18	ZB2EO	16	47	355	2,660	77	VK3YD**	20	36	50	955
19	VK3ZC	22	95	150	2,650	78	VK3CAL	13	36	40	912
20	VK7RO	19	91	174	2,622	79	VK4BKM	13	34	63	910
21	VK5BN	22	93	151	2,615	80	VI3XB*	15	33	57	895
22	VK2AQF	21	92	154	2,553	81	G3SXW	24	32	45	865
23	9V1TL	21	83	179	2,530	82	VK4TT***	14	29	66	860
24	VI3AUQ	21	86	148	2,427	83	VK2SU	13	36	37	847
25	VK4APZ	19	88	135	2,402	84	GW3MPB***	19	29	43	795
26	VK2GW	18	85	139	2,395	85	GW3JI	12	34	39	787
27	VK5AGX	18	83	145	2,385	86	G3YEC	18	30	33	765
28	VE7UZ	22	84	129	2,325	87	G3ZRH	14	29	33	745
29	VK6RU	20	83	154	2,322	88	VK6AUX	10	28	35	735
30	VE3ST	22	73	173	2,299		VK5BS	12	27	39	735
31	VQ1AW	17	55	249	2,185	90	VK5RJ*	12	24	54	732
32	VK6IT	18	75	127	2,080	91	G3SJX	19	30	31	730
33	VK5GZ	16	72	107	1,975	92	VK5HO	11	33	69	717
34	ZL1HV	17	72	105	1,965	93	G8QZ	15	27	33	697
35	VK2APK**	26	54	184	1,950	94	VK7ZO	8	25	41	680
36	VK3AZW	20	73	117	1,915	95	ZD8JP	10	25	36	672
37	VK8XX	19	77	136	1,857	96	VK3XU	10	26	35	670
38	VK3JI	17	69	94	1,792	97	VK4SF**	17	35	49	645
39	VK5UM	17	69	106	1,786	98	G3DOT	12	28	33	642
40	GM3YOR	29	68	86	1,782	99	G3WRR	14	25	28	640
41	VE3JKZ	16	48	181	1,780	100	G3ILO	14	25	25	625
42	VK2DO	15	65	97	1,700	101	VK2AZR	8	24	29	600
43	VK4XW	16	63	86	1,682	102	G3ICH***	14	22	30	590
44	VI3KS	14	61	85	1,637	103	VQ1FB*	9	15	42	505
45	VK3DNC	21	64	74	1,626	104	VI3DOV	11	20	20	492
46	G2QT	25	61	88	1,605	105	VK2IC***	10	17	17	409
47	VK3DQ	21	60	77	1,583	106	G4IJW	9	15	15	375
48	G3CCZ	24	61	65	1,545	107	G2AJB	9	14	17	365
49	VK2BHQ	14	58	76	1,540	108	VK4NUN*	6	13	21	360
50	VK3BDH	16	58	75	1,527	109	VE3BZQ***	9	12	29	355
51	VK7CH	15	56	85	1,520	110	GM8SQ***	14	14	15	355
52	G3UJE	25	55	91	1,475	111	G3JKY	7	12	14	310
53	VE3IR	19	56	61	1,412	112	VK3SV*	4	12	17	300
54	VK2EL	15	51	68	1,360	113	G4XTM	7	10	10	225
55	ZL2OM	14	51	77	1,359	114	G4DJX***	6	8	8	200
56	VK3FC	16	53	65	1,355	115	VK3CYL***	2	6	7	155
57	VK6AJ	15	46	90	1,345	**Average**		**30**	**54**	**101**	**1,557**
58	9J2BO	14	27	163	1,343	**Totals**			**6,286**	**11,677**	**179,103**
59	G4OBK	18	51	64	1,335	*=3·5Mhz	**=7MHz		***=14MHz		

AWARD WINNERS

Senior Rose Bowl	L Sawkins, VE7CC
Junior Rose Bowl	N Hoyow, 6Y5HN
Col Thomas Rose Bowl	F Handscombe, G4BWP
Receiving Rose bowl	E Trebilcock, BCRS195

SINGLE-BAND WINNERS

3·5MHz o'seas	VI3XB	**7MHz o'seas**	VK2APK
14MHz home	GW3MPB	**14MHz o'seas**	VK8HA

PREFIXES WORKED BY UK STATIONS

Frequency (MHz)

PFX	3.5	7	14	21	28	Total
C6			1			1
P2		1	2			3
V2	1	1	1			3
VE1	16	8	16	2		42
VE2	8	4	15			27
VE3	23	10	44	2		79
VE4			5			5
VE5	1	1	3			5
VE6			2			2
VE7		2	7			9
VK1		1	1			2
VK2	1	12	9			22
VK3	2	20	5			27
VK4		5	7			12
VK5		2	3	1		6
VK6	2	6	1			9
VK7	1	5	1			7
VK8		1	2			3
VQ1	4	3	2	1		10
VP9			1			1
VS6	1	1	1			3
VU			1			1
Z2			1	2		3
ZB2	1	1	1			3
ZC4	1	1	1	1		4
ZD8	1	1		1		3
ZL1	3	5	3			11
ZL2	4	6	4			14
ZL3	1	3	2			6
ZL4	3					3
3B8	1					1
3B9		1				1
3D6			1	2		3
4S	1		1			2
5B4	1			1		2
5N			1			1
5Z	1	1	1	1		4
6Y	1	1	2	1		5
8Q		1		2		3
9H		1				1
9J			1	1		2
9M2		1	1			2
9V		1	2			3
Prefixes	23	30	36	13	0	
Total	79	107	152	18	0	

Number of different prefixes = 43

RECEIVE SECTION

1 BCRS195 1,840 points
2 BRS1066 1,805 points

PREFIXES WORKED BY OVERSEAS STATIONS

Frequency (MHz)

PFX	3.5	7	14	21	28	Total
C6	1	1	1			3
G	83	148	276	137	1	645
P2	2	3	3	2		10
T30	1					1
V2			1			1
VE1	10	12	11	2		35
VE2	1	6	5			12
VE3	16	33	36	5		90
VE4		1	3			4
VE5	2	1	5	1		9
VE6		2	1			3
VE7	3	7	9	2		21
VK1	1	2	2	1		6
VK2	22	27	23	5		77
VK3	30	34	32	11		107
VK4	15	18	22	6		61
VK5	10	12	12	3		37
VK6	9	11	11			31
VK7	12	13	11	4		40
VK8	1	1	2			4
VQ1	2	3	4	1		10
VP9		1	1			2
VQ9					1	1
VS6	2	1	1	1		5
VU		1	2			3
Z2			1	1		2
ZB2	1	1	1	1		4
ZC4		1	1	1		3
ZD7		1				1
ZD8	1	1	1	1		4
ZL0			1			1
ZL1	8	11	8	6		34
ZL2	5	6	10	1		22
ZL3	2	4	2	1		9
ZL4	2	1				3
3D6		1	1	1		3
4S			2			2
5B4				1		1
5H			1			1
5N			1			1
5Z	1	1	1	1	1	5
6Y	1	2	1	1		5
8P			1			1
8Q			2	2		4
9H				1		1
9J	3	1	1	1	1	7
9M2		1	1			2
9V	1	1	3	1		6
9Y				1		1
Prefixes	29	36	42	30	4	
Total	248	371	515	203	4	

Total number of different prefixes = 49

HOW THE LEADERS MADE THEIR SCORES

Callsign	3·5			7			14			21			28		
	Q	B	A	Q	B	A	Q	B	A	Q	B	A	Q	B	A
VE7CC	58	36	17	91	45	22	127	49	22	19	18	10			
6Y5HN	57	17	8	121	39	18	221	39	20	12	9	5			
5Z4MX	43	12	8	121	35	17	143	41	25	97	14	12	2	2	2
G4BWP	67	33	22	62	42	19	79	52	28	12	12	11			
G3FXB	46	24	15	77	48	26	82	46	27	10	10	9			

A = Areas Q = QSOs B = Bonuses

TOTALS INFORMATION

Band	Claimed	Checked	QSOs	Bonuses	Dups	Lost	Scores
80	36,985	38,045	2,257	1,338	3	875	37,170
40	61,105	62,090	3,644	2,292	9	2,061	59,999
20	73,395	74,065	5,141	2,418	15	1,899	72,166
15	9,750	9,835	631	334	0	151	9,684
10	100	100	4	4	0	16	84
Total	181,315	184,105	11,677	6,286	27	5,002	179,103

EQUIPMENT USED BY THE LEADERS

VE7CC TS820/L4B. 3·5MHz delta loop 100ft. 3·5MHz inv-V 100ft. 7MHz 2-el Yagi 100ft. 14MHz 5-el Yagi 105ft. 21MHz 4-el Yagi 90ft
6Y5HN TS120/SB101. 4-el beam ht, lf dipoles.
5Z4MX Drake TR7. TH6DXX 402BAS, 3·5MHz inverted-V.
G4BWP TS830S. 3-el beam. Inverted-Vs.
G3FXB T4XC/R4C. Two 3·5MHz slopers. 7MHz beam. 7MHz dipole/ht quad.

28MHz Phone and CW Cumulative Contests 1985

At the request of entrants, the rules for these activity contests have been modified. An additional phone session has been added and a bonus may now be claimed for each county worked in each session. There are other minor changes for the awards and the frequencies to be used. Each session will count separately, and the total score will be the sum of that obtained in the best three of the five sessions in either the phone or the cw contests. As has been requested, the cw sessions have been brought forward a few weeks. Subject to a good entry being received for these contests, it is proposed to hold further sets of 28MHz Cumulatives in the spring of 1986.

1. The general rules for RSGB hf contests as published in the "Operating Guide" supplement, *Rad Com* January 1985, will apply.

2. Dates and times. Each session will commence at 8pm and finish at 10pm. Phone sessions. 16 September, 24 September, 2 October, 10 October and 18 October. CW sessions. 21 October, 29 October, 6 November, 14 November, 22 November.

3. Sections. Single-operator, multi-operator and swl. All entrants, including each operator of a multi-operator entry, must be fully paid-up members of the RSGB. Portable or /A entries are acceptable, but entrants must operate from the same location for all sessions.

Contests Calendar

May-September	10GHz Cumulatives *(Rules in April issue)*
May-September	Microwave Cumulatives *(Rules in April issue)*
1 September	LZ DX *(Rules in August* MOTA)
4-5 September	Howdy Days *(Rules in August* MOTA)
7, 8 September	IARU Region 1 VHF/UHF/SHF *(Rules in July issue)*
7, 8 September	144MHz Trophy and IARU *(Rules in July issue)*
8 September	DF Qualifying Event, Slade
14/15 September	International ATV *(Rules in April issue)*
16, 24 September, 2, 10, 18 October	28MHz Phone Cumulative *(Rules in September issue)*
22 September	70MHz Trophy *(Rules in July issue)*
21, 22 September	Scandinavian Acitivity (cw) *(Rules in*
28, 29 September	Scandinavian Acitivity (phone) *September* MOTA)
29 September	DF National Final, Northampton
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
20 October	21MHz CW *(Rules in May issue)*
24 October	432MHz Cumulative
26 October	DF Treble Night Event, Mid-Thames
27 October	70MHz Fixed
21, 29 October 8, 14, 22 November	28MHz CW Cumulative *(Rules in September issue)*
1, 17 November	1,296/2,320MHz Cumulative
2, 3 November	144MHz CW
3 November	WAB CW *(Rules in February* MOTA)
9, 25 November	432MHz Cumulative
9, 10 November	2nd 1·8MHz
1 December	144MHz Fixed
3, 19 December	1,296/2,320MHz Cumulatives
11 December	432MHz Cumulative
15 December	70MHz CW
8, 9 March 1986	**Commonwealth** *(Rules in September 1985 issue)*

4. Frequencies. Phone 28·5-28·8MHz, CW 28·0-28·2MHz. Entrants are asked to spread out within the specified segments.
5. Exchange. RS(T), number (starting at 001 for each session) and RSGB county code (see "Operating Guide"). For QSOs with overseas countries, RST and serial No (when given). SWL section, see rule 11 below.
6. Scoring. Each session is scored separately, and the sum of the three highest scoring sessions to count. Each completed contact is worth three points and a bonus of five points can be claimed for the first contact in each session with a new county or country. Contacts with any station (worldwide) count for points. Subject to the limitations in rule 11, swl entrants score on the same basis as transmitting entrants.
7. Single log for each mode covering all sections entered. This to show: date of session, call, RS(T), serial number sent and received, county code, points and bonus claimed. Logs must be fully scored and totalled and should also show the county code sent. A separate list of counties/countries worked in each session should be included. RSGB HF Contest log sheets (or equivalent) should be used. Incomplete logs will not be accepted.
8. Entries should be sent to HF Contests Committee, c/o Mrs R L Glaisher, G4RWW, 279 Addiscombe Road, Croydon CRO 7HY.
9. Entries for the phone section should be postmarked not later than Monday 18 October; and for the cw section, not later than Monday 2 December.
10. Awards. Certificates will be awarded to the leading three entrants in each section for the phone and cw contests, subject to a minimum of 10 entries being received in the section.
11. SWL section. Rules as transmitting section, except as detailed below:
(a) Entrants British Isles RSGB members only, who do not hold a Class A transmitting licence.
(b) Logs must be headed date, time, call heard, call of station being worked, report, number and county code of station heard, points and bonus (where applicable). **Note:** The call of the station being worked may only appear once in every three contacts logged, unless it is a new county for bonus.

The Commonwealth Contest 1986

Participation in this contest will count towards the HF Contest Championship 1985-86 for UK entrants.

TRANSMITTING SECTION

1. The general rules for RSGB HF contests, to be published in the "Operating Guide" supplement *Rad Com*, January 1986, will apply.
2. Date and time. From 1200gmt 8 March 1986 to 1200gmt 9 March 1986.
3. Sections. Single-operator entries only from members of the RSGB resident in the UK and radio amateurs licensed to operate within the British Commonwealth or British Mandated Territories. Entries from GB, aeronautical mobile or maritime mobile stations will not be accepted. Entries may be single- or multi-band. Single-band entries should show contacts on one band only; details of contacts made on other bands should be enclosed separately for checking purposes. Multi-band entries will not be eligible for single-band awards.
4. Band and mode. A1A only in the 3·5, 7, 14, 21 and 28MHz bands. In accordance with IARU recommendations, contestants are requested to operate within the lower 30kHz of each band, except when contacting novice stations that operate above 21,000 and 28,100kHz.
5. Exchange. Contacts may be made with any station using a British Commonwealth callsign, except those within the entrant's own call area. UK stations may not work each other for points. A contact exchange consists of RST and a three-figure serial number commencing with 001 and increasing by one for each successive contact throughout the contest, irrespective of band in use. Serial numbers when sent from non-competing stations, must be recorded.
6. Scoring. Each completed contact will score five points. In addition, a bonus of 20 points may be claimed for the first, second and third contacts with each Commonwealth call area (as listed in the accompanying table) on each band. All British Isles prefixes (G, GB, GD, GI, GJ, GM, GU and GW) count as one call area.
7. Documentation. Separate log sheets (HFC1) for each band must include gmt, callsign of station worked, RST/serial number sent, RST/serial number received and points claimed. Separate band totals should be added together and the total claimed score entered on the cover sheet. It is important that logs are carefully checked for duplicate contacts. Unmarked duplicate contacts for which points have been claimed will be penalized 10 times the number of points claimed, and logs containing in excess of five will normally be disqualified. Your entry should include a declaration that the rules and spirit of the contest and the terms of the entrant's licence were observed.
8. Name and address for entries. Entries should be addressed to A K Gray, G4DJX, 44 Sherwood Avenue, St Albans, Herts AL4 9PQ, UK. All entries become the property of the RSGB. In the event of any dispute, the ruling of the Council of the RSGB shall be final.
9. Date for entries. Note early date for entries. Adjudication of this contest will commence on 14 April 1986. Any entry received after this date may be excluded from the contest. Overseas stations are therefore advised to forward their logs by airmail.
10. Awards. To the winner, the BERU Senior Rose Bowl; to the runner-up, the BERU Junior Rose Bowl; and to the leading UK station, the Col Thomas Rose Bowl. Certificates of merit will be awarded to *(a)* first, second and third placings in home and overseas multi-band sections; *(b)* the leading home and overseas single-band entries on each band; *(c)* the leading station in each overseas call area.
11. Receiving section. Rules as transmitting section, except as detailed below:
(a) Only the entrant may operate the station for the duration of the contest. Holders of transmitting licences covering frequencies below 30MHz are not eligible to take part.
(b) To count for points, a station outside the entrant's own call area must be heard in contest contact. CQ or test calls will not count for points. A station may be logged only once on each band for the purpose of scoring. When both stations in contact are heard, they should be logged separately and points claimed for both entries, provided that the stations are outside the entrant's own call area.

Each completed log entry will score five points. In addition, a bonus of 20

COMMONWEALTH CALL AREAS

The following call areas are recognised for the purpose of scoring in the 1986 Commonwealth Contest:

A2	Botswana
A3	Tonga Is
C2	Nauru
C5	Gambia
C6	Bahamas
G/GB/GD/GI/GJ/GM/GU/GW	
H4	Soloman Is
J3	Grenada
J6	St Lucia
J7	Dominica
J8	St Vincent
P2	Papua New Guinea
S7	Seychelles
T2	Tuvalu
T30	W Kiribati
T31	C Kiribati
T32	E Kiribati
V2	Antigua, Barbuda
V3	Belize
VE1	Maritime Provinces
VE1	Sable Is
VE1	St Paul Is
VE2	Province of Quebec
VE3	Province of Ontario
VE4	Province of Manitoba
VE5	Province of Saskatchewan
VE6	Province of Alberta
VE7	Province of Br Columbia
VE8	North West Territories
VK1	Australian Capital Ter
VK2	New South Wales
VK3	Victoria
VK4	Queensland
VK5	South Australia
VK6	Western Australia
VK7	Tasmania
VK8	Northern Territories
VK9L	Lord Howe Is
VK9N	Norfolk Is
VK9X	Christmas Is
VK9Y	Cocos Keeling Is
VK9Z	Mellish Reef
VK0	Heard Is
VK0	Macquarie
VK0/VP8/ZL5	Antarctic
VO1	Newfoundland
VO2	Labrador
VP2E	Anguilla
VP2K	St Kitts, Nevis
VP2M	Montserrat
VP2V	British Virgin Is
VP5	Turks & Caicos
VP8	Falkland Is
VP8	S Georgia
VP8	S Orkneys
VP8	S Sandwich Is
VP8	S Shetland Is
VP9	Bermuda
VQ9	Chagos
VR6	Pitcairn
VS5	Brunei
VS6	Hong Kong
VY1	Yukon
VU	India
VU	Laccadive Is
VU7	Andaman & Nicobar Is
YJ	Vanuatu
Z2	Zimbabwe
ZB2	Gibraltar
ZC4	Cyprus (UK Bases)
ZD7	St Helena
ZD8	Ascension Is
ZD9	Tristan da Cunha, Gough Is
ZF	Cayman Is
ZK1	Cooke Is
ZK1	Manihiki
ZK2	Niue
Zk3	Tokelau
ZL0*	
ZL1*	
ZL2*	
ZL3*	
ZL4*	
ZL7	Chatham Is
ZL8	Kermadec Is
ZL9	Auckland & Campbell Is
3B6/3B7	Agalega & St Brandon
3B8	Mauritius
3B9	Rodriguez Is
3D2	Fiji
3D6	Swaziland
4S	Sri Lanka
5B4	Cyprus
5H	Tanzania
5N	Nigeria
5W	Western Samoa
5X	Uganda
5Z	Kenya
6Y	Jamaica
7P	Lesotho
7Q	Malawi
8P	Barbados
8Q	Maldives
8R	Guyana
9G	Ghana
9H	Malta
9J	Zambia
9L	Sierra Leone
9M2	W Malaysia
9M6/9M8	E Malaysia
9V	Singapore
9Y	Trinidad & Tobago

*Due to recent changes in the New Zealand licence allocations, ZL0, ZL1, ZL2, ZL3 and ZL4 will count as separate call areas for the purpose of this contest.

points may be claimed for the first, second and third stations heard in each British Commonwealth call area on each band. All British Isles prefixes count as one call area.

