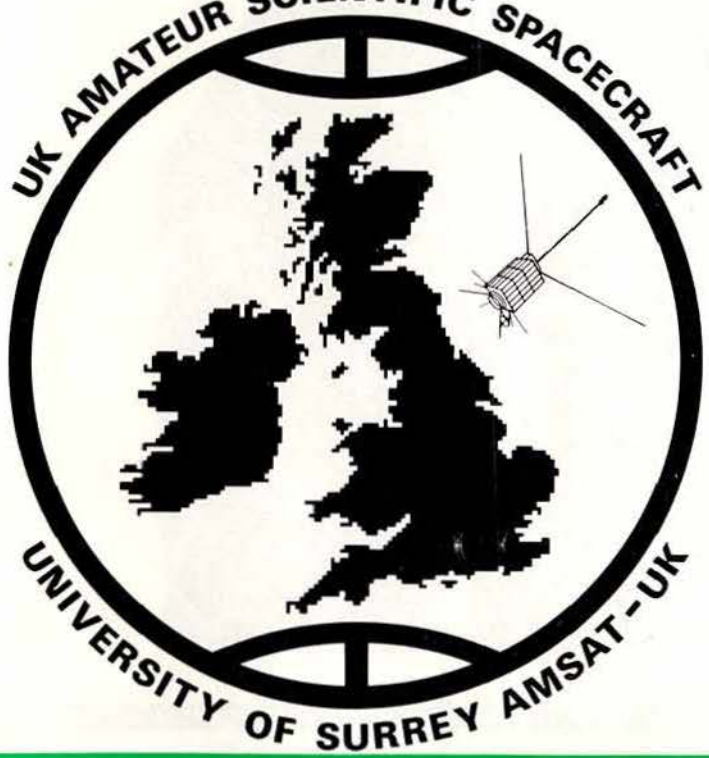
RADio COMmunication

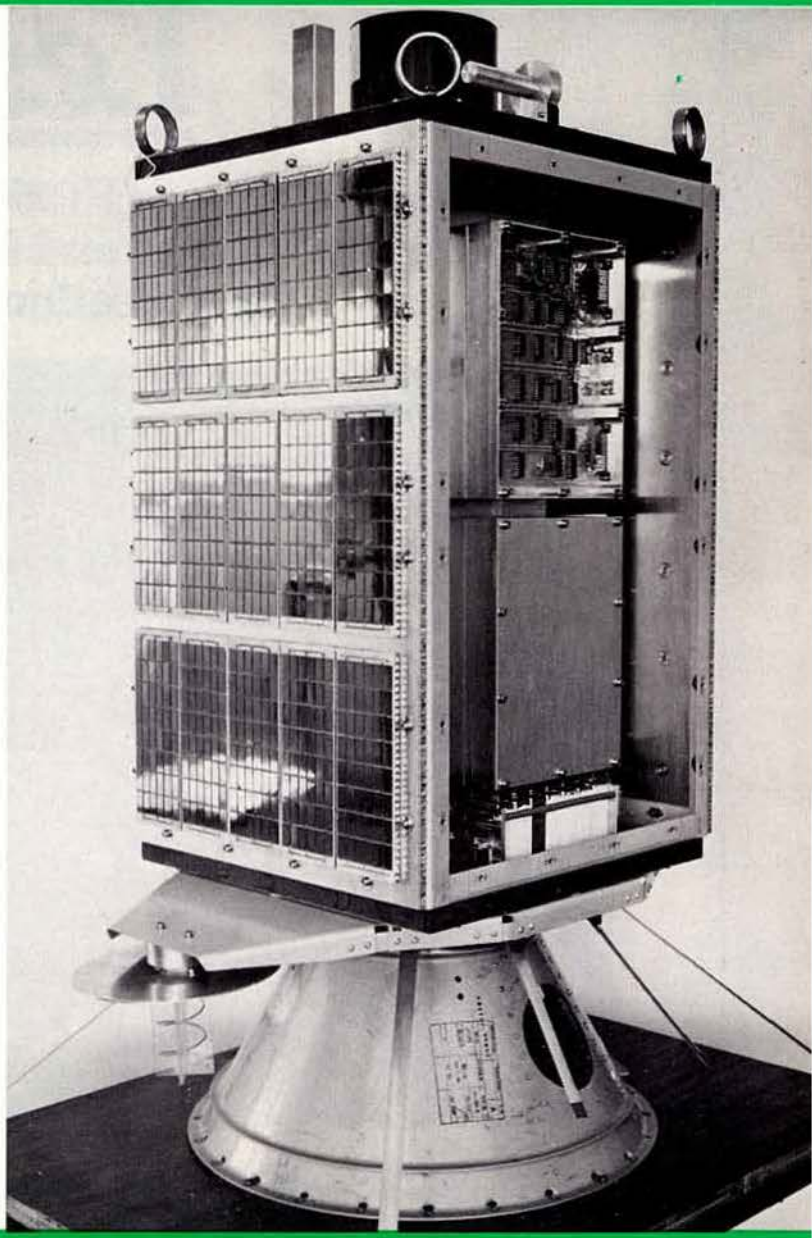
January 1983

Described in this issue

An error-resilient 1,200 baud decoder for UOSAT spacecraft telemetry and experiment data

by M. S. HODGART and J. Z. SLOWIKOWSKI





Journal of the Radio Society of Great Britain

RSGB

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JANUARY 1983

VOLUME 59 No 1

RADio COMmunication

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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.

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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I have used the TS430S, John has used it, Alan has used it, in fact we have all put the new HF rig from Trio on the air and our unanimous opinion is that with this new rig Trio have pushed the concept of transceiver as we all knew it well into the next generation of equipment. Not only is the rig compact, only slightly larger than the TS130S but along with being a full amateur band transceiver the new TS430S also provides todays discerning operator with a general coverage receiver. Key features of the new rig are two digital VFO's, eight memory channels each of which can be used as a separate VFO, programmable band scan, IF shift, notch filter and the provision for internally fitting an optional FM mode.

The TS430S modes of operation are USB, LSB, CW, and AM. FM is available by the addition of the optional FM430 frequency modulation unit. Mode selection is easily accomplished by front panel switches with adjacent LED indicators.

In addition to the amateur bands from 160 to 10 metres (including the new frequency allocations) the TS430S features a 150kHz to 30MHz general coverage receiver. Front panel UP/DOWN switches allow easy selection of the desired amateur band. A MHz step switch provides 1MHz band steps across the entire range of the transceiver and each of the two digital VFO's is completely tunable from 150kHz to 30MHz.

The two digital VFO's operate independently of each other tuning in 10Hz steps, a STEP switch is provided, use of which increases the tuning step to 100Hz. An A = B switch is provided to enable the operator to quickly put both VFO's on the same frequency, ideal for checking on the source of QRM without losing the original operating frequency. A lock switch guards against accidental frequency shift. RIT is provided which operates on both VFO's and memory channels alike.

Each memory stores frequency, mode and band information, the eighth memory holds receive and transmit frequencies independently so giving simple split frequency operation. A front panel VFO-MEMO switch allows each of the memory channels to be used either as a VFO or as a fixed channel. An internal lithium battery gives complete memory and VFO back-up independent of the external supply to the transceiver. The TS430S also has Memory scan, the transceiver scanning only the channels in which a frequency has been stored. Not only does the memory hold frequency but the mode also, most useful if a mix of broadcast frequencies has the odd SSB net frequency within it. The hold time for each occupied channel is approximately 2 seconds, a hold switch is provided to interrupt the scanning process.

A programmable band scan is available, the limits of scan being set by memory channels 6 and 7. Again the hold switch will cancel the scan function.

IF shift enhances listening on today's busy bands.

A tunable notch filter is included to give best interference rejection.

A front panel NAR/WIDE switch allows narrow-wide IF filter selection when the optional filters are installed. In the SSB mode, with the optional YK-88SN (1·8kHz) filter installed, either 2·4kHz wide, or 1·8kHz narrow may be selected. In the CW mode, with the optional YK88C (500Hz) or the YK88CN (270Hz) filter installed 2·4kHz wide or 500Hz or 270Hz narrow may be selected. In the AM mode, with the optional YK88A (6kHz) filter installed, 6kHz wide or 2·4kHz narrow may be selected. In the FM mode, with the optional FM430 unit installed, a single 15kHz bandwidth is provided.

A front panel switch activates the speech processor circuit, with its audio compression circuit, and change in ALC time constant, resulting in a marked improvement in intelligibility, accompanied by a substantial increase in "talk power."

The TS430S runs 200 watts input on SSB/CW on 160-15 metres; 180 watts on 12-10 metres. In the AM mode, it runs 80 watts on all bands and in the FM mode with the optional FM-430 unit fitted the rig runs 100 watts input, again on all bands. The TS430S operates from 12 volts DC, or from 240 volts AC by means of an optional AC power supply.

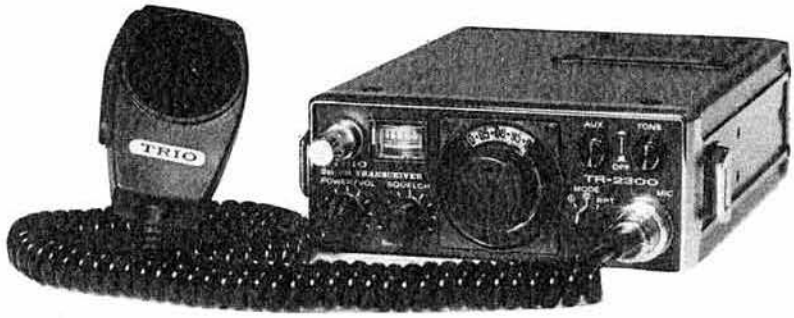
All mode squelch circuit.

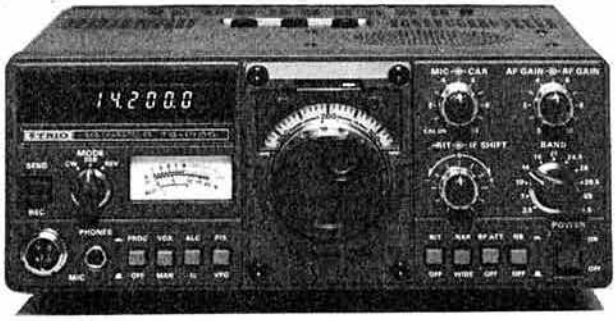
Includes a 20dB FR attenuator.

A transverter socket is included on the rear panel.

TR 2300

Portable 2 metre FM Transceiver now reduced from £166.75 to **£144.44** Carriage £5.00





TS 130S, V

HF Solid State Mobile and Portable Transceiver. TS 130S **£531.00** inc VAT
TS 130V **£433.32** inc VAT

TS 830S

HF Transceiver reduced from £694.83 to **£678.50** inc VAT

TR 9500

UHF Multimode Transceiver reduced from £449.88 to **£428.49** inc VAT

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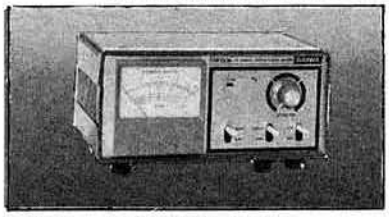
TRIO

As the appointed distributors for Trio, we recommend that you purchase your Trio equipment from an approved stockist (list above). Any stockist *not* on the list has no connection with the Trio UK sales and service organisation and cannot, despite claims to the contrary, offer any meaningful guarantee of backup service on Trio equipment.

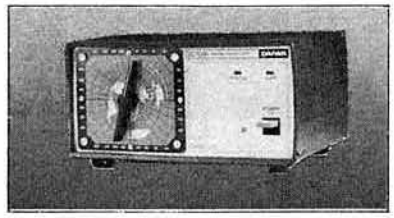
we recommend the DAIWA range.

		Price inc. VAT	Carr.
VHF AMATEUR RECEIVERS			
SR9	2m FM tunable/xtal receiver 144-146MHz.....	46.00	1.50
SR1000	2m synthesised VHF monitor receiver. Requires no crystals for full amateur band coverage 144-146MHz.....	72.50	2.25
POWER & SWR METERS			
CN520	1·8-60MHz mini cross needle power/SWR meter	32.50	1.50
CN540	50-150MHz mini cross needle power/SWR meter	35.00	1.50
CN620A	1·8-150MHz cross pointer power and SWR meter. Up to 1kW.....	52.81	1.50
CN630	140-450MHz cross pointer power and SWR meter. Up to 200W.....	75.00	1.50
CN650	1·2-2·5GHz cross pointer power and SWR meter. Up to 20W.....	95.00	1.50
CNW518	3-30MHz 8 band hi power tuner and cross needle power meter.....	175.00	2.00
CNA1001A	Fully automatic all band ATU. Includes cross pointer power meter.....	156.00	5.00
CNA2002	As for CNA1001A but 2kW rating for tuner and power meter.....	228.00	5.00
ANTENNA ACCESSORIES			
CS201/TW2	Two way 50 ohm coax switch. 0-500MHz.....	11.98	1.00
CS401	Four way 50ohm coaxial switch 0-500MHz.....	36.99	2.00
ROTATORS			
DR7500X	For HF 3 element beams. Preset controller. 6 core cable.....	98.04	5.00
DR7500R	As for DR7500X but using the DAIWA round controller.....	107.98	5.00
DR7600X	Heavy duty. Will take up to 2 element 40m beam. Preset control.....	141.00	5.00



DR7600R	As for DR7600X but using the DAIWA round controller.....	152.00	5.00
KS065	Deluxe bearing for fixing stays to rotating mast.....	18.50	2.00
PS200D 20	Heavy duty power supply 9-15v 20 amps. Fully metered.....	98.00	5.00
POWER SUPPLIES			
PS300	Daiwa heavy duty PSU 30A max 22A continuous.	117.99	5.00

INFRA-RED MICROPHONE			
RM940	New mobile mic with no connections between mic and rig.....	45.00	1.50
S9	Spare sensor for RM940 mic system.....	6.50	0.50
M9	Extra mic for RM940 system.....	13.00	1.50
F4	Set of four windshields for RM940 mic. Available singly at 75p.....	3.00	0.50



the NRD, NSD line

If I am absolutely honest, I am not certain whether I own an NRD515 because of its unbelievable performance as a general coverage receiver or just for the sheer pleasure of having and constantly admiring probably the finest piece of equipment available today.

Perhaps it comes down to the same thing, certainly the other NRD owners I have spoken to have all expressed the same feelings, that the NRD is a receiver in a class of its own.

As a person not owning the receiver, you may ask what sets this particular one above all others. This is difficult to define – the feel of the equipment when wandering over the crowded band, its signal handling capability and selectivity can only really be appreciated by use. Technically, the equipment is above reproach. JRC's manufacture and production control methods as applied to other items in the range are equally applied to their amateur products. The other items I refer to, only a small part of the vast range, are marine radio equipment, Marisat mobile terminals, Omega navigators, doppler sonar, echo sounder/fish finders, communication satellite earth stations and a complete range of avionic beacons, radar and associated products. Indeed, a wide range application of electronic and radio technology for land, sea and air.

You may be forgiven for associating such advanced technology with complexity of operation, a piece of equipment that needs an operator with an electronics degree. However, the assumption is incorrect. The NRD is easy to use with the minimum of controls to ensure the operator really enjoys his listening time. Digital readout, MHz, mode and filter bandwidth switches together with a VFO knob that will tune the band continuously without using any other control, from 10 KHz to 30 MHz or vice versa. To assist with difficult band conditions the NRD515 has pass band tuning and the medium wave broadcast section from 600 KHz to 1·6 MHz has a preselector control to cope with the crowded conditions. Add the optional 600 Hz CW filter and the 96 channel memory unit and, as other NRD515 owners would say, "a joy to own".

Now available for the radio amateur who is also a short wave man is the NSD515 transmitter. Again, part of my station, the NSD515 is, without a doubt, the only companion for the NRD515. A connecting harness which links the two units together provides full transceive operation or on release of a push button the units assume their own identities and become separates. A "remote" position on the transmitter MHz switch enables the receiver MHz switch to control the transmitter, so, as you tune across the band and into an amateur section then the transmitter automatically "comes up" on the same band. With the remote VFO push button selected on the transmitter and the MHz switch at remote, the transmitter becomes the slave of the receiver and operating simplicity is yours. Of course, in only seconds the two pieces of equipment can be set to work cross band or duplex.

Add to the above an RF speech compressor, an overmodulation indicator and the ability to monitor your transmitted audio and you will see how easy it is to produce the perfect signal.

Add 100 watts of transmitted signal and an optional internal aerial tuning unit which is matched individually to each band and is switched from one band to the other remotely by either transmitter, receiver or memory unit and you will see how much care and attention to detail JRC apply to their range of amateur equipment.

POWER SUPPLY UNIT
NBD 515.
£148.35 inc. VAT

TRANSMITTER
NSD 515.
£1223.60 inc. VAT

RECEIVER
WITH 96 CHANNEL MEMORY UNIT
NRD 515 **NDH 515**
£985.00 **£198 inc VAT**

SPEAKER
NVA 515
£34.50 inc. VAT

We are pleased to note that the RSGB has shouldered the task of mounting a national exhibition once again, to take place in March at N.E.C. Birmingham. We feel that this can be of great benefit to visitors and exhibitors alike and we are happy to give wholehearted support to the RSGB in this venture
Well done RSGB. Now let's all support them

EMPORIUM NEWS

Hello.
I am pleased to report that there is a new call sign on the band **G3PCY.** John, who can be heard late at night using **the new Trio TS430S,** a TL922 linear and the 3 element mono bander on 20 metres—the fact that he's calling and beaming to VP8 land and that out there is **his friend and confidant VP8** . . . should not surprise friends of John who know that as well as being **a genius** with radio equipment he is also a philantropher (sorry philatelist). I am sure that John won't mind me saying that he has really fallen for the new Trio HF rig, the TS430S, and he is never off the air. I am amazed that Trio, who have just announced **the new R2000 general coverage receiver** and the TR3500 hand held 70 cm transceiver, could possibly score a hat trick. But they have and the result is the TS430S. A mobile/portable/base station amateur band transceiver with general coverage receive capabilities—just return to page 1 of our advertisement and consider **the new HF rig from Trio.**

I've said this before and I'll say it again, but I have just unpacked yet another fine new product from Daiwa. Latest in their range is the LA2035 2 metre linear amplifier giving 30 watts output FM/SSB/CW from 0·5-3 watts of RF drive. The price will astound you as it did me—complete including all necessary leads and RF switched the LA2035 costs £38.41. A price which includes VAT—carriage on the item is £2.00.

Just a word on **the TR3500 hand held 70 cm transceiver.** I am sure you are all aware of the crowded state of the 2 metre band. I am also certain you know about **the large number of 70 cm repeaters** dotted up and down the country. Put the two together: the TR3500 and the wide open spaces of 70 centimetres and you add **another dimension to amateur radio.** The best thing about the new TR3500 is its compatibility with the many accessories of the 2 metre TR2500. If you are the proud owner of this transceiver then the base charger, soft or hard case, spare battery pack, combined speaker microphone and mobile mount are all compatible and as usable with the new 70 cm version, the Trio TR3500. Price of the TR3500 **is £238.51**—not much more than the TR2500 **at £220.80.** Both prices include VAT and carriage is, of course, by Securicor at £5.00. I run the TS780 on 70 cm along with my colleague Roy G8ROR, David G4KFN, he's one model back with a TS770E, still a superb rig but there's plenty of 70 cm activity in Matlock. Ian, another local lad, G8RNU again has a TS770E. He, I might add, has the money to buy a TS780 to work alongside his TS770E but to date our sales techniques have failed to catch him.

Talking about sales techniques brings to mind our shops now to be found in London, Glasgow and, of course, here at Matlock. Take **London** for a start: staffed by **Andy** and **Tony**—pleasant, courteous lads and not treating each person who enters the shop as a catch. Advice, and good advice at that, is dispensed free of charge. The full range of Trio equipment is on demonstration at all times—even items which are temporarily out of stock. That is to say the demonstration equipment in a Lowe shop is not used as stock and this brings me to another point: do you really want to buy a rig that several other people have already played with? At a Lowe shop demonstration equipment remains demonstration equipment and when it is eventually sold is sold with a reduction in price which more than compensates for it being "used".

In Glasgow another technical genius—**Sim**—for a long time our part-time agent but now the Scottish shop manager. Those of you who have visited the shop will be aware of Sim's kind, helpful nature and his wide knowledge of equipment and amateur radio. He also has a computer department and a visit to the shop will, I am sure, convince you of his abilities. Again, the Glasgow shop has a full range of Trio equipment on display.

Here in Matlock David G4KFN is in charge. A Royal Signals operator, as are Andy and Tony in London, David has a showroom packed with rigs and a warehouse second to none. In the wings here at Matlock are the service and workshop lads whose abilities to right wrongs are well known throughout the kingdom. **However, a sad story here has to be told:** the size of the service department, and to a great extent the quantity of spare parts, is directly proportional to the volume of equipment we sell. What I am saying simply is that the rigs we service are the ones we have legitimately, as **the Trio authorized importer,** imported. A grey import, be it a new or second-hand purchase, we, unfortunately, cannot touch. If we did then the service we give to customers who have bought from us would be stretched and, in time, reputations would suffer. As a help, if you are in any way dubious as to whether the piece of equipment you may wish to buy is a genuinely imported item and qualifying for attention from our workshop staff, should problems arise **then please do not hesitate to ring us for advice.**

On a brighter note, I would like to bring again to your attention the Honor range of meters: the KRT100, 200 and 500 models—at the prices of £5.75, £10.80 and £19.50. Respectively, these meters provide an economical way of obtaining a nice piece of test equipment. Carriage on the meters is only £1.00 so if you feel you are too far away from a Lowe shop to make a visit then place your order by telephone or by letter. We accept payment by Barclaycard and Access credit cards as well as by cheque.

I have just had a pleasant surprise. **A chap in Australia** has written to me saying that he reads Emporium News. Just imagine that. Out there in the sunshine sipping an ice cold Fosters whilst gazing on the bronze, naked girls on the Bondi Beach whilst contemplating the wonderous view of Sydney Harbour Bridge floodlit with the gaunt outline of the Sydney Opera House in the background and the massive bulk of Eyres Rock on the horizon, **a guy can find time to read Emporium News** and enquire about the Shimizu SS105S HF transceiver, build it yourself kit. Well the Shimizu SS105S HF transceiver is the only "build-it-yourself" rig available today. Put quite simply the package presents you with a transistorized low power transceiver that requires approximately 12 hours work plus very basic test equipment in order to produce an exceptionally good HF rig of above average performance. **Geoff Arnold, Editor of Practical Wireless,** bought one for his own station. I suppose Geoff, being a practical chap, wanted the satisfaction of building his own gear but still having something worthwhile at the end of it. So he bought a Shimizu. So impressed he was with it that he wrote an article, a review, on it. And, of course, the result is that sales have increased and the rig is extremely popular—so popular that we have had a waiting list for the optional boards. Of course we can tell the guy in Australia about the popularity of the model but we can't tell Geoff, he would probably want commission on the sales!

Before I close, I have to tell you that **Trio have done it again**—announced a new model. I must say I feel a little guilty about not saying anything about the new rig because I have had a pre-production model in my shack for the last few weeks. Anyway, the new rig is called the TR7930. There is a 45 watt version available stateside but this will not be available in Europe, neither will the PA stage, nor the 1750 tone burst which is not fitted to the American version, so beware a TR7930 that does not carry the Trio name but is "Kenwood".

Replacing the TR7800, the TR930 has a green readout, readable in the brightest sun. Gee, I wish I hadn't written about those naked Australian girls. All the features of the TR7800 plus programmable scan, 21 memories, carrier operated scan-hold and timed-hold selectable by a front panel switch, programmable priority channel and the ability to skip the memory frequencies you don't want at that particular moment.

Anyway, that's about it for now as I have just heard a rumour **that John's about to apply for his DXCC award** and he wants a little help with the application form, so I must go and assist so Gud DXes 73es FBYLS, XYLS, esFBOM, etc. DAVID.

QRV? FER ICOM

IC-R70, The very latest from Icom!

Now that we have tried the R70, we believe it is going to be a real winner. The R-70 covers all modes (when the FM option is included), uses 2 CPU-driven VFO's for split frequency working, and has 3 IF frequencies: 70MHz, 9MHz, 455KHz and a dynamic range of 100dB.

Other R-70 features include: input switchability through a pre-amplifier, direct or via an attenuator, selectable tuning steps of 1KHz, 100Hz or 10Hz, adjustable IF bandwidth in 3 steps (455KHz). Noise limiter, switchable AGC, tunable notch filter, squelch on all modes, RIT, tone control. Tuning LED for FM (discriminator centre indicator). Recorder output, dimmer control.

The R-70 also has separate antenna sockets for LW-MW with automatic switching, and a large, front mounted loudspeaker with 5.8W output. The frequency stability for the 1st. hour is ± 50Hz, sensitivity- SSB/CW/RTTY better than 0.32 μv for 12dB (S+N)÷N, Am-0.5μv, FM better than 0.32 for 12dB Sinad. DC is optional on the R-70. It has a built-in mains supply.

The IC-R70 measures 286mm x 110mm x 276mm and weighs 7.4Kg., making it a very attractive package indeed. Are you ready for this truly excellent receiver? You must hear it, we know you will be impressed!

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM

Introducing the NEW IC-740

This latest transceiver contains all the most asked-for features, in the most advanced solidstate HF base station on the amateur market...performing to the delight of the most discerning operator.

Study the front panel controls of the ICOM IC-740. You will see that it has all of the functions to give maximum versatility to tailor the receiver and transmitter performance to each individual operator's requirements.

Features of the IC-740 receiver include a very effective variable width and continuously adjustable noise blanker, continuously adjustable speed AGC, adjustable IF shift and variable passband tuning built in. In addition, an adjustable notch filter for maximum receiver performance, along with switchable receiver preamp, and a selection of SSB and CW filters. Squelch on SSB Receive and all mode capability, including optional FM mode. Split frequency operation with two built-in VFO's for the serious DX'er.

The IC-740 allows maximum transmit flexibility with front panel adjustment of VOX gain and VOX delay along with ICOM's unique synthesized three speed tuning system and rock solid stability with electronic frequency lock. Maximum versatility with 2 VFO's built in as standard, plus 9 memories of frequency selection, one per band, including the new WARC bands.

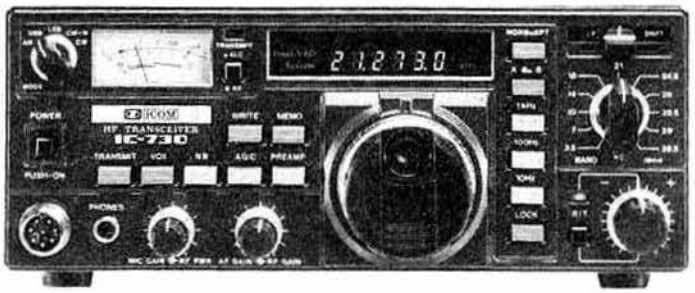
With 10 independent receiver and 6 transmitter front panel adjustments, the IC-740 operator has full control of his station's operating requirements.

See and operate the versatile and full featured IC-740 at your authorized ICOM dealer.

Options include:
- FM Module
- Marker Module
- Electronic Keyer
- 2 - 9MHz IF Filters for CW
- 3 - 455MHz Filters for CW
- Internal AC Power Supply

Accesories
- SM5 Desk Microphone
- UP/DWN Microphone
- Linear Amplifier
- Autobandswitching Mobile Antenna
- Headphones
- External Speaker
- Memory Backup Supply
- Automatic Antenna Tuner

IC-730 The best for mobile or economy base station



ICOM's answer to your HF mobile problems – the IC-730. This new 80m–10m, 8 band transceiver offers 100W output on SSB, AM and CW. Outstanding receiver performance is achieved by an up-conversion system using a high IF of 39MHz offering excellent image and IF interference rejection, high sensitivity and above all, wide dynamic range. Built in Pass Band Shift allows you to continuously adjust the centre frequency of the IF pass band virtually eliminating close channel interference. Dual VFO's with 10Hz, 100Hz and 1kHz steps allows effortless tuning and what's more a memory is provided for one channel per hand. Further convenience circuits are provided such as Noise Blanker, Vox, CW Monitor APC and SWR Detector to name a few. A built in Speech Processor boosts talk power on transmit and a switchable RF Pre-Amp is a boon on today's crowded bands. Full metering WWV reception and connections for transverter and linear control almost completes the IC-730's impressive facilities.

And NOW the 70cm version IC-45E.

Amazingly small, yet very sensitive. Two VFO's, five memories, priority channel, full duplex and reverse. LED S-meter, 25KHz or 5KHz step tuning. Same multi-scanning functions as the 290 from mic or front panel. All in all the best 2M and 70cm FM mobiles ICOM have ever made.

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM

IC-AT500 Automatic antenna tuner

100W version AT100

The Automatic Antenna Tuners which put all the others to shame.

It was only when we started to use the new fully automatic antenna tuners from ICOM that we realised just how far ahead of their competitors they are! The very fast tune up time and simplicity of use make them a real worthwhile addition to any station even if the rest of your station isn't ICOM. If it is, then you have the added advantage of fully automatic band selection so that you can virtually hide it away in a cupboard if you want (though we think you will want to show it off).

Apart from its very rapid action and auto band selection facilities it will select the correct antenna for the band (up to four). The new bands are covered of course, but the AT100 does not cover topband, whereas the AT500 does.

Dual accessory sockets are supplied so that you can easily chain your IC-720A, (or IC-701 or IC-730) together with the IC-2KL and AT-500 to produce what must be one of the most advanced automatic stations available.

Why not call us for more details or get your dealer to demonstrate one to you today?

IC-2KL Super Linear Matching power supply IC-2KLPS

To compliment the excellent IC-720A HF Transceiver, ICOM have produced the IC-2KL linear amplifier. It is of a similar size and matches the IC-720A perfectly. It produces 500W output on SSB, CW, AM and RTTY needing 80-100W of drive. As with the IC-720A it will operate from 1.6MHz to 30MHz continuously at full output power, but you still need an antenna that matches. It will follow the IC-720A automatically changing bands WITH NO TUNING – the operating is done from the prime-mover.

This automatic facility can be overriden for use on rigs other than the IC-720A, but can be added to the IC-701, IC-730, IC-740 The IC-2KL employs a heat pipe cooling system for the heatsink of the power transistors. This is a new technology used to transfer the heat, and has a high conductance, several hundred times that of copper, plus a very quick response.

The IC-2KL has a matching power supply the IC-2KLPS delivering 40vDC at 25A continuous for 10 minutes maximum.

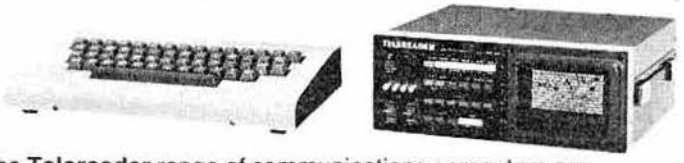
Tono RTTY and CW computers 9000E

The TONO range of communication computers take a lot of beating when it comes to trying to read RTTY and CW in the noise. Others don't always quite make it!

Check the many facilities offered before you buy – especially look at the 9000E which also throws in a Word Processor. Call us for further information and a brochure?

Receive only version **Tono 550**

NEW! with built-in VDU.



The **Telereader** range of communications computers are becoming very popular right through the range. All have composite video and UHF output for use with a TV set. Add a new dimension to your short wave listening.

CWR685E Send/receive with VDU and Keyboard
CWR-670 Delux rx only version with CW and six selectable baud rates – 3 shifts
CWR-610 "Morse Master" Rx only (but it does RTTY also-3 baud rates). Key socket and built in oscillator for morse practice.

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM

IC-720A. Possibly the best choice in HF.

The main problem that the amateur of today has to deal with is deciding just which rig out of the many excellent products available he is going to choose. Technology is advancing at such a rapid rate and getting so sophisticated that many cannot hope to keep up. Some go too far!

Perhaps one way of dealing with the problem is to look at just What each model offers in its basic form without having to lay out even more hard earned cash on "extras". The IC-720A scores very highly when looked at in this light. How many of its competitors have two VFOs as standard or a memory which can be recalled, even when on a different band to the one in use, and result in instant returning AND BANDCHANGING of the transceiver? How many include a really excellent general coverage receiver covering all the way from 100kHz to 30MHz (with provision to transmit there also if you have the correct licence)? How many need no tuning or loading whatsoever and take great care of your PA, should you have a rotten antenna, by cutting the power back to the safe level? How many have an automatic RIT which cancels itself when the main tuning dial is moved? How many will run full power out for long periods without getting hot enough to boil an egg? How many have band data output to automatically change bands on a solid state linear AND an automatic antenna tuner unit when you are able to add these to your station?

Well you will have to do quite a bit of hunting through the pages of this magazine to find anything to approach the IC-720A. It may be just a little more expensive than some of the others – but when you remember just how good it is, and of course the excellent reputation for keeping their secondhand value you will see why your choice will have to be an IC-720A!

CUE DEE antennas

The BEST in recent tests and really well made too. Send for a catalogue of these DX antennas. Here's part of the range:-

4el 2m yagi VHF	4144A	8 dBd
10el 2m yagi VHF	10144	11.4 dBd
15el 2m yagi VHF	15144	14 dBd
17el 70cm yagi UHF	17432	14.5 dBd
4/5el HF Beam	DUO 2	(14/21 MHz) 9/8 dBd

All matching cables, clamps and booms available for stacking 10 and 15 element yagis.

The World's most popular portables IC-2E/IC-4E

Nearly everybody has an IC2E – the most popular amateur transceiver in the world – now there is the 70cm. version which is every bit as good and takes the same accessories.

Fully synthesized – Covering 144 – 145.995 in the 400 5KHz steps. (430-439.999 4E).

Power output – 1.5W with the 9v. rechargeable battery pack as supplied – but lower or higher output available with the optional 6v or 12v packs. Rapid slide-on charging facility.

BNC antenna output socket – 50 ohms for connecting to another antenna or use the Rubber Duck supplied (flexible ¼ whip – 4E)

Send/battery indicator – Lights during transmit but when battery power falls below 6v it does not light, indicating the need for a recharge.

Frequency selection – by thumbwheel switches, indicating the frequency. 5KHz switch – adds 5KHz to indicated frequency.

Duplex simplex switch – gives simplex or plus 600KHz or minus 600KHz transmit (1.6MHz and listen input on 4E).

Hi-Low switch – reduces power output from 1.5W to 150mW reducing battery drain.

External microphone jack– If you do not wish to use the built-in electret condenser mic an optional microphone speaker with PTT control can be used. Useful for pocket operation.

External speaker jack – for speaker or earphone. This little beauty is supplied ready to go complete with nicad battery pack, charger, rubber duck.

A full range of accesories in stock.

ICML1	10W mobile booster for IC2E
BP5	11 volt battery pack
BP4	Empty battery case for 6 x AA cells
BP3	Standard battery pack
BP2	6 volt pack
BC30	Base charger for above
BC25	Mains charger as supplied
DC1	12 volt adapter pack
HM9	Speaker microphone
CP1	Mobile charging lead
IC123	cases

All prices include VAT

Fully approved marine version now available

ICOM are proud to introduce the IC-M12 which is the Marine version of the worlds most popular portable, the IC-2E. It uses all the same accessories, has the same exceptional receiver sensitivity and versatility of the 2E and it is HOME OFFICE APPROVED. 12 Channels – Synthesised – No Crystals to buy!

12 programmable channels which include the private ones

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM

Great base stations IC-251/IC-451

ICOM produce a perfect trio in the UHF base station range, ranging from 6 Meters through 2 Meters to 70 cms. Unfortunately you are not able to benefit from the 6m product in this country, but you CAN own the IC-251E for your 2 Meter station and the 451E for 70 cms.

Both are really well designed and engineered multi-mode transceivers capable of being operated from either the mains or a 12 volt supply. Both contain such exciting features as scan facilities, automatic selection of the correct repeater shift for the band concerned, full normal and reverse repeater operation, tuning rate selection according to the mode in use. VOX on SSB continuous power adjustment capability on FM and 3 memory channels. Of course they are both fitted with a crystal controlled tone burst and have twin VFO's as have most of ICOM's fully synthesized transceivers. There is now a superb low noise mast head pre-amp available for the IC-451.

Multimode mobiles IC-290E/IC-490E

10W RF output on SSB, CW and FM. Standard and non-standard repeater shifts. 5 memories and priority channel.

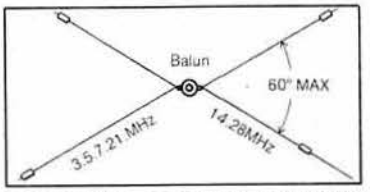
Memory scan and band scan, controlled at front panel or microphone. Two VFO's LED S-meter 25KHz and 1KHz on FM – 1KHz and 1000KHz tuning steps. Instant listen input for repeaters.

Agents Agents (phone first – all evenings and weekends only, except Scotland).
Scotland – Jack GM8 GEC (031 665 2420)
Midlands – Tony G8AVH (021-329 2305)
North West – Gordon G3LEQ Knutsford (0565) 4040
Ansafone available.

Ever thought about 50MHZ??

As you know, the Home Office have given permission for the 50MHZ band to be used to holders of special licences – the issue of which is to be controlled by the RSGB. This must be one of the most exciting things that has happened to the Radio Amateur since the invention of sliced bread (or should I say the micro-processor?). As you know, there are many countries in the world who already have 50MHZ – so there is already some exciting equipment available. One of these is the ICOM IC-505 which is a multi-mode portable offering a choice of outputs of 3W (portable) or 10W (fixed). We have imported a few of these excellent little transceivers and they are available at **£299. inc. VAT** so why not think about trying out this excellent band? Call us or send for technical details.

A new trap dipole £49.50.inc.



The MT-240X Multi-band trap dipole antenna (80m – 10m) is a superbly constructed antenna with its own Balun incorporated in the centre insulator with an SO239 connector. Separate elements of multi-stranded heavy duty copper wire are used for 80-40-15 and 20-10 Metres.

Really one up on its competitors £49.50 inc. VAT.

Available nationwide through local dealers a selection of which are listed below:

Tyrone Amateur Electronics N. Ireland (0662) 2043
Bredhurst Electronics Sussex (0444) 400786
Photo-Acoustics Ltd. Bucks (0908) 610625
S & S Amateur Radio Lancs (07) 744 22239
Alyntronics Tyne & Wear (0632) 761002
Fanthorpes Humberside (0482) 223096
LAM Electronics Glos (0242) 43891
Booth Holdings Avon (02217) 2402
Telecom S Yorks (0226) 5031
Gemini Lancs (0204) 652233
Poole Logic (0202) 683093

Securicor or post dispatch free.

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet Electronics

143 Reculver Road, Herne Bay, Kent. Tel: (02273) 63859.

Same day despatch if possible.

DATONG

MODEL PTS-1

TONE SQUELCH UNIT MODEL PTS-1

Designed to wire-in to the microphone and loudspeaker lines of existing FM or AM transceivers, Model PTS-1 provides a second independent squelch system.

The squelch operates only when the incoming signal carries a pre-arranged tone of precisely the correct frequency. Thus two transceivers, each fitted with Model PTS-1, will respond only to each others transmission protecting the user from undesired interruptions.

The system is ideal for Raynet groups, club nets, or groups of friends who wish to monitor for each others signals over long periods.

Sixty-four tones in the range from 1747 to 2330 Hz are selectable by a DIL switch and a built-in notch filter removes the tone from received signals.

Model PTS-1 is built to high standards using 9 ICs on a glass fibre PCB. A full data sheet is now available.

Unit price: £39.99 + VAT (£45.99 inclusive) (Note – a unit is required for each radio in the group).

NOTE: All transmissions must be identified as required by licence conditions.

MODEL AD270/370

COMPACT RECEIVING ANTENNAS MODELS AD270/370

Datong Active Antennas solve the age-old problem of finding space for a 'good' receiving aerial.
Model AD370 mounted on a roof top or Model AD270 in a loft will give similar sensitivity to much larger conventional aerials yet are only 2½ and 3 metres long respectively.
Moreover they do not suffer from interference picked up by the feeder cable; such pick-up can be a problem with conventional dipoles because it is hard to maintain good balance over a band of frequencies.
Although active antennas were introduced to the amateur market by Datong only a few years ago they have long been used by military and commercial receiving stations. The performance specifications achieved by the Datong AD270/370 are very close to those of "professional" active antennas selling for ten times the price – a point which is not lost on our many professional customers.
The advanced design ensures two things: that you don't miss signals through inadequate sensitivity and that the antenna does not invent signals which are not there.
Datong Active Antennas represent an advanced solution to a common problem and so far as we know have no serious competition in terms of performance at the price. (Reviewed in Rad. Com., June 1982).

GENERAL COVERAGE RECEIVER CONVERTER MODEL PC1

Once upon a time it was the norm to use a ten metre receiver to receive the two metre band. Now, large numbers of special purpose two metre SSB rigs are in use and conversion the other way becomes a very attractive possibility.
With the addition of Model PC1 each of these two metre SSB rigs becomes a really good general coverage receiver (from 50 kHz to 30MHz!).

MODEL PC1

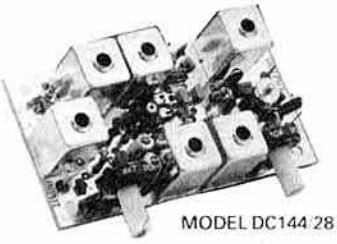
Two metre SSB rigs are not cheap and it makes good sense to get the most out of them. They also tend to have very good performance in terms of sensitivity, selectivity, and big signal handling. Each of these features is just as vital for short wave reception and Model PC1 is designed not to degrade them at all. The result, your two metre SSB rig receives below 30 MHz as well as it receives on two metres. And compared to many medium cost general coverage sets, that is saying a lot!
Try this test. Listen on twenty metres after the band goes dead in the evening. With many general coverage receivers the band never dies. It remains populated with phantoms generated by the receiver from the many very strong signals on forty metres. This is the kind of effect that the higher quality receivers minimise, and that goes for PC1 plus a good two metre rig. Reviews: Rad. Com., April 1982,

BROADBAND PREAMPLIFIER

MODEL RFA

MODEL RFA

Model RFA is designed to improve slightly 'deaf' receivers within the range 5 to 200 MHz. It includes r.f. activated in/out switching so that it can be used to improve the sensitivity of low power transceivers (less than 20 watts PEP) simply by connecting it in series with the aerial.
Most receivers have nearly adequate sensitivity. Adding Model RFA will give a useful improvement in signal-to-noise ratios without causing too easy overload on strong signals. The gain is fixed at 9 dbs for this reason.
Conventionally most preamplifiers have been designed for single narrow frequency bands. By using modern broadband techniques wide coverage is achieved without compromising the noise performance.
Model RFA is ideal for improving VHF scanners, HF receivers, mobile radio systems as well as for use on fixed amateur bands such as the 14, 21, 28, 56, 70 and 144 MHz bands.



MODEL DC144/28

HIGH PERFORMANCE 2 METRE CONVERTER

MODEL DC 144/28

Again strong signal performance is the key to the design of Model DC144/28.
Where conventional converters use a dual gate mosfet as a mixer, the Datong uses a balanced pair of Schottky diodes fed with nearly 10 mW of local oscillator at 116 MHz.
Where other converters use open wound coils, the Datong coils are in screening cans on a plated through board.
The result: an unusual freedom from spurious signals and overload effects together with a spurious-free dynamic range of 90 dbs.
As the Rad. Com. reviewer wrote "With a 3 db noise figure and 90 db dynamic range the Datong DC144/28 is one of the best 144 MHz converters currently available", Rad. Com., April 1982.
Model DC144/28 is available either as a tested PCB module, as illustrated, or fully cased in a diecast aluminium box.

PRICES All prices include delivery in U.K. basic prices in £ are shown with VAT inclusive prices in brackets.

FL3	112.50	(129.37)	AD370	56.00	(64.40)	Codecall		
FL2/A	34.00	(39.67)	AD270+MPU	45.00	(51.75)	(Linked)	28.00	(32.20)
FL1	69.00	(79.35)	AD370+MPU	60.00	(69.00)	Codecall		
FL2	78.00	(89.70)	MPU	6.00	(6.90)	(Switched)	29.50	(33.92)
PC1	119.50	(137.42)	DC144/28	34.50	(39.67)	Basic DF System	149.00	(171.35)
ASP	72.00	(82.80)	DC144/28			Basic Mobile		
VLF	26.00	(29.90)	Module	28.00	(32.20)	DF System	159.00	(182.85)
D70	49.00	(56.35)	Keyboard Morse			Complete Mobile DF		
D75	49.00	(56.35)	Sender	119.50	(137.42)	System	214.00	(246.10)
RFC/M	26.00	(29.90)	RFA	29.50	(33.92)	PTS1	39.99	(45.99)
AD270	41.00	(47.15)	See previous advertisement or price list for further details.					

DATONG ELECTRONICS LIMITED

ALL DATONG PRODUCTS ARE DESIGNED AND BUILT IN THE U.K.

Data sheets on any products available free on request – write to Dept R.C.

DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Tel: (0532) 552461

AMATEUR ELECTRONICS UK

FT-230R 25watt 2m FM mobile

- Two independent VFO's
- 10 memories
- Priority function
- Memory and band scan
- 12.5/25 KHz steps
- Large LCD readout.

FT-290R/FT-790R 2m & 70cm portables

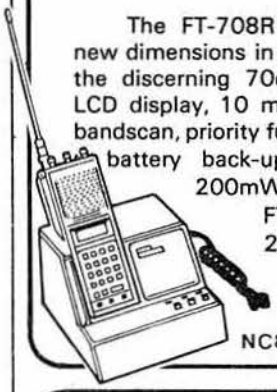
10 memories, 2 VFO's, LCD display, C size battery, easy car mounting tray.

FT-290R 0.5 low/2.5 high watts out

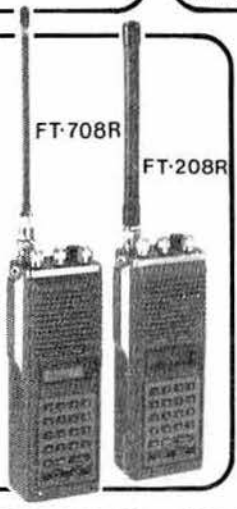
FT-790R 0.2 low/1.0 high watts out (incorporates speech compressor).

FT-708R and FT-208R Synthesized UHF/VHF transceivers

The FT-708R and FT-208R provide new dimensions in operating flexibility for the discerning 70cm and 2m operator. LCD display, 10 memories, memory and bandscan, priority function, internal lithium battery back-up. RF output FT-708R, 200mW low, 1 watt high, FT-208R, 300mW low, 2·5 watts high.



NC8 Charger DC PSU



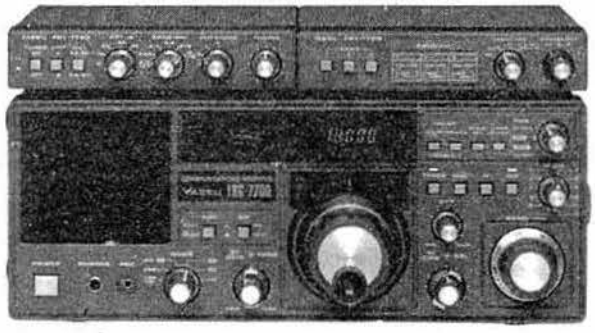
FT-480R High technology all-mode 2metre mobile

The most advanced 2 metre mobile available today - USB, LSB, FM, CW full scanning with priority channel, 4 memory channel, dual synthesized VFO system.

FRG-7 General coverage receiver

The set with the world-wide reputation. YAESU's famous FRG-7 out-performs many a more expensive set. Rugged and reliable, it features high sensitivity and Wadley loop stability - a delight to use for the established amateur and new SWL alike.

FRG-7700 High performance communications receiver



YAESU's top of the range receiver. All-mode capability, USB, LSB, CW, AM *and* FM 12 memory channels with back-up. Digital quartz clock feature with timer. Pictured here with matching FRT-7700 Antenna tuner and FRV-7700 VHF converter.

Access Barclaycard Visa — or attractive H.P. terms readily available for on-the-spot transactions. Full demonstration facilities. Free Securicor delivery.

As factory appointed distributors we offer you-widest choice, largest stocks, quickest deal and fast sure service right through-

For full details of these new and exciting models, send today for our latest SHORT FORM CATALOGUE. All you need do to obtain the latest information about these exciting developments from the World's No.1 manufacturer of amateur radio equipment is to send 36p in stamps and as an added bonus you will get our credit voucher value £3·60-a 10 to 1 winner!

THE PICTURE SAYS IT ALL!

The latest FAT CAT from YAESU–
The ALL NEW FT-980 CAT HF transceiver
with continuous RX coverage of 150KHz–30MHz and computer interface option.

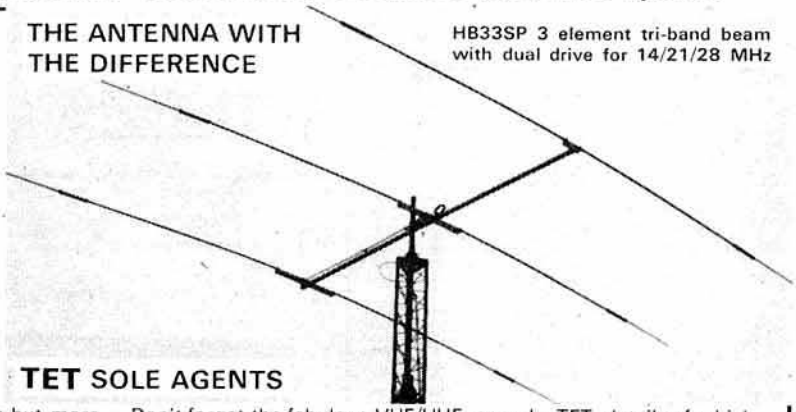
TET ANTENNA SYSTEMS

TET HF antennas are unique in that they employ dual driven elements with the following distinct advantages—

- Improved gain over conventional arrays.
- Broader bandwidth with lower SWR.
- Enhanced front to back ratio.
- Better matching into solid state transceivers without an A.T.U.
- High power handling capacity.
- All this plus superb mechanical construction.

THE ANTENNA WITH THE DIFFERENCE

HB33SP 3 element tri-band beam with dual drive for 14/21/28 MHz



TET SOLE AGENTS

See recent issues for full details of models and prices but more importantly listen on the bands for the ever-increasing numbers of delighted users of TET antennas.

Don't forget the fabulous VHF/UHF range by TET, details of which we shall feature shortly - but if you would like the full story now, an S.A.E. will do the trick.

YOUR LOCAL TET STOCKISTS

Amateur Radio Exchange,
373 Uxbridge Road,
Acton, London W3

Amcomm Services,
194A Northolt Road,
South Harrow,
Middlesex

Bredhurst Electronics,
High Street, Handcross,
Haywards Heath,
West Sussex RH17 6BW

Stephens James Ltd.,
47 Warrington Road,
Leigh, Lancs. WN7 3EA

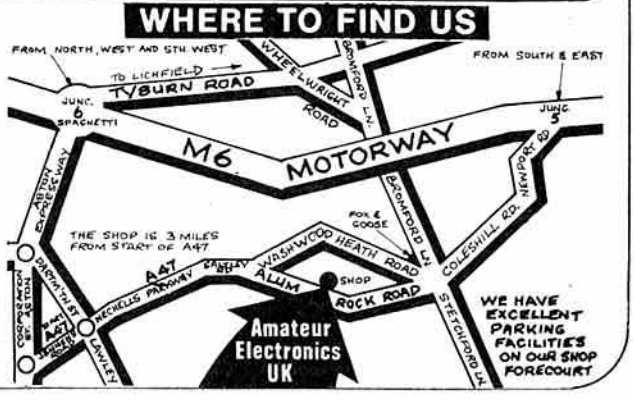
Uppington Tele Radio,
12-14 Pennywell Road,
Bristol BS5 0JT

AGENTS

North West – Thanet Electronics Ltd. Gordon, G3LEQ, Knutsford (0565) 4040
Wales & West – Ross Clare, GW3NWS, Gwent (0633) 880 146
East Anglia – Amateur Electronics UK, East Anglia, Dr. T. Thirst (TIM) G4CTT, Norwich 0603 667189
North East – North East Amateur Radio, Darlington 0325 55969
Shropshire – Syd Poole G3IMP, Newport, Salop 0952 814275

Amateur Electronics UK
504-516 Alum Rock Road·Birmingham 8
Telephone: 021-327 1497 or 021-327 6313
Telex:334312 PERLEC G
Opening hours: 9.30 to 5.30 Tues. to Sat.
continuous – CLOSED all day Monday.

WHERE TO FIND US



DO YOUR MAIL ORDER SHOPPING THE EASY WAY— THE BREDHURST WAY

To order any of the items listed below, simply write enclosing a cheque or phone and quote your credit card number—we'll do the rest!

Bredhurst electronics

TRIO R-600 £235.00

TRIO		£	c&p
TS930S	9 Band TX General Cov Rx	1154.00	(–)
TS830S	160-10m Transceiver 9 Bands	678.50	(–)
VFO230	Digital VFO with Memories	231.15	(2.00)
AT230	All Band ATU/Power Meter	129.00	(2.00)
SP230	External Speaker Unit	39.10	(1.50)
TS430	160-10m Transceiver	T.B.A.	(–)
TS130S	8 Band 200W Pep Transceiver	531.00	(–)
TS130V	8 Band 20W Pep Transceiver	433.00	(–)
VFO120	External VFO	93.61	(1.50)
TL120	200W Pep Linear for TS120V	159.00	(1.50)
MB100	Mobile Mount for TS130/120	17.70	(1.50)
SP120	Base Station External Speaker	25.00	(1.50)
AT130	100W Antenna Tuner	88.00	(1.50)
PS20	AC Power Supply - TS130V	64.97	(2.50)
PS30	AC Power Supply - TS130S	99.82	(5.00)
MC50	Dual Impedance Desk Microphone	29.40	(1.50)
MC35S	Fist Microphone 50K ohm IMP	14.00	(0.75)
MC30S	Fist Microphone 500 ohm IMP	14.00	(0.75)
LF30A	HF Low Pass Filter 1kW	20.00	(1.00)
TR9130	2M Multimode	411.00	(–)
TS9500	70cm Multimode	428.00	(–)
TR9000	2M Synthesised Multimode	359.00	(–)
BO9	Base Plinth for TR9000	37.26	(1.50)
BO9A	Base Plinth for TR9130	37.26	(0.50)
TR7800	2M Synthesised FM Mobile 25W	257.00	(–)
TR7730	2M Synthesised FM Compact Mobile 25W	268.00	(–)
TR2300	2M Synthesised FM Portable	144.00	(–)
VB2300	10W Amplifier for TR2300	62.30	(1.50)
MB2	Mobile Mount for TR2300	20.00	(1.50)
TR3500	70cm Handheld	T.B.A.	(–)
TR2500	2M Synthesised Handheld	220.00	(–)
ST2	Base Stand	49.45	(1.50)
SC4	Soft Case	13.00	(0.50)
SMC25	Speaker Mic	15.40	(1.00)
PB25	Spare battery pack	23.69	(1.00)
MS1	Mobile Stand	30.36	(1.00)
TR8400	70cm FM Synth Mobile Tcvr	299.00	(–)
PS10	Base Station Power Supply for 8400	64.00	(2.00)
R600	General Coverage Rec	244.00	(–)
R2000	Synthesised 200KHz-30MHz Rec	T.B.A.	(–)
SP100	External Speaker Unit	26.90	(1.50)
HC10	Digital Station World Time Clock	64.40	(1.50)
HS5	Deluxe Headphones	21.85	(1.00)
HS4	Economy Headphones	10.80	(1.00)
SP40	Mobile External Speaker	13.57	(1.50)

ICOM			
IC740	HF Mobile Transceiver 8 Band	699.00	(–)
IC720A	HF Transceiver & Gen Cov Receiver	883.00	(–)
PS15	Power Supply for 720A	99.00	(3.00)
IC251E	2M Multimode Base Station	499.00	(–)
IC25E	2M Synth Compact 25W Mobile	239.00	(–)
IC290E	2M Multimode Mobile	366.00	(–)
IC2E	2M FM Synthesised Handheld	159.00	(–)
IC L1/2/3	Soft Cases	4.25	(0.50)
IC HM9	Speaker/Microphone	12.00	(0.75)
IC BC30	230V AC Base Charger and Hod	45.00	(1.50)
IC BC25	230V AC Trickle Charger	5.00	(0.75)
IC CP1	Car Charging Lead	3.75	(0.50)
IC BP2	6V Nicad Pack for IC2E	29.50	(1.00)
IC BP3	9V Nicad Pack for IC2E	20.00	(1.00)
IC BP4	Empty Case for 6 × AA Nicads	6.95	(0.75)
IC BP5	11.5V Nicad Pack for IC2E	39.50	(1.00)
IC DC1	12V Adaptor Pack for IC2E	9.75	(0.75)
IC ML1	10W Booster	59.00	(1.00)
IC-R70	General Coverage Receiver	469.00	(–)

TV INTERFERENCE AIDS		
Ferrite Rings 1⅛" dia per pair	0.80	(0.20)
Toroid Filter TV Down Lead	2.50	(0.50)
Low Pass Filter LP30 100W	3.95	(0.50)
Trio Low Pass Filter LF30A 1kW	20.00	(1.00)
Yaesu Low Pass Filter FF501 DX 1kW	23.00	(1.00)
HP4A High Pass Filter TV Down Lead	4.95	(0.75)

ANTENNA BITS		
H1-Q Balun 1:1 5kW Pep (PL259 Fitting)	9.95	(0.75)
T Piece Polyprop Dipple Centre	1.20	(0.30)
Polyprop. Strain Insulators	0.40	(0.10)
Small Egg Insulators	0.40	(0.10)
Large Egg Insulators	0.50	(0.10)
75 ohm Twin Feeder - Light Duty - Per Meter	0.16	(0.04)
300 ohm Twin Feeder - Per Meter	0.14	(0.04)
URM67 Low Loss 50 ohm Coax - Per Meter	0.60	(0.20)
UR76 50 ohm Coax - Per Meter	0.25	(0.05)

Please send total postage indicated. Any excess will be refunded.

YAESU		£	c&p
FT1	Superb new HF Transceiver	1295.00	(–)
FT902DM	160-10m 9 Bamd Transceiver	885.00	(–)
FC902	All Band A.T.U.	135.00	(1.50)
SP901	External Speaker	31.00	(1.50)
FT102	New HF Transceiver	725.00	(–)
FT101Z	160-10m 9 Band Transceiver (FM)	590.00	(–)
FT101ZD	160-10m 9 Band Transceiver (FM) Digital R.O.	665.00	(–)
DCT101Z	DC/DC Power Pack	42.55	(1.50)
FAN101Z	Cooling Fan for 101Z/ZD	13.80	(0.75)
FT707	8 Band Transceiver 200W Pep	569.00	(–)
FT707S	8 Band Transceiver 20W Pep	485.00	(–)
FP707	Matching Power Supply	125.00	(5.00)
FC707	Matching A.T.U./Power Meter	85.00	(1.00)
MMB2	Mobile Mounting Bracket for FT707	16.10	(1.00)
FRG7	Genral Coverage Receiver	199.00	(–)
FRG7700	200KHz-30MHz Gen. Coverage Receiver	329.00	(–)
FRG7700M	As above but with Memories	409.00	(–)
FRT7700	Antenna Tuning Unit	37.00	(1.00)
FT208R	2M FM Synthesised Handheld	209.00	(–)
FT708R	70cm FM Synthesised Handheld	219.00	(–)
NC7	Base Trickle Charger	26.88	(1.30)
NC8	Base Fast/Trickle Charger	44.10	(1.50)
NC9C	Compact Trickle Charger	8.00	(0.75)
FNB2	Spare Battery Pack	17.25	(0.75)
PA3	12V DC Adaptor	13.40	(0.75)
FT480R	2M Synthesised Multimode	379.00	(–)
FT780R	70cm Synthesised Multimode (1·6MHz Shift)	459.00	(–)
FT290R	2M Portable Multimode	249.00	(–)
MMB11	Mobile Mounting Bracket	22.25	(1.00)
CSC1	Soft Carrying Case	3.45	(0.75)
NC11C	240V AC Trickle Charger	8.05	(0.75)
FL2010	Matching 10W Linear	64.00	(1.20)
Nicads	2-2 amp HR Nicads Each	2.50	(0.20)
FF501DX	HF Low Pass Filter 1kW	23.00	(1.00)
FSP1	Mobile External Speaker 8 ohm 6W	9.95	(0.75)
YH55	Headphones 8 ohm	10.00	(0.75)
YH77	Lightweight Headphones 8 ohm	10.00	(0.75)
QTR24D	World Clock (Quartz)	28.00	(0.75)
YM24A	Speaker/Mic 207/208/708	16.85	(0.75)
YD148	Stand Mic Dual IMP 4 Pin Plug	21.00	(1.50)
YM38	As 34 but up/down Scan Buttons	24.90	(1.50)

FDK VHF/UHF EQUIPMENT			
Multi 700EX	2M FM Synthesised 25W Mobile	169.00	(–)
Multi 750E	2M Multimode Mobile	289.00	(–)
Expander	70cm Transverter for M750E	199.00	(–)

HEADPHONES			
HS4	TRIO economy	10.35	(1.00)
HS5	TRIO deluxe	21.85	(1.00)
HS6	TRIO lightweight	14.95	(1.00)
YH55	YAESU standard	10.00	(0.75)
YH77	YAESU lightweight	10.00	(0.75)

WELZ SWR/POWER METERS

SWR/POWER METERS			
Model 110	HF/2M Calibrated Power Reading	11.50	(0.50)
SWR25	HF/2M Twin Meter	11.50	(0.50)
UH74	2M/70	14.30	(0.50)
WELZ SP15M	HF/2M 200W	29.00	(0.75)
WELZ SP45M	2M/70cm 100W	45.00	(0.75)
WELZ SP200HF/2M		59.00	(1.00)
WELZ SP300HF/2M/70		79.00	(1.00)
WELZ SP4002M/70		59.00	(1.00)
DAIWA CN620A	HF/2M Cross Pointers	52.80	(–)
DAIWA CN630	2M/70 Cross Pointers	75.00	(–)

TELEREADERS (CW & RTTY)			
TASCO	CWR 680	189.00	(–)
TONO	Θ 550	299.00	(–)
TONO	Θ 9000	650.00	(–)

RECEIVERS			
ATC720	Airband handheld	129.00	(–)
SX200N	Scanning VHF-UHF Receiver	259.00	(–)

NICAD BATTERIES		
'C' Nicads 2-2 amp-Hr (FT290R etc)	2.50	(–)
'AA' Nicads 500 mAmp-Hr	1.00	(–)

DUMMY LOADS		
DL30 PL259 30W Max 150MHz	5.00	(0.50)
CT15A WELZ PL259 50W Max 450MHz	6.95	(0.75)
CT15N WELZ N connector 50W Max 450MHz	11.96	(0.75)
T100 SO239 100W Max 500MHz	22.95	(0.75)
T200 SO239 200W Max 500MHz	34.00	(1.00)
DL600 SO239 600W Max 350MHz	29.95	(1.50)
CT300 WELZ SO239 1kW Max 250MHz	42.95	(2.00)

CONNECTORS—INTER SERIES ADAPTORS	
BNC Plug to SO239	1.75
BNC Socket to PL259	1.75
BNC Socket to SO239	1.75
BNC Socket to N plug	3.50
BNC Plug to N socket	3.50
SO239 to N plug	3.00
PL259 to N socket	3.00

Mimimum postage 30p—any no. of connectors.

DATONG D70 MORSE TUTOR
£56.35 inc VAT & carriage

DATONG PRODUCTS			
PC1	Gen Coverage Converter HF on 2M	137.42	(–)
VLF	Very Low Frequency Converter	29.90	(–)
FL1	Frequency Agile Converter	79.35	(–)
FL2	Multi-mode Audio Filter	89.70	(–)
FL3	Audio Filter & Notch	129.37	(–)
ASP	Auto RF Speech Clipper (Trio or Yaesu Plug	82.80	(–)
D75	Manually controlled RF Speech Clipper	56.35	(–)
RFC/M	RF Speech Clipper module	29.90	(–)
D70	Morse Tutor	56.35	(–)
AD270	Indoor Active Antenna (inc PSU)	47.15	(–)
AD370	Outdoor Active Antenna (inc PSU)	64.40	(–)
MK	Keyboard morse sender	137.42	(–)
Codecall	Selective calling device (Link prog)	32.20	(–)
Codecall	Selective calling device (Switch prog)	33.92	(–)
RFA	Wideband preamplifier	33.92	(–)
MPU	Mains power unit	6.90	(–)

MORSE EQUIPMENT			
MK704	Squeeze Paddle	10.50	(0.50)
HK708	Up/Down Key	10.50	(0.50)
—	Practise scillator	8.75	(0.50)
EK121	Elbug	33.00	(0.50)
EKM1A	Matching Side Tone Monitor	10.95	(0.50)
EK150	Electronic Keyer	78.00	(–)

ROTATORS			
Hirschmann	RO250 VHF Roto	39.95	(2.00)
9502B	Colorator (Mod VHF)	56.95	(2.00)
KR400RC	Kenpro—inc lower clamps	110.00	(2.50)
KR600RC	Kenpro—inc lower clamps	145.00	(3.00)

DESK MICROPHONES		
SHURE 444D Dual Impedance	39.00	(1.50)
SHURE 526T Mk II Power Microphone	53.00	(1.50)
Adonis AM303 Power Microphone + Scan buttons	29.00	(1.00)
Adonis AM503 Compression Mic + Scan buttons	39.00	(1.00)

MOBILE SAFETY MICROPHONES		
ADONIS AM202S Clip on	21.00	(–)
ADONIS AM202H Head Band + Up/Down buttons	31.00	(–)
ADONIS AM202F Swan Neck + Up/Down Buttons	33.00	(–)

DRAE PRODUCTS—fully protected power supplies

4 Amp 27.95 (1.50)		12 Amp 69.00	(2.00)
6 Amp 44.95 (2.00)		24 Amp 99.00	(3.00)
VHF Wavemeter 130-450MHz		24.95	(–)

TEST EQUIPMENT		
Drae VHF Wavemeter 130-450MHz	24.95	(–)
FXI Wavemeter 250MHz MAX	33.00	(0.75)
DM81 Trio Dip Meter	67.50	(0.75)
MMD50/500 Dig. Frequency meter (500MHz)	75.00	(–)

COAXIAL SWITCHES		
2 Way Toggle Switch (HF/2m)	6.00	(0.50)
2 Way Diecast—PL259 (500MHz)	10.00	(0.50)
2 Way Diecast—N type (500MHz)	12.95	(0.50)
2 Way WELZ CH20A (PL259)	15.95	(0.75)
2 Way WELZ CH20N (N type)	27.95	(0.75)
5 Way Western Rotary Switch HF	13.95	(0.75)
3 Way LAR Modules HF	16.95	(1.00)

HELICAL ANTENNAS		
2M BNC or PL259 (state which required)	4.50	(0.50)
2M Thread for TR2300 or FT290R (state which)	4.50	(0.50)
70cm BNC or thread	4.50	(0.30)
70MHz Helicals BNC or PL259	5.00	(0.75)

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AMATEUR RADIO EXCHANGE

There's a lot of talk among the radio fraternity about "grey imports," but what does this term really mean?

To the UK distributors of TRIO and ICOM it means enterprising retailers by-passing them and purchasing direct from overseas sources. (The YAESU situation is somewhat different as there are two importers in healthy competition.)

To you, the customer, cutting out the monopoly middle-man in this way means quite simply lower prices, of which more later. It also means choice – the ability to come to one showroom and try out **all** the rigs on the market side by side, and then select the one that's right for you, rather than having some salesman push a particular make because that's the one he's "authorised" to sell.

Sometimes you may hear doubts expressed about the suitability for UK use of "non-approved" imports, or about after-sales service on them. Well, if you're buying from us... relax. We haven't become London's leading Amateur Radio store by selling **anything** that's not serviceable, or by giving your repair to the first likely lad to walk in clutching a soldering iron!

We think that TRIO for example is great stuff. That's why we've always tried to have as much of it passing through our doors – back or front! – as possible, but at prices that are fair on the customer, like these...

TS-530S Good value at £537. Even better value at £489 here.
TS-830S Why pay £695 when you can buy it from us for just £649?

TWO - AMAZING NEW RECEIVERS - BREAKTHROUGHS IN TECHNOLOGY AND PRICE

As sole UK importers we are proud to present two superb new scanning receivers – the AR – 3000 for Air Band listening and the MK – 4000 for Amateur and Public Service Band coverage – both with absolutely tremendous specifications and both priced at only **£99.**

AR-3000

Fully synthesized AM coverage of 110 – 139.995MHz in 10kc steps with 5kc option.
Manual control or auto-scan.
Integral speaker, all within super-compact dimensions of 120mm x 222mm x 44mm.
12v operation – ideal for mobile, portable or base station use.

MK-4000

FM coverage of 70 – 87.9875MHz and 140 – 175.9875MHz in 12.5kc steps on both bands.
8 memories with manual selection.
Auto-scan of full frequency range or memories only.
Lock-out facility.
Built-in digital clock.
12v operation, making it suitable for base station or mobile use.

It's always been our policy to offer our customers the widest choice of amateur radio receivers and transmitters to be found under one roof anywhere in the UK **plus** the facility to try them out, one against the other, to find the one that's right for you.

Well, now we're doing the same with communication terminals for decoding RTTY, CW, ASCII and AMTOR. Where else will you find complete ranges of decoders by AEA, MICRODOT, MICROWAVE MODULES, TASCO – TELEREADER and TONO at prices starting from £175 for receive-only up to £700 for top-of-the-range receive-and-transmit equipment like the CWR-685 as illustrated?

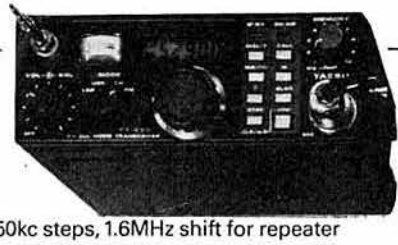
One item you certainly won't find in many other places is the unique British-made ICS AMTOR decoder for which we have just been appointed the sole London retailers!

MORE OVER PAGE!

AMATEUR RADIO EXCHANGE

FRG-7

YAESU's evergreen communications receiver giving continuous coverage from 500kc to 30MHz on AM/SSB/CW. Still the best value for money in the market...and even better value from us at only **£169** including FREE Heliscan aerial.



FT-290/FT-790

Yaesu's popular 2m Portable format now available for 70cm as well, with full 10MHz coverage, all-mode FM/CW/USB/LSB, 25/50kc steps, 1.6MHz shift for repeater operation, toneburst, etc.

FT-290: **£249** with our well known mods.
FT-790: **£295**

...W · NEW · NEW... FT-980

Yaesu's latest HF transceiver, which fits neatly into their range between the FT-102 and the FT-ONE... and is an obvious competitor for the mythical (or merely elusive?) Trio TS-930.
Features like general coverage receive, notch filter, pass-band tuning and IF shift will make this rig a top-of-the-market bargain at a price yet to be announced, but which we anticipate will be not a million miles from **£999.**

IC-720A

Introduced a year ago, this superb HF rig from ICOM has become a firm favourite because of its remarkable general coverage receive capability from 100kc to 30MHz, plus transmit facility across its entire range for commercial purposes.

OUR PRICE **£795**

IC-740

The latest addition to the ICOM transceiver range, this gives all mode coverage – AM/CW/SSB/FM – right across the amateur bands from 1.8 to 30MHz.

Incorporating such features as IF shift, pass-band tuning and notch-filter as standard, this is one rig that has to be seen and tried by anyone in the market for a really top-quality base station.

OUR PRICE **£649**

IC-R70

Presenting the best in today's receiver technology from ICOM, featuring:

- Two VFOs • Frequency range 100kc – 30MHz
- Three IFs 70MHz/9MHz/455kHz • HF pre-amp
- Sensitivity 0.5 μv AM – 0.32 μv S/N 12dB

All this...and much more...for £469

WRAASE SSTV SCAN CONVERTER

As exclusive UK distributors of the superb WRAASE ELECTRONICS range, we invite you to come and try these high-quality German products for yourself RIGHT NOW and see why their reputation is so good.

