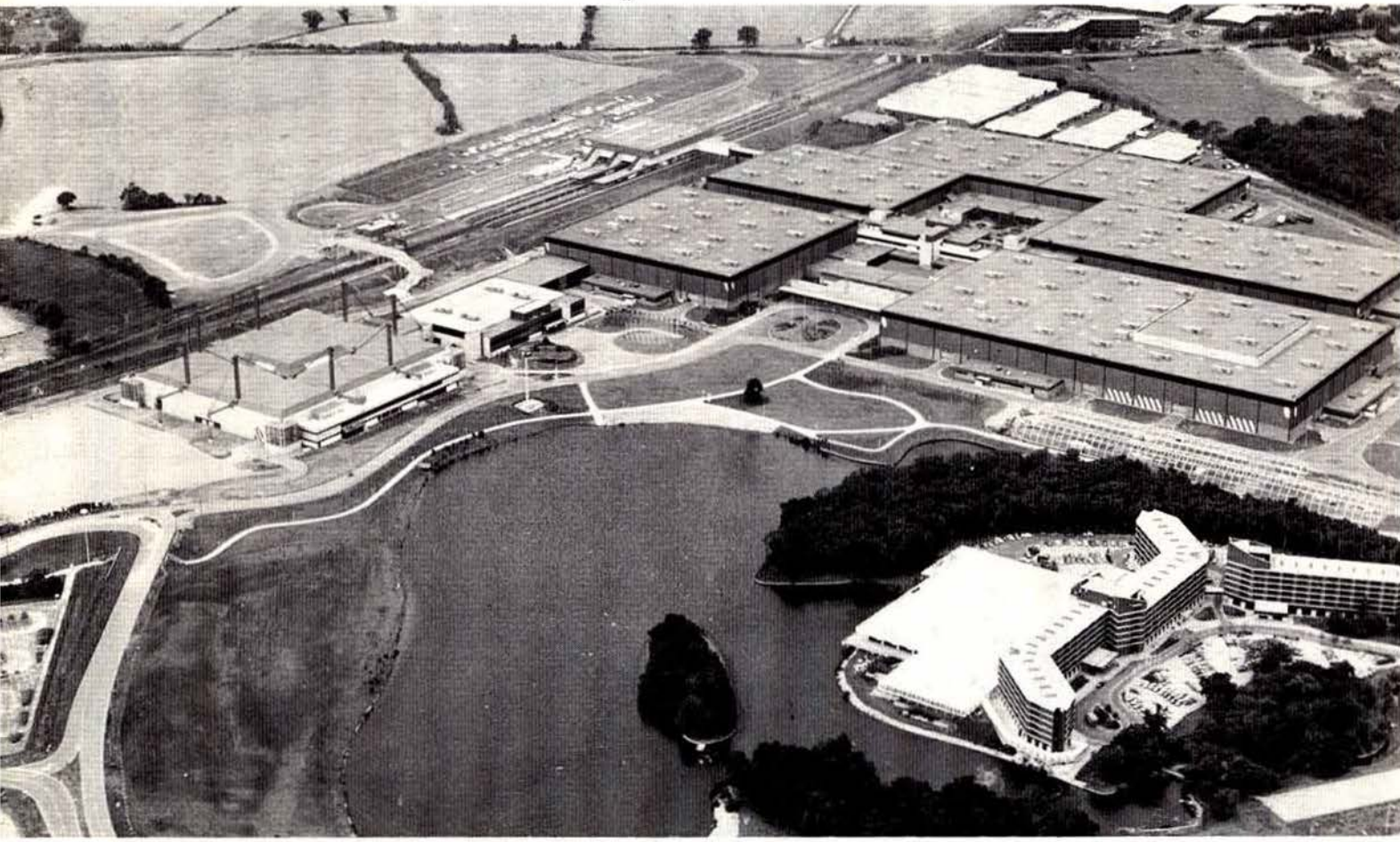
March 1983

RADio COMmunication

The National Exhibition Centre, Birmingham, where the RSGB National Amateur Radio Convention takes place on 5-6 March 1983



Left: Birmingham International Arena (Hall 7) with Hall 6 on its right (see photograph on page 216). Right: main NEC complex of five halls. Beyond, centre: Birmingham International Station (BR). Bottom right: Birmingham Metropole Hotel and conference complex

Journal of the Radio Society of Great Britain

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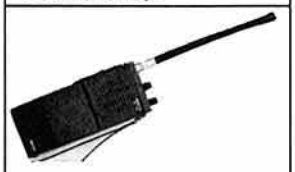

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MARCH 1983

VOLUME 59 No 3

RADio COMmunication

CONTENTS

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

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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Closing date for contributions unless otherwise notified: five weeks before publication date

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.

Modes of Operation
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.

General Coverage
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.

Two VFOs
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.

Memory Operation
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.

Band Scan
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
IF shift enhances listening on today's busy bands.

Notch Filter
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.

Filters
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."

Speech Processor
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.