A separate log is required for each band. Logs should show the date/time gmt, callsign of station heard, RST/serial number sent by the station heard, callsign of the station being worked, and points claimed.

(c) The BERU Receiving Rose Bowl to the winner. Certificates of merit to the leading entrant in each continent.

HF Contest Championship 1985-6 rules

1. RSGB hf contest general rules do not apply.

2. No entries for the championship are required.

3. The championship will be decided on the basis of RSGB hf single-operator contests held between 1 October 1985 and 31 July 1986.

4. Points will be awarded in each contest as follows to every UK station submitting logs:

4.1 Points will be calculated by expressing the score gained by each station in each contest as a percentage of the leading UK station in that contest.

4.2 The points calculated in **4.1** will then be multiplied by the following factors for the relevant contest:

21/28MHz Telephony	20	Second 1·8MHz 1985	10
21MHz CW	20	First 1·8MHz 1986	10
7MHz Telephony	20	Town & Country	10
7MHz CW	20	Region Round-up	10
Commonwealth	30		

Example: If the leading station in the 21MHz CW Contest scores 30,000 points, and the entrant concerned gains 6,000 points, the points awarded to that competitor in the HF Contests Championship for that contest will be:

$$\frac{6{,}000}{30{,}000} \times 100\% \times 20 = 400$$

5. Points calculated as in **4** above by UK stations using the same basic callsign (with or without suffixes) and entering two or more of the individual contests will be totalled and a table published in *Radio Communication*.

6. Club Stations. To be eligible for inclusion a club station must be operated by the same single operator during each contest. In the event of a club station meriting an award, the award will be made to the operator concerned and not to the club.

7. Awards The winner will receive the G2QT Trophy. A certificate will be awarded to the runner-up.

BARTG Spring 1985 HF Contest

The results of this contest have now been published. Copies can be obtained from Peter Adams, G6LZB, at the address above.

Autumn VHF/UHF RTTY Contest 1985

1800gmt 12 October—1100gmt 13 October

Rules for this contest can be obtained from: BARTG Contest Manager, Peter Adams, G6LZB, 464 Whippendell Road, Watford, Herts WD1 7PT.

Club News

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

RSGB affiliated organizations are requested to report all programmes and new items to their regional representatives regularly. Information for inclusion in the **November** issue should reach them by **13 September** and for the **December** issue by **18 October.**

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 Thurme Way Liverpool L25 4SQ. Tel 051-722 3644

Barnoldswick (Rolls-Royce ARC)—4 September (Surplus equipment sale). 8pm. Sports & Social Club. Sec G4ILG, tel 0282 812288.

Blackburn (E LARC)—3 September (Surplus equipment sale), 24 September (Informal), 1 October (The Welshpool and Llanfair light railway). 7.30pm. The Conservative Club, Cliffe Street, Rishton. PRO G6LXU, tel Gt. Harwood 887385.

Bury (BRS)—17 September ("Propagation of radio waves", G3LEQ). Weekly meeting informal except 2nd Tuesday of month. 8pm. Mosses Community Centre, Cecil St, Bury. Sec G4TBT, tel Burnley 24254.

Chester (C&DARS)—10 September (Visit by Lowe Electronics of Matlock, latest equipment), 17 September (Inter-club quiz at Chester with Ellesmere Port ARS), 24 September (TBA), Morse classes 7.15pm, G4MOU. Main meetings 8pm. The Chester Rugby Union Football Club, Hare Lane, Vicars Cross, Chester. Details G4EZO, tel Chester 40055.

Fylde (FARS)—3 September (Visit to control tower, Blackpool Airport, 7.20pm, assemble at A/P fire station), 17 September ("QRP is fun", G3RJV), 1 October ("Basic principles of, and factors affecting propagation," G3KEN). 7.45pm. Kite Club, Blackpool Airport, Sec G8GG, tel 725717.

Liverpool (L&DARS)—3 September (Trade show), 10 September ("Fire prevention," G3LIU), 17 September (Isle of Man inquest), 24 September (Pre-agm), 1 October (AGM). 8pm. The Churchill Conservative Club, Church Road, Wavertree, Liverpool 15. Sec Albert Webb, tel 051-427 8557.

Manchester (SMRC)—6 September (Contest preparation and activity night), 13 September (Report on ssb field day), 20 September (Surplus equipment sale), 27 September (Visit by Mr J Nelson, G4FRX). 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec G3WFT, tel 061-973 1837.

Merseyside Raynet—22 September (Mersey marathon). All members are required for this major event supporting the St John Ambulance Brigade. We will be using the new County call sign G1MCR. Details G8RXB, tel 051-638 5879.

Penrith (Eden Valley RS)—19 September (Visit by Bertram Donn, G3XSN, Region 1 Representative RSGB). 7.30pm. The Kings Arms, Temple Sowerby, Penrith. Sec G1FBD, tel 0768 88260.

Preston (PARS)—12 September ("Atomic structure," G4DBU), 26 September ("Test your rig night," G3SYA). 8pm. Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Sec G3ZXC, tel 0772 718175.

Thornton Cleveleys (TCARS)—2 September ("Antennae," G3AOW), 9 September (Club on air/informal evening), 16 September (Component sale), 23 September (Judging of construction competition), 30 September (Club on air/informal evening). 7.30pm. Norbreck 1st Scout Hut, Carr Road, Bispham. Sec G4WIC, tel 0253 821 827.

Wirral (WARS)—4 September (Quiz), 18 September ("Smith Charts simplified," G3EGX), 2 October (Sale of surplus equipment). 8pm. Heswall Parish Church Hall, Heswell. Sec G4KPY, tel 051-625 7311.

Wirral (W&DARC)—4 September (Quiz as guests of the Wirral ARS at Heswall), 7-8 September (Club entry 144MHz Trophy Contest), 11 September (Technical talk TBA), 18 September (Visit by members only to a telephone exchange then D&W at The Angel), 22 September (Club entry in the 70MHz Trophy), 25 September (Technical talk TBA). 8pm. Irby Cricket Club, Mill Hill Road, Irby. Sec G8TRY, tel 051-630 1393.

Wirral Raynet—1 September (First-aid course for members). 7.30pm. St John's HQ, Carlton Road, B'Head, 15 September (Wirral half-marathon). 9am. Parkgate, 22 September (Mersey marathon). Future meetings 5 September and 3 October. 7.30pm. Birkenhead YMCA. Details G6FNF, tel 051-653 4067.

Thank you to South Manchester RC for its enthusiastic welcome and hospitality. It was also nice to have the two previous regional representatives, Roland Parkinson and Bill Furness, in attendance. To Bury Radio Society and Wirral & DARC, thank you for your club magazines; both are very professionally produced.

I am receiving information from some clubs too late for inclusion in *Rad Com.* Please check the dates at the top of "Club News". Clubs which do not appear this month are those from which I have no new information.

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

Goole (GR&ES)—3 September (Natter night), 10 September (Discussion on G3LEA construction trophy), 17 September (AGM), 24 September ("Metre wave operation," G8FWC). 7.30pm. Goole Junior Chambers, Boothferry Road, Goole. Details G8IOH, tel 040-584 462.

Halifax (H&DARS)—24 September (AGM), The Running Man, ph, Pellon Lane, Halifax. Sec D Moss, tel Halifax 0422 202306.

Maltby (MARS)—23 September ("Cheap QRP," G4BVV). 7pm. School Buildings, Church Lane, Maltby. Details G3ZHI, tel 0709 814911.

Todmorden (T&DARS)—2 September (Talk by Harry Leeming, G3LLL), 16 September (Informal). 8pm. Queen Hotel, Todmorden. Sec G6MDB, tel Todmorden 2494.

RSGB President Joan Heathershaw, G4CHH, with G1HCJ, after opening GB2RXW operated by the Grimsby & Cleethorpes District Raynet Group to celebrate the centenary of the British Red Cross

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

Birmingham (Midland ARS)—17 September (Homebrew contest), 18 October (AGM), 19 November (Surplus sale). 294a Broad St, Birmingham B1 2DS. Sec GBBHE, tel 021-422 9787.

Bromsgrove (BARS)—10 September ("Secret listeners,"), 24 September (Open meeting). 8pm. Hundred House, Stourbridge Road, Bromsgrove. Sec Alan Kelly, G4LVK.

Bromsgrove (BARC)—13 September (Surplus auction). 8pm. Avoncroft Arts Centre, Bromsgrove. Sec G6EAM, tel Kingswinford 549 298580.
Dudley (DARC)—2 September (General meeting), 9 September (Natter night), 23 September (Radio in aviation, G4AJB). 7.45pm. Allied Centre, Greenman Alley, Tower St, Dudley. Sec G4NRA, tel 0384 278300.
Halesowen (MEB Sports & Social Club RC)—10 September ("The truth about swr," G8MWR), 24 September (General meeting). 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.
Rugby (RATS)—24 September (DF hunt). 7.30pm. Cricket Pavilion, "B" entrance. Rugby radio station. Sec G4TWH.
Shrewsbury (Salop ARS)—5 September (Natter night), 12 September (Fox hunt), 19 September (Natter night), 26 September (Model aircraft). 8pm. Old Bucks Head, Frankwell, Shrewsbury. Sec G6DQY, tel 92 260668.
Stourbridge (SARS)—2 September (Natter night), 7 September (Carnival event). 7.45pm. Robin Woods Centre, School St, off Enville St, Stourbridge. Sec Mr Williamson, tel Stourbridge 392006.
Stratford-upon-Avon (SuA & DARC)—9 September (Technical topics), 23 September (Talk about df hunting). 7.30pm. The control tower, The radio station, Bearley, Nr Stratford. Sec G8OVC, tel Stratford-upon-Avon 750584.
Telford (T&DARS)—4 September (Rally group meeting), 11 September (Committee meeting), 18 September ("What we did in GM land," G3UKV), 25 September (Technical surgery). 8pm. Dawley Bank Community Centre, Dawley, Telford. Sec G6XUF, tel 0952 770568.
Warwick (Mid-WARS)—10 September (Night on the air), 24 September (Visit to Warwick school radio station). 8pm. 61 Emscote Road, Warwick. Sec G8MFP, tel 0203 542877.
Wolverhampton (WARS)—2 September (Visit to police motorway control), 10 September (Discussion night), 15 September (144MHz df hunt), 17 September (Committee meeting), 24 September (Night on the air). 8pm. Electricity Sports Club, St Marks Road, Chapel Ash, Wolverhampton. Sec K Jenkinson, tel 0902 24870.
Worcester (W&DARC)—2 September (Club publicity), 30 September (AGM). 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)—11 September (Visit to Chesterfield Telephone Exchange), 25 September (TBA). The Angel Hotel, Bolsover. Sec N G Herrington, c/o G4AGE.
Buxton (BARS)—10 September (TBA), 24 September ("VHF then and now," G5UM). 8pm. Haddon Hall Hotel, London Road, Buxton. Sec G6MIF, tel Buxton 6174.
Derby (D&DARS)—4 September (Junk sale), 11 September ("Ultrasonics," Dr Graham Hall). 7.30pm. 119 Green Lane, Derby. Sec G4EYM, tel Derby 556875.
Grantham (GRC)—1 September (Foxhunt). 8pm. Shirley Croft Hotel, Harrowby Road, Grantham. Sec G8WWJ, tel Grantham 65743.
Leicester (Wigston ARC)—7-8 September (144MHz Trophy Contest), 12 September (Visit to police HQ Enderby). 7.30pm. United Reform Church, Long Street, Wigston, Leicester. Sec G6HAJ, tel Leicester 403105.
Lincoln (LSWC)—4 September (Hamfest meeting), 7 September (Prep for hamfest), 8 September (Hamfest at Lincolnshire showground), 11 September (Activity night/night on air), 22 September (Foxhunt), 25 September (Lecture on video recorders, G6DHL). 8pm. City Engineers Club, Waterside South, Lincoln. Sec G4STO, tel Gainsborough 788356.
Newark (NADARC)—5 September (Annual junk sale), 15 September (Final df event of 1985), 3 October ("Meteor scatter," G4OIG). 7.30pm. Wortington-Simpson Sports & Social Club Pavilion, Hawton Lane, Balderton, Newark. Sec G4SDZ, tel Newark 702076.
Spalding (SADARS)—13 September (Video show of club activities). 7.30pm. The Ship Albion, Albion Street, Spalding. Sec G4ZGT, tel Spalding 2781.
Worksop (WARS)—3 September (Visit to Scunthorpe Club), 17 September ("Lightning protection," Ken Walton). 7.30pm. The Unicorn, Bridge Street, Worksop. Sec G4ZUN, tel Worksop 486614.

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

Cambridge (C&DARC)—6 September ("Homebrew hf beams"), 13 September (Informal), 20 September ("Slow-scan tv"), 27 September (Informal). 7.15pm for 8pm on formal nights. Coleridge Community College, Radegund Road, Cambridge. Sec G4TRO, tel 0223 353664.
Dunstable (DDRC)—13 September ("Airport '85, a pilot's view", G4ZJF), 14-15 September (TV Contest), 21 September (The Second National Amateur Car Boot Sale, Old Warden Aerodrome), 11 October (Open evening with demonstrations), 25 October ("Improving your dx on 144MHz," G8VR). Chews House, Room 3, High St, Dunstable, Beds. Details G6EES, tel Dunstable 607623.
Milton Keynes (MK&DARS)—9 September (Talk on linear measurement). The Community Centre, Hodge Lea Lane, Hodge Lea, Nr Wolverton, Milton Keynes. Sec G3ZPA.
Peterborough (Greater Peterborough ARC)—26 September (TBA). 7.30pm. Southfields Junior School, Stanground. Sec G4NRJ.
Shefford (S&DARS)—5 September ("Technical topics," chaired by G6PVS), 6-7 September (SSB region 1 field day at Toplers Hill), 12 September ("Repeaters past and present," G8HVV), 19 September (Grand autumn junk sale), 26 September ("Weather satellites," G8LOK). 7.45pm. Church Hall, Shefford, Bedfordshire. Sec G4PSO.
Wellingborough (Nene Valley RC)—4 September (Natter nite), 11 September (TBA), 18 September (Technical topics), 25 September (Lundy Island expedition, report and photographs). Dolben Arms, Finedon, Northamptonshire. The club is looking for new premises, any reader or club member who knows of suitable premises please let sec G4XEN know.

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

Maidenhead (M&DARS)—5 September and 17 September (Lecture). Red Cross Hall, The Crescent, Maidenhead. Details G8RYW, tel Maidenhead 28463.
Oxford (RAFARS)—14 September (Battle of Britain "at home" day, 3,710kHz ssb and 144.55 fm, GB2AB at RAF Abingdon). 7.30pm. Civil Service Club, Marston Road, Oxford. Details G6ZH, tel 0491 651259.
Reading (R&DARS)—17 September (Exhibition of latest equipment and kits from Wood & Douglas, G4EEE), 1 October ("Improving your dx on 144MHz, Ken Willis, G8VR). Details G4CCC.
Vale of White Horse (ARS)—3 September (TBA), 17 September ("The weather and propagation", Jim Bacon, G3YLA). Details G3SEK.

REGION 7—RR R Sykes, G3NFV, 16 The Ridgeway, Leatherhead, Surrey KT22 9AZ. Tel 0372 372587.

Ashford (Echelford ARS)—9 September ("QRP", G4BUE). 8pm. The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. Sec G4VAZ, tel Sunbury 83823.
Bexleyheath (North Kent RS)—3 September (Film night), 17 September (New members evening). 8pm. The Pop-in-Parlour, Graham Road, Bexleyheath. Sec G6CUE, tel 01-309 7214.
Biggin Hill (BHARC)—17 September (RSGB video). 8.30pm. St Marks Church Hall, Church Road, Biggin Hill. New Sec Robert Senft G0AMP, tel 0689 57848.
Crystal Palace (CP & DRS)—21 September ("The early days", G2MI). 8pm. All Saints Parish Room, Upper Norwood, SE19. Sec G3FZL, tel 01-699 6940.
Redhill (RATS)—17 September, ("Receiver noise measurement", G4EUG). 8pm. Constitutional and Conservative Club, Warwick Road, Redhill. Sec G8JXV.
Sutton (S & CRS)—20 September ("International radio union", G3GVV). 8pm. Downs Lawn Tennis Club, Holland Avenue, Cheam, Surrey. Sec G4BOX.

REGION 8—RR M Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE. Tel 0795 70132.

Burgess Hill (Mid-Sussex ARS)—19 September (Informal), 26 September (Junk sale). Marle Place, Burgess Hill. Sec G1FRF, tel 07918 2937.
Canterbury (East Kent ARS)—5 September ("Mixers", G6YLO), 19 September (Natter night and soldering demonstration/practice). 7.30pm for 8pm. Cabin Youth Centre, Kings Road, Herne Bay. Sec G6TRM, tel Herne Bay 369454.
Dartford (DDFC)—8 September ("Slade"), 10 September (Pre-hunt meeting), 15 September (Club hunt), 29 September (Northampton final). After 9pm. Horse & Groom, Leyton Cross, Dartford Heath. Details G8DYF, tel Greenhithe 844467.
Darenth Valley (DVRS)—11 September ("Raynet", G3GJW). Crockenhill Village Hall, between Swanley & Orpington. Details Mrs Sheila Hillman, tel Orpington 26951.
Eastbourne Electronics (ARC)—7-8 September (144MHz Trophy Contest, Woods Corner, Dallington), RAE and Morse classes, Sundays 7.30pm. Archery Youth Centre, Seaside, Eastbourne. Details Mr Sullivan, tel Eastbourne 765701.
Eastbourne (Southdown ARS)—2 September (Main meeting. "Royal Greenwich Observatory time service", G3ZQB). 7.30pm. Chaseley Home, South Cliff, Eastbourne. 17 September (New RAE course starts), Hailsham Leisure Centre, Vicarage Lane, Hailsham. Details G4XNL, tel Eastbourne 638653.
Gillingham (BRATS)—5 September ("Creed 444 teleprinters", G4EVY), 19 September ("'Ack George"), 17 September (Official opening of club shack). Parkwood Community Centre, Parkwood Green, Wigmore, Gillingham. Details G4ZTF, tel Medway 374670.
Maidstone (MYMCAARC)—6 September (Natter night), 13 September ("Fault diagnosis of 27/30MHz rigs", G4XRH), 20 September (Natter night and RAE classes), 27 September ("Aerials", G3ORP). YMCA Sportscentre, Melrose Close, Cripple Street, Maidstone. Results of agm, chairman, Peter G3ORP, Sec Graham G4AXD, tel Maidstone 29462.
Swale (SARC)—9 September ("Repeaters", talk and slides, G4RVV and G3TIS). 7.30pm for 8pm. The Ivy Leaf Club, 52 Dover Street, Sittingbourne, Kent. Details G4NPM, tel Minster 873147.
Tunbridge Wells (West Kent ARS)—6 September (Open evening), 7-8 September (144MHz RSGB/IARU contest and ssb field day), Cranbrook site. Adult Education Centre Annexe, Quarry Road, Tunbridge Wells. Details G4KIU, tel 0892 33586.

REGION 10—RR E J Case, GW4HWR, 2 Abbey Close Tyrhiw, Taffswell, Mid-Glam CF4 7RS. Tel 022 810368.

Bridgend (B&DARS, GW4LNP)—6 September (AGM). 8pm. YMCA, Angel St, Bridgend. Sec GW4SML.
Cardiff (CRSGB)—9 September ("SWR and all that!", GW4HWR). 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Sec GW6ZHP, tel Cowbridge 3212.
Fishguard (F&DARS)—Meetings at the Radio Shack, FE Centre, Fishguard, Pembs, Dyfed. Details Sec GW0ALN.

I would like to hear from more club secretaries with details of past or future meetings for inclusion in this column. Please check deadline dates at the beginning of the section. RR10

Members of the Nene Valley Radio Club on Lundy Island where they activated GB4LI on 11-18 May 1985. L to r: Pat Barwell, G4ZCY; John Barwell, G4ZPL; Dave Martin, G4RST; Lionel Parker, G5LP; Roy Curzon, G1AUY; Roy Smith, G4TTX; and Malcolm Huptman, G4ZBN.