- Two full-size picture memories (128 x 128 pixels – 16 shades of grey).
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- Simple mic input/speaker output connection to your transceiver.
- Third memory available for COLOUR SSTV.
- ...and to complete the range, the FAX-655 FAX-MEMORY enabling you to view almost any SSTV or FAX signal transmitted on radio frequencies – Press picture services on VLF, weather satellite pictures in the SR or APT mode (NOAA/WEFAX/GEOS) in the 135-138MHz satellite band. **£695.**

And for the 'home brew' enthusiast, assembled boards available as follows:	
SC140 SSTV Scanconverter Board	**£179**
SC160 SSTV Scanconverter Kit, TX/RX	**£299**

SC-422A CONVERTER £598
KB-422A KEYBOARD £135

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YAESU

FT980	**NEW** all-mode transceiver with AM/CW/FM/SSB/AFSK	P.O.A.
FT 102	160-10M 9-Band Transceiver **NEW**	699.00
FT ONE	Gen. Coverage Transceiver **NEW**	1295.00
FT 790R	70cm all-mode portable **NEW**	295.00
FT 101ZFM	160-10m 9-Band Transceiver	590.00
FT 101ZDFM	160-10m 9-Band Transceiver	P.O.A.
DIGT 1012	Digital unit	90.00
DCT 101Z	DC Adaptor	42.50
FV 101Z	Remote vfo	112.00
FT902DM	9-Band AM/FM Transceiver	885.00
FC 902	9-Band atu, swr/pwr etc	135.00
FTV 901R	Transverter fitted 2m module	285.00
430 TV	70cm module for above	185.00
144 TV	2m module for Transverter	100.00
70 TV	4m module for Transverter	80.00
FV 901DM	Remote vfo for 901	260.00
SP 901	External speaker	31.00
FL 2100Z	9-Band 1200W linear	425.00
FT 707	8-Band solid state 100W	499.00
FP 707	230 volts AC power supply	125.00
FC 707	Aerial tuner (unbalanced only)	85.00
MR7	Metal rack for above	15.70
MMB 2	Mobile mounting bracket	16.00
FRG 7	0.5-30MHz receiver	169.00
FRG 7700	SSB/AM /FM recvr. dig. readout	299.00
MEM 7700	Memory unit for above	90.00

CONVERTERS FOR ABOVE

FRV 7700A	118-150MHz	69.75
FRV7700B	50-60MHz & 118-150MHz	75.50
FRV 7700C	140-170MHz	65.95
FRV 7700D	70-80MHz & 118-150MHz	72.45
FRT 7700	Receiver aerial tuner	37.85
FF 5	LF filter for above	9.95
FT 480R	2m all-mode transceiver	379.00
FP 80A	230V AC power supply	63.00
FT 780R	70cm all-mode transceiver	449.00
FT 290R	**SPECIAL** 2m all-mode portable with ARE mods	249.00
NC 11C	AC charger	8.00
CSC-1	Carrying case	3.45
MMB-11	Mobile mounting bracket	22.25
FT 208R	2m synthesized portable FM	199.00
NC 9C	AC charger	8.00
FT 708R	70cm hand-held	209.00

TRIO-KENWOOD

TS 930	Gen. coverage transceiver **NEW**	1078.00
TS 830S	160-10m transceiver 9 bands	650.00
AT 230	All-band ATU power meter	110.00
YK 88C	500Hz CW filter	29.60
YK 88CN	270Hz CW filter	32.60
TS 530S	160-10m trans 200w pep digital	489.00
TS 130S	8-band 200W pep	499.00
TS 130V	8-band 20W pep	445.00
AT 130	100W antenna tuner	79.00
TR 2300	2m FM synthesised portable	166.75
TR 2500	2m FM synthesised handheld	207.00
HC 10	Digital desk World Clock	58.75
DM 801	Dip meter	60.00
TR 7730	New 25W FM transceiver	247.00
R 600	Gen. coverage receiver	212.00

ROTATORS

KR 250	Kenpro Lightweight 1-1½" mast	44.95
9502B	Colorotor (Med. VHF)	55.00
KR 400RC	Kenpro—inc. lower clamps	99.95
KR 600RC	Kenpro—inc. lower clamps	139.95

ICOM

IC 740	Multimode H.F. transceiver **NEW**	649.00
IC 720A	HF transceiver and gen. cov. rec.	795.00
IC 730	HF mobile transceiver 8-band	586.00
IC R70	New multimode receiver	469.00
PS 15	Power supply for 720A	99.00
IC 251E	2m multimode base station	499.00
IC 25E	2m synth compact 25W mobile	259.00
IC 290E	2m multimode mobile	366.00
IC 24G	2m FM mobile 10w	169.00
IC 2E	2m FM synthesised handheld	159.00
IC 4E	70cm handheld	199.00
ICL1/2/3	Soft cases	3.50
IC HM9	Speaker/microphone	12.00
IC CP1	Car charging lead	3.20
IC BP2	6V Nicad pack for IC 2E	22.00
IC BP3	9V Nicad pack for IC 2E	17.70
IC BP4	Empty case for 6 X AA Nicads	5.80
IC 8PS	11.5V Nicad pack for IC 2E	30.50
IC DC1	12V adaptor pack for IC 2E	8.40

MICROWAVE MODULES

MMT 144/28	2M Transverter for HF Rig	109.95
MMT 432/28S	70cm Transverter for HF Rig	159.95
MMT 432/144R	70cm Transverter for 2m Rig	184.00
MMT 70/28	4m Transverter for HF Rig	115.00
MMT 1296/144	23cm Transverter for 2m Rig	184.00
MML 144/30LS	2m 30W linear Amp (3WI/P)	69.95
MML 144/50S	2m 50W linear amp (10W1/P)	85.00
MML 144/100S	2m 100W linear Amp (10W1/P)	139.95
MML 432/20	70cm 20W linear Amp (3W1/P)	85.00
MML 432/50	70cm 50W linear Amp	109.95
MML 432/100	70cm 10/100W linear Amp	228.65
MM 2001	RTTY to TV converter	189.00
MM 4001	RTTY transceiver	269.00
MM 4000KB	RTTY transceiver with keyboard	299.00
MMC 50/28	6m converter to HF Rig	29.90
MMC 70/28	4m converter to HF Rig	29.90
MMC 144/28	2m converter to HF Rig	29.90
MMC 432/28S	7cm converter to HF Rig	37.90
MMC 432/144S	70cm converter to 2m Rig	37.90
MMC 435/600	70cm ATV converter	27.90
MMK 1296/144	23cm converter to 2m Rig	69.95
MMD 050/500	500MHz dig. frequency meter	75.00
MMD 600P	600MHz prescaler	29.90
MMDP 1	Frequency counter probe	14.90
MMA 28	10 meter pre amp	16.95
MMA 144V	2m RF switched pre amp	34.90
MMF 144	2m band pass filter	11.90
MMF 432	70cm band pass filter	11.90
MMS 1	The morse talker	115.00
MMS 2	Advanced morse trainer	169.00

MORSE EQUIPMENT

MK 704	Squeeze paddle	10.50
HK 707	Up/Down key	10.50
EK 150	Electronic keyer	74.00

MOBILE SAFETY MICROPHONES

ADONIS AM 202S	Clip on	20.95
ADONIS AM202F	Swan neck + up/dwn bttns	30.00
ADONIS AM202H	Head band + up dwn bttns	30.95

DRAE

FULLY PROTECTED POWER SUPPLIES

4 amp	27.95	6 amp	44.95
12 amp	69.00	24 amp	99.00
VHF Wavemeter	130 450MHz		24.95
Morse Tutor			47.00

DATONG

PC1	Gen. Cov. Converter HF on 2m	137.42
VLF	Very Low Frequency Converter	29.90
FL1	Frequency Agile Converter	79.35
FL2	Multi-mode Audio Filter	89.70
FL3	FL 2 with auto notch **NEW**	129.37
ASP	Auto R.F. Speech Clipper (Trio or Yaesu plug)	82.90/89.70
D 75	Manually controlled R.F. Speech clipper	56.35
RFC/M	R.F. Speech Clipper Module	29.90
D 70	Morse Tutor	56.35
AD 270	Indoor Active Filter (inc. PSU)	54.05
AD 370	Outdoor Active Filter (inc. PSU)	71.30
MK	Keyboard morse sender	137.42
PTS1	Programmable tone squelch system (two units)	45.99
RFA	Wideband preamplifier	33.92
MPU	Mains Power Unit	6.90

BENCHER

BY 1	Keyer Paddle (black base)	32.00
BY 2	Keyer Paddle (chrome base)	39.95
BY 3	Keyer Paddle (gold plated)	92.00
ZA 1A	Balun 3·5-30mHz for dipoles	12.65
ZA 2A	Balun 14-30MHz for beam ant	13.80

TONO

THETA 9000E	RTTY/CWASC11	650.00
THETA 550	The latest—a winner!	299.00

AMPLIFIERS

UC 70	430MHz 55W + preamp	149.00
2M-50W	144MHz 30-50W	65.00
2M-100W	144MHz 100W + preamp	115.00
MR 150W	144mHz 130-150W + preamp	159.00
MR 250W	144MHz 250W + preamp	259.00

MUTEK

SLNA 144s	144MHz switched pre-amp	33.90
SLNA 144u	Unswitched version of above	20.38
SLNA 144ub	Unboxed version of SLNA 144u	12.41
TLNA 432s	432 MHz 1·4dB NF/13dB gain switched pre-amp	54.90
TLNA 432u	Unswitched version of above	26.40
TLNA 432ub	Unboxed version of TLNA 432u	18.50
BLNA 432ub	1·3dB NF/13dB gain sub-mini 432MHz pre-amp	12.43

TASCO

TeleReader CWR 685 RTTY/CW/ASC11	699.00
TeleReader CWR 670E As above RX only	259.00
MorseMaster CWR 600 As above basic unit	189.00

WELZ

SP 200	1·8-160MHz 20W-200W-1KW	59.00
SP 300	1·8-500MHz 20W-200W-1KW	79.00
SP 400	130-500MHz 5W-20W-150W	59.00
SP15M	1·8-150MHz 0·2·5-20-200W	29.00
SP 380	1·8-500MHz 20W-200W **NEW**	49.00
AC 38M	8 band ATU 400W	59.95
CT-15A	DC-450MHz dummy load	6.95
CT-15N	As above N-type socket	11.75
CH 20A	DC-450MHz coax switch SO239	15.95
CH 20N	As above—N type sockets	23.95

373 UXBRIDGE ROAD, ACTON, LONDON W3 9RH
Tel: 01-992 5765/6/7 *Just 500 yards east of Ealing Common station on the District and Piccadilly Lines, and 207 bus stops outside*

136 GLADSTONE STREET, ST HELENS, MERSEYSIDE
Tel: 0744 53157 *Our North West branch run by Peter (G4 KKN), just around the corner from the Rugby Ground.*

Closed Wednesday at Acton and Monday at St Helens, but use our 24-hour Ansafone service at either shop

SMC SERVICE

Free Finance on most substantial items. Importer guarantee on Yaesu Musen. Free Securicor on major Yaesu items. Access, Barclaycard over the 'phone. Biggest branch/agent/dealer network. Ably staffed and equipped service dept. Securicor 'B Service' contract at £4.49. Biggest stockist of amateur equipment. 24 years of communications experience.

FREE FINANCE

On *regular* priced items from: Yaesu, Ascot SMCHS, CDE, HyGain, Channel Master, Hansen, SMC, MFJ, KLM, Mirage and Hi-Mound, on invoices over £100 SMC offers Free Finance! How is it done? Simple, pay 20%, split the balance equally over 6 months or pay 50% down and split the balance over a year.

You pay no more than the cash price!!

GUARANTEE

Yaesu's *own* warranty does not extend outside Japan. Repairs are the responsibility of the UK retailer. SMC's guarantee is backed, as UK distributors, by daily contact with the factory and many tens of thousands of pounds of spares and test equipment. Avoid hawkers offering sets without serial numbers, spares, service or advice back-up.

SUPERB QUALITY RECEIVER: NRD515 £825 inc

VAT @ 15% & SECURICOR

- ★ 30MHz to 100kHz or lower, 100Hz steps.
- ★ PLL digital VFO, stable (50Hz/hr AWU).
- ★ Backlash free, 500Hz analogue calib.
- ★ Fast tune up/down switch, dial lockout.
- ★ SSB (USB/LSB), CW, AM, RTTY.
- ★ 6 and 2.4kHz, 600* and 300* Hz @ −6dB.
- ★ Passband tuning ±2kHz on SSB and CW.
- ★ Variable BFO on CW for preferred tone.
- ★ Modular plug in design with mother board.
- ★ Reliable—low power schottky & CMOS.
- ★ Designed for maximum ease of operation.
- ★ Noise blanker 0-10-20dB attenuator.
- ★ Small (140 × 340 × 300mm) light 7½Kg.

PROFESSIONAL MONITOR

- ★ Up conversion, 70.455MHz and 455kHz
- ★ No R.F. amplifier, balance U310 mixer
- ★ Crystal filter before first IF amplifier
- ★ Transceiver provisions; sidetone, trip etc.
- ★ Frequency data input/output port.

NHD518	96 (4 × 24) channel memory unit.
NCM515	Remote frequency keypad controller, LCD readout. 4 channel memory Up/down step tuning.
CQE515	Junction unit (NCM515 to NHD518).
NVA515	External 3W speaker.
CFL260	600Hz mechanical filter
CFL230	300Hz crystal filter

WIDE COVERAGE ALL MODE RX; FRG7700

- ★ 30MHz down to 150kHz (and below).
- ★ 12 Channel memory option with fine tune.
- ★ SSB (LSB/USB), CW, AM, FM.
- ★ 2·7kHz, 6kHz, 12kHz, 15kHz, @ −6dB.
- ★ 3 Selectivities on AM. Squelch on FM.
- ★ Up conversion, 48MHz first IF.
- ★ 1kHz digital, plus analogue, display.
- ★ Inbuilt quartz clock/timer.
- ★ No preselector, auto selected LPF's.
- ★ Advanced noise blanker fitted.
- ★ Antenna 500Ω to 1·5MHz, 50Ω to 30MHz.
- ★ 20dB pad plus continuous attenuator.
- ★ Switchable A.G.C. Variable tone.

*** SPECIAL OFFER! ***

'7700 THE ONE WITH FM!

- ★ 110 and 240Vac, 12Vdc option.
- ★ Signal meter calibrated in "S" and SIMPO.
- ★ Acc; Tuners, Converters, LPF, Memory.
- ★ FRT7700; 150kHz-30MHz, Switch, etc.
- ★ FRV7700A; 118-130, 130-140, 140-150MHz.
- ★ FRV7700B; 118-130, 140-150, 50-59MHz.
- ★ FRV7700C; 140-150, 150-160, 160-170MHz.
- ★ FRV7700D; 118-130, 140-150, 70-80MHz.
- ★ FRV7700E; 118-130, 140-150, 150-160MHz.
- ★ FRV7700F; 118-130, 150-160, 170-180MHz.
- ★ FF5; 500kHz (for improved VLF reception).
- ★ MEMGR7700; 12 Channels (internal fitting).
- ★ FRA7700; Active Antenna.

FT980 ALL MODE HF TRANSCEIVER

NEW

★ Some facilities optional

- ★ Rx 150kHz-30MHz
- ★ Tx 160-10M 9 bands + 3 × 500kHz Aux bands
- ★ All modes AM, CW, FM, LSB, USB, AFSK
- ★ IF shift + variable bandwidth 2·6kHz-300Hz
- ★ Inbuilt keyboard operation + Scanning
- ★ Switchable attenuator 10, 20, 30dB
- ★ Audio peak + notch filter −40dB
- ★ RF process and Auto mic gain control
- ★ 3rd order IMD −40dB at 100W PEP
- ★ AFSK shift 170, 425, 850Hz selectable
- ★ Multi channel memory + programmable scan limits
- ★ Optional computer interface available

SOUTH MIDLANDS COMMUNICATIONS LTD

S. M. HOUSE, RUMBRIDGE STREET, TOTTON, SOUTHAMPTON SO4 4DP, ENGLAND
Tel: Totton (0703) 867333, Telex: 477351 SMCOMM G, Telegram: "Aerial" Southampton.

GRIMSBY
S.M.C (Humberside)
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Grimsby, Lincolnshire.
Grimsby (0472) 59388
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STOKE
S.M.C. (Stoke)
76 High Street,
Talke Pits, Stoke.
Kidsgrove (07816) 72644
9-5.30 Tue-Sat

LEEDS
S.M.C. (Leeds),
257 Otley Road,
Leeds 16, Yorkshire.
Leeds (0532) 782326
9-5.30 Mon-Sat

CHESTERFIELD
S.M.C. (Jack Tweedy) LTD,
102 High Street,
New Whittington, Chesterfield.
Chesterfield (0246) 453340
9-5 Tue-Sat

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Unit 27 Pinfold Workshops,
Pinfold Lane, Buckley.
Buckley (0244) 549563
9.30-5.30 (Lunch 1.30) Tue-Sat

SMC AGENTS

Edinburgh	Jack	GM8GEC	(031-657 2430 Day (031-665 2420 Eve	**Bangor**	John	GI3KDR	(0247) 55162	**Neath**	John GW4FOI	(0639) 52374 Day (0639) 2942 Eve
Stourbridge	Brian	G3ZUL	(03843) 5917	**Tandragee**	Mervyn	GI3WWY	(0762) 840656	**Jersey**	Geoff GJ4ICD	(0534) 26788

FT ONE

*Option

FREE FINANCE

★ Rx: 150KHz-30MHz. Continuous general coverage.
★ Tx: 160-10m (9 bands) or 1.5-30MHz commercial.
★ All Modes: AM, CW, FM*, FSK, LSB, USB.
★ 10 VFO's!!! Any Tx-Rx split within coverage.
★ Two frequency selection ways, *no* bandswitch.
★ Main dial, velvet smooth, 10Hz resolution.
★ Inbuilt keyboard with up/down scanning.
★ Dedicated digital display for RIT offset.
★ Receiver dynamic range up to 100dB!!!
★ SSB: Variable bandwidth *and* IF shift.
★ 300* or 600Hz*, 2,400 → 300Hz, 6kHz*, 12kHz*.
★ Audio peak and notch filter. FM squelch.
★ Advanced variable threshold noise blanker.
★ 100W RF, key down capability, solid state.
★ Mains and 12VDC. Switch mode PSU built in.
★ RF processor. Auto mic gain control. VOX.
★ Last but not least *full* break in on CW.

FT902DM £885 inc.

VAT @ 15% & SECURICOR

★ 160-10 metres including new allocations.
★ Variable IF bandwidth 2.4kHz down to 300Hz.
★ Audio Peak and independent notch controls.
★ AM, FSK, USB, LSB, CW, FM, (Tx and Rx).
★ Semi-break in, inbuilt Curtis IC Keyer option.
★ Digital plus analogue frequency displays.
★ VOX built-in and adjustable.
★ Instant write in memory channel.
★ Tune up button (10 sec. of full power).
★ Switchable AGC and RF attenuator.
★ Optional 350 or 600Hz CW, 6kHz, AM filters.
★ Clarifier (RIT) switchable on Tx, Rx or both.
★ Plug in modular, computer style constructor.
★ Fully adjustable RF Speech processor.
★ Ergonomically designed with necessary LEDS.
★ Incredible range of matching accessories.
★ Universal power supply 110-234V AC and 12V DC.

SPECIAL OFFER — NOW WITH CW FILTER, AM FILTER, CURTIS KEYER AT NO EXTRA!

*Option ** D & DE Models

FT102

"INSTANT" H.P.

★ 1.8-3.5-7-10-14-18-21-24.5-28MHz
★ All modes: LSB, USB, CW, AM†, FM†, (†Option board)
★ Front end: extra high level, operates on 24V DC
★ RF stage bypassable, boosts dynamic range over 100 dB!
★ Variable bandwidth 2.7KHz→500Hz *and* IF Shift
★ Fixed bandwidth filters, parallel or cascade
★ IF notch (455kHz) *and* independent audio peak
★ Noise blanker adjustable for pulse *width*
★ External Rx and separate Rx antenna provisions
★ *Three* 6146B in special configuration—40dB IMD!
★ Extra product detector for checking Tx IF signal
★ Dual meter, peak hold ALC system
★ Mic amp with tunable audio network
★ **SP102:**—Speaker, Hi and Lo AF filters, 12 responses!
★ **FV012:**—VFO, 10Hz steps and readout, scanning, QSY
★ **FC102:**—ATU, 1·2KW, 20/200/1200 W FSD PEP, wire
★ **FAS-1-4R:**—4 way waterproof antenna selector

FT101ZD £635 inc.

VAT @ 15% & SECURICOR

★ 160-10 metres including new allocations.
★ Variable IF bandwidth 2.4kHz down to 300Hz.
★ Selectable CW fixed bandwidth CW-W and CW-N*.
★ Semi-break in with sidetone for excellent CW.
★ Digital plus analogue frequency displays.
★ 180W PIP and—31dB 3rd order intermod.
★ RF speech processor fitted—adjustable level.
★ VOX built-in and is adjustable from the front panel.
★ Wide dynamic range for big signal handling.
★ High usable sensitivity, for those weak ones.
★ Superb noise blanker—adjustable threshold.
★ Attenuator; 0-10-20dB, AGC; slow-fast-off.
★ Clarifier (RIT) switchable on Tx, Rx or both.
★ Low level transvertor drive output facility.
★ Universal power supply 100-234V AC and 12V DC*
★ Incredible range of matching accessories.
★ 6 models: Digital/Analogue—AM/FM options.

FREE SECURICOR

*Option

FT707 £509 inc.

VAT @ 15% & SECURICOR

SPECIAL OFFER

SMC FM MODIFIED VERSION AVAILABLE

★ 80-10 metres (including 10, 18 and 24MHz bands).
★ USB-LSB-CWN-AM (Tx and Rx operation).
★ 100W PEP. 50% power output at 3:1 VSWR.
★ Full "broad band" no tune output stage.
★ Excellent Rx dynamic range, power transistor buffers.
★ Rx Schottky diode ring mixer module.
★ Local oscillator with ultra-low noise floor.
★ Variable IF bandwidth—16 crystal poles.
★ Bandwidths 6kHz*, 2.4kHz-300Hz, (600-350) Hz*.
★ AGC; slow-fast switchable VOX built-in.
★ Semi-break in with side tone for excellent CW.
★ Digital (100Hz) plus analogue frequency display.
★ LED Level meter reads: S, PO and ALC.
★ Indicators for: calibrator, fix, int/ext VFO.
★ Receiver offset tuning (RIT-clarifier) control.
★ Advanced noise blanker with local loop AGC.

*Option

hy-gain

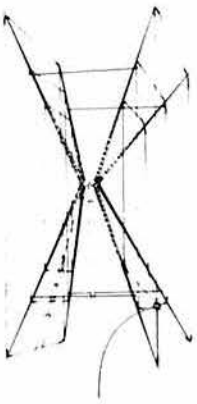
The TH7DXX is a new 7 element (10-15-20M) broadband VSWR less than 2:1 at band edges! Compact 20' (6·1M) turning radius – 31' (9·4M) longest element dual driven element Yagi which by combining monoband *and* high Q, ultra high power, trapped parasitics provides an average front to back of 22dB on 20 and 15 and 17dB on 10 meters. The antenna weighs 75lbs (34kg) and its projected 9·4 sq feet (0·9 sq m) of wind area produces a load of 240lbs at 80 mph (129 kph).

Construction features include: 6063-T832 taper swaged thick wall aluminium, 18-8 stainless hardware, diecast ali boom/mast clamps, heavy gauge ele/boom clamp and rugged phasing lines. It uses a ß match for DC ground and comes complete with preformed feeder straps and the famous BN86 ferrite balun.

		inc VAT	p/p
12AVQ	Vertical 10-20m inc.	**£50.60**	£2.20
14AVQ/WB	Vertical 10-40m inc.	**£64.40**	£2.20
18AVT/WB	Vertical 10-80m inc.	**£109.25**	£2.20
14RMQ	Roof mounting Kit	**£36.22**	£2.20
18V	Vertical 10-80m inc.	**£29.78**	£2.20
103BA	3 Ele Yagi 10m	**£67.85**	£2.20
105BA	5 Ele Yagi 10m	**£143.75**	£3.95
153BA	3 Ele Yagi 15m	**£90.85**	£2.20
155BA	5 Ele Yagi 15m	**£217.35**	£5.90
203BA	3 Ele Yagi 20m	**£166.75**	£4.90
204BA	4 Ele Yagi 20m	**£286.35**	£7.30
205BA	5 Ele Yagi 20m	**£362.25**	£9.40
402BA	2 Ele Yagi 40m	**£247.25**	£6.50
DB10/15A	3 Ele Yagi 10-15m	**£146.05**	£4.80
TH3JNR	3 Ele Yagi 10-15-20m	**£194.35**	£3.10
TH2MK3	2 Ele Yagi 10-15-20m	**£169.05**	£3.20
TH3MK3	3 Ele Yagi 10-15-20m	**£274.85**	£5.30
TH5DXX	"Thunderbird" 5 el.	**£378.35**	£6.70
TH7DXX	"Thunderbird" 7 el.	**£458.85**	£8.75
HYQUAD	2'Ele Quad 10-15-20m	**£332.35**	£6.00
18TD	Dipole Tape 10-80m	**£113.85**	£2.80
BN86	Balun 1:1·3 30MHz	**£15.53**	£1.40
LA1	Lightning Arrestor	**£48.19**	£0.92

NB: PRICES INCLUDE VAT AT 15%
Carriage extra, mainland rate shown

Gem Quad



A light strong, boomless, quad antenna covering 10-15-20m. The centre spider is aluminium and the spreader arms (13·6ft and 2·2lb) are of a glass fibre tri-dectic construction. (Thin rods forming a triangle with tape criss-crossing for light, rigid, low wind resistance structure.)

The double cone shape offers optimum spacing between loops and maintains these critical measurements even under severe weather conditions. This optimum spacing provides "monobander" performance; high gain, maximum capture area, low angle radiation, low SWR and good F/B and F/S ratios. The toroidal balun supplied provides single 50 ohm coaxial feed on all bands, with no lossey coils, traps or switches.

2 element 18' × 18' × 9l'; TR 9l'; 8dB Gain; 25dB F/B
3 element As 2 ele plus 6·5 boom; 8·9dB Gain; 30dB F/B.
4 element As 2 ele plus 13' boom; TR 22'.

GQ2E	2 Ele Antenna	**£189.75**	£5.40
GQ3E	3 Ele Antenna	**£313.95**	£9.20
GQ4E	4 Ele Antenna	**£446.20**	£10.00
GQCK1	Conversion Kit 1 Ele	**£126.50**	£4.10
GQCK2	Conversion Kit 2 Ele	**£256.45**	£6.70
GQSPIDER	Centre piece (spare)	**£32.78**	£1.80
GQSPREADER	Spreader Arm (spare)	**£16.10**	£2.40

NB: PRICES INCLUDE VAT AT 15%
Carriage extra, mainland rate shown

J-BEAM

FOUR METRES				
4Y/4M	Yagi, 4 element	7·0dB	**£22.43**	£1.73
PMH2/4M	Harness, 2 way		**£13.23**	£1.44
TWO METRES				
HO 2M	Halo, head only	3·0dB	**£5.17**	£0.63
HM 2M	Halo, 24in mast	3·0dB	**£5.75**	£0.75
UGP 2M	Ground Plane	0·0dB	**£10.92**	£1.73
C5 2M	Colinear omnivert	4·8dB	**£47.72**	£1.73
5Y 2M	Yagi 5 element	7·8dB	**£12.07**	£0.58
8Y 2M	Yagi 8 element	9·5dB	**£15.52**	£1.73
10Y/2M	Long Yagi, 10 element	11·4dB	**£33.35**	£1.73
14Y/2M	Long Yagi, 14 element	13·0dB	**£36.23**	£1.73
D5/2M	Yagi, 5 over 5 slot	10·6dB	**£21.85**	£1.73
D8 2M	Yagi, 8 over 8 slot	12·3dB	**£29.32**	£1.73
PBM10/2M	10 element parabeam	12·4dB	**£39.67**	£1.73
PBM14/2M	14 element parabeam	13·7dB	**£48.00**	£1.73
Q4 2M	Quad, 4 element	10·0dB	**£25.87**	£1.73
Q6 2M	Quad, 6 element	12·0dB	**£33.92**	£1.73
5XY/2M	Yagi, 5 element cross	7·8dB	**£24.72**	£1.73
8XY/2M	Yagi, 8 element cross	9·5dB	**£31.05**	£1.73
10XY/2M	Yagi, 10 element cross	11·3dB	**£40.82**	£1.73
PMH2 C	Harness, Cir. Polar		**£8.05**	£0.52
PMH2 2M	Harness, 2 way		**£10.92**	£0.86
PMH2 2ML	Harness, 2 way long		**£11.92**	£1.15
PMH4 2M	Harness, 4 way		**£25.30**	£1.73
SEVENTY CMS				
C8/70	Colinear vert.	7·8dB	**£54.05**	£1.73
D8/70	Yagi, 8 over 8 slot	12·3dB	**£22.43**	£1.73
PBM18/70	Parabeam 18 element	14·9dB	**£27.60**	£1.73
PBM24/70	Parabeam 24 element	15·1dB	**£36.80**	£1.73
MBM28/70	Multibeam, 28 element	12·5dB	**£18.40**	£1.73
MBM48/70	Multibeam, 48 element	15·7dB	**£31.05**	£1.73
MBM88/70	Multibeam, 88 element	18·5dB	**£42.55**	£1.73
8XY/70	Yagi, 8 element cross	10·0dB	**£36.80**	£1.73
12XY/70	Yagi, 12 element cross	13·0dB	**£46.00**	£1.73
PMH2/70	Harness 2 way		**£9.20**	£0.75
PMH4/70	Harness 4 way		**£19.55**	£1.44
TWENTY THREE CMS				
D15/23	15 over 15 slot	15·0dB	**£36.80**	£1.73
CR/23	Corner reflector	14·8dB	**£35.08**	£1.73
PMH2/23	Harness 2 way		**£27.60**	£1.73

NB: PRICES INCLUDE VAT AT 15%
Carriage extra, mainland rate shown

Kenpro

KR600RC
£132.25

360° round type meter Max. load 200kg. Rot, 600kg/cm, brake 4,000kg/m. 1½in-2½in masts Lower casting optional.

KR400RC
£90.85

360° round type meter Max. load 200kg. Rot, 400kg/cm, brake 1,500kg/cm 1½in-2½in masts Lower casting optional.

KR500
£90.85

Elevation Rotator (180°) Up to 50kg of Load. 1¼in-2¼in mast. 1⅛in-1⅝in boom

KR250
£51.75

Twist and switch controller. Rotator 200kg/cm. Brake 600kg. 1in-1½in masts.

NB: PRICES INCLUDE VAT AT 15%
Carriage free (post or road) mainland only

Channel Master

9508
£79.92

Auto control, secondary pointer gives position during travel. Stainless steel hardware. Heaviest duty "offset type". To 5sq

Takes 1-2" masts and 1-2" stub.

9502
£56.92

Automatic control box. Dial direction secondary pointer gives position during travel.

Takes 1-2" mast and 1-1⅞" stub.

Upper mast support bearing.

2" mast and 1¾" stub.

Post and packing **£1.20**
9523 **£14.38**

Rotary bearing 3-way guying.

Takes $1\frac{29}{32}$" mast.

Post and packing. **85p**
9525 **£14.38**

NB: PRICES INCLUDE VAT AT 15%
Carriage free (or as shown) mainland only

CDE

AR40
£79.35

Accurate, silent self calibrating control box. Dial up desired beam heading, push knob; motor rotates to that position and then switches off.

CD45
£125.35

Large illuminated meter gives read out of antenna heading at all times. Armature brake. Low voltage meter. Handles antennas to 8½sq ft.

HAM IV
£228.85

Large illuminated meter gives read out of antenna heading at, all times. wedge solenoid brake mechanism. Handles antennas to 15sq ft.

T2X
£287.50

Large illuminated meter gives read out of antenna heading at all times. Wedge solenoid brake mechanism. Handles antennas to 30sq ft.

NB: PRICES INCLUDE VAT AT 15%
Carriage free (post or road) mainland only

SMC

SOUTH MIDLANDS COMMUNICATIONS LIMITED

BRANCHES: CHESTERFIELD · GRIMSBY · STOKE · LEEDS · BUCKLEY

COAX SMC PLUGS

BNC PLUG 50 ohms		
UG88	Standard type 5.5mm	£0.78
UG599	Large type 11.2mm	£3.22
BNC SOCKET 50 ohms		
UG290	Standard 4 hole type	£0.78
UG1094	Nut fixing type	£0.76
UG69	Free, cable-end, 5.5mm	£0.94
BNC COUPLER 50 ohms		
UG914	Back to back female	£1.07
UG491	Back to back male	£1.66
UG274	'T' 2 female 1 male	£2.23
SMC3FBNC	'T' 3 female	£2.02
UG306	Elbow. Male-Female	£1.86
BNC INTERSERIES ADAPTOR 50 ohms		
UG255	BNC plug – UHF socket	£1.76
UG273	BNC socket – UHF plug	£1.76
UG201	BNC socket – N plug	£3.28
UG349	BNC plug – N socket	£3.16
UG606	BNC socket – N socket	£2.59
UHF PLUG		
PL259	Standard type 11.2mm	£0.55
PL259P	Push on type 11.2mm	£0.79
UG175	Reducer 5.0mm	£0.14
UG176	Reducer 5.6mm	£0.14
PL259R	Reduced type 5.0mm	£0.67
PL259A	Deluxe type 11.2mm	£1.50
PL259B	Deluxe type 5.0mm	£1.13
PL259SL	'Solderless' 11.2mm	£0.63
PL259SS	'Solderless' 5.0mm	£0.63
PL259E	Angle type 5.0mm	£0.95
PL259M	Metric type standard 11.2mm	£0.75
L42P	For LDF2/50 Heliax	£9.20
L44P	For LDF4/50 Heliax	£9.00
PL259PM	Panel mount 4 hole	£1.07
UHF SOCKET		
S0239F	Standard 4 hole fix	£0.48
S0239F31000	4 hole PTFE Au plate	£0.97
S0239T	2 hole fixing type	£0.48
S0239NI	Nut fixing inside type	£0.59
S0239NO	Nut fixing outside type	£0.59
S0239E	Free angle type 5.0mm	£1.01
	Free cable end 5.0mm	£2.22
MX913/C	Dust Cap c/w chain	£0.46
MX913/M	Dust Cap metric type	£0.46
UHF COUPLER		
PL258	Back to back female	£0.91
PL274	Back to back chassis	£1.07
SMCPL/PL	Back to back male	£1.38
M359	Elbow male-female	£1.07
M358	'T' 2 female 1 male	£1.38
M358AF	'T' 3 female	£1.70
M458	'X' 3 female 1 male	£2.13
UHF INTERSERIES ADAPTORS		
UG255	UHF socket – BNC plug	£1.76
UG273	UHF plug – BNC socket	£1.76
S0/25	UHF socket – 2.5mm jack	TOS
S0/35	UHF socket – 3.5mm jack	£0.79
S0/NF	UHF socket – N socket	£1.96
UG146	UHF socket – N plug	£2.25
UG83	UHF plug – N socket	£1.96
UHF CABLES		
PL36PL	3.0' RG58 PL259 ends	£1.85
N PLUG 50 ohms		
UG536	Small type 5.5mm	£2.82
UG21	Standard type 11.2mm	£1.55
L42W	For LDF2/50 Heliax	£7.40
L44W	For LDF4/50 Heliax	£10.80
N SOCKET 50 ohms		
UG58	Standard 4 hole fix	£0.94
UG1052	Free cable end 5.5mm	£2.85
UG23	Free cable end 11mm	£1.70
L42N	Free jack for LDF2/50	£7.40
L44N	Free jack for LDF4/50	£10.80
MX913C	Dust cap c/w chain	£0.46
N COUPLER 50 ohms		
UG107	'T' 2 female 1 male	£3.74
UG28	'T' 3 female	£3.16
UG57	Double male adaptor	£2.70
UG29	Double female adaptor	£2.13
UG27	Elbow male-female	£2.24
N INTERSERIES ADAPTORS 50 ohms		
UG201	N plug – BNC socket	£3.28
UG349	N socket – BNC plug	£3.16
UG606	N socket – BNC socket	£2.59
UG146	N plug – UHF socket	£2.25
UG83	N socket – UHF plug	£1.96
S0/NF	N socket – UHF socket	£1.96

NB: PRICES INCLUDE VAT AT 15%
Postage: £0.50 any quantity (UK)

HANSEN

IN LINE POWER/SWR BRIDGES P.E.P., R.M.S. 1·8–440MHz

The Hansen range covers 30 quality models with top-of-the-line the FS710. This is a flat frequency response, peak envelope power and average in-line wattmeter with many novel features. Notable being the 'power independent' SWR scale – no forward power calibration knob, just direct reading SWR. SWR.

FS710; PEP AUTO-SWR RMS LEVEL
FS710 £78.20

FS710H: 1·8-60MHz. 15, 150, 1·5kW
FS710V: 50-150MHz. 15, 150W
V.S.W.R: 4:1 and to 20:1
Accuracy: ±7% of FSD
Impedance: 50-52 Ohms
Connectors: SO239
Power: 240 Volts AC 50Hz
Weight: 3·lbs (1·5Kgs)
Size overall: 8 × 4 × 5½"
Size Meter: 2 × 3¼"
Time Const: PEP follow 4 second

FS500 £60.95

PEAK READING LEVEL RESPONSE
FS500H 1·8-60MHz 20, 200 & 2kW
FS500V 50-150MHz 20 & 200W
Power ±7% FSD. SWR 1:1-5:1
Size: 8 × 4 × 5½"

FS600 £44.85

PEAK READING LEVEL RESPONSE
FS601M 1·8-30MHz 20 & 200W
FS601MH 1·8-30MHz 200 & 2kW
FS602M 50-150MHz 20 & 200W
FS603M 430-440MHz 5 & 20W
Power ±10% FSD. SWR 1:1-3:1
Size: 6¼ × 2¼ × 4¼"

FS300 £40.25

LEVEL RESPONSE, LARGE METER
FS300H 1·8MHz 20, 200 1kW,
FS300V 50-150MHz 20, 200W FSD
Power ±10% SWR 1:1-3:1 ±10%
Size: 8 × 4 × 5½"

FS7 £35.65

VHF/UHF WATTMETER & BRIDGE
FS7 145MHz & 432MHz 5, 20, 200W
Power average ±10%. SWR 1:1-3:1
Power Max: 144MHz, 200W
432MHz 20W
Size: 6¼ × 2¼ × 4¼". 'N' type sockets

FS711 £32.20

REMOTE INDICATOR TYPE
FS711H 1·8-30MHz 20 & 200W
FS711V 50-150MHz 20 & 200W
FS711U 430-440MHz 5 & 20W
Power ±10% SWR 1:1-3:1 ±3%
Indicator 5 × 2½ × 1½"
coupler 3½ × 2½ × 1½"

FS5E £32.20

INDEPENDENT TWIN METER
FS5E 3·5-150MHz 20, 200 & 1kW
Power average ±10%. SWR 1:1-5:1
Powet Max: 1kW 3·5-30MHz
50W 50-150MHz
Size: 7 × 3 × 3½". 'On the Air' LED

FS300M £31.05

LEVEL RESPONSE, POWER & SWR
FS301M 1·8-30MHz 20, 200W
FS301MH 1·8-30MHz 200, 2kW
FS302M 50-150MHz 20, 200W
Power ±10%. SWR 1:1-3:1 ±3%
Size: 6¼ × 2¼ × 4¼"

SWR3S £23.00

WIDE RANGE POWER & SWR
SWR3S 3·5-150MHz 20 & 200W
Power average ±10%. SWR 1:1-3:1
Power Max: 200W 3·5-30MHz
50W 50-150MHz
Size: 6 × 2¼ × 2½". Antenna/switch

SWR50B £23

TWIN METER, RELATIVE POWER
SWR50B 3·5-150MHz Scaled 1kW
Power average ±20% SWR 1:1-3:1
Power Max: HF 1kW 1:1. 300W 3:1,
VHF 50W
Size: 6 × 2¼ × 2½". 'On the Air' LED

8 new models in stock. See for details

NB· PRICES INCLUDE VAT AT 15%
Carriage free (surface post) worldwide

SMC-HS

HF, VHF, UHF ANTENNAS MOBILE VERTICALS

SMC-HS Mobile Elements, tabulated below, feature an inbuilt PL259M connector, which mates with the SO239M on any of the four standard mounts. This arrangement is ideal for easy removal – band changes, comparative test, car wash, and anti-vandal, system checks from the feed point, portable operation and for ease of garaging etc. All models have fold over bases (either lift and lay or locking collar) except the 78B which has an inbuilt ball in case the mount must be fitted askew.

Model	Band	Gain	Type	Power	Length	Price
20SE	20m		(¼λ)	100W	1·72m	£15.35
17SE	17m		(¼λ)	200W	1·92m	£14.20
15SE	15m		(¼λ)	130W	1·72m	£13.80
12SE	12m		(¼λ)	200W	1·92m	£13,40
10SE	10m		(¼λ)	100W	1·72m	£12.65
4E	4m	0dB	½λ	150W	1·03m	£7.65
2H/PL	2m		(¼λ)	50W	0·17m	£3.45
2QW	2m	0dB	½λ	200W	0·49m	£2.30
2VF	2m	3dB	½λ	50W	1.06m	£10.35
2NE	2m	3dB	½λ	150W	1·30m	£6.90
78SF	2m		(⅝λ)	100W	1·42m	£12.25
78F	2m	4·5dB	⅝λ	100W	1·75m	£12.25
78B	2m	4·5dB	⅝λ	150W	1·72m	£12.65
88F	2m	5·2m	⅝λ	100W	2.03m	£16.50
70N2M	2/70	2·7dB 5·1dB	(¼λ) 2 × ½λ	100w	0·89m	£14.20
258	70cm	5·5dB	2 × ½λ	100W	0.91m	£11.50
358	70cm	6·3dB	3 × ½λ	100W	1·36m	£14.95

Model	Description	Price
SOWM	Wing Mount. SO239M upper SO239 under adjustable angle	£3.45
TMCAS	Boot Mount c/w 6 mtrs RG58 and PL259 plug	£7.30
GCCA	Gutter Mount deluxe cast type c/w 4 mtrs cable assemble and PL259	£8.80
SOMM	Mag Mount c/w 4 mtrs RG58 PL259 *For use with smaller antennas only*	£8.45

An alternative mounting for any of the two metre antennas listed above is the BSD stainless steel bumper strap at **£7.75** plus the HS88BK extension tube at **£16.50** which raises by 80 cms and acts as a counterpoise to the radiator.

Also fitting the bumper mount is the 10 foot, 3 section (quick disconnect and fold over jointed) mobile colinear element which provides about 7dB of gain for **£28.35.**

Stop press: ⅝λ ultra low radiation angle, typ. 30° below ⅞λ. Substantial improvement on DX (in clear).

For operation on 2 metres and 70 cms the dual band 70N2M is an elegant solution particularly when combined with the HS770 diplexer which provides 50W power handling, 30dB isolation between transceivers with an insertion loss of only 0·5dB for **£13.40.**

NB: PRICES INCLUDE VAT AT 15%
Mainland delivery: accs. £0.80, antennas £1.80

S. M. HOUSE, RUMBRIDGE STREET, TOTTON, SOUTHAMPTON SO4 4DP, ENGLAND
Tel: Totton (0703) 867333, Telex: 477351 SMCOMM G, Telegram: "Aerial" Southampton
See preceding pages for complete addresses and phone numbers

FT290R

- ★ 144-146MHz (144-148 possible)
- ★ 2.5W PEP, 2.5W/300mW out on FM CW
- ★ FM: 25kHz and 12.5kHz steps
- ★ SSB: 1kHz and 100Hz steps
- ★ ±600kHz repeater split, 1750kHz burst
- ★ Integral telescopic antenna
- ★ Rx, 70mA, Tx; 800mA (FM maximum)

FT790R

- ★ 430-330MHz (440-450 alternative)
- ★ 1W PEP, 1W/250mW FM/CW out
- ★ FM: 100kHz and 25kHz steps
- ★ SSB: 1kHz and 100Hz steps
- ★ 1·6MHz shift with input monitor, 1,750Hz burst
- ★ Rx: 100mA/200mA. Tx; 750mA maximum
- ★ BNC Mounted ¼λ flexi antenna included

★ Multimode USB, LSB, FM, CW '790 EX-STOCK
★ Optically coupled main tuning
★ 100Hz backlit LCD Frequency display
★ 10 memory channels "5 year" backup
★ Any Tx/Rx split with dual VFOs
★ Up/down tuning from microphone
★ AF output 1W @ 10% THD
★ Bandwidth 2·4kHz and 14kHz @ −6dB
★ LED's, "on air", "busy" m/c meter; S.PO
★ 58 (H) × 150 (W) × 195 (D). 1.3kg

SMC2.2C	NiCad 2.2 A/hr, "C"	TOS
SMC2.0C	NiCad 2.0 A/hr "C"	£2.35
SMC8C	Slow Charger (220mA)	£8.80
MMB 11	Mobile Mount	£22.25
CSC1	Soft carrying case	£3.45
FL2010	Linear Amplifier 2m 10W	£64.40
FL7010	Linear Amplifier 70cms	£99.65

6, 2 or 70!

6, 2 or 70!

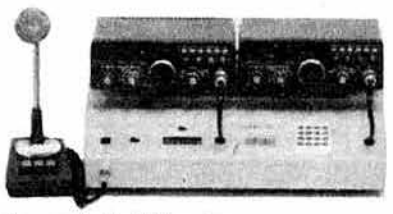
FT480R (2m)

- ★ 144-146MHz (143.5-148.5 possible)
- ★ ±600kHz standard repeater split
- ★ Excellent dynamic range and sensitivity
- ★ FM; 25, 12½, 1kHz steps
- ★ SSB; 1,000, 100, 10Hz steps

FT780R (70cm)

- ★ FT780R1·6 fitted 1·6MHz Shift **£459** inc.
- ★ 430-434MHz (440-445) possible
- ★ GaAs Fet RF for incredible sensitivity
- ★ FM; 100kHz, 25kHz, 1kHz, steps
- ★ SSB; 1,000, 100, 10Hz steps

★ USB-LSB-CW-FM (A3j, A1, F3)
★ 30W PIP A3j, 10/1 W out A1 F3
★ Any TX Rx split with dual VFO's
★ Four easy write-in memory channels
★ Memory scanning with slot display
★ Up/down tuning/scanning from mic.
★ Priority channel on any memory slot
★ Digital RIT. Advanced noise blanker
★ Satellite mode allows tuning on Tx
★ Semi break in with side tone
★ Very bright blue 100Hz digital display
★ Display shows Tx & Rx freq (inc RIT)
★ String LED display for "S" and PO
★ LED's; "On Air", Clar, Hi/Low, FM mod.
★ Size (Case): 8.3" D, 2.3" H, 6.9" W



illustrated with SC1 station consol & YD148 mic

FT208R £199 inc

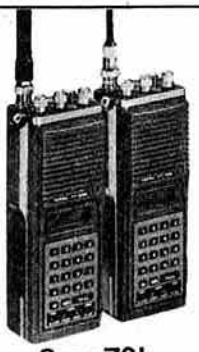
VAT @ 15% & POSTAGE

- ★ 144-146MHz (144-148 possible)
- ★ 12.5/25kHz synthesizer steps
- ★ ± 600kHz repeater split
- ★ 2.5 or 0.3W RF output
- ★ Rx: 20mA squelch 150mA max AF
- ★ Tx: 800mA at 2.5W RF
- ★ 0.25μV for 12dB SINAD

FT708R

- ★ 430-440MHz (440-450 alternative)
- ★ 25kHz synthesizer steps
- ★ Any split keyboard programmable
- ★ ±7.6MHz EU split standard
- ★ 1W or 100mW RF output
- ★ Rx 20mA squelch, 150mA (max AF)
- ★ Tx:500mA it 1W RF
- ★ 0.4μV for 12dB SINAD

★ Keyboard entry of frequencies/splits
★ LCD digital display with backlight
★ Any split + or − programmable
★ Ten memory channels "5 year" back up
★ Up/down manual tuning. Memory scan
★ Manual or auto scan for busy/clear
★ Priority channel with auto search back
★ Scan between any two frequencies
★ Auto scan restart. 1,750Hz tone burst
★ Built in condenser microphone
★ 500mW to int/ext speaker
★ External speaker/mic available
★ 168(H) × 61(W) × 39(D)mm
★ C/w Quick change NiCad pack, helical



2 or 70!

2 and/or 70!!

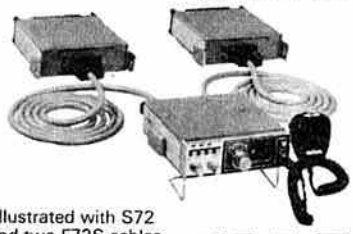
FT720RV ~~£245~~ NOW £199 inc

- ★ 144-146MHz (144-148MHz possible)
- ★ 12½kHz synthesizer, 600kHz shift
- ★ 0.3μV for 20dB quieting
- ★ Rx 0.5A. Tx RV 3.5A, RVH 6.5A
- ★ 5.8 (6.5)" D × 6" W × 2(2.2)" D

FT720RU ~~£265~~ NOW £229 inc

- ★ 430-434MHz
- ★ 25kHz synthesizer steps, 1.6MHz shift
- ★ 0.5μV for 20dB quieting
- ★ Rx; 0.5A, Tx; 4.5A
- ★ 5.8 (6.5)" D × 6" W × 2(2.2) " D

★ Four easy write-in memory channels
★ Rx priority channel (auto check)
★ Scanning band/memory empty/busy
★ Up/down tuning/scanning from mic.
★ Optically coupled tuning control
★ Manual and automatic tone burst
★ String LED's for 'S' and PO. 7 status LEDs
★ 1½W of audio to internal/external speaker
FT720 Control Head
★ 3.3 (4.3)" D × 6" W × 2 (2.2)" H
S72 Switching box
★ Pushbutton band change Auto steps/splits
E72S Extension cable, 2m long
E72L Extension cable, 4m long
MMB3 Mobile Mounting bracket for deck



illustrated with S72 and two E72S cables

SOUTH MIDLANDS COMMUNICATIONS LTD

S. M. HOUSE, RUMBRIDGE STREET, TOTTON, SOUTHAMPTON SO4 4DP, ENGLAND
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Affiliated societies: £14.50 (including *Rad Com*); **£8.70** (excluding *Rad Com*).

RADIO SOCIETY OF GREAT BRITAIN

(Limited by guarantee)

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Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW

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Founded 1913. Incorporated 1926. Member society, International Amateur Radio Union

PATRON: HRH The Prince Philip, Duke of Edinburgh, KG

The national society representing all UK radio amateurs

Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the general manager, from whom full details of Society services may also be obtained.

GENERAL MANAGER AND SECRETARY
D. A. Evans, G3OUF

EDITOR
A. W. Hutchinson

RSGB HEADLINE NEWS—Tel 0707 59312

By telephoning the above number, members can receive up-to-date amateur radio news of immediate interest from a three-minute recording. This is generally updated twice weekly, or more frequently as necessary.

RSGB SUNDAY NEWS BROADCASTS

These broadcasts are made every Sunday morning, giving almost complete coverage of the British Isles. Stations broadcasting them (particulars below) use the callsign GB2RS.

The purpose of these news broadcasts is to provide an outlet for amateur radio news items which cannot wait for the next issue of *Rad Com.* Items for inclusion should reach RSGB HQ by letter (marked "GB2RS news") or telephone 0707 59260 before 10am on Wednesdays, although no guarantee of inclusion can be given. Once broadcast, items are not usually repeated.

INTENDED RECEPTION AREA	NORMAL READER	RESERVE READER	LOCAL START TIME
Frequency: 3·640MHz. Mode: ssb			
NE Scotland	GM3HGA	GM3VEY	1130
Frequency: 3·650MHz. Mode: ssb			
SE England	G2MI	G4ARZ	0900
Midlands	G2CVV	G8QZ	0930
SW England/Wales	G8ML	G3JFH/G4IEY	1000
Northern Ireland	GI3GAL	GI3SXG	1030
NE England	G5VO	G3MCF	1100
E Scotland	GM4CUZ	GM4FLP	1430
Midlands	G8QZ	G2CVV/G3SZJ	1800
Frequency: 3·660MHz. Mode: ssb			
Central Scotland	GM3TCW	GM3ULP	1130
Frequency: 7·0475MHz. Mode: a.m.			
UK (from Northern Ireland)	GI3GGY	GI2DHB	0900
UK (from N Midlands)	G3LEQ	G2CVV	1100
Frequency: 144·250MHz. Mode: ssb (horizontal polarization)			
N from Carlisle	G4LAA	(Vacancy)	0930
SW from the Midlands	G3BA	G3KQF	0930
NE from S Devon	G3CHN	G3PBV	1000
NW from Manchester	G3SMT	G3SMM	1000
NNW from Cleveland	G4JJB	G8FTZ	1000
W from Carlisle	G4LAA	(Vacancy)	1030
SE from Lincoln	G3NRO	G8ZVF	1030
SW from London	G3FZL/G3VAG	G3IIR	1030
S from Aberdeen	GM8GHV	GM8MBP	1030
W from Bristol	G4CJZ	G3ZWY	1100
W from Bangor, Co Down	GI3TLT	GI3SXG	1130
Frequency: 145·525MHz (S21). Mode: fm (vertical polarization)			
Caithness	GM4KNQ	GM4LNN	0930
Cornwall	G2ABC	G3NPB	0930
North Hampshire	G8CKN	G3PZN	0930
Suffolk	G3ZNU	G4FZZ/G4HMF	0930
Leeds	G3SPX	G8XGN	0930
Co Down	GI3WEM	GI4DOR	0930
Edinburgh	GM4EHO	(Vacancy)	0930
E Cornwall/S Devon	G3ZYY	G8XTE	1000
Londonderry	GI2DHB	GI4AHD	1000
London	G3FZL/G3VAG	G3IIR	1000
Birmingham	G3BA	G4LCM	1000
Lincolnshire	G3NRO	G8ZVF	1000
Tyneside	G4LDT	G8TKU	1000
Glasgow	GM4HCO	GM4CXM	1000
Elgin	GM4ILS	(Vacancy)	1000
Southampton	G8LVC	G4COM/G4IDV	1030
E Sussex coast	G8SC	G3ZFE	1030
Bristol	G4CJZ	G3ZWY/G8NNU	1030
Manchester	G3LEQ	G3JWK	1030
Dumfries	GM3MSG	(Vacancy)	1100
Brighton coast	G3ZYE	G8GEZ	1100
Preston	G8WAT	(Vacancy)	1100
Huntingdon, Cambs	G8BBK	G8TOI	1100
Jersey	GJ4JWA	GJ8YVL	1100
Barmouth, Gwynedd	GW4LNK	GW6ARL/GW3KJW	1100
Clwyd/Merseyside	GW4IEQ	G8NNS	1100
Aberystwyth	GW4JXB	GW8MAW	1130
Exeter	G3PBV	G4PCB	1130
Leicester	G4JYS	G4EYL	1130
Scarborough	G4OSD	G4EEV	1130
Enniskillen	GI4PCY	GI4CZW	1230

A MESSAGE FROM THE SOCIETY'S PRESIDENT

It is with humility that I accept the honour and responsibility of being your 49th President.

Much is owed to the enthusiasm and energy of the army of voluntary unpaid officials at all levels from the Council down, without whom the Society would cease to exist. I have also been impressed by the tireless dedication of your general manager, loyally supported by his staff, despite the difficult working conditions at 35 Doughty Street. The move of headquarters to Potters Bar is a significant step forward towards improved conditions for the staff and facilities for the members.

The United Nations has designated 1983 as "World Communications Year," and has selected the International Telecommunication Union as the lead agency. The heightened awareness of all nations to the importance and value of telecommunications should find a ready response from the amateur service with its accent on international friendship. In this respect every member of the Society is an ambassador to the world at large. In the forefront of our minds should be the twin watchwords of "Communication" and "Friendship" in all our dealings, local, national and international.

I wish all members a happy and successful year.

Don Baptiste

RSGB COUNCIL ELECTION RESULT

The result of the ballot to fill four vacancies on Council from 1 January 1983 was as follows:

ORDINARY MEMBERS

Candidate	Votes
N. Foot, G8MCQ	1,810
G. A. Griffiths, G3STG	2,230
H. M. Holmden, G4KCC	2,347
G. R. Jessop, G6JP	2,730
D. M. Pratt, G3KEP	2,696
B. Reay, G8OSN	1,722
F. S. G. Rose, G2DRT	1,941
K. E. V. Willis, G8VR	3,257

Messrs H. M. Holmden, G4KCC; G. R. Jessop, G6JP; D. M. Pratt, G3KEP; and K. E. V. Willis, G8VR, were accordingly elected to serve on the RSGB Council for the three years 1983-5. The election of Mr G. R. Jessop was confirmed at the annual general meeting on 4 December.

Mr R. Bellerby, G3ZYE, resigned from Council in November 1982, thus creating a casual vacancy which Council may wish to fill at its first meeting in 1983.

QTC
Amateur radio news

World Communications Year (WCY) 1983

The United Nations has proclaimed 1983 as World Communications Year: *development of communications infrastructures* (WCY)

The main objective of WCY is to provide the opportunity for all countries to undertake an in-depth review and analysis of their policies on communications infrastructures. The observance of WCY should stimulate concrete action by governments, UN organizations, other international and regional organizations, non-government organizations and users of communications services, to improve and accelerate communications infrastructures all over the world.

The new Telecommunications Bill

A new Telecommunications Bill is now before parliament; its main purpose is to legislate for the privatization of British Telecom, but one section of it seeks to amend portions of the Wireless Telegraphy Act of 1949 and 1967. It is a long and complex bill, and the Society's Licensing Advisory Committee is still engaged in studying it in order to establish the implications for radio amateurs. Broadly speaking, the main thrust of the bill is to cut down interference, particularly from cb-type operators using equipment which could not be licensed in the UK—the bill seeks to make possession, advertisement or sale of certain types of radio equipment illegal, and proposes limited powers of arrest without warrant and the ability to enter and search premises in which there is suspicion of an offence having been committed.

The bill had its second reading on 29 November 1982, and then went forward for detailed clause-by-clause consideration by parliament. In essence, there is a power in the bill which is aimed at allowing the Secretary of State to prohibit the sale, advertising, manufacture or possession of equipment which he may specify: this is designed to close a loophole which allows, for instance, a.m. cb equipment to be freely bought and sold in shops and advertised in magazines. The bill appears to apply principally to equipment which is not licensable—amateur radio equipment does not, *prima facie*, fall into this category.

It must be stressed that much could happen before the bill receives the royal assent and appears on the statute books, but a preliminary reading would seem to indicate that it is to be welcomed as a positive step forward in the controlling of spectrum abuse and the ease of enforcement of the existing legislation.

May RAE

The closing date for normal entries to the May Radio Amateurs' Examination is 15 February 1983. This examination can be taken at many centres, and to assist candidates in obtaining a place the RSGB will be accepting candidates for its own examination centres in London and Derby.

Early application to the Membership Services Department, RSGB headquarters, well before 15 February is strongly recommended.

Society history

The RSGB Council has formed a working group to examine all aspects of the Society's history. The group is interested in borrowing photographs for reproduction, and in obtaining photocopies of documents of amateur radio interest published before 1930.

Anyone who is able to assist in this direction is asked to contact Les Hawkyard, G5HD, QTHR, in the first instance.

Two pull-out supplements this month

This month, in addition to the annual index supplement in the centre of this issue, another four-page pull-out supplement, *Rad Com Operating Guide 1983*, is located between the main text and the index. This brings together basic operating information which in previous January issues has been scattered throughout the journal.

It is hoped to develop this "guide" in future to include similar basic information which will remain largely unchanged during the year.

Stolen equipment

On 28 October in Manchester: Yaesu Musen FT290R, serial number 1KO60700; Microwave Modules linear amplifier MML144/30/LS; Eurosonic 13·8V dc 5A psu. Information to Longsight Police Station, Manchester, or tel 0463 38050.

On 9 November in Farnham, Surrey: Yaesu FT480R, serial number ICO90518. Information to Farnham Police Station, tel 0252-716262.

RSGB NATIONAL AMATEUR RADIO CONVENTION

National Exhibition Centre Birmingham

5 and 6 March 1983

For the first time in the history of UK amateur radio, the Society is planning a major convention feature which will include a large trade exhibition, lectures covering all sections of the radio spectrum, and lectures for newcomers to the hobby.

The NEC is an ideal venue for such an event, primarily because of its excellent road and rail links. Car parking will be free, and special train fares (including the entrance fee) will be available from British Rail. Further information will follow next month.

Extension course for radio amateurs

The Bedford College of Higher Education, Cauldwell Street, Bedford, is offering a course for licensed amateurs who wish to extend their knowledge. Subject areas are: vhf/uhf propagation; antennas, swr, modulation and digital integrated circuits. The course commences on 17 January and will consist of eight weekly evening sessions. Further information from Mr C. P. Meadows, G4KWH, lecturer, School of Engineering, tel Bedford 45151, ext 240.

Catholic net

A well-established Catholic net meets on 3,710kHz at 9am on Mondays, Wednesdays and Fridays. Other skeds can be arranged. More information from Mr P. J. Fay, G3AKG, 116 Lowfield Road, Caversham, Reading RG4 0PB.

New club project

Anyone interested in the formation of a Church Lads and Church Girls Brigade radio amateur swl international club, is invited to contact Mr R. V. Copeland, G4PDF, 6 Powis Mews, Flitwick, Beds MK45 1SU.

RSGB NATIONAL VHF CONVENTION

Sandown Park Racecourse

Esher, Surrey

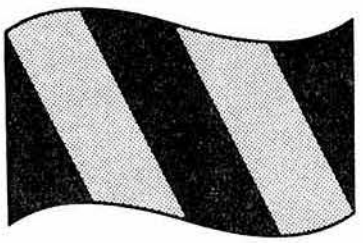
Saturday 26 March 1983

Trade exhibition — Lecture programme

Evening social function and buffet supper

Details next month

Rotarian Reg Leigh, G4EWY, co-ordinator of Rotarians of Amateur Radio (ROAR), who is about to compile a new register of rotarians with amateur licences. He asks them to please send their callsign, name, address, phone number, club, classification, wife's name (Inner Wheel?) to him at 22 Western Road, Lancing, West Sussex BN15 8RX. There is no charge, but a stamp for a copy would be appreciated.



RSGB at the National Exhibition Centre, Birmingham

5th & 6th March 1983

This year's National Amateur Radio Exhibition takes place on 5th & 6th March 1983 at the National Exhibition Centre. To make travel by train even easier, the Society has entered into a special arrangement with British Rail to bring you a package deal, which includes the rail journey from the station nearest your home to Birmingham International — and admission to the exhibition — all included in the price. Return tickets for travel on the London Underground system are available at a small extra charge*. Since members don't have to leave to go home the same day, the opportunity exists to enjoy the exhibition and also stay overnight in Birmingham and enjoy that too.

The table given below shows the inclusive prices from your county, and all that is required is to complete the coupon and send it with your remittance, and a self-addressed envelope, to: The Travel Manager, Kings Cross Station, London NW1 2RT.

Prices shown are return fares

	£		£		£
Avon	9.50	Lancashire	10.50	South Yorkshire	10.00
Bedfordshire	9.50	Leicestershire	5.50	West Yorkshire	11.50
Berkshire	10.00	Lincolnshire	8.50	Greater Manchester	7.50
Buckinghamshire	8.00	Greater London	12.00	Clwyd	10.50
Cambridgeshire	12.00	Merseyside	9.50	Dyfed	16.00
Cheshire	6.50	Norfolk	14.00	Mid Glamorgan	11.50
Cleveland	16.50	Northamptonshire	6.00	South Glamorgan	11.00
Cornwall	29.50	Northumberland	21.00	West Glamorgan	13.50
Cumbria	15.00	Nottinghamshire	6.50	Gwent	10.00
Derbyshire	5.50	Oxfordshire	7.75	Gwynedd	12.50
Devon	24.50	Shropshire	6.00	Powys	8.50
Dorset	19.50	Somerset	23.00	Central Scotland	23.50
Durham	17.50	Staffordshire	5.00	Dumfries/Galloway	18.50
Essex	14.75	Suffolk	14.00	Fife	23.50
Gloucestershire	6.50	Surrey	14.75	Grampian	31.00
Hampshire	17.75	Sussex	15.75	Highlands	33.50
Hereford/Worcester	4.50	Tyne & Wear	18.50	Lothian	22.50
Hertfordshire	11.50	Warwickshire	4.00	Strathclyde	22.50
Humberside	13.00	West Midlands	4.00	Tayside	25.50
Isle of Wight	20.50	Wiltshire	10.50	(Children half price)	
Kent	15.75	North Yorkshire	14.50		

Ref: NEC Amateur Radio Exhibition
5th & 6th March 1983.
(Please include a self addressed envelope)

Name_____ C/S_____

Address_____

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Station travelling from/to_____

No. of tickets Adults [ ] Children [ ]

*I will/will not require [ ] LT tickets at 80p each

Remittance enclosed £ [ ]

An error-resilient 1,200 baud decoder for UOSAT spacecraft telemetry and experiment data

by M. S. HODGART and J. Z. SLOWIKOWSKI*

Introduction

The scientific, amateur radio and educational spacecraft UOSAT-Oscar 9, built at the University of Surrey in conjunction with AMSAT and supported by British industry, was launched into a polar, 95min earth orbit on 6 October 1981. Experiment and telemetry data from the spacecraft is transmitted at a variety of speeds and in several formats at 145·825 and 435·025MHz nbfm compatible with inexpensive amateur receivers and simple groundstation antenna systems. The most useful data format for scientific and engineering purposes, however, is the high-speed 1,200bps ASCII option using phase-synchronous cfsk.

The nature of the phase-synchronous cfsk data transmissions is first discussed, and an effective circuit for decoding these data in the presence of noise is described.

The telemetry signal

The actual telemetry data for the purpose of this note is an irregular series of figures "1" or "0". In the encoder on board the satellite a bit "1" creates an audio tone of 1,200Hz, while a bit "0" creates an audio tone of 2,400Hz. For each bit there is either one cycle of 1,200Hz or two cycles of 2,400Hz. An example of a typical signal is shown in Fig 1. It is this waveform that phase modulates the down-link carrier. It is to be noted that the bit interval "T" is always a constant—approximately 840ms—and the start of a bit interval is always on a positive-going zero crossing.

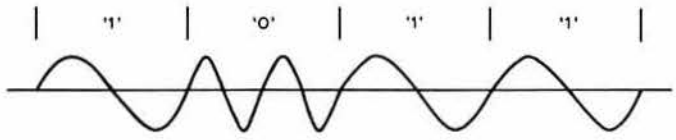

Fig 1. Example of telemetry signal

The modulation deviates the carrier's phase by approximately ±90° on either a "1" or a "0". Assuming the use of a conventional fm receiver, its output is in theory the time differential, the *slope*, of the original modulating signal. The output needs post-integration to restore the signal before decoding.

In practice, with the limitations of a finite i.f. bandwidth (recommended about 12kHz) in the receiver, and limited bandwidth of whatever discriminator is used in the receiver, the output may be expected to be quasi-integrated already. The user will need to apply additional de-emphasis—a simple RC low-pass filter—and adjust it empirically. The test of a reasonable state of signal restoration is that the output amplitude stays constant with the signal switching arbitrarily between the "1" state and the "0" state. This may easily be seen on an oscilloscope.

Further filtering at some sharp cut-off frequency above 2,400Hz with the idea of reducing noise to the decoder should not be attempted. It serves only to distort the signal. The decoder is of a correlator type, so that no signal-to-noise advantage can be expected.

Clearly the task for a decoder attempting to interpret this signal is: (a) to decide on the start of each bit interval—to establish the timing in fact—and (b) to decide within each interval whether there is one cycle of a 1,200Hz tone or two cycles of a 2,400Hz tone. Then it may give as an output either a "1" or a "0", depending on a correct interpretation of the waveform.

An important practical problem can arise from arbitrary and random sources of interference; the overall signal-to-noise could be poor due to the uncertain alignment in some situations of either the transmitting antennas or the receiving antennas or both; and it is a consequence of frequency demodulation that within temporary drop-outs of signal the output of the discriminator may contain high energy spikes in addition to ordinary background hiss. Practical experience shows that spikes can enter the system also from man-made electrical interference. It was found necessary to design a decoder which could contend with such conditions tending to degrade the signal. In a word, the decoder must be *tolerant* to noise.

After the work was completed it was found that a desirable consequence of developing a decoder with robust acquisition properties on poor-quality signals was that it was equally successful on these signals when they were recorded. Signals could be recorded on a domestic-quality tape recorder, and decoding was possible on play-back despite the speed fluctuations which exist in the transport; the decoder is self-timing.

Decoder design principles

The decoder that emerged after a number of trials and design attempts consists of two basic blocks; one block is an unconventional phase-locked loop whose job is to acquire timing. The other block is a correlator and is intended to acquire the data, driven by a synchronizing waveform derived from the pll. Fig 2 is a simplified system diagram. To understand the nature of the system it may be helpful to consider the nature of the signal entering the system in more detail. Rather than considering it as a series of sine-wave tones—which is its essential nature presented at the input—it is more convenient to consider the *digital* equivalent which emerges at the output of the first limiting stage of the system at point (1) of Fig 2. In the absence of noise, and for the same assumed bit pattern as in Fig 1, this digital waveform

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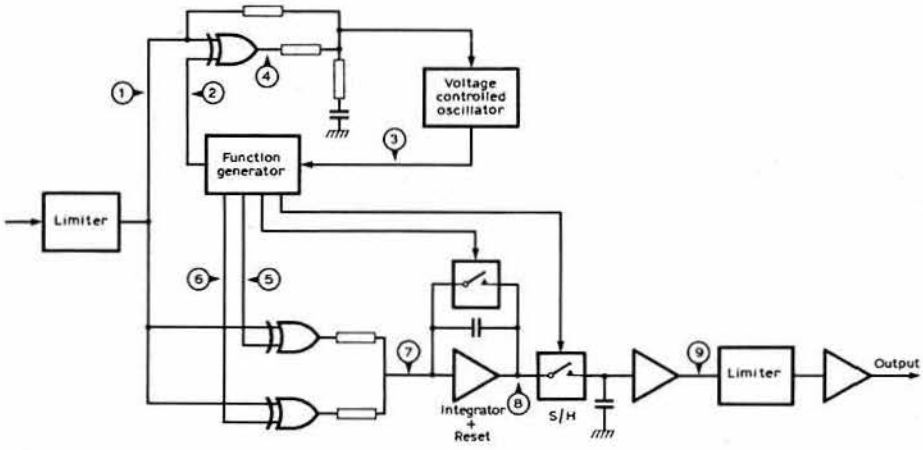


Fig 2. Block diagram of overall system

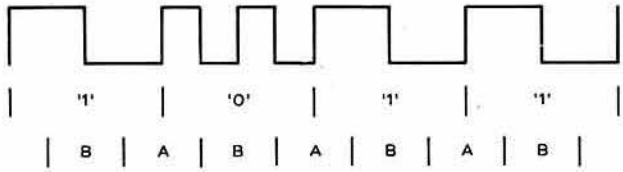


Fig 3. Example of digital equivalent telemetry signal after limiting

would have the appearance shown in Fig 3. Careful observation shows that it consists of alternating regions of timing and data.

The regions marked "A" in the diagram are always the same, while the regions marked as "B" have the same structure but have a polarity depending on there being a data "1" or a data "0". Seen as a digital pattern the signal has a high redundancy, with 50 per cent of its time always being the same—in the "A" regions. It is an obvious strategy then to design the pll block to "work" on the "A" regions of the signal only and to ignore the "B"; equally the aim is to design the correlator block to "work" on the "B" regions of the signal but not on the "A".

In order to confer the maximum noise immunity both timing and data acquisition must be prepared to tolerate noise spikes and "glitches".

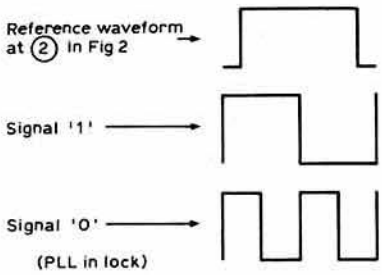


Fig 4. Waveforms in pll part of the system

The phase-locked loop

It is assumed that the general principles of pll design are known to the reader. In practice a simple and well-known RCA COSMOS chip system was employed. It is known that better systems are available. Whatever chip is employed, pin connections must exist so that some non-standard modifications can be made. Reference to Fig 2 shows, for example, a "feed forward" path; the signal input to the EX OR gate at point (1) bypasses the gate and adds into the loop filter capacitor in parallel with the EX OR output. Second, there is a function generator interposed between the tunable voltage-controlled oscillator vco and the reference input, between points (3) and (2) at the EX OR gate. The reference waveform at point (2) is not oscillating at the same rate as the conventional square waveform generated by the vco; it is not even a square wave. The function generator block interposed between the vco and the EX OR gate produces a waveform as shown in Fig 4. It is seen to be a rectangular function with a mark to space ratio of 3:1. In other words for 75 per cent of the time it is "high". The figure shows it in reference to the two possible inputs of a "1" or a "0" *assuming that the pll is locked.* The actual vco waveform (not shown) is running at a nominal 4,800Hz (see circuit description later).

All the waveforms to be expected around the pll block are shown in Fig 5. Column (a) shows the waveforms when the pll is in lock. Column (b) shows the waveforms when the vco function is lagging the input; and column (c) shows the waveforms when the vco function is leading the input. The vco function may be termed a reference signal.

Possibly the most important waveform is the *error* signal, and is the sum of the signal input and the EX OR output physically existing as a current injected into the loop filter capacitor. The points to be appreciated are that the error waveform is always at a constant level V/2 in the lock condition; that on average it goes above V/2 if the vco lags, and on average it goes below V/2 if the vco leads*. It is also to be noted that the error signal is the same irrespective of the input data being either a "1" or a "0". A more subtle point is that for 75 per cent of the time, when the reference signal is high, the *error signal is unaffected by the signal input level.* The pll is therefore immune to noise and interference for 75 per cent of the time. A further benefit of this non-standard system is that there is no unwanted frequency modulation of the vco when the system is correctly in lock.

Connoisseurs of pll design will recognize the choice of loop filter as a simple approximate "proportional plus" circuit. The choice of all resistor values and capacitor values was carefully computed, but the final choice of loop bandwidth and damping was arrived at empirically. The chosen loop bandwidth for the component values, shown in Fig 6, is 10Hz with the damping in the order of unity. More complicated psd designs based on edge-controlled logic or point sampling techniques with sample, hold etc, are not optimum in this application. The standard EX OR gate, as indicated in the diagram, is optimum for noise rejection in the remaining 25 per cent of the time when the system is not noise immune. Effectively the integrative properties of the loop are fully exploited here, and the steering of the loop is governed *not* by the edge of the input on the start of each signalling cell but by the average signal level within 25 per cent of the cell. Use of edge-controlled logic would be quite inappropriate in this context.