Other Important Features
All mode squelch circuit.
Includes a 20dB FR attenuator.
A transverter socket is included on the rear panel.

the **new** hf amateur band transceiver **and** general coverage receiver .... the Trio TS430S

Now from Trio, the R2000 general coverage receiver. By taking all the superb features of the R1000 and combining them with the latest in microprocessor control Trio have, in one step, completely revised the standard by which short wave receivers are judged. Among the many features provided for the discerning listener are programmable scan, memory scan, memory retention of the mode set for a particular frequency and last, but not least, Trio have included an FM mode—why FM after all this time and our repeated comment that for a shortwave broadcast receiver FM is not really necessary. Take a look at the rear panel of the R2000: a socket marked VHF converter. Wouldn't it be superb if Trio produced a VHF converter covering from 118 to 174MHz—then you would require FM, you would also require AM. Study the features and I am sure you will agree the Trio R2000 is the receiver for you.

Continuous Coverage from 150kHz to 30MHz
Front panel up/down band switches allow easy selection within the full coverage of the receiver. The VFO is continually tunable throughout the full 150kHz-30MHz range.

All Modes SSB, CW AM and FM

Ten Memories Store Frequency, Band and Mode Data
Each of the ten memories can be tuned by the VFO, thus operating as ten built in digital VFOs. The original memory frequency can be recalled by simply pressing the appropriate memory channel key. All information on frequency, band, and *mode* is stored in the selected memory.
The "auto M" switch allows two types of memory storage: when the "auto M" switch is off, data is memorized by pressing the "M in" switch; when the "auto M" switch is on the frequency being used at that time is automatically memorized.

Memory Scan
Scans all memory channels or may be user programmed to scan specific channels. Frequency, band and mode are automatically selected in accordance with the memory channel being scanned.

Programmable Band Scan
Scans automatically within the programmed bandwidth. Memory channels 9 and 0 establish the scan limit frequencies. The hold switch interrupts the scanning process. However, the frequency may be adjusted using the tuning knob whilst in the scan hold position.

Clock Display with Integral Timer

Three Built In Filters with Narrow/Wide Selector
In the AM mode 6kHz wide or 2·7kHz narrow may be selected. In the SSB mode 2·7kHz is automatically selected. In the CW mode 2·7kHz is again chosen and if the optional YG455C filter is installed then 500Hz in the narrow position. In the FM mode 15kHz bandwidth is automatically selected.

Other important features are: squelch on all modes, noise blanker, a large 4 inch front mounted speaker, tone control, RF attenuator, AGC switch, high and low impedance antenna terminals, 13·8 V DC operation, record jack and, of course, provision for a VHF converter. All in all, a truly remarkable receiver.

£391.00 inc VAT carriage £5.00

"memorable"
the new receiver from Trio.

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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.

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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.....	125.00	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
POWER SUPPLIES			
PS200D	Heavy duty power supply 9-15v 20 amps. Fully metered.....	118.00	5.00
PS300	Daiwa heavy duty PSU 30A max 22A continuous	135.00	5.00
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RM940	New mobile mic with no connections between mic and rig.....	45.00	1.50
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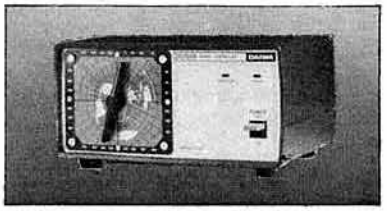
F4	Set of four windshields for RM940 mic. Available singly at 75p.....	3.00	0.50



NEW

The AOR Company, Authority on Radio, have, over the past few years, become known as experts in the design and construction of 2 metre and 70cm handheld equipment. Following on the previously successful models, **the new AR280** provides for the amateur who requires simplicity of operation coupled with a higher power output than other handhelds—an alternative rig. Without a doubt the AR280 with its high quality audio and 5 watts output provides a signal that commands attention on today's crowded 2 metre band.

Power Output
1 watt when in the low power position
5 watts in the high power position

Frequency Range
Using a PLL frequency synthesizer, the rig covers 140-150MHz in 5kHz steps. Electrically tuned stages ensure sensitivity and output power are constant over the entire range.

Memory Channels
Three memory channels are provided for convenience of operation, memory 3 being used for split frequency operation.

Repeater Shift
Full repeater facilities, frequency shift and tone burst are provided for easy access to the many repeaters up and down the country.

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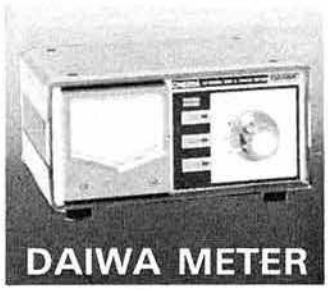
OBITER DICTA

Good morning

Well, with a bit of luck **we shall soon have the shop in Darlington.** I have seen suitable premises and, as I say, if all goes well then you will soon be able to see **the full range of equipment**—Trio, plus all the other bits and pieces we sell displayed in the North East. For more news on the progress of this shop keep reading this page. **Opening dates** and where to park the car; all this has been carefully considered. After all, having paid for your TL922 linear and then carried it two miles to the car it is a bit upsetting to find that parking charges are in excess of one pound. **Parking adjoining the Darlington shop,** as I say, if all goes well is free. It also seems to be the site of the cheapest petrol in the area. **No Botanical Gardens** I am afraid but for railway buffs nostalgia is close by.


DAIWA METER

This month, of course, is the **National Amateur Radio Exhibition** at the **NEC Birmingham.** We shall be there, adjacent to the RSGB stand and we wish the RSGB well in this, their first venture at the country's prime Exhibition site. From what I have seen the March Exhibition promises to be the finest thing that amateurs have had provided for them. The show combines all the varied aspects of amateur radio, **coupled to the professionalism of such a venue as the NEC.** Travel couldn't be easier. Ample car parks, its own linked railway station and, of course, for the executives the ability to jet in from afar to the adjoining airport. **Catering** and **toilets** are above question, plus all the other features of a professional exhibition centre, banks, etc. Like all Exhibitions, if **nobody** comes or everyone says the admission is too high then we can say goodbye to this prestigious venue. **I think the RSGB** have done a good job and put their head on the block. Don't you be the person to chop it off.