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 Group—Second Tuesday in each month. Green Lawns Hotel, Bay View Road, Colwyn Bay, Clwyd. Sec GW4UWI, tel 0492 2149.

Colwyn Bay (Conwy Valley ARC, GW6TM)—12 September ("Electronic static protection", GW3MDK). 8pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec GW4VVW, tel 0492 636376.

Deeside (Alyn & Deeside ARS)—2 September (Talk on contest arrangements), 9 September (Committee meeting and D&W), 16 September ("Computers in data communications", Roy Honeyman), 23 September ("Raynet" talk and demonstration G8RXB and D&W). 8pm. 20 Eccleston Road, Kinnerton, Chester CH4 9DY. Sec GW4RKX, tel 0244 660066.

Dolgellau (Meirion ARS)—5 September (RSGB video). Dolserau Hall Hotel, Dolgellau. Sec GW4KEV.

Holyhead (Holyhead & District ARS). Alternate Sundays starting 8 September, 7.30pm. Foresters Arms, Kingsland, Holyhead. Sec Mrs Barbara Anzian, tel 0407 50577.

Porthmadog (P&DARC)—19 September ("Voyages around the world as a radio operator", talk and slides, GW4XXF). 8pm. Harbour Cafe, Ffestiniog Railway, Porthmadog. Sec GW4WKQ, tel 0758 740445.

Rhyl (R&DARC, GW4ARC)—2 September (AGM), 16 September (Activity night). 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 (Grampian Repeater Group)—Users of GB3GN are asked to note a change in operating procedure during peak times from 0730 to 0900 and from 1630 to 1800. During these hours talkthrough will be limited to 90s per over, which for transgressors will be followed by 10s of "bleeps" and closedown. During the restricted period the end of transmission indicator is a series of five "dits". At other times 5·5min is allowed, and the indicator is a "K". Sec GM8HGD.

Forfar (F&DARC)—2 September ("Bee keeping", Dave Norrie), 30 September ("The "j" operator", GM4BAG). 7.30pm. New venue, 46 High St, Kirriemuir. Details GM4WMN, tel 057581 222 or call S20 on club nights.

Inverness (ARC)—Sec now resides at Donolly, Clachnaharry, Inverness, tel Inverness 242463.

SARCON 85 21 September. See *Rad Com* August p607 for details.

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

Dunfermline (DRS, GM3IDS)—Thursdays, 7.30pm. Outh Muir Wireless Station, Knockhill, by Dunfermline. Details GM4WYR, tel 736401.

Glenrothes (G&DARC, GM3ULG/GM4GRC)—Wednesday and third Sunday each month. 7.30pm. 15 September (AGM). Provosts Land Centre, Leslie, Fife. Details GM4TNP, tel 755958.

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

Dunoon (D&DARC)—20 September ("Cheap home-made antennae for 2m", GM4FDM). 7.30pm. Community Centre, Edward St, Dunoon. Sec GM1KJN, tel 036984 217.

Glasgow (West of Scotland ARS, GM4AGG)—Fridays, 7.30pm. 154 Ingram St, Glasgow. CW classes available. Once the premises have been modernised new members will be welcome for the exciting winter programme. Details GM8YBP, tel 041-776 2814.

Would all club secretaries please pass along details on club programme for 1985/86 session ASAP. RR14

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

Ballyclare (E Antrim ARC, GI4KKK)—10 September ("Mobile clinic", GI4BWM). 8pm. Fairview Primary School, Ballyclare. Sec GI4PRH.

Belfast (RSGB Group)—19 September (AGM). 8pm. 90 Belmont Road, Belfast. AR GI4RXS.

Enniskillen (Lough Erne ARC)—17 September (AGM). 8pm. Railway Hotel, Enniskillen. Sec GI4CZW.

Lisburn (Lagan Valley ARS, GI4GTY)—10 September (AGM). 8pm. Rathvarna Teacher's Centre, Pond Park Road, Lisburn. Sec GI4PSK.

Londonderry (North West of Ireland ARC, GI3CFH)—3 September ("RSGB video"). 8pm. Prehen Municipal Boathouse, Victoria Road, Londonderry. Sec GI4OUN.

REGION 16—RR A Owen, G4HME, 102 Constable Road, Ipswich, Suffolk IP4 2XA. Tel 0473 51319.

Bury St Edmunds (BSt.ERS)—17 September (TBA). 7.30pm. Guildhall, Guildhall Street, Bury St. Edmunds. Sec G3GBB.

Braintree (B&DARS)—4 September (Planning JOTA). 8pm. St Peter's Church Hall, St Peter's Close, Braintree. Chairman G6THE, tel 0376 25587.

Chelmsford (CARS)—3 September ("HF antenna systems", G5RV), 1 October (AGM). 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details G4BYR.

Colchester (CRA)—19 September ("Test equipment", Geoff Blake), 1 October (AGM). 7.30pm. Colchester Institute, Sheepen Road, Colchester. Sec G3FIJ, tel 0206 851189.

Ipswich (IRC)—4 September (Plans for ssb field day). 8pm. Rose and Crown, Norwich Road, Ipswich. Sec G4IFF, tel Ipswich 44047.

Leiston (LARC)—19 September ("Wavemeter construction"). 7.30pm. 5 Main St, Leiston. 1 October ("Bomb disposal" RAOC). 7.30pm. Sizewell Sports and Social Club, King George's Avenue, Leiston. Sec G6ORK, tel Leiston 831597.

Norwich (Norfolk ARC)—4 September ("Raynet", G3HRK), 11 September ("RSGB", G4HMF). 7.45pm. Valley Drive, Community Centre, Plumstead Road, Norwich. Details G3VNQ, tel Norwich 37709.

Stanford le Hope (SLH&DARC)—2 September ("Power in the shack"), 9 September (VHF Night), 23 September (Project night), 30 September (Natter night). 8pm. St Joseph's Parish Rooms, Scratton, Standford le Hope. Details G4OVG, tel SLH 642312.

Vange (VARS)—5 September (Junk sale), 12 September (Talk, G3YTF), 15 September (VARS rally), 19 September (Talk, G4FUF), 26 September ("AMSAT UK", G3AAJ), 3 October (Junk sale). 8pm. Barstable Community Centre, Basildon. Details Mrs D Thompson, tel Basildon 552606.

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

Amateur Radio and Computer Club (AMRAC)—13 September, Details Sec Trevor Tugwell, tel 04895 81032 or G6DLJ, tel 0703 891975.

Basingstoke (BARC)—2 September ("Direction finding", G6AGE). 7.30pm. Forest Ring Community Centre, Sycamore Way, Basingstoke. Sec G4WIZ, tel Tadley 5185.

Blackmore Vale (BVARS)—10 September (Homebrew equipment competition, to be judged by Tony Nailor of Spectrum Communications). 7.45pm. Bell and Crown, Zeals, (on the A303). Sec G1GRG, tel 0963 70969.

Eastleigh (Itchen Valley ARS)—13 September ("Cable tv", G6WPX), 27 September ("QRP working", G4BUE). 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford, Hants. Sec G6DIA, tel 0703 863039.

Fareham (F&DARS)—4, 18 September (Natter nights), 11 September ("430MHz 1kW linear amplifier", G6XHR), 25 September ("2 meter rhombic aerials", G6MVL). 7.30pm. Portchester Community Centre, Portchester, Hants. Sec G4ITG, tel Fareham 234904.

Farnborough (F&DARS)—11 September, (Pre-agm meeting) 25 September (Annual construction contest). Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. PRO G4MBZ, tel Farnborough 837581.

Horndean (H&DARC)—2 September (Junk sale). Merchiston Hall, London Road, Horndean. PRO G4BEQ.

Liphook (Three Counties ARC)—4 September ("Computer decoded morse," G6VMA), 18 September ("South west France", G6SNS). 8pm. The Railway Hotel, Liphook. Sec G3TBT, tel Passfield 368.

Southampton (SARS)—Results of recent agm, Chairman G6WEX, Treasurer G3VSL. 7.30pm. Hall of Aviation, R J Mitchell Museum, Albert Road, Southampton. Sec G4VKB.

Waterside (WSWC)—10 September (Informal evening), 24 September ("The sands of time", G3KWU). 7.30pm. Fawley and Blackfield Community Centre, Blackfield, Southampton. New Sec G1KMY.

Wimborne (FRARS)—8 September ("Aurora, what causes it", part 1) 15 September (DF hunt). 7.30pm. Flight Refuelling Social Club, Merly, Wimborne. Sec G8ZLH, tel 0202 570894.

Winchester (WARC)—21 September ("The sands of time", G3KWU). 8pm. The Log Cabin, Stockbridge Road, Winchester. Sec G4FPC, tel 0962 64747.

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

Berwick (Borders ARS)—6, 20 September (Informal). Tweed View Hotel, Tweed St, Berwick. Sec G1IUK, tel 0289 305465.

Bishop Auckland (BARC)—12-14 September club will operate GB4BPC from the battlements of Brancepeth Castle in Co Durham to celebrate the 900th anniversary of Brancepeth village church. Other meetings informal. Sec G0ACY.

Great Lumley (GLAR&ES G4EUZ)—Wednesday evenings, Community Centre, Great Lumley, Durham. RAE tuition available on request. Sec G4OCQ, tel 0385 40827.

Hazelrigg (NER&CC G4YPT)—2 September (Committee meeting), 9 September (CW class), 15 September (Visit to Tynemouth coast guard stn), 16 September (Informal), 23 September (RAE Maths), 30 September (CW class). Hazelrigg Village Hall, North of Newcastle. Sec G1HDV, tel 0632 2742413.

Morpeth (Northumbria ARC G4AAX/G6AAX)—5 September (Business meeting). Old Telephone Exchange, Cresswell Rd, Ellington, Morpeth. CW classes run each club night. Sec G6IIA, tel 0670 513026.

Stockton (S&DARC G4XXG)—Wednesday evenings. Billingham Community Centre, Stockton. RAE and cw classes are available on club nights. HF and vhf station used on club nights. Sec G6NRY, tel 0642 582578.

Will all club secretaries note that it is their responsibility to pass on their clubs activities to the regional representative if they wish to have those details published in *Rad Com*. Please give serious thought to your autumn/winter programme and pass the information on as soon as it is available.

Don't forget, repeaters cost money to run, support your local repeater group. Teesside Repeater Group (GB3TS) secretary is Pauline Bland, G8MBK, 5 Belgrave Drive, Normanby, Middlesbrough TS6 0SQ, tel 0642 467095. Tyne & Wear repeater group (GB3TW/GB3NT) secretary is David Williams, G6FCP, Braeheads, Mill Rd, Chopwell, Newcastle upon Tyne NE17 7JD, tel 0207 501212. Your support will be greatly appreciated.

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

Cheshunt (CDARC)—4 September (Club project G4ZCX), 11 September (Natter nite), 18 September (Video: "Amateur Radio's newest frontier-space shuttle"), 25 September (Natter nite). 8.15pm. Church Room, Church Lane, Wormley, Nr Cheshunt, Herts. Details G4OAA, tel 09924 64795.

Chiswick (ABCARC)—17 September (Members' pre-1939 equipment), 7.30pm. Committee Room, Chiswick Town Hall, London W4. Sec G3GEH, tel 01-992 3778.

Edgware (EDRS)—("Pre-war transmitters", G3CG), 26 September (Quiz, G3PSP). Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec J Cobley, tel Hatfield 64342.

Ealing (EDARS)—Tuesdays, 7.30pm. Northfields Community Centre, 71a Northcroft Road, W13. Nets on S9 and SU49. Sec G4SCR, tel 01-997 1416.

Harrow (RSH)—6 September (Construction nite), 13 September (Activity nite on 28MHz), 20 September ("Community radio", A Lex-Arnold), 27 September (Activity nite on 20MHz). Harrow Arts Centre, High Road, Harrow Weald. Talk-in on GB3HR (B14). Details G8XBZ, tel Rickmansworth 779942.

Havering (HDARC)—4 September (Informal), 11 September (DF hunt, weather permitting), 18 September (Informal), 25 September (Junk sale). Fairkytes Arts Centre, Billet Lane Hornchurch, Essex. Sec G0OBI, tel Hornchurch 41532.

London (Civil Service ARS)—First and third Mondays in the month during lunch hour, Civil Service Centre, Monck Street, Millbank, SW1. Details G Gostin, tel 01-632 6444 daytime. Nets Tuesday 7.30pm. 144.575 fm and 8.00pm 1,960kHz.

London (Central POHQARS)—Open to all BT and PTT employees. Net 3,750kHz. Wednesdays 8pm. Details G3TIS.
London (City University ARS)—Thursdays. Contact Robert Benyon, G4KSK on 01-253 4399.
London (New Scotland Yard Amateur Radio Society). Not open to the public. Club station active from time to time, G4NSY and G8NSY. Sec, NSY Amateur Radio Soc, Room 99, NSY, Broadway, SW1.
St Albans (Verulam)—10 September (Informal and activity nite), 24 September (TV repeaters, G3VZV). 7.30 for 8pm. RAFA HQ, New Kent Road, St Albans. Sec G4JKS, tel St Albans 59318.
Welwyn Garden City (Welwyn Hatfield ARC)—New club. First and third Thursdays in each month, 8pm. Scout HQ, WGC. Net on S15, 145,375MHz, Mondays, 8pm. Morse classes on Thursdays. Sec G0AII, tel 0707 326138.

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

Bristol (BRSGBG)—30 September (Glen Ross, G8MWR—Microwave Society). 7.30pm. Small Lecture Theatre, Bristol University. Details G4SQQ, tel 0272 508451, or G4ROX, tel 0272 513573..
Bristol (South Bristol ARC)—11 September (AGM). 7.30pm. Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol BS14 0LN. Details G4RZY, tel Whitchurch 834282.
Cheltenham (Smiths Industries RS)—5 September (AGM). 8pm. Club House, Newlands, Bishops Cleave. Details G8UJG, tel Bishops Cleeve 2175 or Bishops Cleeve 3333 ext 2511.
Gloucester (GARS)—4 September (AGM). 7.30pm. St John Ambulance Headquarters, Heathville Road, Gloucester. Details G6AWT.
Portishead (Gordano ARG)—7, 8 September (IARU Region 1 trophy 2m contest). 8pm. The Ship, Redcliffe Bay, Portishead. Details G3LJD.
Street (S&DARS)—3 September (RSGB video film—"Amateur radio new frontier"), 1 October ("Gardening for the DXer", G4DZW). 7.30pm. Strode College, Church Road, Street. Details G4SCD, tel 0458 45145.
Yeovil (Y&DARC)—5 September ("Great circle propagation paths", G3MYM). 7.30pm. Recreation Centre, Chilton Grove, Yeovil. Details G3GC, tel 0935 75533.

Members' Ads

CONDITIONS OF ACCEPTANCE

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Members' Ad form printed on the back of a *recent* address label carrier used to mail *Rad Com* to the advertiser: this will automatically provide proof of membership and should not be more than two months old. No acknowledgement of receipt will be sent, and advertisements not clearly worded or punctuated, or which do not comply with the conditions of acceptance, will be returned. No correspondence concerning this service will be entered into.

Trade or business advertisements, even from members, will not be accepted for "Members' Ads" but should be submitted as classified or display advertisements in the usual way. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions, or for the quality of goods offered for sale. Advertisements for citizens band equipment will not be accepted.

Warning. Members are advised that they should, as far as possible, ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The "purchase" of goods legally owned by a finance company could result in the "purchaser" losing both the goods and the cash paid.

The current rate is £2.30 for 40 words or less: advertisements containing more than 40 words will cost an additional £2 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

The closing date for the **November 1985** issue is **19 September**

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

FOR SALE

FTI perfect Curtis keyer, fm board, fan mod, cw filters, £1,200 ono. Himond brass fist key 802, £40. Bencher squeeze key (chrome), £40. Thandar frequency meter PFM 200A 20Hz to 200MHz bargain at £50. G4UGO, QTHR. Tel Thornbury (Avon) 412572.
Yaesu FT230R 2m fm mobile with accessories, £130. 3-ch 70cm Pye Westminster with preamp, £45. G6OHB, not QTHR. Tel 01-348 6405.
Vintage radio books, *Wireless Constructor Magazine*, complete volume 2, 1125 pages, 1925-1926, hard bound, £20. RSGB *Amateur Radio handbook* 1946, £3. 8-10A psu, £20. MML100S Microwave Modules 2m linear with SEM 12A psu, £140. G4XTA. Tel 09313 359.
Yaesu FT480R vgc, never used, mobile, complete with orig packing, buyer collects, £300. G4KYX, QTHR. Tel Bedford 211044.
FT101ZD complete with fan, mic, dc psu and 600Hz cw filter, all in vgc, £375. G3XKN, QTHR. Tel 0525 52207.
FT201 tx/rx 80-10m gd cond, £175. G4CTJ, QTHR. Tel 01-680 8822 ext 2308, 8am-4pm.
LS20XE pocket-sized 144MHz synthesized handheld 1W tx/rx with helical, nicads, ac-charger, dc-charger, case, boxed, as new, £90. Hi-mound single-paddle keyer, £15. Labgear teletext adapter, fits tv antenna socket, £80. ASR33 Tele PE and plinth, offers? G3OHC, QTHR. Tel 021-352 0199.
Eddystone EB35 rx, £40. Cossor hb vhf base tx/rx QQV040 o/p, £25. Pye pcr rx (22MHz) mains, £15. Avo 8, £50. BC342 rx spares or rebuild, £25. R4187 rx airborne spares or rebuild, £15. Marconi 791D deviation meter, £65. Various meters components 868 bridge, £40. Signal generators af to uhf Advance HI, £25. Marconi 867, £60, 801D, £75, 1064, £60, 1065, £25. Scopes, TEK545, £75. Telequipment dual beam, £50, small portable, no case, £20. Avo 7, £28. PO type multimeter, £6.50. Advance dual psu 0-30V 2A, £25. Small uncased psu 12V 2A etc, £3.50. G4YVJ, QTHR. Tel Brighton 416963.
Your chance to own a mint cond TS930S complete with internal auto atu and cw filters, £1,050. GI3ZCK, QTHR. Tel 0232 798615 after 7pm.
Sharp MZ80K 48k built-in screen and data recorder, switchable 2/4MHz, with dedicated Sharp rtty terminal unit, books and cassette programs, £250. Sharp MZ700, 64k, never used, books and programs, £135. Tom, GM3EDZ, QTHR. Tel 041-427 0122.
Congratulations to me, I've reached my first junk sale after seven years as an amateur, includes Icom IC-AH1 mobile hf antenna and tuner worked ZS, VU, W7 from car, now no car so £120. Liner two, £75. Eddystone EC10, £25. Valves boxed 6146's, QQVO 640's and QB4/1100 plus base capable of 3kW input on hf, one glass evacuated Jennings pi tank capacitor, 5kV at max capacitance. Blowers, roller coaster, and more. Telephone or sae for list. G4HTO, QTHR. Tel 0623 882651.
Silent key, G2CLP complete stn, 30ft lattice tower winch, down beam motor emotator control, all cables, £175. Hy-Gain 3-el tribander Thunderbird beam hd coaxial, £130. FT101ZD Mk3 fm new bands, £450. FDK multi 3000 2m fm/ssb digital readout, £350. Both rigs installed under one year, complete mics. manuals, swr power meter, 100W, £15. Valves 4 x 6SJ6C, £10. Complete lists available. G3FWA. Tel 0234 48272 or G3XKB, QTHR. Tel 0234 870526.
Dragon bits, twin disc drive with pos cartridge, as new, £175. OS9 software, stylograph, dynacall, rms, Pascal, 09 Basic etc, all as new. Mike Ganley. Tel 0272 426392.
IC251E 2m tx/rx, exc cond, handbook, orig packing, £385. 2m antennas, 4-el Tonna, £7. 7λ/8 wave mobile, £8. Trio 9R59DS, gen-cov-rx, £25. G8SGF, not QTHR. Tel Cambridge 350554.
Belcom LS202E 2m multimode handheld tx/rx, case, QRO battery pack and charger, £160. Lowe TX40G 10m fm rig, hardly used, £40. BNOS L144 10-100 linear, new, £115. All items in orig packing. G4ILO, QTHR. Tel Colchester 572685.
Trio TR9000 multimode 2m rig in absolute mint cond, never been used mobile, complete in orig boxes, £285. MET 14-el 2m beam, 3 months old, £30. Woodpecker blanker, new cond, £45. G4RCG. Tel Wakefield 362144 or 0532 539820 (work).
Trio TS500, PS500 and VFO-5 tx/rx, wkg but needs attention, £100 ono. G2DYM 6 band anti-tvl trap dipole with antenna, matching unit, £20. G6ISM, QTHR. Tel 0533 892759.
HF antennas 12AVQ and C4, two spokes broken £15 ea, buyer collects. TTC C-3022 transistor checker, leads, large meter, £12. K30 power mic, £20. 2m car gutter fit antenna, PL259 fitted, unused, £8. Radiomobil car radio, £10. Tel Shoreham-by-Sea 3552.
FC700 tuner, boxed, as new, £90. Valves, matched pair 6146B made by GE, 12BY7A driver, brand new and unused, £21 for the three. 6159 (QV06-20C) four new, some used, all ok, make a gd linear, offers. G4FSY. Tel Hemel Hempstead 59970.
FDK multimode 750E 2m fm/ssb/cw, 1W/10W up/down scan, mic, immac cond, £195. Tonna 9-el X-Yagi 2m, £20. GPV5 2m vertical base stn colinear antenna, £18 both exc cond. G4TNC, QTHR. Tel 0642 674642.
Sharp MZ80A gd cond with Basic first reasonable offer or swap FT790 with cash adjustment. Johnny. Tel 0427 5266 anytime.
Icom IC27IE 25W multimode, mint cond, fitted Mutek preamp, £550 incl base mic. Yaesu FT230 25W mobile fm, two at £180 and £200. G1DCS, QTHR. Tel 01-540 3959.
Tempo 2002 2kW 144MHz linear, as new, £785. Trio TS780 dual bander multimode base, mint, £725. Yaesu FT2700RH new dual band 25W fm, £439. Yaesu FT209RH 5W battery, £225. Yaesu FT780R 70cm multimode, £285. All mint. Tel 01-998 4936 after 8pm.
FT690R 6m multimode, similar to 290R but incl a.m. mode, immaculate rig for sale at only £220. Tel Ayr 531225.
2m rx MR1000A, 10 channel scanner, complete with 10 xtals, antenna, nicads and charger, £45. ASR33 teleprinter with paper-tape reader, punch, £20 (collect). Bruce. Tel 01-995 4956.
Hy-Gain 18AVT/WT, 5 band, 10-80m, trap vertical antenna, all stainless steel hardware, boxed with instruction manual, £100. G4UDB, QTHR. Tel Southampton 437148, evenings.
Icom ICO4E, mint cond, hardly used, soft case and charger, orig packing, £195. *Wanted* MM or W & D 384MHz source and varactor. G0AWP. Tel Hull 651827 after 5.30pm.
Shack clearance, Yaesu FT290R nicads, charger, carry case, helical and whip antennas, new boxed Hirschman light duty and CDE AR30/40 score medium duty rotators, Kenwood ham clock, also general antenna equipment, the lot for £300. Buyer collects. G1GJR, QTHR. Tel Finmere 622.