The correlator block

The correlator part of the decoder is designed to interpret the "B" region of the incoming signal and ignore the "A" regions. The design aspects are conventional. The essence of a correlator is that the input should be multiplied by a would-be "match" to its noise-free shape. On integration of their product the integrator output at the end of one bit period will have either incremented up if the match was correct, or incremented down if the signal was the inverse of the attempted match. That is precisely what is done

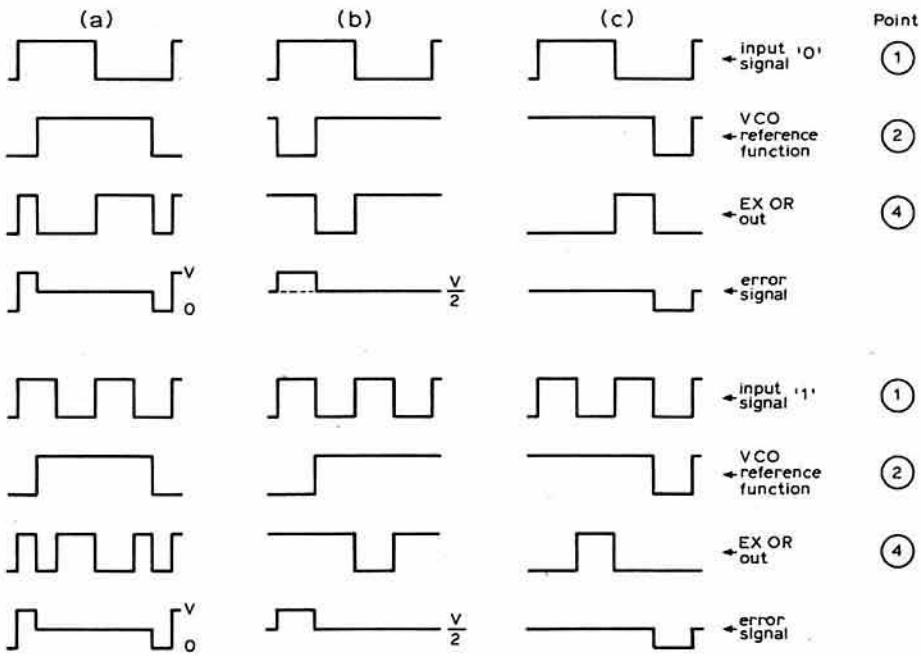


Fig 5. Phase-locked loop waveforms

*Assumed voltage levels + V on high, 0 on low. Practical system V_{DD} - V.

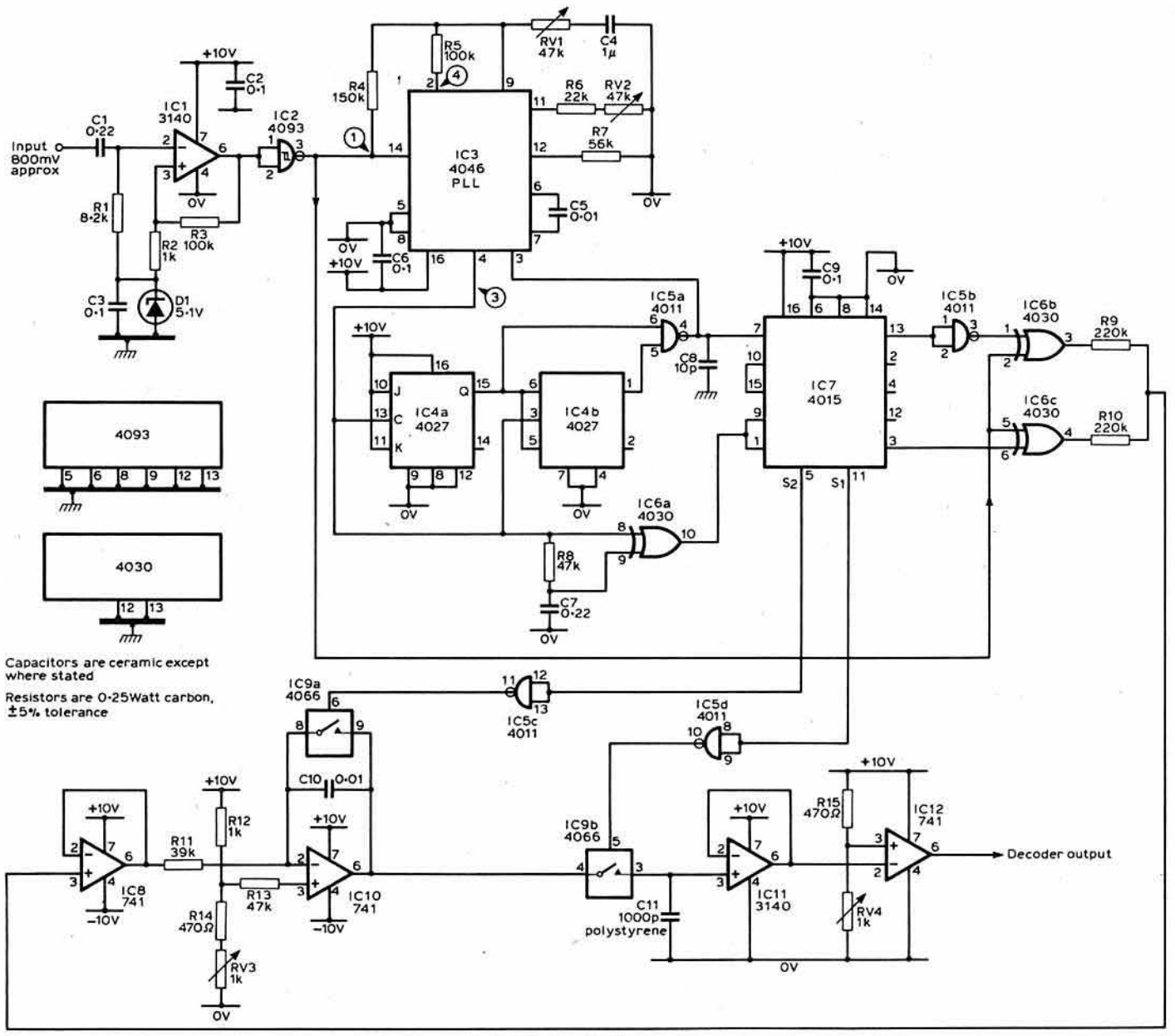


Fig 6. FSK pll correlator decoder

in this circuit except that the "multiplication" is replaced by a digital EX OR gate.

A peculiarity of this system is that the input signal is cross "multiplied" by *two* different waveforms in two separate EX OR gates whose outputs are then summed, see points (5) and (6) in Fig 2. These two reference waveforms and their relationship to the signal input within one signalling interval are shown in Fig 7. As indicated in previous discussion, these waveforms have their origin in a common logical derivation within the pll function generator. The timing of these correlator reference signals is only valid assuming that the pll has in fact acquired lock on to the input signal.

After some thought it will be realized that the nature of the *summed* current into the integrator, at point (7) in Fig 2, is either "positive" (above average) on a "1", or is a "negative" (below average) on a "0"; but only within the "B" region of the signalling interval. In the first 25 per cent and the last 25 per cent there is just an average current contribution into the integrator. The voltage at the integrator output ramps up or ramps down, and may be sampled after time 3T/4 from the beginning of the interval. This may be held, and after subtraction of a threshold the input to the limiter at point (9) is then ideally low or ideally high, indicating the estimate of the incoming bit. (Various biases have to be introduced at various points to allow for operation between zero and one positive power supply.) The actual output is inverted for the correct polarity.

It should be realized that the effect of noise glitches within the "B" region is to slow down or attempt to reverse the integration ramp. But this scheme clearly creates the maximum margin and resistance to such adverse noise effects. As long as there is *some* net integration within the "B" region, and in the correct sense, then the correlator will make the right decision. It may also be realized that in the first 25 per cent and the last 25 per cent—the "A" regions—the correlator is unaffected by the signal level at (1) which may have any value. The correlator is therefore immune to noise and interference for 50 per cent of the time.

UOSAT decoder circuit description

The circuit diagram of the UOSAT decoder is shown in Fig 6.

Limiter

The input from the previous discriminator stage should ideally be adjusted in the range 500mV to 1V peak-to-peak. Such a signal was found to produce optimum results when applied to the fet input op-amp IC1. IC1 is a limiter whose output is a square wave with edges corresponding to the input sine-wave zero crossing points as shown in Fig 3. The relatively slow rising and falling edges are speeded up by passing the square wave through the Schmitt trigger gate IC2. The clean limited waveform is fed to the pll, entering on pin 14 of IC3, R4, and to the correlator input on pin 2, IC6. After two inversions the square wave signal is of the same polarity as the input sine wave.

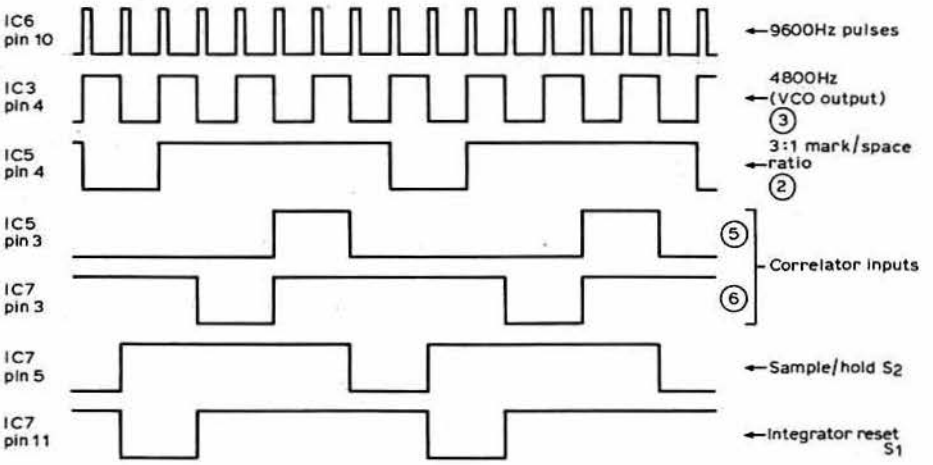


Fig 8. More system waveforms (system resting)

Phase-locked loop

As explained earlier, the purpose of the phase-locked loop is to produce the accurately-timed waveform pulses which are required by the correlator and integrator. In addition, pulses are required for the reset and sample/hold circuitry. The waveforms which are derived from the pll output frequency of 4,800Hz are shown again in Fig 8 with reference to the pin locations.

The vco centre frequency and tunable frequency range are set by C5, RV2, R6 and R7. With the values given, the frequency will tune approximately ±1·4kHz either side of 4.8kHz. When the pll is in lock, the vco control voltage (pin 9, IC3) will be an average $V_{DD}/2$ (5V in this case). The parallel combination of R4 and R5 together with RV1 and C4 make up the vco input filter. The values chosen produce a damping factor of approximately unity and a bandwidth of approximately 10Hz. It is to be noted that R4 is a direct connection between the signal input and the loop filter, by-passing the built-in EX OR gate; this non-standard feature is a vital part of the system. The pll output at pin 3, IC3 is a square wave of 4,800Hz, and R8, C7 and IC6 produce the correct clocking frequency of 9,600Hz for IC7.

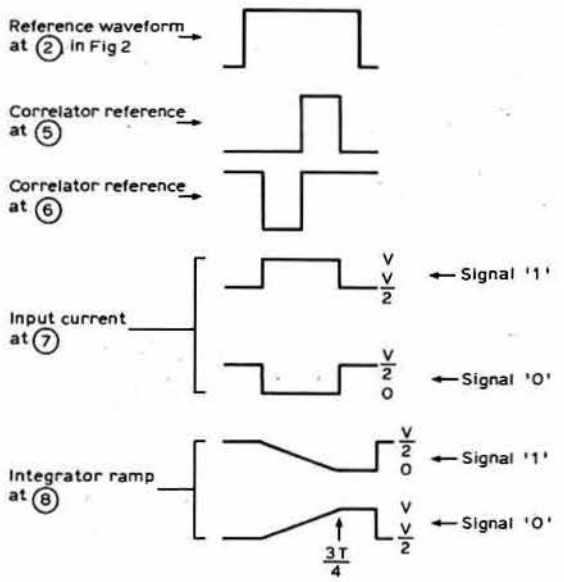


Fig 7. Waveforms in correlator part of the system

Logic and shift register stages

IC4 and IC5 produce the 3:1 mark/space ratio waveform required by the shift register IC7 for further wave shaping and the phase detector pin 3, IC3. The correct timing waveforms required by the correlator inputs on pin 1 and 5, IC6, the analogue integrator reset pin 6, IC9, and sample/hold analogue switch pin 4, IC9, are generated by the shift register IC7.

Correlator

The input at (1), as previously mentioned, can be either a 1,200Hz or 2,400Hz square wave. This is "multiplied" by the two correlator reference signals in two separate EX OR gates of IC6. The outputs of the two EX OR gates are added to produce one of the two possible wave forms shown in Fig 7. The correlator output is buffered by IC8 before being applied to the integrator IC10 and C10.

As the circuit was designed for 10V working, the logical "0" must produce an integrating ramp from 5V to 10V, while a "1" produces a ramp from 5V to 0V. C10 and R11 were chosen to produce the correct ramping time of 0·4ms. The potential divider R12, R14 and RV3 is adjusted so that no integration occurs when the buffer output is 5V (ie, when pin 3, IC10, is at 5V).

At the end of each bit cell, the integrator must be next for a fresh integrating cycle to begin. The sampling and holding of the integrator output is done by IC11 and C11. A sample is taken via the analogue switch at the end of the integrating period. The level detector IC12 is simply an op-amp configured as a 5V voltage comparator with high gain, so that any sampled level on pin 2, IC12, above 5V will indicate a logic "0", and a level below 5V will indicate a logical "1". As IC12 is in the inverting mode, the ultimate logic levels emerge as normal convention, "1" is high, "0" is low. R15 and RV4 set up the 5V threshold level.

Setting-up procedure

Alignment and adjustment of this system requires at least an accurate voltmeter. Preferred equipment for precise adjustment includes an oscilloscope (preferably two 2-channel) and a frequency source capable of providing a drift-free input of 1,200 or 2,400Hz. The alignment of the pll subsystem will probably require a frequency meter.

Since most of the decoder is built using cmos components, a small power supply (50mA or less) of +10V and −10V is required. Since the vco is sensitive to voltage changes at its control input, a stabilized 10V supply is required for good results.

By applying an accurate voltage of $V_{DD}/2$ at pin 9, IC3, and the filter R4, R5, RV1 and C4 disconnected, RV2 should be adjusted until a frequency of 4,800Hz appears at pin 4, IC3. The voltage should be varied from 0 to V_{DD} and the required variation in frequency checked. The low-pass filter is then connected and RV1 is adjusted so that stable lock is achieved when 1,200 or 2,400Hz inputs are applied.

The correlator output via the buffer IC8 (pin 6) should appear as in Fig 7 when stable frequencies are applied to the input. RV3 is adjusted so that the output of the integrator pin 6 is as shown (accurate setting up is required here to avoid preferential occurrence of one logic level above the other, for a noisy input). Finally RV4 is adjusted so that the threshold voltage on pin 3, IC12, is $V_{DD}/2$ (ie, 5V threshold).

If the above-mentioned laboratory equipment is not available to the constructor, it may be found adequate to insert the following resistors in place of the potentiometers: RV1, 39kΩ; (RV2, 33kΩ); R14 + RV3, 1kΩ; and RV4, 470Ω.

It is recommended that RV2 is left as a variable resistor which can be set using real UOSAT transmissions. One further simplification which can be made is to omit the −10V power supply and ground pin 4 of all the op-amps. However, this loses some valuable integral signal at IC10 because the signal low value only goes down to approximately 1V and not 0V.

After successful construction and testing, the circuit should now be completely operational for decoding the UOSAT synchronous data. □

EQUIPMENT REVIEW

The Yaesu Musen FT102 hf transceiver

by PETER HART, G3SJX*

Front view of the FT102

Introduction

The FT102 is the latest medium-price hf transceiver from Yaesu Musen. Introduced during the summer of 1982, this amateur-bands-only transceiver boasts a wide dynamic range receiver and extra-low-distortion transmitter. It is intended for ac mains operation only, incorporating valve driver and pa stages. The transceiver is a multimode design, with fm operation combined with a.m. transmit and a selection of extra filters available as optional extras.

Matching accessories available include antenna tuner, digital remote vfo, external speaker with additional audio filtering, and four-way remote antenna selector.

The instrument obtained for review comprised the basic FT102 without extra filters or fm facility. Measurements were also made with the FV102DM remote vfo.

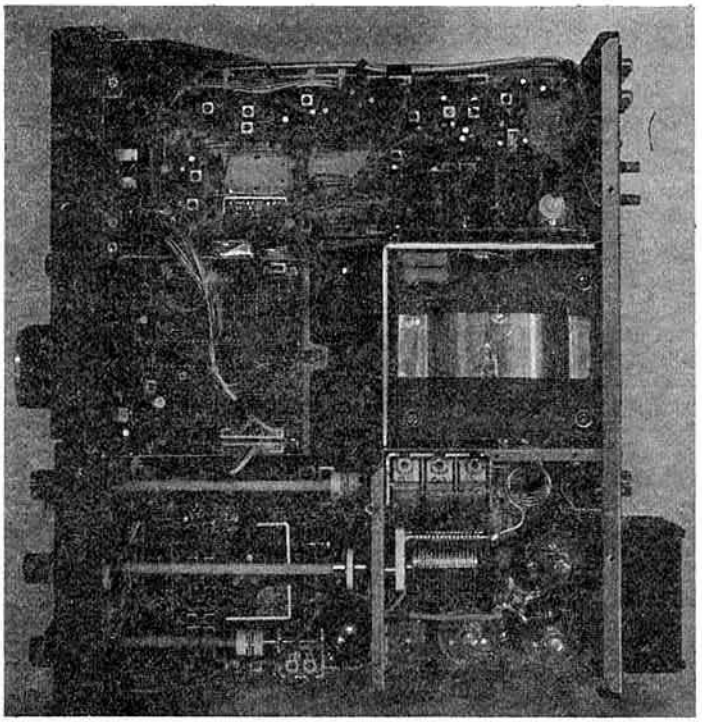
Principal features

The FT102 covers the hf allocations in 12 500kHz ranges, and provision is made for operation on usb, lsb, cw, a.m. and fm, with a number of selectable additional i.f. filter bandwidths available as extra. Both analogue and digital readout are provided, together with a built-in mains psu and cooling fan. Principal facilities include variable receiver bandwidth and i.f. shift, controllable notch and peaking filters, clarifier operating on receive and/or transmit, noise blanker, selectable receiver rf amplifier, and two-speed agc plus off. Transmitter facilities include speech processor, true transmission monitor, vox, extensive twin metering and adjustable audio characteristic.

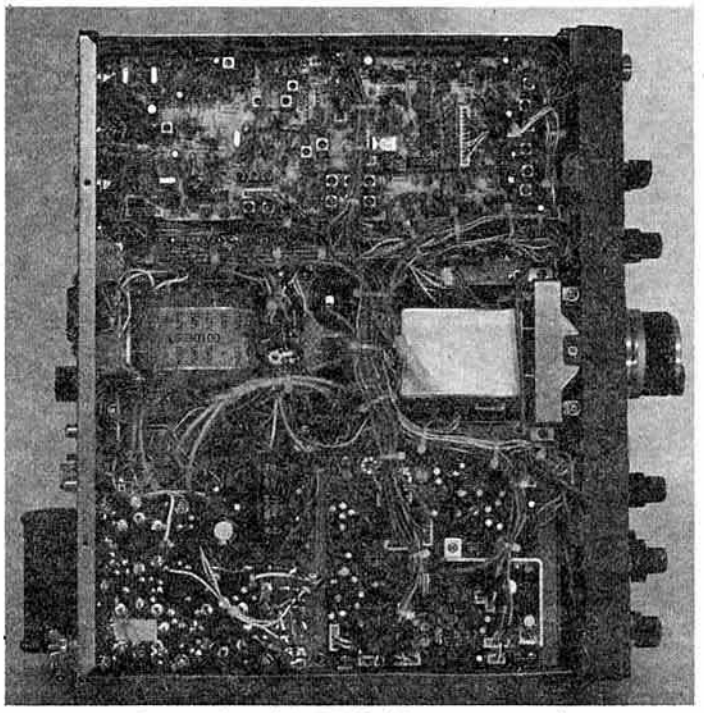
Extensive interfacing facilities are provided through connectors on the rear panel. These include ac power, 12V out, antenna socket, antenna outlet to external receiver, external antenna for the receiver, low-power rf output, narrowband and wideband i.f. outlets, receiver af out, transmitter af in, external speaker, anti-trip, ptt and key. Four DIN connectors are provided for control of remote vfo, external receiver, transverter and linear.

Description

The transceiver measures 36·8 (w) by 12·9 (h) by 30·9cm (d) and weighs 15kg. Conventional construction has been employed, with a sturdy steel chassis and rear panel and a diecast front panel. The circuitry is contained on eight printed boards mounted on both sides of the chassis and interconnected by plug and socket flying leads. The pa is housed in a separate screened compartment. The front panel is attractively styled and the controls are well laid out and easy to use. Six semi-preset controls may be recessed into the front panel, placing them out of the way when



Top view of the FT102 with covers removed



Bottom view of the FT102 with covers removed

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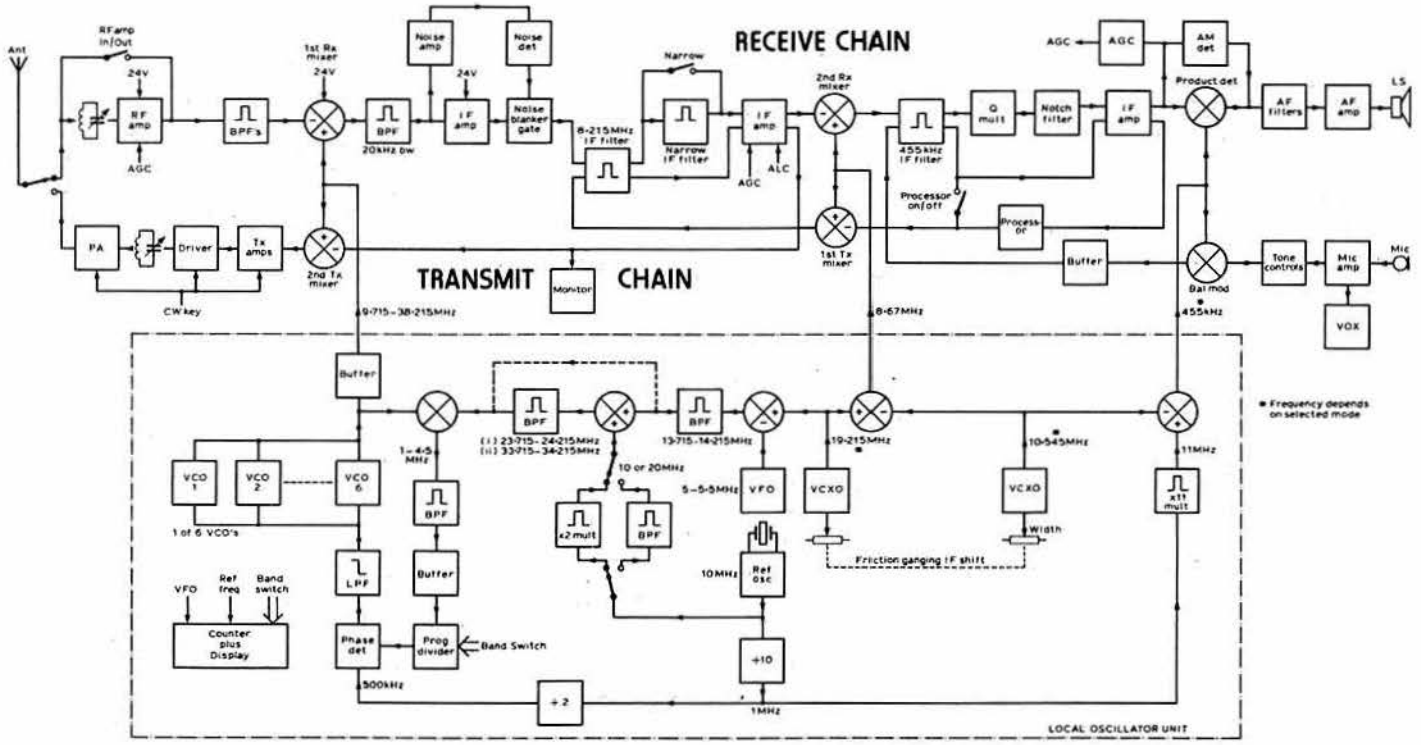


Fig 1. Simplified block diagram of FT102

adjustment is not required. The tuning rate is 17kHz per revolution of the 50mm diameter control knob. Digital frequency readout to 100Hz resolution is provided by a blue fluorescent display which gives excellent visibility even with direct sunlight. A larger-than-average 9cm diameter speaker is mounted in the top of the case. The brushless dc fan mounted on the rear panel is particularly quiet in operation.

A simplified block diagram of the FT102, omitting the fm sections, is shown in Fig 1. The transceiver is dual conversion with intermediate frequencies of 8,215 and 455kHz. In many respects, and in particular the local oscillator, the frequency relationships of the FT102 bear a strong similarity to the Trio TS830S[1].

On receive, incoming signals are amplified in an age-controlled cascode fet rf amplifier and converted to the first i.f. of 8,215kHz in a push-pull fet mixer. The input to the rf amplifier is preselector tuned from the front panel, and the input to the mixer is coupled via bandswitched double-tuned circuits. The output from the mixer passes through a 20kHz-wide monolithic crystal filter to a cascode fet i.f. amplifier followed by the noise blanker gate and the 8,215kHz eight-pole i.f. filters. The rf amplifier, first mixer and first i.f. amplifier operate from a 24V supply to improve strong signal performance. Provision is made for two cascaded eight-pole i.f. filters to accommodate narrow cw bandwidths. After further amplification the signal is converted to the second i.f. of 455kHz in a dual-gate fet mixer. In early transceivers a three-pole ceramic filter (or optional narrower eight-pole filter) provides selectivity at 455kHz followed by a notch filter and further amplification. In later transceivers, the three-pole filter is replaced by a narrower filter with improved shape factor. A diode-ring product detector is used on ssb and cw, and a diode envelope detector on a.m., followed by audio filtering and an integrated af amplifier. On cw an additional controllable audio peaking filter is operable.

Variable bandwidth and i.f. shift operate by altering the frequency of two vcxos by plus or minus a few kilohertz. Variable bandwidth is obtained by altering the frequency of the second conversion oscillator (8,670kHz) together with the product detector injection on 455kHz. I.F. shift operates by altering the frequency of the first conversion oscillator together with the second conversion oscillator, and the width control as well due to friction ganging of the controls. As the two vcxos alter the frequency of the second conversion oscillator equally but in opposite directions, the net result of operating the shift control is to alter the frequency of the first conversion oscillator and the product detector injection with no net change in frequency of the second conversion oscillator. The effect on bandwidth of altering these oscillator frequencies is described in [1].

On transmit, ssb is generated at 455kHz, processed and mixed to 8,215kHz for further filtering and conversion to final frequency. The 455 and 8,215kHz filters are common to both the receiver and the transmitter circuitry. The mixer to final frequency is a balanced diode ring mixer, and is followed by three stages of amplification before the valve driver, preselector tuning and pa stages. The pa uses three parallel-connected 6146B valves. The alc operates by reducing the gain of the 8,215kHz i.f. amplifier whenever grid current is detected in the pa valves.

Oscillator injection at 455kHz for the product detector and balanced modulator is obtained from mixing a 10,545kHz vcxo with an 11MHz signal derived from the 10MHz reference oscillator. Oscillator injection at 8,670kHz is derived from mixing 19,215 and 10,545kHz vcxos. The remainder of the local oscillator unit is concerned with oscillator injection for the signal frequency mixer between 9,715 and 38,215kHz. The principle is essentially the same as that adopted for the TS830S, and the reader is referred to [1] for further description.

Measurement technique

The measurement technique was similar to that used in previous reviews [2]. All signal input voltages are given as pd across the antenna terminal. When performing transmitter or receiver two-tone intermodulation measurements, the amplitude of intermodulation products generated is quoted with respect to either tone of the test signal.

Unless stated otherwise, all measurements were made on ssb with the audio gain set to give about 100mW af output, width control to maximum, shift control and tone control central, the af filter switched out and the rf amplifier switched in.

Receiver measurements

Sensitivity

Table 1 shows the sensitivity results obtained on ssb, both with the rf amplifier switched in and switched out. With the amplifier switched in, these figures indicate a noise floor of around – 133 to – 135dBm or a noise figure

Table 1. Receiver measurements (1)

Frequency	Sensitivity for 10dB s+n:n		Input for S9	
	RF amplifier in	Rf amplifier out	RF amplifier in	RF amplifier out
1·8MHz	0·14μV (– 124dBm)	0·56μV (– 112dBm)	45μV	140μV
3·5MHz	0·13μV (– 125dBm)	0·50μV (– 113dBm)	40μV	125μV
7MHz	0·14μV (– 124dBm)	0·63μV (– 111dBm)	40μV	160μV
10MHz	0·2μV (– 121dBm)	0·79μV (– 109dBm)	63μV	180μV
14MHz	0·16μV (– 123dBm)	0·89μV (– 108dBm)	45μV	140μV
18MHz	0·14μV (– 124dBm)	0·56μV (– 112dBm)	35μV	110μV
21MHz	0·14μV (– 124dBm)	0·71μV (– 110dBm)	35μV	125μV
24MHz	0·16μV (– 123dBm)	0·56μV (– 112dBm)	40μV	100μV
28MHz	0·14μV (– 124dBm)	0·50μV (– 113dBm)	28μV	90μV

Table 2. Receiver measurements (2)

Frequency	RF amplifier in		RF amplifier out	
	Image rejection	8,215kHz i.f. rejection	Image rejection	8,215kHz i.f. rejection
1·8MHz	90dB	72dB	43dB	58dB
3·5MHz	74dB	74dB	47dB	58dB
7MHz	83dB	63dB	48dB	46dB
10MHz	82dB	64dB	51dB	51dB
14MHz	65dB	70dB	40dB	53dB
18MHz	80dB	74dB	48dB	58dB
21MHz	86dB	73dB	51dB	56dB
24MHz	80dB	75dB	39dB	60dB
28MHz	70dB	80dB	34dB	64dB

of 6 to 8dB. With the rf amplifier switched out, these figures become −118 to −123dBm for the noise floor and 18 to 23dB for the noise figure.

S-meter calibration

The input signal level required to give an S9 meter reading is shown in Table 1. At 14MHz the S-meter calibration was:

S-reading	RF amplifier in Input signal	Relative increase	RF amplifier out Input signal	Relative increase
S1	2·8μV		13μV	
		2·5dB		2dB
S3	3·8μV		16μV	
		4dB		3dB
S5	6·0μV		22μV	
		7·5dB		9dB
S7	14μV		63μV	
		10dB		7dB
S9	45μV		140μV	
		22dB		18dB
S9+20	560μV		1·2mV	
		20dB		15dB
S9+40	5·6mV		6·3mV	
		18dB		13dB
S9+60	45mV		28mV	

Note that as the rf amplifier is agc controlled, the S-meter characteristic will differ depending on whether this amplifier is switched in or out. With the amplifier switched in the linearity above S9 is good.

Spurious responses

Table 2 shows the 8,215kHz i.f. rejection and the rejection of the primary image frequency which occurs 16,430kHz above the frequency to which the receiver is tuned. Switching out the rf amplifier also switches out one stage of front-end selectivity, and this results in a substantial degradation of these rejection figures. There was no detectable response at the 455kHz i.f. on any band. Worst case rejection of the half i.f. at 4,107kHz occurred on the 3·5MHz band at a level of 81dB.

To check for internally-generated spurious signals, the antenna socket was terminated in 50Ω and the receiver carefully tuned across each band in turn. A number of very weak spurii were noted, mainly between 28 and 30MHz, and none strong enough to move the S-meter or cause problems with an antenna connected.

Other spurious responses were checked by setting the signal generator on either side of the on-tune frequency and noting the amplitude for any responses obtained corresponding to an Sl meter reading. The generator was tuned from 100kHz off frequency down to 1MHz, and from 100kHz off frequency up to vhf. Generator harmonics, image and i.f. responses were ignored.

Frequency	RF amplifier in		RF amplifier out	
	Worst response	Other responses	Worst response	Other responses
1·8MHz	10mV	2 up to 250mV	35mV	1 up to 250mV
3·5MHz	50mV	5 up to 250mV	None	up to 250mV
7MHz	20mV	6 up to 250mV	70mV	1 up to 250mV
10MHz	70mV	3 up to 250mV	22mV	none to 250mV
14MHz	13mV	9 up to 250mV	45mV	1 up to 250mV
18MHz	35mV	9 up to 250mV	4mV	3 up to 250mV
21MHz	40mV	6 up to 250mV	3·5mV	4 up to 250mV
24MHz	40mV	4 up to 250mV	16mV	5 up to 250mV
28MHz	18mV	Several at 70mV	70mV	5 up to 250mV

AGC performance

The agc threshold was measured as 1·4μV with the rf amplifier in, or about 10μV with the rf amplifier out. The audio output remained within 1dB for a 120dB increase in the rf input above the threshold level (rf amplifier in). The attack time for a 20dB increase in a 100μV signal was measured as 10ms in the slow position or 2ms with some overshoot in the fast position. Corresponding decay times for a 20dB decrease in a 1mV signal were 500 and 40ms respectively.

Selectivity

The i.f. selectivity was measured with the width control set to maximum. It was found possible to measure about 75dB down the skirts of the filter before reciprocal mixing and generator noise became apparent. The results were:

Response	Bandwidth	Response	Bandwidth
−3dB	2·25kHz	−40dB	3·65kHz
−6dB	2·7kHz	−50dB	3·9kHz
−10dB	2·9kHz	−60dB	4·25kHz
−20dB	3·15kHz	−70dB	5·0kHz
−30dB	3·4kHz	−80dB	6·0kHz (approx)

The skirt response was symmetrical.

The notch filter depth was measured as greater than 40dB.

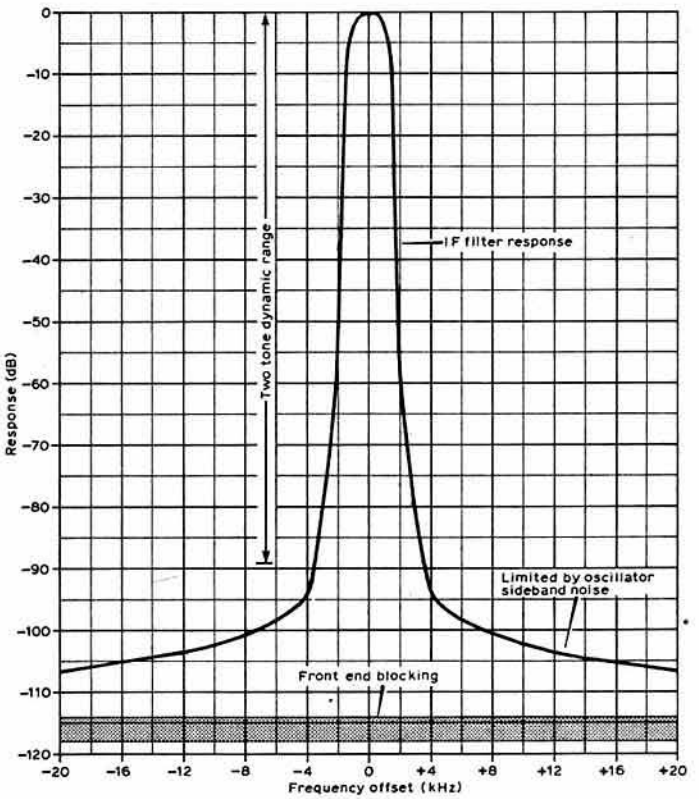


Fig 2. FT102 effective selectivity curve on ssb (2·5kHz bandwidth)

Oscillator sideband noise

Noise on the spectrum of the local oscillator (reciprocal mixing) was measured by connecting a signal generator on 21·4MHz to the antenna socket, tuning the receiver away from the generator frequency, and noting the level required to give a 3dB increase in noise output from the receiver. To ensure that the generator noise spectrum was considerably lower than that of the receiver local oscillator, a crystal filter with matching transformers was inserted between the generator and the receiver. Measurements on ssb (2·5kHz bandwidth) were:

Frequency offset	Input level	Level with respect to noise floor
3kHz	−39dBm	95dB
5kHz	−36dBm	98dB
10kHz	−31dBm	103dB
15kHz	−29dBm	105dB
20kHz	−27dBm	107dB
30kHz	−22dBm	112dB
40kHz	−20dBm	114dB
50kHz	−18dBm	116dB
75kHz	−15dBm	119dB
100kHz	−15dBm	119dB
200kHz	−15dBm	119dB

The ultimate limit was reached with input signals of −15dBm (40mV).

The effective selectivity curve is shown in Fig 2.

Reciprocal mixing measurements were also made using the FV102DM fully-synthesized remote vfo which replaces the internal LC vfo tuning 5 to 5·5MHz. The results were identical, showing—almost certainly—that the major noise contribution is occurring in the vco/phase locked loop circuitry providing local oscillator drive to the signal frequency mixer.

Third-order intermodulation

Measurements were made with signal spacings of 25kHz.

Frequency	RF amplifier	Third-order intercept	Dynamic range
7MHz	In	−1dBm	88dB
7MHz	Out	+15dBm	90dB
28MHz	In	0dBm	89dB
28MHz	Out	+11·5dBm	89dB

The dynamic range quoted is the two-tone spurious-free dynamic range related to the receiver noise floor on ssb (2·5kHz bandwidth approximately). No degradation in the intermodulation performance was observed with the noise blanker in operation, even at maximum threshold level.

In-band linearity was assessed with signal spacings of 200Hz, centred in the i.f. passband, and the af output viewed on a spectrum analyser [1]. With the rf amplifier in, −40dB third-order products were generated with input signals of 2μV. Between 7μV and 2mV the ip products were constant at −30dB rising to −20dB with signal levels of 20mV. With the rf amplifier out, the signal amplitude required to give the above ip levels was approximately 19dB higher. Reducing the rf gain control reduced the level of inband intermodulation products.

Blocking

The front-end blocking performance varied according to the on-tune signal level, due to the effect of agc on the rf amplifier. With a 10μV input signal at 28MHz, blocking occurred at −16dBm (35mV), and, with a 100μV input signal, at −4dBm (140mV). Measurements were only made with the rf amplifier in, and frequency offsets of 100 and 200kHz gave identical results.

Audio

The maximum audio power output into an 8Ω load was measured as 1·3W before the onset of clipping. An output of 1W could be obtained at three per cent distortion, and maximum audio output could be achieved with 0·3μV input signal. (7MHz, rf amplifer in.)

Transmitter measurements

CW power output, harmonics and spurii

Adopting the tuning procedure outlined in the manual for cw operation and driving to the maximum recommended level, gave the following results:

Frequency	Power output	Harmonics	Other spurii
1·8MHz	150W	−42dB	Less than −80dB
3·5MHz	165W	−40dB	−78dB
7MHz	152W	−40dB	−70dB
10MHz	150W	−45dB	−57dB, two at −64dB
14MHz	145W	−46dB	−55dB, three −60 to −70dB
18MHz	140W	−40dB	−58dB, five −70 to −80dB
21MHz	125W	−54dB	−62dB, five −70 to −80dB
24MHz	118W	−52dB	Several −38 to −70dB
28MHz	110W	−51dB	−60dB, five −65 to −75dB

The drive control may be used to operate at lower power levels.

The worst spurious outputs were obtained on the 24MHz band, where the figure of −38dB represents the third harmonic of the 8,215kHz i.f. This is inevitable when using final i.f.s which are sub-harmonics of the signal frequency. Fig 3 shows the output spectrum on the 24MHz band between 24 and 26MHz. The vertical scale is 10dB per division. Principal spurii on other bands occur at the i.f. of 8,215kHz and at 455kHz below the operating frequency.

Fig 4 shows the keying waveform and rf envelope when keying at speeds of 40wpm. There is very little distortion of the envelope, but the 1ms fall time could cause noticeable key clicks.

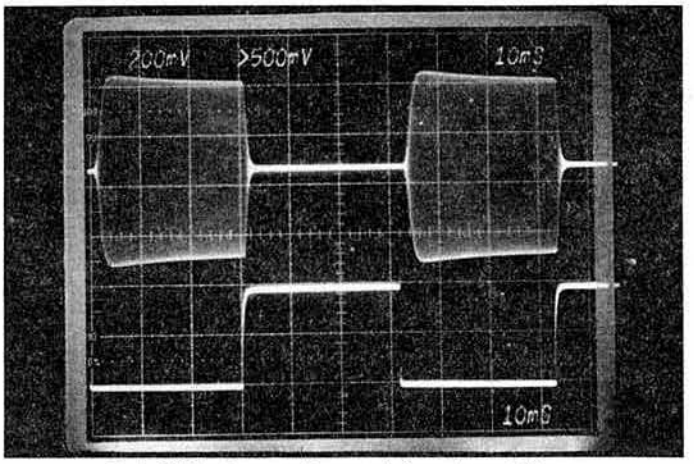


Fig 4. CW keying waveform and rf envelope at 40wpm

SSB power output and distortion

Two-tone measurements were made by applying 700Hz and 1·7kHz equal amplitude audio tones to the microphone socket and adopting the tuning procedure outlined in the manual. With the alc indication towards the top of the black zone, as recommended, the results were:

Frequency	Power output (p.e.p.)	Intermod products 3rd	Intermod products 5th	Intermod products at ±10kHz	Intermod products at ±20kHz
1·8MHz	170W	−24dB	−32dB	−60dB	−75dB
3·5MHz	160W	−28dB	−34dB	−65dB	−80dB
7MHz	160W	−34dB	−32dB	−65dB	−80dB
10MHz	145W	−25dB	−30dB	−60dB	−75dB
14MHz	152W	−31dB	−34dB	−67dB	−80dB
18MHz	158W	−36dB	−32dB	−62dB	−78dB
21MHz	142W	−30dB	−33dB	−62dB	−75dB
24MHz	135W	−30dB	−33dB	−63dB	−70dB
28MHz	125W	−30dB	−32dB	−60dB	−70dB

Reducing the microphone gain control to obtain 100W p.e.p. gave the following results:

Frequency	Intermodulation products at 100W p.e.p. output 3rd	5th	±10kHz	±20kHz
1·8MHz	−30dB	−39dB	−70dB	−80dB
3·5MHz	−40dB	−50dB	−80dB	−80dB
7MHz	−37dB	−50dB	−80dB	−80dB
10MHz	−31dB	−48dB	−80dB	−80dB
14MHz	−44dB	−55dB	−80dB	−80dB
18MHz	−30dB	−40dB	−65dB	−78dB
21MHz	−30dB	−45dB	−65dB	−76dB
24MHz	−40dB	−48dB	−60dB	−70dB
28MHz	−30dB	−40dB	−60dB	−70dB

The specification quotes the intermodulation product level as −40dB at 100W p.e.p. Although not stated, this is probably quoted with respect to p.e.p. and is equivalent to −34dB when quoted with respect to either tone of the two-tone signal, as are the figures above. This figure is not achieved on most of the bands. The alc is not capable of holding down the power output to the 100W level, and comes into operation at about the 140W level.

With the speech processor in operation, additional distortion was generated, largely confined to the audio bandwidth of the transmitter. Fig 5 shows the two-tone spectrum without the processor, and Fig 6 with 8dB

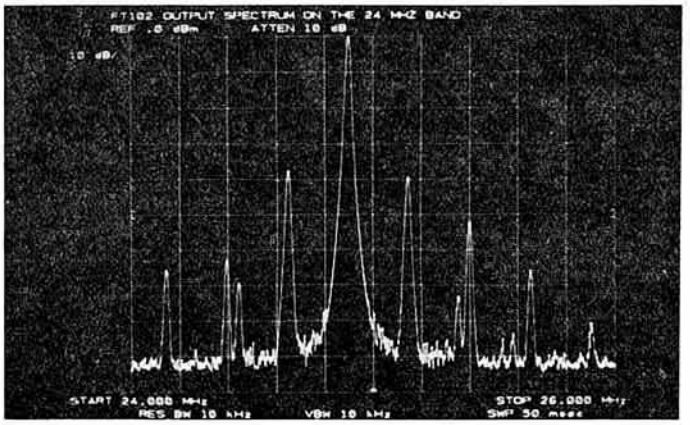


Fig 3. Transmitter spectrum on 24MHz band between 24 and 26MHz

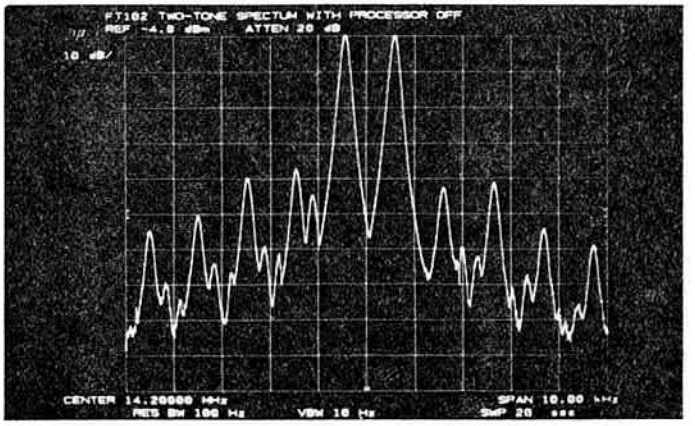


Fig 5. Two-tone transmitter spectrum with processor off

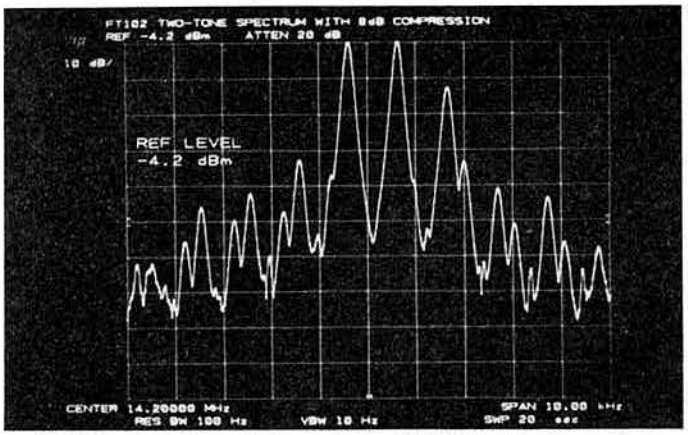


Fig 6. Two-tone transmitter spectrum with 8dB speech compression

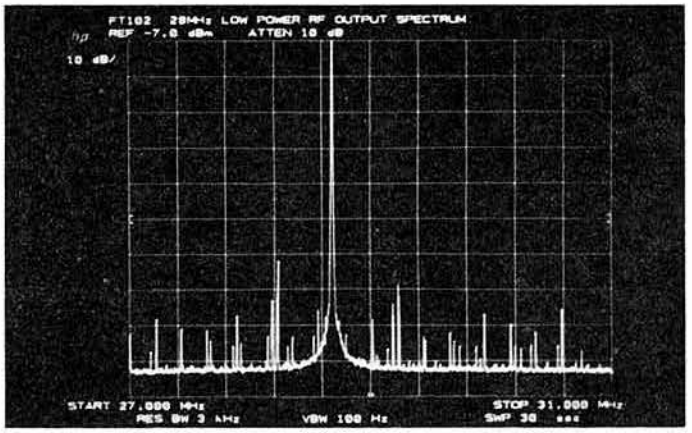


Fig 7. Transverter low power output spectrum on 28MHz band between 27 and 31MHz.

compression. The frequency span in both cases is 10kHz and the vertical scale 10dB per division.

The carrier suppression was between −50 and −60dB with respect to a single tone at full output power. The sideband suppression with a 1kHz audio tone was −70dB.

Audio

With the processor off, full output could be achieved with 0·3mV af input. The second harmonic of a 1kHz tone driving the transmitter to full output was −50dB.

Transmitter noise output

The transmitter wideband noise output was measured at 21·4MHz using a spectrum analyser with a low-noise preamplifier and a crystal filter. By observing the noise in the passband of the filter and tuning the transmitter away from the filter frequency so that the carrier was attenuated by the filter skirt response, the required measurement dynamic range could be compressed. The results on cw at full output were:

Frequency offset	Noise output	Noise output with respect to carrier in a 2·5kHz bandwidth
5kHz	−78dBm/Hz	−95dB
10kHz	−85dBm/Hz	−102dB
20kHz	−92dBm/Hz	−109dB
30kHz	−99dBm/Hz	−116dB

Measurements with the FV102DM gave similar results.

These results agree closely with the receiver reciprocal mixing measurements, indicating that the source of the noise was the first local oscillator.

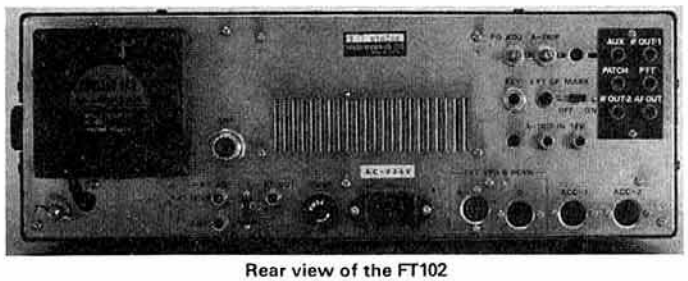
Frequency stability

The frequency drift was measured on 28MHz using the low level rf output. The transceiver drifted 100Hz during the first 5min from switch-on, a total of 200Hz after 15min, 450Hz after 1h, and 530Hz after 2h. The digital readout was accurate to within the resolution of 100Hz, and on cw the frequency readout was correct for a beat note of 700Hz.

Low-power (transverter) output

A low-power rf output facility is provided, taking output from the pre-driver stage. The heater switch should be turned off to disable the driver and pa, and time allowed for the heaters to cool. Alternatively, the transmitter may be inhibited electrically via the relevant DIN accessory connector. This is not described in the manual. Approximately −6dBm cw output was available on all bands, but a key-up spacer at about −35dB existed. The keying line is routed to accessory socket ACC1 pin 2, and it would be preferable to key, in addition, any subsequent transverter or amplifier. Higher powers than −6dBm may be obtained, but this results in a degradation of the harmonic and spurious outputs. In general the spurious output is worse than the complete transmitter, due to the reduced amount of selectivity (preselector and pi-tank bypassed). Fig 7 shows the output spectrum on 28MHz between 27 and 31MHz with a vertical scale of 10dB per division. A substantial number of spurii at −80dB are visible.

On ssb −5dBm p.e.p. output could be obtained at −30dB ips.



Rear view of the FT102

On the air performance

The transceiver was used for a period of two months, and generally performed very well. On the lower frequency bands it was preferable to switch out the rf amplifier, but on 28MHz the poor image rejection with the amplifier out resulted in strong spurii from 45MHz Band 1 tv. The reviewer lives within five miles of the Crystal Palace tv transmitter, and switching in the rf amplifier completely eliminated the problem. In conjunction with the MH1B8 microphone, good quality reports were received, with most stations preferring a few decibels of speech processing. The phone jack is compatible with stereo headphones.

The FV102DM digital memory vfo provides a number of useful facilities, including 12 memories, direct keyboard entry of frequency, scanning from the microphone, 10Hz frequency readout, four tuning rates, clarifier etc. This vfo suffered less from clicks when tuning in the presence of strong signals than other synthesized equipment used by the reviewer.

Manual

The 56-page instruction manual covers operation of the equipment, installation of the optional filters and fm board, circuit diagrams and alignment instructions. The circuit is described but no detailed servicing instructions are given. A parts list is included as a separate booklet.

Conclusions

The FT102 is a versatile transceiver with a good overall performance. The receiver dynamic range is not quite as high as claimed (89dB measured) but is nevertheless better than many other transceivers available. The three-valve pa delivers approximately 50 per cent more power than most transceivers, and the distortion is generally lower. However, the particularly low distortion figures claimed do not appear to be met.

The current price is £725 incl VAT, with fm board and additional filters extra. The fm/a.m. transmit board is priced at £40, and additional 8·2MHz i.f. filters at £11·90.

Acknowledgements

The transceiver used in this review was kindly loaned by South Midlands Communications Ltd, of Totton, Southampton. The reviewer would like to thank G3RQZ for providing critical on-the-air comments.

References

[1] "The Trio TS830S hf transceiver", P. J. Hart, G3SJX. *Rad Com* July 1982, pp576-80.

[2] "The Icom IC720A hf transceiver", P. J. Hart, G3SJX. *Rad Com* February 1982, pp129-33.

[3] "The Yaesu Musen FT-ONE hf transceiver", P. J. Hart, G3SJX. *Rad Com* October 1982, pp854-8.

The Toni-Tuna re-visited

by A. J. OAKLEY, G4HYD,* and A. G. HOBBS, G8GOJ**

SINCE THE ORIGINAL ARTICLE was published, *Rad Com* August 1982, this device has caused considerable interest, and numerous units have been built. As a result of the feedback generated by this response, the following corrections and modifications are now offered. All the suggested modifications can easily be "retro-fitted" as described; however, all future productions of the pcb will be manufactured to accept them without "surgery".

Corrections

First, despite the most careful proof reading, two errors crept into the circuit diagram (Fig 1, as published):

(1) The lower end of R5 (15kΩ) should be connected to the −5V rail, and not to ground.

(2) C3 (0·1μF) should be connected between IC1, pin 4 and ground, and not as shown.

The printed circuit layout is correct in respect of both these points, but see modified Fig 1.

Second, on page 680, third paragraph, fourth line, for RV3 read RV2.

Modifications

When attempting to adjust the input offset of IC1, potentiometer RV1 is very critical. To improve matters, change the value of R6 from 100kΩ to 470Ω, and insert an additional resistor, R35 (100kΩ) between RV1 slider and IC1, pin 3 (Fig 1). This can be achieved by carefully cutting the pcb track adjacent to RV1 slider, and soldering the new resistor between this slider and the top end of R6, on the underside of the board.

Sensitivity of the indicated frequency to input signal amplitude, though not serious, can be improved by fitting C16 (100pF) between pins 11 (input) and 9 (ground), of IC2 (Fig 1). This new capacitor can be soldered direct between these points on the underside of the board.

Adjustments of the range potentiometers RV2, RV3 and RV4 can be made less critical by adding two resistors R36 and R37 (220Ω each) between the +5V line and the top end of the potentiometers, and between the bottom end of the potentiometers and ground (Fig 2). The pcb tracks can be cut close to RV2, and the resistors bridged across these breaks on the underside of the board.

Overheating of the transformer can be caused by core saturation due to the dc component flowing through the secondary windings. This can be alleviated by using only one half of the secondary to feed both D3 and D4, allowing the dc components to cancel out. This can be achieved by cutting the pcb track between D4 cathode and the transformer, and soldering a bridge of insulated wire between D4 cathode and D3 anode, on the underside of the board (Fig 3).

This latter modification will keep the temperature rise inside the case under better control. However, some constructors have had difficulty with drifting of indicated frequency with temperature. Although all the prototypes used the component values specified, it now appears that the sensitivity to heat of IC2 varies between manufacturers, and maybe even between batches from the same supplier. If this is a problem, change the 47kΩ thermistor for another value. If the display indication moves to the right with time, increase the value of the thermistor, and vice versa.

Modifying the Toni-Tuna for wide shift

As designed, the Toni-Tuna has a frequency resolution of 10Hz (ie a 10Hz difference between adjacent l.e.ds). This gives a "window" 400Hz wide. If it is desired to use the unit as a tuning aid for wide shift signals (eg 850Hz) this

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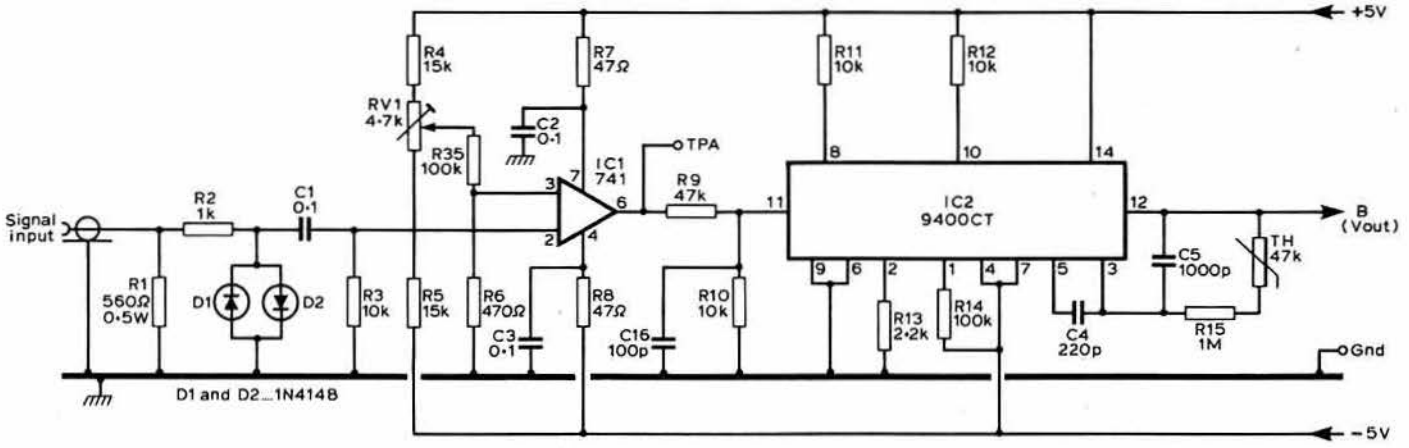

Fig 1. Modified circuit diagram of the input amplifier and F to V converter

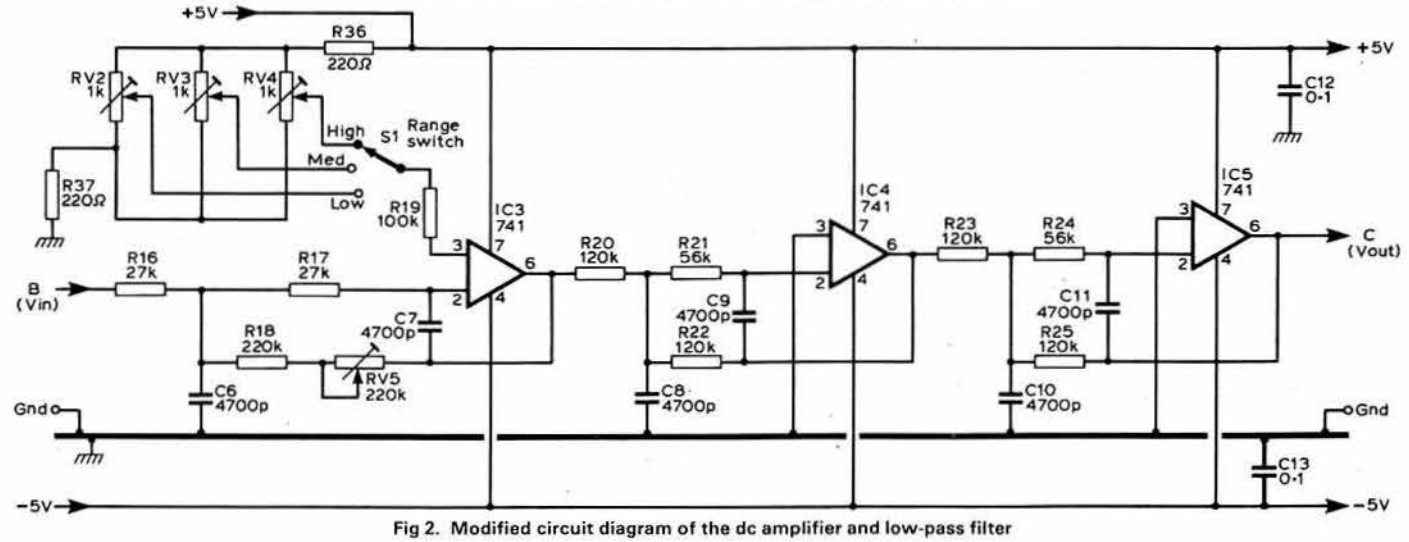

Fig 2. Modified circuit diagram of the dc amplifier and low-pass filter

Table 1. LED frequencies for narrow (170Hz) and wide (850Hz) standards

LED	170 (1,275/1,445) (Hz)	850 (1,275/2,125) (Hz)	170 (2,125/2,295) (Hz)	850 (2,125/2,975) (Hz)
1	1,165	725	2,015	1,575
2	1,175	775	2,025	1,625
3	1,185	825	2,035	1,675
4	1,195	875	2,045	1,725
5	1,205	925	2,055	1,775
6	1,215	975	2,065	1,825
7	1,225	1,025	2,075	1,875
8	1,235	1,075	2,085	1,925
9	1,245	1,125	2,095	1,975
10	1,255	1,175	2,105	2,025
11	1,265	1,225	2,115	2,075
12*	**1,275**	**1,275**	**2,125**	**2,125**
13	1,285	1,325	2,135	2,175
14	1,295	1,375	2,145	2,225
15	1,305	1,425	2,155	2,275
16	1,315	1,475	2,165	2,325
17	1,325	1,525	2,175	2,375
18	1,335	1,575	2,185	2,425
19	1,345	1,625	2,195	2,475
20	1,355	1,675	2,205	2,525
21	1,365	1,725	2,215	2,575
22	1,375	1,775	2,225	2,625
23	1,385	1,825	2,235	2,675
24	1,395	1,875	2,245	2,725
25	1,405	1,925	2,255	2,775
26	1,415	1,975	2,265	2,825
27	1,425	2,025	2,275	2,875
28	1,435	2,075	2,285	2,925
29*	**1,445**	**2,125**	**2,295**	**2,975**
30	1,455	2,175	2,305	3,025
31	1,465	2,225	2,315	3,075
32	1,475	2,275	2,325	3,125
33	1,485	2,325	2,335	3,175
34	1,495	2,375	2,345	3,225
35	1,505	2,425	2,355	3,275
36	1,515	2,475	2,365	3,325
37	1,525	2,525	2,375	3,375
38	1,535	2,575	2,385	3,425
39	1,545	2,625	2,395	3,475
40	1,555	2,675	2,405	3,525

*Green l.e.ds, indicating correct tuning point.

Additional components list

R6	Change from 100kΩ to 470Ω
R35	100kΩ
R36, 37	220Ω
R38	33kΩ
RV6	100kΩ
C16	100pF polystyrene

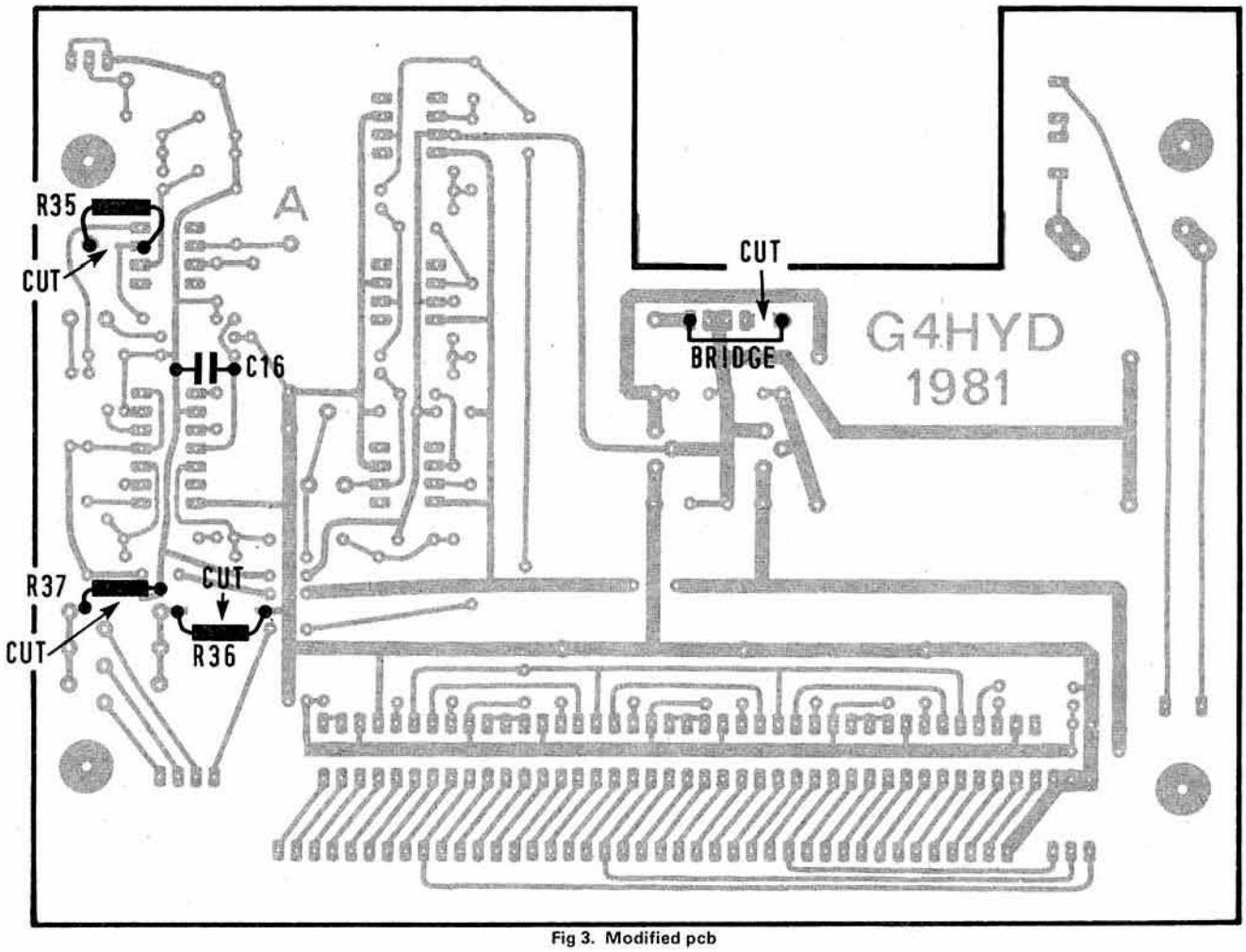

Fig 3. Modified pcb

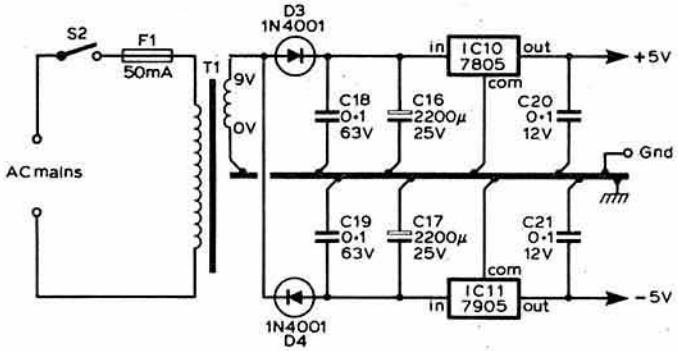

Fig 4. Modified psu circuit diagram

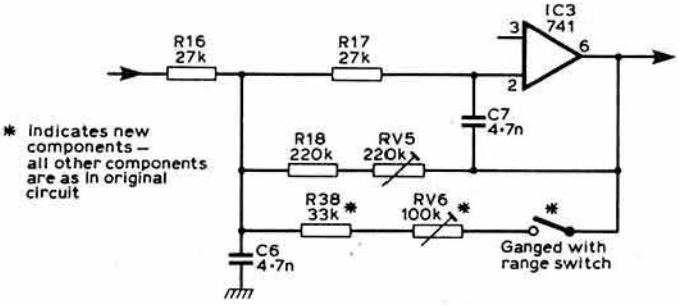

Fig 5. Circuit of wide shift modifications

window is clearly not wide enough, and if it is also desired to use the same l.e.d. display, the resolution must be decreased in the same ratio as the increase in shift, ie (850/170) = 5.

In the circuit description, it will be recalled that RV5 sets the stage gain of IC3, and hence the resolution. This stage gain can be reduced by the factor arrived at above by altering the values of R18 and RV5. By connecting an additional resistor/potentiometer combination in parallel with the original R18/RV5, and using a spare pole on the range switch, the Toni-Tuna can provide a dual-standard instrument (Fig 4).

To set-up the wide shift range(s) the unit should first be correctly set for 170Hz shift, and then the new RV6 and appropriate range offset control (RV2/RV3/RV4) should be adjusted to suit the wide shift tones in use.

If the unit is set up for the 850Hz shift standard tones of 2,125Hz and 2,975Hz, it may be found that there is some non-linearity at the upper frequency end of the display. This will not affect the operation or usefulness of this instrument, and may be corrected by altering the value of C4. However, this will also affect all the other adjustments, and is outside the scope of this article.

Table 1 gives a list of the frequencies for the individual l.e.ds for the two common narrow shift standards, and the two common wide shift standards.

PCBs

Etched, drilled and tinned pcbs are available from the BARTG equipment manager, Mr I. Brothwell, 56 Arnot Hill Road, Arnold, Nottingham NG5 6LQ. Cost £5 to BARTG members, £6 to non-members, plus 40p p&p. Boards now incorporate all the modifications described except those required for switchable wide/narrow shift option. □

The RS amateur radio satellites of the Soviet Union . . . a follow up

by PAT GOWEN, G3IOR, European co-ordinator, AMSAT*

IN THE ARTICLE entitled "The RS amateur radio satellites of the Soviet Union" (*Rad Com* April 1982, pp306-8, 311) it was stated: "Since the earlier decoding formulas of these telemetry channels were supplied to the author by UA3CR, during the testing period, a few changes have been made, but are said to be minor. An update will be supplied when the final and full factors are known officially." Almost one year after the launch, the full and final details of the telemetry system designed and built by Alexander Papkov have been released, with the result that the earlier commitment and promise can now be fulfilled.

First, the E prefix that turns the first channel from its run of K, D, O, G, U, S, W into EK, ED, EO etc was, when the additional "dit" prefixed the line indicating the parameter, taken to be an active satellite, eg with the transponder switched on, as the translation of the meaning of the extra E morse indicator was "satellite activated". Indeed, the satellite is activated, but not necessarily for transponding, as the added "dit" is present when, and only when, the particular satellite is accessed by a command station for controlling purposes, during which time the transponder, robot etc may be either on or off. The indication of an actively transponding satellite can come from observation of a positive value from any of the K prefixed channels that commence each frame, or, of course, by the identification of transponded signals themselves.

As for the frames and channels themselves, details are now available of the previously missing third channel that commences with an N prefix (or with the extra "dit" when activated by the command to cause the N to become R). Apart from one change in the first channel the remaining modifications are indeed minor.

Modifications to original article

Table 4. The first channel and basic frame holds correct, with the exception of G prefix which earlier was a zero level TLM like ID (or SD) in the second frame. It is now a service parameter employed by the command station to ensure correct reception of any particular instruction, eg when receipt of the sent command is positive, a number corresponding to this is transmitted following the G indicator. It should be noted, while dealing with the first channel, that U line, indicating the gas pressure of the hermetically-sealed portion of the satellite, will not be present on all of the RS series, as not all have sealed from vacuum systems aboard.

Table 5. The second channel, prefixed by I (or S) holds true, but it has been pointed out that the S-meter readings are not necessarily calibrated according to international standard (is there one?). The units given are relative S units, and thus cannot be used to give absolute field strength at the satellite.

IW (SW) refers to the relative S-meter of the second service channel. This second service receiver is in fact an additional receiver which may be employed by the command stations to give communication between them, and an indicator of the presence of the secondary command signal at the satellite.

Third channel. The newly-acquired third channel commences with indicator letter N which will be turned to R while under command. This channel provides interesting physical data which should be of value to those considering the thermo-dynamics of solar effects in vacuum.

Third channel: prefix N or R

Letter	Content	Calculation
K	Transponder output power	$0{\cdot}2 \times N^2$ = transponder output in milliwatts
D	Total solar panel output	50N = Solar current in milliamps
O	1st solar panel temperature	$2{\cdot}7(N-26)$ = Temperature in °C
G	2nd solar panel temperature	$2{\cdot}7(N-26)$ = Temperature in °C
U	3rd solar panel temperature	$2{\cdot}7(N-26)$ = Temperature in °C
S	Equipment structure temperature	$0{\cdot}8(N-5)$ = Temperature in °C
W	Hermetically-sealed section gas temperature	$0{\cdot}8(N-10)$ = Temperature in °C

Table 6. The fourth channel prefixed A (or R) needs no comment or amendment, and stands as before.

Table 7. The fifth channel is prefixed M normally and W while activated by the command station. It is pointed out that the QSO number given by the line prefixed by D for the on-board log does not indicate the all-time number of QSOs made, as the number will revert after 999 and count up once more. It is the serial number of that batch, as given to the contactor during his QSO.

The heater radiation control power given by O line may be employed either automatically or by ground command, to experiment with the ideals of control of the function temperature within the environment, and as indicated by the other channels, eg the N frame etc.

The G line, which reads "Robot input power" is, in fact, "Robot output power", with the same calculation applying.

The service channel power output on the U line is a third transmitter that may be used to give a plain carrier useful for fine doppler measurement out of the passband, or as intercommunication between the command stations when desired. The formula to give the output power is $N \times 20$ = output in milliwatts.

Telemetry

The telemetry is the same for all six satellites of the series, although they are not all alike in structure, content, or total function. The telemetry and command system for the series, termed the "TLM-12" by its designer and builder, is versatile and accurate, and is based on a 35-channel two-step analogue computer, which in turn switches on 31 points of on-board apparatus. The current demand from the 9V feed requires only 5mA at the moment of measuring, lasting 200ms, and rests at only 1mA for the remaining time. The error of measurement is within plus or minus one per cent of the unit value itself; eg for, say, 9V it is within $\pm 0{\cdot}002$V. Five groups of seven parameters are available, plus the satellite identification as its own RS number.

Conclusion

At the time of writing, all satellites of the system are healthy and well, and a recent test has shown all functions to be in perfect order. Both the number of users and the variety of callsigns are growing, and ever-increasing distances are being worked by them. With four active transponders on the RS series, plus Oscar 8, the satellite bands are now about the most widely used and utilized parts of the 145 and 29MHz bands in terms of contacts being made. □

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TECHNICAL TOPICS

Pat Hawker, G3VA

FOR MANY YEARS the term "tv dinner" has come to mean the precooked, reheated packages eaten from a tray while watching "Crossroads". American amateurs have added a new definition: "A cable tv dinner looks like a regular tv dinner, but when you put it in the oven it leaks all over the place".

Among all the current UK arguments about tree-networks of coaxial cable versus star-networks of fibre optics, few commentators have mentioned that most American cable networks reduce costs by using aluminium rather than copper cables; even so, a well-designed and well-maintained wideband cable network should in theory be reasonably immune from inward and outward leakage at levels that affect amateur radio operation. The problem of course is that in practice many of the systems are decidely "emnc" which I would define as "electromagnetically non-compatible". A definition, unfortunately, that applies to much of the electronics equipment now in homes, cars and offices on both sides of the Atlantic, as shown in the first item this month.