Another item related to the RSGB and for the convenience of our customers; we have decided, **for a trial period,** to sell RSGB books in Glasgow and London. So now that the RSGB have moved to Potters Bar and taken their books with them, then it is more convenient, and without carriage charges being necessary, **to pop into one of the shops and make your purchase.** I don't say we will carry the full range, we certainly will not, but the "jewels" of the list will **certainly be available.**

We now have two Trio pieces of new equipment here on display at Matlock. By the time you read this they will also be available from the shops. **The R2000 receiver** which, of course, has been displayed since Leicester and **the new TR430S HF amateur band transceiver with general coverage receiver,** which was released in January. There are many more people who are finding that **shortwave listening** is an addictive hobby. Indeed, there are many amateurs, myself included, who spend more time on the shortwave broadcast station frequencies than on the amateur bands. Don't think that propaganda programmes are all that is to be found on the shortwaves. It is undeniable that propaganda does form a large proportion, if not all the "air time" of some stations, but the more enlightened ones carry quite interesting items. For example, I was listening to **Voice of America** on my **NRD515**—yes I still have the set—one evening, my wife being ensconced downstairs still trying to complete the list of jobs that I had set her to do that morning. Suddenly the sounds of the **"Star Trek"** series came from the NVA515 speaker alongside the rig, and for the next half hour both my wife and I (yes, I relented and allowed her half an hour's break as long as she completed the tasks before midnight), by the diffused light from the rigs, spent an enjoyable part of the evening whilst **VOA "Studio One"** unfolded the story of **"Star Trek"** complete with music and interviews with Spock and Captain Kirk.


SHIMIZU

For those of you who listen to the **BBC World Service,** here at Matlock it has become a ritual to listen to the rousing strains of the signature tune as the Union Jack is run up the mast before trading starts on a Saturday. Back to the story, well at the beginning of January the **local Matlock Methodist Church** was featured broadcasting the annual Covenant Service—a special service to we Methodists—to the world. I had been invited to the recording of the service but didn't make it as **I was organizing an orgy elsewhere** that evening, joking apart, a Children's Christmas Party. I digress again. We here at Matlock have puzzled, John has scratched his head, but we really cannot put our finger on what it is about the TS430S. It just seems to attract attention and those who have used it are of the same opinion. I suppose it is something like the feel of riding in an expensive car or being in the company of an attractive and exquisitely dressed lady—difficult, if not impossible to describe but noticeable all the same. **That's the new Trio TS430S.** As the man said, "A rig which sets new standards in transceiver technology." A piece of equipment that will be the subject of much discussion and praise world wide for months to come.

There are now many R2000 owners up and down the Kingdom. This is a rig which really revolutionizes shortwave equipment, having micro processor controlled functions which we would not have considered feasible a year ago but now available to all. Not only is it a good receiver but its ability to memorize frequencies and modes, scan selected sections of the band, tune continuously at three different tuning speeds sets it apart from other pieces of equipment. **The Trio R2000, truly tomorrow's receiver today**—a **"memorable"** rig.


DELUXE KNOB

After a long period of no stock I am pleased to say the **Daiwa** PS300 and PS200D power supplies are now in stock, well at least they are as I write this. Also, the Daiwa 7500R rotator. For a list of the complete range of Daiwa equipment, first class items all of them, see page 192.

At last there are more contacts to be had on 70 centimetre FM. **Trio produce a complete range of 70 cm equipment:** a hand held, **the TR3500** giving 1.5 watts output, programmable scan, 10 memory channels, memory scan, all in a unit which, due to Trio's now well-known way of doing things, accepts all accessories which you previously bought for your 2 metre **TR2500. The 2 metre TR2500** costs £220.80, the new 70 centimetre version, **the TR3500 costs £238.51**—both prices include VAT, carriage, of course being £5.00. You will notice that the two prices are not very different, **another Trio benefit** derived from the ability to use a case and micro processor control already developed for a previous model, and the cost advantage is passed on to you. The other pieces of 70 centimetre equipment are both mobile: **the FM only TR8400 which still has with it a free PS10 power supply.** Note this power supply features memory backup and a typically Trio high quality speaker. The other rig is the multi-mode TR9500, having SSB, CW, FM and giving 10 watts output. This rig is ideal for the chap who wants to DX on 70 centimetres. The rig has a first class receiver and is easy to use both in the car or at home as part of a base station. **Without a doubt, the rig for the 70 centimetre operator is the Trio TS780.** A true base station in the accurate sense of the word, having an internal power supply and being dual band, that is operating on both 70 centimetres and 2 metres. With a TS780 in your shack the VHF/UHF world will really come alive and superb contacts can be had. Satisfying ones too as those who are active will testify. Why not put a **Strumech Tower** on your Lowe Card. We are agents for **Strumech** and will give all assistance with the purchase of a tower. **After all, we use them ourselves.**

Anyway, that's about it for now as I have just heard a rumour that **Phil G6MHT,** one of our **valued** customers from Derby, has just come for **the special gold-plated TS430S presentation model** he ordered some time ago. An absolutely superb limited edition transceiver, having a **gold**-plated case and front panel, **crocodile** skin handle and **jewel** encrusted Trio badge and, as usual I expect, he'll want us to carry it out to his van so, Gud DXes 73es FBYLS, XYLS, esFBOM, etc.