FT200 hf tx/rx, some spares, £190. MM144-128 2m to 28MHz transverter, £65. 2m mosfet converter i.f. 4-6MHz, £6. G3BDK, QTHR. Tel Towcester 52309.
Yaesu FT757GX, plus MH1 scan mic, mint cond, manual, orig packing, used once only, £625. Avo model 7, gd cond, £25. G4TPS, QTHR. Tel Kings Lynn 775409.
91ft free-standing commercial tower (dismantled), very heavy duty galvanized triangular tapering construction, £420 plus delivery. Can deliver Norfolk at cost. G4VAO, QTHR. Tel Norwich 872853.
Icom IC260E 2m tx/rx, scan, mic, mobile mount, vgc, £220. IC2E case, spkr, mic, spare nicad pack, charger, £100. MM 2m 25W linear and preamp MML 144/24, £35. G3PRD, QTHR. Tel 0909 475399.
Sommerkamp FR100B FL200B with QM70 2m high power transverter wired in, also Osker swr meter, ideal stn for beginners, £200 ono. GW4VRV, QTHR. Tel Porthcawl 771746 anytime.
FDK multi 700E 2m fm 25/12·5kHz spacing, 1-25W output, variable, in gd cond complete with mobile mount, covers 144·150-145·975, reverse repeater instantly switchable, auto tone-burst and any tx/rx offset possible, £120 ono. Delivery arranged free. G4WXC. Tel Grantham 77708.
Rad Com bulletin July 67 to Dec 83, unbound, gd cond, offers, buyer collects. G3TZQ, QTHR. Tel 0752 339916.
BBC-B fitted LVL DDFS, Econet, £330. Watford 32k ramcard, £55. 12" monitor, £40. Video Genie (needs repair) and expansion box (32k, DD/disk and RS232), £130. TE300 teleprinter, free. BBC and V/G software and hardware, sae for lists, digital ics, enquire G4CVZ, QTHR. Tel 051-220 5470.
Kenwood (Trio) TR9130 144MHz multimode tx/rx, gd cond, full UK spec, £325, no offers. Incl 7λ/8 mobile whip, mic, handbook in orig packing, save £175 on new price. Hugh, G1BUE. Tel St Albans 32759 evenings and weekends.
Yaesu FTV107R transverter, suitable most hf rigs, capable full duplex operation through transverter transmit/receive on 50MHz, 144MHz and 430MHz with plug-in modules, complete with 2m module, all leads and manual, £125 plus postage. G3RDG, not QTHR. Tel 01-455 8831.
RTTY Scarab terminal unit MPTU1 factory built, complete with leads and manual, plus matching interface and rtty program for 48k Spectrum with manual, price £85. New 6146 valves a/b, £7 ea. G3UQZ, QTHR. Tel 021-373 8806.
Jaybeam TB3 antenna and Kenpro KR600RC rotator, both new and unused in manufacturer's factory-sealed boxes, £340 for the two. Tel 042-871 2031.
FRG7700, FRT7700 and FRV7700, all in mint cond, used little, £275 ono. Tel 0386 852499 (Worcs).
W/stn No19 Mk3 complete morse key, spare valves, leads, mic-headset, operating board etc, handbook, £60. Telequipment Serviscope type S31 complete with probe and manual, £25. 7 Linden Road, Bicester. Tel 246389.
FT208R, nicads, soft case, charger NC-9C, as new, £150. G4XXI, QTHR. Tel 01-204 5040.
Mini beam, GW5, HF5 complete with balun, not new but used little, £70. G4TZY, QTHR. Tel 0858 62827 (Leics).
250W o/p 144MHz 4CX250B linear, 16 × 6·5 × 9·5in and Collins 2kV and 400V eht psu and new ITT 250B, £180. MM144/28 transverter 12m, UR67 12-el ZL, £65. 16k ZX81 and 6in b/w monitor, £20. Shimizu fm boards, £35. Tel 0536 201697 after 7pm.
KW108 monitorscope, £55. HQ1 minibeam, £60. Trio VFO-820, £50. All in first class cond and complete with manuals. Would prefer customer inspects prior to sale, can arrange shipment at cost if required. G3HJT, QTHR. Tel 890 6487.
RTTY G3LIV board, built, tested, aligned, amateur commercial shift, needs switches, connectors etc for complete rx unit. Information supplied for complete rx/tx unit for BBC, Spectrum computer, incl auto tx/rx changeover from keyboard, £28. G4KUC, QTHR. Tel 061-427 5931.
Kenwood 9130 fm/ssb variable power mod, 5/20W fm and 5/20W ssb, exc cond, nine months old, boxed. G1IYJ, QTHR. Tel 01-391 0514.
Drake TR7, Drake psu incl four rx filters and gen-cov rx, recently serviced and uprated, immac, £725. Atlas 210X, very good performer, £275. G3SAR, QTHR. Tel 0732 832424 day, 0732 458743 night. Ask for Roly.
Trio TS711E base stn 2m tx/rx with MC80 desk mic, exc cond and under Lowe agents guarantee, £650. (Lowes current price £831 with fist mic). GW brass morse key, perfect, £20 plus post. G5BM, QTHR. Tel Newent 820960.
Kango generator 3·0kVA, 2·4kW, 1PH 120/240V, 25/12·5A and diesel engine, gd cond, £350. Buyer collects. Optical tachometer model D20, £20. *Rad Com* complete years 1972-84, offers. Gnome 35mm enlarger with various accessories, £30. G3UXH, QTHR. Tel Medway 250562.
FT102 a.m./fm board, narrow cw filter, FC102 atu, SP102 spkr, £700 ono. Standard C58 2m portable nicads charger, mobile mount, matching 25W linear, £300. Tony, G6YBF not QTHR. Tel Medway 82226 after 7pm.
Icom IC740 hf tx/rx fitted fm, 2·25 years old, as new, used little, £650 or p/exch for Icom IC720A, must be vgc, with filters and preferably fm fitted, w.h.y? GW4RLP, QTHR. Tel 0286 5322.
VIC 20 with micro patch, cw, rtty interface with cassette recorder, £200 ono. Paul, G4XHA, QTHR. Tel 0252 878436 evenings.
Trio TR9000 2m multimode complete with PS20 psu, exc cond, £325. MM preamp NMA144, £25. Alinco 70cm linear ELH 730G, £50. G6RNP, QTHR. Tel 06755 2342.
Tower 40ft Westower STD, post mounting, £220. Daiwa DR7600R rotator, 70ft cable with indicator, £100. 2-el Gem quad, never been used, £100. Printer dot matrix 5 bit baudot, 45,50,75 baud with lots of paper, type Transtel AF11, £65. GM3WIL, QTHR. Tel 0292 79217.
Swap Yaesu YO901 multiscope for FL2100Z hf linear or similar, or QRO 2m/70cm linear, must be 240V. G4NKO. Tel 0480 61112 anytime.
Magmount antenna, £11. Micronta regulated psu 13·8V 2·5A, £10. DX200 comm rx a.m./ssb/cw, £50. Global AT1000 atu, £25. Vega Spidola fm/lw/mw/sw rx, £15. 5λ/8 144MHz base stn antenna, £12. Datong DC144/28 vhf converter, £14. Antennacraft tv dx vhf/uhf/fm colour antenna 307cm long, £30. Stolle rotator and control, £32. All items in vgc, must clear, moving. Tel 061-653 2218 evenings.
Datong PC1 rx adapter, converts 2m rig to superb commns rx, (30kHz-30MHz), £100. Barratt, G4GHG, QTHR. Tel Torquay 37050.
15m 3-el beam, good cond, £30 ono. G4OFR, QTHR. Tel Plymouth 880784.
Floppy disc unit (Transdata model 309) drive and all electronics, 260k disc, 4-ports, for vdu, printer, modem, auxiliary, all necessary cables, bargain at £50. Tel 025-14 28526 (Fleet, Hants).
TM401A, vgc, boxed £300 ono. MFJ cw filer, £5. Codar AT5 tx, vgc, £10. Seiwa 2m marine pocket mini-scanner, charger, £50. Radio/computer operating desk, teak effect, flat pack, £15. Lockwood, G3XLL, QTHR. Tel Mellis 596.
FT901D tx/rx hf, vgc, usb, lsb, a.m., fm, spare pa and driver valves, service manual, YD148 desk mic, £480. Welz AC38M atu, £55. Gould psu 13·8V 3·5A overvolt and current protection, £12. 2m HB9CV antennas, new, £5. Terry, G4OXD. Tel 0462 35248.
Panasonic DR48 communications rx, gd cond, £140. SWL omni-match almost new, £28. Mizuho AP-MI notch and bandpass filter, £15. Radiovision V55R communications rx, (valved), full wkg order, £80. Receivers collection only. Dick. Tel 0229 20856, 6-7pm only.
Yaesu 101ZD Mk3 9 band tx/rx fitted fm, fan, mint cond, £450. Trio 2400 handheld, spkr, mic, base charger, boxed, £135. Eddystone 770R, £75. *Wanted* 930S Corsair, S103BX Shure 444T. Bill, G4EMG. Tel 01-534 3460 evenings, 01-553 7308 days.
Yaesu FT290R multimode, nicads, charger and carrying case, Microwave Modules 144·30 LS Linear. Welz SP15M swr and power meter, £340. G6MZU, QTHR. Tel Welwyn Garden 332693.
Collectors item, Murphy radio type A242, serial No 82470, buyer collects. G8BQ, QTHR. Tel 0205 65975.
Strumech Versatower 30ft base mount, tilt over type, £325. TA32 jnr triband beam, £80. AR40 rotator with control box, £80. All gd cond, buyer collects. G4KIZ, QTHR. Tel 0472 823825.
Tektronix 545A scope, 1A1 35MHz MV dual trace plug-in fully calibrated, spare tube, manuals, £75 ono. Too big for my shack, buyer collects. *Wanted* HQ1 minibeam. G3SEK, QTHR. Tel 0235 31559.
Yaesu FT101EE, one owner, looks new, 10MHz and 24MHz bands added, cw filter and fan, all leads, mic, manual, spare driver and pa, valves, £350. Prefer buyer tests and collects. CW active filter, £12. G3KZU, QTHR. Tel Oxford 63000.
Sony 2001 portable all band synthesized rx fm/a.m./ssb mint, £80. G3VXZ, QTHR. Tel Maidenhead 27350.
FC841 frequency counter 10Hz-65MHz, £35. SMC vswr/p meter 3·5-150MHz, £10. Coutant psu 15-18V dc-2A stabilised, £30. Morse key, £15. Elect/keyer EK121 auto/man, dot/mem, 8/50 wpm, £45. Ekco 715 trans/match, vswr/p-%mod, fld strength, dummyload 10·50W, 50Ω, portable, no batteries required, £40. All as new G1AVE, QTHR. Tel 0621 55648.
FT290R and THPHL30V 30W linear, both mint cond, £250 or may split. Mirage B3016 160W linear 2m, £110. 30ft LOF450, £12. SLNA 1445, £28, all ono. G6HKS, QTHR. Tel Wisbech 584640.
Swan 100MX hf mobile, gd cond, £275. IC201 multimode, £175. Heath RF-IU sig gen, £25. 21-el Tono 70cm atv, £20. *Wanted* Hallicrafters SX-42, SX-73, 101 any cond. G4AFY, QTHR. Tel Kidderminster 753358.
Icom 490E 70cm multimode, £370. Icom 290D 2m multimode, £370. Icom SM8 mic, new model, £50. BNOS 30A psu, £90. MM432 100W linear, £170. Mutek 432E with controller, £80. Two MBM 48 antennas bayed with power splitter, £80. Sony 4000P colour video camera, £375. Stand for 4000P, £50. MM435 tv tx with extra crystal, £150. MM tv converter, £25. Datong auto speech processor, £60. Video recorder remote control for 4000P, £350. Two 10m extra cable for 4000P, also box of camera filters, £40. All equipment unmarked and purchased recently. G4PDW. Tel 0472-70125.
Transverter MMT1296 fm/ssb 2W version, mint, boxed, £165, or with 23-el Tonna, £180. Morsetalker MMS1 complete with key, mint, £75. Barry. G6LIC, QTHR. Tel Wakefield 822605 after 6pm weekdays, or weekend.
13cm transverter kit, incl case, part completed. 144MHz i.f. 600MW o/p, £80. 144MHz 13-el portable Tonna, new cond, £23. 144MHz 16-el tonna, used, £18. Prefer buyer collect or pay carriage. Dave Bancroft. G8PPR, QTHR. Tel Bradford 674396.
Single paddle key, new, unused, heavy black polished steel base, highly polished brass fittings, silver and brass contacts, nice piece of equipment to adorn any shack, £25 plus £2 p&p (UK). Gordon, G4ZPY, QTHR. Tel 0704 894299 anytime.
Yaesu FT480R multimode, £280. Yaesu FT708R handheld, £160. Yaesu NC8 base stn charger, £37. Yaesu YM24 spkr/mic, £18. All untampered, exc cond. Tel Peterborough 77564.
Yaesu 902DM, all modes, nine bands, fm board and a.m. filter fitted, maintenance service and instruction manuals, exc cond, £600 ono. Datong PC1 general coverage converter, £100 ono. G3WBA, QTHR. Tel 0272 873691.
Swap Olympus OM10, case and comp, flash boxed, as new, for 144MHz mains valve linear, 100W o/p for 3W i/p minimum. Gerry. G1ECY, QTHR. Tel 01-890 9733.
Teletype KSR33 on stand with current loop interface and manuals, £25. Cossor 1035 scope with manual, £10. Tel St Albans 67387.
10m fm Rotel RVC220 incl Withers mod board, gd cond, £45. Woden UMI modulation transformer, £5. G4BWW, QTHR. Tel Southport 29036.
Yaesu FRG9600 60-905MHz, all mode vhf/uhf scanning rx. House purchase forces sale, 2 months old, £389. G4LDB, QTHR. Tel Southampton 733626.
Creed 444 teleprinter with silencer cover, pag tu, interface wired for Trio and Icom tx/rx. Lots of paper for printer, £100. G6LJN, QTHR. Tel 098683 403.
BNOS LPM1443100 linear, 3W i/p, 100W o/p, with preamp, little used, 1 year old, £135 ono. G6NQF. Tel 0903 716373, 6-7pm.
Telescopic mast tiltover, homebrew, only 6 months old. The late J Walker's, Moseley, 27 Falmouth Road, Blackpool, Lancs FY1 6LQ. Tel 46873.
QTH Brigg, S Humberside. Georgian style 3 bed detached house and garage. C/H, double glazing, cavity and roof insulation. A desirable residence with permission for 30ft tower. Only £38,750. G4ZMH, QTHR, tel 0652 54917.
FT101Z/D gd cond, £300. FR50B some mods, £30. Buyer collects. Henry Higgins, 34 Coberley, Hanham, Bristol BS15 2ES. Tel 0272 673578.
50MHz MM converter MMC 50/28, unwanted gift in orig box, 3 weeks old, £28. Brian, G4SDL, QTHR, tel 0204 73212 daytime.
CBM64 2 1541 drives, 3 database programs, easy script, printer interface, £475 ono. Buyer collects. G3OXS, QTHR.
FT102 tx/rx with mic, £550 ono. Buyer will also get various smaller items: eg 144MHz converter, swr meter and field strength meter, Radial kit for SMC HF5, £20 ono. Imperfect HF5 antenna (works on 20/15/10), £10. G4CNG, QTHR. Tel Leeds 608609.
TS830S used little over two years, £600, as new. G3NSG, QTHR. Tel 0282 813892.
Computer Video Genie EG3003 with manuals and tapes with plug for ST5, £90 ono. ZX81 with games and manual, £15 ono. Creed 444 plus paper (lots),

£30 ono. *Wanted* 6146 valve. Dick, G0BPS, not QTHR. Tel Folkestone 76171.

Solatron CD523S2 scope, £20. Tfmr 425-0-425 150mA, £10. Choke 20H 150mA, £5. 2m 5-el Jaybeam, £10. 2m ant LY6, £10. *Wanted* HQ1 minibeam. G0BAG. Tel Wokingham 734159.

FTV707 transverter mainframe, brand new and unused, electrically identical to FTV700, £40. G4ZMG, not QTHR. Tel Lincoln 694327, evenings.

Heathkit 32ft free-standing galvanized tower, gd cond but will require new bolts, £45. GI3VAW, QTHR, tel Limavady 62946.

IC255E 2m fm mobile memories scanning simplex and repeater shift, 5 or 30W o/p, £85 ono, or exch for 2m rf switched pre-power amp. G1DDF, QTHR. Tel 01-429 0381.

TR2300 cw nicads, case, charger, ext power lead, £80. R1155A offers. *Wanted* FT221. G8JRA, QTHR. Tel Cholsey 651435.

Trio 2300 cw nicads, all accessories, £100. VB2300 10W pa matching above, £30. Both vgc, £125 the pair or would swap for IC2E. Pye Cambridge 4m a.m. cw manuals, £25. G4MFN,QTHR. Tel Tamworth 282360.