RFI and domestic equipment

During the protracted period when the question of legalizing UK cb was under review, the Home Office Radio Regulatory Department carried out many detailed tests to identify the transmission parameters that would minimize interference to domestic tv, radio and audio equipment and other licensed users of the radio spectrum. The tests showed conclusively that for low-power 27MHz transmitters, the main rfi problem was *not* harmonic radiation but direct breakthrough. All results indicated that consumer equipment was significantly less susceptible to strong fm signals than to a.m. transmissions. Since the tests were made with transmitters having only 2W of effective radiated power, the potential for tvi/rfi problems for radio amateurs is increased many times over. It should be appreciated that ssb is a potent form of a.m.

Basically such problems are due to emnc, the poor electromagnetic compatibility of consumer-type electronics equipment. When one reviews the Home Office results, it speaks much for the effectiveness of the techniques developed by amateurs that many legal-limit hf and vhf transmitters continue to operate in residential areas. But how much easier it would be if the manufacturers would take more steps to improve the emc characteristics of their products.

Dr J. Durkin of the Home Office has recently published detailed results of the Home Office tests in *IEE Proceedings–A*, Vol 129, Part A, No 7, September 1982, a special issue on "Vision and Sound". While few of his findings will come as any surprise to amateurs, they do emphasize the very wide differences between different models, and even between different receivers of the same type. Many of the problems arise from breakthrough into the later stages of receivers rather than from overloading the rf stages. The tests were carried out with a fixed distance of 10m between receiver and transmitter, but the results, Table 1, are presented in the form of calculated distances between transmitter and receiver that would produce just perceptible tvi.

It is a pity that the Home Office has not identified the different brands and models. As shown in Table 1, the same experiments were carried out also with the transmitter on 41·5MHz, and in this case interference often arose from direct breakthrough into the i.f. stages of the tv sets. (It will be appreciated that in Tables 1, 2A and 2B good emc characteristics are indicated by a lesser distance of separation.) For example, it will be noted that tv receiver "3" appears to be of a far better than average emc design, since even a 27MHz a.m. transmitter could be as close as 2m before causing perceptible interference. Compare this with tv receiver "6" where the equivalent spacing would need to be more than 45m.

On the effects of transmissions, Dr Durkin states: "The 27MHz signal appears in some cases to be directly affecting the colour circuits, in which case the colour disappears when the interference is present. In others the signal is directly entering the video circuits, in which case the picture is affected either by the presence of visible interference or, in some cases, by the disappearance of the picture. In some cases it affects the sound circuits, and a distorted cb sound is heard, superimposed on the television sound."

The Home Office also carried out similar tests on a number of different types of audio equipment and on sound radio, with the results shown in Tables 2A and 2B. Modular cassette recorders and record players forming part of unit audio are shown to be highly susceptible to rfi, while lf and mf radio appear to be considerably worse in this respect than vhf/fm radio.

Table 1: Calculated distance between transmitter and tv receiver to produce just perceptible interference on the tv receiver

TV receiver		1	2	3	4	5	6	7
Transmission								
27·5MHz 2W erp	fm m	1·2	2·4	1·1	2·2	1·2	13·0	1·1
	a.m. m	8	8	2	5·5	16	45	10
41·5MHz 2W erp	fm m	45	6·8	3·3	31·0	4·7	10·5	31
	a.m. m	45	10	3·3	31	31	31	45

Table 2A: Calculated distance between transmitter and hi-fi equipment for just perceptible interference

Function	Cassette		Record pick-up		Stereo radio uhf		Mono radio vhf	
Equipment	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)
Distance (m) 27MHz fm 2W erp	3·2	5·2	2·1	3·2	2·1	<2	1·4	<2·0
Distance (m) 27MHz a.m. 2W erp	20	>45	13	32	3·1	<2	1·6	<2·0

(i) Integrated system (music centre)
(ii) System comprising individual modules

Table 2B: Calculated distance between transmitter and short- long- or medium-wave radio

Function	Short wave		Long wave		Medium wave	
Equipment	(i)	(ii)	(i)	(ii)	(i)	(ii)
Distance (m) 27MHz fm	5·3	–	5·5	<1·3	<1·3	<1·3
Distance (m) 27MHz a.m.	22	–	45	6·9	44	<1·3

Table 3: Values of protected signal level, protection ratio and maximum unwanted signal levels for various radio systems as recognized by the Home Office

Service	Frequency range (MHz)	Level to be protected dB (μV) PD	Level to be protected (dBW)	Protection ratio (dB)	Maximum unwanted signal level dB (μV) PD	Maximum unwanted signal level (dBW)
Land mobile	68	11	−126	8	3	−134
	88	8·5	−128	8	0·5	−136
	140	5	−132	8	−3	−140
	174	4	−133	8	−4	−141
	470	2	−135	8	−6	−143
	900			8		
Maritime mobile	150	4	−135	8	−4	−141
Aero mobile						
Localiser	109	20	−117	20	0	−137
Air to ground	115	20	−117	20	0	−137
Glide path	330					
Radar	600		−135	6		−141
DME	1100	12	−125	8	4	−133
Radar	1300					
Broadcast services						
VHF sound mono	95	42	−95	36	6	−131
VHF sound stereo	95	52	−85	51	1	−136
VHF television 1	41·68	42	−95	50 max*		
VHF television 3	174-216	48	−89	50 max		
UHF television	500-850	64	−73	50 max		
Fixed links						
UHF link	450					
Microwave link	1500	32	−105	35	−3	−140
	1800	32	−105	35	−3	−140
Radio astronomy	600					−202
	1400					−194

*Varies across channel (see CCIR Report 306-3)

Note. The protection ratio required by a service is the ratio of wanted to unwanted signal for a defined grade of service. It depends on the nature of the interfering signal and on its frequency relative to the wanted signal. For certain services, including radio and television broadcasting, protection ratios are well established and internationally agreed. In other cases the figure is less well-established but those shown have been found by experience to be satisfactory.

These notes represent only brief extracts from a selection of tests which also examined possible cb interference to other services. Rather curiously the Home Office does not list amateur radio as a "protected service" although I was under the impression that in some circumstances this is the case. The figures for other services are shown in Table 3. Radio amateurs are also likely to be deeply disappointed at the omission of any suggestion whatsoever that the bad emc characteristics of much of the consumer equipment require urgent attention from the manufacturers. The recent ratification in the USA of the Amateur Radio Bill sponsored by Senator Barry Goldwater, K7UGA, gives the FCC the power to insist that equipment firms should accept responsibility for products that do not meet a minimum emc specification, though it may be a long time before effective standards are established. In some countries, such as West Germany and Switzerland, such legislation already exists—though this can give rise to the problem that responsibility shifts to the amateur station for field strengths above a certain level.

Low cost solidstate power amplifiers

When considering the design of solidstate power amplifiers with all their problems of accurately-matched loads, susceptibility to transient overloads, parasitics and other forms of destructive self-oscillation, not to mention the high cost of devices capable of high-power operation, most amateurs tend to play safe and follow closely the techniques currently favoured by professional designers. This is understandable but is not necessarily the best policy for those seeking ways of using the older rf power devices that can now be acquired for a fraction of the cost of "state-of-the-art" devices. With some shopping around it is possible to build a solidstate amplifier of about 10W rating at a better W/£ ratio than by using newly-bought valves and a high-voltage psu (though I stick to my formerly expressed beliefs that the valve approach is still a good deal easier and more certain at and above this power level).

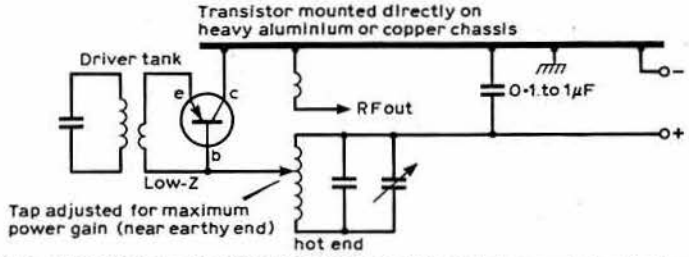


Fig 1. A hybrid form of solidstate power amplifier using grounded collector. This was described for use with early pnp rf power transistors in 1964

Almost 20 years ago, *TT*, and subsequent editions of *ART*, drew attention to what was then described as an "improved transistor amplifier circuit" in the following terms:

"Most transistor power amplifiers use the common-emitter arrangement, corresponding most closely to the standard valve (grounded cathode) circuit, on account of the high gain; others use the common-base configuration on account of its higher maximum frequency for a given transistor; or the common-collector circuit which allows direct metallic contact between the transistor case and the heatsink or chassis.

"The distribution of the desirable characteristics among the three standard circuits has encouraged some designers to try and produce hybrid arrangements combining as many possible good points into a single circuit.

"One such approach is that described by Irving Gottleib in *Electronic Industries* August 1964: Fig 1. This circuit, it is claimed, has been developed using a 2N1908 pnp device, and the author states that he obtained about 10W output on the 7MHz amateur band using a transmitter consisting of a 2N697 co, 2N1907 ba and 2N1908 pa. The efficiency and thermal and electrical characteristics of this circuit are claimed to be outstanding. The author admits that some experimentation will usually be needed to achieve best results but states that, once the input and output impedances have been optimized, stability is almost unaffected by driver or load variations, or by changes in supply voltages."

It was also claimed that such an amplifier could be amplitude modulated almost 100 per cent by means of a transformer winding inserted in the positive dc lead, provided that the supply voltage was suitably reduced. However, I have not heard of anybody using this type of amplifier for many years. Indeed little attention has been given to either this "hybrid" configuration or to the basic common-collector arrangement during the past decade.

Grounded-collector 14MHz linear

In view of the above notes, it was all the more interesting to receive from the prolific Jan-Martin Noeding, LA8AK, a description of a 14MHz solidstate linear power amplifier using the "grounded-collector" configuration. This amplifier was assembled in order to test what could be achieved using low-cost BD139 transistors which are sometimes available for only about 30p (an alternative device is the BD135). LA8AK recalls that while the grounded-collector arrangement was occasionally used by amateurs 15 to 20 years ago, it is now seldom found. To the best of his recollection, he has never seen it proposed for linear operation. In practical terms the amplifier is not very different from the conventional grounded-emitter configuration, but it offers useful advantages.

The LA8AK test amplifier is shown in Fig 2, and incorporates a number of ideas suggested originally by LA7MI. LA8AK writes:

"Instead of an rfc in the supply lead, it uses a low-Q resonant circuit to provide greater stability; LA7MI burnt out several BLY89 devices on hf before adopting this arrangement. For 3·5MHz, C2 would be 2,200pF.

"L2–C2 plus stray capacitances is resonated by means of a gdo with the supply voltage connected with base-to-emitters short-circuited and L1 removed. TR5 is diode-connected and provides further protection of the power devices. L1 consists of 7t, 15mm inner diameter. The input transformer, T1, is three times 8t of enamelled copper wire, trifilar wound on an unknown ferrite core with 15mm outer diameter.

"In the test set-up the transistors were just below cut-off, and some further work on this might prove rewarding. Gain was measured as roughly 10dB, linear rf output with four BD139 devices is 10W, saturation about 12–15W rf. The efficiency is about 50 per cent.

"The four transistors are mounted in a 'cross', with the bases connected together. The emitter leads should be of equal length to ensure equal power

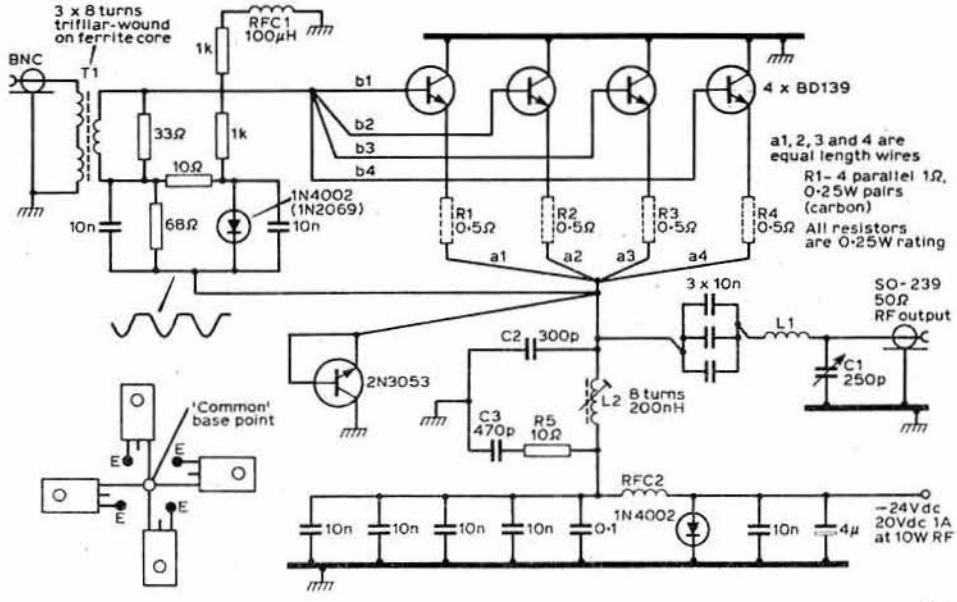


Fig 2. LA8AK's experimental 14MHz grounded-collector linear amplifier using four low-cost (about 30p) BD139 npn devices and providing about 10W rf output

dissipation; no emitter ballast resistors were used in the prototype but could be 1Ω, 0·25W. It is important to achieve equal power sharing either with equal length leads or emitter resistors. The amplifier is mounted on a brass plate screwed to a cooling fin, and in appearance looks more like a 144MHz amplifier than an hf design! The -24V dc supply was chosen because many readily-available surplus power-supply units can provide this."

Sine-waves from a relaxation oscillator

The conventional relaxation oscillator, such as those based on a unijunction transistor, produces a sawtooth form of output. However, it is possible to modify such oscillators so that they provide a reasonably undistorted sine-wave output simply by connecting a resonant circuit in the current-pulse path. Fig 3(b) shows a 3,750Hz audio oscillator modified for sine-wave output as suggested by Professor Tom Stehney *(Electronics Design* 11 June, 1981, p250). He writes:

"Simply insert a tuned circuit in the B2 lead. The current pulses will excite the tuned circuit to produce an oscillation. With adjustments to R1 (shown as 2kΩ for this example), the current pulses can be controlled so that a relatively undistorted sine-wave is available at B2. For this example, a 2V pk-pk sine-wave is produced at 3,750Hz."

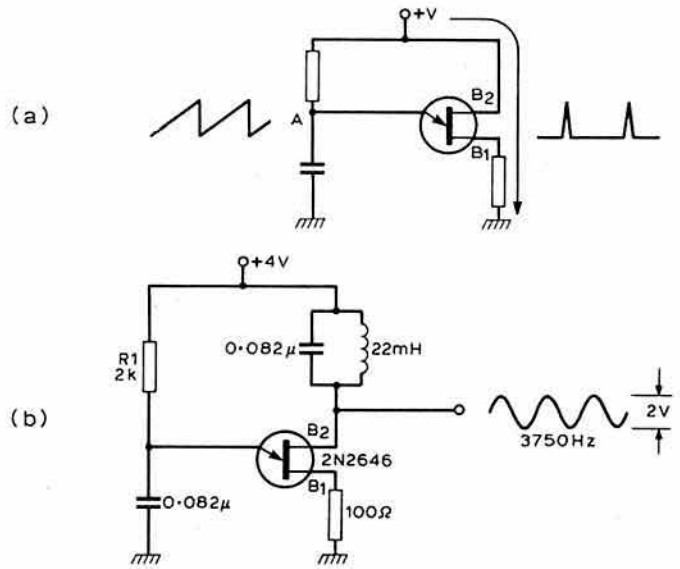


Fig 3. (a) Conventional relaxation unijunction transistor oscillator which develops a sawtooth voltage output at point A. Current pulses flow between B2 and B1. (b) The inclusion of a tuned circuit in the current-pulse path can convert the waveform into a sine-wave. The resonant circuit needs to be tuned to the same frequency as the basic relation oscillator, in this case 3,750Hz

Such an arrangement could be used for tone-burst and similar applications. In the early 'twenties, neon-tube relaxation oscillators were even sometimes used on about 1·8MHz for transmitting purposes.

The Osciplier concept

What, you may be asking, is an "osciplier"? The answer is simply an oscillator with a built-in frequency multiplier. This concept of a doubling oscillator, applied to microwave voltage-controlled oscillators, has been the subject of a series of communications to *Electronics Letters* (Vol 17, No 8, 16 April 1981, pp296-8 "Ku-band MIC bipolar vco"; Vol 17, No 23, pp871-3 "Very broadband bipolar vco"; and Vol 18, No 22, pp946-7

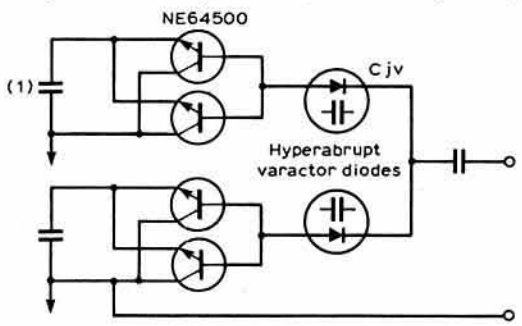


Fig 4. Outline of a bipolar microwave doubling oscillator or "osciplier". The varactor diodes provide both tuning element and frequency multiplication element

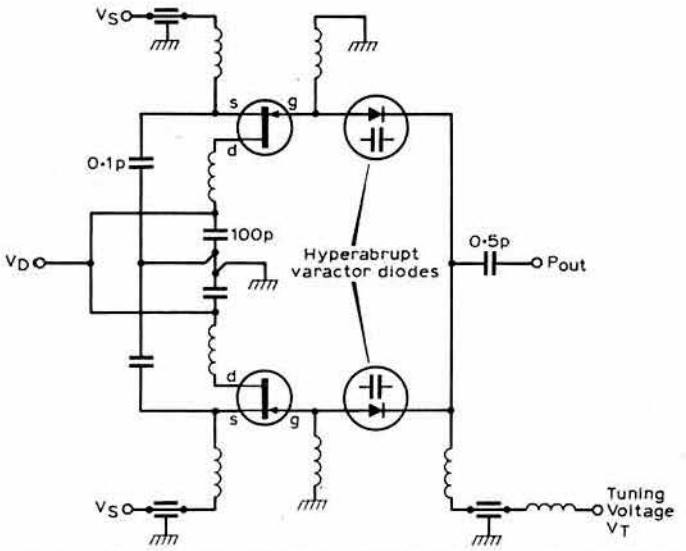


Fig 5. Outline of a 20-30GHz doubling-mode fet voltage-controlled oscillator using microwave integrated circuit (mic) techniques with NE96400 devices. The tuning varactors are gallium arsenide hyperabrupt diodes with capacitance swing of 3·2 to 0·16pF over the range 0 to 20V. This form of mic fet device is susceptible to the value of the ambient light. (R. G. Winch in *Electronics Letters)*

'K-band fet doubling oscillator') from R. G. Winch of Teledyne Microwave. It would appear that the aim of this work is to develop microwave oscillators that can be voltage-tuned over a very wide range, 7-13GHz, 20-30GHz etc, for such applications as electronic counter measures (in other words a frequency-agile jammer that can be immediately locked on to incoming signals). In effect the self-excited oscillator uses two hyperabrupt varactor diodes that simultaneously tune the oscillator and act as frequency doubling elements. Microstrip rather than waveguide circuit elements can be used today up to about 40GHz. It is claimed that since the transistors operate at half the output frequency, circuit adjustments and frequency sensitive elements are substantially less problematic than where the active devices operate directly at the output frequency.

If such an osciplier were to be combined with an anti-parallel diode harmonic mixer it would be possible to receive 22GHz signals with devices working at 5·5GHz, or possibly even lower if times-three frequency multiplication was used in either or both mixer and osciplier. There would also appear to be no basic reason why such systems should be confined to microwave applications. Russian amateurs, for example, have shown the value of harmonic mixers in direct-conversion receivers for frequencies as low as 3·5MHz. One could conceive the osciplier concept being useful over virtually the whole spectrum in much the same way as the overtone crystal oscillator or, more exactly, the old tritet crystal oscillators.

Figs 4 and 5 show outlines of shf oscipliers based on four bipolar and two fet devices, as reported by R. G. Winch.

Nicad charging

In the October 1982 *TT* I included a note on a flexible battery charger for use either on mains supplies or with a vehicle battery for recharging nicad batteries. It used a voltage-sensing arrangement intended to switch off the charging current when the battery voltage reaches a predetermined value. Such sensing arrangements have been, and still are, frequently described in the journals as suitable for nicads.

James Bryant, G4CLF, with a good deal of experience of using nicads, feels that such voltage-sensing systems are not really suitable for this purpose (although entirely suitable for lead-acid batteries). He considers that there is a risk of overcharging and thus damaging the nicads and even, if rapid charging currents greater than 0·1C (where C is the capacity of the cells in Ah) are being used, the possibility of exploding a sealed cell. He is uneasy at the widely-accepted belief that the terminal voltage of a nicad battery can be depended upon to rise when it reaches the fully-charged condition, despite the regular publication of charging curves of the type shown in Fig 6. He also points out that it is highly unlikely, in a nicad battery, that each cell is in exactly the same state of discharge when starting to recharge.

This is a controversial matter on which it is not easy to adjudicate; one can say only that if G4CLF is right then many writers have been wrong. To quote, for example, from an article by E. Parr, *Practical Electronics* March 1978: "Nicad battery chargers usually fall into one of two types. The first is the constant current charger, which charges the battery at a constant current

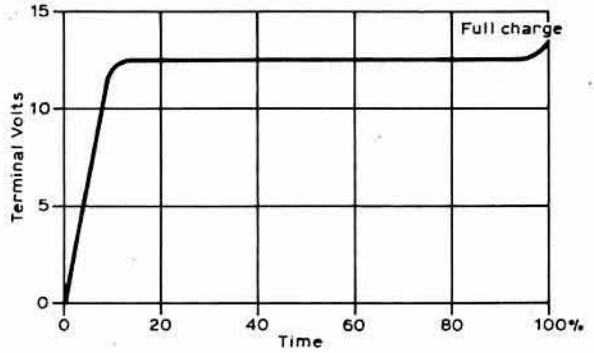


Fig 6. Typical plot of terminal voltage of a nicad battery when charged at constant current. There is little change of voltage until the cells are fully charged, so that the setting of a voltage-sensing automatic switch is fairly critical. Problems can arise when only some cells are fully charged with others only partially charged. Nevertheless voltage-sensing is a commonly-used technique for nicad charging and should not damage the cells provided that the 0·1C rate is not exceeded, though not recommended for rapid charging, when timed chargers are to be preferred

for an indefinite period . . . the number of batteries ruined by overcharging was surprising. The second type of charger is the charge to a voltage type. The battery is charged until its terminal voltage rises to a set level. If the voltage is correctly set the battery cannot be ruined by overcharging. Unfortunately the charge curve of a nicad battery is very flat, see Fig 6, and if the trip voltage is only slightly out you can end up with a 50 per cent charged battery or a battery ruined by overcharging. In addition the trip voltage required will not be the same for all batteries, even those of the same nominal type." This article goes on to describe a timing type charger in which the battery is first fully discharged and then charges for a predetermined length of time.

Thus the timed charge is probably the optimum system and voltage-sensing certainly has its drawbacks. However, I still feel that the charger shown in the October *TT* should prove safe to use at the 0·1C rate, since it combined both voltage-sensing and controlled charging rate. At 0·1C a nicad should be capable of withstanding considerable overcharge without undue damage. Nevertheless the points made by G4CLF are well worth considering.

Buzzer-type continuity tester

One of the most useful and most used workshop tools is a continuity tester. Generally amateurs use the ohmmeter facility of a standard multi-test or "vom" (volts-ohms-milliamps) meter, but this is by no means ideal as it involves selecting the right range and then using probes while watching the meter scale. A simple dedicated continuity tester that uses a buzzer has been described as "probably the least exotic but most needed tool in the lab". Such a device, using two CA3096 transistor-array ic devices, nine resistors, a ceramic (pzt) resonator and a source of 9V has been described by Douglas Holberg in *Electronics* 3 November 1981, p157: Fig 7. This draws no current when the probes are open-circuited, so that no on-off switch is needed. It has a low-threshold sense resistance (about 75Ω) and disregards the pn junction of silicon diodes as a valid response for continuity. When sensing a low resistance, about 18mA is drawn from the battery, of which about 4mA flows through the probes and component or wiring under test.

It uses nine of the ten transistors in two CA3096 arrays (discrete devices could be used if required). TR1, TR2 and R1 to R5 form a bridge circuit which is activated by current flowing through the probes. This provides bias for TR3, providing tail current for TR4 to TR7 which form a differential amplifier. If the resistance across the probes is less than the value of R5 (assuming zero offset in the differential amplifier) then output transistor TR8 turns on, so that the oscillator circuit of TR9, R6 to R8 provides af at about 2kHz to the ceramic resonator.

10MHz and the FT101

Many of the pre-WARC FT101 transceivers have been adapted for use on 10·1MHz by means of one of several different modifications that have been published in *TT*, by Yaesu and elsewhere. Stuart Atkinson, G3YPS, however, encountered and then overcame a problem that may have been experienced by others. He writes: "After reading the items in *TT* on using the older FT101 transceivers on 10MHz, I went ahead and modified my FT101B accordingly, making the driver anode tunable and tapping the pa coil at the ninth turn. At first this seemed to work reasonably well, although compared with 7 and 14MHz the pa 'dip' seemed very shallow and rf output much reduced.

"A look at the circuit diagram revealed the cause: RV6, one of the loading capacitors, was disconnected in the WWV position, and there was no switch contact either. I carefully removed one of the spare switch contacts from another wafer and bolted this by means of a 10BA nut and bolt to the WWV position on S1L and bridged it to the next contact. The pa now performs satisfactorily and output compares favourably with the other bands."

It is not known whether this modification is necessary on other pre-WARC FT101 models. A check with the circuit diagram would reveal this.

Solar powered stations

QST (October 1982) features the first of a two-part article on "Amateur use of solar electric power" by Philip Chapman, W6HCS, P. D. Chapman and A. H. Lewison, including experiments carried out at the Jet Propulsion Laboratory in California. The system described is based on the design of a combined vhf/hf emergency communications station using an array of photovoltaic silicon solar cells to charge a large lead-acid battery (500Ah capacity). With a duty-cycle of 10 per cent transmit, 90 per cent receive, a fully-charged battery will power the station, even in total darkness, for about 72h. When both systems are transmitting the load draws 24A at 13·6V. The solar panels comprise 20 modules, each carrying 44 solar cells which are protected individually by a diode. Total active cell area is 25·6ft². Under "standard operating conditions" each module provides just over 10W at a module efficiency of 6·1 per cent, so total power under these conditions is just over 200W.

This is probably the largest solar generator so far used with amateur equipment, although there are several American solar-powered repeaters, and a number of amateurs have used pv diodes for QRP or daytime-only operation.

In the UK, the IBA has operated an experimental natural energy low-power four-channel tv relay station since October 1981, using solar panels, a wind generator and a large-capacity battery. The equipment represents a load of about 150W, the solar generator has a maximum output of about 780W, and the wind generator about 150W. The premise on which this hybrid is based is that even in sunny Cornwall it would be unwise to depend entirely on a solar generator, but that when there is no sun there is a good chance that the wind will be blowing. So far the sun has delivered rather more power than expected; the wind rather less.

When it comes to microwatts of power, a couple of solar cells will provide output even under ambient room lighting conditions. Some months ago a

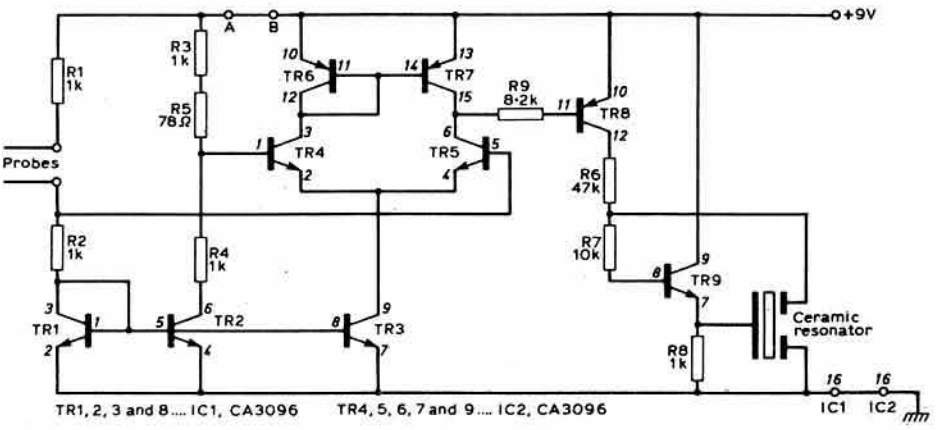


Fig 7. Continuity checker with ceramic resonator "buzzer" for convenient bench-testing work. Based on the use of two CA3096 transistor arrays *(Electronics)*

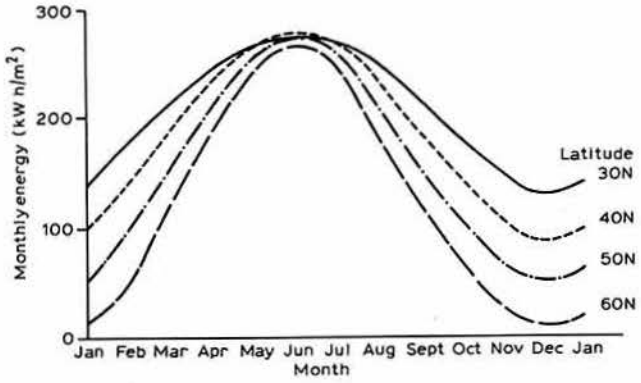


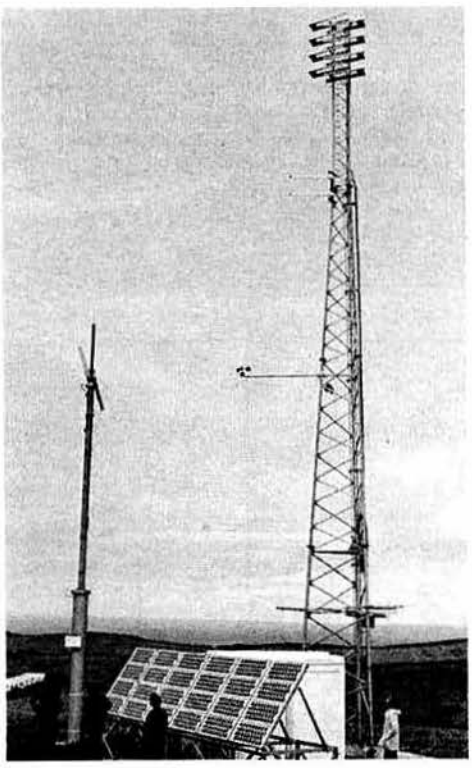
Fig 8. Energy falling on earth's surface from a cloudless sky at different latitudes (Millard, BBC)

Japanese visitor presented me with a Sharp EL835 "solar cell calculator" which has no battery but has five small inbuilt solar cells. So far I have never been able to catch it out; it works immediately it is taken out of its cover and I never need to worry about forgetting to switch it "off".

Unfortunately, a solar generator and battery of the capacity of the Jet Propulsion Laboratory unit does not come cheaply, nor could it be readily transported for use at remote sites or on dxpeditions.

For several years increasing use has been made of solar generators in tropical and sunny climates where the yearly figures of average sunshine are high and, perhaps more importantly, the average hours of peak sunshine are similarly high. The Sudan, for example, has a yearly average of solar irradiation of over 500 average Langleys per day, and an average of almost 6h of peak sunshine per day (1 Langley is equivalent to one calorie per square centimetre). Only in December does the daily average fall below 400 Langleys.

By comparison with the Sudan, the UK is far less favoured by the sun; it is an altogether cloudier, greyer clime. Despite this, a vhf repeater in the Isle of Islay, Scotland, is run from two Lucas modules and a battery: the continuous load is 2·5W, plus 30W on transmit for 48min/day. In the London area there is a yearly average of just over 200 Langleys per day; but in January this falls to under 50. Only in June does the average exceed 400 Langleys. The average number of peak sunshine hours is only 2·45/day, less than half that of the Sudan. Fig 8 shows the situation in different latitudes. In space, solar energy is equivalent to 1·39kW/m², though solar generators over about 1kW require solar panels on paddles rather than mounted on the body of the satellite, since two-thirds of a spinning satellite is in shade.



The experimental four-channel uhf low-power relay station built by the IBA at Bossiney, on the Cornish coast. The array of 24 solar panels, comprising 864 silicon photovoltaic diodes, provides a maximum output of about 780W in peak sunlight. The wind generator has an output of 150W at a windspeed of 7m/s. These charge 36 large lead-acid batteries with about 1,000Ah capacity. Electrical load of the equipment is about 150W

If the conversion efficiency of photovoltaic cells could be raised substantially, and the cost reduced, the terrestrial solar generator would clearly become a much more attractive system for amateurs. The theoretical limit of conversion efficiency for silicon solar cells is about 25 per cent, but in practice even the best cells achieve only about half of this figure—and efficiencies of only about 5–6 per cent are not uncommon. Experimental cells based on gallium arsenide have achieved more than 20 per cent but would be costly to manufacture. Amorphous silicon is another possibility, and will be discussed next month.

Analogue displays aren't dead!

In looking over modern amateur and professional communications equipment, it is nowadays immediately clear that very many of the latest innovations tend to be based on digital techniques. It is equally clear that many of these ideas provide "operator convenience" rather than genuine improvements in basic weak-signal performance. There is indeed often some degree of conflict between those seeking to introduce more and more computer technology into communications equipment and test instruments and those who believe that it is still important to concentrate more on exploiting the latest forms of analogue circuitry and devices, particularly in the main signal path of receivers where high-speed, harmonic-prone digital pulses are apt to gum up the works.

There is also more recognition that even for "read-out" the traditional analogue clock-face and calibrated dial have a lot going for them.

This viewpoint has been expressed quite forcefully by Gene Dewey, WB6AFN/9 "Analog isn't dead—don't be l.e.d. astray by the digital revolution" in *73 Magazine* August 1982. To quote briefly from his provocative introduction:

"Sometimes it seems that everything is going digital. First it was digital watches, then pocket calculators, now its thermometers, bathroom scales, radio dials, petrol pumps and almost everything in some luxury cars. Digital is becoming synonymous with modern, while analogue is considered outdated. . . . Analogue and digital devices each have distinct advantages and disadvantages. Use a digital device when precision is needed but remember that high precision cannot improve accuracy. If position-orientation, position-tracking, or position-setting are important, stay with analogue. For rate measurement, stay analogue. Select the better device to meet your own needs—even if it means being 'old-fashioned'."

In this connection, I would quote from what I have written elsewhere (*Wireless World* June 1982, p84):

"Modern radio communication, it is often stressed, represents the marriage of data processing with traditional radio-frequency technology. But sometimes the problem is to determine which is the dominant partner. The rf engineers often feel they are in danger of being smothered by the embrace of the systems-approach of the computer people. In an analogue world, careful alignment and circuit optimization tend to be admired more than the 'go/no-go' attitude of the digital designers. Digital technology has advanced spectacularly, tending to obscure the steady improvements in crystal filters, mixers of great dynamic range and the opening up of a whole new world by low-noise microwave amplifiers. . . . The computer/communications marriage is clearly well past the honeymoon period and seems to have settled down to quiet domesticity. But rf must be careful not to be dominated by the intrusive digits."

I must admit that there are times, when scanning the amateur radio journals, that I am tempted to groan when I see so much digital circuitry, so little basic rf technology.

Here and there

A tip by Sandy Gerli, AC1Y *(QST)*, notes that where the pointer lines, numbers etc on dial knobs have worn off over the years, they can be renewed using "Liquid Paper" or "Wite-out" fluid. Simply fill the grooves with paint, using the brush applicator cap, and then scrape off any excess when dry with a fingernail. AC1Y considers that markings then look as good as new. While these American products are not widely known in the UK, "Tipp-Ex" fluid, imported from West Germany and used in many offices to correct typing errors, appears to be a comparable product. Whether this is so or not, Tipp-Ex works!

Feedback. Should anybody be trying to reproduce a modern version of the Special Communications Mk 7 ("Paraset") it should be noted that the 250kΩ resistor shown in the November *TT* as connected between screen grid and chassis of the af valve should have been connected between control grid and chassis to form the essential grid leak.

Talking across the Atlantic on coherent light, using lasers with a wavelength of 1·3μm, has come closer with the completion of successful tests by Bell Laboratories of 108km of optical-fibre undersea cable. At 274 million pulses per second, repeaters are needed only at 54km spacing. □

SWL NEWS

Bob Treacher, BRS32525*

Listener Championship for 1983

The HF Contests Committee has introduced a Listener Championship based on participation in hf contests which have swl sections for 1983. The full rules appear in "Contest News", but to whet a few appetites, the idea is that those swls who participate in the Society's contests gain points based on their placings in these contests. There will be six contests, three ssb and three cw, and the listener with the highest points total over the six events will win the championship. With so few ssb hf contests in the calendar, the committee has devised a new one—on 1·8MHz—named the Town & County Contest, the rules for which will appear in due course, but the swl section will count for points in the championship. An swl section will be added to the Region Round-Up Contest, and the championship will also include the well-established 7MHz ssb and cw, 21MHz cw and 21/28MHz ssb contests. It is hoped that listeners will support this innovation, and the committee is hopeful that this extra competitive edge will promote more activity from listeners during the Society's contests.

On the topic of increasing swl activity in contests, readers will recall this column inviting comments last year. The HF Contests Committee has now considered the comments which were received and the following points arose:

(1) G6 and G8 licensees will be eligible in future for all swl contests organized by the Society.

(2) The information to be provided in swl logs will be: date/time (gmt), callsign of station heard, report and serial number sent by station heard, callsign of station being worked, points. (It is not necessary in the 7, 21 or 28MHz contests to log the report and serial number sent by the G station.)

(3) The rule governing the frequency of logging QSOs made by one G station will remain. It is felt by the committee that abandoning this rule would mean that some swls would then tend to sit on one G and log a long string of QSOs made by one station. It is considered that this practice lessens the skill factor involved (eg searching for multipliers). However, the frequency of logging will be altered to fit each particular contest.

(4) The idea of promoting an swl contest on the lines of the Cray Valley or White Rose events was discussed, but it was agreed that such an event should not be included in the 1983 calendar. However, if the Listener Championship is successful there might be some scope for increasing the number of swl contests which will count for points in the 1984 championship.

It is hoped that some listeners who have until now bypassed this facet of the hobby, or the G6 or G8 licensee who has until now been unable to enter, will "give it a try in 1983". No matter how modest the effort, remember the saying "from little acorns mighty oaks do grow". Listeners, G6s or G8s requiring further guidance, or small supplies of log sheets, or who have any comments on the above paragraphs are asked to contact the writer.

DX report

October is traditionally a good month for dx, culminating in CQWW at the end of the month. This year seems to have been no exception, with the majority of reporters finding some exotic morsel. For Brad, BRS1066, it was BY8AA on 21,020kHz at 1315; for Tim, ARS45184, it was ZL on 3,790kHz at sunrise; Paul, A8808, caught HD8GI (Galapagos Is) on 28MHz, while Brian Wainwright, BRS44703, caught TN8AJ on 7MHz. However, CQWW figured in the comments of most reporters, with the star rating going to 1·8MHz. No less than eight reporters voted it "band of the month". It seems that at least 50 countries were heard in the UK. Most of Europe was audible from 1800, with dx reported around midnight and in the period just before and just after sunrise.

Some of the more exotic stations reported were FM7CD (0546), N1GL/6Y5 (0617), NP4A (0619), HH2WW (0627), 9Y4W (0640), 4X4NJ (1825), EW6V (2139), UA9CBO (2241), RG6G (2306), 4Z4DX (2307), ED9CM (2309), C31LD (2322), EA8AK (2333), DJ6QT/CT3 (2339), 5N8ARY (2357) plus KV4, VE, UO5 and VP5. With the increased usage of the band, the forthcoming 1·8MHz contests should be well worth watching. It will be seen from the countries table that a number of listeners did their 1·8MHz scores no harm at all! Dave, BRS25429, logged 39 countries during the event, your scribe managed 38, and Paul, A8808, 37.

1982 HF COUNTRIES TABLE

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	195	197	205	157	117	46	917	ssb
BRS8841	195	208	224	137	103	15	882	ssb/cw
BRS47745	173	199	209	135	122	40	878	ssb/cw
BRS25901	157	187	202	101	105	37	786	ssb/cw
BRS44703	145	170	173	112	110	37	747	ssb
ORS46084/7Q7	162	205	204	81	35	1	688	ssb
A8808	138	138	135	120	94	43	668	ssb/cw
ORS45992/7Q7	160	205	199	75	27	0	666	ssb
BRS46228	115	108	170	134	107	32	666	ssb
BRS35509	123	142	159	95	95	6	620	ssb
BRS1066	109	148	141	101	68	41	608	ssb/cw
BRS48675	98	121	126	73	57	21	496	ssb
BRS30694	115	135	108	53	51	28	490	ssb/cw
BRS31440	118	85	106	74	67	27	477	ssb
BRS45033	161	123	183	3	6	0	476	ssb
BRS18529	52	84	72	117	113	37	475	ssb
RS45466	51	102	92	54	57	16	372	ssb
BRS30493	47	89	112	40	31	6	325	ssb
ARS50886	63	101	88	30	28	2	312	ssb
RS44984	43	40	106	26	13	1	229	ssb
RS49327	44	43	94	11	10	14	216	ssb
ARS45184	42	58	56	17	25	3	201	ssb/cw

Elsewhere in CQWW, 7MHz was good to the Caribbean, with the majority of the dxpeditions audible at around 0730. 9N1WW provided a new one for many on 28MHz, and was also reported on 7MHz. There was also plenty of activity before and after CQWW. WB6WOD/CE0Z had been reported on 7, 21 and 28MHz. JT1AN had been on 7 and 3·5MHz, and J20DU had been very active. The following is a selection of the best dx outside of the contest: **28MHz**—H44PT, TL8DC, ZD7BW; **21MHz**—A6XD, JT1B, ZF2GI, 5R8AL; **14MHz**—VR6KY, YJ8RG, 3D6BS, 5W5DQ; **7MHz**—FP8HL, HP1XJC, NL7G, TU2JT, V3CQ, VS6DO, 5T5RR; **3·5MHz**—AP2ZR, HC1JQ, OA2FF, VP5KP; and **1·8MHz** FC9VN, ZB2EO.

QSL returns during October and early November from various sources were N7UT (Utah—to give BRS1066 his 50th USA state confirmation), PJ2MI, 5H3DM, TU2HS, M1V, 9M8PW, 9X5SL, 9Y50JW, LA1EKO/P (Platform H7 in the Ekofisk oilfield), 1A0KM, KH3AB, VK9ZG (Willis Is) and VP2EC.

The early part of November seemed to be quite poor, with little in the way of good dx available during the day on the higher frequency bands, and activity on 3·5 and 7MHz far short of that normally expected at the beginning of the winter dx season. Towards the middle of the month, the lower bands came to life, providing W6 and W7 on 3·5MHz during sunrise. Around 2300, W and VE were good copy, but apart from CN8, EA8, EA9, TR8 and 7X2 little in the way of dx had been heard during the early evenings. On 7MHz, some burning of the midnight oil had provided useful Central American dx at around 0100, and earlier in the evenings, TN8AJ had been good copy. But the best of both bands had still to come—as your scribe hopes to be able to report in the forthcoming months.

10, 18 and 24MHz

Brad Bradbury, BRS1066, reported the "most important happening of October" to be the fact that the USA got 10MHz. It increased his country total on the band to 31, adding W (all districts), KP4, KL7, plus HK3BBJ and VE7ASS. Paul, A8808, also mentioned the USA activity plus KL7RA at midnight, JA8XR (0800), GI, OK, OZ, HB9, LA and F. KH8AC/KH1 was apparently heard at 0750 one morning but your scribe thinks that the station was actually in W1. Paul had found the hour between 0700 and 0800 the most profitable, with W2, 4, 5, 8, 0, VE6, KL7, VK2, 3 and ZL heard at the beginning of November. Turning to 18MHz, Brad added LA and GM, and had already received QSLs from G, GD and LA.

Here and there

Bernard Hughes, BRS25901, reported a change of QTH, which is over 250ft asl. He was hopeful of putting up a decent antenna system to see how the extra height would affect his receiving capabilities. He was also looking forward to the 144MHz dx season to see what difference the extra height would make at vhf.

Remember . . .

January is usually a busy month, especially on the lower frequency bands (7, 3·5 and 1·8MHz) and this year should be no exception, especially with the Heard Is trips still "go" at the time this is being written. Just a few reminders to close with: your scribe's If challenge (details on p1068, December issue); *73 Magazine's* If ssb contest—8/9 January; CQWW 1·8MHz cw contest—28-30 January, which coincides with the White Rose SWL Contest.

Finally, copy for March should be with your scribe by Tuesday 18 January, with short late items no later than Wednesday 27 January. Final scores for the 1982 countries table should be received by the first date, along with "All-time" scores. □

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MICROWAVES

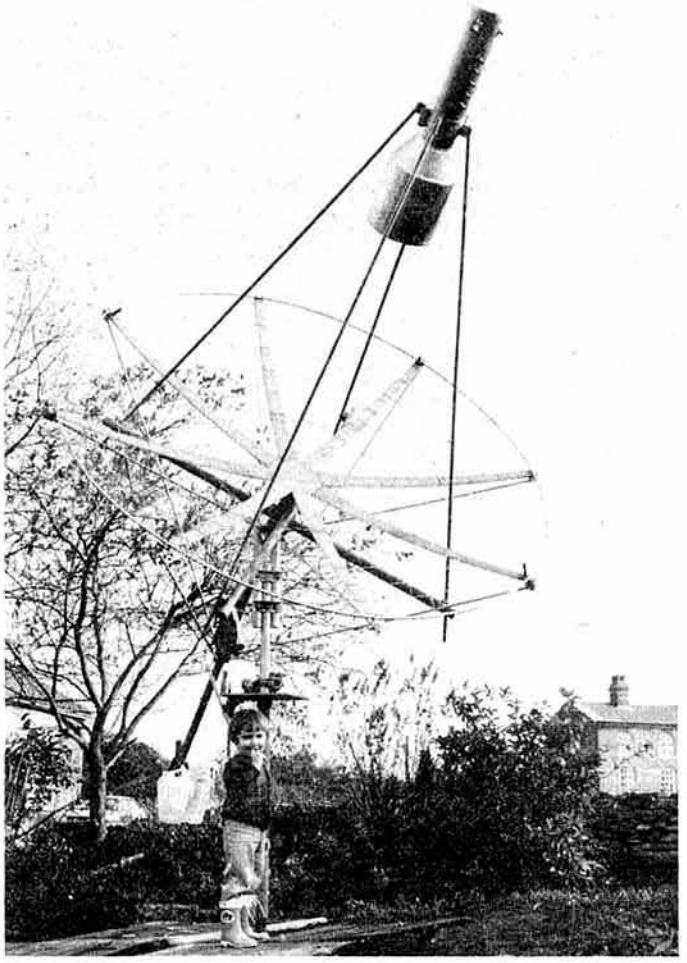
Charles Suckling, G3WDG*

1·3GHz eme news

The November eme activity period, which coincided with the second leg of the ARRL eme contest, produced some very interesting results, especially in the area of small-antenna operations. The potential of 1·3GHz for successful eme tests using relatively small antennas has been recognized for years, but is only now starting to happen in a big way with the advent of very-low-noise preamps using gallium arsenide fets, and a number of regularly active, well-equipped stations with larger antennas and plenty of power.

Results which a year or two ago would have been considered commendable with a 20ft dish, were achieved by Howard Ling, G4CCH, using only an 8ft dish. The 0·6f/D dish had been built originally for tropo work, but Howard decided to try it for eme reception. A W2IMU circularly-polarized feedhorn was therefore constructed and installed in the dish in place of the linear feed, and the whole assembly put on an el/az mount (see photograph). The G4CCH tropo receiving system was improved for eme reception by adding a 0·7dB noise figure MGF1400 gallium arsenide fet preamp (G3WDG design—to be published soon in *Rad Com*). The whole system was finished the day before the eme tests, just in time to check performance, and calibrate the dish-pointing indicators, using sun noise; 7dB of sun noise was measured.

Within a minute or two of aiming the dish at the moon on the following night, the first eme signals were received (at Q5 copy incidentally!) from SM6CKU. Over the next few hours signals were also received from K2UYH, OE9XXI, G3LTF, VE7BBG, W7GBI, WB5LUA and G3WDG (using a 13ft dish). Most of the signals were strong enough to be easily identified. Following his success, Howard hoped to try for some two-way contacts in the December tests.



Kerry Ling (3 years old, 1m tall) standing below G4CCH's 8Ft eme dish

Proving that an even smaller dish can be used, Manfred Plötz, DL7YC, made more two-way contacts in November using his 2m dish and 500W of rf, and has now worked SM6CKU, K2UYH and G3LTF. He was heard by several other stations. Two other German stations were active using small antennas. DJ9PC heard SM6CKU using a 3m dish, and DJ5BV made two contacts, with SM6CKU and K2UYH, using an array of 16 loop-Yagis and 500W. This is only the second recorded QSO on 1·3GHz eme where Yagis have been used (the first was F9FT to SK2GJ a couple of years ago). To put things in context, SM6CKU reports that DJ5BV was weaker than DL7YC, and knows which type of antenna he would prefer to build! DJ5BV was heard by several other stations, including G3LTF.

It may be noticed that one theme runs through these small antenna successes—SM6CKU. His is undoubtedly the strongest 1·3GHz eme signal at the moment, and it comes from a well-made 8m dish fed with only 125W of rf. Rather more rf is generated, but Ben suffers from 6dB of feeder loss. He is planning to move his eme shack to just below the dish, which will improve his signal by around 5dB. One wonders what minimum size of equipment will then be able to receive his signals!

Operating news

An excellent year for microwave dx continued, with a good opening at the end of October which resulted in three new IARU Region 1 records being made. The lift was fairly widespread and was particularly good from the UK to many parts of the Continent. Steve Berry, G4LRT (ZM45d), worked the following dx: OK1AIY/P (HK38c), F1FHI (ZH63d), ON1JE (BL80f), DJ0NA (FK58b), DJ6GQ (EI13j) and F1EA (DI39c). He passed on the interesting information that F1FHI worked SM1BSA on 1·3GHz over a distance of 1,800km, which is probably a new IARU Region 1 record!

It looks as though records were also broken on the next two bands up. The 2·3GHz distance record was moved on a few kilometres to 1,027km when John Tye, G4BYV, worked OK1AIY/P in HK28c (off the edge of his QTH locator map!). At about the same time, John's 3·4GHz record was being broken by PA2DOL, who apparently worked a German station at over 500km; full details of this contact are not yet to hand. Overall, G4BYV was very impressed by the conditions, which also gave him GH, EJ, EI, HK, FK and EK squares on 1·3GHz.

Peter Blair, G3LTF, and Simon Freeman, G3LQR, were comparing notes during the opening on their 1·3GHz results, and found that the conditions were very localized. There were occasions, for example, when G3LTF's signals were much stronger with a particular station than G3LQR's, and vice versa. G3LTF's stations worked list included OE2CAL (GH, and first OE QSO on 1·3GHz for Peter), OK1AIY/P (HK), DL6NAQ/P (EK), ON1JE (BL), DL3NQ (EJ), F1EA (DI), DJ6GQ (GI), DC7QH (GM), DD3KL (DK) and DF8DO (DL).

Bryan Harber, G8DKK, made a number of good contacts on 1·3GHz during the lift, including a string of eight German stations, four of which were in new squares. Bryan noticed the scarcity of French stations, but one pleasant surprise was the contact with F1FHI in ZH square. F1FHI is apparently looking for more UK stations on 1·3GHz and is well equipped —200W of rf to four 23-element F9FT Yagis, and an MGF1400 preamp. G8DKK is still trying to obtain the FMD Senior award for 1·3GHz, having 37 of his 41 counties confirmed. The last few cards are proving rather difficult, despite saes!

One dx station reported to be nearly operational on 1·3GHz is EA2AA in YD square, who has a Microwave Modules transverter plus 60W pa, and is only awaiting the delivery of some antennas from F9FT. On 10GHz there are unfortunately no dx QSOs to report! All has not been quiet on the east coast though, as G3LQR and G8HPU have been carrying out tests over the 20-mile obstructed path between their home stations. So far G3LQR has copied G8HPU's 30mW signal at 15dB above noise. Simon can also regularly receive the Martlesham 10GHz beacon GB3MHX.

Awards corner

Following closely upon his success in earning himself Certificate No 58 for "first contact on 10GHz beyond 150km", Michael Johnson, G8HPU/P, turned in a claim for the "five squares at 10GHz" parchment. The claim included no less than three Dutch stations worked from a site at Walton on the Naze on the Essex coast.

Two other claimants for the "first beyond 150 on ten gigs" have been G3PHO/P and G4FRE/P, who received Certificates Nos 59 and 60.

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4 - 2 - 70

Ken Willis, G8VR*

WINTER CONDITIONS have resulted in day after day of nothing but noise emanating from the receiver on the vhf bands, although the weather relented for just 48h at the end of October to produce a most enjoyable opening to eastern Europe. Some very good contacts were made by those fortunate enough to have caught it, and this was further proof of the need to maintain a listening watch if these winter openings are not to be missed. A regular study of the weather maps is also important at times when, as at present, auroral activity is less likely to occur and Es openings are still some months off. The amateur is ever-resourceful, however, so despite generally poor conditions there is still quite a lot to report.

QTH locator systems

For some years operators on the vhf bands in Europe have used a QTH locator system which not only provides very precise positional information but also has led to the popular pastime of "squares chasing" with its associated award system. Few operators would these days doubt the value of such a system when "MS14b" is shorthand for "15km south of Rapla, Estonia"—a great saving when the pile-ups are at their highest.

The current system does contain some ambiguities, however. These were not so important in the early days of vhf operation, but they are more serious today in view of the vastly increased ranges being covered by tropo, Es, aurora, ms and eme contacts with modern equipment and larger antennas. For example, on the larger versions of the "squares maps" a station giving a locator of IX42f could be either in the south of Italy or in Sweden because the map repeats itself going from south to north. This is because there are only 26 letters in the alphabet to use in the letter-pairs which identify the main square. Similarly, if one goes from the "A" vertical line of squares either to the east or west, the line will eventually repeat again for the same reasons.

This probably explains why the system has never been popular with hf band operators, who work over much greater distances than we do on vhf. The maps are always aimed at the vhf operator, and are restricted (in the UK versions) to the area bounded on the west by the "U" vertical line and in the east by "V" or "W" vertical line, deep inside Russia. To overcome these difficulties, John Morris, G4ANB, proposed a new system which would avoid the ambiguities and yet be compatible with the present system and not nullify its awards or squares totals in any way. A description of the system, which superimposes "fields" over the top of groups of existing squares, can be found in *Rad Com* November 1980, with further comment in *4-2-70* in the January 1981 issue. At the 1981 IARU Region 1 conference in Brighton, a proposal by Sweden and the UK to adopt the G4ANB (or "Maidenhead") system was narrowly defeated, but it was generally accepted that the present scheme was not entirely satisfactory.

In September this year I met John Lindholm, W1XX, of the ARRL headquarters staff, and he informed me that in the January 1983 issue of *QST*, he proposed to publish an article on the G4ANB squares system, together with information on the introduction of a USA "squares" award programme very similar to that now operative in Europe. The prime purpose of this exercise was stated to be a motivation for greater activity on the vhf bands in the USA, since the cw and ssb portions of the bands are currently greatly under-used in that country.

Ultimately Europe will have to decide whether to follow suit and adopt the new system. If IARU Region 1 comes out in favour, no doubt we shall all go over to it. Since the new system covers the entire globe, hf operators will no doubt take it up to avoid spelling out those long place-names phonetically (residents in Llanfairpwllgwyngyll please note).

It seems to me that, however good the new scheme may be, it is unfortunate that the UK—which more than any other country has pioneered the use of the vhf and uhf bands—should be obliged to rush into a change simply because our American cousins wish to put more life into their own bands. If you have any views on the subject, please make them known to *4-2-70*. By coincidence I have just received a card from IV square for an Es contact. No prize is offered for guessing from which country it came.

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Awards issued

The vhf awards manager, Jack Hum, G5UM, has been kept very busy during the past few weeks, and some of the claims he has processed have been quite unusual.

Jim Little, G4HPH (Wigan), has successfully claimed an award for three countries and 30 counties worked on 70MHz. All contacts were made on amplitude modulation on 70·26MHz, and it took two years to collect the cards. He receives Standard 70MHz Award No 142.

Derek Poulter, G3WHK (Surrey), has qualified for 70MHz Senior Award No 48. Some of his cards went back to 1975, but there were enough of them to give him a four countries 20 squares award (No 4) on the same band. Dave Sellars, G3PBV, who is well known down in the southwest, has received a sticker to update his basic squares award to the 20 countries 100 squares level.

Cliff Jeffery, G6ADE, killed two birds with one stone by submitting cards which gave him 432MHz Standard Award No 179 and six countries 30 counties certificate No 20 on the same band. He is the first G6A- - to be admitted to the 432MHz list.

During October G5UM sent out 10 plus 40 squares certificates for 144MHz operation to G4BLV, G8ZOS, G8MLJ and G8OEH. This took the total of those certificates issued to 99, so Jack was interested to see who would claim No 100. In the event a dual claim arrived from overseas, submitted by Willy Andersen, OZ4ZT, and Alliss Andersen, OZ1ACB. On the basis of "ladies first", G5UM issued certificate No 100 to Alliss and No 101 to Willy.

G4BLV (Birmingham) not only received the 10/40 squares award on 144MHz as mentioned above, but also sent cards which gave him certificate No 178 in the Standard 432MHz category. Three months ago, G6DAH became the first G6- - - to achieve a Senior 144MHz transmitting award. He has now provided evidence of having worked 100 different squares on the same band and becomes the first G6- - - to do so, receiving certificate No 17.

G6DER has also qualified for the 144MHz Senior by confirming contacts with 15 countries and 60 counties. From Edinburgh, GM8GFF sent cards for nine countries and 40 counties worked, and qualified for Standard 144MHz Award No 524. Close on his heels was G4ARI (Leicester) who received No 525.

Beacon news

G3COJ has written to say that the two Yagis now installed at the GB3VHF beacon at Wrotham, Kent, are not fed in quadrature as reported in *4-2-70* for November. Instead they are in phase. He also wishes to record the stalwart work carried out by G3KYD in erecting the new antenna system. The old five-element antenna which served the beacon well for so many years was on display at a recent meeting of the RSGB VHF Committee. It had suffered very little in all this time, and because of its history it is hoped to preserve it in the Wireless Museum.

During the tropo opening on 30 October, G4IOG (Sittingbourne) was able to copy the Czechoslovakian beacon OK0EA (HK18d) on 432·103MHz. Bob says that his location is "a hole in the ground" so that hearing anything over this range is remarkable. On this occasion the signal was audible all day, sometimes at S9.

The following is a list of all UK vhf/uhf beacons in bands covered by *4-2-70*, operative on 1 December 1982:

Callsign	Frequency (MHz)	QTH locator	ERP (W)	Antenna	Beaming degrees	Keying
GB3SIX	50·020	XN49f	10	Dipole	0, 180	F1A
(Operates 0100-0800gmt only at present)						
GB3CTC	70·030	XK46d	40	2-el Yagi	45	F1A
GB3WHA	70·040	AL71d	16	2-el Yagi	315	F1A
GB3BUX	70·050	ZN61a	20	2 × turnstile	Omni	A1A F1A
GB3ANG	70·060	YQ35c	100	4-el Yagi	160	A1A
GB3CTC	144·915	XK46d	40	3-el Yagi	45	A1A
GB3VHF	144·925	AL52j	50	2 × 3-el Yagi	288	F1A
					348	F1B
GB3LER	144·965	ZU65f	50	4-el Yagi	22	F1A
GB3ANG	144·975	YQ35c	20	4-el Yagi	160	F1A
GB3WHA	432·81	AL71d	25	2 × 8/8 Yagis	330	F1A
					90	
GB3SUT	432·89	ZM31b	60	2 × 8/8 Yagis	0	F1A
					135	
GB3EM	432·91	ZN32b	50	8/8 Yagis	150	F1A
GB3CTC	432·97	XK46d	5	4-el Yagi	45	F1A
GB3ANG	432·99	YQ35c	100	9-el Yagi	170	F1A

50MHz

November is the month when the 50MHz enthusiasts look for transatlantic openings, and that of 1982 was of particular interest because the decline in the solar cycle activity was so marked that it may have offered the last opportunity of such contacts for more years than some of us care to think about. G4GLT and G4BPY were both listening for the first signals from the east coast of the USA as we entered November, and G4BPY felt that

transatlantic propagation was almost possible on 1 November since he heard ZB2VHF by F2 backscatter on 50·035MHz with his beam towards the Caribbean. At much the same time, G5KW copied FY7THF with his beam roughly in the same direction. In the event, the first crossband transatlantic contact of the season was a neck-and-neck affair between G4BPY and G4GLT, and it had some very interesting aspects.

On 5 November, both these UK stations were listening for VE1YX, Bridgewater, Nova Scotia, on 50·10MHz, transmitting to him also on 28,885kHz. At 1335gmt, W2IDZ called in on 28MHz to say that strong audio was being received at his location from BBC tv on 48·25MHz. At 1338gmt another American station broke in to report reception of transatlantic video signals on 49·5MHz. The muf was apparently creeping up, and at 1345gmt the UK listeners heard a strong "ping" on the frequency of VE1YX. Other pings followed, one of sufficient duration for "VE1" to be copied at normal cw speed, and then at 1402gmt the full call "VE1YX" was heard at 439. Both G4BPY and G4GLT started to call the Canadian on 28MHz when at 1403gmt a 3min burst of signal from him on cw at 579 enabled both UK stations to exchange reports with him and make the dual QSO, jointly sharing the satisfaction of the first 50MHz transatlantic crossband contact of the season. By 1406gmt VE1YX had faded out, but K1TOL reported later that video signals from Europe reached 50·2MHz during the brief opening.

G4GLT has sent a recording of the VE1YX transmissions. The pings are very distinct but appear to be lacking in any doppler shift. It is difficult to say whether meteors were involved in providing this path across the Atlantic. If propagation was partly F2 and partly ms, was the meteor trail at the beginning, end or part-way along the path of a multi-hop transmission? The F2 layer is much higher (150–250 miles) than levels at which meteors typically produce ionization (50 miles), so just where any interaction between the two reflecting media could have occurred is open to discussion. G4BPY says that he has observed it, with others, on other occasions when 50MHz propagation was marginal, both on ZS signals as well as east–west paths. He wonders if meteors might somehow inject some extra ions into an F2 region not quite dense enough on its own to support 50MHz propagation. He suggests studying the phenomenon on 28MHz by looking for "pings" on marginal transmission paths. Meanwhile both stations are regarding this QSO as being by a "meteor-assisted" F2 propagation mode.

G5KW unfortunately missed this first opening, proving that however diligently you monitor for these events, it is impossible to be on the spot 24h a day. However, Ken made up for it on 13 November when he worked WB1FUB crossband at 1302gmt, and heard K1IKN and other weak stations on both cw and ssb. Later PJ9EE was heard calling G5KW, but no contact resulted from Ken's replies on 28MHz. This opening followed a major solar flare which occurred on 12 November around 1430gmt. G4GLT heard the FY7THF beacon for the first time this year, and said it was by F2 propagation. This is significant, because G5KW had his beam in the direction of the Caribbean when he worked into the east coast of America on 13 November, propagation being by F2 backscatter, or as G4GLT says, "more correctly by sidescatter". During the scatter propagation the muf only reached 41·25MHz or so, as determined by states-side reception of BBC tv signals.

Meteor scatter

The interest in 432MHz meteor scatter increases, more or less hand-in-hand with the growth in eme capability on this band, since very high erp is needed to produce good reflections from trails on this frequency. A late report has come in from G4DGU, who operated during the Perseids shower in August; he says that during this period, OZ7IS worked OY5NS on 432MHz ms cw. Chris had some tests himself with SM3AKW (JW) and heard only pings from him. However, this may have been affected by the fact that just before the shower, G4DGU's antenna system received a lightning strike which damaged his receiver front-end, so it is probable that he was "getting out" better than he was receiving. His system uses 8 × 21-element Yagis with a Mutek 0·5dB front-end and a K2RIW amplifier. The set-up is also used for eme (see later).

On 144MHz the regular ms operators continue to make effective use of sporadic meteors. Between 22 October and 14 November, G4IJE (Essex) worked SM3JGG (HV) and UQ2GFZ (NR) for new squares, plus contacts with DL3MBG (GI), OZ1FDH (GP), Y22HA (GO) and OK1OA (HK). All were on cw, but on ssb he worked YU3ZV (HG) who was using half a new antenna under construction for eme purposes. It currently has 176 elements (all Yagi elements) and will eventually have 352! Not an antenna for a suburban location, I suspect, but with his 100W into only half the array he is already a potent signal for those needing to work HG square.

Two new stations have appeared on the ms scene, both from Norway. LA6QBA normally lives in Oslo, but goes occasionally on weekends to GV square, where G4IJE has already worked him. He is often on the vhf net. LA1TV, worked recently by G4KPX, is in ET square, which is not often heard though it has been worked, especially on aurora. He too, is on the vhf net. G8VR has received a very attractive QSL card from LA6HL/TF for a contact on ms during that station's expedition to Iceland in 1982. On the back is an encouraging message to all who were not lucky enough to catch him on that expedition. He says: "Hope to work you again in July 1983 from TF." There is just a chance, also, that we shall see some /P ms operation from OY this summer, but until arrangements have been completed it would be best not to whet too many appetites, as there are still many problems to overcome before it can take place.

G4IJE is experimenting with G4IDE's ZX81 programme for both sending and decoding high-speed morse. In the ms role there are many problems in obtaining a predictable beat-note and in copying signals down in the noise or with marked doppler shift, but the early tests are very encouraging and it is not too rash to predict that one day all ms contacts will take place with information read off a vdu rather than being heard on a slowed-down cassette recorder.

Tropo

In the midst of all the rain and wind, G3POI telephoned on the evening of 29 October to ask if I was hearing anything. True, the weather had abated at that time and the sky was actually clear, but I thought that Clive was optimistic when he said that the weather map for the next couple of days looked very much like the one which prevailed during the massive tropo opening on 13 and 14 September. Next morning a telephone call from G4IJE to say that the 144MHz band was full of OK stations got me out of bed in a hurry. What followed was a very spectacular opening to eastern Europe.

The good conditions started on the late evening of 29 October, but reached their peak during daylight hours on 30 October, which, being a Saturday, resulted in considerable activity. The 144, 432 and 1,296MHz bands were wide open, and the action was primarily to OK, although a good deal of other dx was also worked. On 144MHz the OKs were out /P in great numbers, heading for the hill-tops, so that their signals were at times incredibly strong. The opening was quite sharply defined, and G5KW in Cornwall said that it did not reach those parts. G3BDQ (Hastings) found things fairly quiet until the evening of 30 October, the time when it was tapering off for those further north. He made up for lost time, however, by working nine OKs, ten East German stations, four SMs and numerous DL etc. After midnight he was called by UQ2GLO (KQ) and UP2BKH (KP), both of whom were worked. This was on 144MHz. On the same band G4IJE worked "about 35" OKs, 75 per cent of which were portable stations. G3POI almost filled his log book with a huge list of contacts, including more than 40 OKs. In the evening of 30 October Clive worked OH1DP (LU) and heard another OH calling. These stations were totally inaudible at G8VR's QTH, only a few miles from G3POI, which says a great deal for the 160-element antenna at his location as he was receiving the OHs at very good strength. Later G3POI worked an all-time best tropo contact in a QSO with OH5LK (NU), the distance being 1,961km. Later he worked UR2PCG (LR) in the early hours of 31 October. The range deepened to just embrace the nearer Russians as the event petered out, and it is amazing to report that several stations became so bored with working into Czechoslovakia that they switched off and went to bed! This does not happen very often. Two newly-licensed G6 stations were talking to each other "across town" saying that the QRM was too great, so when they had settled in on 144MHz they would "catch the OKs some other time". Unfortunately it is not *always* like that on vhf!

The 432MHz band was also very busy. G6JHR (Kent), reporting for the first time, worked Y23FG (FM), OK1MXS/P (HK), SM0DJW (IS), HB9AEN (DG) and DL6NAQ/P (EK) for three new countries. His previous best was a contact with FJ square. He is using 18W to a 17-element Cue Dee antenna at 45ft.

G8GGP (Kent) also worked OK1MXS/P (HK), DL6NAQ/P (EK) and SM0DJW (IS), and commented that it was a great pity that no SP stations were active as they would have been in exactly the right spot to have figured in this opening. Tim also worked 13 OKs on 144MHz, one of them running only 1W output, and the bulk of them portables.

G4BPY who disputes my calling him a fugitive from 70MHz (and rightfully so, as he has the "Supreme") was active on 432MHz in the event and worked three OKs, Y24XN/P, GJ4JWA, HB9AEN/P and, his most prized contact for a new country, LX1DB (DJ). He also heard beacons OK2EA on 432·937MHz, and DJ2LF on 432·005MHz, the latter sending "DJ2LF DL38". This beacon is not listed, but could be DL2LFA, given as being on 432·008MHz in the list, but no "A" was being sent in the call. Gordon's best dx was OK2VIL/P at 1,462km.

GW4BHZ went /P to his now famous site in YN75f, and took a bigger squares map this time! He found propagation more restricted than in the 13/14 September event, but in the directions where it was open it was stronger,

though he believes that he was really beyond the western edge of the lift and able to get into it only by virtue of the fact that he was at 1,840ft asl. He did pretty well, however, and on 144MHz worked 11 OKs, 2 OEs, 3Y and HB9. The best dx was 1,544km into JJ square, using a FT225RD running 30W to a nine-element Tonna. He also tried some fm, but gave it up due to the lack of any clear channels, though a few contacts into PA were made. Brian complains of fm stations invading the ssb and cw portions of the band during the opening, right down to 144·025MHz.

A very interesting opening and a nice break in conditions. The vhf population in Europe is now so large that similar openings should occur from time to time, especially with so many stations prepared to go to high vantage points to improve propagation.

EME

This is the first time since I took over *4-2-70* that any space has been devoted to the eme mode of operation. A few years ago such operation would have been confined to just a handful of stations equipped with huge antennas and very large power amplifiers. This is still true, but because some of the overseas stations are so big their signals can now often be heard in this country by stations with single 16-element antennas without elevation capability, provided you know when and where to listen and in what direction to point the antenna (at the moon, of course, if you can see it through our cloudy skies!) Many European stations, including several Gs, have worked the USA via the moon with no more than a 4CX250 amplifier and a 16-element Tonna, though to do so you must have the right station at the other end.

For years the biggest station was K1WHS, in Maine, who operates on 144MHz. His antenna has 336 elements with full elevation and azimuth control. His receiver has a 0·8dB noise figure, and some of the things he can detect and measure in space sound like pure science fiction. Recently, however, other stations have appeared with almost comparable capability, so there are quite a few which can now be heard on 144MHz. There are also many operating on 432MHz, where the antennas can be physically smaller for the same gain.

In future issues I will, if this proves popular, give details of the moon position during the periods most suitable to "listen to the moon". The signals from K1WHS on occasions move the S-meter. These periods will be when the moon is between 15° and the horizon, that is within the vertical polar diagram of a typical single Yagi. At the same time further details of eme will be given, coupled with a dire warning *not* to call stations which are heard, since the path is not reciprocal and, unless stations are properly equipped for eme and use the correct procedure, their presence on the eme frequencies causes interference to those who go in for eme "properly".

Every year there is an eme contest held in two parts. The second "leg" this year was over the weekend of 6/7 November. G3WDG, operating from Northants on 432MHz using a "chicken-wire" dish of 13ft aperture, worked K3NSS, ZS5JJ, I5MSH, YU2RGC, F9FT, K2UYH, N9AB and VE4MA, all being "random" contacts, ie not arranged by schedules. All were on cw of course.

G4DGU, who uses the equipment already described in the ms section, was also active on 432MHz. He worked ZS5JJ, YU1AW, JA6CZD (449 reports!), I5MSH, N9AB, K3NSS and F9FT, four continents and six countries, even though high winds were making it difficult to keep his Yagis on target. G4DGU heard many stations besides those he worked—namely HB9SV, HB9BPQ, UA3CBO, I2COR, YU2RSG and F2TU—an indication of how popular the eme mode is becoming these days. G4DGU could also hear his own ssb echoes "off the moon", which is quite remarkable considering the relative simplicity of his system.

During October G4KGC, using the G3WDG dish, contacted YU1AW via the moon on 432MHz. G3WDG requests users of the vhf net to stay off 14,345kHz on Saturdays and Sundays at 1600gmt, and on Sunday at 1000gmt, because at these times the frequency is used for setting up 432MHz eme skeds.

News from here and there

Old-timers may be interested to learn that Jim Foster, ex-G2JF, and a leading vhf operator in the post-war period up to 1972, is fit and well at the age of 77, and living in South Africa where he signs ZS5JF. He is active there on 144 and 432MHz, and hopes to work some of his old friends via the Phase 3 satellite when it is finally launched. In a future *4-2-70* it is hoped to describe some of his exploits in the early days of vhf, and to compare the results with what is worked today. Meanwhile he can be reached at 2 Burton Place, New Scotland Road, Pietermaritzburg 3201, Natal, Republic of South Africa.

Salvioni Giacarlo, I4BXN, who is very well known on the vhf bands, is attempting to put together and publish a callbook of all amateurs active on 144MHz. To assist this mammoth task he has requested information such as callsign, name, address, telephone number, equipment details and preferred operating times to be sent to him, QTHR. The mind boggles at the depth of this self-imposed task, but if readers wish to respond, they can, if they wish, send the details to me and I will send them en masse to Salvioni.