David

MICROWAVE MODULES LTD

A SELECTION FROM OUR EXTENSIVE RANGE

TRANSVERTERS FOR 432MHz

MMT432/144-R pictured

VHF & UHF RECEIVE CONVERTERS

MMC144/28 pictured

RECEIVE PREAMPLIFIERS

MMA144V pictured

MMT432/28-S

This all-mode linear transverter allows your 28MHz transceiver to operate on the popular 70cm band. Providing an output of 10 watts RMS, and incorporating a low-noise receive converter, this product represents a cost-effective means of moving up to one of the few peaceful amateur bands. A frequency shift, allowing coverage of 432-434MHz and 434-436MHz, both from 28-30MHz equipment means that the simplex, repeater and satellite portions of 70cm can be utilised.

Price: **£159** inc VAT (p&p £2.50)

MMT432/144-R

This product, which is similar to the MMT432/28-S above, is intended for use with a 2 metre transceiver, to provide coverage of the 70cm band. The basic specification is the same, with the exception that this unit incorporates a repeater shift of 1·6MHz for simple access of the many UK repeaters. The transverter is supplied with a suitable attenuator to allow use with transceivers having an output power of 10 watts.

Price: **£184** inc VAT (p&p £2.50)

MMC50/28

Input frequency range	:	50-52MHz
Output frequency range	:	28-30MHz
Overall gain	:	30dB typ.
Noise figure	:	2.5dB or better

Price: **£29.90** inc VAT (p&p £1.00)

MMC70/28

Input frequency range	:	70-72MHz
Output frequency range	:	28-30MHz
Overall gain	:	30dB typ.
Noise figure	:	2.5dB or better

Price: **£29.90** inc VAT (p&p £1.00)

MMC144/28

Input frequency range	:	144-146MHz
Output frequency range	:	28-30MHz
Overall gain	:	30dB typ.
Noise figure	:	2.5dB or better

Price: **£29.90** inc VAT (p&p £1.00)

MMC432/28-S & 144-S

Input frequency ranges	:	432-434MHz & 434-436MHz
Output frequency range	:	MMC432/28-S 28-30MHz MMC432/144-S 144-146MHz
Overall gain	:	30dB typ.
Noise figure	:	3dB or better

Price: **£37.90** inc VAT (p&p £1.00)

MMA144V

This RF switched low-noise receive preamplifier utilises the proven 3SK88 in a noise matched design. Providing a power gain of 15dB and having a noise figure of better than 1.3dB, this unit will accept a through power of 100 watts.

Price: **£34.90** inc VAT (p&p £1.00)

MMA1296

This low-noise 1296MHz preamplifier comprises a two-stage preamp and a high technology microstrip interstage filter.

Power gain	:	18dB typ.
Noise figure	:	2.9dB max.
Frequency coverage	:	1250-1300MHz

Price: **£34.90** inc VAT (p&p £1.00)

MORSE TUTORS

MMS1 pictured

MMS1 £115 inc VAT (p&p £2.50)

This speech-synthesised morse tutor produces random morse, in various group lengths, and at speeds in the range 2-20 wpm and provides speech response to the pupil, to enable a check to be made on his/her receiving ability. The unit is designed around a microprocessor and is a perfect and accurate means for the individual to learn morse code.

MMS2 £169 inc VAT (p&p £2.50)

This advanced Morse Trainer is based on the MMS1, and includes all the above facilities, with the addition that the pupil may key his own morse into the unit so that he can perfect his sending ability. As this is a more advanced product, the speed range is 6-32 wpm.

ALL MICROWAVE MODULES PRODUCTS ARE FULLY GUARANTEED FOR 12 MONTHS (INCLUDING PA TRANSISTORS)

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HOURS: MONDAY-FRIDAY 9-12.30, 1-5.00

THANET'S GUIDE

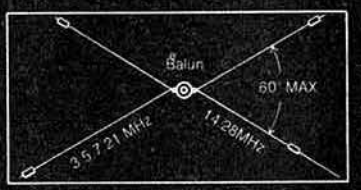
IC-720A £949 inc.

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!

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

IC-730 £629 inc.

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.

Securicor or post despatch free.

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TO THE GALAXY

IC-AT500 £339 inc.

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.

And remember we also sell **Yaesu, Jaybeam, Datong, Welz, G-Whip, Western, TAL, Bearcat, Versatower** and **RSGB** publications from our shop and showroom at the address below.

Come in for a demonstration or just a chat, our qualified sales staff and technicians will be glad to assist you.

Listed below are other sets available from Thanet Electronics, a more detailed specification of these will appear in future advertisements, prices are inclusive of VAT. IC-505 £299, IC-251 £559, IC-290E £379, IC-290H £399, IC-25E £269, IC-410 £379, IC490 £429, IC-AT100 £249, IC-45E £289, IC-551 £369, IC-PS20 £139, IC-2E £169, IC-4E £199, IC-451 £689, IC-ML1 £59, IC-PS15 £119. TONO: MR250 £325, 9000E £669, TASCO: CWR-670 £289, CWR-685E £789, CWR-610 £189.