FRG7 rx exc cond, £135 ono. G3XXJ, QTHR. Tel 021-351 2370.

Praktica LLC camera and 50mm lens, just serviced, £50. *Wanted* Handheld synth scanning rx 110-170MHz, eg Regency HX2000, also recently used RRC RAE study course. Kemble, G3UYK, QTHR. Tel Winchester 67819.

Yaesu tx FL101, rx FR101DD 2m and 6m boards fitted exc cond, use as separates or tx/rx. Mic, handbook and leads supplied, to a good home please, £395. Gerrard, G6PLS. Tel 077-473 2358 day, 077-473 4200 night.

Yaesu FTDX560 hf tx/rx plus FV400S ext vfo, cw filter, matching spkr, mic, fan, spare valves, £250. Icom IC2A (USA 2E), £100. G4GYE. Tel Chelmsford 350348.

Trio TM-201A 5/25W fm mobil, boxed, mint cond, £200. Yaesu FT208R handheld portable, spare nicad battery, nice cond, boxed, £160. Buyer collects or pays postage. *Wanted* Yaesu PA3DC adapter. Jeff, G6XRL, QTHR. Tel Poynton 876192.

VHF clearance, FT290R incl Mutek, case, charger, nicads, mobile mount, gutter mount, 2 ants, 6A psu, 5xy and cables, brackets, rotator, colinear, wavemeter, plugs, amplifier, over £800 worth, sell for £550 ono, or possible split. G4UXG, QTHR. Tel 01-898 2662 day.

Icom IC271E Mutek mint, £575. Icom 471E mint, £575. Scopex 10MHz scope, gd cond, £60. *Wanted* 7213 valves and LDF550 cable. G4NQC, QTHR. Tel 01-697 3250.

Kenwood TS430S with FP707 psu, ssb filter, fm board and genuine workshop manual, £600 ono. The psu is not available separately. Yaesu FT102, fitted very narrow cw filter and fm board and technical manual, £475 ono. Two large loudspkr cabinets fitted with 15in Electrovoice units, these will handle 150W rms ea, £250 the pair or will consider swap for new 80 track double side disk unit for BBCB if all necessary ICs etc incl. Neil, G4RQN, QTHR. Tel Kings Lynn 771389 5-7.30pm.

WANTED

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Old wireless sets wanted, any cond, domestic or amateur. Also interested in early radio books, catalogues, valves, components and gramophones. Sell or exch new Mirage B108 80W 2m linear, Atlas 210/215 digital vfo, Shure 444. G4ERU, QTHR. Tel Bournemouth 510400.

Yaesu FT101ZD owner requires for his line-up a vfo, scope and transverter to match. Fair price paid for perfect only gear. GW4RGI. Tel Pembroke 682334 evenings or weekends.

Old timers, secret listeners, can you tell me my father's callsign pre-war to 1961, Frank Forbes, QTH, Croydon or East Grinstead? Any info please contact G1ITK, QTHR. Tel Yapton 554248.

Ten-tec Argosy, Omni or Corsair. Miniature 455kHz/500Hz filter. G4AYG, QTHR.

10GHz complete stn required except for prime mover by mechanical incompetent! G6JNS, QTHR. Tel 0905 620041 evenings and weekends.

Icom IC402 70cm ssb tx/rx. Chris, G6LRY, QTHR. Tel Wantage 2205 evenings.

Any info on Labgear topbander tx. G4MNB, QTHR. Tel Swindon 826325 evenings.

FV-707DM and FC707. Peter, G4YYO, QTHR. Tel Oakamoor 702208.

Transformer 1500-0-1500V at 700/800mA or similar for linear. VFO120 remote vfo for Trio TS120. *For sale* Sinclair 48K Spectrum with free radio software, psu and handbook, £60. GM3WCS, QTHR. Tel 0383 726456.

Valves for HRO, one 5Z4 metal clad, four 6D6, three 6C6, one 6B7, one 42. R C Hogg, 238 Goring Road, Worthing, West Sussex BN12 4PG. Tel 45876.

Copies of *Television* magazine. 1928 Sept. 1929 Feb, March April, June, July, Nov, Dec. 1930 Jan, Feb, March, May, July, Aug, Nov. 1931 Jan, Feb, April, Aug, Sept. Purchase or exchange 1923/4 *Amateur/Popular Wireless*. G2KU, QTHR. Tel 01-657 1126.

16-el Tonnas for club project, any cond, urgent. 60ft lattice wind-up tower, must be in gd cond. G4VRY, QTHR. Tel 0532 703772.

PSU 20/25A, 13·8V, 220/230V primary. Not home-brew. State price. EI9D, QTHR.

Please have you got any info on an ex-WD R109 rx that I could buy or borrow? I am also interested in buying any ex-WD equipment of interest. Keith, tel 091-469 3955.

Buy or loan to copy manual for telequipment D33, all expenses paid. Series resonant first oscillator xtals for G2DAF Mk2 rx. Nick, G3KWJ, QTHR. Tel 027-587 2306.

BFO unit LP1976/1 for Eddystone 770R, rebuilt complete except for this unit. Would pay expenses etc. B Bond, 28 King Court, Capworth St, Leyton, London E10 5AJ.

Two empty tape spools 5¾in diameter for old fashioned reel tape recorder. G3KH, QTHR, 133 Station Road, Cropston, Leicester, LE7 7HH.

HF tx/rx, Yaesu, Trio, Drake, Collins or similar, Gd separates would do, will pay cash and collect. Also collect old time wireless sets and ham equipment. Jim Taylor, G4ERU, 5 Luther Road, Winton, Bournemouth. Tel 0202 510400.

2m tx/rx fm/a.m. or ssb. Anything to get started. W.H.Y. as cheap as possible please. Chris. Tel Cottered 217 after 6pm weekdays, anytime weekends.

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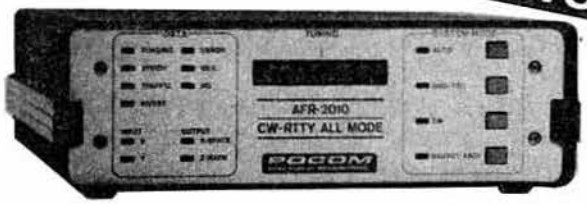
NEW PRODUCT NEWS



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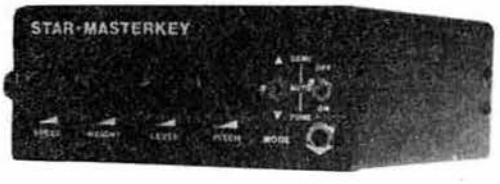

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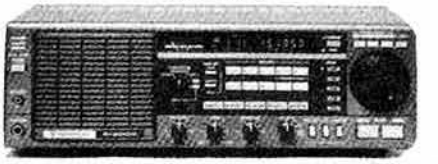

R-600

The R-600 is a high performance general coverage communications receiver covering 150 kHz to 30 MHz in 30 bands. Use of PLL synthesized circuitry provides highly accurate frequency control with maximum ease of operation. Use of the latest technology assures the ultimate in short wave listening enjoyment on all covered frequencies, whether using AM, SSB, or CW modes of operation. The compact size of the R-600 allows the user the maximum flexibility in placement of the radio, and the front mounted speaker permits the radio to be located between shelves without degradation of audio quality.

R-1000

The R-1000 is a high class general coverage receiver covering 30 bands from 200 kHz-30 MHz with a PLL synthesizer that incorporates a variety of KENWOOD's sophisticated electronic technology acquired over many years.
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R-2000

The R-2000 provides outstanding performance through use of microprocessor controlled operating functions, allowing maximum flexibility and ease of operation throughout its operating range. An all mode receiver, it covers 150 kHz-30 MHz in 30 bands, on SSB, CW, AM and FM. Key features include digital VFO's, ten memories that store frequency, band, and mode information, memory scan, programmable band scan, digital display with 24 hour dual clock, plus timer, and a host of other features to enhance the excitement of listening stations around the world.

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CAT. NO.	TYPE	DESCRIPTION	PRICE INC. VAT FREE CARR. £
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1331	TS-930S	Transceiver, HF w.gen. cov. receiver	1230.00
1330	TS-930 + ATU	As above with automatic ATU	1390.00
1336	AT-930S	ATU for TS-930S	159.00
1329	SP-930	Speaker and filters for 930S	66.00
1313	MC-60A	Desk top microphone, 8 pin built-in pre-amp	62.00
1357	YK-88AI	6kHz AM Filter	37.00
1356	YK-88CI	500Hz CW Filter	36.00
1348	YG-455C-1	500Hz CW Filter	83.00
1349	YG-455CN-1	270Hz CW Filter	90.00
1314	MC-42S	Hand mic for TS-930S	17.00
1324	TS-430S	Transceiver, HF w.gen. cov. receiver	699.00
1310	PS-430S	DC power supply, deluxe cooled	144.00
1319	SP-430	External Speaker	38.00
1334	FM-430	FM Unit	43.00
1321	MB-430	Mobile Mount	13.00
1322	AT-250	Automatic ATU	290.00
1313	MC-60A	Desk top mic. built-in pre-amp	62.00
1320	AT-130	Antenna tuning unit	103.00
1315	YK-88CN	250Hz CW Filter	41.00
1352	YK-88SN	1.8kHz SSB Filter	36.00
1326	TS-530SP	Transceiver HF	699.00
1327	SP-230	External Speaker	45.00
1325	AT-230	Antenna Tuning Unit	155.00
1312	MC-50	Desk top microphone	35.00
1302	KB-1	Deluxe VFO knob for TS930, 830, 530	12.00
1354	YK-88C	500Hz CW Filter	36.00
		Accessories for TS-530SP: MC-60A, MC-50, KB-1, YK-88C, YK-88CN, YK-88SN	
1328	R-600	Receiver	290.00
1333	DCK-1	DC cable kit for R-600, R-1000, R-2000	8.25
1332	R-1000	Receiver	360.00
1335	R-2000	Receiver	455.00
1301	ST-1	Base stand/quick charger for TR-2400	45.00
1309	MC-30S	Hand microphone, 500 ohm, noise cancelling, 4 pin	15.00
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1311	PB-25	Nicad battery pack for TR-2500	28.00
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1369	SP-40	Compact mobile speaker	16.00
1371	MC-46	Auto-patch up/down microphone, 6 pin	43.00
1339	TR-9130	2m all mode transceiver, 25W	475.00
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1340	SM-220	1.8-150MHz station monitor	240.00
1350	PC-1A	Phone patch for TS-930/940	50.00
1303	RA-1	Antenna	8.00
1317	MB-100	Mounting bracket for TS-130S/660	21.00
1344	DS-2	DC/DC Converter for TS-830S	55.00
1346	CK-18	Coil kit Warc bands for TS-180	11.00
1387	TM-411A	70cm Mobile Transceiver	389.00
1358	MA-4000	Dual band antenna 2m/70cm	38.00
1359	SC-9	Soft case for TR-2600	20.00
1360	PB-26	Nicads for TR-2600	31.00
1362	SMC-30	Spkr/mic for TH21E/41E/2600/3600E	22.00
1363	PB-21	Nicads for TH21/41E	20.00
1364	SC-8	Soft case for TH21/41E	9.50
1365	EB-2	Battery case for TH21/41E	15.50
1366	TS-711E	2m Multi-mode base stn.	730.00
1367	TH-21E	2m FM Micro transceiver	160.00
1368	TH-41E	70cm FM Micro transceiver	189.00

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CAT. NO.	ITEM		PRICE INC. CARR. & VAT
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1229	FT-77	Compact Transceiver 100 watts	455.00
1244	FT-757GX	Transceiver all mode	699.00
1242	FC-757AT	Automatic antenna tuner	275.00
1245	FP-757GX	Switch mode power supply	170.00
1240	FP-757HD	Heavy duty power supply	190.00
1241	FRB757	Switch box for FT757GX to FL2100Z	9.40
1212	MMB20	Mobile mount for FT757GX	19.60
1230	FT-980	Transceiver (CAT) /gen. cov	1565.00
1246	FL-2100Z	HF 1200w Linear Amplifier	699.00
1262	NC9C	Charger mains (FNB3)	9.10
1231	FT-290R/ FBA5	Tx/Rx "Keyboard", 2M 1.8w c/w FBA5	225.00
	FT-209R/ FNB3	Tx/Rx "Keyboard", 2M 2.7w c/w FNB3	255.00
	FT-209R/ FNB4	Tx/Rx "Keyboard", 2M 3.7w c/w FNB4	260.00
	FT-209RH/5	Tx/Rx "Keyboard", 2M 2.3w c/w FBA5	230.00
	FT-209RH/3	Tx/Rx "Keyboard", 2M 3.7w c/w FNB3	260.00
1232	FT-209RH/4	Tx/Rx "Keyboard", 2M 5.0w c/w FNB4	265.00
	CSC10	Carrying case (FBA5/FNB3)	8.70
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1233	FT-208R	VHF handie FM transceiver	198.00
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1260	FBA2	Battery pack sleeve (fits FNB2)	3.50
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	SMC8-9AA	Charger slow (13A style)	8.30
1262	NC9C	Charger slow	9.10
1258	NC7C	Base Master	32.50
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	FT-730R	Transceiver 70cm FM 10w synthesised	225.00
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1214	FVS1	Voice synthesiser module	22.90
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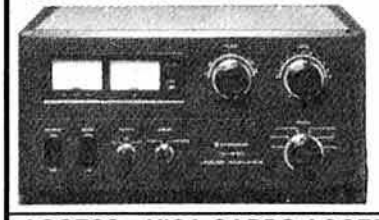

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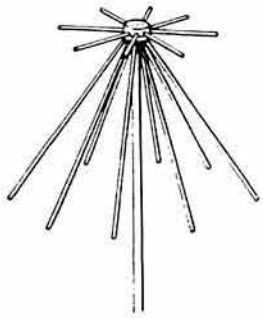

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(1) The ½" mount which requires a nominal ½" hole and access to the underside to secure the fixing nut. This base is suitable for all surface angles, including vertical but it is not recommended for locations where the underside is exposed to the weather, or for UHF. The feeder cable is terminated by tag plates. Available as types 2001 (feeder inner needs soldering), 2002 (feeder termination by grub screws) and 2003 (as 2002 but quick release).
(2) The ⅜" mount which requires an exact ⅜" hole but access to the underside is not necessary as the base assembly snap fits into the hole. Clamping the cable expands the collets and gives a secure fixing. Cable termination is co-axial and this mount is recommended for all frequencies including UHF. Assembly is easy because REVCO'S new TAPERLOK design has only two components for cable termination!
The whip system interface is a $\frac{5}{16}$" UNF stud which can be used with a wide range of adaptors including the quick release. (The 2017 ⅜" mount uses its own special flush fitting loading coil instead of a $\frac{5}{16}$" stud).
The 2005X base is highly recommended as it is the easiest to fit and the most versatile. The cable termination is substantially waterproof.
⅜" snap-in mounts may not be suitable for vertical or near vertical surfaces when used with longer whips.

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GUTTER MOUNTS: A clamp assembly that is attached to the vehicle's gutter and is capable of carrying a body mount. Care should be taken when choosing a gutter mount as modern vehicles tend to have a light plastic moulding poorly attached to a meagre metal flange. As gutter mounts are fully exposed to the weather, the 2005X base is recommended, as is the Quick Release system which allows the antenna to be removed for safe stowage.
BOOT-LIP MOUNTS: Another quick mount option that may be preferable to the gutter mount. Again the 2005 is top choice as its negligible below-body space requirement can cope with the restricted room inside the shell of a boot lip mount.

FIXED STATION ANTENNAS: A purpose-made stainless steel bracket, complete with U bolts, is available to convert most of REVCO's antennas for fixed station use by the addition of ground plane elements. Again, the 2005 is recommended. The assembly also contains a coaxial socket to allow attachment of the feeder. REVCO also has two specially designed fixed station antennas for VHF – the 2060 and the 2061 with adjustable ground planes (Hi and Lo band). These are particularly valuable for emergency use as only one antenna for each band need to be kept in stock. 2060 covers 120-180MHz and 2061 covers 60-120MHz.

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MEMBERS. Use right-hand price columns. It is essential that you quote your call sign or BRS number so that you can be recognised as a member.

PRICES. These include postage, packing and VAT where applicable. For airmail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 10am and 4pm, Monday to Friday.

POSTAL TERMS. Cash with order. **Stamps and book tokens cannot be accepted.** Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Our Giro account number is 5335256. Please write your name and address clearly on the order, and allow up to 28 days for delivery.

ORDER FROM: RSGB Publications (Sales), Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW

(Raynet supplies should be obtained from Mrs J. Balestrini, Merrivale, Willow Walk, Culverstone, Gravesend, Kent)

RSGB News Bulletin
FOR MEMBERS ONLY

REVIEW OF RADIO INVESTIGATION SERVICE COMPLETED

A review of the Radio Investigation Service by the Department of Trade and Industry has produced 128 separate recommendations. The outcome of the review is essentially that the RIS is to be re-orientated towards an enforcement role and to carry out what Mr Geoffrey Pattie, Minister of State for Industry and Information Technology, called "a phased withdrawal from the time-consuming effort put into dealing with domestic TV and radio reception problems". In his announcement in the House of Commons on 26 July, Mr Pattie said that more RIS resources would be devoted to dealing with pollution of the radio spectrum by those who operate without licences and those who abuse their licences. RIS staff had already begun to step up enforcement action in this field and much more would follow. The increased activity would be undertaken by a staff numbering 240, compared with 340 before the DTI took over the RIS.

The DTI is to publish a booklet which Mr Pattie said "....would enable most people to carry out simple and safe diagnosis of their domestic TV or radio reception problems". It will contain a technical section for TV dealers and repairers and will be obtainable from Post Offices. A call-out charge of £21 will now have to be paid before the RIS will visit a complainant to diagnose the cause of domestic TV or radio reception problems. Visits will not be made unless the apparatus has an external aerial and a log of reception problems has been completed. With effect from 1 January 1987 the RIS will only pay a visit to deal with domestic TV and radio reception problems when such a visit can be combined with other journeys and when a dealer has provided a written report stating that he has been unable to effect a remedy. With effect from 1 January 1988 the RIS will only visit to diagnose reception problems caused to sets complying with BS905.

BS905 to be implemented

The provisions of BS905, which relate to immunity standards for television receivers, will be incorporated in legally binding regulations as soon as possible. This will make it an offence to sell, manufacture or import television receivers which do not comply with the standard.

CHALLENGER SHUTTLE MISSION A GREAT SUCCESS

"A stunning success" is one of the many superlatives which have been used to describe the amateur radio aspects of Mission 51-F of the Space Shuttle "Challenger". It is hoped that the unique atmosphere which developed during the mission, both at RSGB Headquarters and at amateur stations all over the UK, emerges from the bare words.

It should be stressed at the outset that much of the hard work at Headquarters as far as the Challenger mission was concerned was associated with the wish to gain maximum favourable publicity for amateur radio: this is why the Society was particularly keen to have a contact with Dr England during the mission from its Headquarters station. It is enormously important for amateur radio to have a credible and positive face to present to the man-in-the-street, and a large slice of broadcast time in the middle of the main ITN Sunday news bulletin - for example - is well worth having from that point of view. It can safely be said that this objective was fully achieved.

The story began on 28 September 1984 when NASA astronaut Dr Tony England, WOORE, visited RSGB Headquarters. Dr England was due to fly on Shuttle mission 51-F, which was originally scheduled for launch on 17 April 1985: with the blessing of NASA Dr Owen Garriott, W5LFL, had carried out some experiments in amateur radio operation during an earlier Shuttle mission in 1983 using 144 MHz fm, and Dr England was keen to do the same. At that time some slow-scan television operation had been planned, as had 28 MHz working. Because of various problems relating to the spacecraft itself, what actually materialised was 144 MHz fm operation in the same manner as that on Dr Garriott's mission - although with a preponderance of scheduled operation, in accordance with Dr England's wish to contact schools and youth organisations wherever possible - and 144 MHz slow-scan television transmission. As a result of his visit, the Society was left with high hopes of some excellent operation from space.