From Frank Howe, G3FIJ, comes a report that a group of enthusiastic amateurs in the Colchester area were forming into a contest group. They give warning that they will be a power to be reckoned with in future. It was a great pleasure to hear from Frank, as for years he has given up his time to do everything possible to further the cause of amateur radio in his area, not only through his very popular and well-organized slow-morse transmissions, but also by virtue of the RAE study courses which he arranges and teaches. The very long list of amateurs who received their licences as a result of Frank's efforts bears witness to his readiness to pass on his experience and knowledge to others. In the parlance of the old-time cricketers, Frank can correctly be described as both "an amateur and a gentleman".

Imperial College Radio Society, G5YC/G8EYC, has been forced to vacate its shack on the roof of a high building in South Kensington. It now plans to keep the antenna in its old site but operate from a very remote point. To facilitate this, it is planned to install Heliax feeder with a specified loss of only 0·38dB/100ft at 150MHz, together with a masthead preamp and power amplifier. Theoretically the society should get as good results as previously, even though the operating position will be across the street, four floors up, with the antenna 11 floors high some 500m distant! Work is in hand to send audio tones down the same cable as the rf to control the duplex rotor system.

Mike Barry, G4MAB, says that in a 144MHz contact with PA0XMA he learned that the Dutch station has receivers for both 70 and 50MHz and seeks crossband skeds with UK stations. He will transmit on 144MHz. PA0XMA is particularly keen to try during an aurora, so any station active on 70MHz during an aurora might somehow indicate that they can also listen on 144MHz. G4JCC reports this station's interest in 50/70MHz also.

G5UM says that some South Midlands stations are active on 70MHz on Monday and Thursday evenings using fm. The time is around 2130gmt, and between their overs they listen for weak cw calls.

Dave Sellars, G3PBV, has "trained" his ZX81 microcomputer to send and receive morse up to about 200wpm. He also uses it for contest scoring. G4IDE has also done much work in this area, and no doubt there are others. If you feel that *4-2-70* has a role in listing stations with similar microcomputer/vhf interests, a list of calls will readily be printed, as the impact of these machines on our hobby must surely increase.

Two or three readers have written about the use of the 144·300MHz calling channel. The main points raised justify some comment. First, during any major opening it is not always good practice to adhere rigidly to the calling frequency, because this will only result in it being continually jammed. When many stations are on the band, a CQ call on any relatively clear spot in the appropriate part of the band for the mode will usually produce the desired result. The formal calling channel is clearly to be preferred when conditions are flat, as many operators leave their receivers on the frequency when doing other jobs around the shack. This of course applies to both cw and ssb, but when things "hot up", move away.

The second point is an equally valid one, since it condemns the growing practice of someone calling "CQ" on the calling channel immediately after another station has finished doing the same. The first caller is then jammed in listening for replies to his call, while the second caller is also subject to interference. The result is chaos, especially if both stations then attempt to overpower the other. Sometimes this situation will arise inadvertently when, due to beam headings or conditions, a station cannot hear another operator on channel although he may be audible to someone at a remote point. A few moments listening on channel before calling will overcome these problems and increase the chance of making a contact.

Late news

On 22 November the solar flux went above 200 and a noise storm developed on 50MHz, with blackout for a time on the hf bands. Two days later a widespread aurora occurred starting in the early afternoon and persisting until about 1930gmt. Stations in the south worked into Russia, Finland, Hungary and Yugoslavia. Most of the action seemed to be found with QTFs at 75°, but G3BDQ (Hastings) had to lock his beam into a northerly heading, due to high winds, and worked—among others—UQ2GCG (LR), RR2RBD (MS) and OH1DP (LU), all new squares for him. Other stations active were UQ2AO (MQ), UP2BFR (LP) and HG7PR (JH) worked by G4IJE, HG0HO and YU2ZV (worked by G3IMV) and HG8CE (KG), UQ2GAJ (LQ) and HG8CE (KG).

There was much activity on 70MHz, and on this band beacons GB3ANG, GB3CTC and EI4RS were all copied at good strengths with auroral tones.

A weak second phase occurred around midnight but did not develop in the south. G5KW in Cornwall said the auroral conditions were excellent in the far west also. □

THE MONTH ON THE AIR

John Allaway, G3FKM*

AS IS NOW VERY OBVIOUS to all who use the band, 10MHz was released for use by USA amateurs at 1900 on 28 October 1982. General, Advanced, and Extra class licence holders may use up to 250W input of A1 and F1 emissions in the segments 10,100-10,109kHz and 10,115-10,150kHz. The missing section is presently used by the USA Government radio service. The notice which was issued emphasized: (a) the importance of not interfering with the stations in the fixed service who use the band, and (b) the fact that the amateur allocation is on a secondary, non-interference basis.

Aemar Higgins, GI3YMT, would be happy to act as QSL manager for any dx station. His address is 15 Everton Drive, Cregach, Belfast BT6 0LJ.

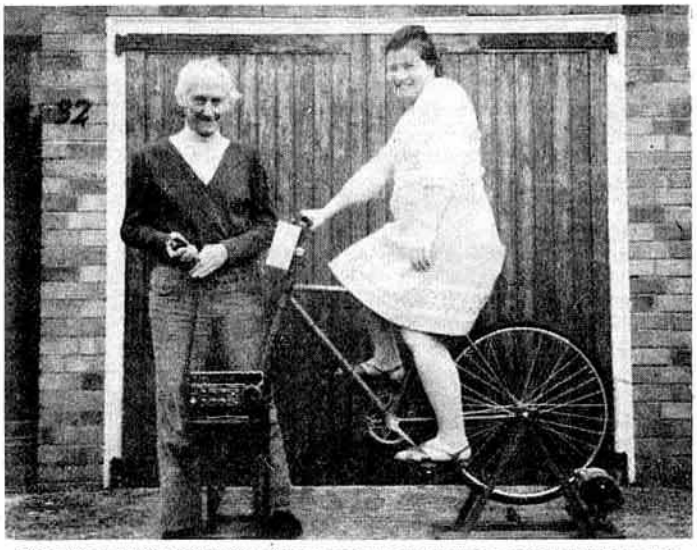
G3XFZ advises that he is not the QSL manager for T30AT, for whom he is getting QSL cards from all over the world.

Overseas news

Eric Newton has reported that 5H3FN became active in May 1982 and soon became aware of the problems of a dx station—including the fact that there are many would-be dxers who call incessantly regardless of what is happening. Their persistence does not get them a contact but merely results in a frequency change! Eric says that only about 25 per cent of expected QSLs have been received—please apply to the address in "QTH Corner". It appears that amateur licences in Tanzania are obtained through the Director General, Radio Licensing Section, PO Box 9070, Dar Es Salaam, and that the licence is very similar to that in the UK.

G4LPQ was operating as VP8APQ during October with the assistance of Maud, VP8NY, and Charlie, VP8ML. He was able to be on 21MHz every third day and talk to G3LDI and his other friends in Norfolk. John found that the technique of making his own list works well—he would collect a log page full and then work them all. USA and UK stations were the best behaved, and working Ws was a delight. The local amateurs are slowly returning to a semblance of normality, and claims for lost gear are being met and replacements made.

Vince Lear, VK2EAO/G3TKN, has been working into Europe on 3·5 and 7MHz using his FT707 and dipoles. Signals are good on the short path from 1900 to 2030, but skip favours eastern Europe and there seems to be a shortage of Gs. He hears many Gs and Europeans calling "CQ DX" but not hearing replies because of the QRM at their end (and receivers suffering from cross-modulation?). However, Vince thinks that activity from VK is very low on the lower frequency bands and that many Gs are getting through but may not be aware of the fact. He says that the best transmitting antenna is not the best for reception—many would do better to use a Beveridge or loop for this purpose, and to remember to use an rf attenuator.



G3TWS and wife G8TWS testing a pedal-powered generator developed by John for use in Zaire to power an hf network linking mission hospitals

*10 Knightlow Road, Birmingham B17 8QB

G3SAX has pointed out errors in the report on p973 of November 1982 *Rad Com* which refers to H44JE. It seems that this incorrectly assigned a daughter to G3FIX! Julia has no 14MHz antenna, and Robbie is only in contact with her when 21 or 28MHz is open and when the contact does not interfere with her social life. She is in fact on 21,225kHz occasionally from 0900 to 1100 talking to G3SAX, who is her father.

G3GVV has supplied a list of amateurs in Fiji, a total of 32, of which 3D2s AZ, CM, CS, ER, PG, UR and PG are the most active. The others are 3D2s AN, AS, BM, CC, DI, EC, EN, EQ, ES, JG, KR, MD, ME, PS, SA, SS, WR, FE, HS, RK, MO, MS, IS, PS and MW.

Readers will be pleased to know that Ray Naughton, VK3ATN, who fell some 80ft with his tower during a freak storm in October 1981, is now fully fit again. During his stay in hospital he was visited by more than 300 amateurs. The storm struck suddenly with winds of over 100mph while Ray was working on a rotator, and the whole structure collapsed, throwing him on to the roof of his shack from where he was thrown a further 12ft to the ground.

Dirk, WA4IKZ, has written to point out that he deals with QSL requests for those needing cards from CR9T, and not JA4IKZ as seen in some places. He has operated the station twice; from 14 to 22 July and from 8 to 14 October 1982, and made about 2,600 contacts, all but 10 on cw. He hopes to return next month but at present is living in Jeddah in Saudi Arabia and working for Saudi Arabian Airlines. Anyone needing a fast QSL is invited to write to the address in "QTH Corner".

Top band "firsts"

Since the table of claimed "firsts" published in March 1982 *MOTA*, a number of other claims have been received. The EK, HZ, MP4B and PA dates seem to be earlier than those listed before.

CP1EU - G3XZK (19.6.74)
DL2HK - G2BON (7.9.50)
EK1AO - GM2HIK (22.1.50)
HA5BKI - G2BON (2.12.50)
HZ1KE - GM2HIK (22.1.50)
I4AMO - G2HKU (16.4.76)
LU5HFI - G3WTA (30.7.73)
MP4BJI - G3WTA (10.8.71)
OK1AJX - G2BON (24.1.50)
OJ0MA - G3XZK (30.12.74)
OZ7JQ - G2BON (24.1.50)
PA0PN - G2HKU (23.12.54)
SM5AXY - G2BON (19.1.51)
VE1MX - G3WTA (4.1.73)
ZB1AR - GM2HIK (12.3.50)
ZC4JA - - G2HKU (6.2.54)
5A2CW - G2DHV (21.10.59)
9A1VU - G2HKU (2250 on 27.12.63)

DX news

FB8WG should have left Crozet early in December, and the relief crew for the island is believed to contain two amateurs who are said to be FB8WH and FB8WI. F6BFH reports that FB8XAB, FB8ZR and FB8ZQ will be active soon. Those still seeking a contact with Marion Is will be interested in a *DX-NL* report that ZS2MI is now active every Saturday from 1100 to 1200 on 14,150kHz. a new callsign—VK0AP—will be active from Macquarie Is during 1983. The operator's name is Peter and he will use 50MHz as well as the hf bands.

ZL3AHF is scheduled to begin a six-months stay on Penrhyn Is (in the North Cook Is) this month. He will only be heard using cw. VK9ZA should now be fully operational after receiving the new power supply for his TS120S. Changes in the amateur population of the islands around New Zealand mean that ZL4OY should have now left Campbell Is but is likely to appear from Chatham Is this year. A new operator may be going to Campbell Is.

Gordon, T2GSH (formerly ZL1BFV/YJ8GH), is now active again and will be in Tuvalu until October. He has been reported on 14,183kHz at 1300.

4K1D is said to arrange schedules for five-band cw contacts if asked. He operates from 5 to 20kHz above the low ends of 3·5 and 7MHz after 2100.

VQ9WB is a new arrival on Chagos. He is to be found after 1730 on either 14,300, 21,300 or 28,555kHz.

The promised increase of activity from China seems to have taken place with the appearance of BY8AA on 21MHz cw—giving Chengdu as location. *DX News Sheet* has received a card from BY1PK saying that the station began operating on 4 November and is the station of the Sichuan province branch of the CRSA.

Three more DXCC countries have been deleted from the DXCC list—Bajo Nuevo (HK0) and Serrana Bank (HK0, KP3, KS4), and the former Saudi Arabia/Iraq Neutral Zone (8Z4). The HK0 islands now count as San Andreas Is.

The Technical Institute of Radio in Damascus announced that 6C35A, 6C35M, 6C35N and 6C35O would be on the air on 25, 26, 30 and 31 December to celebrate the 35th anniversary of amateur radio in Syria. Special QSLs will be available and a special request is made that, due to the very small numbers of amateurs in Syria, and the high cost of QSLs, three ircs are sent with direct QSL requests, and that ircs are also sent with cards being forwarded via bureaux.

Lou v.d. Nadort, PA0LOU, chairman of the IARU Region 1 Division, at his home in Zundert in the Netherlands

Expeditions

The final positions of the two expeditions planning to visit Heard Is this month were not known at the time of writing. Licences and landing permits have been issued to the WIA group, and the motorized sailing vessel *Anaconda II* has been chartered for the nine mountaineers and three amateur operators—believed to be VK3DHF, K8CW and N4BQW. Departure from Perth was scheduled for 1 January, and the route planned to go near to Kerguelen Is (FB8X) and Amsterdam Is (FB8Z) where there may be brief amateur activity. Callsigns to be used by this group have been given as VK0HI, VK0CW and VK0MD. The other group, led by Jim Smith, VK9NS, expects to leave Hobart also in the first week in January and to follow a more southerly route in the *Cheyness II*. In this case the ship will carry an 18-person crew, including six amateurs, and should stay on Heard Is for two weeks, and licences and landing permission have been received.

According to the *Long Island DX Bulletin* F5MF and F6BBJ were planning to visit many African countries, including C5, J5, S9, TY, TZ, 3C1, 3C0, 5U and 5V, with D4 and TT other possibles. They will concentrate on cw on 3·5 and 7MHz, and 3,502, 3,792, 7,005, 7,075, 14,045, 14,105, 14,195, 21,045, 21,245, 21,295, 28,025 and 28,545kHz have been given as possible operating frequencies. No dates were available. The same news source mentions a planned trip for 30 days to the South Orkney Is by a team of Argentine amateurs, commencing in mid-January.

K4YT is now at home and has some 15,000 QSL cards for his African trip to send out. Cards for TJ9BB, TYA11, K4YT/5N0, 5Z4RK, 5Y4RK and 9Q5VT were supplied by IDXF and are now being processed. F6ATQ had just received QSL cards to confirm his spring 1982 contacts from Abu Ail as J20/Z in late October.

Welcome . . .

. . . to the following overseas amateurs who joined the Society during October: DF3GJ, DJ7HM, EI2AK, EI3EV, EI5T, EI6ES, EI9ABB, K3DI, KA4DOZ, OH2PO, ON1KFC, SM3UL, SM7FCD, VE2SH, VK2ATT, W5TBV, WA9SLD, ZB2HG, ZR6AIE and ZS6AEV. Listener new members include H. V. Howitt (A4), M. Kentell (F) and A. M. Solomondis (5B).

QSL via . . .

C31XO via F6GOW
EA4LH/CE3 via EA4JF
FM0AYU via F5QE
HD8GI via W3HNK
JX1CY via LA7JO
JW5VAA via LA4YW
JX5 VAA via LA4YW
OY5J via WA3HUP
P47N via W5AT
TU2JT via F6CXV
VP5BAX via N4BAA
VP8AIC via WA4TWS
VP8SB via G4DMA
5N8BG via G4GGY
9U5DSD via WA4WPO

Contests

1983 CQ WW 160M DX Contest

2200 28 January to 1600 30 January (CW)
2200 25 February to 1600 27 February (Phone)

Single- and multi-operator (maximum of five operators). Exchange RS/T and country, USA state or VE province (serial number has been eliminated). QSOs with own country count two points, with same continent five, and with other continents 10. The multiplier is the total of USA states, DXCC countries and VE provinces worked. For each duplicate, false, or unverifiable contact, three additional contacts will be removed, and a second multiplier removed if the contact was a multiplier. Sample log and summary sheets are available from *CQ*, but home-made sheets may be used —40 QSOs per page, with time, numbers sent and received, and separate columns for QSO points and to indicate new multipliers. Indicate "CW" or "SSB" on the envelope, and post logs to Don McClenon, N4IN, 3075 Florida Avenue, Melbourne, Fla, 32901, USA, before 28 February for the cw contest, and 31 March for the ssb contest.

Results of the **1981 CQ WW DX Contest (CW)** appeared in October *CQ*, and UK scores (single operator) were listed as follows:

Callsign	Band	Points	Callsign	Band	Points
G3FXB	All	2,720,785	G3TVW	21MHz	155,134
G3XTT	All	1,430,220	**GW3KYA**	21MHz	84,656
GW4BRS	All	887,285	G3WKL	21MHz	35,283
G3ESF	All	398,772	**GW3MPB**	14MHz	41,920
GM3RAO	All	310,116	**G4KPE**	7MHz	127,170
G2AJB	All	54,436	G3XKQ	7MHz	85,840
G8DI	All	26,846	G2FNK	7MHz	9,856
G6NK	All	14,840	**G3VMK**	3·5MHz	98,118
G4GIR	28MHz	423,456	**GM4LGM**	3·5MHz	21,630
G4IQM	28MHz	83,731	**GW3NYY**	1·8MHz	21,320
G5EBA	28MHz	2,560	**GM4KWS**	1·8MHz	6,876
G3RAU	21MHz	167,386	**G3XWZ/A**	1·8MHz	4,512

Congratulations to **G3FXB**, who won the W3AU Trophy as top European all-band entry. **GW3NYY** was world third on 1·8MHz. In the multi-operator single-transmitter category, **GW3RRS** scored 3,293,346 points, **GB2MM** 2,683,296, G6UW 2,589,348, **GU3SXW** 2,486,380, G3SSO 2,449,386, GU3HFN 2,100,897, and G8JC 243,032. Certificate winners are printed in bold type. **G3CWL** was the only UK entrant in the QRP section with 6,480 points.

World Communication Year

0001 to 2400 15 January

The object is to contact as many others as possible on all bands, 1·8MHz to 275GHz, excluding 10, 18 and 24MHz. Single- and multiple-operator categories—all mixed-modes but not cross-mode. Send RS/T and number indicating ITU Region and ITU zone (UK would be 127). Stations may be worked once on each "band"—telephony (including sstv) and telegraphy (including rtty) count as separate bands. The multiplier is the total of ITU zones worked on each band added together, and points are as follows: four for contacts outside own ITU region, two with stations outside own zone but in same ITU region, and one with stations in same zone. Logs should show time, band, callsign, exchange and claimed points, with multipliers clearly marked. Multi-operator entries must list all operators' names and calls. Include summary sheet showing total QSOs, points claimed, and zone multiplier for each band and total score. Include region and zone with name, address and callsign. Post no later than 28 February 1983 to the organizers: Potomac Valley Radio Club, PO Box 337, Crownsville, Md, 21032, USA. A plaque will be given to the top scorer in each ITU region in each category. Certificates will be sent to the winners in each Zone.

In the **1982 Helvetia 26 Contest**, UK scores were as follows: **GM3XNE**, 12,240 points; GM3UDJ, 11,520, **G5EDZ**, 11,466; G3VOF, 8,316; G4GGY, 5,772; G3MVA, 3,726; G8QZ, 3,360; GM4LGM, 2,640; G3DQL, 2,016; and GM3ZRT, 1,092.

REF/UBA Contest

0600 29 January—1800 30 January (CW)
0600 26 February—1800 27 February (Phone)

3·5 to 28MHz. Contact C3, CN, D6, DA1/2, F, FC, FB8, FG, FH, FK, FM, FO, FP, FR, FW, FY, HB, HH, J2, LX, OD, ON, TJ, TL, TN, TR, TT, TU, TY, TZ, VE2, XT, YJ, 3A. 3B, 3V, 4U, 5R, 5T, 5U, 5V, 6W, 7X, 9Q, 9U and 9X. Single-operator entrants may only operate for 26h—the 10h rest may be taken in up to three parts. Exchange RS/T and serial number (from 001). French and Belgian stations will include two figures or letters to indicate their location. One point per QSO, the multiplier being the total from each band of departments, overseas departments, territories, DUF countries, Belgian provinces, DA2/FBA, and 14 DNF countries worked. Log and summary sheets are available from REF HQ. Send logs to B. Francillon, F6BDN, Sq Trudaine 2, 75009 Paris, France.

Awards

All Africa Award

Revised rules for this award have been received from SARL. Confirmation is required from at least 34 countries in mainland Africa. For this purpose ZS1, ZS2, ZS3, ZS4, ZS5 and ZS6 count as countries, and together with A2, 7P8 and 3D6 are nine which must be included in the 34. Areas which have changed prefixes may still be counted as well as the original prefix. All contacts must have been since November 1945 with minimum reports of RST338 or RS33. Include a full list of contacts—certified by an awards

HF propagation study

Band predictions for January 1983

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each hand.

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 "plus" sign in the 28 and 3·5MHz columns respectively.

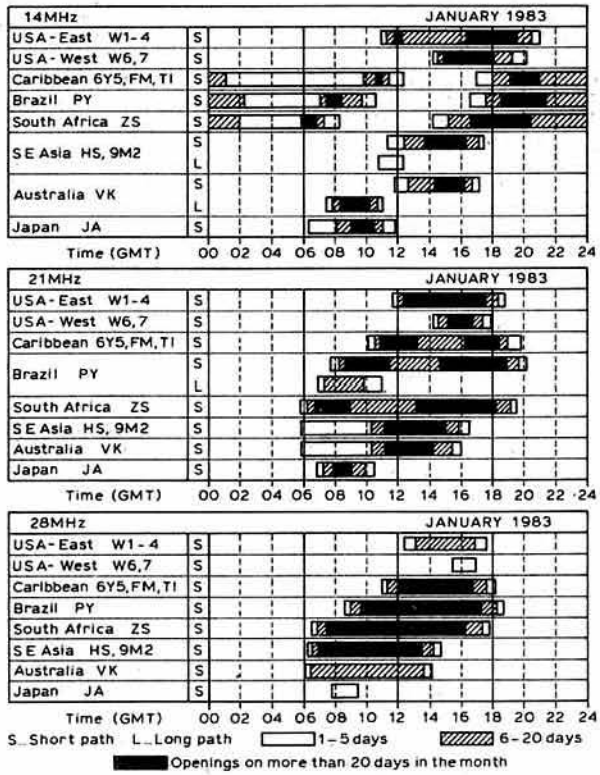
	28MHz	21MHz	14MHz	10MHz	7MHz	3·5MHz
GMT	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802
EUROPE						
Moscow	....2674....	....79994...	...1887882..	43.666567833	985543235888	+÷52....25÷+
Malta	....26541...	....89886...	...18778972.	562665568985	998732236899	+÷+4....3+++
Gibraltar	.....3321...	....288761..	....8888872.	242.86567984	898653335799	+++÷2...24++
Iceland	......22....	.....3785...	....188895..	.1..6767883.	776164446786	+++÷32..35+÷
ASIA						
Osaka	.....	....41.....	....75.....	1..1532232.2	....31.13654	.....35.
Hong Kong	....43.....	....884....	...156541...	1...2333432.	1....1.13674	.....3÷4
Bangkok	....6863....	....79872...	....265671..	3....3236533	3.....13677	.....4÷5
Singapore	....4654....	...168883...	....155671..	2....2236633	2.....13686	.....4÷3
New Delhi	....665.....	...17885....	...224564...	51...1236335	73.....13678	5.....45÷
Teheran	....7875....	...377883...	1..5335682..	7423..236755	873....13678	÷5.....455
Colombo	....7886....	...257884...	.....25683..	32....236755	61.....13678	3.....45÷
Bahrain	....7765....	...366884...	2..521468511	8422..136876	872....13678	÷5.....355
Cyprus	....88872...	....2989981..	32.765678732	885633357988	98731.124788	+÷4.....4÷+
Aden	....77762...	...3557871..	4..4..268853	8531...35888	872....13677	+4.....354
OCEANIA						
Suva (S)	.....11....	.....3651...	....166671..	....433364..	....31.132..	.....
Suva (L)	....21.....	...76421331	...17655673.	...3532255..	....12...22..	.....
Wellington (S)	.....12....	.....675....	....66666...	....633462..	....31.132..	.....
Wellington (L)	.....	....21.....	..1.75323521	...15322441.	....3...21..	.....
Sydney (S)	....3332....	....87771...	....166567...	....3333641.	....11.1351.	.....2..
Sydney (L)	.....	.....42.....	56543551	....4323473.	....11..241.	.....
Perth	....4432....	...268774...	....265683..	1....3236753	13662	.....44.
Honolulu	.....	.....	.....1..5..	.13.212134..	..3331.131..	....4.....
AFRICA						
Seychelles	....2244....	...2447851..	3..1..268853.	831....35888	84.....13678	÷.....35÷
Mauritius	....36542...	...2456872..	42.1..2688864	851....35898	73.....13688	5.....3÷+
Nairobi	....65563...	...25568831.	52.3...158985	9731...25898	872.....3687	+4.....355
Salisbury	....23553...	...14457852.	65.3...37997	9831....4899	872.....2688	+4.....3÷+
Capetown	....226551..	44568641	76.21..15898	9842....2689	873.....378	+4.....4÷
Lagos	....687762..	1...86568741	771251.15891	89652...269.	7883.....48.	4++.....5.
Ascension Is	....274351..	77556641	774.62..1688	99833....379	88851....158	+++2.....2÷
Dakar	....188673..	78667741	664.74113798	989351...489	87872....168	54÷4.....3÷
Las Palmas	....177671..	....6998971.	343.87667885	888474334799	989851111489	÷+++2....25÷
S AMERICA						
South Shetland	.....22231..	56666531	453.75321235	4562431...13	23332.....	.....
Falkland Is	.....23563..	47655531	454.7521.135	688252.....3	46653.....1	.342.....
Rio de Janeiro	.....32122..	....1754453.	444.651..156	989262....36	88873.....4	÷5÷4.....
Buenos Aires	.....12243..	....2564442.	334.762...25	788263.....4	588631.....1	25÷4.....
Lima	......7763..	......86551.	112.2351..13	5681532....3	588631.....	25÷4.....
Bogota	......7763..	......87551.	1.2..352..23	6671332....4	687631.....1	3554.....
N AMERICA						
Barbados	......7763..	.....486562.	112..651.154	7671332...26	887631.....4	÷544.....
Jamaica	......4873..	......88651.	..1..1531123	55714321...4	687531.....2	4554.....
Bermuda	......5873..	......88771.	..1..5542353	65712321..36	887631.....4	÷554.....2
New York	......1762..	......68861.	..1..2564452	556123231135	888531....14	5554.....
Mexico	.......562..	.......874..	..1...263111	356.3223...1	378531.1.....	.4÷4.....
Montreal	......1762..	......68871.	..1..2565552	556.23332246	888531..1..14	5554.....
Denver	.......41..	.......285..	66421	356.21133112	378531.1...1	.4÷4.....
Los Angeles	.......2...	.......74..	.......2631.	255.22.331.1	158531.11...	.2÷4.....
Vancouver	.....	.....23..	.1.....762.	355.22.25322	258431.131.1	.2÷4.....
Fairbanks	.....	.....	.1...11135..	353.23235742	346331.13432	..34.....2..

Propagation predictions

Conditions in January will differ little from those of the previous month. Towards the end of the month the hf bands will remain open a little longer. Predictions given for December will also prevail during January.

It is pointed out again that the graphs for 28, 21 and 14MHz use the gmt time-scale; this makes it easier to convert into local times of various dx regions.

The provisional mean sunspot number for October 1982 issued by the Sunspot Index Data Centre, Brussels, was 94·3. The maximum daily number was 164 on 2 October, and the minimum was 39 on 18 October. The predicted smoothed sunspot numbers for January, February, March and April 1983 are, respectively: (classical method) 101, 99, 97 and 95; (SIDC adjusted values) 102, 100, 98 and 96.



manager of a national society—plus 10 ircs, and send application to Awards Manager, SARL, PO Box 3911, Cape Town, 8000, Republic of South Africa. Note that the SARL countries list includes H5, ET2 (in addition to ET3), CN2, S8 and V9. ZS2MI does not count as it is not on mainland Africa.

Top Band Certificate

Also from SARL. Europeans require one confirmed QSO with ZS on 1·8MHz since 1 January 1960 with minimum RST338 or RS33 report. Send certified details plus 10 ircs to the address above.

Worked All Scottish Districts

Certificates will be issued by the Scottish Tourist Board to overseas amateurs who confirm contacts with GM. A special plaque will go to the first to work all 56 districts after 25 November 1982 in each country and in each USA and Canadian call area. Application forms and record books are available from A. G. Anderson, GM3BCL, West Balfour House, Durris, Banchory, Kincardineshire AB3 3BJ. The award will be in three classes—Gold for all districts, Silver for 45, and Bronze for 30 confirmed. Endorsements for bands or mobile operation are available.

The WAB Award

The WAB awards system has been revised and an updated record book containing full details is now available. It may be obtained, price £4 inland or £4.50 overseas, from B. Morris, G4KSQ, 22 Burdell Av, Sandhills, Estate, Headington, Oxford OX3 8ED. Please make cheques etc payable to the Worked All Britain Award account.

Sherwood Forest Award

Available to licensed amateurs and listeners for contacts/confirmed reports since 1 January 1982. A total of 30 points is needed—one point is gained for each station in Nottinghamshire, two for each Mansfield ARS member, and five points for contacting the club station G3GQC. All bands and modes accepted, but a station may only be counted once. Send log details plus £1.50 to Awards Manager, G8UYD, 83 Moor St, Mansfield, Notts. A list of members is available from G8UYD in exchange for an sae.

V. C. Harvey-Brain

Old-timers will remember the exploits of Harvey in the Indian Ocean area during the years between 1959 and 1974 as VQ9HB, VQ9V, VQ9HBA, VQ8BFA, VQ8BFC, VQ9V/F and VQ9V/D. He has also been VK6VC, and is now living in New Zealand as ZL1BSO at 7 Hamilton Rd, Surfdale, Waiheke Is, Hauraki Gulf. It seems that he was often asked why he did not write a book about his exploits as one of the old type of expeditioner who travelled in a small boat unsponsored by the present day type of expedition organization. He has now done this and *Seychelles Saga—the story of two boats and a dream which came true* is now available direct from him price £3.90 by surface mail.

Around the bands

G8KG was not caught out by the early deadline this month, and his report on propagation goes as follows: "Solar activity continued to be on something of a plateau during October and the first three weeks of November. The 27-day average of the 2,800MHz solar flux continued to fluctuate gently above and below 165 sfu, with daily values topping the 200 mark for just a few days during each solar rotation. At the time of writing (23 November) there were some signs of an upward trend, but this will probably be short-lived."

QTH CORNER

A22CT	via G3HCT, J. Bazley, "Brooklands", Ullenhall, Henley in Arden, Warwicks.
A35TN	VK3VU, R. Forrester, Box 6000, Ballarat 3350, Vic, Australia.
CR9T	via WA4IKZ or D. Tanis, Saudia, CC 906, Box 167, Jeddah, Saudi Arabia.
CQ6OF	(Europeans) via CT1OF, J. Gracias, R do Parque 46, 1500 Lisboa, Portugal.
FW0KN	via DK7XN, R. Ulrich, Hummelsbuetteler Weg 68, D 2000 Hamsburg 63, FR of Germany.
FW0XR	(see 3D2XR).
G5ACI/AA	YASME Foundation, Box 2025, Castro Valley, Cal, 94546, USA.
G4OBH/JW	G. Wimpenny, Queens College, Cambridge.
JW6MY	Box 224/10, Longyearbyen, Norway.
OA4DW	(see ZP5XDW).
P42E	via WA2SPL, J. Krone, Box 7, Grafton, NY, 12082, USA.
ZP5XDW	via N4DW, Box 35, Bristol, Va, 24203, USA.
DF9EAJ/3B9	via DL0LH, c/o DL9QH, P. Klier, Ulmenweg 9, D 2085 Quickborn, FR of
DF9XP/3B9	Germany.
3D2XR	via DK6XR, H. Rambatz, Heidlohstr 35, D 2000 Hamburg 61, FR of Germany.
5H3BH	(24/11 to 6/12/82) SM0DJZ, Idungatan 3, S-19500 Mersta, Sweden.
5Y4DA	PO Box 30137, Nairobi, Kenya.
6C35A	
6C35M	
6C35N	PO Box 35, Damascus, Syria. (Enclosure 3 ircs).
6C35O	

"The general improvement in hf band conditions has been quite marked, and this is due partly to the normal seasonal improvement and partly because the very high levels of geomagnetic activity in the months up to and including September have now declined, at least for the time being. Nevertheless, the earth's magnetic field is now much more disturbed than it was during the peak of the cycle, and this has a particularly marked effect on the reliability of the North Atlantic openings on the higher bands, an effect which was very evident during the CQ WW Phone Contest."

Thanks to the following who made a good end to 1982 by sending in logs from which the following section has been made up: G2HKU, G5JL, G3s BDQ, GIQ, GVV, GM3ITN, G3s KSH, LPS, NWG, SVW, UKH, YRM, G4EHQ, GW4KGR, G4s LRS, OBK, G5CFJ, and RS25429 and 31301.

Stations using A1A are listed in italics.

1·8MHz. **0100** DJ6QT/CT3, *UL7CAD.* **0400** I4RYC, OH0W. **0600** W2-W4. **0700** W1-W4, W8LRL. **2100** *VK6HD.* **2200** *LX1YZ, LZ2SC.* **2300** EA8AK, ED9CM, LA4O, RG6G, ZB2EO, 4U1ITU, 4Z4DX, *DL0HSC/5B4.*

3·5MHz. **0100** *FM7WU, DL0HSC/5B4.* **0400** DJ6QT/CT3, VP9IB. **0500** *C31XO,* PJ9EE, ZF2FL, *ZL* (to 0700), 9Y4W. **0600** *CN8AD,* HH2WW, *PY1ZAE,* W6-W7, ZL4PO/C, *5T5TO.* **0700** *N6RO, N7KA, ZL2-ZL4,* ZL1SD, 6Y5IC. **2100** *VK6HD.* **2300** *DJ2SL/EA6,* RG6G.

7MHz. **0300** HH2CG, KL7RA, N7UA. **0500** VE8DX, W6-W7 (until 0700), *VP5s BAX,KP.* **0600** *CE6AT, KL7Y, TU2JT, V3CQ, ZL* (until 0800), 5T5TO. **0700** *CN8AD, J88AB, KH6AM, VK,* VK9NS, 5T5RR, *9U5DSD.* **0800** K6OJ/C6A, V3DX, *ZB2EO.* **1800** *JA* (until 2100). **1900** *C21XN, J28DP, ZL1JJ, DK7PE/4S7.* **2000** *UA0YAE, XT2AW, 9K2BE.* **2100** *HL1EJ, DJ6SI/T5, VK6RZ, VU9TTC.* **2200** *JA3CSZ, JW6MY, K7TI/VS6, DL0HSC/5B4.* **2300** *FP8HL, HZ1AB, VP5AH, VU9ARZ, DL2GG/YV5.*

10MHz. **0500** *VE2LI.* **0600** *FK8EB,* most *W* districts. **0700** *VK, ZK1AC, ZL.* **0800** *KL7PJ, ZL3IS.* **1700** *J20DU, VE, W.* **1800** ZL1AA, *ZS6BVF, 9J2BO.* **2000** *KP4EQG.* **2100** *N0ZO/DU1, VP2MIX, 5Y4CS.*

14MHz. **0700** KC6s LQ, *YA, SU1s IM, MI,* VK. **0800** WB6WOD/CE0Z, ZK1CG, ZL4OY/A: **0900** *HZ1ZZ,* VS5GA, 3D2XR. **1000** *UA0YAE.* **1600** *VQ9VO.* **1700** *BY1PK,* FB8VE, FW0XR, *KH6CF, T31AE,* T32AJ, VK0DX, *W7,* 3B8CA. **1800** HL9AZ, *JA, DJ6SI/T5, VK, ZL.* **1900** *FR0GGI,* KL7DV, *4K1D.* **2000** *HV3SJ,* V2AO, VP8MT. **2100** J20DU, VP8SB. **2200** HZ1HZ, KL7G, 9X5SL. **2300** VK6RU.

18MHz. **0800** *DL, F, LA, OE, OZ.* **1500** *G4CTQ/ZB2.* **1800** *VP8ANT.*

21MHz. **0800** *BY1PK,* JA (until 1000), *DJ6TI/T5, TL8ER,* YI1BGD, ZL (until 1100). **0900** *BY8AA, WL7J,* ZL4OY/A, *3V8AA,* 8Q7AV. **1000** FK8CE, HL9AH, OD5BP. **1400** M1Y, W6 (until 1900), 6D5XMT. **1500** 9Y5RD/SU, *TL8ER.* **1600** W7 (until 1900). **1700** D44BC, ZD9BX, 5Y4ITU. **1800** KH6CF, *KL7PJ,* VP9AD, 5R8AL. **1900** WB6WOD/CE0Z.

24MHz. **0800** *G6BY/MM* (off W6), *G4CTQ/ZB2, 5N2HKR,* **0900** *DL, F.*

28MHz. **0800** JA (until 1000), ZL1AXU, ZL2AZU, 9J2. **0900** 3B8FK. **1000** *CN8CY,* FY7CH, *ZL3GQ,* 6T1YP, 9N1WW. **1100** P47N, S79WHW, VK, VP2VDH, VS6CT, W, *5Y4ITU.* **1200** AP2SP, J3AH, J6LOV, VP2VD, VS6, YK1AO, DL9EAJ/3B9, 5N9ACO. **1300** A92P, ED9CM, HC2TM, HD8GI, UK1PAL. **1400** *J20DU, VP8ANT,* W6 (until 2000), *9X5SL.* **1500** A71BJ, VE5, 3V8AA. **1600** A22GM, DL1FAN/6W8. **1700** HC0, VE5, 6, and 7, W7 (until 2000). **1800** *HR8AL,* VE7, *VP5BAX,* VP8APQ.

Thanks to all contributors this month, and also to the following for items copied: *DX News Sheet* **(G3XTT/G3ZAY),** the *Ex-G Radio Club Bulletin* **(W3HQO),** *Long Skip* **(VE3EUP),** *DX'press* **(PA0GAM),** *CQ Magazine* **(W1WY),** *DXNL* **(DL3RK),** the *DX Bulletin* **(K1IN),** and the *Long Island DX Bulletin* **(W2IYX).**

Please send all material for **March** by **28 January,** and for **April** issue by **4 March.**

NEW PRODUCT

Bencher XZ-2 audio filter

Given a reasonable degree of i.f. selectivity, a good audio filter can be a very useful addition to a receiver, particularly in winkling out very weak cw signals, although it must not be forgotten that the most important requirement lies between the ears, and that for contest work too much selectivity can mean many missed contacts.

The MFJ four-position filter using operational amplifiers has been popular for many years, and the Bencher filter is of a similar design, but with a passband tuning facility incorporated. This has the advantage that the centre frequency of the filter can be aligned with that of the cw i.f. filter in the receiver; something not possible with the fixed type. Additionally, with a wider i.f. filter in use, the audio unit can be tuned across the i.f. passband to peak the desired signal.

The acid test of a unit designed to be inserted between receiver and headphones or speaker, is how much effect it has on the normal audio quality. In this respect, the Bencher filter is quite satisfactory, having a "comfortable" sound with the absence of any objectionable hiss. The unit is capable of delivering 1W of audio into 8Ω, which should be sufficient in most applications. It has been in use for some time in both contest and "peacetime" operations, and has proved its worth, particularly on the lower frequency bands, with the narrower bandwidths coupled with a good i.f. filter providing all the selectivity likely to be needed. Even at the sharpest position, the passbands appear to be reasonably flat-topped, thus avoiding the annoying peaky response of some filters. There is an ssb position, but this was, in practice, found to be rather sharp for restful telephony reception. A tunable notch on the filter would increase the usefulness of this facility.

The unit requires an external supply of +9 to +15V, and in addition to a phone jack on the front panel it has phono socket connections for input and speaker at the rear. It is priced at £57.14, and Bencher's UK agents are Radio Shack Ltd.

G3MXJ

Mobile rallies calendar

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

11 March—Lagan Valley RS Hamfest 1983, Lisburn Markets (beside Lisburn Swimming Pool). Opens 7pm. Talk-in, bring & buy, and trade stands. Refreshments available. Details from sec GI8SXN, QTHR.

13 March—Pontefract & DARS Components Fair, Carleton Community Centre, Pontefract. Open 11am. Talk-in on S22. Licensed bar, refreshments, bring & buy. RSGB publications. Emphasis on build-your-own. Details from G4AAQ, tel 0977 791071.

27 March—White Rose ARS Rally. The Refectory, The University of Leeds. Opens 11am. Full range of facilities. About 40 top dealers. Full catering, huge car parks on site. Details from R. Hughes, G4DZI, QTHR.

10 April—Swansea ARS Rally. Patti Pavilion, Swansea, (next to St Helens Cricket Ground on A4067 Swansea-Mumbles coast road). Open 10.30am-5pm. Trade stands, RSGB books, local repeater groups, bring & buy, licensed bar, refreshments, hf station and S22 talk-in. Good car parking. Further details from GW4HSH, QTHR, tel 0792-404422.

15 May—Northern Mobile Rally. The Great Yorkshire Showground, Harrogate. Organized by the Otley ARS. Doors open 11am (10.45am for wheelchair and blind visitors). Many attractions: Punch and Judy, films for junior ops, bring & buy stall, licensed bar, and excellent refreshments. Talk-in on vhf and uhf. Further details from G4KDV (G8DFZ) QTHR, tel 0943 463083.

15 May—Swindon & DARC Mobile Rally. Park School, Marlowe Avenue, Swindon, Wilts. Open 10am. Talk-in on 144MHz (S22) and 432MHz (SU8). Many trade stands. Film shows for children, and other displays of hobbies from groups in the area. Ample car parking, and refreshments. Details from K. A. Saunders, G8SFM, QTHR, tel 0666 89307.

29 May—East Suffolk Wireless Revival. Civil Service Sports Ground, Bucklesham, nr Ipswich. Traders, non-radio stalls, attractions for all the family. Fleamarket and car boot sale (instead of "bring & buy"). Details from Jack Tootill, G4IFF, 76 Fircroft Road, Ipswich IP1 6PX, tel 0473 44047.

5 June—Spalding & DARS Mobile Rally. Springfields, Spalding. Details from I. Buffham, G3TMA, QTHR.

12 June—RNARS Mobile Rally. HMS Mercury, nr Petersfield, Hants. Opens 10am-5.30pm. Refreshments will be available all day. Arena events, and trade stands. Details from G4DIU, QTHR.

10 July—Worcester & DARC Annual Mobile Rally. Droitwich High School, Ombersley Road, Droitwich. Open 11am-5pm. Attractions will include "strawberry fields", fancy dress competition, model aircraft displays. Details from rally manager, Brian Jones, G8ASO, QTHR, tel Worcester 351565.

31 July—Rolls Royce ARC (Barnoldswick) Mobile Rally, Sports & Social Club, Barnoldswick. Open 11am. Details from Leslie G. Logan, G4ILG, QTHR.

7 August—RSGB National Mobile Rally, Woburn.

14 August—Derby Mobile Rally. Lower Bemrose School, Derby. Further details nearer the date. Details from G3VGW.

18 September—Peterborough R&ES Mobile Rally. Wirrina Sports Stadium, Bishops Road, Peterborough. Situated on the river embankment with good car parking, good food, and bar meals, with bar in the adjacent Gildenburgh rooms. Open 10.30am-5pm. Details from D. T. Wilson, 4 Conway Avenue, Peterborough, tel Peterborough 76238.

COUNCIL PROCEEDINGS

A brief report of a special meeting of Council, held on 14 October 1982

Present: Dr E. J. Allaway (President, in the chair), Messrs R. Bellerby, P. F. D. Cornish, Dr D. S. Evans, Mr L. N. G. Hawkyard, Mrs J. Heathershaw, Messrs G. R. Jessop, T. I. Lundegard, G. I. Knight, I. Kyle, W. J. McClintock, H. S. Pinchin, B. O'Brien (members of Council), B. Douglas-Mann (representing the Society's solicitors), D. A. Evans (general manager/secretary), and Mrs H. M. Allin (minutes secretary).

Apologies for absence were received from Mr D. E. Baptiste, Mr R. G. Barrett, Mr J. Bazley, Mr K. A. M. Fisher, Mr F. Hall and Mr D. M. Pratt.

The President said that this special meeting had been called to give Council an opportunity to review the current position with regard to the move to a new headquarters. He introduced Mr Bruce Douglas-Mann, representing the Society's solicitors.

Move of headquarters

Mr Evans outlined the current problem which had arisen due to the absence of an "established use" certificate for utilization of 35 Doughty Street for offices. This had come to light during legal transactions originally in respect of the move. The Society and its solicitors had been advised that provided the Society was in the process of obtaining the certificate, the exchange of contracts should not suffer any delay. After much work, it was now possible to establish office use for a sufficient period to enable the Society's solicitors to apply for the certificate, but it was thought unlikely that this would include the use of the top floor for offices, as this had been used for residential purposes until shortly before the Society took over the property. The property had been purchased by the Society in 1967 and an Act of Parliament demanded proof of office use for four years following 31 December 1963. Because of the doubt over the top floor, the purchasers of 35 Doughty Street had proposed a reduction in the price. This had been agreed by the F & S Committee, with a recommendation for the solicitors to proceed in their attempt to obtain planning permission for use of the top floor as offices. The latest development in negotiations was that the purchasers were not prepared to exchange contracts until the certificate had been obtained.

Mr Douglas-Mann said that he had applied for the certificate from Camden Council on 11 October and he thought it overwhelmingly probable that the Society would receive the certificate in respect of ground, first and second floors at least. If Camden Council did not agree to non-residential use of the top floor, an appeal could then be made by the Society to the Secretary of State. This could take up to 12 months to go through. Arrangements had been made whereby exchange of contracts and completion could take place almost immediately, with a sum retained on deposit account, to be released as soon as the certificate had been obtained.

Mr Douglas-Mann summed up the position by saying that Council had to decide now whether to go ahead with the move or to defer the transaction until a clearer idea of obtaining the certificate had been gleaned.

Mr Bellerby asked if planning permission could now be sought for use of the top floor as offices. Mr Douglas-Mann replied that Camden Council was reluctant to agree to conversions from residential property to offices. He pointed out that the top floor had been used as a flat during the relevant period.

With regard to the third floor, Mr Douglas-Mann saw no reason (subject to the surveyor's advice as to whether there might be any adverse effect on the application for an established use certificate) why a planning application for this floor should not be made and arrangements negotiated for a further release of an additional sum of money.

Following some general discussion, Mr Cornish circulated a paper giving figures involved with the proposed move.

Mr Douglas-Mann left the meeting at this juncture. The President expressed the appreciation of Council for his attendance.

Mr O'Brien then summarized the feelings of the Finance & Staff Committee expressed at the short meeting which had been held prior to the Council meeting. He said the risks involved were thought to be very slight but that Council should decide what risks to take. He said that a decision had to be reached that day and added that he sympathized with the general manager and recognized the desperate need to move very quickly.

After some discussion, several Council members voiced the opinion that the Society should proceed without delay. A formal proposal was made by Mr Bellerby:

> "That exchange of contracts proceed as planned; that a retention sum be authorized against the issue of an "established user" certificate; that a planning application is lodged immediately for change of use of the top floor to office use; that an additional retention sum be authorized against the success of planning application"

This was seconded by Mr Knight and passed by Council with two abstentions.

Mr Jessop explained that he had abstained not because he was against the principle of the proposal but because he was against Potters Bar as the location of the new HQ.

Mr Lundegard wished it to be recorded that he abstained because he had not been present at the meeting when the proposed new HQ had been voted upon.

It was agreed that a formal announcement should be made before the annual general meeting. Mr Evans confirmed that as soon as the exchange of contracts had taken place, all Council members would be informed immediately. This would be followed by a special *Council Letter* and announcements on GB2RS and the headline news service.

(The November issue of Radio Communication *had been due to go to press on 15 October, but this was delayed until 20 October in the hope that, if contracts were exchanged by that date, an announcement could be included. In the event, printing had to start before contracts were exchanged in order to ensure that the November issue, because it included the Annual Report & Accounts, Council ballot papers etc, reached members by the statutory date required by the Companies Act.)*

OBITUARIES

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

Mr J. Brown, V2AB (ex-VP2AB)

Jim Brown died in Antigua on 8 October 1982. He had been well known on the dx bands for many years, and more recently had included sstv in his amateur radio activities.

Mr W. E. Nutton, G6NU

Bill Nutton, who died on 22 January 1982 at the age of 88, was widely known as "Naughty Uncle" or "Uncle". His interest in radio commenced in the army, and he became a signals instructor in the first world war. He took up amateur radio after leaving the army, and in 1920 was one of the founders of the Medway Amateur Transmitters Society, later to become the Medway AR & TS. He was chairman of MARTS on several occasions, and was made an honorary president of the society. During the second world war he was a VI, and he claimed to have been "on the air" every day during peace time.

His deep involvement with MARTS continued until his death, which occurred while preparations were being made for the society's 60th anniversary.

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, plus basic unchanged information on other affiliated organizations which was last published in the July 1982 issue. Unchanged details will be published again in July.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **March** issue should reach them by **15 January** and for the **April** issue by **19 February.**

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 members.

COMPOSITIONS OF RSGB REGIONS

Region 1	Cheshire, Cumbria, Greater Manchester, Isle of Man, Lancashire, Merseyside.
Region 2	All that part of Humberside north of River Humber, North Yorkshire, South Yorkshire, West Yorkshire.
Region 3	Hereford and Worcester, Shropshire, Staffordshire, Warwickshire, West Midlands.
Region 4	Derbyshire, all that part of Humberside south of River Humber, Leicestershire, Lincolnshire, Nottinghamshire.
Region 5	Bedfordshire, Cambridgeshire, Northamptonshire.
Region 6	Berkshire, Buckinghamshire, Oxfordshire.
Region 7	Greater London south of River Thames, Surrey including that part of London north of the Thames administered by Surrey.
Region 8	Kent, East Sussex, West Sussex.
Region 9	Cornwall, Devon.
Region 10	Dyfed, Gwent, Mid Glamorgan, Powys, South Glamorgan, West Glamorgan.
Region 11	Clwyd, Gwynedd.
Region 12	Grampian, Highland, Island Authorities, Tayside.
Region 13	Borders, Fife, Lothian.
Region 14	Central, Dumfries and Galloway, Strathclyde.
Region 15	Northern Ireland.
Region 16	Essex, Norfolk, Suffolk.
Region 17	Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire.
Region 18	Cleveland, Durham, Northumberland, Tyne & Wear.
Region 19	Greater London north of River Thames, Hertfordshire.
Region 20	Avon, Gloucester, Somerset.

REGION 1—RR W. R. Parkinson, G3FNM, 141 Norris Road, Sale, Cheshire M33 3JR. Tel 061 973 1472.

Area representatives in Region 1

G. L. Adams,	G3LEQ	Knutsford
E. C. Baines,	G6CQZ	Bacup
A. M. Cooper,	G3TKD	Chester
B. Donn,	G3XSN	Liverpool
I. F. M. Duthie,	G8TCJ	Carlisle
J. R. Fogg,	G8UZZ	Wirral
F. Harrison,	G3XII	Leyland
J. Heywood,	G4IAL	Stockport
N. Horrocks,	G2CUZ	Southport
N. Jenkin,	G4CGT	Darwen
G. Lancefield,	G3DWQ	Preston
A. B. Langfield,	G3IOA	Manchester

R. J. B. Morgan, GD3KGC Isle of Man
R. F. Redhead, G4FXG Poulton-Le-Fylde
E. A. Thorne, G3ART Crosby, Nr Maryport

Accrington (North Western Repeater Group)—20 January, 8pm. Globe Bowling Club, Willows Lane, Accrington. Sec Howard Aspinall, G3RXH.

Ainsdale (AARC)—4, 18 January. Ainsdale Scouts HQ. Details from sec Norman Horrocks, G2CUZ, tel 0704 77604.

Barnoldswick (Rolls-Royce ARC)—5 January (Surplus equipment sale), 2 February (Display of antique radio equipment by Dave Reeves, G6EOF, and also a members' natter night), 8pm. Rolls-Royce Sports & Social Club, Barnoldswick. Sec Leslie Logan, G4ILG, tel 0282 812288.

Blackburn (East Lancs ARC)—4 January (A talk on Raynet by Tony Hore, G8LTC), 1 February (A talk and demonstration on atv by S. J. Cooper, G3YTI), 7.30pm. Shadsworth Leisure Centre, Blackburn. Pro Norman Jenkin, G4CGT, tel 0254 75037.

Blackpool (B & Fylde ARS)—4 January, 1 February. Contact sec Jim Newland, G5ND, for venue etc, tel 0253 64508.

Bolton (B & DARS)—Wednesdays, 8pm. Horwich Leisure Centre, Horwich. Sec Dave Molyneux, G6AEK, tel Atherton 877921.

Bolton (BTC ARC)—Details from sec, c/o Electronics Dept, Bolton Technical College, Manchester Road, Bolton.

Bolton (Edbro RC)—Details from A. L. Brown, c/o Edbro Ltd, Lever Street, Bolton.

Bolton (Norweb ARC)—Information from C. J. Moulding, G4HYG, c/o Sports & Social Club, Norweb Electricity, Manchester Road, Bolton BL3 2QN.

Bolton (Red Rose RS)—Details from sec Geoff Mollison, G8VCW, tel Bolton 21424.

Bury (BRS)—Tuesdays, 7.30pm. Mosses Youth & Community Centre, Cecil Street, Bury. Sec Mike Bainbridge, G4GSY, tel 061-761 5083.

Carlisle (Border Television ARC)—Details from sec, Border Television Ltd, Television Studios, Carlisle, Cumbria.

Chester (C & DRS)—Tuesdays except the first Tuesday in each month, 8pm. Chester RUFC, Hare Lane, Vicars Cross, Chester. Sec Chris Hopley, G8ICT.

Congleton (CARC)—Details from RS42758, 156 Holmes Chapel Road, Congleton, Cheshire CW12 4QB.

Crewe (South Cheshire ARS)—First Monday in each month. RAOB Social Club, Earle Street, Crewe. Information from B. G. F. Roe, G4LVR, tel 0270 665661.

Douglas (IoMARS)—Mondays, fortnightly, Keppel Hotel, Creg-ny-Baa, nr Onchan, Isle of Man. Sec Colin Matthewman, GD4FWQ, tel 0624 22295.

Eccles (E&DRC)—Tuesdays, 8.30pm. White Swan, Worseley Road, Swinton. Clubs calls are G3GXI and G8GRI. President, Arnold Moss, G8VF; chairman/acting sec Chris Harrison. G8KRG, tel 061 797 0031.

Leyland (LHARG)—10 January. New venue: Astley Park Sports Club, Hallgate, Astley Village, Chorley. Details from Arthur Jolly, G4JCO.

Liverpool (L & DARS)—11 January (Video show, RSGB), 18 January ("Phil's travels", by Phil Storey, G3YBH), 25 January (Equipment show by Amateur Radio Exchange, St Helens), 1 February ("PCB technique" by Bill MacKune, G8CFM), 8.15pm. Wavertree Conservative Association, Church Road, Wavertree, Liverpool. Sec Gordon Purslow, G6MHG, tel 051-263 5837.

Liverpool (Riversdale ARS)—Details from sec, c/o Dept of Elect & Rad Engineering, Riversdale College of Technology, Liverpool L19 3QR.

Liverpool (Sefton ARC)—First and third Wednesday in each month, 8pm. Liverpool Prison Officers Club, Hornby Place, off Hornby Road, Liverpool 9. Sec Len Gurney, G4LBJ, tel 051-523 6077.

Liverpool (UoLARS)—The society meets informally in the shack at the top of the Old Union Building, 2 Bedford Street North, Liverpool 7. Further information from sec Peter R. Jones, GW6AJK, c/o UoL Students Union.

Macclesfield (M & DRS)—Second and fourth Tuesdays in each month, 7.30pm. St Andrews Old School Hall, St Andrews Road, Brough Street West, Macclesfield. Sec Dave Lucas, G6HIQ, tel Macclesfield 28610.

Manchester (ICLR&ES)—Information from sec, c/o 4TB, International Computers Ltd, Wenlock Way, West Gorton, Manchester M12 5DR.

Manchester (M & DARS)—Wednesdays, 7.30pm. Newton Heath Community Centre, 203 Droylsden Road, Newton Heath, Manchester. Meetings include operation of the club station, G3HOX, on hf/vhf, a programme of monthly lectures and construction projects. Now in progress, a df receiver with a view to df hunts in the spring and summer. Sec John Dent, G4LRR.

Manchester (MUARS)—Informal meetings most lunch-times and Wednesday afternoon in the shack on the first floor on the north side of the Students' Union Buildings. Sec c/o Amateur Radio Society, University Union Buildings, Oxford Road, Manchester M13 9PR.

Manchester (Openshaw TCRC)—Information from the college, Whitworth Street, Openshaw, Manchester M11 2WH.

Manchester (South Manchester RC)—7 January ("The hitch hiker's guide to meteorology or how to get a lift", by Peter Bass, G6MOQ), 14 January (Review of contest activity including a slide show), 21 January (Visit to a British Telecom repeater station), 28 January ("VHF oscillator stability," by Dave Bolton, G8UQC), 4 February (Radio clinic—bring your faulty equipment for expert diagnosis), 19 February (SMRC Second Quadruple Night DF), 8pm. Sale Moor Community Centre, Norris Road, Sale. Also informal meetings each Monday evening in the club shack at the Centre. Sec Dave Holland, G3WFT, tel 061-973 1837.

Manchester (UMIST RS)—During term time, Wednesday afternoons in the shack on L floor in the main building. Thursdays, 8pm, in the Union Bar. Contacts are Dave Crye, G6BSK, or Dave Brooke, G6GZH, c/o Shack, tel 061-236 3311, ext 2945, or c/o Radio Society, UMIST Union, Box 88, Sackville Street, Manchester M60 1QD.

Manchester (West Manchester RC)—Wednesdays, 8pm. Atherton & Tyldesly Scout HQ, Shuttle Street, Tyldesly. Sec Dennis Tennant, G4KCB.

Maryport (Solway RC)—The Education Settlement, Castle Hill, Maryport. Contact sec S. R. Miles, 6 Mill Street, Maryport, for dates and times of meetings.

Ormskirk (ORC)—Contact sec Kevin Higgins, G4IGX, 8 Delph Top, Greetby Hill, Ormskirk L39 2DX, tel Ormskirk 75546, for further information.

Penrith (Eden Valley RS)—Third Thursday in each month, 7.30pm. Two Lions Hotel, Great Dockray, Penrith, Cumbria. Club net 7pm, Thursdays, 3·650MHz. Sec Stuart Marsh, G4JHV, tel 0768 88260.

Preston (PARS)—Second and fourth Thursdays in each month. Lonsdale Club, Fullwood Hall Lane, Fullwood, Preston. Sec George Earnshaw, G3ZXC.

Rossendale (Rossendale Valley ARC)—Wednesdays, 8pm. Bishops Blaize Hotel, Burnley Road, Rawtenstall. Sec Mrs Celia Adams, G6GZM, tel 0706 220935.

St Helens (StH & DARC)—Thursdays, 7.45pm. Conservative Rooms, Boundary Road, St Helens. Pro Alan Manchester, G6FJU, tel 0744 56889.

Salford (Dial House RS)—Wednesdays, 5.30pm. Dial House, 21 Chapel Street, Salford. Details from sec, Manchester Central Area Sports & Social Club, c/o M43, Dial House.

Salford (UoSCS)—Wednesday afternoons from 1.30pm. Shack on the top floor of the Clocktower, The Pavilion, Castle Irwell Students Village. Contact Paul Wells, G4GMV, c/o SUCS, Students Union, University of Salford, University Road, Salford M5 4WT.

Skelmersdale (S & DARC)—The RR welcomes this newly affiliated club to the "Club news" column. Meetings are Thursdays, 8.30pm. Dunlop Sports & Social Club (near the football ground), Skelmersdale. RAE and morse tuition is available. Further information from the sec, Joe Singleton, RS47778, 3 Willows Drive, Skelmersdale, Lancs, tel 0695 22242.

Stockport (SRS)—Second and fourth Wednesdays in each month, 8pm. Blossoms Hotel, corner of Bramhall Lane and Wellington Road, Stockport. Sec Stan Aspinall, G3VSA, tel 061-437 1437.

Tarporley (Mid-Cheshire ARS)—Wednesdays, 8pm. Cotebrook Village Hall, Sadlers Lane, off the A49, Tarporley. Sec Rick Dodd, G8PNL, tel Winsford 57766.

Thornton Cleveleys (TCARS)—From the first week in January the society will meet at a new venue, the Scout Hut, Norbreck 1st Scout Group, Carr Road, Bispham, 7.30 to 9.30pm. 3 January (Surplus equipment sale), 10 January (Pie and peas supper, tickets 75p, in advance please), 17 January (Demonstration of amateur radio equipment and computers—including goodies to buy), 24 January (To be arranged), 31 January (Photography, demonstration of colour printing by Pete Reilly, G4BVW). Sec Mrs Jen Ward, G8YOK, tel 0253 890114.

Wallasey (St Dunstan's ARS)—Information from E. C. John, G3SEJ, 52 Broadway Avenue, Wallasey, Merseyside L45 6TD.

Warrington (Racal Communication RS)—Information from sec, c/o Racal Communications Ltd, Chesford Grange, Warrington, Cheshire W81 4RH.

Warrington (UK FM Group Western)—6 January, 3 February, 8pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Warrington (WARC)—4 January (Club project night and discussion on the club display for NARSA), 11 January ("A mug's guide to satellites", by Chris Crotty, G4PDJ), 18 January (Hot pot supper, please book in advance), 25 January (Return challenge quiz with the Bury club—to be confirmed), 1 February (Talk on propagation by Gordon Adams, G3LEQ), 8 February ("Japanese morse", by Norman Kendrick, G3CSG), 7.30pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Chris Crotty, G4PDJ, not QTHR.

Warrington (10th Warrington Scout Group ARC)—Information from sec, c/o 41 Highfield Avenue, Great Sankey, Warrington, Cheshire WA5 2TW.

Wigan (Douglas Valley ARS)—Thursdays except the second in each month. Shevington Conservative Club, Shevington, Wigan. Sec Dave Harrison, G4NDJ.

Wigan (WCTARC)—Information from J. R. Hesford, Dept of Electrical Engineering, Wigan College of Technology, Parsons Walk, Wigan WN1 1RR.

Wirral (WARS)—5 January (Sale of surplus equipment), 19 January ("A home built atu", by Norman Kendrick, G3CSG), 2 February ("Switched mode power supplies", by Cedric Cawthorne, G4KPY), 7.45pm. Minto House School, Birkenhead Road, Meols, Wirral. Sec Cedric Cawthorne, G4KPY, tel 051 625 7311.

Wirral (W & DARS)—Second and Fourth Wednesday in each month, 8pm. Irby Cricket Club, Irby Mill Road, Irby. Sec Gerry Scott, G8TRY, tel 051-630 1393.

Woodford (RATEC)—Mondays, 8pm. The British Legion, Moor Lane, Woodford, Cheshire. Sec Bob Marsh, G8TYH, tel 061-439 1422.

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel 094-786 333.

Area representatives in Region 2

S. A. Berry, G4IWR Hull
P. N. Butterfield, G4AAQ Pontefract
K. R. Cass, G3WVO York
K. M. Cleary, G4ATZ Boston Spa, Wetherby
J. Clegg, G3FQH Huddersfield
D. Crisp (Dr), G5PW Cleckheaton
I. R. Firth, G3WWF Leeds
J. R. Simpson, G3CAA Scarborough
M. J. Topham, G8NUC Bradford

Barnsley (B&DARS)—Mondays, 7.30pm. The Warren, Warren Quarry Lane, off Park Road, Barnsley. Sec G4JKW.

Barnsley (UK FM Group Northern)—2 January, 6 February, 7.30pm. The Royal Hotel, Church Street, Barnsley. Sec G4LUE.

Bradford (UoBARS)—Thursdays, 7.30pm. N10, Main Building. Sec G8GOV. Net frequency 145·275MHz.

Denby Dale (DD&DARS)—Second and fourth Wednesday in each month, 7.30pm. Pie Hall, Denby Dale. Sec J. Clegg, G3FQH.

Doncaster (Ex DMIoHEARC)—Mondays, 8pm. The Church Hall, Armthorpe Road. Sec R. Lane, G8VLQ, tel 59747. Club call is G3UER.

Goole (G&DARS)—Mondays, 8pm. The Junior Chamber Buildings, Boothferry Road, Goole. Sec Richard Sugden, G8IOH. Details from G8IOH or G8VHL.

Halifax (H&DARS)—First and third Tuesday in each month. 18 January (Emergency planning unit), 15 February (Small arms), 7.30pm. Clairmount Road, Halifax. Sec G4LEC, tel 0422 33080.

Halifax (Northern Heights ARS)—First and third Wednesday in each month, 8pm. Bradshaw Tavern, Bradshaw, Halifax. Sec G6CJL. Club net frequency is 145·275MHz.

Harrogate Repeater Group—Chairman, G4ATZ.

Hornsea (HARS)—Wednesdays, 8pm. The Mill, Mill House, Atwick Road, Hornsea. Sec M. Willerby, G4MWE.

Hull (H&DARS)—Fridays, 8pm. RAE classes are held at 9pm, Fridays. West Park Recreation Centre, Walton Street, Hull. Sec G3DUL, tel 0482 447355.

Hull (HUR&ES)—Tuesdays, 1.15pm. Room 313B, University Union Building, Cottingham Road. Details from G4KWZ or G4EZP, c/o Hull Students Union.

Leconfield (Army School of Mechanical Transport ASMT/RCTARS)—Tuesday evenings and coffee at lunchtimes. Signals Division, Normandy Barracks, Leconfield. CW classes, 7pm, Friday. Sec G4NQI, address as above.

Leeds (BYLARA)—Sec Mrs D. Hughes, G4EZI, 3 Primley Park Crescent, Leeds LS17 7HY.

Leeds (L&DARS)—Mondays, 8pm. Old Hall Golf Club, Woodhall Lane, Calverly, Leeds. Sec G6CJI, tel Dewsbury 455516.

Leeds (White Rose RS)—Wednesdays, 8pm. Moortown Rugby Football Club, Moss Valley, Alwoodly, Leeds 17. Club net 8pm, Thursdays, 3·775MHz, or 21·35MHz depending on propagation. Sec G3KWT.

Mexborough (M&DARS)—Fridays, 8pm. Harrop Hall, Dolcliffe Road, Mexborough. Sec Mrs G. Drohan, 5 Swinburn Avenue, Adwick-le-Street, Doncaster.

Otley (OR&ES)—Tuesdays, 8pm. Back of Courthouse Street, Otley. Sec Jack Annakin, G8DFZ.

Pontefract (P&DARS)—6 January (AGM), 13

January (Informal), 20 January (Junk sale), 27 January (Informal), 3 February (Construction evening), 8pm. The Carleton Community Centre, Wakefield. 13 March (Components Fair), a must for all the home brewers in the region. Details on this from Phil, G4AAQ. Sec, G4ISU.

Ripon (R&DARS)—Thursdays, 7pm. Quarrymoor Recreation Centre, Harrogate, Ripon. Sec D. J. Barker, c/o Sgts Mess, 38 Engr Reg RE, Claro Bks, Ripon, N Yorks.

Scarborough (SARS)—Mondays, 3 January (Junk sale), 10 January ("Amtor", by G4EEV), 7.30pm. Scarborough Cricket Club, North Marine Road, Scarborough. Sec G4JAQ, tel 862638.

Sheffield (SARS)—Third Monday in each month, 8pm. Sheaf House Hotel, Bramell Lane, Sheffield. Sec G4APV.

Spen Valley (SVARS)—Thursdays, 6 January (Equipment alignment), 20 January ("Slow scan", by G4BLL), 3 February ("What is Raynet?", by G3KWT), 8pm. Old Bank Working Men's Club, Mirfield, W Yorks. Sec G4MLW.

Wakefield (NWRC)—Thursdays, 6 January (G4DXA on interference), 13 January (Visit to Wakefield Power Station), 20 January (Visit to Pontefract ARS junk sale), 3 February (Visit to Leeds Microcomputer Users Group), 7.45pm. Carr Gate Working Men's Club, Wakefield. Sec G6ELE.

Wakefield (W&DARS)—11 January (To be announced), 25 January (On the air/natter night), 8 February (Visit to Radio Aire Studios), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G4BLT, tel Wakefield 255515.

Wharfdale Repeater Group—Sec G3KKP.

York (YARS)—Fridays, 7.30pm. United Services Club, Micklegate, York. Sec Keith Cass, G3WVO.

Happy New Year to all members in Region 2. Once again we have the six-monthly complete list of clubs and groups in the Region. If your details are not correct please let me know so that my records can be updated. *RR2.*

REGION 3—RR L. W. Craven, G4EQI, Grass Moor, Radford Road, Alvechurch, Birmingham B48 7DT. Tel 021-445 1347.

Area representatives in Region 3

D. Fleet,	G8MAI	Stoke-on-Trent
W. F. M. Hahn,	G3UOL	Coventry
J. K. Harvey,	G4IVJ	Birmingham
S. H. Jesson,	G4CNY	Hereford
B. A. Jones,	G8ASO	Worcester

Atherstone (AARC)—Second and third Thursdays in each month, 7.30pm. The Tudor Centre, Coleshill Road, Atherstone. Sec G6IQM, tel Fillongley (0676) 40946.

Birmingham (Midland ARS)—18 January ("New transformers for old", by Joe Long, G8KWE), 7.30pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (Slade RS)—First Friday in each month, 7.45pm. The Kingsbury Road Community Centre, 75 Kingsbury Road, Erdington, Birmingham B24 8QH. Sec G4FGF, tel 021-770 3474.

Birmingham (South Birmingham RS)—5 January (New Year's resolutions and members' discussion of events for 1983), Thursdays (HF night on the air), Fridays (Construction and morse classes), 7.30pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G8RGQ, tel 021-459 8312.

Birmingham (University of Aston ARS)—Society is active on hf, vhf and uhf. Club rigs available. Callsigns G3UOA and G8PGM. Meets Fresher Fayre, 1pm. Chairman M. Beach, G8ZEZ, St Peters College, College Road, Birmingham B8 3TE.

Birmingham (UoBARS)—Club room gatherings every lunchtime during term. Second floor Students Union (above shop). Sec Dave Thomas, G4HHJ.

Bromsgrove (B&DARC)—14 January (Competition results and natter night), 8pm. Regular Friday meetings, Avoncroft Art Centre, Bromsgrove. Sec G4LVK, tel 021-445 2088.

Burton-on-Trent (B-on-T&DARS)—Wednesdays, 8pm. Stapenhill Institute, Main Street, Stapenhill, Burton-on-Trent. Sec G3ACR, tel Burton (0283) 43118.

Cannock Chase (CCARS)—Thursdays, 8pm. Bridgtown War Memorial Club, Union Street, Bridgtown, Cannock Chase. Sec G8HZP, tel Cheslyn Hay (0922) 416419.

Coventry (CARS)—Fridays, 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Sec G4HRY, tel Coventry (0203) 618648.

Coventry (CTARS)—Mondays, 7pm. Winfray Annexe of Coventry Technical College. Sec G8ISJ, tel Coventry (0203) 414007.

Dudley (DARC)—Second and fourth Tuesdays in each month. Central Library, Dudley. Sec Norman Rock, 28 Conway Close, High Acres, Kingswinford, Brierley Hill DY6 8PT, tel Kingswinford (0384) 277617.

Hereford (HARS)—First and third Friday in each month, 8pm. Civil Defence HQ, Gaol Street, Hereford. Sec G4CNY, tel Hereford (0432) 3237.

Kidderminster (K&DARC)—Alternate Tuesdays, 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Sec G8WOX, tel Kidderminster (0562) 61584.

Malvern Hills (MHRAC)—Second Tuesday in each month. Morse classes at 7.30pm before each club meeting. The Red Lion Inn, St Ann's Road, Great Malvern. Sec G4GFX, 9 Wyche Road, Malvern, tel Malvern (06845) 62900.

Much Wenlock (Wenlock ARES)—Second and fourth Wednesday in every month. 12 January (Discussion evening to include ballot on possible change of venue), 26 January ("Banking—tips on how to save for the new rig", by Robert Green). Raven Hotel Clubroom, Much Wenlock. Sec G3ZSL, tel Bridgnorth (0746) 861332.

Redditch (RRC)—Second and fourth Thursday in each month, 8pm. WRVS Centre, Ludlow Road, Redditch. Sec G3EVT, tel Alcester (0789) 762041.

Rugby (RATS)—Wednesdays, 7.30pm. Cricket Pavilion entrance to "B" Building, Rugby Radio Station, A5 trunk road, Hillmorton, Rugby. Sec G4ECO.

Shrewsbury (Salop ARS)—Thursdays, 21 January (Annual dinner dance), 8pm. Sec G3UQH.

Solihull (SARS)—18 January ("Planning permission", by S. A. Craske, G3ZLS), 7.30pm. The Manor House, High Street, Solihull. Sec G4AXW, tel 021-742 3972.

Stoke-on-Trent (North Staffs ARS)—First and third Monday in each month (Lectures etc), other Mondays (Discussion evenings, Raynet etc), 7.30pm. Harold Clowes Community Centre, off Dawlish Road, Bentilee, Stoke-on-Trent. Sec G8FGR.

Stoke-on-Trent (SonTARS)—Thursdays, 7.30pm. 2a Racecourse Road, Oakhill, Stoke-on-Trent. Sec G4IMV, tel Newcastle (0782) 613207.