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-74O 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.

IC-2KL + PSU £1149 inc.

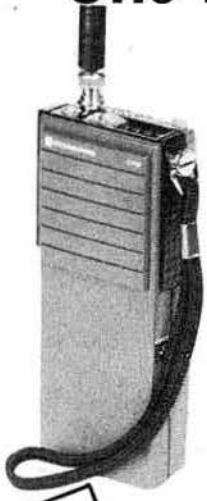
Agents (phone first – all evenings and weekends only, except Scotland).
Scotland – Jack GM8 GEC (031 665 2420) **Midlands** - Tony G8AVH (021 329-2305)
North West – Gordon G3LEQ Knutsford (0565) 4040 Ansafone available

Dealers
Wisbech Amateur Radio Exchange (0945) 581 099
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

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet Electronics
143 Reculver Road, Herne Bay, Kent. Tel: (02273) 63859.
BARCLAYCARD VISA
Same day despatch if possible

Lee Electronics Ltd

C110 2m/FM Handy



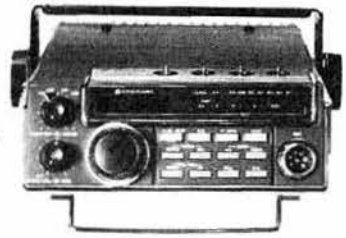
- Synthesized 144-146 MHz
- 2 watt RF output.
- 2.3 watt RF output on optional ni-cad pack.
- S. meter/power meter.
- Illuminated channel change.
- Tone burst fitted.
- Repeater shift.
- Many options.
- Light weight 420gms.
- Supplied with helical ant.

NEW

Price: T.B.A.

C5800 2m/FM/SSB

- 25W SSB/FM
- 10 Memories
- 3 Scan Modes
- USB/LSB
- 12.5/5KHz Steps
- RIT Control
- S/Power Meter



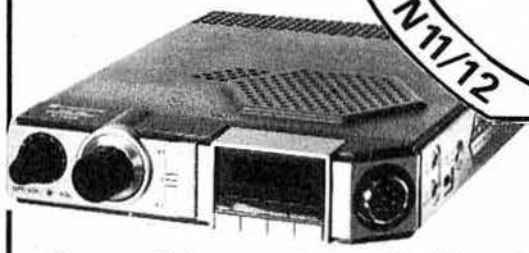
The C5800 is the smallest Multi-Mode FM Transceiver on the market at present, measuring only 149 x 55 x 218 mm and weighing a mere 1.9 Kg. If you want further information either come in and see it or send for a full colour leaflet on this and other standard models.

£359-00
inc VAT and carriage

N.E.C. N11/12 N.E.C. N11/12 N.E.C. N11/12 N.E.C. N11/12

NO!!
more phoning around for the best prices until the end of March, on all items over £100, we are offering Interest free H.P. on R.R.P.
10% discount for cash
7% discount for plastic
All items carry full warranty

C8900 VHF
C7900 UHF



These small slim transceivers are ideal for todays compact cars as very little room is required for fitting. The units can be fitted separately or stacked one above the other with the brackets provided. Both units feature tiltable led displays for easy reading when the sets are mounted below the drivers eye level. The sets provide a good 10 watts RF output with excellent performance specification. If you are in any doubt come and try them at the N.E.C. or if you are close by drop into the shop.

£199-00/£239-00
inc VAT and carriage

C58 FM/SSB

- 144-146 MHz
- FM/USB/LSB
- 1 Watt
- 5 Memories
- Multi-Scan Mode
- RIT
- Noise Blanker
- 5KHz/12.5KHz

The C58 has all the features possible on a portable rig many of which some mobiles don't have. Its optional accessories allow it to be used in the car with a power output of 25W. Come in and compare this with the FT290 — you may be glad you did.

£239-95
inc VAT and carriage

SEE US AT THE N.E.C.
N.11 & 12 MARCH 5/6

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9.30am-1pm Thurs.
10am-4.30pm Sat.

AMATEUR RADIO EXCHANGE

Our very first advertisement – in RAD COM for November 1976, for those who keep such things – invited readers to display their surplus equipment for sale on a commission basis, and ever since secondhand sales have been an important and integral part of our business.

Now we are proud to announce out new Central Computer facility for instant matching of buyers and sellers of secondhand gear. No need to part-exchange it, or bring it to the shop, unless you're a coffee addict! Just phone us with the details, which we then enter into our computer, at a normal charge of just £10 per item.

All enquiries for a particular type or make of equipment are answered by mailing out the relevant entries in the electronic store, after which it is up to the two parties concerned to get in touch and negotiate their deal.

So, if you have things you want to sell really fast, phone us now on our direct Central Computer line –

01-992 5789

CAN'T GET TO LONDON OR ST. HELENS?

Don't worry. Come and see us on our Stand at major Rallies in March

- RSGB Exhibition at the NEC in Birmingham Saturday/Sunday 5th and 6th
- NARSA Exhibition at Pontins, Southport Saturday/Sunday 19th and 20th.
- White Rose Rally at University of Leeds Sunday 27th.

SONY ICF-2001

Still unique in the market, a superb HF communications receiver with keyboard entry and LCD covering AM/SSB/CW from 150kc to 30MHz and FM from 76 to 108MHz with six station memories.

A masterpiece of compact modern technology for only £129.