Mission 51-F was slightly delayed, again for reasons connected with the spacecraft itself, and the launch date was eventually set at 12 July 1985. As with the previous mission, the Society began preparations some three weeks prior to the launch. Since the special GB2RS transmissions from Headquarters had proved useful in keeping members up-to-date with the latest developments during Garriott's mission, it was decided to extend the coverage to two special broadcasts per day - one at 16 hours GMT and one at 2030 GMT. The timing of the latter was chosen with a view to its falling between the two main BBC and ITN television news bulletins each evening and also with an eye to propagation on the two HF bands which were used for the broadcasts in conjunction with a "semi-local" 144 MHz transmission. A BBC-B microcomputer was used with the appropriate software to convert the Keplerian elements for the spacecraft into orbital data for the UK: the Keplerian element set was checked for currency with NASA each day of the mission and the details broadcast. Some comical scenes occurred several times prior to the evening broadcast when the element set was changed twenty minutes or so before going on the air and the data had to be recalculated and scripted in somewhat less than half the usual time taken for this exercise. Details of uplink and downlink frequencies and other operating information were also broadcast and minor alterations and updates were made available.

On the day of the launch itself, 12 July, the 1600 broadcast passed without incident. Lift-off was due at 2030, at which time the second GB2RS broadcast of the day was due on the air. The first few minutes of the broadcast proceeded smoothly enough but word was then received from NASA that a malfunction in an actuator supplying liquid hydrogen coolant to one of the Shuttle's main engines had occurred and the launch had been aborted with three seconds to go before lift-off. It emerged some days later that NASA had solved the problem and that launch would now take place on 29 July.

As is well known by now, earth orbit was achieved on 29 July: Challenger finally "cleared the tower" at 21 hours 10 seconds GMT after various holds in the countdown. As always, there is more to it than that. Launch had originally been scheduled for 1853 GMT but it was almost as though there was a conspiracy afoot somewhere to ensure that the content of the 2030 GB2RS broadcast would have little resemblance to the script which had been rather optimistically prepared just before the broadcast. In the event, various amendments to the launch time and the associated reasons were received "live" from NASA and hastily scribbled on pieces of paper thrust under the nose of the newsreader: after one indefinite delay to the launch it was felt better to close down GB2RS and hastily re-convene the station as GB3RS. However, no sooner had a few reports been taken on 3650 kHz than the news of a successful launch came through. GB2RS was quickly reactivated and the facts announced, after which it was hoped that normality would prevail. Unfortunately, the spacecraft suffered some quite serious problems shortly after launch, and the log reveals that

GB3RS became GB2RS no less than four times in the space of 20 minutes as new information became available. One amusing point was that the 10pm ITN television news broadcast was stating gloomily that the mission would have to be aborted at virtually the same time as GB2RS announced that the mission would continue in a lower orbit than that planned: subsequent events were to prove that GB2RS alone had its facts right....

First pictures

The first orbit during which amateur radio operation was expected was Orbit 47: on the basis that the Society planned to make contact with WOORE during that orbit for the benefit of the UK media, both BBC Television News and BBC Radio News were present in the Headquarters radio room. Unfortunately, there were problems aboard the spacecraft and there was no amateur radio operation during either Orbit 47 or the following orbit, which had also been listed as a "probable" for operation by Dr England or the other licensed astronaut aboard Challenger, Dr John-David Bartoe. Some filming had been done by BBC TV News, but the material was not expected to be used and there was a certain amount of depression at RSGB Headquarters at the loss of a good media opportunity. However, there was a consolation. Just after the 2030 GB2RS broadcast, as GB3RS was taking reports on 3650 kHz, another operator in the shack was tracking Orbit 49. This had not been listed as being expected to produce any operation from Challenger, and in any event it was only just a feasible pass for the UK at some 6 degrees elevation from Potters Bar. Right at the end of the orbit, when the spacecraft was at 2 degrees elevation and some 1900 km away, slow-scan television signals suddenly became audible on 145.55 MHz and a picture appeared on the monitor: to the elation of all concerned it appeared to be one frame of a composite colour transmission which gave a perfectly good black-and-white picture of Dr John-David Bartoe in the Shuttle's payload bay. GB3RS quickly underwent temporary metamorphosis into GB2RS so that the news could be broadcast in the proper manner, although it was reported that the operator's voice was about an octave above its normal frequency range!

Although it was by this time not far off midnight, BBC Breakfast television were contacted and expressed an interest: some of the material filmed the previous day and the picture received on Orbit 49 was duly broadcast at just after 7am and 8am on Friday 2 August. It emerged later that Orbit 49 had been the first on which there had been any operation at all and that it had been chiefly for the benefit of some American clubs and schools: GB3RS just caught part of that orbit. The picture which was received was almost certainly the first in Europe from Challenger and indeed the first in Europe from a Shuttle mission; it is reproduced on the front cover.

Voice contact

The next scheduled "pass" was during Orbit 62, and during this orbit the Blackwood and District Amateur Radio Society in Gwent, GW6GW, scored a notable "world first" by having a two-way voice contact with Dr England at 1719 GMT. Signals were well received at RSGB Headquarters but there was noticeable sharp fading, abrupt changes in polarisation and marked Doppler shift, all of which were carefully noted for later use. Dr England gave details of the progress of some of the experiments and also transmitted a high-resolution slow-scan picture of himself aboard the spacecraft. Brian Davies, GW3KYA, of the Blackwood club, is a personal friend of Dr England and was naturally highly delighted with the contact.

Orbit 63, which was also scheduled for operation, produced no results: by now it was becoming clear that the difficulties earlier in the mission and the much lower orbit which had resulted had caused major changes to be made in the astronauts' work schedules and it was very much a matter of looking and listening on each orbit which came within range of the UK "just in case". This policy paid off, since slow-scan television pictures were received during various unscheduled passes by stations around the UK who later reported that they were somewhat short of sleep.

Orbit 78 on the Saturday was scheduled to produce some activity and did so: right on cue the characteristic sound of the SSTV signals and the CW identifier "WOORE/CHALLENGER" appeared out of the noise and some good pictures of the astronauts floating in weightlessness and smiling hugely appeared on the monitor. At times the signals were extremely strong, which was a good omen for what was to follow: the Society had been advised that Dr England would attempt to have a contact with GB3RS during Orbit 79! Equipment was checked and re-checked and a simple picture, consisting of a short greetings message to Dr England and a drawing of the spacecraft, was hastily prepared in case it proved possible to transmit it to the Shuttle. As 1909 GMT approached, three pairs of ears were listening down into the noise. At 1910 GMT the voice of Dr England was heard, in contact with the Scout station EI3ISJ at the Irish Scout Jamboree: at that stage the signal was quite noisy but as WOORE had a brief contact with the Denbigh School Radio Society station G1GJY at Bletchley he rapidly became fully quieting in the GB3RS receiver. And then the magic words "GB3RS, this is WOORE on board Challenger" were heard and a historic contact began. Dr England said that they had "....a kind of a rocky start" but that they were now "doing great" and indeed were to remain in orbit for another day. Asked about the progress of the British experiments, Dr England said that both the X-ray telescope and the CHASE experiment to measure the amount of helium on the sun were working very well and that, all in all, "....your British experiments are getting along famously". He then sent the complete sequence of slow-scan television pictures, which were almost perfectly resolved, and GB3RS transmitted its reply. By then, however, the spacecraft was rapidly disappearing over the horizon and it was not known for some time whether Dr England had received TV pictures from GB3RS. Happily, NASA was able to confirm later that the pictures had been "perfect copy" aboard Challenger. GB3RS was therefore the first (and, as it later turned out, the only) station outside the United States to have two-way voice and television contact with the spacecraft, although by no means the first to have two-way voice contact.

Media reaction

The reaction of the media was swift, although because of the fact that it was a Saturday and also the day before the birthday of Her Majesty Queen Elizabeth the Queen Mother the coverage was a little more limited than perhaps the story deserved. Independent Television News made a filmed report at Headquarters on the Sunday morning, and there was a well-produced item on the contact in the main bulletin of the day at 8.45pm. BBC domestic radio found various outlets for the story on the following Monday, and no less than 19 local radio stations carried material from the two recordings which had been made at GB3RS during the contact. BBC External Services also made good use of the material and it was featured in the prestigious World Service programme "Science in Action" as well as many vernacular language transmissions.

The final scheduled pass was Orbit 93, on the Sunday, and in some ways this produced the most striking results of all. With the spacecraft still 2 degrees below the horizon, according to the Society's software, slow-scan television signals were heard and the signal strength rapidly built up to an astonishing 50 dB over S9 on the S-meter of the FT726 which was in use at GB3RS. By the time the spacecraft was at closest approach, the signal was more like that of a mobile station outside the Headquarters building than a spacecraft some 500 miles away running something like one watt to an "indoor" antenna. A virtually perfect, and most beautiful, picture of the X-ray telescope looking out of the Shuttle's cargo bay - with the earth and some spectacular cloud formations at the right of the frame - was the result, and it is also reproduced on the front cover. Signals were so strong that the operator at GB3RS who was tracking the spacecraft was forced to remove his headphones, complaining of ringing in his ears!

As if that was not enough, Orbit 94 - which was not scheduled to produce any operation - featured the same sequence of pictures, although not at quite such extraordinary signal strengths. By this time reports were being solicited from various stations up and down the country for the following - and final - GB2RS special news bulletin, and it became clear that some very strong signals had been received on Orbit 93. Several stations reported fully quieting slow-scan signals on nothing more than hand-held 144 MHz fm transceivers and their associated whip antennas. Mobile stations had also received signals at enormous strength: to the point, in fact, where they were thought to be much too strong to be coming from Challenger!

The Shuttle made a flawless touchdown at Edwards Air Force Base at 8.47pm on Tuesday 7 August, after a mission which will long be remembered by amateur radio operators in the UK. It is pleasing to be able to report that there were few reports of interference to the signals from WOORE and that many good pictures were received in various parts of the country: the worst jamming suffered by GB3RS was on one occasion one evening when the cleaners began using their vacuum cleaner in the corridor just outside the radio room half-way through an SSTV "pass". Needless to say, the corridor remained dirty for an extra few minutes.

Thanks...

The Society extends its sincere thanks to NASA, ARRL and AMSAT-UK, as well as many others who assisted with making the mission a great success from the point of view of amateur radio. Many appreciative comments on the accuracy of the information supplied by the special GB2RS transmissions were received after the last broadcast had been made, and this would not have been possible without the efforts of those mentioned above. The large number of stations calling in after the GB2RS news broadcasts are also thanked for their useful reports: as a tailpiece, on one occasion the 40 metre broadcast is reported to have been heard in Japan!

RADIO SOCIETY OF GREAT BRITAIN

(LIMITED BY GUARANTEE)

REGISTERED OFFICE:

Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW

FIFTY-EIGHTH ANNUAL GENERAL MEETING

MINUTES OF THE FIFTY-EIGHTH ANNUAL GENERAL MEETING OF THE RADIO SOCIETY OF GREAT BRITAIN HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, SAVOY PLACE, LONDON WC2R OBL ON SATURDAY 8 DECEMBER 1984 COMMENCING AT 2PM.

Present: Mr R G Barrett, GW8HEZ (President, in the chair): Mr P F D Cornish, G3COR, Honorary Treasurer: Mr D Baptiste, CBE, Immediate Past-President: Mr D A Evans, G3OUF, Secretary/General Manager: Mr J Blacquier, representing the Society's auditors: and 145 corporate members.

The President welcomed members to the meeting and introduced those present on the rostrum. He passed on apologies for absence from the Executive Vice-President and President-Elect, Mrs Joan Heathershaw, G4CHH: an unexpected professional commitment had occurred during the morning and she was not able to be present at the meeting.

The President then introduced Council Members who were present and read out the apologies for absence.

The President outlined the format of today's meetings, which would fall into four sections. After the formal Annual General Meeting there would be an Extraordinary General Meeting, called by the Council of the Society, to debate the Notice given in the November 1984 edition of Radio Communication. The presentation of awards and the question-and-answer session would then take place.

Annual General Meeting

NOTICE CONVENING THE MEETING

The President stated that the notice calling the meeting was set out on page ii of the Annual Report & Accounts which had been circulated to all members in the November 1984 edition of Radio Communication. The Secretary read the first part of the calling notice and proposed that, to save time, agenda items be read as they arose.

MINUTES OF THE 57TH ANNUAL GENERAL MEETING

The minutes of the 57th Annual General Meeting had been circulated with the March 1984 edition of Radio Communication. It was proposed and seconded that the minutes be confirmed. On a show of hands the President declared the resolution carried.

ACCOUNTS FOR THE YEAR ENDED 30 JUNE 1984, AND THE REPORTS OF COUNCIL AND AUDITORS

The President invited the Honorary Treasurer to introduce and comment on the accounts which had been circulated to members. Mr Cornish in turn invited Mr Blacquier of Edward Moore & Sons to read the formal report of the auditors. Mr Blacquier stated that in the opinion of the auditors the accounts, prepared under the historical costs convention, gave a true and fair view of the state of affairs of the Society and its subsidiaries as at 30 June 1984 and that they complied with the Companies Acts 1948 to 1981.

Mr Cornish said that he would be pleased to answer any questions with regard to the accounts.

An unidentified member enquired why the figures for Lambda Investments continued to be repeated each year when the company was dormant: he considered that the retention of the company involved extra work and the publication of the figures used up unnecessary space in Radio Communication. Mr Cornish said that the publication of the accounts of Lambda Investments was required by law whilst the company continued to exist: he added that the Society preferred to keep the name in case it proved useful in the future.

Mr C Newton, G2FKZ, noted that the purchase of the balance of the land and property at Potters Bar had been deferred: he wondered whether there was a possibility of the price increasing during that time. Mr Cornish explained that the price was fixed under the contract and that deferral of completion had been at the request of the vendors. Amongst other things, this meant that rent continued to be received.

Mr H Bellfield, G3SBV, noted that the figure for income from advertising revenue was down on that for 1983 and he wondered whether the Honorary Treasurer had any comments on that. Mr Cornish commented that there were now some seven magazines with an amateur radio content. The number of advertisers was limited and they had tended to spread themselves over the available publications - in consequence, Radio Communication had suffered a decline in advertising revenue. In practice the magazine had lost few advertisers, apart from those which had gone out of business: what had tended to happen was that advertisers who had previously taken several pages in any one issue had cut back on the amount of space taken. Mr Cornish said that there were some signs of an improvement in the position.

Mr A Milne, G2MI, noted that the Society had made a loss of £50,000 and asked what was going to be done about it. Mr Cornish said that a deficit had been clearly foreseen in the Society's forward planning. He added that a deficit was anticipated during the coming year, although he hoped that it would not be so high: his forecast was based on some very pessimistic predictions concerning advertising revenue. An important factor was that some new books scheduled for production and sale should become available during the next six months. All expenditure had been very closely inspected and monitored, as was proper and prudent: ways of increasing revenue were also the subject of scrutiny. Subscriptions had also gone up as of 1 July 1984, and Mr Cornish commented that this was perhaps overdue.

Mr J Greenwell, G3AEZ, asked what proportion of book sales were made at rallies and exhibitions as opposed to other sales. Mr Cornish drew Mr Greenwell's attention to Note 9 of the Accounts, which stated that "Book sales totalling £44,193 gross made at rallies and exhibitions have been accounted for under income from book sales".

Mr L Ross, G8MWR, asked for more clarification on this point. He felt that the cost of production of books had been ignored in the figure quoted by Mr Cornish and that an overall loss must have been made. Mr Cornish drew Mr Ross' attention to page iv of the Accounts, where the figure for book sales had been given as £316,282 and the figure for printing and distribution costs was given as £170,433. These figures did not take into account the costs of staff. Mr Cornish also said that the cost of attending rallies and exhibitions had come under scrutiny during the year in review.

Mr Ross also queried the cost of the National Amateur Radio Convention at the NEC. Mr Cornish pointed out that the exhibition proper had virtually broken even: the concurrent Convention had introduced certain costs which had not been foreseen, and the ultimate cost to the Society had been in the region of £10,000. He said that this matter had also been carefully scrutinised during the year.

The Secretary, Mr D A Evans, G3OUF, wished to make a general point in connection with questions in this area. He said that the Society did not go to rallies and exhibitions simply to sell books: the intention was also to provide information, answer questions and, as he put it, "....to fly the flag". However, the manner in which the associated accounting was done meant that the costs of attendance at rallies and exhibitions were linked with the costs associated with books, which perhaps gave a somewhat unfair picture of the true situation. He said that the goodwill generated by the Society's attendance at events of this nature could not be easily expressed in financial terms.

Mr Ross said that since the Society did not use all the available floor space at the NEC, it should be possible to allow clubs and societies to rent the space at a cheap rate. This would make the exhibition more representative and comprehensive. The Secretary pointed out that this policy already existed and that some 15 per cent of the floor space at the NEC was already given free to RSGB-affiliated organisations such

as BARTG. However, there was inevitably a price to be paid for the goodwill thus engendered because of the high cost of floor space at the NEC. Mr Ross said that he acted on behalf of a national society and space had not been donated to them: Mr Evans explained that the policy only extended to RSGB-affiliated societies and that Mr Ross' society was not affiliated.

Mr R Royall, G8ESB, asked whether the loss associated with the NEC Exhibition was wholly associated with the HF Convention. Mr Cornish said that the reason for the loss could not be attributed in a simple manner and that costing exercises of this type were never straightforward. The President, Mr R G Barrett, GW8HEZ, said that the figure of £10,000 covered a number of additional activities such as the donation of space to affiliated societies, the costs associated with the Society's own stand and those devoted entirely to the work of its committees. In addition, there were costs involved in arranging lectures, seminars, film shows and associated matters; this could be considered as an associated cost of Society publicity. Mr Cornish added that a precise breakdown could not be given at that time: however, broadly speaking, the total receipts associated with the NEC were some £44,000 and the costs were around £55,000.

Mr M Atherton, G3ZAY, of the Society's HF Committee, felt that the actual costs of the HF Convention - a part of the Convention as a whole - had not exceeded about £1,000.

Mr C Young, G4CCC, asked where the cost of RAYNET insurance was shown in the Accounts. Mr Cornish said that it came under "Insurance", and that the total figure was £7,643 as against £5,500 for the previous year. Mr Young asked whether the latter figure included insurance for repeaters, and Mr Cornish said that it did not: he added that from memory the amount for RAYNET insurance was some £3,000 but he did not have a precise figure with him.

Mr J Piper, G4MWC, felt that perhaps cost centres could be provided as from 1 July 1985. Mr Cornish noted this comment.

Mr I Hopwood, G6CWK, said that the figure for insurance seemed to show a considerable increase on that given in the previous set of accounts: he asked whether the Society retained the same insurers each year and when comparative quotations were sought. Mr Cornish said that the Society had asked its brokers to undertake a comprehensive review of its insurances and modify them where necessary: this exercise had produced more cover at a lower cost. The greater part of the increase had been associated simply with inflation, but insurance for RAYNET and the repeater and beacon network had been added - if these were subtracted, the cost of insurance was marginally less than it had been in the previous year.

Mr L Ross wished to return to the issue of exhibition costs: he felt that the reason for the loss associated with the NEC Exhibition was still unclear. The Secretary explained that in broad terms it had been treated as the cost of goodwill and publicity for the Society and for amateur radio.

Mr G Haylock, G2DHV, wondered whether the Treasurer had any comments on the apparent doubling in bank charges in the 1983-84 Accounts. Mr Cornish outlined the method by which bank charges were assessed and explained that the current account was kept as low as possible so that surpluses could be used to generate interest: this was done on a weekly basis. From time to time a cost-benefit exercise was carried out, and Mr Cornish felt that the Society did better by obtaining interest and incurring higher bank charges. Bank charges themselves had also increased during the year in review.

Mr P Crosland, C30AKA, put two questions: he firstly asked Mr Cornish to comment on the great increase in legal and professional fees. Mr Cornish gave a breakdown of the costs, some of which were residual "one-off" charges relating to the new Headquarters building. Mr Crosland's second question concerned the amount of subscriptions which had been waived and whether the auditors satisfied themselves that all such waived subscriptions were in accordance with the Society's constitution. Mr Cornish said that, as at 30 June 1984, 422 subscriptions had been waived and he assured Mr Crosland that the procedures adopted by Council for handling applications for waived subscriptions were properly followed.