Stourbridge (StARS)—3 January (Discussion evening), 17 January (Annual constructor's contest), 7.30pm. Cross Inn, Hagley Road, Oldswinford. Sec G8JTL, tel Lye (038482 4019).

Stratford-upon-Avon (S-upon-A&DARC)—10 January (Construction evening), 24 January (Visit to BBC Pebble Mill). Bearley Radio Station. Talk-in on S22. Programme sec G6CWK, tel Stratford (0789) 68863.

Sutton Coldfield (SCARS)—Second and fourth Mondays in each month (Lectures etc), 10 January (BBC video tape "The Secret Listeners"), 7.30pm. Club nets first and third Mondays, 145·2MHz, 8pm. Central Library, Sutton Coldfield. Sec G8TUR, tel 021-3532061.

Tamworth (TARS)—Second Monday in each month (Formal), 8pm. Riverside Meeting Rooms, Lichfield Street, Tamworth. Other Mondays (Informal). Club shack, Whitacre Heath, Nr Kingsbury. Club net Wednesdays, 145·475MHz, 9pm. Sec G4BKA, tel Tamworth (0827) 283952.

Telford (T&DARS)—5 January (G3ZME on the air), 12 January ("Short wave bc band DX-ing" by Tom) 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G8UGL, tel Telford (0952) 584173.

Walsall (WARC)—First and third Mondays in each month. Forest Community Centre, Hawbush Road, Leamore, Bloxwich. Club net Fridays, 28·025MHz cw, 8pm, and 3·70MHz ssb, 9pm. Sec G4GKC, tel Walsall (0922) 31675.

Warwick (Mid-Warwickshire ARS)—First and third Tuesdays in each month, 8pm. 61 Emscote Road, Warwick. Club net Mondays on non-meeting days, 145·350MHz, 8pm. Sec G8RZR, tel Warwick (0926) 499730.

Willenhall (W&DARS)—Alternate Wednesdays, 8pm. Saracens Head, Bloxwich Road South, Willenhall. Sec G4FAQ, tel Wolverhampton (0902) 730300.

Wolverhampton (WARS)—Mondays, 8pm. Wolverhampton Chamber of Commerce & Industry, 93 Tettenhall Road, Wolverhampton WV3 9PE. Sec G6AKN, tel Wolverhampton (0902) 782883.

Worcester (W&DARC)—First Monday in each month, 8pm. Odd Fellows Club, New Street, Worcester. Third Monday in each month. Old Pheasant, New Street, Worcester. Sec G4NRD, tel Evesham (0386) 41508.

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

Area representatives in Region 4

B. Bennett,	G3EAM	Lincoln
J. C. Burbanks,	G3SJJ	Nottingham
A. W. Faint,	G6GWH	Market Harborough
D. H. Lander,	G4LOL	Mansfield
J. Shardlow,	G4EYM	Derby
J. A. Sheardown,	G8TIY	Scunthorpe
B. Thompson,	G4KAL	Grimsby

Bolsover (BARS)—Wednesdays, 8pm. The Angel Hotel, Bolsover. Sec David Brocklehurst, G8KIF, tel Chesterfield 811666.

Derby (D&DARS)—5 January (New Year junk sale), 12 January ("The history of the society", by G2CVV), 19 January (Computer demo by John Jennings of ICL), 26 January ("Contests", by G6CHE), 2 February (Junk sale), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Derby (NHARG)—Fridays, 7.45pm. Nunsfield House, Boulton Lane, Alvaston, Derby. Sec Ian Cage, G4CTZ, tel Derby 799452 or 71875.

Eastwood (Notts & Derby Border ARC)—Tuesdays, 7pm. Sunnycroft Scout HQ, Derby Road, Eastwood. Sec Peter Fretwell, G6DXL.

Grimsby (GARS)—Alternate Mondays, 7.30pm. Cromwell Social Club, Cromwell Road, Grimsby. Sec Reg Scarlett, G4HZF.

Heanor (SE Derbyshire ARS)—Tuesdays, 7.30pm. South East Derbyshire College, Ilkeston, Heanor. Sec S. Cope, G6ETO, tel Langley Mill 3753.

Hinckley (HARES)—Wednesdays, 7.30pm. John Cleveland College, Butts Lane, Hinckley. Sec Norman Geary, G8STX, tel Hinckley 632778.

Ibstock (IARS)—Tuesdays, 7.30pm. Hastings Arms, Ibstock. Sec Glenn Tyers, G6DWD, tel Coalville 39661.

Leicester (L Repeater Group)—Sec Geoff Dover, G4AFJ, tel Nottingham 875200.

Leicester (LRS)—Mondays, 7.30pm. Sundays, 10.30am. Gilroes Cottage, off Groby Road, Leicester. Last known sec Paul Elliot, G4MQS, tel Quorn 43024.

Loughborough (L Falcon ARC)—Fridays, 8pm. Brush Sports & Social Club, Fennel Street, Loughborough. Sec Fred Hopewell G4PGC, tel Loughborough 263369.

Louth (L&DARS)—First Wednesday in each month, 7.30pm. Church Rooms, Eastgate, Louth. Sec Chuck Turner, G8ZVF, tel Grimsby 822482.

Lincoln (LSWC)—Second and fourth Wednesday in each month. First, third and fifth Wednesday (RAE and morse classes), 12 January ("Valves", by G8CTG), 8pm. City Engineers Club, Waterside South, Lincoln. Sec Pam Rose, G8VRJ, tel Gainsborough 788356.

Mansfield (MARS)—First Friday and third Tuesday in each month. Victoria Social Club, Princes Street, Mansfield. Sec Duncan Walters, G4DFV, tel Mansfield 648679.

Matlock (Derwent Valley ARS)—First Monday in each month, 8pm. Matlock Training College, Chesterfield Road, Matlock. Sec Bob Burbeck, G4NOB.

Melton Mowbray (MMARS)—Third Friday in each month, 21 January ("Front-end measurements", by G4AMK & G6KQP), 7.30pm. St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 63369.

Newark (N&DARS)—First Thursday in each month, 7.30pm. Palace Theatre, Appleton Gate, Newark. Sec Roger Hiscock, G4MDV.

Nottingham (ARCON)—6 January (Forum), 13 January ("QRP" by G4DVW), 20 January (Activity night), 27 January (RSGB tape slide lecture), 3 February (Forum), 7.30pm. Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham. Sec Paul Chapman, G4IJL, tel Nottingham 623828.

Scunthorpe (SARC)—4 January (Video tape), 11 January (Contest discussion), 18 January ("Slow scan tv", by G3CCH), 25 January ("RTTY", by G8YAU), 7.30pm. Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. Sec Joe Sheardown, G8TIY, tel Scunthorpe 732438.

Skegness (S&DARS)—First and third Tuesday in each month, 7.30pm. The White Swan, Burgh-le-Marsh, Skegness. Sec Alvis Else, G6JAE, tel Stickney 329.

Spalding (S&DARC)—Second Friday in each month, 14 January (AGM). Maple Room, White Hart, Market Place, Spalding. Sec Ian Buffham, G3TMA, tel Spalding 3845.

Wigston (WRC)—Fridays, 7.30pm. United Reform Church, Wigston Magna. Sec Alan Faint, G6GWH, tel Market Harborough 62827.

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

Area representative in Region 5

L. Critchley,	G3EEL	Peterborough

Bedford (B&DARC)—Wednesdays, 8pm. The Club House, Ravensden, Bedford. No programme received for January. Sec Jane Ferguson, G6JJT.

Cambridge (C&DARC)—Fridays during term time. Coleridge Community College, Radegund Road, Cambridge. Club press officer D. Leary, G8JKV, tel Swavesey 31120.

Cambridge (CUWS) (G6UW & G6CUW)—Mondays. St John's College Buttery Bar, closed during vacation. Chairman, A. C. R. Stickland, G4LUN, sec, T. Gleeson, G8TUG.
Corby (C&DARG)—Fridays, 7.30pm. Hightrees Scout Centre, The Nook, Corby. No programme received for January. Sec P. Richardson, G8MLA.
Dunstable Downs (DDRC)—Fridays, 8pm. 28 January (Annual dinner & dance). Chews House, Dunstable High Street. Chairman, R. Joyce, G3WLM, sec, C. Asquith, G4ENB.
Leighton & Linslade (LLRC)—Mondays, 7pm. Vandyke Community College, Room A64, Vandyke Road, Leighton Buzzard. Sec P. Brazier, G6JFN, tel Heath & Reach 270.
Luton (Kent Process Controls ARC)—Open to all employees of Brown Boveri and Brown Boveri Kent PLC. First Wednesday in each month, 8pm. Kent Club House, Tenby Drive, Luton. Chairman, H. Gadsden, G3JLW, sec, J. Allen, G3DOT.
March (M&DARS) (G3PMH)—It is not known when this club meets or where, as the last information I have from them is that they were looking for a new club house. Sec V. Cracknell, G4KPZ.
Northampton (NRC)—Thursdays, 8pm. Kingsthorpe Community Centre. Sec G3VMU, tel Northampton 28516.
Peterborough (GPARC)—Fourth Thursday in each month, 7.30pm. Southfields Junior School, Stanground. Sec Frank Brisley, G4NRJ.
Peterborough (PR&ES) (G3DQ)—Fourth Thursday in each month. Scout Hut, Occupation Road, off Lincoln Road, Peterborough. 18 September (Peterborough rally). Chairman, L. Critchley, G3EEL, sec D. Wilson, G4KSW, although on the day this goes to press the club has their AGM and things may have changed.
Shefford (S&DRS)—Thursdays, 8pm. Church Hall, Shefford. Chairman, G3DOT, sec, Brian Elliot, G4MEO.
St Neots (SN&DARS)—First and third Monday in each month. Chairman, G8GRT, sec, G4FOH, press officer, G6EDB.
Wellingborough (Nene Valley RC)—Wednesdays, 8pm. The Royal, Knox Road, Wellingborough. Sec L. Parker, tel Wellingborough 79539.

If this information is not correct, please contact me and let us get the records straight. Thank you for all the information supplied by club secretaries and a Happy New Year to you all.—*RR5.*

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

Area representative in Region 6
C. Sharpe, G2HIF Wantage

Amersham (Forest Glade DX Club)—Details c/o 100 Chestnut Lane, Amersham, Berks.
Aylesbury Vale (AVRG)—Details c/o 26 Finmere Crescent, Aylesbury, Bucks.
Aylesbury Vale (AVRS)—25 January (AGM and natter night), 8pm. Stone Village Hall, Stone. Sec Mike Marsden, G8BQH, tel 0296 641783.
Banbury (BARS)—Details c/o 64 Mascord Road, Banbury, Oxon.
Bracknell (BARC)—Details c/o 8 Toll Gardens, Bracknell, Berks.
Bracknell (Sperry Gyroscope ARS)—Details c/o Sports & Social Club, Downshire Way, Bracknell, Berks.
Burnham Beeches (BBRC)—Details c/o 13 Battlemead Close, Bracknell, Berks.
Chesham (C&DARS)—Second Wednesday in each month. The Stable Loft, Bury Farm, Pednor Road, Chesham. Details c/o 21 Lynton Road, Chesham, Bucks.
Didcot (Rutherford Labs ARC)—Details c/o J. D. Gilbert, Bldg R25, Chilcot, Didcot, Oxon.
Farham (FVHFG)—Details c/o 31 Pigott Road, Wokingham, Berks.
Harwell (HARS)—Details c/o Recreational Association, Building 161, Harwell.
High Wycombe (Chiltern ARS)—Sir William Ramsay School, Science Block, Lecture Theatre. Details from G3NCL, tel High Wycombe 712020.
High Wycombe (Mid Thames DFC)—Details c/o Lowfield House, Bolter End, Lane End, High Wycombe, Bucks.
Langley (LCARS)—Details c/o Station Road, Langley, Berks.
Maidenhead (Home Counties ATG)—Details c/o 33 Switchback Road North, Maidenhead, Berks.
Milton Keynes (MK&DRS)—Details c/o 31 Brookfields Road, Haversham, Milton Keynes.
Newbury (N&DARS)—Details c/o Heatherlea, Adbury, Holt, Newtown, Newbury, Berks.
Oxford (OURS)—Details c/o 62 Banbury Road, Oxford, Berks.
Reading (Ariel RG)—Details c/o 57 St John's Road, Caversham, Reading.
Reading (Racal M&TS&SC)—Details c/o Racal Tacticom Systems Ltd, PO Box 112, Reading, Berks.
Reading (R&DARS)—Details c/o Heatherlea, Adbury, 40 Broad Lane, Tilehurst, Reading, Berks.
Reading (R Telephone Area RC)—40 Broad Lane, Upper Bucklebury, Reading, Berks.
Slough (McMichael ARS)—Details from L. J. Perry, McMichael, Slough, Bucks.
Slough (S Bucks CG)—Details c/o 47 Severn Crescent, Langley, Slough.
Vale of the White Horse (VWHARS)—Details c/o College Farm House West, Hendred, Wantage, Oxon.

REGION 7—RR Pat Walker, G8HMG, 12 Brownlow Road, Redhill, Surrey RH1 6AW. Tel Redhill 64035.

Area representative in Region 7
L. V. Mayhead, G3AQC Camberley

Addiscombe (AARC)—Tuesdays (Informal), 9pm. The Woolsack, 154 Gloucester Road, Selhurst, Croydon. Sec Peter Hart, G3SJX, tel 01-656 9054. Congratulations to the club on its contest results in 1982.
Ashford (Echelford ARC)—Second Monday and last Thursday in each month, 8pm. The Hall, St Martin's Court, Kingston Crescent, Ashford, Middx. Sec Anton Matthews, G3VFB, tel 01-892 2229.
Bexleyheath (North Kent RS)—First and third Tuesday in each month, 8pm. The Pop-In Parlour, Graham Road, Bexleyheath. Sec Pelham Conduit, G4KCZ.
Biggin Hill (BHARS)—Last Tuesday in each month. 18 January (AGM. An award will be made at the AGM to the club member who has achieved most for amateur radio in 1982), 8pm. Biggin Hill Memorial Library. Sec Ian Mitchell, G4NSD, tel Biggin Hill 75785.
Coulsdon (CATS)—Second Monday in each month, 7.30pm. St Swithun's Church Hall, Grovelands Road, Purley, Surrey. Sec A. R. Bartle, tel 01-684 0610.
Cray Valley (CVRS)—First and third Thursday in each month, 8pm. Christchurch Centre, Eltham High Street, Eltham SE9. Sec Peter Clark, G4FUG.
Croydon (Surrey Radio Contact Club)—First and third Monday in each month, 10 January (New Year party), 8pm. TS Terra Nova, 34 The Waldrons, Croydon. Sec Ray Howells, G4FFY, tel 01-642 9871. The second meeting in each month is an informal discussion with an opportunity to practice cw.
Crystal Palace (CP & DRC)—Third Saturday in each month, 8pm. All Saints church parish rooms, Church Road, South Norwood SE25. Sec Geoff Stone, G3FZL, tel 01-699 6940.
Guildford (G & DRS)—Second and fourth Friday in each month, 14 January (New Year party), 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec Helen Mullenger, G8SXB, tel Aldershot 20384.
Guildford (UHF Repeater Group)—First Thursday in each month, 8.45pm. Anchor & Horseshoe, Burpham, Guildford. Details from Roger Taylor, G4HZA, 6 High Street, Chobham, Woking, Surrey, tel Chobham 7552.
Kingston (K&DARS)—Third Wednesday in each month, 8pm. Alfriston, 3 Berrylands Road, Surbiton. Sec Robin Pellatt, G4LJI, tel 01-399 8113.
New Cross (Clifton ARS)—Fridays, 14 January (Video show by the BBC External Services), 8pm. Above the New Cross Inn, Clifton Rise, London SE14. Details of programmes from R. Hinton, 42 Sutcliffe Road, Welling, Kent.
Redhill (Reigate ATS)—Third Tuesday in each month, 18 January (Ken Franklin, G3JKF, describes his antenna vector processor), 8pm. Constitutional & Conservative Club, Warwick Road, Redhill. Sec Chris Barnes, G8FEE, 25 Hartswood Avenue, Reigate RH2 8ET.
Sutton & Cheam (S & CRS)—Details of meetings available from George Brind, G4CMU, tel Burgh Heath 54497.
Thames Ditton (Thames Valley ARTS)—First Tuesday in each month, 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec Julian Axe, G4EHN, tel 01-946 5669.
Wimbledon (W & DRS)—Second and last Friday in each month, 8pm. St John Ambulance Hall, 124 Kingston Road, Wimbledon SW19.

Please would the secretaries of clubs not mentioned let me have details of their programmes and dates and times of meetings.—*RR7.*

REGION 8—RR K. A. Crouch, G8KEN, 14 Victoria Road, Capel-le-Ferne, Folkestone, Kent CT18 7LR. Tel 0303 55241.

Area representatives in Region 8
J. Brooker, MBE, G3JMB Haywards Heath
G. D. Edy, G4AXD Maidstone
J. C. Greenhow, G3PEY Tunbridge Wells
K. J. Homewood, G8NPC Hastings
A. D. Ralph G8XLH Chatham

Brighton (B&DRS)—Every second Wednesday in each month, 7.45pm. YMCA, Marmion Road, Hove. Details from Godric Goodrich, G4NLA.
Burgess Hill (Mid-Sussex ARS)—13 January ("Submarine cables part 2", by Ron, G4GKO), 27 January (AGM), 10 February (Surplus sale), 7.30 for 7.45pm. Marle Place Adult Education Centre, Leylands Road, Burgess Hill. Details from Bob Hodge, G4MMI, tel Hurstpierpoint 833559.
Canterbury (East Kent RS)—First and third Thursday in each month. The Cabin, Kings Road, Herne Bay. Details from Derek, G8ELS, or call on GB3KS.
Chichester (CARC)—First Tuesday and third Thursday in each month, 4 January (TBA), 20 January (TBA), 7.30pm. Fernleigh Centre, North Street, Chichester. Details from S. Talbott, or club sec, G4ETU.
Crawley (CARC)—Fourth Wednesday in each month (Formal). Second Wednesday in each month (Informal, at a club member's QTH). 12 January (Informal. Tel G4IQM to find out where to go), 26 January (AGM. Please attend or don't complain afterwards!). Trinity United Reform Church, Ifield Drive. Sec David Hill, G4IQM, tel Crawley 882641.
Dartford (DDFC)—Steve, G4NKM, is the one to contact at Malt Shovel PH if you are interested in DFing, as all are made welcome.
Dover (South East Kent YMCAARC)—Wednesdays, 5 January (Natter night and committee meets), 7.30 for 8pm. YMCA, Leybourne Road, Dover. Mondays is RAE with G4EGQ. Thursdays is cw night by arrangement with G3VSU. Listen on S20 or GB3KS for info and talk-in by G8YMD or G3YMD.
Eastbourne (Southdown ARS)—First Monday in each month, 7.30 for 8pm. Chaseley Home for Disabled Ex-servicemen, Southcliff, Eastbourne. Sec G6BGT, tel Eastbourne 640727.
Gravesend (GRS)—Mondays, 8pm. Windmill Tavern, Shubbery Road. Details from sec, G4NBQ.
Hastings (HERC)—Wednesdays, 7.30pm. First, second, fourth and fifth Wednesday is micro night, first Wednesday, committee meets, all at Ashdown Farm Community Centre. Third Wednesdays in each month (Main meeting at West Hill Community Centre), 19 January ("Astronomical electronics", by P. Read). Details from Alan Beecher, G8VEM, tel Hastings 216516.
Horsham (HARC)—First Thursday in each month, 8pm. Guide HQ, Denne Road, Horsham. Details from Tony Wadsworth, G3NPF.
Kent Repeater Group—This group is responsible for GB3KS (Dover); GB3KN (Mid-Kent); both on 144MHz. GB3CK (Charing); GB3EK (Margate); GB3NK (Wrotham); and GB3SK (Folkestone); all on 432MHz. Information from chairman, G3MDO.
Maidstone (MYMCAARC)—Fridays, 8pm. "Y" Sports Centre, Loose Road. First and third Fridays are for beginners mainly, but all are welcome. Details from G4GKW or G4EMC.
Medway (MARTS)—Fridays, 7.30 for 8pm. Details from sec Ruby Sivyer, tel Medway 61927, after 6pm.
Sussex Repeater Group—This group is responsible for GB3SR and GB3BP on 144MHz. GB3BR, GB3HO and GB3NX on 432MHz, and GB3WX, GB3CP and GB3HM on 1·3GHz. Details from G4GNX.
Thanet (RCT)—7 January (Video tape talk), 21 January (Talk by Racal of Thanet), 28 January (Visit to Richborough power station), 8pm. Birchington Village Centre. New sec is Ken, G4PTE, tel Thanet 32198.
Tunbridge Wells (West Kent ARC)—Alternate Fridays, 7 January ("Keyers and kindred subjects", by John Thwaites), 21 January (Computing in amateur radio), 4 February (Energy conversion competition, rules in club magazine, *QLF),* 8pm. Adult Education Centre, Monson Road, Tunbridge Wells. Informal meetings at Drill Hall, Victoria Road, Tunbridge Wells, on following Tuesdays. Details from Brian Castle, G4DYF.
Worthing (W&DARC)—Tuesdays, 7.30 for 8pm. Pond Lane Amenity Centre, Worthing. Details from Joyce Lillywhite, tel Worthing 63062.

If your club has dates listed in the entry, then information has been sent, if not, this is latest information to hand, and if wrong tell your club secretary to send me your latest information, otherwise your club will not be mentioned again until July's *Rad Com.* 73s for 83.—*RR8.*

REGION 9—RR W. J. Colclough, G2XC, Highview, Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860 485.

Area representatives in Region 9
B. H. Body, G8JML Truro
A. C. Courtney, G8XIP Exeter
H. G. Hughes, G4CG Barnstaple

Married at Wolborough Church, Newton Abbot, on 25 September were Peter Hicks, G4DVP, and Caroline, daughter of the late Bill Jones, G3BBF. Although Caroline comes from Devon and Peter from near Grimsby, they met at an eyeball after many cw contacts between G3BBF and G4DVP. Shown at the reception are, l to r: Bert, G2FIX; Eileen, the bride's mother; Caroline; Peter; Sylvia, xyl of G3LHJ; and Derrick, G3LHJ

L. G. Mays, G2CWR Paignton
A. E. Warne, G3YJX Wadebridge

Camborne (Cornish RAC)—First Thursday in each month. 6 January ("Polymers—where would we be without them?", by Stella, G6EGS), 17 January (Computer section floppy disc tutorial (2), by Des Old, G3CZZ), 7.30pm. SWEB Club Room, Pool, Camborne. Pro S. Rodda, G4PEM, 1/2 Penrose Terrace, Penzance, tel 0736 3948 or 3524. President, A. H. Hammett, G3VWK; chairman, D. W. Blackford, G3NPB; vice-chairman, P. Lock, G8HTE; sec, J. J. Vinton, G6GKZ; treasurer, P. Smart, G8XAI. Cornish net weekdays, 3·714MHz, 1000h; Sundays, 144MHz ssb, 144·275MHz, 1030h, 3·692MHz, 1100h. Cornish award manager, E. Bowden, G2AYQ. SAE for details.
Exeter (EARS)—Second Monday in each month, 8 January (Christmas dinner), 7.30pm. Community Centre, St Davids Hill, Exeter. First and third Mondays (Informal). The Scout Hall, Emmanual Road, Exeter. Pro Andy Lake, G8YOA, tel 0392 39597; chairman, R. Williams, G3RFJ; sec, F. Stower, G6FGS; treasurer, R. Donno, G3YBR.
Exeter (EUARS)—Sundays during term time, 2.30pm. Room 225, Applied Science Building, North Park Road, Exeter. Contact Miss Bellchambers, G8ZPJ, Devonshire House, Stockers Road, Exeter EX4 4PZ.
Exmoor (ERC)—Thursdays, 8pm. Loughrigg, East Street, South Molton, Devon. Sec Peter Dixon, G4JBR, tel 07695 2738.Club call G8SSS.
Exmouth (EARC)—Alternate Wednesdays, 7.30pm. Science Dept, Rolle College, Exmouth, Devon. Sec Mrs J. Nicholson, G8XRR, tel Exmouth 77263. Chairman, Alec Jefford, G8GON. Club call G4HOB.
Newquay (N&DARC)—Alternate Wednesdays, 7.30pm. Treviglas School, Newquay. Contact Pat King, G4GFY, tel 0872 71133. Chairman, Bob Lawrence, G4LDA; treasurer, Brian Pearce, G8GOR.
North Devon (NDARC)—Odd months: fourth Wednesdays, 7.30pm. Community College, Abbotsham Road, Bideford, Devon. Even months: fourth Wednesday, 7.30pm. Community College, Pilton, Chaddiford Lane, Barnstaple, Devon. Sec George Hughes, G4CG, tel 0271 3683. Assistant sec, C. B. Searle, G4LST; chairman, Les Hawkyard, G5HD; treasurer, Geoff Beale, G4ELU.
Plymouth (PPARS)—During term 12h per day. Contact Jeff Key, G8VTW, ARS, Plymouth Polytechnic Students Union, Drakes Circus, Plymouth, Devon.
Plymouth (PRC)—Alternate Mondays, 7.30pm. Tamar School, Paradise Road, Millbridge, Plymouth PL1 5QW. Contact Peter Connor, G8XTE, tel 0755 37319. President, Steve Rance, G3WL; chairman, E. McConaghy, G4KXZ; vice-chairman, D. Whitbread, G6EQM; sec I. Budding, G4GWK.
Saltash (S&DARC)—First and third Fridays in each month, 7.30pm. Toch H, Burraton, Saltash. Sec R. Rayment, 30 Alma Road, Plymouth, Devon. President, Harry Griffiths, G2DFH; chairman, Dave Bunce, G8VJB; treasurer, Colin Squires, G3XCS; Pro R. S. Pridham, G4BVB.
Torbay (TARS)—Fridays, 7.30pm. Last Saturday in each month (Special meetings), 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay. Pro Les Mays, G2CWR, tel 0803 558714. President, Les Mays, G2CWR; chairman, Derek Webber, G3LHJ; sec Mrs M. Rider, 7 Kingston Close, Kingskerswell, Devon TQ12 5EW, tel 0804 75130. Nets: Monday, Wednesday, Friday, 3·756MHz, 1030h, Saturdays at 1000h. Club calls G3NJA and G8NJA. The club has three new licensed members—Ken, G6OYK, Arthur, G6OQB, and Paul, G6OYW.
Treverbyn (English China Clay RC)—Alternate Mondays, 3 January (AGM), 21 January ("New generation home computers", by G8PLC), 7pm. Pentewan Labs, Pentewan Road, St Austell, Cornwall. Contact Jack Redfearn, G8HSZ, tel 0726 3647. Chairman, Bev Rabey, G8NYR; sec, Mike Porter, G4OKS; treasurer, T. Watts, G8NYA; RSGB rep, Chris Colley, G4JYF. Other Mondays, 7pm. The Club Room, Treverbyn. HF (Group) includes cw lessons. VHF, uhf and microwave also arrange programmes.

At the time of compiling the above information I have no other details of the following clubs and societies except that they were included in a list published on 28 October 1982. It would be appreciated if the secretaries would send me details of their meetings, officials, etc to complete my records: British Rail ARS, Tavistock; Britannia Radio Club, Dartmouth; ITT Com Grp, Paignton; Kelly College ARS, Tavistock; Poltair School, St Austell, Cornwall; St Ives County Sec, St Ives, Cornwall. *RR9.*

REGION 10—RR P. A. Jones, GW4HAT, 68 Pastoral Way, Tycoch, Swansea SA2 9LY.

Abergavenny and Nevill Hall (A&NHARC)—Thursdays, 7.30pm. Above Male Ward 2, Pen y Val Hospital, Abergavenny. Sec D. F. Jones, GW3SSY, tel Blaenavon 791617, Club call, GW4GFL.
Aberystwyth (ARSGBG)—4 January (Subject to confirmation), 7.30pm. The Bay Hotel, The Seafront, Aberystwyth. Sec Simon Mee, GW4CTV, tel Aberystwyth 828365.
Barry (BCoFERS)—Club calls GW3VKL, GW4BRS, and GW6BRC. Thursdays, 7.45pm, Barry College of Further Education Annexe, Weycock Cross, Barry. Slow morse class followed by constructional projects in the shack with films or lectures in the hall. Sec Simon Lloyd-Hughes, GW8NVN.
Blackwood (BARS)—Club call GW6GW. Fridays, 7pm. Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. Club net on 144·675MHz each Tuesday, 7pm. This club does not meet during school holidays. Sec Wynn Wright, GW8UAM.
Bridgend (B&DARC)—Club call GW4LNP. Second Wednesday in each month, 7.30pm. NCB Social Club, Tondu, Bridgend. Club net on 145·325 each Wednesday and Sunday, 7pm. Sec Peter Lynn, GW8WCI, tel Bridgend 861115.
Cardiff (CRSGBG)—Club call GW5BI. 10 January ("Design philosophy of solidstate power supplies", by John Case, GW4HWR), 7.30pm. Pantmawr Hotel, Tyla Teg, Whitchurch, Cardiff. Sec Cyril Laws, tel Cowbridge 3212.
Loughor (LAR&EC)—Club call GW4HVJ. Tuesdays fortnightly, 7.30pm. Loughor Scouts Hall, Heol Cae Tynewydd, Gorseinon. Sec Tim Griffin-Thomas, GW8TYS, tel Gorseinon 893392.
Newport (NARS)—Club call GW4EZW. Mondays, 7pm. Brynglas House, Brynglas Road, Newport. CW classes each meeting. HF dx group, construction and microwave groups meet each month on Thursday. Sec Robert Johns, GW4NXD, tel Pontypool 56348.
Pembroke (PRSGBG)—Club call GW2OP. Last Friday in each month, 7.30pm. The Defensible Barracks, Pembroke Dock. Sec Martin Shelley, GW3XJQ, tel Pendine 267.
Port Talbot (BSCARS)—Club call GW3EOP. Thursdays, 7.30pm. BSC Sports & Social Club, Margam. Sec Reg Bray, GW4ESV, tel Briton Ferry 821993.
Powys (PARC)—Club call GW4HVN. Thursdays, 7.30pm. The Cricket Pavilion, Montgomery. Sec Mike Smith, GW4DWX, tel Welshpool 2068.
Rhondda (RARS)—Thursdays fortnightly, 7.30pm. National Union of Mineworkers Club, Tonypandy. Sec Cyril Parry, tel Porth 676655.
Swansea (SARS)—Club call GW4CC. First and third Thursday in each month, 20 January (Bob Barrett, GW8HEZ, executive vice-President of RSGB, will talk on "RSGB and the radio amateur"). The club will be participating in "The Swansea Bay Micro Show" on 13 January (1200-2100h), 14 January (0900-2100h), and 15 January (0900-1600h), using the call GB4SWN. HF and vhf stations will be operational during these periods. Club net Sundays, 1100gmt, 28·530MHz. Controller Cen, GW4BIQ, would like to hear more stations call in, not necessarily club members but those in the locality. Sec Roger Williams, GW4HSH, tel Swansea 404422.

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

Area representatives in Region 11
E. C. Jones, GW4JPP Tywyn
J. Lawson-Reay, GW8WFS Llandudno

Anglesey (ARG)—A new society. Contact Mr C. Williams, GW6DOK, tel 77603.
Bangor (University College of North Wales ARS)—The Rockets Room, Room 261, School of Electronic Engineering Science, Dean Street, Bangor, Gwynedd. No details of programmes or secretary.
Colwyn Bay (Conwy Valley ARC) (GW6TM)—6 January (Christmas dinner at Green Lawns Hotel, followed by entertainment. Contact club treasurer GW4IYN for booking), 13 January (Talk by Ian Auchterlonie, GW6OM, "Amateur radio 1926—to date"), 7.30pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec Mr J. N. Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL22 7DS, tel 0745 823674.
Dolgellau (Meirion ARS) (GW4LZP)—First Thursday in each month, 7.30pm. Nannau Hall Country Club, Llanfachreth, nr Dolgellau. Sec Mr R. Halhead, GW3KOR. No details of programmes.
Menai Bridge (Ysgol David Hughes Radio Club)—No further details.
Rhyl (R&DARC)—Sec Mr B. Jones, 6 Rhodfa Maes Hir, Rhyl, tel 0745 37284. No details of programmes.
Sealand Deeside (RAF Sealand ARC)—E. E. Hewins, OIC, Radio Wing, No 30 MU, RAF Sealand, Deeside, Clwyd. No further details or programmes.
Wrexham (WARS)—c/o 4 Ithens Way, Soutley Road, Wrexham, Clwyd LL13 7EQ. No further details.

REGION 12—RR M. R. Hobson, GM8KPH, 4b Tummel Crescent, Pitlochry, Perthshire.

Area representative in Region 12
R. M. Grant, GM4DQJ Scone

Aberdeen (AARS)—Fridays, 7.30pm. 35 Thistle Lane. Details from sec Dave Travis, GM4GXD.
Dundee (Kingsway TC ARC)—Tuesdays, 6.30pm. Thursdays (RAE class). Old Glamis Road, Dundee. Details from sec Alan Ramsey, GM6BML, 94 Dens Road, Dundee DD3 7HX.
Elgin (Moray Firth ARS)—First Monday in each month, 7.30pm. The Spey Bay Hotel, Spey Bay, Nr Fochabers. Wednesdays, 7.30pm. The Club Room, Moray Further College of Education, Elgin. Details from sec Rev Stanley Bennie, tel 0542 32312.
Invergordon (Easter Ross RC)—Wednesdays, 7.30pm. 100 High Street, Invergordon. The club callsign is GM4MFL and RAE classes and morse classes are available. Programme details from GM4DKL.
Kirkwall—Members meet frequently to discuss amateur radio and allied subjects. Details from GM3IBU.
Perth (P&DARG)—Tuesdays, 8pm. Perth City Sports & Social Club, Leonard Street. Mondays (RAE class), Wednesdays (Practical class). Details from sec Richard Barnes, GM6ESY, tel 073882 575, daytime. Members may wish to note that RSGB publications are now available from Axdon TV Services, Athol Street, Perth. Members discount on production of current membership card.
Shetland (Lerwick RC)—Wednesdays, 7pm. Isleburgh House Community Centre, Lerwick. Members can use the club premises at other times. Details from sec GM4BBI.

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

Area representatives in Region 13
D. G. L. Anderson, GM4JJJ Dunfermline
J. McVicar, GM8GEC Musselburgh

Berwick-upon-Tweed (B&DARS)—First and third Friday in each month, 7.30pm. Details from GM8YPI, tel Eyemouth 50492.
Borders Repeater Group—The group administers the two 144MHz repeater projects, GB3BT (Berwick-upon-Tweed), and GB3SB (Scottish Borders). Meetings are held in Kelso as and when necessary. Details, GM4CXP, tel St Boswells 2795, or G3HDT, tel Berwick-upon-Tweed 88260.
Dalgety Bay (Marconi Space & Defence Systems ARC)—Details from GM4HGB, tel Glenrothes 771057.
Dunfermline (DARS)—Second Wednesday in each month, 7.30pm. Fraser Lounge, City Hotel, Bridge Street, Dunfermline. The club is at present looking for

suitable premises to hold organized meetings. Old and new members will be most welcome to come along. Details GM8IID, tel Dunfermline 728778.

Edinburgh (E&DARC)—Tuesdays, 7.30pm. City Observatory, Calton Hill, Edinburgh. Details from GM3RFQ.

Edinburgh (Ferranti Recreation Club AR Section)—Membership is restricted to company personnel. Details from GM8JKG, tel 031-441 5684. Visits by other clubs by prior arrangement.

Edinburgh (GB3ED Repeater Group)—Details, GM3GBX, tel 031-447 2611.

Edinburgh (Heriot Watt UARC)—Wednesdays, 2.30pm. Mountbatten Buildings, 31-35 Grassmarket, Edinburgh. Details, GM4JFS, tel 031-339 1104.

Edinburgh (Leith Nautical College ARC)—Thursdays, 6.30pm. Leith Nautical College, 24 Milton Road East, Edinburgh 15. Although principally intended to further interest within the college, the club would welcome local radio amateurs and short wave listeners as members. Details from Michael Gathergood, GM4KFK. Halls of Residence, Leith Nautical College.

Edinburgh (Lothians RS)—Second and fourth Thursday in each month, 13 January (Mini lectures), 27 January ("RSGB", by GM3YOR), 10 February ("Jack's black box night", GM8GEC), 24 February ("QRP, a way of life", by GM3XX), 7.30pm. Drummond High School, Broughton Street, Edinburgh. Details GM6JAG, tel 031-664 5403.

Glenrothes (G&DARC)—Wednesdays and third Sunday in each month, 12 January (Visit Longannet Power Station), 16 January ("Amateur radio in New Zealand", by GM4GVJ), 16 February (Visit BBC mw transmitter, Falkirk), 20 February (TBA), 7.30pm. Provosts Land Centre, Leslie, Fife. Details GM8ZTV, tel Kirkcaldy 203582.

St Andrews (UoStAR&ES)—Details from Physics Department, North Haugh, St Andrews.

REGION 14—RR V. J. Kusin, GM4HCO, 109 Weymouth Drive, Glasgow G12 0EL.

Area representative in Region 14

J. G. Gaughan, GM4FEO Helensburgh

Ayr (AARG)—Second and fourth Friday in each month, 14 January (Film night), 28 January (Homebrew competition), 11 February ("CW on the hf bands", by GM3VMG), 7.30pm. Community & Leisure Centre, 24 Wellington Square, Ayr. Details from sec R. D. Harkess, GM3THI.

Dumfries (D&G REC)—First and third Monday in each month, 7.30pm. Cargenholm Hotel, New Abbey Road, Dumfries. Details from GM4NNC.

Falkirk (Stirlingshire ARC)—First Tuesday in each month, 7.30pm. Details from GM6CRQ, 2 Mayfield Mews, Falkirk.

Glasgow (West of Scotland ARS)—Fridays, 7.30pm. 22 Robertson Street, Glasgow G2 8DU. Morse classes. Details from sec Ray James, GM4CXM.

Greenock (G&DARC)—Details from GM3XNJ.

Helensburgh (HARC)—First and third Wednesday in each month, 7.30pm. John Logie Baird School, Helensburgh. Operational nights each Thursday. Details from sec B. P. Spink, GM6CBF.

Irvine (Cunninghaeme & DARC)—Thursdays. The Community House, Irvine. Details from GM3JOB.

Kilmarnock (K&L ARC)—Tuesdays, 7.30pm. The Broomhill Hotel, London Road, Kilmarnock. Details from GM3ZRT.

Motherwell (Mid-Lanark ARC)—Fridays, 7.30pm. Wrangholm Hall Community Centre, Jerviston Street, New Stevenson, Motherwell. Details from GM3ULP.

Stranraer (Wigtownshire ARC)—Thursdays, 7.30pm. Community Centre, Lewis Street, Stranraer. RAE and morse classes. Details from sec GM4LQS.

RR14 would like to hear from RSGB clubs and groups in the region who haven't sent any information for a considerable period of time. There are supposed to be 14 clubs in this region—I have not heard from 10 of them.

REGION 15—RR J. T. Barnes, GI3USS, Whitegables, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ. Tel 0247 3948.

Area representatives in Region 15

R. J. G. Burnside,	RS45534	Belfast
D. F. Campbell,	GI4NKD	Craigavon
J. Chapman,	GI4LVC	Magherafelt
C. J. T. Corderoy,	GI4CZW	Enniskillen
A. T. Hamilton,	GI4HVI	Castlerock
H. M. Irvine,	GI3TLT	Newtownards
W. P. McMichael,	GI4LKA	Greenisland
S. G. Moore,	GI8YTH	Belfast
J. A. Porter,	GI3GGY	Londonderry
P. S. Valentine,	GI3RKE	Omagh

Antrim (ANDARC)—Third Thursday in each month, 7.30pm. Clotworthy House, Castle Grounds, Antrim. Sec GI4FUM NOT QTHR. Tel Antrim 64672.

Ballyclare (East Antrim ARC)—Second Tuesday in each month, 7.30pm. Carntall Hall, Carntall Road, Mossley. AR GI4LKA. Sec GI4JXM.

Ballymena (BRC)—Thursdays, morse class, 8-9pm; Club meeting, 9pm. Sundays (Club get-together) 3pm. 70 Nursery Road, Gracehill. Details from sec GI4HCN.

Banbridge (Mid-Ulster ARS)—Sundays, 3pm. GI4BAC QTH. Details from GI4NVD.

Bangor (B&DARS) (GI3XRQ)—7 January ("The beginnings of amateur radio", by GI5SJ). Sands Hotel, Bangor. Sec GI4JTF.

Belfast (BRSGBG)—Third Wednesday in each month. January (ID cards night), February ("An engineer looks at the sky", by GI6DEQ), 8pm. 90 Belmont Road, Belfast. AR GI6DGP.

Belfast (COBYMCAARC) (GI6YM)—Tuesdays, 7pm. Saturdays, 2.30pm. Club room, Fourth floor, YMCA, Wellington Place, Belfast. Sec GI6BJO.

Belfast (Queens UoBRC)—37 Fitzwilliam Street, next to Students Union, Club station GI3LLQ/GI6FQB on all bands, 3·5 to 432MHz. RAE and morse tuition available. Activities include electronics and computing. Details from chairman GI4MAC, sec GI4LGP, or GI6AGB, GI4FVM, GI6ETD and GI8MUO.

Colraine (C&DARS) (GI4NRQ)—Fridays, 8pm. Flowerfield Arts Centre, Portstewart. Sec GI4LNJ.

Colraine (NWIARC)—Contact GI4KIQ or GI4AHD.

Craigaven (Mid-Ulster ARC)—First Sunday in each month, 3pm. QTH of GI4BAC. Sec GI4NKD.

Enniskillen (Lough Erne ARC)—Third Monday in each month, 8pm. Lakeland Forum. Sec GI4PCY (Ex-GI6EZT).

Larne (L&DARS)—Newly formed and will be applying for affiliation. Wednesdays, 6.30-9.15pm. Larne Tech College, Room 270. Morse classes available. RAE class in tech college. Programme being arranged. Details from sec GI4CPP.

Lisburn (Lagan Valley ARS) (GI4GTY)—10 January ("Mobile installation", by GI3USS), 14 February ("Raynet", by GI4IYD), 7.30pm. Rathvarna Teachers' Centre, Pond Park Road, Lisburn. Sec GI8SXN.

Londonderry (NW of IARC) (GI4CFH)—First Monday in each month, 7.30pm. The New Brathouse, Victoria Road, Prehen, Londonderry. Sec GI4OUN.

Magherafelt (MARS) (GI4MFT)—First Tuesday in each month, 7.30pm. Other Tuesdays (CW and construction). 12 Garden Street, Magherafelt. Sec GI4OMO (ex-GI8JNP).

Omagh (West Ulster ARC)—Second Monday in each month, 8pm. McAleers, Campsie, Omagh. Sec GI4OHW (Ex-GI8XQM).

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Area representatives in Region 16

F. R. Howe,	G3FIJ	Colchester
R. W. Howe,	G3PLB	Basildon
J. R. Tootill,	G4IFF	Ipswich
L. V. G. Turner,	G4CUT	Chelmsford

Braintree (B&DARS)—First Monday in each month (Informal), 8pm. Third Monday in each month (Formal), 18 January (Dick Barton's special agent, Neil Tueson). 7.45pm. Braintree Community Centre, Victoria Street. Details from Mick Jones, G6DFZ, tel Braintree 44168.

Bury St Edmunds (BStERS)—Third Tuesday in each month, 7.30pm. Guildhall, Guildhall Street. Details from John Munro, G3GBB, 29 Angel Hill, Bury St Edmunds.

Chelmsford (CARS)—First Tuesday in each month, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details from Andrew Mead, G4KQE, tel Silver End 83094.

Colchester (CRA)—Thursdays fortnightly, 13 January ("Obtaining planning permission for aerials", by G4JVM), 27 January ("The new Sudbury repeater", by G4IZA), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 70189.

Felixstowe (FARC)—Tuesdays, 8pm. Felixstowe Golf Club. Details from John Hobin, G3XIX.

Great Yarmouth (GYRS)—Thursdays fortnightly, 7.30pm. STC Sports & Social Club, Beevor Road, South Denes. Details from A. D. Besford, G3NHU.

Harlow (H&DRS)—Tuesdays, 7.30pm. Mark Hall Barn, First Avenue. Details from Cilla Mann, G4KVR, c/o Mark Hall Barn, First Avenue, Harlow.

Haverhill (H&DRS)—Fridays, 7.30pm. Copse Hall Farm, Steeple Bumpstead Road. Details from Dave Hickford, G4MVK, tel Haverhill 61207.

Ipswich (IRC)—Second and last Wednesday in each month, 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

Loughton (L&DARS)—Fridays fortnightly, 8pm. Loughton Hall, Rectory Lane. Details from B. Capon, G8UBH.

Lowestoft (L&DARC)—Fridays, 7.30pm. North Suffolk Teachers Centre, Lovewell Road. Details from Terry Weatherly, G3WDI, tel Lowestoft 63216.

Martlesham (MRS)—Wednesdays, 7.30pm. British Telecom Research Labs, Martlesham Heath. Please contact G3ZNU first.

Norwich (Norfolk ARC)—Wednesdays, 5 January (Short meeting), 12 January (Talk by Regional Rep, G3PLF), 19 January (Short meeting), 26 January ("Aurora", by G3IOR), 7.45pm. Crome Community Centre, Telegraph Lane East. Details from Paul Gunther, G8XBT, tel Norwich 610247.

Saffron Walden (SW&DRAS)—Third Wednesday in each month, 8pm. Details from Garry Morton, G6KDW, tel Saffron Walden 22715.

Southend (S&DRS)—Fortnightly, 8pm. St Michaels Church Hall, Sir Walter Raleigh Drive, Rayleigh, Essex. Details from A. Adams, G3YOA.

Stanford-le-Hope (SIH&DARC)—Mondays, 8pm. The Scout Hut, Hardie Road. Details from Alan Taylor, G4KJI, tel Stanford-le-Hope 5057.

Stowmarket (S&DARS)—First Monday in each month, 7.30pm. Red Cross Hut, Station Yard. Details from Jim Lowe, G8SCB, tel Needham Market 721296.

Thurrock (TARC)—First and Third Tuesday in each month, 8pm. Grays Park Hall, Orsett Road, Grays. Details from G3KMD.

Vange (VARS)—Thursdays, 6 January (Junk sale), 13 January ("Clocks", by G4OAD), 20 January (AGM), 27 January ("M100", by G4IFD), 7.30pm. Main Hall, Barstable Tennants Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

REGION 17—RR H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.

Area representatives in Region 17

P. G. Brooker,	G3WXC	Isle of Wight
M. A. Lawrence,	G4JXO	Portsmouth
J. F. Martin,	GU3YIZ	Guernsey
D. I. Mason,	G3ZPR	Poole
A. D. Morrissey,	GJ3YLI	Jersey
A. C. A. Newman,	G2FIX	Salisbury
P. J. Sterry,	G3CBU	Basingstoke
M. J. Stevens,	G3CPN	Ferndown
G. S. Symons,	G3DSS	Sturminster Newton
G. M. Taylor,	G8HVY	Weymouth

Andover (ARAC)—Second Wednesday and third Tuesday in each month, 8pm. Wolversdene Club, Love Lane, Andover. Sec G3KVX.

Basingstoke (BARC)—Second Tuesday in each month, 7.30pm. British Legion Club, Basing. Sec G6KVN, tel Tadley (07356) 3004.

Basingstoke (UK FM Group Southern)—First Wednesday in each month, 7.30pm. Chineham House, Popley, Basingstoke. Chairman G3ZRM, tel Aldershot (0252) 26108.

Bournemouth (BRS)—First and third Friday in each month, 7 January (Talk by G4GTH), 21 January (Film, "The Secret Listeners"), 7.30pm. Kinson Community Centre, Kinson. Sec G4EKE, tel Ferndown (0202) 877945.

Chippenham (C&DARC)—Tuesdays, 7.30pm, Chippenham Sea Scouts HQ. Sec G8UGY, tel Bromham (0308) 850289.

Fareham (F&DARC)—Wednesdays, 7.30pm. Portchester Community Centre. Sec G4ITG, tel Fareham (0329) 234904.

Fareham (HMS Collingwood ARS)—Wednesdays, 7.30pm. Details from sec, G8OWJ, tel Fareham (0329) 234139.

Farnborough (F&DRC)—Second and fourth Wednesday in each month, 7.30pm. Railway Enthusiasts Club, Access Road. Sec G4BJQ, tel Farnborough (0252) 43036.

Gillingham (Blackmore Vale ARS)—Second Tuesday in each month, 11 January ("DX operating techniques", by G3NBC), 7.30pm. Sherman Chemicals, Station Road, Gillingham. Sec G3WRV.

Guernsey (GARS)—Tuesdays and Fridays, 8pm. The Lodge, La Corbinerie, Oberlands, St Martins. Sec GU6CLY, tel 0418 21197.

Horndean (H&DARC)—Second Thursday in each month, 13 January ("Test equipment calibration", by G3WLY and G8AFZ), 7.30pm. Merchiston Hall, Horndean. G8PHH has taken over the duties of pro. Sec G6GBM, tel Horndean (0705) 593429.

Jersey (JAEC)—Second Wednesday in each month, 8pm. The Communication Centre, St Brelade. Sec Mrs M. Smith, tel 0534 23248.

Jersey (JARS)—Sundays, 10.30am. Fridays, 8pm. Le Hocq Tower, St Clement, Jersey. Sec GJ6BUK.

Poole (PARS)—Last Friday in each month, 7.30pm. Poole Technical College. Sec G8ZCG, tel Broadstone (0202) 693986.

Portsdown Hill Repeater Group—Sec G8GNB, tel Titchfield (03294) 41456.

Portsmouth (Marconi E&ARS)—Last Tuesday in each month, 7.30pm. Broad Oaks Canteen, Portsmouth Airport. Sec G3FWE.
Portsmouth (P&DRS)—Thursdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland. Sec G3JZV.
Salisbury (SR&ES)—Thursdays, 7.30pm. Grosvenor House, Churchfields Road. Sec G2FIX, tel Winton (072274) 3837.
Southampton (SARS)—Wednesdays, 7.30pm. Bitterne Park Secondary School, Dimond Road, Bitterne. Details from G4LDK, tel Bursledon (042121) 3451.
Southampton (SUARC)—Tuesday evenings, informal meeting every lunchtime. Clubroom, Old Union Buildings. Sec G4LYL.
Southampton (Waterside Short Wave Club)—Fourth Tuesday in each month, 7.30pm. Blackfield Community Centre, Blackfield, Nr Southampton. Sec G6DLJ, tel Fawley (0703) 891975.
Swindon (S&DARC)—Thursdays, 7.30pm. Park School, Marlowe Avenue, Swindon. Sec Ian Browne, tel Swindon (0793) 485564.
Weymouth (S&DRS)—First Tuesday in each month, 4 January (RSGB film show), 7.30pm. Army Bridging Camp, Wyke Regis, Weymouth. Sec G3ZGP, tel Weymouth (0305) 812893.
Wimborne (Flight Refuelling ARS)—Sundays, 7.30pm. Flight Refuelling Social Centre, Wimborne. Sec G3VFY, tel Wimborne (0202) 882271.
Winchester (WARC)—Third Saturday in each month, 8pm. The Scout Log Cabin, Stockbridge Road. Sec G6FBR, tel Winchester (0962) 66764.

New Year's greetings to all members, from RR17. May all your QSOs in 1983 be R5!

REGION 18—RR W. A. Ricalton, G4ADD, 4 South Road, Longhorsley, Morpeth, Northumberland NE65 8UW. Tel Longhorsley 259.
Consett (C&DARC)—Mondays, 7.30pm. RAFA Club, Sherburn Terrace, Consett. Sec G8WEJ.
Durham (DURES)—Physics Dept, Science Site, Durham University. Details from sec Mark Puddephat, Oswald 299, Gray College.
Easington (EAR&EC)—Tuesdays and Thursdays, 7.30pm. Easington Village Workmen's Club. RAE and morse tuition if required (the club has a good pass record). Details from sec G4GXI.
Great Lumley (GLAR&EC)—Alternate Wednesdays, 7.30pm. Great Lumley Community Centre. Sec G8HPW.
Hartlepool (HRH)—Mondays, 7.30pm. Methodist Church Hall, Frange Road. Sec G3NWU.
Middlesbrough (Post Office ARC)—All amateurs welcome, but first contact sec G8CDP.
Middlesbrough (Teesside Repeater Group)—Last Tuesday in each month, 7.30pm. 196 Marton Road, Middlesbrough, Cleveland. All amateurs and swls invited but first contact sec G8MBK.
Morpeth (Northumbria ARC)—Thursdays, 7.30pm. Old Telephone Exchange, Ellington. Sec Ian Gibbs, G4GWB, tel Morpeth 790417.
Newcastle upon Tyne (T&WRG)—Now no formal meetings. Sec G8XDF.
Prudhoe (TARC)—7pm. Active all bands. CW instruction each night. Falcon Hotel, Prudhoe, Co Durham. Sec G4IZW, tel 0632 678828, evenings.
Redcar (East Cleveland ARC)—Fridays, 7.30pm. RAE classes held. Advice to newcomers given. RAFA Club, Newcomen Terrace, Redcar. Pro G4KIR.
Sunderland (SRAS)—The Brewery Buildings, Westbourne Road. Sec Arthur Everard, G8PCD.
Tyneside (TARS)—Mondays, 7.30pm. Community Centre, Vine Street, Wallsend. Sec James Dingwall, G4ILW, tel 872661.

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

Area representatives in Region 19

W. G. Dyer,	G3GEH	London
L. D. E. Light,	G3KDL	Wembley
P. J. Marcham,	G3YXZ	Watford, Herts
B. H. J. Pickford,	G4DUS	Rickmansworth
J. H. Sleight,	G3OJI	Ware
T. J. Tugwell,	G8KMV	Stevenage

Barking (BR&ES)—Mondays, Tuesdays, Wednesdays, and Thursdays, 7-10pm. Westbury Recreational Centre, Ripple Road, Barking. Monday (RAE class night), Tuesday (Morse code practice), Wednesday (Constructional and operational night), Thursday (General get-together). Contact sec Alan Sammonds, tel 01-594 2471.
Cheshunt (C&DARC)—5 January (Natter night), 12 January (Equipment evening), 19 January (Natter night), 26 January ("Kitchen sink pcbs", by Roger, G4AAO). The Church Room, Church Lane, Wormley, Nr Cheshunt, Herts. This club is actively engaged in fostering newcomers to obtaining their RAE. It also holds morse classes. Details from Bob Gray, G6CNV, tel Dane End 254.
Chingford (Silverthorn ARC)—7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Sec G4AJA, tel 01-529 2282.
Chiswick (ABCARC)—18 January (AGM), 7.30pm. The Committee Room, Chiswick Town Hall, High Road, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.
Ealing (E&DARS)—Tuesdays, 8pm. Northfields Community Centre, Northfields Road, London W13. Sec Ted Batts, G8LWY.
Edgware (E&DRS)—9 January (Affiliated Societies Team Contest. Please confirm date with sec), 13 January (AGM), 27 January (Informal). The Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec Howard Drury, G4HMD, tel 01-952 6462.
Grafton (GARC)—8pm. Five Bells Pub, East End Road, East Finchley, London N5. Sec Jim Chambers, G4IBK, tel 01-346 5841.
Harrow (RSH)—7 January (Talk to be announced), 14 January (Informal), 7.30 for 8pm. Roxeth Room, Harrow Arts Centre (opposite the Alma Pub), High Road, Harrow Weald, Middx. Come up on GB3HR for instant talk-in to the premises on clubnight. Details from Chris Friel, G4AUF, tel 01-868 5002.
Havering (H&DARC)—Wednesdays, 5 January (AGM), 12 January (Natter night), 19 January (A demo of the microdot communications terminal by a rep from Polemark Ltd), 26 January (Natter night), 8pm. Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Details from A. Negus, G8DQJ, tel Upminster 24059.
Ilford (IRSGBG)—Tuesdays, 8pm. 50 Mortlake Road, Ilford. Details from Barbara Seager, 8 Maxey Gardens, Dagenham.
London (Civil Service ARS)—First and third Mondays in each month. This club has returned after a long absence. It holds its meetings mainly during the lunch hour at the Civil Service Recreation Centre, Monck Street, Millbank, SW1. Details from G. Costin, G4GFU, tel 01-632 6444, daytime.
London (Imperial College ARS)—Details of this club can be obtained from G4MIK, tel 01-589 5111, ext 1301, during office hours. The attendance at this venue is by invitation only if not already a club member.
London (Post Office HQARG)—Weekly net Wednesdays, 8pm, for PO and BT staff. Details from J. A. Clark, Room 521, Electra House, Victoria Embankment, London WC2. This club is only open to PO staff.
St Albans (Verulam ARC)—7.45 for 8pm. Charles Morris Memorial Hall, Tyttenhanger Green, St Albans, Herts. Details from G3JKS, tel St Albans 59318.
Southgate (SARC)—13 January ("Interference cancelling techniques", by G3JWI), 7.30 for 8pm. St Thomas's Church Hall, Prince George Avenue, Oakwood, London N14. Publicity sec G8EWG.
Stevenage (S&DARC)—*Please note the following:* all meetings are now held at TS Andromeda, Shephall View, Stevenage, Herts. Morse classes, 7.30pm. 4, 18 January, 8pm. Details from T. Bailey, G6CRF, tel Stevenage 62860.
Shelbourne (SRC)—Thursdays, 7pm. Shelbourne Youth Centre, Hornsey Road, London N7. Details from G4BZW, tel 01-249 1843.
South West Herts UHF Group—This group's 10GHz beacon is now back on the air as of 22 April. They would like some interested people to help maintain it, especially with cash assistance. If you can help, give Peter, G3YXZ, a shout or write to 29 Standfield, Abbots Langley, Watford.
UK FM Group—For information on this group and future policy please contact Pat Spenceley, G8LZA, or J. Parkins, G8KVP.
Wanstead (ELRSGBG)—Nothing heard. The club may still meet at Wanstead House on the third Sunday in the month, but nothing has been heard since April 1982.

RR19 thanks those club secs who remembered to send in the programme for January 1983.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ. Tel 0272 848140.

Area representatives in Region 20

R. W. Marshall,	G4ERP	Bishops Cleeve
E. A. Perkins,	G3MA	Gloucester
K. A. Saunders,	G8SFM	Leighterton
J. Thorn,	G3PQE	Weston-super-Mare

Bath (Downside School ARS)—Details of the school's radio activity can be obtained from the Physics Department, Downside School, Stratton-on-the-Fosse, Bath, Avon.
Bristol (BARC)—Tuesdays, 7.30pm. YMCA, Park Road, Kingswood. Computer night every fourth Tuesday. Details from Trevor Cockram, G8GFZ, or Alan Williams, G3ZKI, tel 0272 553020.
Bristol (BRSGBG)—24 January (AGM), 7.30pm. Queens Building, University Walk, Bristol University, (enter University Walk from the Hawthorns Hotel and—look for the Continental-type road barrier). Details from Chris Short, G8GLQ, tel 0272 621253.
Bristol (First Crockern Scouts Short Wave Group)—Details of the group (licensed amateurs and short wave listeners are welcome to the shack by arrangement), from Pete Knowles, 30 Church Path Road, Pill, Bristol BS20 0EE, tel Bristol 8814248.
Bristol (HTVRC)—Details can be obtained from Robin Thompson, G3TKF, tel Keynsham 3965.
Bristol (North Bristol ARC)—Fridays, 28 January (AGM, all members are requested to attend), 7.30pm. C/o Self Help Enterprise, Braemar Crescent, Northville, Bristol. Details from Ted Bidmead, G4EUV, tel 0272 691685.
Bristol (UoBARS)—Details of the society's activities etc can be obtained from Mark Posen, G6DYY, c/o Students Union, Bristol University, Queens Road, Clifton, Bristol BS8 1LN.
Bristol (432MHz Repeater Group)—For enquiries regarding the 432MHz repeater GB3BS, and GB3AA, the 1·3GHz repeater situated at Alveston, near Bristol, contact the sec Steve Bailey, G4MCQ, or Terry Rowe, G8NNU, tel 0272 559398.
Cheltenham (BYLARA)—YLS and xyls. Details can be obtained regarding membership c/o Little Croft, Shurdington Road, Cheltenham. (Ladies—how about some copy for this column. *RR20).*
Cheltenham (CARA)—First Thursday and third Friday in each month, 7.30pm. The Old Bakery, Chester Walk, Clarence Street, Cheltenham, (please note that by the time this appears in print I understand that the above address may well have changed, as new accommodation is being sought—*RR20).* Details from John Holt, G3GWW, tel Witcombe 3435.
Cheltenham (Government Communications ARC)—Details from sec, c/o Government Communications Headquarters, Benhall, Cheltenham.
Cheltenham (Smiths Industries RS)—Second Thursday in each month, 7.30pm. The Club House, Newlands, Bishops Cleeve. HF, vhf and fstv operating under the callsign G4MEN. Details from sec, c/o Sports & Social Club Office, Smiths Industries Aviation Division, Evesham Road, Bishops Cleeve, Cheltenham GL52 4SF.
Gloucester (GARS)—Wednesdays, 5 January (Members' slides evening), 28 January ("Friendly" skittles match at the RAFA Club, Gloucester), 7.30pm. Please note new address: St Barnabas Church Hall. Details from Tony Martin, G4HBV.
Mendip Repeater Group—GB3WR, 144MHz repeater, GB3UB and GB3VS, 432MHz repeaters, and GB3UT, 1·3GHz tv repeater. Details of the repeaters, subs, and applications for membership can be obtained from Steve Gardner, G8GMZ, tel Midsomer Norton 413902.
Portishead (Gordano ARG)—Fourth Wednesday in each month, 7.30pm. Ship Hotel, Down Road, Portishead. Details from Bob Coles, G8ROC, tel 0272 877789.
Shirehampton (SARC)—Fridays, 14 January (Film show), 21 January (Impromptu lecture), 28 January (Natter night), 7pm. Twyford House, High Street, Shirehampton. Details from Ron Ford, G4GTD.
Taunton (T&RDC)—Fridays, 7.30pm. The County Hall, Taunton (opposite the Crescent car park). Details from sec Graham Swetman, G8TJF.
Wells (EMI Sports & Social Club RC)—Cedar House, Chamberlain Street, Wells, Somerset BA5 2PJ. (Regret no further details—*RR20).* Details from sec, at the above address.
Weston-super-Mare (RAFARS)—This is the headquarters station of the RAFARS, and details of membership etc can be obtained from the Admin Secretary, RAFARS, RAF Locking, Weston-super-Mare, Bristol BS24 7AA.
Weston-super-Mare (WsMRS)—Third Monday in each month, 7.30pm. The Rugby Club (off Drove Road), Weston-super-Mare. Details from G3BLO or G3PQE, tel 0934 22712.
Yeovil (Y&DARC)—Thursdays, 6 January ("Aerial vertical radiation patterns", by G3MYM), 13 January ("Potted history of radio astronomy", by G6HTI), 20 January ("Frequency synthesis", by G3DSS), 27 January (Natter night), 7.30pm. Building 101, Houndstone Camp, Yeovil. Details from Don McLean, G3NOF, tel 0935 24956.

ANNEE MONDIALE DES COMMUNICATIONS
WORLD COMMUNICATIONS YEAR
AÑO MUNDIAL DE LAS COMUNICACIONES
1983

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

Alterations and additions to this list should be sent to the organizer Mr M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex

Clock time	Callsign	MHz	Mode	Town	Notes
Sundays					
1015	G3CGD	1·875	A1A/A3E	Cheltenham, Glos	
1100	G2FXA	1·910	A1A/A3E/J3E	Stockton-on-Tees	
1100	G3XJJ	3·535	A1A/J3E	Northampton	
1130	G3BLS	145·250	F2A	Osney, Oxford	[1]
1200	G4BFJ / G4DKK	144·625	F2A/F3E	Banstead, Surrey Tooting, SW London	
1200	G3PER	145·575	F2A/F3E	Heysham, Lancs	[1]
1200	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
1200	G3GNS	1·910 / 3·550 / 144·250	A1A / A1A / A1A	Locking, Avon	[13]
1400	G3LZV	145·250	F2A/F3E	Manchester	[3]
1830	G4GOC	145·250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1930	G3LDW	144·160	A1A/J3E	Halesowen	[1]
2000	G3LZV	145·250	F2A/F3E	Manchester	[3]
2000	G4JBB	145·425	F2A	Birmingham	[10]
2005	G3OLU	145·375	F2A/F3E	Braintreee, Essex	
2030	G3ORP	144·250	A1A/J3E	Maidstone, Kent	[6]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	GW4LLE	145·525	F2A/F3E	Milford Haven, Dyfed	
Mondays					
1100	G4IRI	3·550	A1A/J3E	Bolton, Lancs	
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1900	G3TPY	145·275	F2A/F3E	Chester, Cheshire.	[1]
1900	G4ILD / G3ZQS	145·400	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1930	G4BFJ / G4DKK	144·625	F2A/F3E	Banstead, Surrey Tooting, SW London	
1930	GI3SXG	144·100	A1A/J3E	Newtownards, Co Down	
1930	G4LLU / G4JSQ	144·160	F2A/F3E	Wolverhampton, W. Midlands	
2000	G2FXA	145·525	F2A/F3E	Stockton-on-Tees	[1]
2000	G3LZV	145·250	F2A/F3E	Manchester	[3]
2000	G4IRI	3·550	A1A/J3E	Bolton, Lancs	
2000	G4JDL	144·250	A1A/J3E	Solihull, W Midlands	[2]
2030	G3ASR	1·875 / 144·175	A1A/J3E / A1A/J3E (lsb)	Harrow, Middlesex	[1] [12]
2030	G2FKO	145·525	F2A	Bideford, Devon	
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[14]
2200	G3GMS	145·250	F2A/F3E	Whitley Bay, T & W	[1]
Tuesdays					
1100	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	G4CWN	144·100	A1A/J3E	Stoke-on-Trent, Staffs	
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1900	G4RS	3·565 / 145·525	A1A/J3E / F2A/F3E	Catterick, N Yorks	[1]
1930	G4BFJ / G4DKK	1·950 / 144·625 / 144·625	A1A/J3E / F2A/F3E / F2A/F3E	Banstead, Surrey / Tooting, SW London	
1930	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
1930	G4DAL	145·575	F2A/F3E	Lancaster, Lancs	[1]
1930	G4HTD	145·550	F2A/F3E	Plymstock, Devon	[5]
2000	G3VHE	145·350	F2A	Swindon, Wilts.	[1]
2000	GM4ELV	144·250	A1A	Arrochar, Strathclyde	
2000	G4FEX	145·250	F2A/F3E	Horsley Woodhouse, Derbyshire	[1]
2030	G3IRM	1·975	A1A/A3E	Bury St Edmunds, Suffolk	
2030	G3OHM/A	144·180	A1A/J3E	Birmingham	
2030	G3KGU	1·910	A1A/A3E	Theydon Bois, Essex	
2030	G2FKO	145·525	F2A	Bideford, Devon	
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2200	G3AWL	144·110	A1A/J3E	Easington, Co Durham	[8]
Wednesdays					
1100	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1900	G3TPY	145·275	F2A/F3E	Chester, Cheshire.	[1]
1900	G4ILD / G3ZQS	145·400	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1900	G2ABC	145·250	F2A/F3E	Truro, Cornwall	
1900	G3ULY / G4EXD	3·583 / 145·475	A1A / F2A	Culgaith, Cumbria	[1]
1930	G4NNS / G4BFJ / G4DKK	144·625	F2A/F3E	Sunbury-on-Thames, Middx Banstead, Surrey Tooting, SW London	
1930	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
1930	G4FKH	3·550	A1A	Chelmsford, Essex	
1930	G4HTD	145·550	F2A/F3E	Plymstock, Devon	[5]
2000	G2FXA	144·250	A1A/J3E	Stockton-on-Tees	[1]
2000	GW4KDP	145·550	F2A/F3E	Barmouth, Gwynedd	[1]
2000	G3SWP	144·180	A2A/J3E	Doncaster, South Yorks	[1]
2000	G3LZV	145·250	F2A/F3E	Manchester	[3]
2000	G4BP/A	145·475	F2A/F3E	Scarborough, Yorks	
2030	G4LHI	145·250	F2A/F3E	Huntingdon, Cambs	[1]
2030	G2FKO	145·525	F2A	Bideford, Devon	
2100	GW4LLE	145·525	F2A/F3E	Milford Haven, Dyfed	
2130	GM4HYF	28·350 / 145·375	A1A / F2A	SE Glasgow	[1]
Thursdays					
1100	G4IRI	3·550	A1A/J3E	Bolton, Lancs	
1830	G4GOC	145·250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
1830	G4ILD / G3ZQS	145·400	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1] [1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1900	G3TPY	145·275	F2A/F3E	Chester, Cheshire.	[1]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1900	G4BNA	3·590	A1A	Swindon, Wilts	
1900	G3BLS	145·250	F2A	Osney, Oxford	[1]
1900	G3ZRZ	1·975	A1A/A3E	Blackpool, Lancs	
1900	G4RS	3·565 / 145·525	A1A/J3E / F2A/F3E	Catterick, N Yorks	[1]
1930	G4BFJ / G4DKK	1·950 / 144·625 / 144·625	A1A/J3E / F2A/F3E / F2A/F3E	Banstead, Surrey Tooting, SW London	[15]
1930	G4HTD	145·550	F2A/F3E	Plymstock, Devon	[5]
1930	G3ASR	1·875 / 144·175	A1A/J3E / A1A/J3E (lsb)	Harrow, Middx	[1] [11] [12]
2000	G2ACZ	1·819	A1A	Mablethorpe, Lincs	
2000	G3LZV	145·250	F2A/F3E	Manchester	[3]
2000	G3IRI	3·550	A1A/J3E	Bolton, Lancs	
2000	GM4ELV	144·250	A1A	Arrochar, Strathclyde	
2000	G4JDL	144·250	A1A/J3E	Solihull, W. Midlands	[4]
2030	G2FKO	145·525	F2A	Bideford, Devon	
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[14]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2200	GM4HYF	28·350 / 145·375	A1A / F2A	SE Glasgow	[1]
Fridays					
1100	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
1830	G4ILD / G3ZQS	145·400	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1] [1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1900	G4FIM / G3KWT	145·550	F2A/F3E	Leeds, Yorks	
1900	G3TPY	145·275	F2A/F3E	Chester, Cheshire.	[1]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1930	G4ILW	145·550	F2A/F3E	Gateshead, T & W	[1] [16]
1930	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
1930	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
1930	G4BFJ / G4DKK	144·625	F2A/F3E	Banstead, Surrey Tooting, SW London	
2000	G3RR	145·550	F2A/F3E	Barnoldswick, Lancs	
2000	G3WOK	144·775	F2A	Hailsham, Sussex	
2030	G2FKO	145·525	F2A	Bideford, Devon	
2200	G3AWL	144·110	A1A/J3E	Easington, Co Durham	[8]
Saturdays					
1100	G3LZV	145·250	F2A/F3E	Manchester	[3]
1200	G3GNS	1·910 / 3·550 / 144·250	A1A / A1A / A1A	Locking, Avon	[13]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
2000	G3LZV	145·250	F2A/F3E	Manchester	[3]
2000	G4JBB	145·425	F2A	Birmingham	[10]
2000	G4FEX	145·250	F2A/F3E	Horsley Woodhouse, Derbyshire	[1]
2030	G2FKO	145·525	F2A	Bideford, Devon	
2100	GW4LLE	145·525	F2A/F3E	Milford Haven, Dyfed	
2200	G3GMS	145·250	F2A/F3E	Whitley Bay, T & W	[1]

Notes

[1] Omnidirectional
[2] Horizontal to SE
[3] Vertical to S
[4] Horizontal to NW
[5] Vertical to E
[6] Tilted polarization NE to SW
[7] To SW
[8] To S
[9] To NE
[10] To NNE
[11] First and third Thursdays in each month
[12] Horizontal
[13] Reports to RAFARS Locking
[14] Horizontal to E and W
[15] Starting speed 12wpm
[16] Vertical to N

CONTEST NEWS

SSB Field Day 1982 results

A total of 72 logs (including checklogs) was received for this year's contest, an increase of 17 over the 1981 figure. It seems conditions were very much poorer than last year, and certainly the further north one went, the worse the weather became.

The standard of logkeeping was generally good, with one or two notable exceptions. One entrant claimed 242 multipliers, and one log was written in three different coloured inks! A number of groups had clearly not studied the rules carefully, as logs were wrongly scored, country check lists omitted, both sides of log sheets used, and individual operators' callsigns not listed. These rules are intended to make life just that little bit easier for the adjudicator. A lot of points were lost because of the omission of the /P, or the addition of /P to a fixed station's callsign, and QSOs were listed for one band when quite clearly these QSOs had taken place on another band. This year no points were deducted for these obvious mistakes, but care should be taken when copying logs in future.

Congratulations to Swansea ARS, GW4CC/P, who won the open section. Their station consisted of a TS530 driving an L7 to a two-element quad at 60ft, and a W3DZZ at 40ft for the lower frequency bands. Runner-up in the open section was the Cray Valley RS, G3RCV/P, who used an FT101ZD, an MLA2500 into a DX33 at 70ft, a three-element 20m quad at 40ft, a 40m delta loop, and an 80m dipole. In third place was Lichfield RS, G3WAS/P, who used an FT107, an SB220, a TH6 at 70ft, and delta loops for the lower frequency bands.

In the restricted section the winner was Liverpool & DARS, GD3AHD/P, who repeated last year's success by an even larger margin over the rest of the field. The station consisted of an FT101ZD and a 245ft centre-fed wire. Second place went to Gloucester ARS who used an FT101Z to a 270ft centre-fed wire, and third place went to the Windy Yet Group, GM3NEQ/P, who used a TS830 to an inverted-V.

Following requests from a number of clubs, the results include individual band listings. One or two groups were in favour of this contest clashing with the 144MHz contest, as they said it enabled the club to operate in a portable contest on both the vhf and hf bands, and so satisfied most people's operating preferences. Thanks to all groups who forwarded comments with their logs. A sample of these is included below. The Northumbria Trophy will be awarded to GW4CC/P, and certificates of merit will be sent to G3RCV/P, G3WAS/P, GD3AHD/P, G4AYM/P and GM3NEQ/P.