FAIRMATE AS-32320

In stock at last, our brilliant new-generation VHF/UHF scanning receiver covering 110-136MHz, 136-162MHz and 296-367MHz.

With features like these, it just has to be a winner...

- Band scan
- Manual UP/DOWN frequency search
- Memory scan of up to 10 selected frequencies in 5kc steps
- Pause-on-scan feature.
- Lock-out facility
- Two memories
- AM/FM facility

Amazing value at only £129

MORE OVER PAGE!

AMATEUR RADIO EXCHANGE

TS-430S

Trio's latest HF transceiver for mobile or base station use featuring 160-10m operation with general coverage receive • USB/LSB/CW/AM with optional FM, all mode • 10Hz step dual digital VFOs • Eight memories to store frequency, mode and band data • Lithium battery memory back-up • Memory scan • IF shift circuit • Built-in speech processor, tunable notch filter and noise blanker • Narrow/Wide filter selection.

Fantastic value at our special price of £675

NEW · NEW · NEW

What are we keeping under wraps?

Could it perhaps be the new YAESU FT-726 VHF base station transceiver... the one we've all been waiting for since they dropped the FT-221R and the FT-225RD?

So new that we do not yet have a photo, but we do know the main specification points and the price – **£649.**

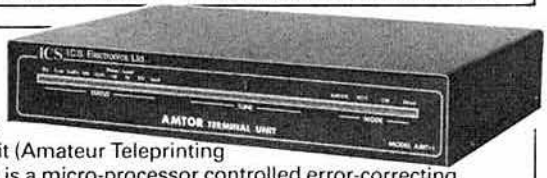
• Triple-band operation on 4m or 6m, 2m and 70cm.
• Plug-in RF heads for each band available separately.
• 2 VFOs • 10 memories • 20Hz resolution on CW and SSB.
• IF shift and width control. • Programmable offset for duplex.

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 **£1100**

AMT-1



This AMTOR terminal unit (Amateur Teleprinting Over Radio) is a micro-processor controlled error-correcting data communication system, allowing virtually error-free data transmission between suitably equipped stations. Made in England by ICS Electronics, it offers full AMTOR error-correcting facilities **plus** RTTY, ASCII and CW (transmit only). • Mode and configuration control from the keyboard of your terminal • Crystal controlled AFSK generator and 4-pole active receive filter

A milestone in amateur radio communications for just £275.

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 £675

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

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!

LICENSED CREDIT BROKERS ✻ Ask for written quotation on HP terms. Also interest-free terms with 50% deposit.

BARCLAYCARD VISA · ACCESS We welcome Access

CREDIT CARD SALES BY TELEPHONE.

All prices include VAT and are correct as we go to press. However, we reserve the right to vary them if forced to do so by the time this advertisement appears.

Rapid mail order dispatch, with FREE carriage by insured Post or Securicor within the UK mainland.

YAESU

FT980CAT	**NEW** all-mode transceiver with AM/CW/FM/SSB/AFSK	P.O.A.
FT 102	160-10M 9-Band Transceiver **NEW**	775.00
FT ONE	Gen. Coverage Transceiver **NEW**	1345.00
FT 790R	70cm all-mode portable **NEW**	309.00
FT 101ZFM	160-10m 9-Band Transceiver	590.00
FT 101ZDFM	160-10m 9-Band Transceiver	665.00
DIGT 1012	Digital unit	90.00
DCT 101Z	DC Adaptor	42.50
FV 101Z	Remote vfo	112.00
FT902DM	9-Band AM/FM Transceiver ★	795.00
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	445.00
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 ★	365.00
FP 80A	230V AC power supply	63.00
FT 780R	70cm all-mode transceiver ★	399.00
FT290RD	**SPECIAL** 1983 version with ARE mods and 3SK87 f/end	259.00
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

TS430S	Gen. coverage multi-mode **NEW**	675.00
TS 930	Gen. coverage transceiver **NEW**	P.O.A.
TS 830S	160-10m transceiver 9 bands	P.O.A.
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	48.00
9502B	Colorotor (Med. VHF)	56.60
KR 400RC	Kenpro—inc. lower clamps	P.O.A.
KR 600RC	Kenpro—inc. lower clamps	P.O.A.

ICOM

IC 740	Multimode H.F. transceiver **NEW**	675.00
IC 720A	HF transceiver and gen. cov. rec.	849.00
IC 730	HF mobile transceiver 8-band	620.00
IC R70	New multimode receiver	469.00
PS 15	Power supply for 720A	99.00
IC 251E	2m multimode base station	539.00
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	169.00
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 BPS	11.5V Nicad pack for IC 2E	30.50
IC DC1	12V adaptor pack for IC 2E	9.50

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
HK708	Up/Down key	11.95
EK 150	Electronic keyer	74.00

MOBILE SAFETY MICROPHONES

ADONIS AM 202S	Clip on	P.O.A.
ADONIS AM202F	Swan neck + up/dwn bttns	P.O.A.
ADONIS AM202H	Head band + up dwn bttns	P.O.A.