Mr R Glaisher, G6LX, commented that he knew many young people who, despite earning a good deal of money, claimed the reduced Society membership fee applicable to younger members. He did not feel that Council had got the formula quite right. The Secretary outlined the qualifications for associates and student corporate members: the latter needed to provide documentary evidence that they were in full-time education and between the ages of 18 and 25. He advised Mr Glaisher that he would be happy to look into any cases of alleged abuse which were brought to the Society's attention.

There were no more questions on the accounts.

MEMBERS TO SERVE ON COUNCIL FOR 1985

The President read the letter from the scrutineers announcing the results of the recent Council election: these were as follows:

Election for Ordinary members: Dr E J Allaway, G3FKM, 2,394 votes - Mr J Bazley, G3HCT, 738 votes - Mr R Royall, G8ESB, 743 votes. Therefore Dr E J Allaway was elected as an Ordinary member.

Election for Zone C: Mr J Greenwell, G3AEZ, 220 votes - Mr I Lundegard, G3GJW, 527 votes - Mr W J McClintock, G3VPK, 535 votes. Therefore Mr W J McClintock was elected as Member for Zone C.

Election for Zone D: Mr E Briggs, G3IJU, 150 votes - Dr J N Gannaway, G3YGF, 462 votes - Mr F S G Rose, G2DRT, 366 votes. Therefore Dr J N Gannaway was elected as Member for Zone D.

The President then announced the names of all Members who were to serve on Council during 1985: these were as follows. President: Mrs J Heathershaw G4CHH, Immediate Past-President: R G Barrett GW8HEZ, Honorary Treasurer: P F D Cornish G3COR. Ordinary Members: Dr E J Allaway G3FKM, B O'Brien G2AMV, Dr D S Evans G3RPE, H M Holmden G4KCC, G R Jessop G6JP, D M Pratt G4DMP, G R Smith G4AJJ and K E V Willis G8VR. Zonal Members: J T Barnes GI3USS, Dr J N Gannaway G3YGF, F Hall GM8BZX, W J McClintock G3VPK, H S Pinchin G3VPE and D S Smith G4DAX.

The President noted that there had been two recounts in the case of the Zone C election. He also thanked the scrutineers who had performed the count.

An unidentified member felt that a total number of votes cast of approximately 3,000 out of over 30,000 Society members demonstrated an appalling lack of interest.

Mr P Hawker, G3VA, asked why "....we were making history today" in only having one newly-elected ordinary member of Council. The President replied that it was simply that the other ordinary members still had some of their three-year term of office left to run. Mr Hawker said that when the new system had been agreed the members had been informed that a third of Council would be re-elected each year. The Secretary pointed out that the pattern of Council membership could become upset: for example, when a member of Council became President they could receive what was, in effect, a further two-year term of office and that it so happened that this year there was only one vacancy. Mr Hawker considered that the situation was self-perpetuating and disturbing. (It is to be noted that the rules governing the elections of Council members are unambiguously laid down in the Articles of Association). The President thought that the number of vacancies next year would set Mr Hawker's mind at rest.

The President then called for volunteers to act as scrutineers at next year's election. Messrs. A C Butcher G3FSN, A H B Bower G3COJ, W M Dunell G3BYW, T M Emery G3KWU, I R Brothwell G4EAN, T Winchcombe G6ZH, L W Ross G8MWR, R S Hewes G3TDR, G Ellison G3LZN, M McBrayne G3KGU, G P Stancey G3MCK, L E Newnham G6NZ, F C Ward G2CVV and H M Holmden G4KCC volunteered and their names were noted.

Mr H Bellfield, G3SBV, asked how many spoiled votes there had been. In reply, the Secretary said that there had been 92 unidentified votes, these being votes with no callsigns or names supplied: there had also been 62 late votes and a total of 71 invalid or spoilt votes.

APPOINTMENT OF AUDITORS AND THE FIXING OF THEIR REMUNERATION

The President announced the resolution that Messrs Moores & Rowland be re-appointed auditors of the Society for the ensuing year and that their remuneration be fixed by Council. Before taking a vote on the resolution, the President invited the Honorary Treasurer to make a short statement with regard to the auditors. Mr Cornish said that the resolution should technically be read as it appeared on the agenda - "To resolve that Messrs Edward Moore & Sons be re-appointed auditors of the Society for the ensuing year". However, Edward Moore & Sons had very recently announced that they would be merging their practice with that of another firm of chartered accountants - Messrs Rowland Neville - with effect from 1 January 1985. From that date the combined firm would practice as Messrs Moores & Rowland. Mr Cornish said that since the meeting was taking place in advance of the merger, it was still correct to refer to the Society's auditors as Messrs Edward Moore & Sons: this being so, he was making his present statement in order to ensure that there was no confusion and that members would not think that the auditors had been changed. It had been confirmed to Mr Cornish by the auditors that there would be no change in the partners and staff dealing with the affairs of the Society: from the Society's point of view, the only change would be to the name. He therefore wished to propose that Resolution No.4 be amended to read "To resolve that Messrs Edward Moore & Sons who will practice as Messrs Moores & Rowland from January 1985 be re-appointed auditors of the Society for the ensuing year and that their remuneration be fixed by Council". That was the resolution which should correctly be put, and Mr Cornish called for a proposer and seconder. Mr A Milne, G2MI, proposed and Mr W Scarr, G2WS, seconded the resolution that the Society's auditors be re-appointed for the ensuing year and that their remuneration be fixed by Council. On a show of hands the President declared the resolution carried.

ANY OTHER BUSINESS

Mr C Hawkins, G6UPJ, noted that there had been an increase in membership during the year of 6.7 per cent. He also noted that the number of licensed members was only 53.6 per cent of the total number of licensed amateurs: he wondered whether, if membership fell below 50 per cent, the licensing authority could question whether the Society was truly representative of radio amateurs. The Secretary felt that the question was difficult to answer directly: similar comments to those of Mr Hawkins had been made before and the matter had often been discussed within the Society. He felt that more people were coming into the hobby with less sense of its traditions and it was possible that the needs and reasons for a national organisation were not as apparent to them as to those who joined the Society some 10 or 15 years ago. This problem was being addressed but it was not easy to solve. The Secretary also said that, although it could not be proved, it seemed evident that UK licensing conditions were such that people tended to retain their callsigns even though their interest in the hobby might become temporarily dormant: as a result, many holders of amateur callsigns did not use them and were not active and therefore did not retain their membership of the Society. The Secretary also felt that the figure of 53.6 per cent could usefully be contrasted with that of other national societies such as the American Radio Relay League, which had a membership of some 35 per cent of licensed amateurs in the USA.

The Secretary also pointed out that in some countries, notably those in the Eastern bloc, an amateur licence would not be issued unless the intending amateur was also a member of the national society: in a humorous aside, he said that this would be a delightful state of affairs.

Mr A Underwood, G3ESO, wished to raise the issue of the use of Raynet by Emergency Planning Officers and Civil Defence. The President stated that this was properly a question for the third part of the meeting.

Mr P Crosland, C30AKA, said that he wished to raise a question concerning notified business. He said that on 14 October Mr H Holmden, G4KCC, had written to the General Manager asking for five resolutions to be put on to the agenda. He considered that these resolutions had met the provisions of the Companies Act and wished to know why the meeting had not been notified of these. Having not been notified of the question, the Secretary said that he did not have the correspondence with him but, in his recollection, the matters were not appropriate for the Annual General Meeting: however, Mr Holmden was quite free to raise any question he wished in the question-and-answer session. Mr Crosland felt that they were ordinary resolutions which should be raised formally at the AGM. Mr Holmden interjected, saying that he was the member who had challenged the ways of reducing subscriptions. He had raised five resolutions and he saw no reason why they should not be brought up. The Secretary pointed out that the AGM meeting notice had already gone to press at the time the resolutions had been submitted, so it would have been impossible to include them even if Council had considered them to be appropriate business. Mr Crosland maintained that the resolutions should be read out. Mr R Broadbent, G3AAJ, said that in his opinion the proposals of those attending the AGM - who by definition were those most interested in the affairs of the organisation - should be seen to have the benefit of an official hearing. He felt that a full report of the proceedings of Council should be given in Radio Communication. Mr Broadbent added that there appeared to be a grey area with regard to questions for the AGM.

Mr L Ross, G8MWR, said that he had asked the General Manager's office whether items for any other business had to be submitted in writing prior to the meeting and what the appropriate timescale was. He said that he had been specifically informed that questions did not have to be submitted in writing and that matters could be raised from the floor. He therefore proposed that Mr Holmden's resolutions be raised so that the meeting could decide for itself whether or not they should be debated. Mr Ross added that, as far as he was concerned, anything relating to the affairs of the Society was suitable material for discussion here and now.

The President reiterated that there were four sections to the meeting and that the question-and-answer session was the proper part of the meeting for a discussion of points such as those made by Mr Ross. Mr Ross said that he had come to the meeting to ask specific questions and to receive specific answers and that he was not interested in the informal question and answer session since nothing discussed in that part of the meeting was binding on the Society. In reply to Mr Ross, the Secretary said that he was quite clear in his own mind that, when he had discussed the matter of questions with Mr Ross on the telephone prior to the meeting, the Secretary was referring to the question-and-answer session.

The President said that under Article 32, at least 21 days' clear notice of the general nature of business to be transacted at the Annual General Meeting should be given in writing to every corporate member of the Society who was entitled, under the Articles, to receive notices from the Society. No business other than routine business could be taken at the AGM without such notice. In other words, it was not possible simply to attend the meeting to ask a question and have a vote taken with respect to that question: there was no provision in the Articles for such action. The Secretary noted that if a member of the Society wished to put a resolution to the Society, there were a number of possible routes which could be followed. In essence, the matter could either be raised through the Council of the Society - and there would be an example of this later in the day - or, if the member did not believe that this would achieve the desired result, an Extraordinary General Meeting could be called under Article 30, provided that the member had the backing of 499 other corporate members for the resolution. The resolution could then be put to a meeting of the Society.

(At this point the President explained that it would be necessary to adjourn the meeting for ten minutes so that a presentation could be made by Mr Louis van de Nadort, PA0LOU, President of IARU Region 1, to Mr Eric Godsmark, G5CO, on behalf of IARU Region 1. Mr van de Nadort had to leave the meeting by 3.45pm so as to be able to return to Holland. A report of the presentation is given later.)

The President then reconvened the meeting. The Secretary continued, saying that, in addition, in order to raise a resolution at an AGM, the resolution needed to comply with section 140 of the Companies Act 1948: one requirement was that one-twentieth of the members had to support such a resolution (which had not been the case with Mr Holmden's resolutions). The former requirement had, in fact, been noted at the 1973 Annual General Meeting by the then President. The Secretary emphasised that the question-and-answer session was fully reported in Radio Communication.

An unidentified speaker raised a point of order concerning Article 32, which stated that "No business other than routine business shall be taken at such a meeting without such a notice". He felt that since members had not been so notified, that was the end of the matter. However, Mr P Crosland, C30AKA, maintained that the General Manager had been given the resolutions and that he had been asked to promulgate them. He proposed that the resolutions be put to the meeting. The President stated that this would not be possible since they had not been notified to the overall membership. A general debate ensued on the propriety of accepting this and other proposals, and the President reiterated that none could be accepted since they had not been properly notified to the membership.

At this point the Honorary Treasurer stated that problems of this nature were not uncommon. He pointed out that, as a matter of record and practice, the notice of the Society's Annual General Meeting, together with the Accounts and the Annual Report, were published in the November edition of Radio Communication. Members were therefore in receipt of the appropriate notice at least 21 days prior to the meeting, as was required by the Companies Act. He felt that the main misunderstanding lay in the area of what could be discussed under the heading of Any Other Business: it was not generally realised that the only resolutions which could be put in that part of the meeting were those of which notice had been given, and this very phrase was contained in the legislation. Mr Cornish felt that the remaining problem was a practical one, namely, how to circularise the 37,000 members of the Society without incurring undue expense. This was why the practice of sending out the notice of the Annual General Meeting and the Annual Report and Accounts with the November edition of Radio Communication had evolved. In practical terms this meant that a member wishing to bring up any matter under the heading of Any Other Business would have to give due notice to the Society by early October. He emphasised that this was not the same requirement as that to give at least 21 days' notice of the Annual General Meeting, as required by law. The Society actually gave members considerably more notice of the meeting, which was timed to coincide with the publication of the November edition of Radio Communication at more or less the beginning of the month. Mr Cornish added that no-one had considered the matter in depth since there had been no particular need to do so: he suggested that in future years there should be a notice in, for example, the August edition of Radio Communication which gave the latest date by which Council must be in possession of resolutions for inclusion on the agenda of the Annual General Meeting.

The President then proceeded with the presentation of awards. The Calcutta Key, for outstanding service to international friendship, was presented to Mr Eric Godsmark, G5CO. The Founders Trophy, for services to the RSGB, was awarded to Mr Michael Dennison, G3XDV, Chairman of the Repeater Management Group. In his acceptance speech, Mr Dennison said that the Repeater Management Group worked very much as a team and that he was accepting the trophy on their behalf as well as personally.

The Marconi Medal was awarded to the DFOEME Group for earth-moon-earth work in the 2.3 GHz band. It was presented to Dr C Suckling, G3WDG, on their behalf by Mr Frank Dutton, Chief Engineer of the Marconi Research Centre.

There being no further formal business to transact, the meeting closed at 3pm.

Extraordinary General Meeting

The President, Mr R G Barrett, GW8HEZ, opened the meeting by reading the notice calling the EGM, which had previously been circulated to members with the November 1984 issue of Radio Communication. There were two resolutions proposing changes to the Society's Articles of Association. The first was "That the Memorandum of Association of the Company be altered by deleting the whole of Paragraphs 4, 5 & 6 and inserting the following new Paragraph 4 - '4. The income and property of the Society shall be applied exclusively in the promotion of the foregoing objects, and no dividend shall be paid to its members or any of them; but these restrictions shall not prevent the payment to any member (including any member of the Council of the Society) of interest on money lent, or rent for premises leased by him or her to the Society, nor the payment of appropriate fees or other remuneration for original literary or other material accepted by the Society for publication or inclusion in any of its publications'". A statement had been circulated with the Notice of this Resolution by Council. Dr D Evans, G3RPE, in his capacity as Chairman of the Technical & Publications Committee, then gave a short introduction to the resolution. Under the present Articles of Association, columnists and authors who were also members of Council could not be paid for their work, yet they could submit the same material to other publications and be paid for their efforts. This seemed to him to be a bad principle. On completion of his introduction, the President invited discussion from the floor of the meeting.

Mr L Devaney, G8UZC, found it puzzling that members of Council could not write whilst in office, leave office for one year so that their material could be published and then offer themselves for re-election based on the quality of their work. He felt that the consequent variations in the membership of Council would be good for the Society.

Mr J Bluff, G3SJE, thought that the implications of the proposed change to the Articles of Association had not been properly realised and he did not think that the long-term implications were good. He also took exception to the manner in which the proposed alteration had been presented. He considered that Council were in a privileged position and on this occasion had not looked deeply into this resolution. He noted that Council itself had carried the resolution by six votes to two, with 13 Council Members present at the relevant meeting. The President explained that those who had abstained from voting considered that they might have a vested interest. Mr Bluff considered that the resolution should be rejected.

An unidentified speaker assumed that, because this part of the meeting was an Extraordinary General Meeting, 500 people had signed a petition to call it: he wondered where they all were. The President explained that Council was entitled to call an EGM itself under Article 29 and was, quite properly, doing so.

Mr A McKenzie, G3OSS, stated that he was for the motion. He said that writing involved a great deal of hard work and that it was not automatically profitable: this might mean that a particular piece of work would not be done and he felt that this was a serious situation. He also felt that the meeting did not appear to be trusting its Council today, which seemed curious to him since the membership elected Council in the first place.

Mr L Salaman, RS46145, also expressed himself strongly in favour of the motion, saying that the labourer was surely worthy of his hire.

Mr L Ross, G8MWR, requested an assurance that the resolution related specifically to payment for published material.

Mr R Broadbent, G3AAJ, asked why the clause concerning property had been included since it seemed irrelevant to the matter of payment for written material.

Mr G Griffiths, G3SIG, felt that finding the best authors for the best books was in the best interests of the Society, including its financial well-being. The Society needed to be able to compete with commercial publishing houses in order to attract the best authors. He wholeheartedly supported the resolution.

Mr C Newton, G2FKZ, took the view that as a member of the Society he had always wished to put something into the organisation. He did not see why members of Council should be, in effect, penalised for contributing to the Society: however, he felt that there should be proper safeguards against abuse.

Mr G Stancey, G3MCK, broadly agreed with the proposal, although he was concerned that as stated it was rather wide-ranging. He also objected to the way it been presented rather suddenly at the meeting.

Some discussion took place on the possibility of letting the motion lie on the table for a period of one year. The President stated that it was only possible to vote on the motion as presented to the meeting.

Mrs H Claytonsmith, G4JKS, pointed out that the resolutions under discussion had been given proper notice which had been circulated with the November edition of Radio Communication and that Mr Stancey's comment was therefore invalid.

Dr D Evans, G3RPE, who had originally introduced the motion, made a number of points in reply to the comments from the floor. He considered that the logic of the speaker who had suggested that not paying Council Members for their writing was a way of forcing them to resign was indeed strange. He found it appalling that members should consider that Council Members wished to line their pockets. At present Council Members were reimbursed for all of their out-of-pocket expenses which were associated with attending meetings of the Society. The proposal was an extension of what the Society could do in return for their literary contributions. He felt that the workloads on Council Members were high and that writing was an arduous task which should be properly rewarded.

Mr J Bluff, G3SJE, felt that the motion should still be rejected by the meeting because the wording was nebulous. However, he hoped that Council would take note that there was a general view in favour of moving the Articles of Association in the direction implied by the resolution.

Mr A Milne, G2MI, commented that "anyone who becomes a Council Member and thinks they are on to a good thing wants their brains examined". As a past member of Council, he felt that not to be paid for work done was unfair and unreasonable.

Mr D Baptiste, Immediate Past-President, was surprised that the meeting felt that there was scope for abuse. He pointed out that the only effects of the motion would be to make payment of appropriate fees for published material available to Council Members and to allow payment on money lent, or rent for premises leased by Council Members to the Society. In other words, there was no reason why the Society should not benefit from a Council Member as it would from any other member.

Mr K Fisher, G3WSN, speaking as an ex-member of Council, felt that good work should not become unavailable to the Society because of the present restriction. He was in favour of supporting the resolution.

Mr B O'Brien, G2AMV, pointed out that the original provision for the payment of interest on money lent and payment of rent for leased premises had been in the Articles of Association for many years: he thought that some speakers had not realised that.

The President added that the proposed amendments had been drafted by the Society's legal advisers and that the only part which was proposed for modification was the payment for literary material. An unidentified speaker asked for the original Article to be read out to the meeting, and this was duly done by the Honorary Treasurer.

Mr J Walker, G8CTO, moved that the resolution be put. Mr A Milne, seconded. Mr P Fretwell, G4UFC, called for a poll. The Secretary confirmed that Mr Fretwell held 5 proxy votes. After further discussion, the President, by way of clarification, confirmed that a vote would first be taken on whether the resolution was to be moved. On a show of hands the President declared that this was carried. The President then called for a show of hands by those members that were holding meeting cards. The Secretary announced that there were, on the show of hands, 79 votes for the resolution, 48 against, with 8 abstentions. Mr Fretwell confirmed that he still wished a poll to be carried out. The Secretary then asked the EGM proxy holders, all of whom were present, how they wished to cast their proxy votes. When the count had been completed, the President announced that the result of the poll was - for the resolution, 381 votes, against the resolution, 81 votes, with 20 abstentions. Some members had abstained by proxy. The President declared the resolution carried.