Comments

"Contest well supported and enjoyed by all" — *Southdown ARS.*

"This is the first time we have entered this contest, we found it most enjoyable, and we certainly intend to make this contest a regular event in our calendar" — *Grimsby.*

"Lost a lot of time on Saturday due to generator troubles, but thanks for a very good contest" — *Isle of Wight ARS.*

"Excellent contest run in typically bad weather, had 0·5in spark jump across atu insulators, however that made time for a quick dose of the water of life" — *Windy Yet Group.*

"Torrential rain plus 100mph gale made life a little uncomfortable. Would like to see a more direct approach on station inspections, otherwise no changes please" — *West of Scotland "B".*

"Our thanks to the HF Contests Committee for all their hard work" — *Edgware & DRS.*

"The scoring system does not put enough premium on the real dx contact" — *Swansea ARS.*

"Phew! what a weekend. Rotator stuck on the TH6 for 7h, two brave club members climbed the 70ft mast in the dark in driving rain and wind to try and free it (don't tell anyone it was only a blown fuse in the tent)" — *Northumbria ARC.*

OPEN SECTION

Posn	Callsign	Group	Number of points/multipliers 3·5MHz	7MHz	14MHz	21MHz	28MHz	Total pts/mults	QSOs (claimed)	Score
1	GW4CC/P	Swansea ARS	473/14	354/17	2,050/51	834/37	449/26	4,160/145	1,213	603,200
2	G3RCV/P	Cray Valley RS	1,020/25	737/20	1,230/43	644/40	126/29	3,757/157	1,007	589,849
3	G3WAS/P	Lichfield RS	800/28	909/25	1,138/38	654/38	158/25	3,659/154	1,022	563,486
4	G3WOR/P	Worthing & D ARC	987/17	1,136/27	823/33	453/30	318/32	3,717/139	998	516,663
5	G3KLH/P	Racal	662/14	649/16	1,317/45	930/41	161/17	3,719/133	1,078	494,627
6	G4AAX/P	Northumbria ARC	753/16	274/12	1,360/54	361/42	139/25	2,887/149	781	430,163
7	GM4AGG/P	West of Scotland ARS "A"	1,126/26	683/12	1,314/34	406/26	113/14	3,642/112	1,029	407,904
8	G4HRS/P	Horsham ARC	1,231/29	417/11	994/39	492/35	47/12	3,181/126	1,013	400,806
9	GW4NZ/P	BSC Port Talbot RC	766/13	180/11	1,307/37	1,006/44	70/13	3,329/118	976	392,822
10	G3WSC/P	Crawley ARC	955/26	529/16	451/29	711/44	140/23	2,786/138	781	384,468
11	G3SFG/P	Southgate ARC	967/19	595/16	494/28	529/30	207/25	2,792/118	851	329,456
12	G3FJE/P	Shefford & D ARS	957/20	178/17	981/32	569/36	73/13	2,758/118	734	325,444
13	G3XEP/P	White Rose ARS	854/16	550/16	679/42	162/21	210/20	2,455/115	674	282,325
14	G4IRC/P	Ipswich RC	1,069/16	357/18	740/39	79/18	175/24	2,420/115	659	278,300
15	G3NJA/P	Torbay ARS	628/13	209/9	1,262/41	596/30	24/9	2,719/102	726	277,338
16	G5BK/P	Cheltenham ARA	840/14	87/4	1,332/37	314/18	225/22	2,798/95	830	265,810
17	G4DLY/P	Wirral CG	814/18	369/14	1,112/31	406/25	8/4	2,709/92	713	249,228
18	G6CW/P	ARC of Nottingham	611/15	549/14	814/37	324/24	63/10	2,361/100	714	236,100
19	G8JC/P	Worcester & D ARC	804/15	372/11	984/36	178/14	65/12	2,403/88	690	211,464
20	G3ASR/P	Edgware & D RS	774/16	441/10	479/19	188/20	186/20	2,068/85	505	175,780
21	G5FZ/P	Lincoln SWC	788/11	705/20	531/32	22/5	22/3	2,068/71	619	146,828
22	G3NWR/P	Wirral ARS	725/16	498/13	679/25	136/15	–	2,038/69	500	140,622
23	GI3XRQ/P	Bangor & D ARS	462/9	103/8	916/24	547/17	–	2,028/58	482	117,624
24	GM3UWO/P	Kilmarnock & Loudoun ARC	393/10	225/7	649/27	322/18	20/7	1,609/69	399	111,021
25	GI4MMJ/P	–	483/16	37/3	1,023/23	127/15	26/6	1,696/63	448	106,848
26	G3BRS/P	Bury RS	572/13	417/11	724/20	106/10	–	1,819/54	485	98,226
27	GM4HEL/P	Helensburgh ARC	444/12	5/1	1,021/25	188/19	–	1,658/57	420	94,506
28	G3GHN/P	Clifton ARS	422/17	286/13	322/18	137/13	76/10	1,243/71	316	88,253
29	G3XRT/P	Ilford G	456/13	468/11	511/23	52/11	–	1,487/58	368	86,246
30	G3BPK/P	Douglas Valley ARS	479/15	75/7	560/22	170/18	11/3	1,284/65	360	83,460
31	G4ECT/P	Cheshunt & D ARC	589/13	262/7	572/18	47/6	20/3	1,490/47	379	70,030
32	G3SDS/P	South Dorset RS	277/8	41/5	694/28	211/15	–	1,223/56	318	68,488
33	G4NRT/P	–	471/10	174/8	444/26	17/3	36/11	1,142/58	297	66,236
34	G3AFT/P	Grafton RS	529/9	178/5	324/11	114/16	71/12	1,216/53	319	64,448
35	GM4MFL/P	–	438/12	101/5	820/23	34/3	–	1,393/43	371	59,899
36	G3ZPR/P	Poole ARS	314/8	–	814/22	33/6	43/5	1,204/41	308	49,364
37	G2CLN/P	Droitwich ARC	520/10	346/9	286/17	–	–	1,152/36	292	41,472

RESTRICTED SECTION

Posn	Callsign	Group	Number of points/multipliers 3·5MHz	7MHz	14MHz	21MHz	28MHz	Total pts/mults	QSOs (claimed)	Score
1	GD3AHD/P	Liverpool & D ARS	1,047/20	250/14	1,201/41	550/34	23/6	3,071/116	862	356,236
2	G4AYM/P	Gloucester ARS	773/17	567/14	866/26	122/9	88/9	2,416/75	625	181,200
3	GM3NEQ/P	Windy Yet G	462/10	175/11	1,120/30	186/20	126/16	2,069/87	542	180,003
4	G4EKT/P	Hornsea & D ARC	792/17	383/11	342/24	167/27	41/11	1,725/90	414	155,250
5	GM8MJ/P	West of Scotland ARS "B"	581/10	288/11	810/25	216/18	46/9	1,941/73	540	141,693
6	G4MHC/P	Malvern Hill ARC	719/16	489/9	431/26	119/12	56/10	1,814/73	442	132,422
7	G3GRS/P	Gravesend RS	641/13	420/9	598/24	154/18	–	1,813/64	453	116,032
8	G3WQK/P	Southdown ARS	681/15	315/11	721/31	41/6	–	1,758/63	471	110,754
9	G3KUE/P	Preston ARS	922/13	471/11	470/19	97/8	15/4	1,975/55	512	108,625
10	GM3ZRC/P	Greenock & D ARC	562/18	426/10	600/25	71/8	4/2	1,663/63	410	104,769
11	G6OI/P	Stourbridge & D ARC	607/10	260/11	394/25	160/17	9/3	1,430/66	346	94,380
12	G4NOK/P	North Wakefield RC	256/7	377/11	293/19	113/12	114/14	1,153/63	296	72,639
13	G3FVA/P	South Manchester RC	245/7	124/9	299/25	225/19	70/10	963/70	241	67,410
14	G4MCQ/P	South Bristol CG	449/10	123/4	656/21	105/6	48/7	1,381/48	345	66,288
15	G3CNX/P	Grimsby ARS	895/16	473/12	132/14	2/1	–	1,502/43	408	64,586
16	GW4LNP/P	Bridgend & D RC	507/11	213/7	755/20	7/2	–	1,482/40	394	59,280
17	G3KTC/P	–	410/10	191/7	493/22	101/9	–	1,195/48	299	57,360
18	G4FUR/P	Coulsdon ARS	403/8	99/4	298/18	104/14	98/11	1,002/55	233	55,110
19	G4GCT/P	North Bristol ARC	320/11	282/8	300/22	111/11	4/2	1,017/54	249	54,918
20	G6AJ/P	Barnsley & D ARC	354/9	–	419/23	142/15	60/7	975/54	254	52,650
21	G6HH/P	Hastings RC	411/12	113/3	274/21	133/14	18/4	949/54	249	51,246
22	G3GIZ/P	Chester & D RS	237/5	399/11	504/22	10/1	14/3	1,164/42	329	48,888
23	G3SKY/P	Isle of Wight ARS	402/9	307/10	197/13	24/8	–	930/40	216	37,200
24	GM4HKH/P	Borders ARS	–	97/7	516/23	158/15	2/1	773/46	199	35,558

Check logs received with thanks from EA8ANZ, G3WOV, G3XTJ, G4MLN, G4JVG/SM0, GU3HFN, OZ4ZT, OZ5EDR, YU7SF, ZS6TJ.

" 'Oh Lord why hast thou forsaken us?' On the Friday prior to the contest it rained, it rained on the Saturday, on Sunday things got worse—not only did it rain but it blew a gale. On the Sunday you would have thought we had pitched our tent in a pond. As I sat with two tee shirts, three Arran sweaters, waterproof anorak and leggings and wellington boots I thought 'How cheery those south coast G stations appear to be with all that warm sunshine—I hope the perishing s - - s get electrocuted!!' Seriously though, please adjust scoring system. It seems daft to get maximum points for an S9 + 40dB DL/portable and only three for working a VK/ZL station"—*West of Scotland ARS "A".* *G3KDB*

First 1·8MHz Contest 1983 rules

1. Aim of contest. To encourage the use of the 1·8MHz band.

2. Eligible entrants. Single-operator stations only. British Isles entrants must also be members of the RSGB. **Entrants must operate in accordance with the terms of their licences.**

3. Period. 2100gmt Saturday 12 February to 0100gmt Sunday 13 February 1983.

4. Sections

(a) British Isles stations.

(b) Overseas stations including EI.

5. Frequencies/Mode. 1·8-2·0MHz cw only. British Isles stations should note that overseas stations may be allocated different parts of the band: eg Austria, 1·823-1·838MHz; Netherlands, 1·825-1·835MHz; USSR, 1·850-1·950MHz.

6. Contest call and exchange. CQ test, RST plus serial number starting at 001. British Isles stations must also give their country code as published in this issue of *Radio Communication.*

7. Scoring

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

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

8. Logs. Entries must be clearly written or typed on one side only of RSGB hf contest log sheets (Form HFC1) or international A4 size paper using blue or black ink. Log sheets to be headed: date/gmt; callsign; RST/number sent; RST/number received; code received; bonus; points. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. For unmarked duplicate contacts for which points have been claimed, additional penalty points may be deducted (eg 10 times the claimed score for the contact).

9. Declaration. Each entry must be accompanied by the following declaration, signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and agree that the decision of the Council of the RSGB shall be final in all cases of dispute".

10. Address for logs. RSGB HF Contests Committee, c/o D. S. Booty, 139 Petersfield Avenue, Staines, Middlesex TW18 1DH, England.

11. Closing date for logs. Logs must be postmarked no later than Monday, 28 February 1983.

12. Awards

(a) The Somerset Trophy will be awarded to the winning station in the British Isles section, and certificates of merit to the second and third placed entrants.

(b) The Maitland Trophy will be awarded to the Scottish entrant with the highest aggregate number of points in this contest combined with the second 1·8MHz Contest 1982.

(c) Certificates of merit will be sent to the first three stations in the overseas section, and to the leading entrant from each overseas country.

(d) A certificate of merit will be awarded to the highest placed log from an entrant who has not entered a First 1·8MHz Contest before. Candidates for this award should mark their entries "First-time Award".

(e) A certificate of merit will be awarded to the highest placed UK entrant who has achieved pensionable age on or before 13 February 1983. Candidates for this award should mark their sheet "Senior Citizen's Award".

70MHz Cumulative Contest rules

1000-1200gmt, 30 January, 13 February, 27 February, 13 March 1983
0900-1100gmt, 27 March, 10 April, 24 April 1983

The following general rules, published in the January 1983 edition of *Radio Communication,* will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 9, 10a, 11b, 12a, 13-26.

All entries and check logs to: VHF Contests Committee, c/o Mr J. H. Quarmby, G3XDY, 12 Chestnut Close, Rushmere St Andrews, Ipswich IP5 7ED.

432MHz Fixed Contest rules

1000-1500gmt 6 February 1983

The following general rules, published in the January 1983 edition of *Radio Communication,* will apply: 1, 2, 3, 4b & 4d, 5a, 6a, 7a, 9, 10a, 11a, 12a, 13-26.

All entries and checklogs to: VHF Contests Committee, c/o Mrs P. Suckling, G4KGC, 46 Windsor Close, Towcester, Northants NN12 7JB.

March 1983 144/432MHz & SWL Contest rules

1400-1400gmt, 5-6 March 1983

The following general rules, published in the January 1983 edition of *Radio Communication,* will apply: 1, 2, 3, 4e, 5a, 6a, 7a, 8b, 9, 10a, 11a, 12a, 13-26.

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

RSGB Listener Championship 1983 rules

1. RSGB hf receiving contest general rules do not apply.
2. No entries for the championship are required.
3. The championship will be decided on the basis of the listener contests held between 1 February and 31 October 1983.

4. Points will be awarded to the leading eight UK receiving stations in the results published in *Radio Communication* as follows:

	Position							
Contest	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
7MHz Phone	70	55	50	45	35	25	15	5
7MHz CW	70	55	50	45	35	25	15	5
1·8MHz Town & County	50	35	30	25	20	15	10	5
Region Round-Up	50	35	30	25	20	15	10	5
21/28MHz Phone	80	65	55	45	35	25	15	5
21MHz CW	80	65	55	45	35	25	15	5

5. A table will be published in *Radio Communication* showing the points gained by each receiving station, and certificates will be awarded to the winner and the runner-up.

Dartford Heath DF Qualifying Event results

Sixteen teams started from Shipbourne Common. Weak signals, under QRM, from both hidden transmitters were identified by some competitors.

Station "A" was located near the intersection of two footpaths in a wood just south east of Bewl Bridge Reservoir, 25km from the start. Station "B" was located beneath grid power lines to the south of Holtye Common, 20km south west of the start.

Half of the competitors headed for the "A" station, which was well hidden in thick undergrowth. Tony Judd from Mid-Thames was first in at 1451.

The "B" station, although not so well hidden, had the advantage of radiating power lines and as a result several competitors acquired some quite unusual bearings. Trevor Gage was first in at 1437.

Overall winner of the field was Brian Bristow, who found his second transmitter at 1547. An excellent tea was held in Hever Village Hall where results were speedily computed and all involved were treated to a film show of last year's Dartford Heath event (as if they needed reminding!).

Thanks go to all competitors and helpers for making it a successful event, and also apologies are due for the marginal signals received at the start.

			Time of arrival	
Posn	**Name**	**Club**	**Station "A"**	**Station "B"**
1	B. Bristow	Mid-Thames	1452	1547
2	P. Lisle	Mid-Thames	1454	1552
3	A. Simmons	Mid-Thames	1500	1555
4	W. Pechey	Mid-Thames	1615	1505
5	I. Butson	Colchester	1618	1455
6	R. Parsons	Burton-on-Trent	1622	1511
7	M. Hawkins	Chelmsford	1627	1529
8	T. Gage	Mid-Thames	1629	1437
9	G. Taylor	Aerial	1446	–
10	A. Judd	Oxford	1451	–
11	R. Shepherd	Mid-Thames	1452·5	–
12	A. Butcher	Chelmsford	–	1511·5
13	S. Carey	Dartford Heath	–	1513
14	R. Brocks	Chelmsford	–	1528
15	D. Newman	Rugby	–	1528·5
16	C. Oliver	Dartford Heath	–	1546

W. Pechey and A. Simmons qualify for the National Final.

Mid-Thames DF Qualifying Event results

The event was organized by the Mid-Thames Radio Direction Finding Club on the west London Ordnance Survey Map, sheet No 176. The start was located at Chorleywood Common car park.

Hidden station "A" was located at the side of the tow path between Uxbridge and Harefield, the overhead power wires causing considerable problems for competitors.

Hidden station "B" was located between Barnet and Borehamwood in a narrow strip of wood at the side of Dyrhams Park Golf Club. The aerial polar diagram successfully persuaded a number of teams to cross a nearby stream several times before finding the transmitter, much to the amazement of a large number of people on a sponsored walk.

			Time of arrival	
Posn	**Name**	**Club**	**Station "A"**	**Station "B"**
1	B. Bristow	Mid-Thames	1510	1427
2	R. Vickers	Slade	1520	1430
3	P. Lisle	Mid-Thames	1524	1430
4	A. Simmons	Mid-Thames	1527	1440
5	M. Hawkins	Chelmsford	1434	1540
6	E. Mollart	Mid-Thames	1432	1546
7	G. Whenham	Coventry	1446	1547
8	D. Newman	Rugby	1434	1547·5
9	B. Poole	Mid-Thames	1434·5	1547·75
10	R. Shepherd	Mid-Thames	1554	1428
11	I. Butson	Chelmsford	1448	1558
12	T. Gage	Mid-Thames	1423	1600
13	R. Brocks	Chelmsford	1442	1607
14	C. Merry	Dartford Heath	1436	1615
15	R. Parsons	Burton-on-Trent	1528	1621
16	W. Pechey	Mid-Thames	1630	1537
17	S. Carey	Dartford Heath	1526	–
18	C. Plummer	Mid-Thames	–	–

Qualifiers for the National Final are R. Vickers and P. Lisle.

G. Marconi QRP-SSB Contest rules

Aim. To contact any station in contest or not, in any part of the world.
Date. 5-6 February 1983.
Time. Starts at 1500gmt Saturday, ends at 1500gmt Sunday.
Type of competition. Single-operator, single-band and multi-band.
List. General and for bands.
Prizes. First three places in general list, technical prizes; awards to first of every band.
Power. Maximum power is 10W p.e.p. output.
Bands. 28, 21, 14, 7 and 3·5MHz, near QRP calling frequencies.
Reports. RS report as for normal QSO.
Points. Same country, one point; same continent, two points; out of continent, five points.
Multipliers. Any country of DXCC list counts one point the first time that it is contacted on one of the five hf bands.
Antenna multiplier. Contacts made using a "non-directive" antenna count double points. "Non-directive" is considered to mean any wired antenna, or any vertical if it is not rotative and if it has only

one active element, and no passive elements. Any directive array (Yagi, quad, log-periodic, etc) is considered as directive.
Final score. Sum of QSO points times the sum of multipliers.
Grand total score. Final score times the "power bonus".
Power bonus. Depends on power used: Power output between 10W and 4W p.e.p.—power bonus 1; Power output between 3·9W and 1W p.e.p.—power bonus 2; Power output between 0·9W and 0W p.e.p.—power bonus 3. (Example: 50 QSO points times 30 multipliers equals 1,500 points of final score; if using 1·5W p.e.p. output, power bonus is two; grand total score is 1,500 × 2 = 3,000).
Logs. Must contain, in order: date; time gmt; call of station contacted; RS report given and received; multipliers; points; band. Enclose also a summary sheet, explaining score calculation, and a description of rig used, and of antenna used, and the power calculation mode. All must be signed. Statements of the contest committee are final.

Logs must be sent to manager, I0OAY, Massimo Capozza, Via Sierra Nevada, 99, 00144 Rome, Italy, not later than 30 days from date of the contest.

White Rose RS Third SWL Lower Frequency Bands Contest rules

1200gmt 29 January—1200gmt 30 January 1983
The rules for this contest are the same as those published in the October 1981 issue of *Radio Communication*. Copies of these rules can be obtained from Mr D. McGregor, G4IDJ, c/o White Rose RS, 8 Manor Court, Shadwell, Leeds LS17 8JE.

Entries should be sent to White Rose RS, PO Box 73, Leeds LS1 5AR,to arrive not later than 24 March 1983. Contestants wishing to receive a copy of the results should enclose an sae or two ircs if outside the UK.

BARTG Spring VHF/UHF RTTY Contest 1983 rules

Duration. 1800gmt Saturday 9 April 1983 to 1200gmt Sunday 10 April 1983. A 4h rest period must be taken and declared during this period.
Bands. 144MHz, 432MHz and 1,296MHz bands. Contacts via a repeater or satellite will not be valid.
Operators. Licensed amateur radio stations within zones 14 and 15 who are permitted to use rtty as a mode of communication. Portable operation is allowed but must be from one location or within 1km for the whole of the contest. Contest logs from swls will also be very welcome.
Contacts. Stations may not be contacted more than once on any one band during the period of the contest.
Messages. Messages shall consist of the following:
(a) Time of start of contact in gmt, to consist of a full four-figure group. This information must be passed in both directions and logged. Expressions like "same" or "same as yours" are not permitted.
(b) RST report, normal three-figure group.
(c) Message number. This will consist of a three-figure number starting from 001 for the first contact made on the band in use and running consecutively from this number.
(d) QRA locator (normal five-symbol locator) is preferred, or QTH given either as a town or as a bearing and distance in km from a town (max 25km). The town must be identifiable on a 1:500,000 tourist or route-planning map.
Logs. Logs for each band shall be entered on separate A4 size log sheets, preferably BARTG type, and be accompanied by a cover sheet similar to the RSGB form 427, giving address for correspondence, site and equipment details, comments, and signature of responsible person etc.

The log shall contain: date; time of start of contact; RST report sent; message number; time received; callsign of station worked; his RST and message number (these may be combined, eg 599001); QRA and/or QTH received; estimated distance; and points claimed. It will be helpful to include your own QRA at the top of every log sheet. Copies of forms and log sheets are available from either G8APB or G8CDW.
Scoring. All *two-way rtty* contacts will score in accordance with the distance chart given for 144 and 432MHz. One point per kilometre will be used for 1,296MHz. Proof of contact may be required in certain cases where the station worked does not appear in any other contest log received.
Distance chart. This is as follows:

0- 50km scores 1 point	250-300km score 11 points
50-100km score 3 points	300-350km score 13 points
100-150km score 5 points	350-400km score 15 points
150-200km score 7 points	400-450km score 17 points
200-250km score 9 points	450-500km score 19 points

and pro rata on 50km radial increments.

Awards. Certificates will be awarded to the top scorers and runners-up in each section for each band. Each band is regarded as a separate contest so single-band entries will count.
(1) Single-operator stations UK and Europe
(2) Multiple-operator stations UK and Europe } See note
(3) Short wave listeners UK and Europe
The judges decision will be final and no correspondence can be entered into in respect of entries or logs received after the closing date for entries. All logs must be postmarked no later than **7 May 1983** to qualify.

Send your logs to BARTG VHF/UHF Contest Manager, Chris Plummer, G8APB, 27A Thorn Lane, Four Marks, nr Alton, Hampshire GU34 5XB, England.
Additional note. Single-operator stations may be fixed or portable but must be set up and operated by one operator only, otherwise entry must be made under the multiple-operator section.

BARTG Autumn 144MHz RTTY Contest 1982 results

Well over 170 stations were active at sometime or other during the contest, over 110 of these located in the UK. Certificates of merit go to the winners and runners-up in each section, and the Ealing Challenge Cups to the winners of the single and multi-operator sections.

G8CDW

SINGLE-OPERATOR SECTION

Posn	Callsign	Allowed QSOs	Points	Best dx	Km	Antenna	Power out	QTH asl (Metres)
1	G3NNG	62	544	DC9YC	618	16-el Tonna	100	122
2	G4NQC	63	423	DB5JI	457	9 × 14 Yagi	80	36
3	ON7CB	30	345	GW3ASW/P	541	4 × 16 Yagi	90	—
4	G3NYK	42	320	DL6RJ	434	12-el Yagi	50	30
5	G3EMU	31	301	DG9YBR	458	9-el Yagi	50	23
6	PA3ACA	24	244	G4FUT	490	4-el Yagi	100	—
7	G8ABI	43	229	PE1IML	365	9-el Yagi	80	92
8	G4OAK	36	218	G4EEV	372	HB9CV	60	35
9	G8RBY	32	176	G8GHU	265	2 × 16 Tonna	30	84
10	G8TRA	30	175	PE1IML	394	4-el Quad	10	100
11	G8LWY	35	151	PE1IML	373	8-el Yagi	100	3
12	G6CJI	12	143	DC8AM	777	—	—	—
13	G3EHM	21	123	G8GHU	265	10-el Yagi	200	259
14	G4GOU	20	109	ON7CB	352	10-el Yagi	80	137
15	G4CDA	14	104	G4OAK	305	16-el Tonna	28	26
16	G6ANT	24	100	ON7CB	335	C.C.Boomer	8	16
	ON7EU	10	100	G2NNG	422	9-el Yagi	15	—
18	G8CDW	18	82	ON7CB	317	6-el Yagi	15	33
19	G8XLH	15	73	PE1IML	323	—	70	120
	G8VJU	15	73	ON7CB	278	9-el Yagi	8	110
21	G6KMM	17	71	G8MGY	223	9-el Tonna	8	153
22	GI8HXY	8	68	G2BRS/P	546	16-el Tonna	50	15
23	G3TTC	7	21	GW3ASW/P	210	5-el Yagi	40	9

MULTIPLE-OPERATOR SECTION

Posn	Callsign	Allowed QSOs	Points	Best dx	Km	Antenna	Power out	QTH asl (Metres)
1	G4IVV/A	78	862	DH2HAU	586	4 × 9 Tonna	100	35
2	G2BRS/P	61	555	PA3CEJ	588	2 × 14 Yagi	120	274
3	G8CUL/P	61	479	DL6RJ	630	17-el Tonna	150	229
4	G8GCP/P	51	465	PE1ILT	548	2 × 16 Tonna	100	214
5	G6CZV	46	300	DC8AM	705	16-el Yagi	60	92
6	G8WYR	27	272	DC8AM	775	11-el CushC	100	183
7	GW3AS-W/P	33	264	ON7CB	542	2 × 8-el Yagi	85	355
8	G8GHU	32	240	PE1IML	549	8-el XY	100	60
9	G8RAF	30	198	G4IVV/A	327	10-el XY	150	0

LISTENER SECTION

Posn	Station	Allowed QSOs	Points	Best dx	Km	Antenna
1	NL4483	40	324	G8WYR	442	5-el Fracaro

The contest manager gratefully acknowledges the receipt of check logs from G3NRW and G8WLO

Contests calendar

2/8 January	3·5MHz Cumulative *(Rules in December issue)*
3/19 January	1·8MHz Cumulative *(Rules in December issue)*
8 January	Annual 40m World SSB Championship *(Rules in December* MOTA*)*
9 January	ISWL 14MHz SSB *(Rules in December* MOTA*)*
9 January	AFS *(Rules in December issue)*
9 January	Annual 80m World SSB Championship *(Rules in December* MOTA*)*
11/27 January	28MHz Cumulative *(Rules in December issue)*
15 January	World Communication Year *(Rules in January* MOTA*)*
16 January	70MHz CW *(Rules in December issue)*
28-30 January	CQ WW DX (CW) *(Rules in January* MOTA*)*
29-30 January	White Rose 3rd SWL LF *(Rules in January issue)*
29-30 January	REF UBA (CW) *(Rules in January* MOTA*)*
January/April	70MHz Cumulative *(Rules in January issue)*
5-6 February	G. Marconi QRP/SSB *(Rules in January issue)*
5-6 February	7MHz (Phone) *(Rules in September issue)*
6 February	432MHz Fixed *(Rules in January issue)*
12-13 February	First 1·8MHz *(Rules in January issue)*
25-27 February	CQ WW DX (Phone) *(Rules in January* MOTA*)*
26-27 February	REF UBA (Phone) *(Rules in January* MOTA*)*
26-27 February	7MHz (CW) *(Rules in September issue)*
5-6 March	144MHz/432MHz/SWL *(Rules in January issue)*
12-13 March	Commonwealth *(Rules in November issue)*
April-September	10GHz & Microwave Cumulatives
2 April	1,296MHz Trophy
3 April	432MHz Trophy
3 April	ROPOCO 1
9-10 April	BARTG Spring RTTY *(Rules in January issue)*
17 April	144MHz CW
17 April	Low Power
7-8 May	432/1,296/2,304MHz
8 May	144MHz Low Power
15 May	Region Round-up
21-22 May	144MHz
4-5 June	NFD
12 June	70MHz/SWL
25-26 June	Summer 1·8MHz
2-3 July	VHF NFD
17 July	3·5MHz FD
31 July	432MHz Low Power
14 August	70MHz Trophy & SWL
28 August	ROPOCO 2
3-4 September	144MHz Trophy & SWL (IARU)
3-4 September	SSB Field Day
October/ November	432MHz Cumulative
1-2 October	432-24GHz & SWL (IARU)
9 October	21-28MHz Phone
16 October	21MHz CW
16 October	1,296MHz Cumulative
5-6 November	144MHz CW
12-13 November	Second 1·8MHz
4 December	144MHz Fixed

Looking ahead

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

15 January—RSGB Presidential Installation, Bloomsbury Crest Hotel, London WC1N.
5-6 March—RSGB National Amateur Radio Exhibition, National Exhibition Centre, Birmingham.
26 March—RSGB National VHF Convention, Sandown Park Racecourse, Esher, Surrey.

Special event station

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

GB4SWN, 13-15 January
The station will be operated by Swansea ARS from the Swansea Bay Micro Show, at the Swansea Leisure Centre. Operation will be on rtty and ssb on hf, and fm on vhf. Details from Roger Williams, GW4HSH.

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 £1 for 40 words or less: advertisements containing more than 40 words will cost an additional £1 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.

Closing dates in 1983 for issues in brackets are: **20 January** (March); **24 February** (April); **22 March** (May); **20 April** (June); **18 May** (July); **16 June** (August); **14 July** (September); **24 August** (October); **22 September** (November); **20 October** (December); **17 November** (January); **15 December** (February).

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

FOR SALE

Trio TS700 2m multimode, PA3 preamp, manual, vgc, £190. SEM Z-Match, 160-10, fitted Ezitune bridge unit, new, £60. SX110 Hallicrafter valve rx, five bands, spkr, vgc, £35. Astro 200 digital tuned broadband 80-10 tx/rx, ac pu, manual, vgc, £300. PKW trap dipole, 80-10, exc cond, £24. Mic mobile, plug, £4. 7/8 ant, mobile whip, gutter mount, cable, new, £12. G6PO, QTHR. Tel 253 885893.

MMT432/28S, 70cm transverter, satellite shift down to 28MHz, as new, superb cond, £100. G8YBT. Tel 0202 748360, evenings.

Yaesu 780R, 1·6MHz shift, 1yr old, good cond, orig packing, handbook, £350 ono. Derek Brown, G8ECI. Tel Fulstow (Lincolnshire) 203.

FT208R 2m handie, mint, only three months old, spkr mic, PA3 MMB10, 21 months warranty left, surplus to requirements, £165. Tel Yves, 01-200 1839.

TS520, vgc, mains or 13·8V dc, no mods, £275. G3KPC, QTHR. Tel Daventry 2623.

Eddystone EC10 Mk1, psu, vgc, £55 ono. GW4CNL NOT QTHR. Tel 0443 202189.

Yaesu 225RD 2m multimode, 10 fixed channel xtals fitted, Mutek front end, rig unmarked, vgc, comp with orig front end, mic, box, £525. Tel 0780 52504.

Clearance items of second world war radio equipment. SAE for list. *Wanted:* roller inductor 28μH approx with panel counter. Can assist with carriage. G4IAD, QTHR. Tel 0204 20107 or 0942 873611.

Scanning aircraft band 6ch rx, model R528 Signal Communication Corporation, brand new, unused, boxed, fitted with six popular xtals, cost £89.75, sell £55 ono, or swap w.h.y? G4OAK. Tel Storrington (09066) 5151.

FT290R, nicads, charger, immac, £200. 5/8 whip magmount, 7/8 whip, £15. Atlas 210X solidstate hf rig, 80-10m, ideal mobile or base, £200. KW lpf, £10. G3PVX, QTHR. Tel 01-866 6432, after 7pm.

Trio JR599 rx, a.m., fm, ssb, 2-160m, solidstate, mains, S-meter, £170 ono. G4JFE. Tel Newbury (0635) 41613.

FT901 tx/rx, all spares, a.m. cw filters, £550. YO901 monitorscope, Panadaptor, £195. IC730, IC PS20 20V power supply, £495. All above in mint cond, no mods history. G3KDH, QTHR. Tel Tring 3505.

FT101ZD Mk3, comp with fm board, mic, fan, £550. Weltz AC38, £40. SP15, £18. Shure 526T, £28. Complete hf station, £600. Tel 0780 52504.

Amtech 300 hf atu, suitable for long wire or PL239, one year old, £28 ono. G4LGY. Tel Basildon 20801, evenings and weekends.

QTH: four-bed modern s det, 2 receptions, fitted bedrooms, kitchen, sep wc, integral garage, utility, brick workshop, store, greenhouse, rural open farmland, 400ft asl, large gardens, superb radio site, panoramic views, M66, M62 1 mile, £36,000. G3FUF, QTHR. Tel 061-643 6000.

Test generator, ex-Air Ministry 1941 type No3, 10S B/5, teak cased, approx 58/78MHz, needs 2/150V, £8. Class D wavemeter, £6. Homebrew 6·3/12·6V power supply, £4.50. Various lengths ex-Air Ministry 50Ω coaxial, approx 0·5in dia, 35p/yd. Collect or carriage extra. G3EJD, QTHR. Tel Boldon (0783) 367217.

Icom IC2E 2m portable, as new, boxed, £90. Channel Master rotator, alignment bearing, £25. Jaybeam Q6/2M 6-el quad, £15. X6/2m/X12/70cm dual band colinear, £10. 2m 7/8 mobile whip, bracket, £8. 2m handheld colinear, £10. G6CIG, QTHR. Tel 0234 41013.

Trio TS599S tx/tr separates, used little. Regret cannot devote time to their sophistication. Fitted 2m converter, unmarked, as new, £480 or £250 each separate. *Wanted:* micro-computer with word processing or printer. G4HRT, QTHR. Tel 0532 665568.

Yaesu FTV250, as new, £90. Taylor valve tester model 45C, £15 ono. tfmrs, secondary 0/8/10/12/16V at 27A, £15. Secondary 13·6V at 12A, £7.50. Both primaries 240V ac. Buyer collects. G3UXH, 99 Bells Lane, Hoo, Rochester, Kent. Tel 0634 250562.

Collins KWM2 tx/rx. New Kenwood TS930S. Tel Derby 557705.

Icom IC251E multimode base tx/rx, £425. Datong morse tutor, £38. *Wanted:* mobile mount bracket for IC245E. G8VHG, QTHR. Tel 0482 855436.

VHF station: MMT28/144, rotator, 8-el Jaybeam Yagi, 22ft scaffold pole, £110. G4KSG, 4 Leam Crescent, Solihull, West Midlands.

Drake 2C rx, £110. Trio 9R59D rx, £30. MFJ cw filter, CWF2, £5. Liner2, matching psu, rx preamp fitted, £50. All in good cond. G4JPQ, QTHR. Tel Stowmarket 613870.

AR88D gen cov rx, 550kHz-32MHz, good wkg order, bfo modified for ssb, orig handbook, many reprints of modifications from *Short Wave Magazine*, full set of spare valves incl, £50. G8PQG, QTHR. Tel Dave, Oxford (0865) 67165, evenings.

TS130S Trio Kenwood hf bands tx/rx, mic, orig packing, service manual, only four months old, £475. G4HHA, QTHR. Tel Ipswich 79935.

TR2300, nicads, etc, as new, £120. Icom IC30A 70cm 10W mobile, £130. Icom IC225 2m 10W mobile, 80ch synthesized, £120. Trio hf 160-10m separates, JR599 rx, £150; TX599 tx, £150; or £290 pair. G8AYN NOT QTHR. Tel Lutterworth (04555) 57790.

TR7800, used little, exc cond, £190 ono. GW3NSP, QTHR. Tel 0222 753622.

MMS2 advanced morse talker, random morse generator, synthesized talkback from random sets or your own keyed in morse. Awaiting G4 so it worked for me! £125. IC2E handheld, soft case, external spkr, mic, charger, £149. Tel 01-540 1141, daytime.

Tangerine rtty program, 2k mc in eprom, comp with instructions, £15. Morse code generation program, £6.50. SSTV grey scale generator program, £4.50. G8WPU, QTHR. Tel 0604 715628.

Racal R17 rx, MA197B pre-selection unit, RA98 sideband adaptor, relevant manuals, £250. G6FQA, QTHR. Tel 0623 29289, after 6pm.

HF5 five-band vertical, matching radial kit, ideal for small QTH, £45. G4AOJ, QTHR.

FT707, mint, no mods, £380. FT290R, mint, no mods, £180. Realistic 10ch rx, new, £50. *Wanted:* Bird Thruline elements, any frequency, any range, Pye MM1 mod meter, Pye SG2V or SG3V sig gen or Dymar equivalent, cash waiting. Tel 0332 760809, after 7pm.

KW2000E, KW107, psu/ls and lpf, comp vgc, manual, £300. UK101 computer, 8k ram, 1/2MHz, 300/600 baud, inverse video, £125. Free psg, not wkg. Jackson C804 100pF variable capacitors, screwdriver adjustment, used, £2 each. G6CSY, QTHR. Tel Graeme, Orpington (0689) 29230.

FT75, ac/dc psus, ext vfo, vxo, speech processor, £90. 10M22D 10·7MHz ssb filter, £10. Two ITT 0440A 10·7MHz fm filters, £5 each. G4NIZ, QTHR. Tel Cambridge (0223) 892672.

Trio TR7100 2m fm tx/rx, 10W, S20-23, R0-7, toneburst, preamp, £70 ono. Pye Cambridge AM10B, a.m./fm, 6ch, S20-22, R1, 0, 145·8, spares, £40 ono. Pye Westminster W30AM, low band, less control gear, £20 ono. Could deliver certain areas. Michael Gathergood, Residence, Leith Nautical College, Edinburgh EH15 2PP.

HW7 QRP cw tx/rx, mods by Heath, HWA7-1 power supply, brand new, both for £70. Western DX5V five-band vertical, £50. All manuals collect or pay carriage. G4GLC. Tel 0509 212583.

FDK750E, exc cond, shack use, comp, £230. 8-el 2m Yagi with x/y bracket, £10. Lamboa ex-computer 12V 10A psu, plus or minus ground, remote or local voltage sensing, adjustable from 8-16V, £40. All ono. G6ALB, QTHR. Tel Orpington 21030.

KW Viceroy tx, KW psu, circuits, etc, good clean wkg order, Heathkit GD125 QM, fb, handbook, Sentinel 2m converter, 2-4m i.f., offers? *Wanted:* AR88D, clean cond, faulty not objected to. R. A. Hounslow, 25b Camborne Close, Northampton. Tel 64583, anytime.

144/100S MM linear, less than one hour's use, £45. 15A psu, front panel ammeter, voltmeter, adjustable volts control, has to be seen, £15. G4NGX. Tel Chris, 01-898 5417, evenings.

Elliott chart pen recorder, 12in/h, takes 3·75in roll paper, 2mA movement, precision instrument, £45 ono. *Wanted:* Eimac or similar SK620 uhf valve bases, G4IYA, QTHR. Tel Shorne 3172.

Cambridge mobiles: AM10D, 170MHz, £30 each. Complete base station, 6-40 pa, £50. Remote controller, £10. Monitor rx in case, £25. Eddystone 840A rx, manual, £25. Creed 5A rtty, steel table, £25. G8FNJ, QTHR. Tel 0449 613378.

TS520, fitted with YG 3395C cw filter, perfect cond, £310 ono. Pair 6146B valves (GE), unused, boxed, delivered, £11. G3ION, QTHR. Tel 0703 769706.

Azden PCS3000 2m fm tx/rx, 5/25W in 12·5/25kHz steps, fully synthesized, eight memories, memory scan, band scan, repeater shift, reverse repeater etc, exc cond, in orig packing, recently checked by Emporium before being offered for sale, £149. Tel Maldon 57227.

Collins S-line, round emblem, 75S3B, 32S3, 516F2, power supply, 312B4 control unit, mint cond, manuals, cables, no mods, etc, owners spare, wants using, genuine reason for selling. Akai 1722L stereo tape recorder, mint, as brand new, £80. G3DAM, QTHR.

Twin 4CX250B 2m high power linear, works well, has been used on various contests, £175. G8VQJ NOT QTHR. Tel Bury St Edmunds (0284) 5004.

KW2000B, 6146Bs, fan, Shure 444 mic, Datong speech processor, swr meter, spares, good cond, carriage extra. G3KGM, QTHR. Tel 01-300 0767.

Yaesu FRG7000RX, exc cond, £180. Transport to be discussed. Tel Johnny, Wylam 2501 (Tyne Valley).

FT101E, comp with external ls, £340. KW108 monitorscope, £45. KW107, £60. HQ1 minibeam, requires attention, £25. G3SHL NOT QTHR. Tel 0536 770939.

ZX81 realtime morse sending program, variable speed, 8-200wpm, converts your ZX81 into keyboard sender, programs incorporate word processor routines to send cq, callsigns, QTH, name, etc, 1k, £2.50. 16k, £4.50. Fully tested on air. G3YPL, QTHR. Tel 093586 3265.

Racal RA17L communications rx, handbook, £150 ono. BC221 frequency meter, comp with tables, homebrew atu, variable l, differential c, offers. D.E. Taylor, 25 Leasowes Road, Kings Heath, Birmingham B14 7AU. Tel 021-449 2922.

TR2200G, helical antenna, carrying case, nicads, charger, mobile mounting brackets, xtalled for S16, S20-22, R3-7, together with VB2200 10W linear and λ/8 mag mount, exc cond, £97. G3ZNI, QTHR. Tel Oxshott (037 284) 3321.

Yaesu FT200/FP200, desk mic, recent overhaul, all new valves except pas, very suitable as first time tx/rx, can be seen operating, £205. G4OPG NOT QTHR. Tel Stan, Bedford (0234) 771549.

TR2400, ST1 base stand, quick charger, BC5 12V quick charger, spkr/mic, carrying case, belt clip, nicads, used little, exc cond, £180. G3ZNI, QTHR. Tel Oxshott (037 284) 3321.

KW2000B, Yaesu mic, vgc, £195. FRG7, exc cond, £125. IC202S, vgc. £130. Mk123 tx/rx, cw tx, mains/12V psu, 2-20MHz, handbook, £50. Mk123 amateur

band xtals, 80, 40/20, £8 each. Could arrange delivery Manchester, London, Yorkshire, local. G4GMZ, QTHR Cheshire. Tel 02602 2649.

FT101E, good cond, in daily use, £270. ATV converter, MMC435/600, £12. ATV antenna, JB, MBM, 48/70cm, £15, JB D8/70cm, £10. JB 5Y2M, £6. Hokushin GP144W 2m colinear, £10. ST5 send and receive rtty tu, £45. G4FLY, QTHR. Tel 0734 594495.

VHF sale: FT290R, nicads, charger, carry case, £170. MML 144/30LS linear, £45. MMT 144/28 transverter, £55. MMC 432/28S converter, £16. AR22 2m monitor, £40. TET SQ22 stacked Swiss quad, £32. TET SQY08S 6-el beam, £25. G4FLY, QTHR. Tel 0734 594495.

RTTY to tv converter, Microwave Modules 2000, all leads, instructions, new, £110. FRT7700 ant tuner, as new, £25. Tel Ian, Solihull (021) 705 5700, evenings or weekends.

Swan 100MX, PSU5A, recent overhaul, very clean cond, all solidstate, 100W output, 80-10m, first reasonable offer secures. LAR mobile omni-match, £10. Tech TE20D sig gen, 120kHz-500MHz, rf att, a.m. or cw, £30. GW4JPC, QTHR. Tel Gorseinon (0792) 896815.

Trio TS700 2m multimode, xtals R3, S20-23, 3N204 preamp, mic etc, orig packing, good wkg cond, £230 ono. 60W hb solidstate linear, 28V, 6-el quad, all worked ms QSOs, all for £250. G8MJG. Tel Steve, Leeds 465208, daytime.

2m station: FT480R, 5/7A psu, MM144/100S linear, 9-el Tonna, £450. Will consider splitting. FRDX500 rx, vgc, homebrew digital display included, £100. Reluctant sale but going hf! Brian Peart, G8RAH, QTHR. Tel Oxford (0865) 66466.

Trio TS510, PS10, built-in xtal filter, external vfo, 75Ω swr meter, lpf dummy load, comp station in good wkg order, one owner since new, no mods, orig packing, £200 ono. GM3LVG, QTHR. Tel Cumbernauld 20850.

SEM Europa B transverter, 6-el 2m quad, £50 ono, or exchange for Datong FL1 filter or similar. G4ORS (G8IPL, QTHR). Tel Crudwell (Wilts) 212.

Must sell to fund new project: MMT144/28, £75. MMC144/28 lo, £15. Motorola CD100 9ch high-band bootmount, loom and control head, sensible offers please. Coaxial like LDF4-50 but solid copper centre conductor, two lengths only 75ft, £25, 85ft, £28. Carriage extra or buyer collects. G4CCH. Tel Howard, 0652 648497.

DX302 synthesized communications rx, 50kHz-30MHz, digital read-out, a.m. ssb/cw, two bandwidths, 6kHz, 2·5kHz, under 1yr old, mint cond, £250 ono. G4EIK, QTHR. Tel St Austell 882913, evenings.

Trio 9000 multimode tx/rx, 2m, exc cond, no mods, 18 months old, £265. G4MVS, QTHR. Tel Geoff, 01-644 8249.

FT480R, as new, £310 ono. G3SHQ, QTHR. Tel Twyford (Hants) 713003.

Trio TS520S cw filter, £350. External vfo 520, £30. FL2000B linear, fitted with 572Bs, £185. Datong D70 morse tutor, £35. Daiwa RM940 infra red mic system, £20. All items plus carriage. G4FCT, QTHR, Humberside. Tel 04012 2291.

Sommerkamp FR100B rx, 80-10m incl new WARC bands, £85. G4OIG (ex-G8CXK), QTHR. Tel Gerald, 0604 408438.

KW2000A, mic, KW serviced, used daily, £185. 12ATV vertical, £20. Marconi Kestrel rx, 200kHz, 4·5MHz, £25. G-whip multimobile three-band self-selecting, lf bands, chrome base, as new, £45. All carriage at cost. G3OAZ, QTHR. Tel 0256 65126.

Trio TR7010 2m ssb mobile tx/rx, reason for sale: poor site, nearby repeater, offers over £80. Steve, G8AGR, QTHR.

TS120V, £285. MMT432/28S, £85. MMT144/28, £60. All used little, vgc. PSUs etc available if required. G8BZR NOT QTHR. Tel 0635 65261.

SF1, exc cond, RB0, nicad, charger, leather case, circuit, spare SU8 xtals, £40. KP202, S20, S22, R7, receive R5-6, nicads, helical, case charger, plastic case tatty, £45. New ex-commercial 70cm amp/tripler, 2W in, 5W out, £15. G4DYN. Tel Plymouth 266286, ext 15.

Yaesu FT207R 144-146 handheld, 2·5W, base power supply, fast charger, spkr, mic, spare nicads, mobile power adaptor, helical and λ/4 antenna, carrying case, all boxed, a complete portable/base/mobile station, £165. Tel 021-742 8850 (west Midlands).

FL2100B, mint, £300. Star 700 series tx and rx, £125. 2-el hf beam Fritzel, £75. CDE44 rotator, £75. Equipment ex-silent key. Details or offers to G3FIJ, QTHR. Tel Colchester (0206) 70189, evenings.

FT480R, three months old, £295. Two Welz coaxial switches, nearly new, £9 each. UHF Cambridge, xtalled SU18, £25. Welz SP200 meter, nearly new, £45. 5-el Cushcraft beam, £10. *Wanted:* FT208R. G6JNS, QTHR. Tel Peter, Worcester 620041.

FT901DM, £575. FV901DM, £150. FTV901R, 2m/70cm, unused, £315. SP901P, £40. FC901, £95. FV101, £45. SP101, £17. FL2100, £200. YC305, £55. CPU2500RK, £175. FRG7000, £190. MM2000, £100. All mint. BC221, 240V ps, £15. Standard SR-C830/M15 marine handheld, ch5, 6, 9, 16, 25, base charger, £80. 12AVQ, £22. 18AVT/WB, unused, £50. Nikon F, f1:1.4 50mm, £100. Polaris Autozoom f4.5 70-230mm, £50. Canon 110ED with flash, £45. Minox B, £50. G3AAG. Tel 01-499 0264.

Trio S99 Custom Special matched pair tx/rx, 2m converter, exc cond, £315. Heathkit DX100U, sideband adaptor, factory built, manuals, £60. SEM Z-Match atu, Vernier scale, mint, £40. G4HLK, QTHR. Tel Staplecross (East Sussex) 326.

Trio R1000 gen cov rx, 200kHz-30MHz, a.m., ssb, cw, immac cond, £220. Would consider SX200N in part exchange. RS49979. Tel Cardiff 490579.

TR2200G, xtalled 12ch, charger, nicads, preamp, £75 ono. Parts for unbuilt hf linear, chassis, PLS05(3), bases, coil former, capacitors, chokes, knobs, transformer, £35 ono. 35ft ali mast, steel base frame, £35. Buyers collect. G4BPW NOT QTHR. Tel 0283 813395.

Icom IC211E, 144MHz multimode base station tx/rx, similar to IC251E, cw handbook and all usual accessories, £300. G8PQG, QTHR. Tel Oxford (0865) 67165, after 6pm.

Trio PS10 power supply, incl built-in spkr, new, £50. 2m λ/8 mobile antenna, £8. G-whip tribander, 10/15/20, £20. 40m and 80m coils for G-whip, £5 each. Offers considered. All as new. G4OVO. Tel Phil, 01-464 6046.

KW107 Supermatch, 1kW hf atu, dummy-load, swr power meter, £60, no offers. Can deliver within 40 miles of Dartford. Please write to S. Langlois, GJ4ODX, Merchant Navy College, Greenhithe, Kent, DA9 9NY.

FT780R 70cm fm, ssb tx/rx, mint cond, used little, comp with all accessories, £375 ono. G4AQU, QTHR. Tel 021-501 2751, after 6pm.

Shack clearance: CR300/1 and psu, £30. Hallicrafter SX71 incl 50MHz, £30. BC348, £20. Suit young swl, BC348 chassis, dial and gang, £8. Jaybeam 8Y/2m unused, £10. D. Hambleton, G4OPF, 133 Mornington Crescent, Cranford, Hounslow, Middx, after 7pm.

SEM Sentinel 100 2m linear amplifier, fb low-noise preamp, demonstration sked by arrangement, £60. Prefer buyer to inspect and collect. G5BM, QTHR. Tel Newent 820960.

FT790 70cm multimode, nicads, case, flexi, only two months old, £270 ovno. Shimizu hf tx/rx, 80-10m, usb, lsb, cw, fm, exc cond, used little, £275 ono. G6HEP, QTHR. Tel Lincoln (0522) 30867.

Icom IC240 2m tx/rx, £110. Yaesu FT75 160-10m mobile/base station rig, comp with mains and 12V power supplies, £150. G4EKB, QTHR. Tel 0582 600031, evenings.

Cambridge antenna noise bridge, comp with battery, £18. *Antennas for all locations* (Moxon), £5 plus postage. *Radio Communication* back numbers free (collected). G3DHH, QTHR. Tel Chiselborough 365.

Datong morse tutor, mint, battery, £40. Datong vlf converter, mint, battery, £20. Datong frequency agile filter FL1, mint, battery, £63. Valves, matched pair TT21, unused, £10 each. Wilkinson, 182 Lonsdale Drive, Enfield EN2 7JU. Tel 01-366 8106.

WB9LV1 fs sf converter, built by G3MNQ and W0LMD, sstv keyboard via G3WW built G3GGJ, the pair for £100 plus carriage. Reason sale xyl stroke, no time to use. H. Burton, G2JR, QTHR. Tel Coventry (0203) 455021.

FT707, £420 ono. Datong asp rf speech processor, £45. G3POX, QTHR. Tel 0480 811549.

Icom IC251E 2m tx/rx, perfect, hardly used, still boxed, all accessories. Icom ICSM5 desk mic, unused, still boxed, Ringo Ranger comp. No sensible offer refused. Will separate. G6CDB. Tel Bracknell (0344) 25474 weekdays after 7pm, all day weekends.

Trio 2300 mic, case, charger, dc leads, £120. Catronic 2m, 10W amplifier Bauer single paddle keyer. G2DRW, QTHR. Tel Coventry (0203) 597135.

TA32J, good cond, £60. KW lp filter, 75Ω, £7. G3NHM, QTHR.

TS130S tx/rx, boxed as new, hardly used, first offer of £490 cash secures sale. I need cash to buy the Rolls Royce of hf equipment, the TS930S. GW4MPX. Tel Richard Jones, 0633 270110, ext 222, work.

Yaesu FT480R, 2-6-82, exc cond, £325 ono. IC22A, R7, S4, auto-tone preamp, boxed, good cond, £75. Garrard SP25 with plinth, £20. Philips stereo 9W + 9W amp, £20. Stereo system AT60, Dulci amp, pair Foster spkrs, £30. G4OZY, G6BLO, QTHR. Tel 01-579 6518.

Trio TS130V low power 10W hf tx/rx, in perfect cond, only four months old, eight bands, legal maximum power output for WARC bands, £395 plus carriage. G3KLF, QTHR. Tel Fareham 236906, weekends or evenings only, please.

Trio TS180S solidstate hf tx/rx, 180-10m incl new WARC bands, four memories, separate frequency control—better than external vfo for split frequency operation, green digital readout, 180W input with auto shutdown if antenna mismatches, speech compressor, i.f. shift, Woodpecker killing noise blanker, duplicate ssb, 500Hz and 270Hz filters all fitted, comp with operating and service manuals, £530. PS30 ac power unit, £60 if required. GM4KGJ, QTHR. Tel 0224 24774.

MML 144/40, £45. MMC 435/600, £17.50. Heathkit scope IO18U, £35. Electronic beam switch, S3U, £5. Transistor tester IT121, £10. 2·5A slide trans, £5. Transformers 270-0-270V 100mA, £2.50. 450-0-450V 180mA, £5. G2FCA, QTHR. Tel Newport Pagnell 613523.

2m xtal pairs 12/52MHz HC25 for repeater and simplex channels, £3 pair. Storno 600 channel oscillators, £9 pair. Storno 500 2m handheld with case, charger, batteries, handbook, £70. Other Storno 600 spares. Honda EM300 generator, faulty, £35. G8AKA. Tel Reading 701163.

FT202 handheld, nicads, homebrew charger, R5, S32, S20-22, £65. ITT Starphone SU8, needs aligning with spare set for parts, service manual, £35. Mini Sea Voice, marine vhf tx/rx, £100. GI4HFB, QTHR.

FDK Quartz 16 2m fm tx/rx, 15ch fitted, £75 ono. Trio TR3200 70cm fm portable tx/rx, 6ch fitted nicads, £115 ono. Skyleader Super Clubman 2ch radio control, comp, £50. G4NMA NOT QTHR. Tel Alan, Stevenage 3388 ext 485, weekdays.

Iambic keyer, Curtis 8044 chip, manual keying, variable sidetone fitted, battery or mains (stabilized integral power supply), positive or negative keying (switchable), cw brand new bencher paddle, 5-50wpm, £65. G3RB, QTHR. Tel Whitley Bay 530504.

HQ1 mini-quad, new, in perfect cond, £105. Trio JR310 rx, 80-10m, £70. Heathkit SB610 monitor-scope, £50. G2DAF tx, 6146 and 813 valves, transformers, etc, open to reasonable offers. G5DJ, QTHR. Tel Sevenoaks (0732) 455685.

KDK2025E, 2m fm synthesized tx/rx, 10 memories, nicad back-up, full scanning, any rx/tx split, 18 months old, mint, never used mobile, offers over £100 plus carriage or collect. Going multimode. GM4MOA, QTHR. Tel 0542 32093.

12ft stressed parabolic dish as per *VHF-UHF Manual*, all parts incl fine aluminium mesh, tripod and el-az mount, offers? HF5 trap vertical, 10-80m, offers? G4GIJ, QTHR. Tel 01-660 5474.

ZX81, 32k ram, psu, built into professional keyboard case. Software library includes amateur radio programs, games, £80. New QTH means no time to use! Buyer collects or meets me central London. G4ILO. Tel Colchester 72685.

SEM Ezitune, SO239 sockets, will also test resonant frequency of antenna, list £30, accept £20. W.J. Seaman, RS49647. Tel Wymondham (0953) 604739.

Trio TL911 linear, 80-10m, 2kW p.e.p. input, spare valves, good cond, used little, £175 ono Standard C146A 2m handheld, nicads, charger, £40. Homebrew tx/rx, similar KW2000, 160-10m, suit experimenter, £65. G3JRL, QTHR. Tel Preston (Dorset) 832760.

TS180S, dfc memory unit, cw filter, £450. PS30, £50. AT180, £50. All ono. Mint cond, orig packing, all handbooks. Carriage extra. G3UEN, QTHR. Tel 0262 850258.

TR9000 multimode, boxed, £250. MM100S linear, £90. TR2300 with nicads etc, 10W matching pa, £150. G4NXF, QTHR.

Yaesu FL100B tx, 80-10m, Hallicrafter SX111 rx, 80-10m, spare valves, relay, psu, £150. Consider exchange. G4NIF, QTHR. Tel Dean, 563316.

Barlow Wadley XCR30 Mk2, fm, bc band, vgc, £60. Joystick vfa, Joymatch 3 atu, Joymatch artificial earth, £26. G4KUU, QTHR. Tel Guisborough 35278.

FTV250 transverter, or exchange for KW Supermatch or similar atu. Tel 0908 642398.

Icom IC240, overhauled by Thanet, all accessories, £105. Enjoy 10m fm converted cb radio, 10W opt, worked USA, Japan, Russia etc. £35. *Wanted:* rtty software for BBC Mod B or ZX81. G4MID. Tel Ted, Mildenhall (0638) 715178, 9am-5pm.

IC202, 2m ssb/cw, 144·0-144·6, £85. Microwave Modules MMT 432/144 transverter, £85. G6BAP. Tel Tunbridge Wells 28947.

Yaesu FT207R charger, case, YM24 spkr/mic, £150. Philips N1700 vcr, 7 blank tapes, £175. Kenwood, VOX3 unit, £10. Creed 7E teletype, £10. 7TR perforator, £10. 6S6 tape reader, £10. All three, £25. Buyer collects. G8RXA, QTHR. Tel 0425 72002, after 6pm.

Trio TR2300 incl nicads, case, charger, rubber flexible antenna, VB2300, mobile mount, £190. G4CEY, QTHR. Tel Elton 355.

Cambridge AM10B, a.m./fm, S20-22, S32, R0-1, many spares, £40. Trio TR7100, 10W fm, R0-7, S20-23, £65. Mobile mount for FT290, fitted homebrew 15W linear, £35. Homebrew 12V 12A psu, £25. All ono. Delivery London or central Scotland. G4KFK/GM4KFK, QTHR. Tel 0895 834167.

HF base station: KW Vespa tx, psu, Trio JR500S rx, fully rf switched, prefer sell as pair, delivery possible if around Newcastle or Canterbury area or if near A1, £150 pair. G4LMX, QTHR. Tel 0632 869659.

4-el hf quad, 10/15m, 4-el, 20m, 2-el W2AU aluminium spiders, 18ft 2in boom, sky blue tapering fibreglass spreaders, 14swg hd copper wire, gamma-matched, buyer helps to dismantle, superb performance, £250. Various Wilson hf monoband beams, 8-el/10m, 6-el/

15m, 5-el/20m, sensible offers please. Above can be made up to any number of elements of course. G3HCU. Tel Evesham (0386) 870 052.

Barlow Wadley com rx model XCR30 Mk2, instructions and service manual, £65. PM2000 peak reading wattmeter, 3·5 to 30MHz, 20-2000W. Also measures swr, £25. G4EWG NOT QTHR. Tel Burton Bradstock (0308) 897189.

Ex-RAF morse key type D, ref 10F 7373, in absolutely superb cond, xtals 33150·0kHz, 32·22222MHz, 18·00600, 25·00600, 32·00000, holders, two Eddystone dials, lp filter, homebrew, variable condenser ref 3021-9, 75pF, offers. G3XWV, 13 Grimpits Lane, Kings Norton, Birmingham, B38 9EY. Tel Wythall (0564) 822280.

Drake R4C, NB, MS4, extra xtals, three optional filters, T4XC, fan, dx eng speech processor, AC4, C4 station console, 50 cycle clock, £850. MN4C tuner, £100. TR4NB, RV4, AC4, fan, Vomax speech processor, £300. Bob Lusby, G5EBA, QTHR. Tel 981 2705.

FDK Multi Quartz 16, seven channels, toneburst, Mullard 25W pa module, £70 ono. Tel Graham, 03745 3784.

Hallicrafters SX100, £120. Panasonic, 32 bands, DR31, £130. Grundig Satellit with ssb unit, £98. Realistic DX300, £125. Search 9 2m rx, £32. Hallicrafters SX43, matching spkr, £130. Eddystone 960, £135. All exc cond. *Wanted:* R1000. Tel 0904 59035.

Two-man touring kayak with paddles, offers. FT7, 160W linear, psu, antenna, swr meter, £350. Will split. EL38 valves, new, boxed, offers. Two transformers, offers. G3XXA, QTHR. Tel West Haddon 656.

Transformers: Partridge 475-0-475, 355mA, other taps, 6·3 etc, £20 ono; 3kV, approx 4A, £25 ono. 7/8 mobile whip, £10. Sinclair 3000 stereo amp, £15. G4NRG, QTHR. Tel Brentwood 810831.

Pye Cambridge FM10B, fitted R0, R4-5, S20, S22-23, xtals for R3, R7, handbook, £35. KW Vanguard, £15. G4KJI, QTHR. Tel 03756 5057.

Gestetner 360 duplicator, stand, stencils, paper etc, A4 folding machine, lots of Letraset, sale or w.h.y.? VHF/UHF, rtty? Tel Paul, Rayleigh (0268) 774089, after 2pm.

FT200, all 10m, Shure 444 and Yaesu mics, £225. CD45 rotator incl 25m eight-way cable, as new, £70. SWR meter, £5. LAR antenna switch, £8. Navy morse key, £25. 25m UR67, all vgc, with handbooks, GW4LTA. Tel Pontypool 50763.

EC10, batt/mains psus, exc cond, £65 ono. Airmec sig gen type 30-30,000Hz, £30 ono. G3XHC, QTHR. Tel Dartmouth 3621.

No 54, tty, in wkg order, handbooks, 80V psu, ttl or V28 level interface, £50. G3OQD, QTHR.

TS700S 2m multimode digital tx/rx, in first class cond, full accessories included, £390. G4AWU, QTHR. Tel Doncaster 710987, evenings.

Two AR106 sf amplifiers, comp with power pack supply unit, £20. One TRPU3 power unit, one CO10 oscillator unit, frequency 10·406MHz, six modulators for 19in rack mounting, £15. G4DZV, QTHR.

TS130S, in mint cond, PS30 psu, both as new, workshop service manual, £480 plus p&p. No haggling please. ASR33 110 baud printer keyboard (ASCII), stand, £70 ono. Buyer collects or pays petrol. Tel Great Wenham (Suffolk) 311665, after 6pm.

Toneburst modules, professional miniature high-quality type, xtal controlled, 1,750Hz frequency, variable level output, approximate size is only 18 × 30 × 10mm, £6.90 each. M. Ferguson, G8THS, 65 Surrey Street, Norwich.

Sony ICF6800W communications rx, fm, 88-108MHz, a.m., 0·530-30MHz, lsb/usb, filters, mains/batt, manual, exc cond and performance, new cost was £416, for sale at £190. Tel Bulls Green (Herts) 219.

Yaesu FT7 80-10m tx/rx, 10W rf, Yaesu FL110 100W linear, £350 ono. 20A psu, part finished, £35. Both above together, £375. G4IDF, QTHR. Tel Worcester 20135, after 6pm or weekends.

Trio TR3200 70cm portable, 12 channels fitted, cw mic, 5/8 whip, helical, carrying case, dc lead, charger, nicads, manual, good cond, £115. G4MTQ, QTHR. Tel Saltash (07555) 5273.

Realistic DS100L gen cov rx, used little, orig carton, £40 plus £1.50 p&p. *1982 Callsign Book*, £3, or £2 if purchased with DX100L. Tel Tisbury 870690, after 4pm.

Microwave horn WG6 1·12-1·7GHz, in exchange for decent size microwave dish. *Wanted:* FT2FB, I still require front end stage inc helical filter scrap board. G8BIH, QTHR. Tel 0420 82739, evenings.

Colour tv monitors, 19in, as used on Rediffusion type wired systems. These can be converted to take suitable tuner and i.f. strip for off air wkg, £10 each. G4DZV, QTHR. Tel 01-524 3193.

Yaesu FT107M, FC107, FP107E, £675 ono. Trio TS780 multimode, £675 ono. Yaesu FRV7700D converters for FRG7700, £50 ono. Pye W15AM Westminister, low band a.m., 6ch, plus all accessories, as new, £80 ono. G8KBQ, QTHR. Tel 0458 33145.

FT290R, vgc, nicads, £190. *Wanted:* AR88, can anyone help? G8ZTN, QTHR. Tel 04606 3814, evenings.

Pocketfone PF1, suitable 70cm conversion, £7.50 the pair. 8XY 2m antenna, year old, £15. 13·6V 15A homebrew psu, £20. Revco 2m 5/8 whip, £5. *Wanted:* Yaesu FL2100Z linear, can afford up to £300. G4DIC, QTHR. Tel 0455 63615, evenings or weekends.

Icom IC701, mint cond, ac psu, electret mic, £470 ono. *Wanted:* FT200 hf tx/rx or similar. G4AZC NOT QTHR. Tel Thanet (0843) 69642.

Rad Coms: 1971-81 inclusive, less August 1976; *PW* 1975-82 inclusive, less five issues, all fb cond, offers. G3DXK, QTHR. Tel Heathfield (East Sussex) (043 52) 4208.

UKW Technik 1,296cm transverter, 28-30 i.f., made by SOTA, £130. G4AAH, QTHR, Tel 0623 642719.

IC740, mint cond, orig packing, mic, full suppliers' guarantee, £595. G3GIQ, QTHR. Tel 01-567 6389.

Shack clearance: Ampex mono vtr 7003, 12h tape, spares (incl heads), leads etc, manual, £50. Marconi 871A mono vidicon camera, remote focus, control unit, manuals, spare vidicon, £25. Peto Scott studio monitor, 14in mono, spares, manual, £15. Airmec wave analyser 248, 5-300MHz, manual, £15. Two Evershed & Vignoles U16 dual pen recorders, eight-day clockwork 1mA movements, £5 each. Samwell & Hutton wobbulator 41B2, crt display, manual, 2-73MHz, £10. Klempt V800MA field strength meter, 30-960MHz a.m./fm, audio monitor, nicads, £20. Marconi TF144 sig gen, 85kHz-25MHz, spares, manual, £25. Philips GM6014 0-30MHz vtvm, manual, £10. All above in full wkg order. Marconi TF1345 standard freq counter, plug-ins, spares, manuals, comp but big and requires attention, hence £10. Free to purchaser of £50 worth or more, collector's pre-war Cossor scope. Can deliver south London for £20 worth plus, or buyer collects. G4IWI, QTHR. Tel 01-679 2730, evenings and weekends.

Wood & Douglas 2m/70cm synthesizer, built, wkg, comp with data, Ithaca audio S100 memory board, wkg with software, data, Cossor DIDS400 computer terminal, keyboard, 20in b&w video monitor, 15MHz bandwidth, any offers? G8POQ, QTHR. Tel Simon, 0661 843449.

Yaesu FRDX400, amateur bands rx, mint cond, 2m rx, vfo, three xtals, 70cm Microwave Modules converter, junk. I. Bush. Tel Croydon (01) 689 8576, evenings.

Heathkit IM16 fet multimeter, £30. IB1103 180MHz frequency counter, £60. IT28 resistance capacity inductance bridge, £30. IM102 swr bridge, wattmeter, 0-200W, 0-2,000W, £25. All ono. Prefer collection or add £1.50 each p&p. G3MA, QTHR.

Eddystone 750 rx, S-meter, fitted product det, AR88 spkr, 480kHz-32MHz, good cond, wkg well, £80. G3WLX, QTHR. (nr Oxford). Tel 08446 643.

Trio R1000 rx, comp, as new, orig packing, never seen a screwdriver, going G4, £205, cash and carry. Tel Huntingdon (0480) 860593, evenings.

Yaesu FRG7700 rx, FRT7700 atu, both only eight months old, used little, manuals, boxed, etc, mint cond, £210. G8WSS, QTHR. Tel Basildon (0268) 25134, evenings.

Oscilloscope, 10-18U, 4·5MHz bandwidth, 10mV/cm sensitivity, comp with full circuit manuals, offers around £35. G4LUG, QTHR. Tel Batley (0924) 479437.

Dynamco portable oscilloscope, dual beam, dual timebase, 35MHz bandwidth, solidstate, rectangular crt, probes, £235. HP431C power meter, less head, £15. Eight-hole paper tape reader, £5. HP1430A dual channel sampler, dc to 12·4GHz, £500, G8BXH, QTHR. Tel John, 01-428 0974.

TenTec Argonaut, used little, absolutely as new, manual, matching psu, Shure mic, £320. G4MLI, QTHR. Tel 0840 770344, evenings.

FR50B/FL50B, good wkg order, external speech processor, fitted vox, £180. Cash and carry please. G3LGX, QTHR. Tel 0329 42482.

FT101 spkr/phonepatch, £30. Beautiful FT101 quality leather carrying case, £35. FT207R, handbook, spkr/mic, nicads, antenna, mains charger, £140. NC2 battery eliminator/quick charger, £30. RSL145GP 5λ/8 ant, £15. Blaupunkt Frankfurt car radio, exc, £45. Taylor, G3UCT, QTHR. Tel Fleet (02514) 6998.

FRG7, exc cond, hardly used, no mods, Yaesu YH55 headphones, 2m converter, 12V power pack, Ringo Ranger, 100ft dipole antennas, *RSGB Guide to Amateur Radio, Operator's Guide*, £190 ono. Tel 0621 55433, evenings.

70cm multimode, Trio TR9500, mint cond, only used base station, never used mobile, six months old, hardly used, together with 48-el multibeam antenna, £300. No offers please. G6ADL, QTHR. Tel Kettering 710004.

70cm standard C78, transportable, matching 10W linear, mounting cradle, nicads, carrying case, rubber duck, all in good cond, £275 ono. G6IJY, QTHR. Tel Wakefield 260819, any time, or 374568, evenings only.

Shack sale: Yaesu FT101ZDFM, WARC, fan, £520. FT480R, listen input, £295. FT780R+1·6 including reverse, £355. FRG7700, £242. FRT7700, £29. MEMGR7700, £70, or 7700 system, £330. Microwave Modules MMT 144-28, £84. MMT432-28S, £123. All items 16 months old. G4ITF, QTHR. Tel Cosham (0705) 386184.

Microwave Modules MMT144/28 2m transverter for connection to hf rig, good cond, module redundant due to purchase of 2m tx/rx, £70. Durham University Radio Society, c/o G6CQC, QTHR.

Yaesu FT7 tx/rx, 80-10m, hardly used, £250 incl postage. *Wanted:* Anything for sstv, slow to fast scan boards. G4ONN. Tel 0202 518828.

Unmodified marine fm Bantams, £20 each or £35 pair. SP250 freq counter, swr/power meter, 174MHz, £30 ono. *Wanted:* Transmatch or sim, would swop above. G6DLJ, QTHR. Tel Southampton (0703) 891975.

Eddystone 730/4 rx, 0·48-30MHz, vgc, manual, £125. Europa C 2m transverter, manual, ideal for FT200 or similar, £50. G4HHJ, QTHR. Tel Dave, Hereford (0432) 266920.

Trio R1000, exc cond, £195. Tel 01-657 5992.

Heath SB102, psu, new pas, £100 ono. Buyer collects (Reading). G3SWB NOT QTHR. Tel 0734 482559.

Sommerkamp FLDX500 tx, 240W p.e.p., spare pa valves, £100. FRDX500 rx, 160-2m, £110. SP400 spkr, £8. All vgc. *Wanted:* Heathkit OS2 scope, Vibroplex Lightning or Champion bug. G3TSS, QTHR. Tel 0434 71 3125.

Trio 2200G, VB2200 10W amplifier, seven repeater, five simplex xtals, nicads, charger, mobile mount, case, dc cord, rubber duckie, £100. G3UXU, QTHR. Tel Sheringham (Norfolk) 824078.

Tempo 2002 2m linear, 1kW op, £500. FT225RD, Mutek, £380. Kenwood TL120 hf linear, 12V, £75. MM transverter, 2m fm/ssb to 10/11m, 10W op, £70. FL1 af notch/peak filter, £30. All above ono or w.h.y.? *Wanted:* ICF2001 or sim. R. Smith. Tel East Grinstead (0342) 313883.

Liner 2 2m ssb tx/rx, fitted 10m board, 10W output on 2m and 10m, manual, mod sheets, £75 ono or exchange Yaesu FV101B vfo, W.H.Y.? G4AQB, QTHR. Tel Bolton (0204) 389033.

Sota 144 linear, inbuilt psu, £110. Mutek SLNA144S preamp, £25. Dentron atu super tuner, 160-10, 1kW, £70. Heathkit HM2140 p.e.p., RMS swr twin meter, £30. Carriage extra. G3DPR. Tel Kemble (028577) 514.