DRAE

FULLY PROTECTED POWER SUPPLIES

4 amp	30.75	6 amp	49.00
12 amp	74.00	24 amp	105.00
VHF Wavemeter	130 450MHz		27.50
Morse Tutor			49.00

DATONG

PC1	Gen. Cov. Converter HF on 2m	137.42
VLF	Very Low Frequency Converter	29.90
FL1	Frequency Agile Converter	79.35
FL 2	Multi-mode Audio Filter	89.70
FL 3	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)	35.84
BY 2	Keyer Paddle (chrome base)	43.72
BY 3	Keyer Paddle (gold plated)	92.00
ZA 1A	Balun 3-5-30mHz for dipoles	15.00
ZA 2A	Balun 14-30MHz for beam ant	17.25

TONO

THETA 9000E	RTTY/CWASC11	669.00
THETA 550	The latest—a winner!	299.00

AMPLIFIERS

UC 70	430MHz 55W + preamp	159.00
2M-50W	144MHz 30-50W	69.00
2M-100W	144MHz 100W + preamp	129.00
MR 150W	144mHz 130-150W + preamp	169.00
MR 250W	144MHz 250W + preamp	325.00

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	769.00
TeleReader CWR 670E As above RX only	289.00
MorseMaster CWR 600 As above basic unit	189.00

WELZ

SP 200	1-8-160MHz 20W-200W-1KW	61.95
SP 300	1-8-500MHz 20W-200W-1KW	85.00
SP 400	130-500MHz 5W-20W-150W	61.95
SP15M	1-8-150MHz 0-2-5-20-200W	32.00
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	11.95
CH 20A	DC-450MHz coax switch SO239	15.95
CH 20N	As above—N type sockets	27.95

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

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.

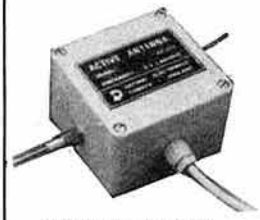
Sixty-four tones in the range from 1747 to 2330 Hz are selectable by a DIL switch and a built-in notch filter removes the tone from received signals.

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.

COMPACT RECEIVING ANTENNAS MODELS AD270/370



MODEL 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

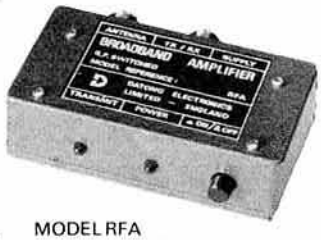
Once upon a time it was the norm to use a ten metre receiver to receive the two metre band. Now, large numbers of special purpose two metre SSB rigs are in use and conversion the other way becomes a very attractive possibility.
With the addition of Model PC1 each of these two metre SSB rigs becomes a 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

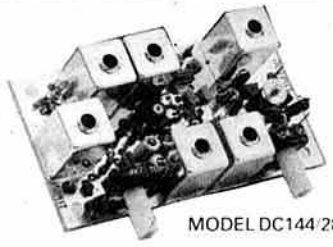


MODEL RFA

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.

HIGH PERFORMANCE 2 METRE CONVERTER

MODEL DC 144/28



MODEL DC144/28

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.

DATONG ELECTRONICS LIMITED

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.					

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

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NEW! FT-980 HF Transceiver

The **ALL NEW**
FT980 CAT transceiver with continuous RX coverage of 150Hz-30MHz and computer interface option.

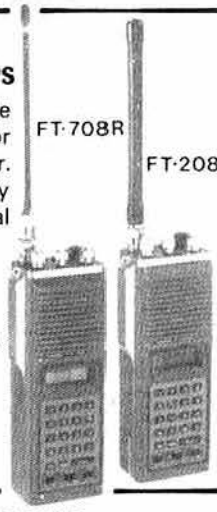
FT-290R/FT-790R 2m & 70cm portables

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 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-708R FT-208R

FT-230R/730R 2m & 70cm FM mobiles

- Two independent VFO's
- 10 memories
- Priority function
- Memory and band scan
- 12.5/25KHz steps (25/100KHz FT-730R)
- Large LCD readout.

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.

FT-480R/780R 2m & 70cm mobiles

The most advanced 2 metre and 70 cm mobiles available today — USB, LSB, FM, CW full scanning with priority channel, 4 memory channel, dual synthesized VFO system.

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

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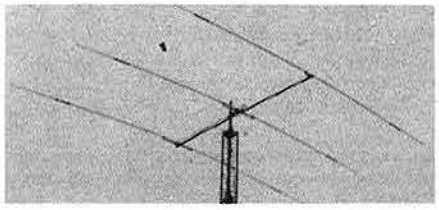
TET ANTENNA SYSTEMS



AX210N	10 ele. yagi for 2m crossed	74.95	(n/c)
HB10F2T	2 ele. 10m mono band beam	51.50	(n/c)
HB10F3T	3 ele. 10m mono band beam	74.95	(n/c)
HB15F2T	2 ele. 15m mono band beam	60.66	(n/c)
HB15F3T	3 ele. 15m mono band beam	93.46	(n/c)
HB15M2SP	VP mini size 15m 2 ele.	69.50	(n/c)
HB15M3SP	VP mini size 15m 3 ele.	102.30	(n/c)
HB34D	4 ele. tri band beam 10/15/20m	222.90	(n/c)
HB33SP	3 ele. tri band beam 10/15/20m	192.50	(n/c)
HB35C	Tri band array 10/15/20m	283.95	(n/c)
HB35T	5 ele. 10/15/20m	278.50	(n/c)
MV3BH	Vertical for 10/15/20m	37.99	(n/c)
MV4BH	Vertical for 10/15/20/40m	48.90	(n/c)
MV5BH	Vertical for 10/15/20/40/80m	63.95	(n/c)
MLA4	Loop antenna 10/15/40/80	105.60	(n/c)
SQ22	Phased 2 ele. swiss quad 2m	58.95	(n/c)
SQY06	6 ele. quagi 2m	45.75	(n/c)
SQY08	8 ele. quagi 2m	52.75	(n/c)
HB210S	10 ele. dual driven yagi 2m	47.99	(n/c)
TE214	14 ele. long yagi 2m	74.40	(n/c)
SSL720	9 x 2 ele. (18) slot fed 70cm	77.20	(n/c)
HB23SP	2 ele. tri band beam 10/15/20m	135.60	(n/c)
SSL218	9 x 2 ele. (18) slot fed 2m	144.79	(n/c)
TPH2	Phasing harness 2m	17.25	(n/c)
QYU10	10 ele. quagi 70cm	67.90	(n/c)
SQ007	70cm 2 ele. phased swiss quad	66.99	(n/c)
SQ10	Swiss quad 10m	97.50	(n/c)
SQ15	Swiss quad 15m	106.90	(n/c)