The second resolution was "2. That the Articles of Association of the Company be altered by deleting from the penultimate paragraph of Article 22 the words from and including 'to waive for a period' to the end of that sentence and substituting for those words the following words: 'To specify from time to time any individual members or classes of members, or applicants for membership, for whom payment of the full subscription would in the opinion of Council be unduly burdensome and to resolve that those so specified shall be liable, either indefinitely or for such period as the Council may prescribe, to pay only a reduced or no subscription, and from time to time to vary the amount of the reduction in the case of any member or classes of members as the Council may think fit'".

Mr B O'Brien, G2AMV, in his capacity as Chairman of the Finance & Staff Committee, drew the meeting's attention to the existing Articles of Association Nos. 19 and 22, which specifically authorised Council to set subscriptions and to enable Council to waive subscriptions of those in financial hardship. Council had also set subscription rates for students and senior citizens: these had not been mentioned in the original Articles of Association, and Council was now seeking more flexibility in the way in which these categories of membership were handled and the ratification of the powers which had been taken in the past. Mr O'Brien then outlined the proposed alterations in greater detail. The President then invited comment from the floor.

Mr L Ross, G8MWR, felt that the issue of the obtaining of a doctor's certificate was rather pointless. He also felt that further debate was a waste of time since the outcome of the debate would be determined by the large number of proxy votes.

Mr J Stanley, G6APO, was pleased to see the proposed change: he wondered whether some similar benefits should also be extended to the unemployed. The President assured Mr Stanley that Council had considered this matter in great detail.

Mr C Hawkins, G6UPJ, asked whether the concept of "sleeping membership", wherein a nominal sum could be paid and membership continuity maintained, could be introduced.

Mr B O'Brien, G2AMV, asked whether Mr Ross could suggest any way in which the present system could be improved. Mr Ross felt that automatic membership should be granted to those who were 100 per cent disabled or blind. Mr O'Brien said that Council would acquire the power to act in this way under the terms of the proposed amendment. He also outlined some of the problems implicit in administering waived subscriptions: for example, how could the Society determine whether a person was disabled without a doctors' certificate? He could not see what other type of evidence would be acceptable for this, and for those unemployed on a temporary basis.

Mr A McKenzie, G3OSS, said that many blind people like himself valued their independence and that automatically waiving their subscriptions could cause offence. He felt that if an individual was experiencing hardship, it was for them to write to Council and for Council to take the appropriate action.

A vote was then called for. The resolution was proposed and seconded and, on a show of hands, the President declared the resolution carried.

The President then declared the end of the Extraordinary General Meeting.

Question and Answer session

The President, Mr R G Barrett, GW8HEZ, opened the informal session with the news that on the day before the meeting Mr John Butcher, Parliamentary Under-Secretary of State for Trade and Industry, had made an important announcement. A one-year experiment had been agreed by the DTI which would allow Class B licensees to use Morse code during their radio contacts to practice the sending and receiving of Morse code. The President's next remarks were drowned by prolonged applause from the meeting.

The President then read the text of the announcement. He commented that it was both a good and welcome move, towards which the Society had been working for a considerable period of time and in which many of its officers had been involved.

An unidentified member felt that the procedure for issuing notices of variation would involve the Society in needless work. The Secretary explained that the DTI could not easily carry out the necessary work and that it was much easier for the Society, with its computer facilities, to carry out the work on their behalf in order that Class B licensees could benefit by this concession. A small indirect charge would amply cover the cost. The President pointed out some further advantages to the Society.

The President continued his remarks by saying that other changes were in progress. The Radio Interference Service had now come under the administration of the DTI, and the Society hoped that, in the future, more resources would become available to tackle some of the difficult problems of spectrum abuse. The new Schedule to the amateur radio licence had been published after two years' intensive work on the part of the Society and the DTI, and it was generally felt to be a considerable improvement on the earlier one. A major revision of the licence document itself was in progress and would last at least 12 months. There was also progress on mutual licensing in CEPT countries.

There had also been considerable discussion with the DTI on the matter of cross-band operation, which was of special concern to Class B licensees. There were still some legal difficulties within the DTI but progress had been made. Progress was also expected in the area of a 50 MHz allocation, where 60 new permits had recently been issued, and in connection with packet radio.

The President went on to mention Operation Raleigh and the expected amateur radio activity from the vessel. He concluded his remarks with comments on the STS-9 shuttle mission with W5LFL aboard. This had been the largest publicity and media exercise undertaken for a long time, and it was hoped to gain further publicity in 1985 with the flight of Dr Tony England, W0ORE, on the Spacelab 2 mission.

The meeting was then declared open for questions

Ms H Claytonsmith, G4JKS, raised the matter of electromagnetic compatibility, with particular reference to the imminent publication of BS905. She felt that the Society could possibly provide some input when the time came for the British Standard to become a Regulation, and she felt that this would be beneficial. Mr D A Evans, G3OUF, the Society's General Manager, said in reply that he wholeheartedly agreed with Ms Claytonsmith's comments and added that he hoped that the EMC Committee would be represented on the appropriate BS Committee in the future. Ms Claytonsmith felt that improvements in this area could have been achieved some time ago: the General Manager said that electromagnetic compatibility presented enormous problems with which the Society was actively occupied: the Society looked to the EMC Committee for future progress in this demanding and complex area.

Mr J Greenwell, G3AEZ, speaking for the EMC Committee, made some comments concerning the effectiveness of British Standards in this area. He added that it was important for those members suffering EMC-related problems to report them to the Society.

An unidentified member was surprised that the Society did not receive a copy of the publication BSI News. He was Chairman of one of the BSI Committees and he felt that it was required reading for the purpose of noting proposals which might be of relevance to amateur radio.

Ms Claytonsmith also wished to enquire as to Council's decision as to the retention of contest trophies for the year by leading clubs and individuals: there appeared to be a conflict between what Council had said in 1983 and what had been said in the most recent "Council Proceedings" in Radio Communication. The General Manager said that he was not aware of Ms Claytonsmith's latter point: the trophies were retained at Headquarters and it was also Council's wish that they be displayed, although the reception area at Headquarters was rather small for the purpose.

An unidentified member complained at the apparent amount of space wasted in Radio Communication by virtue of its page layout. Dr D Evans, G3RPE, said that he had only heard two complaints and that most members seemed pleased with the new and more modern format. He pointed out that Radio Communication had 40 per cent more print on a page than any other journal and it was important to avoid a plain layout which looked flat. The member thought that the layout of Radio Communication could be more subtle, and Dr Evans replied that that was very much a matter of taste.

Ms L Harper, G4FNC, asked firstly why the apology for absence from G3AP had not been read out: the President apologised for his inadvertent omission. She also asked whether Council intended to support the position of the HF Contests Committee in resisting the attempts by IARU-member societies to combine the HF SSB and CW Field Days, bearing in mind the expressed wishes of the membership. She felt that contest organisers should be active contesters and not merely amateur politicians. Mr R Glaisher, G6LX, Chairman of the HF Contests Committee, said that there had been a great deal of correspondence concerning this problem. The IARU Region 1 contest co-ordinator had recently informed Mr Glaisher that, in view of the opposition of RSGB to the merger of the events - and the possible opposition of DARC - he had said in a report to the IARU Region 1 HF Working Group that no further action on the proposal should be taken.

Dr J Allaway, G3FKM, explained the nature of the original proposal and added that it was very likely to be rejected at the next meeting of the HF Working Group in March.

Mr C Lee, G6BQJ, asked when the December edition of Radio Communication had been posted. Mr A W Hutchinson replied that it had been handled late by the Post Office because of a strike at Norwich and it had gone into the post on the Thursday prior to the meeting. Mr Lee asked whether the notice calling the Annual General Meeting would have been valid if the magazine had been delayed in the post: he thought that if the magazine was not handled by the Post Office at the beginning of November the Society was in breach of the rules. The General Manager said that the rules allowed for delays within the postal service: he added that the reason for publishing the notice calling the Annual General Meeting, together with the Annual Report and Accounts, in the November issue was to ensure that the statutory three weeks' notice period was comfortably complied with. He pointed out that the fact that the December issue had been delayed was immaterial.

Mr Lee then asked for a date to be published by which "....matters have to be in to make the meeting next year": this would avoid the misunderstandings which had been discussed earlier in the meeting. The point was noted.

Sqn Ldr T Winchcombe, G6ZH, asked if a resolution could be tabled at the next AGM to require the notice calling the Annual General Meeting to be given in the Times newspaper 21 days before the event: he said that the production and lead times relating to Radio Communication were abysmally long and that this was quite unsatisfactory to the membership. The point was noted.

Mr G Stancey, G3MCK, said that he was professionally involved with bulk-mailing involving contractual terms and, provided that items were mailed on the proper day, the timing of their arrival was immaterial. Mr Stancey also asked what progress had been made with the removal of the 20wpm limit on the sending of callsigns in CW, and he also commented that he found it difficult to cast a vote in elections for Council Members since the candidates apparently did not state what their interests were and what they proposed to do if appointed. He felt that Society members were intelligent enough to know when particular people "....were promising the sky".

The General Manager said that Mr Stancey was correct in his assertion concerning the time of posting and that the potential problem was covered by Article 88. Mr D Pratt, of the Society's Licensing Advisory Committee, said that the Society was conscious of the need to remove the restriction associated with the speed at which callsigns were sent in CW and identification in other modes. He added that the entire licence was the subject of a wide-ranging review in conjunction with the DTI. The President asked the Chairman of the Membership & Representation Committee to comment on the matter of candidates' statements: Mr Henry Pinchin, G3VPE, said that the point regarding people "....promising the sky" was a worrying one which would be further considered by the Committee. The problem would be looked at again before next year's Council elections.

Mr A Othen, G8FSZ, said that the Accounts had not been formally approved during the formal part of the business. The President said that this was not necessary.

An unidentified member thanked Mr A W Hutchinson for his courtesy in matters concerning Radio Communication. He also felt that the RSGB Bulletin was very valuable.

Mr L Ross, G8MWR, said that he had been asked to raise two points by clubs in his local area. Firstly, there was opposition to the requirement to incorporate the words "amateur radio" into the title of a club which wished to be affiliated to the Society and there was also some ill-feeling. Secondly, some members were extremely unhappy about the composition and organisation of the Society's committees. Some appeared to be self-perpetuating insofar as, if one person had to step down, the new committee member was recruited on the basis of having virtually the same views as the old one. Mr Ross felt that this circle could not easily be broken, and he asked whether there was any procedure available to members for changing the membership of a committee, or indeed for nominating members to sit on a given committee. He considered that some members felt that certain committees were not up to date with current events and techniques and there was no way in which the composition of a committee could be altered at the behest of members.

In his reply, the President said that the chairman of a committee was appointed by Council and that the chairman was responsible for selecting members of that committee. At the end of the year - or even before that if necessary - the chairman was answerable to Council for what had been achieved, and Council would want to know whether matters were progressing in the right direction.

The President considered that an "old boy's net" simply did not exist and that Council could intervene if it did not consider that a particular committee was performing its functions adequately. He reiterated that the chairman of each committee was solely responsible to Council for the activities and operation of that committee.

Finally, the President announced that Mr A Milne, G2MI, had celebrated his 77th birthday in August 1984 and that this was also his 60th year in amateur radio: he asked Mr Milne to accept the congratulations of the meeting and of the Society's Council.

The meeting ended at 7.05pm

The attention of members is drawn to page viii of this supplement

THE ANNUAL MEETING OF THE SOCIETY

INTRODUCTION

This statement sets out to clarify the functions of the Annual Meeting of the Society held in early December each year. It incorporates changes made in what is now the Companies Act 1985 and which became available in July of this year.

The main point to be recognised is that the Annual Meeting consists always of two, and sometimes three, different meetings held on the same day, namely:

(i) The Annual General Meeting (AGM).

(ii) An Extraordinary General Meeting (EGM) (if called).

(iii) What may be conveniently referred to as a Society Open Meeting.

The purpose of each will be considered in turn.

ANNUAL GENERAL MEETING

The prime function of the formal AGM of the Society is to deal with those financial and legal matters of the Society AS A COMPANY requested to be dealt with annually by the Companies Act.

The business to be transacted can be divided into two parts: these are designated "routine" and "non-routine" business.

1. ROUTINE BUSINESS

This covers the matters that are required to be dealt with by the Society each year under the Companies Act, namely:

(a) to receive and consider the Accounts and the financial reports of Council and the Auditors

(b) to resolve that auditors for the Society are appointed and that their remuneration be fixed by Council

(c) to announce the results of the Council election and the names of Council Members for the ensuing year.

2. NON-ROUTINE BUSINESS

Any business at the AGM other than "routine" business is designated "non-routine". If non-routine business is to be included in the agenda for an AGM, its general nature has to be indicated in the notice convening the meeting; and if it involves the passing of a special resolution (which requires a three-fourths majority to be effective), the terms of the resolution itself must be set out in the notice.

Any non-routine business will normally be proposed by the Council. However, corporate members (who alone have voting rights) have the right, now contained in Section 376 and 377 of the Companies Act 1985, to require the notification of any resolution which may properly be moved and is intended to be moved at the next AGM. This statutory right to have business included in the agenda for an AGM can only be exercised if it is supported by the signatures of one-twentieth of all the Corporate members, and costs may be payable.

A resolution "may properly be moved" only if it would, if passed, be effective for its ostensible purpose. If it is inconsistent with the Society's Articles (eg because it purports to deal with matters which are the responsibility of the Council), such a resolution would have to be notified and voted on as a Special Resolution overriding the Articles.

EXTRAORDINARY GENERAL MEETINGS

The formal business of the Society may be transacted at an EGM as well as an AGM. While an EGM may be held at any time throughout the year, it has been recent practice to transact non-routine business as defined above at an EGM rather than the AGM as a convenient way of distinguishing it from the routine business of the AGM.

Under Article 29, the Council can at any time call an EGM. In addition, 500 corporate members are entitled under the Society's Articles to require the Council to convene and hold an EGM under what is now Section 368 of the Companies Act 1985, in order to consider whatever the requisitionists specify as the objects of the meeting (including where relevant the consideration of particular resolutions).

SOCIETY OPEN MEETING

In the same way that an EGM may be used to separate the routine formal business of the Society from the non-routine, as described above, it is the view of Council that there is considerable merit in the Annual Meeting clearly separating the legal/Companies Act business from basic amateur radio matters. This can conveniently be done by arranging that the amateur radio business is dealt with in a separate meeting of the Society, albeit held on the same day.

Council therefore proposes that, instead of the present "informal" session:

(a) the Society will hold a "Society Open Meeting" as part of its Annual Meeting.

(b) the agenda will include the President's Address, any announcements of major importance to amateur radio, Council and Committee Awards, and an Open Forum.

(c) as at present, a relatively detailed written report of the meeting will be made. In addition, it will include, where possible, the considered views of Council on points raised by the meeting.

At the Open Forum, priority will be given to questions raised by members present who may also submit their questions in advance. A limited number of written questions from members not present at the meeting may also be accepted as time permits. It is expected that some matters raised will result in recommendations for consideration by Council.

Members Resolutions

The ways in which members wishing to have formal resolutions considered by the membership may be summarised as follows:

1. Via Council

Suggested resolutions for consideration by Council for adoption as Agenda items at the AGM on 7 December 1985 must be submitted to the Secretary as soon as possible, but not later than 5.15 p.m. on 25 September 1985. Having regard to any advice it may seek, Council will consider the inclusion of the resolutions and will convey its decision by first-class post despatched on 27 September 1985.

2. By exercising their rights under the Companies Act mentioned above, namely:

(a) to require the inclusion of a resolution at the AGM (Sections 376 and 377 of the Companies Act 1985). Council will discuss such resolutions at its meeting on 26 October 1985. It therefore advises that any such resolutions be submitted as soon as possible before that date. Under Sections 376 and 377 of the Companies Act 1985, requisionists are responsible for the expenses associated with the circulation of their resolutions and must deposit a reasonable sum to cover these. The expenses likely to be incurred have been investigated: the sum of £200 is considered a reasonable estimate and must be deposited or tendered, with each resolution, at the Society's registered office.

(b) by requisitioning an EGM (Section 368 and Article 30).

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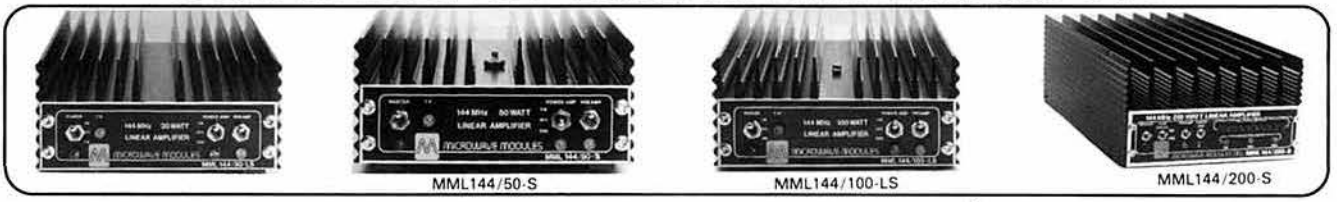
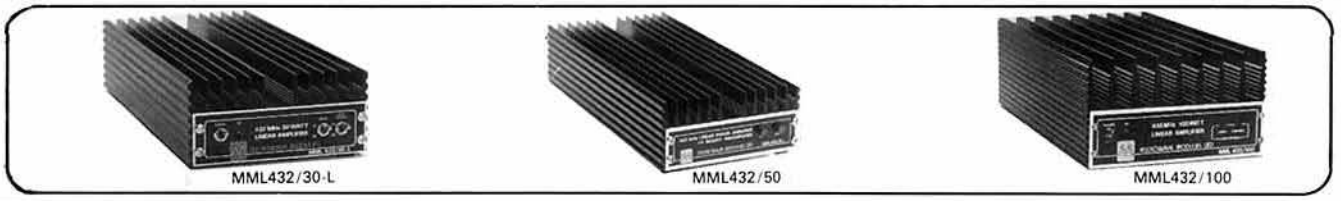


MML144/50-S MML144/100-LS MML144/200-S

PRODUCT	Input Power	Output Power	Modes of Operation	Preamplifier		Power Requirements	RF Vox*	PRICE inc VAT
				Gain	N.F.			
MML144/30-LS	1 or 3W	30W	SSB, FM, AM, CW	12dB	<1·5dB	13·8V @ 4A	✓	**£82.90** (p&p £3.50)
MML144/50-S	10W	50W				13·8V @ 6A	✓	**£92.00** (p&p £3.50)
MML144/100-S	10W	100W				13·8V @ 12A	✓	**£149.95** (p&p £4.00)
MML144/100-HS	25W	100W				13·8V @ 12A	✓	**£149.95** (p&p £4.00)
MML144/100-LS	1 or 3W	100W				13.8V @ 14A	✓	**£169.95** (p&p £4.00)
MML144/200-S	3, 10 or 25W	200W				13·8V @ 30A	✓	**£299.00** (p&p £5.25)



MML432/30-L MML432/50 MML432/100

PRODUCT	Input Power	Output Power	Modes of Operation	Preamplifier		Power Requirements	RF Vox*	PRICE inc VAT
				Gain	N.F.			
MML432/30-L	1 or 3W	30W	SSB, FM, ATV, AM, CW	12dB	2dB	13·8V @ 6A	✓	**£145.00** (p&p £4.00)
MML432/50	10W	50W		12dB	2dB	13·8V @ 8A	✓	**£129.95** (p&p £4.00)
MML432/100	10W	100W		—	—	13·8V @ 20A	✓	**£299.00** (p&p £5.25)

* The RF VOX can be overridden and hard wired.

CONNECTORS . . .

144MHz products– Our standard connector on these products is SO239. We use a high quality PTFE socket of superior quality, but we are able to supply the choice of BNC or 'N' type at no extra charge. Please specify.

432MHz products– The MML432/30-L is fitted with BNC connectors, 'N' type available, please specify. The MML432/50 and MML432/100 both have BNC input sockets and 'N' type output sockets. If this is not to your preference please specify when ordering.

DATA SHEETS . . . A full printed data sheet is available on each product, and is free on request.

CATALOGUE . . . A copy of our latest catalogue can be obtained free of charge upon request.

AVAILABILITY . . . Our products are normally available from stock, either direct from ourselves or any of our 75 UK outlets.

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NEW MOBILES

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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.)

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

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	

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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