Belcom LA106 2m linear amp, exc cond, offers over £120. Redifon 2m fm tx/rx, control gear, some 2m xtals, £30. FT290R, case, nicads, etc, £215. *Wanted:* hf linear amp, TA32 triband beam or similar. G8NQP, QTHR.

AR245 2m fm handheld 5/1W, nicads, charger, helical, case, extension spkr/mic, car charger, vgc, £95. Carriage extra. G6HEL, 3 Greenways, Dewlish, Dorchester, Dorset DT2 7LP.

Icom IC701, Icom psu/spkr, SM2 mic, exc cond, £475 plus carriage. G3FPQ, QTHR. Tel 0420 23168.

UK101, cased 32K, cegmon, toolkit, assembler, ex mon, all in eprom, hi-speed cassette interface, pia, prog graphics board, fan, extra psu, can be seen running, upgrade forces sale, £250 ono. G3XIB, QTHR. Tel 021-453 4004.

TR2200 2m tx/rx, nicads, charger, mic, eight channels, four repeaters, 2W output, perfect cond, £80. Stephens, 1 Barton Drive, Paignton, Devon.

Yaesu FT101ZD FM Mk3, fan, 250Hz cw filter, as new, £525 plus carriage. G3FPQ, QTHR. Tel 0420 23168.

KW Atlanta, 4A vfo, really nice cond, recent new pas, driver, re-aligned, hb and circuit, moderate use only, £220. G3RXW, QTHR. Tel Hitchin 812611.

FRG7, mint cond, manual, £130. G6ALF, QTHR. Tel Bognor Regis 862629.

FTV901R (2m installed), £225. IC260E multimode, £230. KLM15-160BL 2m 160W linear, £150. Cushcraft 214B junior boomer, £40. G4KLN. Tel Leeds (0532) 821020, evenings and weekends.

FM sig gen. Marconi TF2006 (solidstate), freq 88-500MHz, £45. KW linear, £195. Hygain 14AVQ vertical, Hygain 80m loading coil, £35 ono. G5WG, QTHR. Tel 01-504 5499.

Complete base station, FTDX401 tx/rx, FV401 external vfo, matching loudspkr, dynamic mic, manual, spare valves, professionally overhauled, in mint cond, £300 ono. Buyer collects. G4KUA, QTHR. Tel 0233 82 285.

Yaesu FRG7000 gen cov rx, features 250kHz, 29·9MHz, a.m./ssb digital frequency readout, digital clock/timer, preselector, fine tuning volume/tone control, exc cond, £188. Harding. Tel Ingrebourne 45374 (Romford area).

Sell FT200 tx/rx, FP200 ac psu/spkr, all 10m xtals fitted, vgc, manual, used little, £215. *Wanted:* spare valves type 2E22 and handbook for tx/rx type RT77/GRC9GY. Stone, G3JFC, QTHR. Tel Crayford 522489.

FT480R, seven months old, perfect, comp with YA285D vertical colinear, YA285B 5/8 gutter mount, 10A commercial power supply, £295. G3KWK, QTHR. Tel Redditch 41502.

Oscilloscopes: Cossor 339A db, £20. Solartron CD568 scope, £20. T1155 rx, unmodified, £15. Buyer collects. G3BJB, QTHR. Tel Malvern 3946.

Telequipment 5-beam oscilloscope, S51 model, £20. 127 magazines, 95 per cent electronics, 1979-82, send sae for list. Telefunken 7in r-to-r four-track valve tape recorder, model Magnetaphon 96, £20. Many other various items, send sae. I am partially housebound and need ham equipment. Will swop w.h.y. Many 5in reels of tape, used once. Slide rule, still boxed. Sleeping bag, useful to 40° below zero. Valve portable radio, wkg, stereo cassette recorder/amplifier, two two-way spkrs, require slight attention, boxed, £40. W.H.Y? Hall, 10 Dulverton Square, Leeds LS11 0LL, Yorks.

Shimizu hf tx/rx, 80-10m, ssb, cw, fm, fitted nb board, used little, £290 ono. FT790 70cm multimode, nicads, case, flexi, one month old, £280. G6HEP. Tel Phil, Lincoln (0522) 30867.

TS380S, cw filter fitted, external VFO240, SP230 spkr, audio filters, all in orig boxes, manuals, absolute mint cond, £700. GI3YDH, QTHR. Tel Belfast 793913.

FT7B, 10-80m ssb/cw/a.m., 50W p.e.p., exc cond, used little, mobile mount, mic, boxed, £325 ono. FT221 multimode 144-148, good cond, £250. Both in perfect wkg order. G8GX, QTHR. Tel 051-625 7598.

FRDX400 rx, 160-10m, exc rx, vgc, 4 and 2m converters fitted along with fm demodulator, cw filter, £145 ono. Griffiths, G4OSX. Tel Wolverhampton (0902) 334177.

Three-four bedroomed detached house in rural area, North Yorkshire, gas ch, new fitted carpets throughout, fourth bedroom doubles as large shack (15 by 15ft), colinear and rotatable 144MHz beams, £32,500. G8FBU NOT QTHR. Tel Richmond 811812.

Shack clearance: Trio 2300, 2m, fm, as new, Liner 2, 2m, 10m ssb; Trio 9R59DS communications rx, Ringo Ranger 2m antenna, 5/8 mobile whip, 24h clock, all equipment good cond, sensible offers please. G6BGW, QTHR. Tel 061-665 1722.

Sony fm a.m. multi-band rx, ICF 6700W, nearest £200. Tel Torquay 605799.

FT107, FP107 psu, YM36 mic, spkr, only £500. Cash flow problems force sale of this excellent tx/rx, only one year old. Roy Davis, G4LDV, Tudor Lodge, 65 Alum Chine Road, Bournemouth. Tel 0202 767139, evenings.

Trio R820 triple conversion, the ultimate rx, with everything, transceives with TS820 etc, used little, as new, boxed, £435, no offers. MMA144V switched 2m preamp, £20. CDU150 scope, double beam, solidstate, £150. Buyers collect. G4LW, QTHR. Tel Trowbridge 3166.

Yaesu FL2500 linear amplifier, 2kW p.e.p., 160-10m, matched FTDX401-400, 560, etc, good cond, £110. Datong rf clipper, £10. G4BCP, QTHR. Tel Les, 0669 20846.

KW77, triple conversion, amateur bands only rx, good ssb reception, handbook, circuit diagrams, £50. TA33Jr, weatherworn but traps in good cond, £50 ono. G3GEH. Tel 01-992 3778.

KW2000E ac psu, as new, one owner, only used on 10m as exciter for transverter, hence no output valves (6146s), Shure mic, handbook, £225 ono. G8KTG, QTHR. Tel Brighton (0273) 551458, evenings.

FR/FLDX400S Yaesu, in vgc, can be seen wkg, buyer collects, £275. Tel Arundel (0903) 883174, after 8pm.

National Panasonic RF4900 communications rx, 145kHz-30MHz, ssb, cw, a.m., l.e.d. frequency read-out, used less than one hour, as new, £295. G4IER, QTHR. Tel 0937 843217, evenings.

Valves: 829A; 829B; 832A; 35TS; 813, all £5 each. Quantity American metal octal valves, 7- and 9-pin glass miniature valves. List available. G3BJB, QTHR. Tel Malvern 3946.

Mazda tv valves, new, unused, boxed, 50p each. PL81, £1. GY501, £1·50. PL500, £3. 60 prewar valves, mainly 4V, British seven-pin. G4AK, QTHR. Tel Dick, Blackmore (Essex) 822910.

TR2300, mint, used little, nicads, charger, whip, helical, reverse repeater, boxed, operator's manual, service manual, £150. MML144/25 linear, low noise preamp, 25W out, 3W input, spec circuit, mint, £45. Tel 01-366 8106.

210X Atlas 10-80m with psu console, good mobile or base station, £275 ono. *Wanted:* FV301 remote vfo for the Yaesu FT301D. G3XMA, QTHR. Tel Coventry 0203 410208.

Video Genie ED3003 computer, 48k ram extension, rom update to include renumber, flashing cursor, repeat on all keys, lower case, fitted sound board. EG3016 parallel printer interface, software incl microsoft assembler/editor plus, lower case software, many manuals, books on programming, amateur radio programs, morse, contest log and operating, dupe checker, as new cond, £265. G3KWK, QTHR. Tel Redditch 41502.

Eddystone 830/7 0·3-30MHz a.m./ssb/cw, £150. Selmer spkr, 40-50W, £40. 150VA transformer, 200-250V primary, 10/12V secondary, £10. Roll of paper for rtty terminal, £1. MMC 70cm-2m converter, £10. Eddystone oscilloscope, case, large, solid, £15. Tel Dave, 021-778 2206, weekday evenings only.

HRO, two sets coils, one poor rx for spares, £50. Cambridge orig fm dash, xtalled for two, a.m. for spares, £50. Eddystone 830/7, £200. USA military R174, like our 209, £20. Brennel stereo recorder, one fb mono, £70. EMI TR52, £60. Grundig 3200, similar Uher, deacs, £40. Panasonic 0·5in vtr, portable, playback on viewfinder, zoom (cost £150 new), charger, £320. *Wanted:* Sony Umatic portable, Suzuki GP100, 2,500 miles, one year old, extras, £350. G8UNZ, QTHR. Tel Colchester 74427, ext 10, day.

WANTED

New G6 urgently requires mobile mounting bracket for Trio 2300 and/or linear for same—or swap or part exchange for Eddystone 750 rx. P. Askham, Wrangbrook Manor, Upton, Pontefract, W Yorks. Tel Bradford 28401 Green 248.

KW108 monitorscope. HF linear amplifier or linear parts. Exchange Mamiya 645 camera for hf gear. GW4JOQ, QTHR. Tel 0558 823301, evenings.

For AR88D: frequency-graduated translucent circular dial; the two rf/i.f. alignment tools. A.R. Bartle, 105 Mayfield Road, Thornton Heath, Surrey. Tel 01-684 0610.

Mains transformer. Gresham 11290/6XH. DX2065-373. 35V 10A output. Sold by GWM late 'seventies. G3IFV, QTHR. Tel 0454 772190, after 6pm, Mondays-Thursdays.

Racal rf signal display unit RA1766. Air band scanning rx R512 with or without xtals. Morris. Tel Bolton 52384.

Trio 120V. G3WBN, QTHR. Tel 01-654 2761.

KW109 Supermatch for (VK6) 'Brother', fair price paid. G4KDZ, QTHR. Tel Tony, Grays (Essex) (0375) 78783.

Desperately required: any info on Collins 618S4 tx/rx. Will buy, borrow or copy. Any old hf tx. G3YFG, QTHR. Tel 0254 823769.

Collins! Collins! Collins! Collins! Do you own Collins equipment? Join the Collins owners' club. Quarterly news sheet and list of fellow Collins owners. Send details of equipment owned and sae to Bob Ralph, G4KSG, 4 Leam Crescent, Solihull, West Midlands.

To buy or borrow: any information, circuit diagrams, handbooks, etc on "NEMS Clarke" 55-260MHz a.m./fm rx, matching panoramic display unit, both units in 19in rack cases, all postage costs paid. G8PQG, QTHR. Tel Dave, Oxford (0865) 67165.

Creed 75RP/TK. (75 with tape reader and reperforator). Will collect. G4MCA, QTHR. Tel Fundenhall 284.

Circuit/handbook for TW communicator, two mobile, purchase or loan. G3XHM, QTHR. Tel Isle of Wight (0983) 66607.

Large variable capacitors, single/double wide spaced for atu. 250/300mF. Roller coaster. G3AOS, 5 Prospect Drive, Hale Barns, Cheshire WA15 8TQ.

For the wireless museum—old radio books, magazines, catalogues, service-sheets, QSL cards, keys, valves, components, Gamages catalogue, any knobs! Voight/Brierley pick-up Tractrix horn, 150 mile xtal set, collection arranged. Details please to hon curator, G3KPO. Tel Ryde 62513.

KW108 monitorscope or SMC equivalent. Must be mint cond. Write, no phone calls please, to G4FFM, D. Bailey, 10 Manor Road, Stutton, Tadcaster, N Yorks LS24 9BR.

70cm converter or tx/rx. G8KPK, QTHR. Tel Cheltenham (0242) 516075, evenings and weekends.

Recent TenTec Argonaut, purchase or exchange for Hallicrafter Safari FPM300 Mk2 with mobile fan, 10-80-200W input. C. B. Wells, G3MND, QTHR. Tel 0246 568435.

National NXC3 tx/rx relay, part No A50799, reasonable price paid for relay in good cond. G2AYQ, QTHR.

Ideas or offers for weekend country location plot, barn house cottage or similar. Must be good for dx, proven tvi free, preferably coastal and rural, within 150min travelling from central London. Sympathetic planners and neighbours essential. G3UKI, QTHR.

Europa transverter for FT200. G3XXQ, QTHR. Tel 0632 746723, evenings, 782965, daytime.

Cossor CDU150 scope, Advance J1 audio sig gen, maintenance handbooks required. Loan to copy or purchase please. GW3HPS, QTHR. Tel 0222 701558.

Travelling wave tubes for receive, possibly Watkins & Johnson WJ268, WJ269, WJ375. X-band waveguide to coaxial adapters, 726A klystrons, other bits and pieces. Please write w.h.y. Crispino Messina, I5XWW, Via Di Porto 10, 50058 Signa Fi, Italy.

Collins S-line. KW51. Sony Videocorder. CV2000/40S. *For sale:* Viceroy 180W p.e.p. 150W cw, £55. Marconi Marine Falcon 150W p.e.p., solidstate, TT100 pa, matching rx, manual, £80. G3OJR, QTHR. Tel 0482 43353.

TR8300 or Multi U11, must be in good cond. Details to G8CPH, QTHR. Tel Ipswich (0473) 831448.

Collector of Spanish Civil War ephemera wishes to purchase QSL cards sent from Spain during period 1936-9. G3LOV, QTHR. Tel 0840 770689, evenings.

Services Textbook of Radio vol 5, *Aerials for Metre and Decimetre Wavelengths,* by Smith. G3MEH NOT QTHR. Tel 01-388 1288 ext 3505, day, or Tring 6651.

Cossorscope type 7/10 trans, 22 terminals on panel. G2LV, QTHR. Tel South Molton 2495.

Workshop manual or information on Lafayette model KT340, buy or borrow. F. W. Allen, 23 Alfred Road, Greatstone, New Romney, Kent. Tel New Romney 4107.

Yaesu FT101 spares and accessories, FV101, YO901, FC901, or similar. Tel 01-954 1309.

TH2 hf beam. G3UAA, QTHR. Tel Leicester (0533) 875241.

RTTY manuals urgently required for telegraph distortion measuring sets. Plessey TDMS 70 AT&E, TSG10, AT&E TDMS Nos 5 and 6B. Have facilities for copying, via registered post. Scott, 38 The Gardens, Whitley Bay, Tyne & Wear. Tel 0632 527141.

HW8 in good cond, prefer unmodified, psu not required. Tel Oxford (0865) 63000/63428.

KW2000 A, B or E, in clean cond. G8TN, QTHR. Tel Grimsby (0472) 822151.

DL6WU 16-el 70cm antenna. Two-way power splitter. 15m LDF4-50 cable. G8BHD, QTHR. Tel Swanley 68091.

AR88D or similar rx. Tel 0539 821566, after 5pm.

TRS80 level 2 rtty cw information. Programs and hardware details needed please. GW4LZA, QTHR. Tel 0248 713262.

National NC300 or NC303 rx. Hallicrafters SX28(A) rx, no mods, must be comp. Handbook for Johnson Viking or Ranger 2 kit-built tx. Handbook for Hallicrafters SX25 Super Defiant rx. Would consider complete rx. G3WEP, QTHR.

Help required urgently: manual for Heathkit Mohican, buy or borrow for photocopy, your price paid. John Brown, GM4EJE, 224 Califer Road, Forres, Moray TV36 0JE. Tel Forres 73541.

PS No 213A morse key. Details and price to Peach. Tel Axminster (0297) 34259, after 6pm.

FT225RD Yaesu 2m multimode tx/rx, must be in good cond, preferably with Mutek front end board. Bird Thruline plug-in elements types 50C, 5C, 25E, 5E. Offering 500E element for sale or swap. G4AWU, QTHR. Tel Doncaster 710987, evenings.

FT301 or FT301S and any matching units. *For sale:* Yaesu FT780R 70cm multimode, £325 ono. Mk123 set, £30. Tel Dursley 811454.

1928, R32 Marconi rx. Genuine collector wishes to purchase or borrow for detailed photography. Peter Peach. Tel Axminster (0297) 34259, after 6pm.

AN/URM25 sig gen. HP 8640B sig gen. G3FPQ, QTHR. Tel 0420 23168.

144MHz valve linear, with psu, 50-80W output. G8VYJ, QTHR.

Por favor, manual or copy for Heathkit 'scope model IO102 or will copy and return. Spec for Heathkit mains transformer type 54-285, as used in above. Mel, GM6JAG, QTHR.

For collection—amateur 1,296 and commercial low-band tx/rx gear using lighthouse tubes (eg 2C40, 446A, EC56) and cavities. W.H.Y? Price negotiable. All letters answered. G8PTH, QTHR. Tel Blean 471.

Wartime sets: AP4, Whaddon Mk15 or Mk7. Similar xtal controlled tx but must have receive capability, any cond, damaged or incomplete. R. Coleman, 31 Kingfisher Road, Upminster, Essex RM14 1ER. Tel Upminster 21523, evenings, not Sundays.

Valves: student requires any pre-1930 interesting or unusual valves, especially Bright emitter or top pip types to comp a private collection. Also interested in any early radio components incl xtal sets, wartime 1155 rx. Tim, G6GUX, QTHR.

AR88 or similar rx. G8ZTN, QTHR. Tel 04606 3814, evenings.

Radio Handbook, by W6SAI, any year. AR77E, HQ129X, BC348 or similar USA rx. *For sale:* Heath valve voltmeter, £15. Lowe vhf monitor rx ASV1515, comp with five xtals, £20. G3JDK, QTHR. Tel Wickersley 541606, evenings, Rotherham 60166, daytime.

Yaesu FT221R, FT221RD, Trio TS7000S or similar 2m multimode rig. 8874 or 8877 valves and bases suitable for vhf use. John Moxham, G8KBQ. Tel 0458 33145, anytime.

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HRO with coils and psu, must be later model in fine cond. G3XCE, QTHR.

KW600 or similar hf linear. Would consider homebrew if reliable and complete with safe psu. Please write full details and price. G3ADZ, QTHR.

KW valve tx, Vespa Mk1 or 2 or 204 in good cond with manual. Will pay carriage. G5LH, QTHR. Tel 0632 662490.

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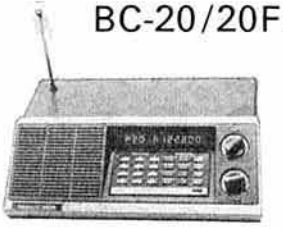

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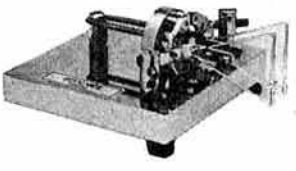

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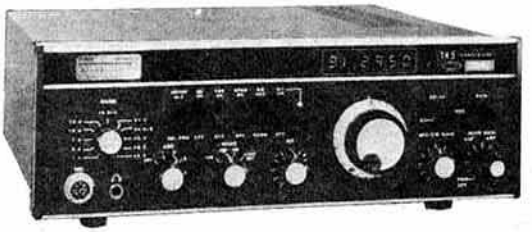

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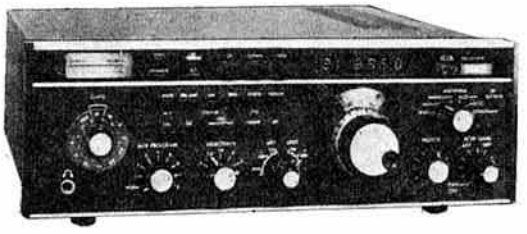

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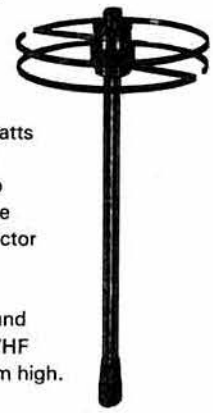

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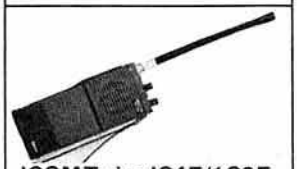

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SPECIFICATIONS

1. General Specifications

Transmission frequency	144·00000 – 147·99999MHz (E) 144·00000 – 145·99999MHz (W)
Type of emission	FM (F_3), SSB (A_3 J), CW (A_1)
Frequency stability	±300Hz within 1 – 60 minutes after power on 50Hz every 30 minutes
Power supply	13·8VDC
Power consumption	Transmission: HI; 3·7A, LOW; 1·5A Reception standby: 450mA
Microphone input impedance	600Ω
Antenna impedance	50Ω
AF output impedance	4 or 8Ω
Grounding system	Negative
Dimensions	149mm (W), 55mm (H), 218mm (D)
Weight	1·90 kg

2. Reception Specifications

Reception system	FM: Double super heterodyne SSB, CW: Single super heterodyne
Intermediate frequency	FM: 1st IF 10·7MHz 2nd IF 455kHz SSB, CW: 10·7 MHz
Sensitivity	FM: 0·19μV (12dB SINAD) SSB, CW: 0·15μV (10dB S/N)
Pass bandwidth	FM: ±6kHz, SSB, CW: 2·2kHz
Selectivity (60dB)	FM: 25kHz, SSB, CW: 4·2kHz
Squelch selectivity	0·15μV (FM)
AF output	More than 2W (into 8 ohms with 10% THD)

3. Transmission Specifications

Power output	25W/1W
Modulation	FM: Reactance modulation SSB: Balanced modulation
Maximum frequency tolerance	± 15 × 10^{-6} (–10– +50°C)
Spurious attenuation	60dB
Carrier suppression	40dB
Undesired side band suppression	40dB
Maximum deviation	±5kHz

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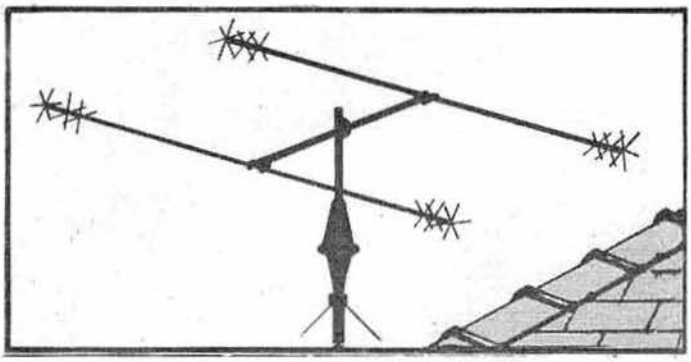

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Turning radius	7 feet	Input impedance	50 ohms
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Forward gain (ref D pole = 1:00)	3·6 dB	Weight	14 lbs
		Rotator requirements	AR40

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	3	200 (total)	30 to 159·999kHz	—	**£10.50**
	4	200 (total)	160 to 999·999kHz	—	**£6.00**
	5	50	1·00 to 1·499MHz	**£10.50**	**£6.00**
	6	10	1·50 to 1·999MHz	**£4.75**	**£4.40**
	7	10	2·00 to 2·599MHz	**£4.75**	**£4.40**
	8	10	2·60 to 3·999MHz	**£4.55**	**£4.10**
	9	10	4·00 to 20·999MHz	**£4.55**	**£4.00**
	10	10	21·00 to 24·999MHz	**£6.00**	**£5.40**
	10A	10	25·00 to 30·000MHz	**£8.50**	—
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Unless otherwise requested fundamentals will be supplied with 30pf load capacity and overtones for series resonance operation.

HOLDERS Please specify when ordering 10 to 200kHz HC13/U. 170kHz to 170MHz HC6 or HC33/U, 4 to 225MHz, HC18 and HC25.
Where holders are not specified, crystals above 4MHz will be supplied in HC25/U.

DELIVERY. Column A 3 to 4 weeks. Column B 6 to 8 weeks.

DISCOUNTS 5% mixed frequency discount for 5 or more crystals at B delivery. Price on application for 10 or more crystals to same frequency specification. Special rates for bulk purchase schemes including **FREE** supply of crystals used in UK repeaters.

The above prices apply to small quantities of crystals for amateur use. We would be pleased to quote for larger quantities or crystals for professional use.

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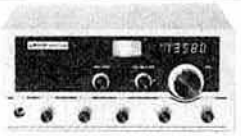

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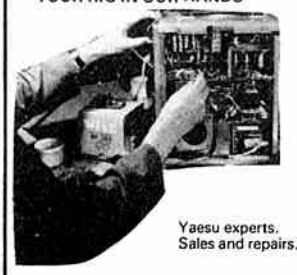

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KDK FM 2030

The KDK FM2030 is a highly compact (55 x 162 x 182mm!!) 12V DC two metre FM transceiver for mobile or base station use. Although providing an unrivalled number of features, operational ease is assured by use of an in house designed, 3rd generation C-MOS micro.

Digital frequency synthesis provides full band coverage in 12.5kHz steps (5 or 10kHz possible). Single knob frequency selection is by an optically coupled encoder (20 steps per revolution). Memory channels are programmed by dialling up a desired frequency and simply pushing in the main tuning knob. This selector also acts as the RIT control allowing receiver offsets in 1kHz steps. The frequency setting capabilities are duplicated on the remote tuning microphone, which also boasts manual tuning: one push-one step, hold down—auto tune, until band edge is reached, when tuning stops and an audio transducer bleeps. A dial speed switch increases tuning steps to 100kHz facilitating rapid QSY (one end of the band to the other in a turn!!)

The scanner seeks occupied or vacant channels and can examine either or both the memory banks or cyclically search any selected portion of the band as defined by the contents of two memory channels, moving on after a break in transmission (closed mode). A centre-zero detector and squelch open logic circuit is incorporated to prevent scanning from stopping prematurely before reaching the exact frequency.

Necessary CPU initializing instructions are provided by a small plug-in module. By substitution or re-arranging the diode matrix, the lower transceive limit, the maximum receive and the maximum transmit frequency limits may be set.

Two/five slot "easy write" memories with "year long" Nicad back-up provides 10 simplex (or 10 semi-duplex with ± 600kHz split) or by cross memory operation 5 invertable semi-duplex channels making the 2030 as easy to use as a crystal controlled transceiver when mobile. This safety first aim is further aided by provision to display memory channel number only (full frequency display is still instantly available). The first memory channel is "semi dedicated" to priority and is instantly programmable when the transceiver is dial controlled.

Repeater operation is spectacularly catered for with:—(reprogrammable) +600 and −600kHz shifts (available on dial and memory channels), cross memory banks (CMB) operation (Tx on 1-5, Rx on 6-10), all with out of band Tx inhibit, crystal controlled 1.75kHz tone burst of preset period, digital display switching between Tx and Rx frequencies and last but not least, a convenient repeater reverse switch for instant monitoring of Tx channel (also inverts the CMB).

3SK78 and 3SK74 UHF mosfets are used in the RF and first mixer which with substantive filtering—antenna; 3 section low and 2 section band pass, pre mixer: 3 section band pass (auto varicap tuned for wide band coverage), post mixer: L/C and monolithic filters provides superior intermodulation performance with high sensitivity (0.2μV for 12dB SINAD). One chip LSI provides all second IF and detector circuits plus sensitive (0.15μV opening) wide range squelch.

The single conversion transmitter uses a balance mixer, auto tuning bandpass filters, for low spurious output and high gain power module, impervious to infinite VSWR, for 25 or 5W switchable output (both levels internally fully adjustable).

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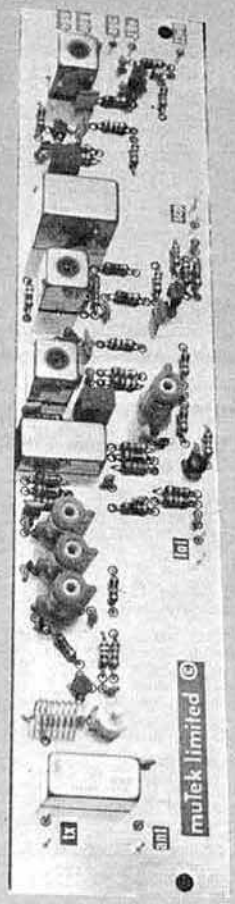

For some time we've had people worrying us to produce a replacement front-end for 144MHz transceivers other than the FT221/225 series. Finally we've done it! Our new front-end for Icom's IC251 and 211 series transceivers offers all the performance improvements associated with the well established RPCB 144ub plus some others!

The circuit now includes an integral inert gas-filled relay to eliminate the losses associated with Icom's diode antenna changeover circuit and an improved mixer post-amplifier using a combination of noiseless and resistive feedback technologies for improved strong signal performance on today's crowded 144MHz band. Other features include a signal path using a class-1 diode ring mixer and a six pole crystal filter.

Fitting is not quite as straightforward as for the RPCB 144ub but should be within the capability of most people who can use a soldering iron competently! For those who'd rather somebody else do the work, both Thanet Electronics and Amateur Radio Exchange are offering fitting services. Contact them for details.

RBCB 251ub £69.90 inc VAT

GFBA 144e 144MHz Masthead Amplifier

For some time now we've had a stream of requests for a masthead mounting 144MHz preamplifier. To be honest its not a project which we've been ecstatic about as the mechanical and environmental aspects of the engineering aren't exactly trivial. Also our feelings about the type of Ina needed to withstand the trials and tribulations of a masthead existence were that something rather special was needed and that particularly in the area of signal handling we could do something rather better than our existing range.

We've done it! The GFBA 144e uses an advanced negative feedback circuit topology around a professional grade gasfet. This gives a combination of very low noise figure with superb dynamic performance. The relays are rather more substantial than those used in most of the imported competition whilst the use of expansive polycarbonate housing ensures that the amplifier won't corrode to oblivion over the years.

We supply the GFBA 144e complete with its matching interface box. It's not particularly cheap—but then good engineering never is—and we suspect that we'll have a waiting list. Please ring or write for a data sheet.

SLNA144s — rf switched 144MHz preamplifier — 0·9dB noise figure/15dB gain typical — **£33.90**

As various reviewers have commented, our SLNA144s is a very fine preamp for the 144MHz band. It has been designed to complement most current transceivers—having the right combination of noise and gain parameters to ensure that the overall receiver sensitivity is limited by external factors such as sky and ground noise. Its dynamic performance is such that the following receiver will normally be the limiting factor with regard to large signal handling whilst the superb bandpass filtering will provide a substantial degree of protection against out of band signals.

The SLNA144s has been designed from the start as a preamplifier not as an afterthought to increase the sales appeal of a power amplifier.

Each sample is individually tested by people who understand the design in a pretty fundamental manner. This results in what we still consider to be the best product of its kind available.

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RPCB 251ub	IC251/IC211 front end board	69.90
RPCB 144ub	FT221/225 replacement front-end board—the one and only!	64.50

We also have antenna combiners for 144, 432 and 1296 MHz; dish semi-kits (1.2m & 1.6m) for 1.2 and 2.3GHz and a 125W 1.3GHz linear!!! Please ring.

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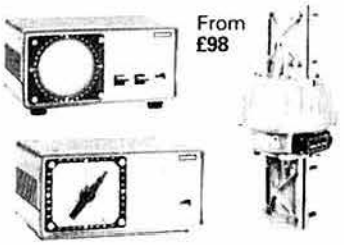

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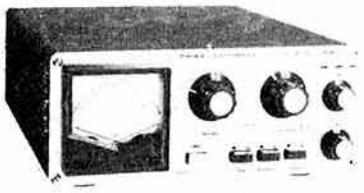

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AR22 Hand held 2m receiver	£83.00
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SR9 2m FM Receiver	£46.00
FDK750E Transceiver	£289.00
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TN3 JNR 3 Element Tribander Beam	£159.28
TH3 MK3 3 Element Tribander Beam	£274.85
TH6 DXX 6 Element Tribander Beam	£281.75
205BA 5 Element 20m Beam	£364.55
203BA 3 Element 20m Beam	£159.85
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The new TET range of VHF and HF antennas now available

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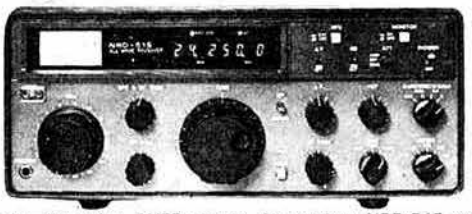
NRD-515 RECEIVER



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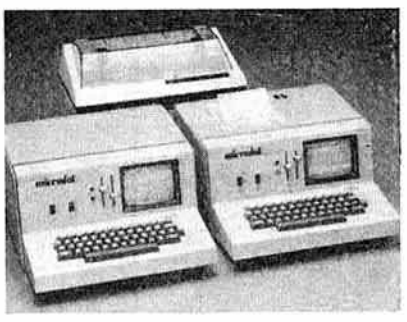

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Total tolerance ± 100ppm 0° to +70°C

6 to 9·999kHz HC13/U	£32.80
10 to 19·99kHz HC13/U	£31.00
20 to 29·99kHz HC13/U	£23.08
30 to 59·99kHz HC13/U	£21.73
60 to 79.99kHz HC13/U	£15.69
80 to 99·99kHz HC13/U	£13.08
100 to 159·9kHz HC13&6/U	£11.32
160 to 399·9kHz HC6/U	£7.83
400 to 499·9kHz HC6/U	£7.00
500 to 799·9kHz HC6/U	£7.83

B High frequencies fundamentals/overtones

Adj. tol. ±20ppm, Temp. tol. ±30ppm −10°C to +60°C

800 to 999·9kHz (fund) HC6/U	£11.01
1 to 1·499MHz (fund) HC6/U	£11·25
1·5 to 2·59MHz (fund) HC6/U	£5.36
2·6 to 20·9MHz (fund) HC6/U	£4.87
3·4 to 3·99MHz (fund) HC18 & 25/U	£6.75
4 to 5·99MHz (fund) HC18 & 25/U	£5.36
6 to 21MHz (fund) All Holders	£4.87
21 to 25MHz (fund) "	£7.31
25 to 30MHz (fund) "	£9.00
18 to 63MHz (3 O/T)	£4.87
60 to 105MHz (5 O/T)	£5.61
105 to 125MHz (5 O/T)	£8.44
125 to 149MHz (7 O/T)	£8.62
149 to 180MHz (9 O/T)	£12.75
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Delivery—Mid range 1MHz to 105MHz normally 4/6 weeks. **Other frequencies** 6/8 weeks.

Holders—Low Frequencies 6 to 150kHz HC13/U, 150kHz to 3·4MHz HC6/U, 3·4MHz to 105MHz HC6/U, HC18/U or HC25/U, over 105MHz— HC18/U and HC25/U.

HC33/U (Wire ended HC6/U) is available on request as per HC6/U. HC17/U (Replacement for FT243) available as per HC6/U at **35p** surcharge on the HC6/U price.

Unless otherwise specified, fundamentals will be supplied to 30pf circuit conditions and overtones to series resonance.

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Please let us know your requirements eg 4MHz HC18/U.
1 off **£2.00**, 100 off **£1.10**. 1000 off **99p**, 2500 off **50p**.

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We are now stocking two new DOUBLE BALANCED MIXERS which are pin compatible with both the MD-108 which we stocked formerly and the SBL-1, but with a much superior specification, covering 500kHz to 500MHz. Supplied with full details.
M-18 is a non-hermetically sealed unit @ **£6.09**
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NEW FASTER SERVICE

We are now supplying crystals to most commercial and MIL specifications in the range 1MHz to 60MHz ordered in small quantities in 2½ weeks AT NO EXTRA CHARGE. We also have even faster EXPRESS SERVICES available for that VERY URGENT order.

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TWO METRE CRYSTALS

CRYSTAL FREQUENCY USE (TX or and HOLDER) / OUTPUT FREQUENCY	4MHz-TX-HC6/U	6MHz-TX-HC25/U	8MHz-TX-HC6/U	10MHz-RX-HC6/U	11MHz-RX-HC6/U	12MHz-TX-HC25/U	14MHz-RX-HC25/U	18MHz-TX-HC25/U	44MHz-RX-HC6/U	44MHz-RX-HC25/U	52MHz-RX-HC25/U
144·4 (433·2)	b	c	b	e	e	b	e	e	e	e	e
144·800	e	e	e	e	e	c	c	c	e	c	e
144·825	e	e	e	e	e	e	e	e	e	e	e
144·850	e	e	e	e	e	e	e	e	e	e	e
145·000/R0T	a	c	a	c	c	b	e	b	e	a	c
145·025/R1T	a	c	a	e	e	b	e	b	e	e	e
145·050/R2T	a	c	a	e	e	b	e	b	e	e	e
145·075/R3T	a	c	a	e	e	b	e	b	e	e	e
145·100/R4T	a	c	a	e	e	b	e	b	e	e	e
145·125/R5T	a	c	a	e	e	b	e	b	e	e	e
145·150/R6T	a	c	a	e	e	b	e	b	e	e	e
145·175/R7T	a	c	a	e	e	b	e	b	e	e	e
145·200/R8R	a	c	a	e	e	b	b	b	a	e	c
145·300/S12	e	e	e	e	e	e	e	e	e	e	e
145·350/S14	e	e	e	e	e	e	e	e	e	e	e
145·400/S16	e	e	e	e	e	e	e	e	e	e	e
145·425/S17	e	e	e	e	e	e	e	e	e	e	e
145·450/S18	a	e	a	e	e	b	b	b	a	a	e
145·475/S19	a	e	a	e	e	b	b	b	a	a	e
145·500/S20	a	c	a	c	c	b	b	b	a	a	c
145·525/S21	a	c	a	c	c	b	b	b	a	a	c
145·550/S22	a	c	a	c	c	b	b	b	a	a	c
145·575/S23	a	c	a	c	c	b	b	b	a	a	c
145·600/R0R	a	c	a	c	c	e	b	b	a	a	c
145·625/R1R	e	e	e	e	c	c	e	b	e	a	a	c
145·650/R2R	e	e	e	e	c	c	e	b	e	a	a	c
145·675/R3R	e	e	e	e	c	c	e	b	e	a	a	c
145·700/R4R	e	e	e	e	c	c	e	b	e	a	a	c
145·725/R5R	e	e	e	e	e	c	e	b	e	a	a	c
145·750/R6R	e	e	e	e	c	c	e	b	e	a	a	c
145·775/R7R	e	e	e	e	e	c	e	b	e	a	a	c
145·800/R8R	a	c	a	a	c	c	b	b	b	a	a	e
145·950/S38	a	e	e	c	e	e	e	e	e	a	e	e

PRICES: (a) **£2.15**, (b) **£2.55**, (c) **£2.80** and (e) **£4.87**

AVAILABILITY: (a), (b) and (c) stock items normally available by return (we have over 5000 items in stock). (e) 4/6 weeks normally but it is quite possible we could supply from stock. **N.B.** Frequencies as listed above but in alternative holders and/or non stock loadings are available as per code (e).

ORDERING: When ordering please quote (1) Channel, (2) Crystal frequency, (3) Holder, (4) Circuit conditions (load in pf). If you cannot give these, please give make and model of equipment and channel or output frequency required and we will advise if we have details.

EXPRESS SERVICE

Many types of made to order crystals are available on our "EXPRESS SERVICE"—with delivery of three days on our class "A" service. Telephone for details.

70cm CRYSTALS

Due to the much higher multiplication involved compared with 2 metres all our stock 70cm crystals are to a much higher tolerance than our standard amateur spec. crystals.

We are stocking the following channels:—RB0, RB2, RB4, RB6, SU8, RB10, RB11, RB13, RB14, RB15, SU18 and SU20 TX and RX for use with: PYE UHF Westminster (W15U), UHF Cambridge (U10B), Pocketfone (PF1) and UHF PF70 Range and Storno CQL/CQM 662 all at **£2.55**.

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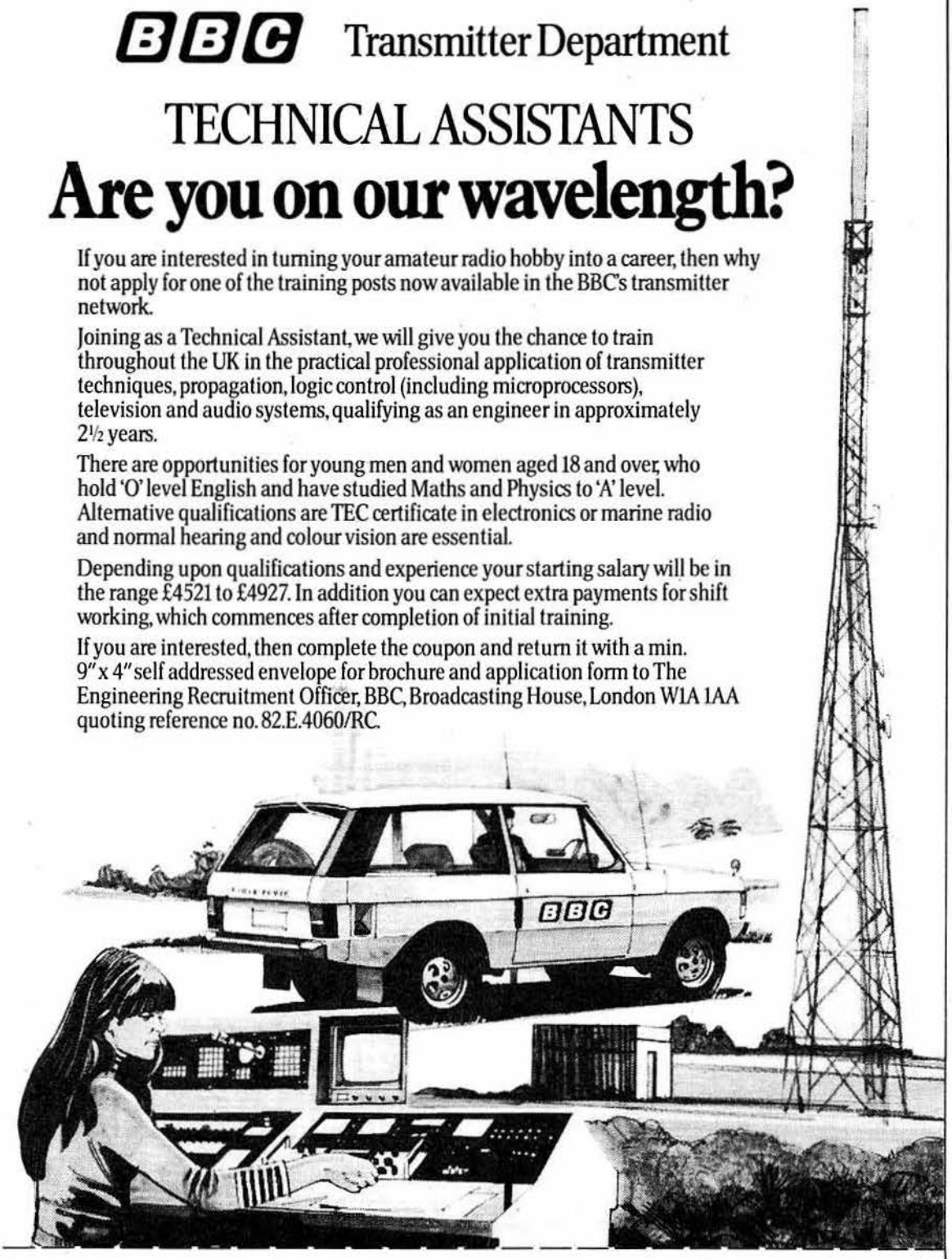

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PRICES. These include postage, packing and VAT where applicable. For airmail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 10am and 4pm, Monday to Friday.

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". Giro A/C No 533 5256. Please write your name and address clearly on the order, and allow up to 28 days for delivery.

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(Raynet supplies should be obtained from Mrs J. Balestrini, Merrivale, Willow Walk, Culverstone, Gravesend, Kent)

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Subscriptions and changes of address for *Ham Radio Magazine* should be sent to: Ham Radio Magazine (UK), PO Box 63, Harrow, Middx HA3 6HS.

RAD COM OPERATING GUIDE 1983

(Supplement to *Radio Communication* January 1983)

General rules for vhf/uhf/shf contests 1983

The rules governing all RSGB vhf/uhf/shf contests to be held in 1983 will be selected from the following general rules, which will be referred to by number. Contestants are advised to read the rules carefully when planning their entry for each event. Supplementary rules will be added for the more complex events, such as VHF NFD.

Please read these rules carefully

Cover and summary sheets and up to 10 log sheets can be obtained from the contest adjudicator. If you are entering a contest it is only necessary to tick the bottom of the cover sheet (Form 427) and enclose a large sae. All stationery is A4 size (30 by 21cm); envelopes which hold flat sheets will carry far more than those which require the sheets to be folded. Larger quantities of log sheets may be purchased from RSGB Publications (Sales). Queries on vhf contests should be made to Frank Matthews, G8ACJ, tel Guildford 573912.

Rules which have been changed since 1982 are prefixed by an asterisk

1. Date and time; see individual contest details.

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

3. All operators must be members of the RSGB or have a membership application in progress.

***4. Sections**

(a) All classes of stations with no separate sections.
(b) Fixed stations only.
(c) Portable stations only.
(d) There will be two sections:
Section S—Single-operator
Section M—Multi-operator
(e) There will be two sections:
Section F—Fixed stations
Section O—All other stations
(f) There will be four sections:
Section S—Single-operator fixed stations
Section A—Single-operator portable or alternative address
Section M—Multi-operator fixed stations
Section P—Multi-operator portable or alternative address.
(g) Sections as per IARU rules.

In fixed station sections, the station must be located at the main address as shown on the licence.

Single-operator stations are those operated by an individual operator who received no assistance whatsoever with the operating or log-keeping during the contest.

All equipment, including antennas and masts, for portable stations must be installed on site during the 24h preceding the contest, or during the contest itself. This does not apply to storage of equipment, or to its prior installation more than 1km away from the contest operating position. Portable stations may be required to provide proof of permission to use a site.

5. Locations

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

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

(c) In multiband events all stations forming one entry must operate from within a circle of 1km radius.

***6. Modes**

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

(b) Entrants may transmit only A1A (cw) or F1A (fsk) and contact only other stations transmitting these modes.

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

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

and pro rata

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

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

(c) Contacts will be scored at one point per contact.

***8. Final tabulation of multiband contests**

(a) All bands will be listed separately. There will be no overall table.

(b) The final tabulation showing the overall results will be formed by taking the sum of the points gained by dividing the scores achieved on each band by the leading station's score on that band and multiplying by 1,000.

ie Points for each band: $\frac{\text{Score achieved from Rule 7}}{\text{Band leader's score from Rule 7}} \times 1{,}000$

(c) The final tabulation and multipliers will be in accordance with IARU rules.

9. Awards

In each section there will be an award to the highest scoring station. An award will also be made to the runner-up in each section in which there are 10 or more entries. In multiband events a certificate will be awarded to the highest scoring on each band who has not qualified for either the overall winners or runners-up award. Additional awards will be made when appropriate.

10. Crossband contacts

(a) Crossband contacts do not count for points.

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

11. Repeat contacts

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

(b) One contact may be made with a given station (as defined in 11a) during each activity period. Only three out of seven activity periods will count towards the final score. However, all available logs should be sent to the adjudicator for the purpose of checking. To be eligible for an award an entrant must take part in a minimum of three activity periods. Serial numbers start at 001 for each activity period and advance by one for each contact.

***12. Contest exchange**

The contest exchange shall consist of:

(a) Both callsigns, RS or RST report followed by serial number, both QTH locator (the standard five-symbol location system) and QTH. The QTH must be given as a direction and distance up to 25km (to the nearest kilometre) from a point identifiable on an Ordnance Survey route planning map (Scale 1:62,500) or similar.

Code letters for use in RSGB contests

Country/Region	Letters
Alderney	ALD
Antrim	ATM
Armagh	ARM
Avon	AVN
Bedfordshire	BFD
Berkshire	BRK
Borders	BDS
Buckingshamshire	BKS
Cambridgeshire	CBE
Central	CTR
Cheshire	CHS
Cleveland	CVE
Clwyd	CWD
Cornwall	CNL
Cumbria	CBA
Derbyshire	DYS
Devon	DVN
Dorset	DOR
Down	DWN
Dumfries & Galloway	DGL

County/Region	Letters
Durham	DHM
Dyfed	DFD
Essex	ESX
Fermanagh	FMH
Fife	FFE
Mid Glamorgan	GNM
South Glamorgan	GNS
West Glamorgan	GNW
Gloucestershire	GLR
Grampian	GRN
Guernsey	GUR
Gwent	GWT
Gwynedd	GDD
Hampshire	HPH
Hereford & Worcester	HWR
Hertfordshire	HFD
Highlands	HLD
Humberside	HBS
Isle of Man	IOM

County/Region	Letters
Isles of Scilly	IOS
Isle of Wight	IOW
Jersey	JER
Kent	KNT
Lancashire	LNH
Leicestershire	LEC
Lincolnshire	LCN
Greater London	LDN
Londonderry	LDR
Lothian	LTH
Greater Manchester	MCH
Merseyside	MSY
Norfolk	NOR
Northamptonshire	NHM
Northumberland	NLD
Nottinghamshire	NOT
Orkney	OKE
Oxfordshire	OFE
Powys	PWS

County/Region	Letters
Salop	SLP
Sark	SRK
Shetland	SLD
Somerset	SOM
Staffordshire	SFD
Strathclyde	SCD
Suffolk	SFK
Surrey	SRY
East Sussex	SXE
West Sussex	SXW
Tayside	TYS
Tyne & Wear	TWR
Tyrone	TYR
Warwickshire	WKS
Western Isles	WIL
West Midlands	WMD
Wiltshire	WLT
North Yorkshire	YSN
South Yorkshire	YSS
West Yorkshire	YSW

(b) Both callsigns, RS or RST report followed by serial number, and QTH locator (the standard five-symbol location system).

*13. Serial numbers start at 001 and advance by one for each contact. For multiband single-callsign events, the serial number advances by one independent of changes of band, but each band must be tabulated on separate logsheets for the purpose of submitting an entry.

In multiband contests, when required as part of the exchange, the QTH must be given in a different form on each band.

No points will be lost if a non-competing station being contacted by an entrant is unable to supply a QTH, QTH locator or serial number, but the receiving operator must obtain enough information to be able to calculate the claimed distance score.

Contacts with stations whose callsigns appear on the station cover sheet(s) will not count for points.

***14. Log keeping**

Entrants must keep their own log records in accordance with licence requirements. The logs for contest entries must be made out on current RSGB contests log sheets or, if computer readout sheets are to be submitted, these must be cut to A4 size, RSGB log sheet format and be line spaced to contain approximately 30 contacts per sheet, or less.

Separate logs are required for each band used in the contest.

Illegible logs will be returned to entrants for rectification.

Logs must be tabulated as follows:

(a) Date/time (gmt)
(b) Callsign of station worked
(c) My report on his/her signals and serial number
(d) His/her report on my signals and serial number
(e) QTH locator received
(f) QTH received
(g) Points claimed

15. A station must operate within the terms of his/her normal licence. (This excludes high power permits.)

16. A station must not engage in more than one contact concurrently.

17. The equipment comprising the station may be used under one callsign only for contest purposes, on any given band. This does not preclude the use of shared equipment for talkback purposes.

18. Stations using telephony in the recognized cw sub-bands 70·025–70·150MHz, 144·00–144·15MHz, 432·00–432·15MHz and 1,296·00–1,296·15MHz, or transmitting on beacon frequencies, are liable to disqualification. Entrants should observe the provisions of the IARU/RSGB band plans.

19. Stations that persistently radiate poor quality signals, or otherwise contravene the code of practice for vhf/uhf contest operations (see below), are liable for disqualification or loss of points.

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

21. Contacts made via a repeater, man-made satellite or moonbounce will not count for points.

22. Proof of contact may be required.

23. Entries

(a) All entries must be accompanied by a current RSGB vhf/uhf contest cover sheet (Form 427) for each band used. The cover sheet must be completed correctly and the declaration signed. In multiband events entrants must also complete a multiband summary sheet (Form 4422).

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

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

(d) Gross errors in log keeping render the entrant liable to disqualification.

24. Stations must permit inspection of their station by members of the VHF Contests Committee, and give site access information if requested to do so.

25. Failure to comply with any of the rules given for a particular contest may result in loss of points or disqualification.

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

Code of practice for vhf/uhf contest operation

1. Obtain permission from the landowner or agent before using the site, and check that this permission includes right of access. Portable stations should observe the Country Code.

2. Take all possible steps to ensure that a site is not going to be used by some other group or club. Check with the local club and last year's results table to see if any group used the site last year (QTH locator). If it is going to be used by another group, come to an amicable agreement before the event. Groups are advised to select possible alternative sites.

3. All transmitters generate unwanted signals; it is the level of these signals that matters. in operation from a good site, levels of spurious radiation which may be acceptable from the home station may well be found excessive be nearby stations (up to 25 miles or even farther).

4. Similarly, all receivers are prone to have spurious responses or to generate spurious signals in the presence of one or more strong signals, even if the incoming signals are of good quality. Such spurious responses may mislead an operator into believing that the incoming signal is at fault, when in fact the fault lies in his own receiver.

5. If at all possible, critically test both receiver and transmitter for these undesirable characteristics, preferably by air test with a near neighbour before the contest. In the case of transmitters, aim to keep all in-amateur band spurious radiations, including noise modulation, to a level of −90dB relative to the wanted signal. Similarly, every effort should be made to ensure that the receiver has an adequate dynamic range.

6. Above all, be gentlemanly at all times. Be helpful and inform all stations apparently radiating unwanted signals at troublesome levels—having first checked your own receiver! If asked to close down by a government or Post Office official, do so at once without objectionable behaviour. If the site owner requests your station to close down, accede to his request without hostility.

General rules for RSGB listeners' vhf/uhf contests 1983

1. The following general rules for vhf/uhf contests published in this issue shall apply: 1, 2, 3, 4a, 5a, 7a, 11a, 21, 23, 25, 26.

2. Listeners' contests are open to all non-licensed members of the RSGB. Only the entrant may operate the receiving station.

3. Logs must show in columns: **(a)** date/time (gmt), **(b)** callsign of station heard, **(c)** my report on his/her signals, **(d)** report and serial number sent by station heard, **(e)** callsign of station being worked, **(f)** QTH locator given by station heard, **(g)** QTH given by station heard (where appropriate), **(h)** points claimed.

On 144MHz the callsign in column **(e)** may occur only once in every 20 contacts logged. CQ and test calls do not count for points and should not be logged. If both sides of a QSO can be heard, both can be claimed for points.

The Hanson Trophy will be awarded to the entrant with the highest aggregate score in all the swl contests between 5 March and 4 September 1983.

General rules for RSGB hf contests 1983

The general rules for RSGB hf contests are given below and are to be read in conjunction with the specific rules for each particular contest. International contest rules will contain the relevant sections of the general rules for the benefit of overseas entrants. Note the change to rule 15.

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

2. Only one contact on each band may be claimed with a specific station, whether fixed, portable, mobile or alternative address. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Proof of contact may be required.

3. Unless otherwise stated, only single-operator entries will be accepted. A single operator station is one manned by an individual operator who receives no assistance whatsoever during the contest period.

4. When multi-operator entries are specifically allowed, such entries will be accepted only if:

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

(b) the operator's callsign is given for each contact.

5. Operators of stations located within the British Isles, ie within the call areas G, GD, GI, GJ, GM, GU and GW, must be fully paid-up members of the RSGB.

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

7. Entries must be clearly written or typed on one side only of RSGB hf contest log sheets (Form HFC1) or international A4 size paper using blue or black ink. *Separate log sheets must be used for each band.* Logs must be kept and entries submitted in gmt.

8. Each entry must include a cover/summary sheet (eg Form HFC2) incorporating a signed declaration.

9. Entries must be addressed to the adjudicator, whose address will appear in the specific rules for each contest, with the name of the contest marked in the top left hand corner. All entries must be postmarked not later than 15 days following the contest. If acknowledgement of receipt is required, British Isles entrants should include a stamped addressed postcard which will be returned to the sender. Overseas entries will not normally be acknowledged.

10. All entries become the property of the RSGB, in the event of any dispute, the ruling of the Council of the RSGB shall be final.

11. For scoring purposes, aeronautical mobile and maritime mobile stations will count only as the minimum score of the particular contest and not for any bonus or multiplier. Entries from GB stations, aeronautical mobile and maritime mobile stations will not be accepted.

12. Awards are made at the discretion of the Council of the RSGB and may consist of trophies, plaques or certificates. When possible, awards are presented at the RSGB AGM following the contest.

13. Certificates of merit are normally sent to the three leading stations in each section of a contest.

14. Entrants may be disqualified for failure to observe the general rules or the specific rules.

15. Points are deducted for errors in the logs. For unmarked duplicate contacts for which points have been claimed, additional penalty points may be deducted (eg 10 times the claimed score for the contact).

16. Small quantities of RSGB hf contest log sheets (Form HFC1) and cover/summary sheets (Form HFC2) may be obtained from RSGB HQ on receipt of a large stamped addressed envelope. Larger quantities may be purchased.

General rules for RSGB hf receiving contests 1983

Note that rule 3 has been amended this year.

1. To claim points, a station may be logged once only on each band whether fixed, portable, mobile, or alternative address.

2. A receiving station log must show in columns: date/time (gmt), callsign of station heard, report and serial number sent by station heard, callsign of station being worked, bonus points, total points. The band in use must be shown at the top of each log sheet.

3. A cover/summary sheet (eg Form HFC2) must be submitted with the logs. The signed declaration must include the words "I certify that I do not hold a Class A transmitting licence".

4. The following rules from the transmitting general rules also apply to receiving contests: 3, 5, 7, 9, 11, 12, 13, 14, 15 and 16.

IARU 144MHz BAND PLAN with UK usage

	144·000	
CW only	144·000–144·015	Moonbounce
	144·050	CW calling frequency
	144·100	CW ms reference frequency
	144·150	
SSB and cw only	144·250	Used for GB2RS and slow morse transmissions
	144·260 ±	Used by Raynet
	144·300	SSB calling frequency
	144·400	SSB ms reference frequency
	144·500	
All modes non-channelized	144·500	SSTV calling frequency
	144·600	RTTY calling frequency
	144·600 ±	RTTY working (fsk)
	144·675	Data transmission calling
	144·700	FAX calling frequency
	144·750	ATV calling and talkback
	144·775	Raynet
	144·800	Raynet
	144·825	Raynet
	144·845	
Beacons only		
	145·000	
FM repeater inputs	145·000 R0	
	145·025 R1	
	145·050 R2	
	145·075 R3	
	145·100 R4	
	145·125 R5	
	145·150 R6	
	145·175 R7	
	145·200	
FM simplex channels	145·200 S8	Raynet
	145·225 S9	Used by Raynet
	145·250 S10	Used for slow morse tone modulated transmissions
	145·275 S11	
	145·300 S12	RTTY-afsk
	145·325 S13	
	145·350 S14	
	145·375 S15	
	145·400 S16	
	145·425 S17	
	145·450 S18	
	145·475 S19	
	145·500 S20	FM calling channel
	145·525 S21	Used for GB2RS fm newscasts
	145·550 S22	Used for rally/ exhibition talk-in
	145·575 S23	
	145·600	
FM repeater outputs	145·600 R0	
	145·625 R1	
	145·650 R2	
	145·675 R3	
	145·700 R4	
	145·725 R5	
	145·750 R6	
	145·775 R7	
	145·800	
	Satellite service*	
	146·000	

*This section of the band to be used ONLY for the satellite service.

NOTES

Operation on the two spot frequencies is not permitted in the UK by the terms of the Home Office licence—see licence footnote No 4.

MS operation can take place up to 26kHz higher than the reference frequency.

The beacon band is exclusive. No transmissions should take place within this section at any time.

The satellite service band must be kept free of normal communication transmissions to prevent interference with this service.

The use of the fm mode within the ssb/cw section and cw or ssb in the fm-only sector is not recommended.

Repeater stations are primarily intended as an aid for mobile working and they should never be used for dx communication. FM stations wishing to work dx should use the all-mode section, taking care to avoid frequencies allocated for specific purposes.

50MHz

A limited number of Class A licensees have been given authority to investigate rf propagation outside broadcasting hours, on a strict non-interference basis, in the frequency band 50·00 to 52·00MHz.

UK 430–440MHz BAND PLAN

	430·000	
All modes, low-power hand-held (431–432MHz is withdrawn from service within an area up to 100km from London)		
	432·000	
CW only	432·000–432·015	Moonbounce
	432·100	CW random ms
	432·150	CW calling frequency
	432·150	
SSB and cw only	432·200	UK ssb calling frequency
	432·300	IARU ssb calling frequency
	432·500	
All modes non-channelized	432·500	SSTV calling frequency
	432·525–432·575	1·3GHz/432MHz linear transponder output
	432·600 ±	RTTY working (fsk)
	432·600	RTTY calling frequency
	432·675	Data transmission calling
	432·700	FAX calling frequency
	432·800	
	Beacon sub-band	
	433·000	
FM repeater outputs in UK only	433·000 RB0	
	433·025 RB1	
	433·050 RB2	
	433·075 RB3	
	433·100 RB4	
	433·125 RB5	
	433·150 RB6	
	433·175 RB7	
	433·200 RB8/SU8	Used by Raynet
	433·225 RB9	
	433·250 RB10	
	433·275 RB11	
	433·300 RB12/SU12	RTTY repeater and rtty afsk working
	433·325 RB13	
	433·350 RB14	
	433·375 RB15	
	433·375	
FM simplex channels	433·400 SU16	
	433·425 SU17	
	433·450 SU18	
	433·475 SU19	
	433·500 SU20	FM calling channel
	434·600	
FM repeater inputs in UK only	434·600 RB0	
	434·625 RB1	
	434·650 RB2	
	434·675 RB3	
	434·700 RB4	
	434·725 RB5	
	434·750 RB6	
	434·775 RB7	
	434·800 RB8	
	434·825 RB9	
	434·850 RB10	
	434·875 RB11	
	434·900 RB12	RTTY repeater-afsk
	434·925 RB13	
	434·950 RB14	
	434·975 RB15	
	435·000	
Satellite service		
	438·000	
	434–440	Sub-band devoted to UK atv-frequencies chosen so as to avoid interference to other band users and, in particular, the amateur satellite service
	440·000	

UK 70MHz BAND PLAN

	70·025	
Beacons only		
	70·075	
CW only		
	70·150	
SSB and cw only	70·200	SSB calling frequency
	70·260	
	70·260	National mobile calling frequency
All modes	70·300	Raynet calling frequency
	70·350–70·400	Raynet
	70·400	
FM simplex only	70·450	FM calling frequency
	70·500	

IARU REGION 1 HF BAND PLANS

The following band plans have been discussed and agreed at IARU Region 1 conferences. Although not mandatory, good operators observe them.

Band (MHz)	Type of emission
3·5-3·6MHz	CW (2)
3·6MHz ± 20kHz	RTTY (1)
3·6-3·8MHz	CW and phone (2, 3)
7-7·04MHz	CW
7·04MHz ± 5kHz	RTTY (1)
7·04-7·1MHz	CW and phone
10·1-10·14MHz	CW
10·14-10·15MHz	CW and rtty

Band (MHz)	Type of emission
14-14·1MHz	CW
14·09MHz ± 10kHz	RTTY
14·1-14·35MHz	CW and phone
18·068-18·1MHz	CW*
18·1-18·11MHz	CW and rtty*
18·11-18·168MHz	CW and phone*
21-21·15MHz	CW
21·1MHz ± 20kHz	RTTY (1)
21·15-21·45MHz	CW and phone

Band (MHz)	Type of emission
24·89-24·92MHz	CW*
24·92-24·93MHz	CW and rtty*
24·93-24·99MHz	CW and phone*
28-28·2MHz	CW
28·1MHz ± 50kHz	RTTY (1)
28·2-29·7MHz	CW and phone

*When available

NOTES

(1) For rtty, recommended section of operation shared with cw.
(2) 3,500-3,510kHz and 3,790-3,800kHz reserved for intercontinental working.
(3) 3,635-3,650kHz is used by USSR stations for intercontinental working.
(4) For sstv, recommended operating frequencies are: 3,735, 7,040, 14,230, 21,340, and 28,680kHz, all ±5kHz.
(5) For beacons, 28·2-28·3MHz is recommended.
(6) For the downlink of amateur satellites, 29·4-29·55MHz is recommended.

RSGB QSL BUREAU

Sending cards through the bureau

Choose QSL cards which do not exceed normal postcard size, viz 5½ by 3½in. As packets going abroad are sent open-ended at Printed Paper Rate, large cards invariably have to be folded, while small ones and those of a thin nature are difficult to handle.

Print the addressee's callsign on both sides of the cards, together with details of his QSL manager if applicable.

Sort USA cards into call areas and *all others alphabetically by prefix*. Do not space the cards with paper markers etc.

Pack all cards the same way up, and ensure they are adequately packed with the correct postage prepaid. Post them to: Mr E. G. Allen, G3DRN, QSL Bureau Manager, 30 Bodnant Gardens, London SW20 0UD.

Collecting incoming cards from the bureau

Supply your sub-manager with stamped addressed envelopes of suitable size and strong material.

Print your callsign, RS or A number in the top left-hand corner of each envelope.

Envelopes should be numbered, and "Last envelope" marked on one so that it is known when a fresh batch is needed.

Envelopes are not normally returned until full weight has been reached for the postage paid; those wishing to collect cards at more frequent intervals should mark their envelopes "Wait 6" etc.

Amendments to the list of sub-managers are published under "QTC" in *Radio Communication* and broadcast on GB2RS.

Callsign series	Series sub-manager
G2 calls	C. H. Adams, RS10906, 4 Park Gate Gardens, East Sheen, London SW14 8BQ.
G3AA-ZZ **G4AA-ZZ** **G5 calls**	Mrs C. Pope, G4CMM, 136 Ridgeway Drive, Bromley, Kent BR1 5DD.
G6AA-ZZ **G8AA-ZZ**	F. J. T. Harris, G4IEY, 4 Merestones Drive, The Park, Cheltenham, Glos GL50 2SS.
G3AA-DZZ	C. A. Bradbury, BRS1066, 13 Salisbury Avenue, Cheltenham, Glos GL51 5BT.
G3EAA-HZZ	S. L. Newport, G4DEV, 101 Elibank Road, Eltham, London SE9 1QJ.
G3IAA-KZZ	P. Lumb, G3IRM, 14 Linton Gardens, Bury St Edmunds, Suffolk IP33 2DZ.
G3LAA-NZZ	J. G. Holland, G3GHS, 26 Grand Avenue, Berrylands, Surbiton, Surrey KT5 9HU.
G3OAA-PZZ	J. H. Brazzill, G3WP, 43 Forest Drive, Chelmsford, Essex CM1 2TT.
G3RAA-TZZ	Mrs C. Pope, G4CMM, 136 Ridgeway Drive, Bromley, Kent BR1 5DD.
G3UAA-VZZ	M. J. Newton, G3UKW, 11 Chestnut Grove, Rushmere St Andrew, Ipswich IP5 7ED.
G3WAA-XZZ	F. G. Rylands, G2VF, 39 Parkside Avenue, Millbrook, Southampton, Hants SO1 9AF.
G3YAA-ZZZ	I. Batley, G8TKU, 3 Folidon Avenue, Fulwell, Sunderland, Tyne & Wear SR6 9HP.
G4AAA-AZZ	C. Johnson, BRS31379, 118 Harvest Road, Smethwick, Warley, West Midlands B67 6NG.
G4BAA-BZZ	Miss L. Harper, G4FNC, 50 Ravenglass Road, Westlea, Swindon, Wilts SN5 7BW.
G4CAA-CZZ	P. Jobson, G3HLF, 41 The Avenue, Gravesend. Kent DA11 0NA.
G4DAA-DZZ	D. Buckley, G3VLX, 16 Wood Ride, Petts Wood, Orpington, Kent BR5 1PX.
G4EAA-EZZ	P. C. Barry, G8OPA, 32 Rutland Avenue, Sidcup, Kent DA15 9DZ.
G4FAA-FZZ	Mrs A. R. Burchmore, G8LXK, 49 School Lane, Horton Kirby, Dartford, Kent DA4 9DQ.
G4GAA-GZZ	R. Maskill, G4JDL, 107 Swallows Meadow, Shirley, Solihull, W. Midlands B90 4PH.
G4HAA-HZZ	Mrs J. Brakespear, G8RZO, The Chequers Stores, Eastchurch Road, Minster, Sheppey, Kent.
G4IAA-IZZ	C. J. Webb, G4JFF, 153 Apsley Road, Oldbury, Warley, West Midlands B68 0QT.
G4JAA-JZZ	K. Baker, G3WTV, 33 Ashdown Drive, Borehamwood, Herts WD6 4NA.
G4KAA-KZZ	K. Draycott, G3UQT, 175 Oliver Road, Kirk Hallam, Ilkeston, Derbyshire DE7 4JW.
G4LAA-LZZ	C. Lennox, G4LXU, Kyme Cottage, Main Street, Newton Kyme, Nr Tadcaster, N. Yorks.
G4MAA-MZZ	Mrs Gwen Thomas, G4JYL, 36 Chelwood Crescent, Leeds LS8 2AQ, West Yorks.
G4NAA-NZZ	John Brakespear, G8RZP, The Chequers Stores, Eastchurch Road, Minster, Sheppey, Kent.
G4OAA-OZZ	Mrs J. F. Rhodes, G8LRT, Wesley Mount, Spring Bank, New Mills, Stockport SK12 4BH.
G4PAA-PZZ	P. A. Braham, G4BYA, 12 Shepherds Mount, Compton, Newbury, Berks RG16 0QZ.
G4RAA-RZZ	Mr & Mrs J. Brakespear, G8RZO/G8RZP, The Chequers Store, Eastchurch Road, Minster, Sheppey, Kent.
G6AAA-ZZZ	Mr and Mrs D. R. Brooks, G4IAQ/G4IAR, 28 Avon Vale Road, Loughborough, Leics LE11 2AA.
G8AAA-CZZ	F. J. T. Harris, G4IEY, 4 Merestones Drive, The Park, Cheltenham GL50 2SS.
G8DAA-OZZ	T. Batley, G8TKU, 3 Folidon Avenue, Fulwell, Sunderland, Tyne & Wear SR6 9HP.
G8PAA-RZZ	Mrs C. Pope, G4CMM, 136 Ridgeway Drive, Bromley, Kent BR1 5DD.
G8SAA-SZZ	K. Baker, G3WTV, 33 Ashdown Drive, Borehamwood, Herts WD6 4NA.
G8TAA-TZZ	K. Draycott, G3UQT, 175 Oliver Road, Kirk Hallam, Ilkeston, Derbyshire DE7 4JW.
G8UAA-ZZZ	C. Lennox, G4LXU, Kyme Cottage, Main Street, Newton Kyme, Nr Tadcaster, N. Yorks.
GB calls	C. Turner, G8NL, 56 Sunny Bower, Tottington, Bury, Lancs BL8 3HL.
GD calls	W. P. Waid, GD3GQX, 1 Mount William, Summer Hill, Douglas, Isle of Man.
GI calls	R. P. Parsons, GI3HXV, 45 Erinvale Avenue, Belfast BT10 0FP.
GJ calls	H. J. Chater, GJ2LU, 106 Rouge Baulion, St Helier, Jersey, CI.
GM 2-letter calls **GM4AAA-ZZZ** **GM5AAA-ZZZ** **GM6AAA-ZZZ** **GM8AAA-ZZZ**	D. R. Macadie, GM6MD, 11 Marchmont Road, Ayr KA7 2SB.
GM3AAA-ZZZ	J. Johnston, GM3LYY, "The Dolphins", Montgomerie Drive, Fairlie, Ayrshire.
GU calls	W. E. Butt, GU2FZC. "Meo Voto", Green Lanes, St Peter Port, Guernsey, CI.
GW2, 3, 4, 5	J. Reid, GW3ANU, 28 Waterson Road, Gabalfa, Cardiff CF4 2SS.
GW6 and 8	J. Lewis, GW8UZL, 14 Gareg y Gad, Llanfair PG, Anglesey LL61 5QF.
BRS and A	D. Borne, G4CYW, Roughways, Chubb Tor, Yelverton, Devon PL20 6HY.

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The FT707 is THE radio of the eighties: 80, 40, 30, 20, 17, 15, 12, 10 metres—100W output (10W 'S' model) 50% developed in 3:1 VSWR—Digital, bright orange LEDs in mode sensitive counter plus analogue readout—Transceiver status at a glance from string LED and 5 single displays—16 poles of crystal filtering provides continuously adjustable IF bandwidth 2·4kHz to 300Hz (N.B. This is true "variable bandwidth" that minimises much of the adjacent channel interference not "IF shift")—Noise blanker of most advanced design using local AGC loop—Schottky diode ring module, power transistor buffers, ultra clean and low noise local oscillator are all combined to produce, size and price notwithstanding a most remarkable receiver.

The illustration to the left shows the complete FT707 System, here neatly mounted in the MR7 rack unit along with a YM35 fist microphone with scanning controls. Alternatively there are two other 600 ohm fist mics, the noise cancelling YM36 or the larger YM37 and the choice of two 50K/600 ohm swan neck desk mics, the standard YM34 or the scanning YM38.

The FC707 ATU can transform loads between 10 and 250 ohms to 50 ohms. An accurate illuminated power meter (15 and 150W FSD) and SWR bridge (to 5:1) plus an inbuilt 150W dummy load complete this attractive package.

The FP707 20 amp supply with inbuilt loudspeaker permits operation from 100-117/200-234V 50/60Hz of the FT707.

The FV707DM is an external digital VFO that uses an advanced twin loop PLL to provide 10Hz tuning steps with excellent spectral purity. The addition of this 1" high package, with its 12 channels of memory with receiver independent tune and internal/external (mic), up/down, fast/slow scanning, perfects the FT707 for mobile or contest use.

The FTV707R transvertor, on top, takes any one of the standard transvertors for 6, 4, 2 or 70cms.

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