YAESU ANTENNAS

Base

RSL145GP	½ wave base ant. 2m	21.20	(1.50)
RSL435GP	½ wave co-linear 70cm	31.60	(1.50)

HF Mobile

RSL3.5	3.5MHz resonator & whip	12.21	(0.50)
RSL7.0	7.0MHz resonator & whip	11.80	(0.50)
RSL14.0	14.0MHz resonator & whip	11.45	(0.50)
RSL21.0	21.0MHz resonator & whip	11.20	(0.50)
RSL28.0	28.0MHz resonator & whip	11.00	(0.50)
RSL2A	Mast to suit above	5.00	(0.50)
RSM2	Gutter mount/Feeder/PL259 suit above	10.94	(0.75)

VHF Mobile

RSL145	2m ¼ wave fibreglass whip	12.10	(0.50)
RSL145S	2m ¼ wave steel whip foldover	9.25	(0.50)
RSL150SS	2m ¼ wave PL259 shock spring	3.90	(0.50)
RSM2	Gutter mount/Feeder/PL259 (RSL145)	10.94	(0.75)
RSM4M	Heavy duty mag/Feeder/PL259	13.25	(1.00)

UHF Mobile

RSL435S	¼ wave antenna	15.50	(0.50)

ANTIFERENCE ANTENNAS

VHF Mobile

TAP3009	¼ wave 3db snap-in hinged whip	11.42	(3.00)
TAP3677	¼ wave 3db snap-in shock coil	15.64	(3.00)
TAP3002	¼ wave unity gain snap-in hinged whip	8.81	(3.00)

UHF Mobile

TAP3462	¼ over ¼ wave 3db	9.89	(3.00)
TAP3697	¼ over ¼ wave 5db	18.40	(3.00)
K220	Mag mount/Feeder to suit above	10.73	(2.00)

Simply phone or write and leave the rest to us

Antennas Various/Accessories

HQ1	Mini beam 10/15/20m 2 ele. 1kW	TBA	(4.00)
C4	Vertical 10/15/20m	48.50	(3.00)
G4MH	Mini beam 10/15/20	85.00	(4.00)
KTLM-4	Gutter mount/Cable assy. SO239	6.90	(0.50)

DATONG PRODUCTS

PC1	50KHz to 30MHz receive converter	137.42	(0.50)
VLF	Very low freq. converter	29.90	(0.50)
FL1	Frequency agile audio filter	79.35	(0.50)
FL2	Multimode audio filter	89.70	(0.50)
ASP/A	Auto RF speech clipper (YAESU)	82.80	(0.50)
ASP/B	Auto RF speech clipper (TRIO)	89.70	(0.50)
D75	Manual RF speech clipper	56.35	(0.50)
RFC/M	RF speech clipper module	29.90	(0.50)
D70	Morse tutor	56.35	(0.50)
AD270	Active dipole RX ant. (indoor)	47.15	(0.50)
AD370	Active dipole RX ant. (outdoor)	64.40	(0.50)
MK	Morse keyboard	137.42	(0.50)
DC144/28	2m converter	39.67	(0.50)
RFA	Broadband preamplifier	33.92	(0.50)
MPU	Mains power unit	6.90	(0.50)

MICROWAVE MODULES

Transverters

MMT28/144	10m transverter	109.95	(2.50)
MMT70/144	4m transverter	119.95	(2.50)
MMT432/144R	70cm transverter	184.00	(2.50)
MMT1296/144	23cm transverter	184.00	(3.00)
MMT70/28	4m transverter	119.95	(2.50)
MMT144/28	2m transverter	109.95	(2.50)
MMT432/28S	70cm transverter	159.95	(2.50)

Linear Amplifiers

MML28/100S	10m 100W linear amp.	129.95	(3.00)
MML70/50S	4m 50W linear amp.	85.00	(2.50)
MML70/100S	4m 100W linear amp.	139.95	(3.00)
MML144/30LS	2m 30W linear amp. 1-3W in	69.95	(2.50)
MML144/50S	2m 50W linear amp.	85.00	(2.50)
MML144/100LS	2m 100W linear 1-3W in	159.95	(3.00)
MML144/100S	2m 100W linear 10W in	139.95	(3.00)
MML432/50	70cm 50W linear amp.	109.95	(3.00)
MML432/100	70cm 100W linear amp.	228.65	(4.00)
MML1296/10	23cm 10W linear amp.	199.00	(2.50)
MML432/30	70cm 30W linear amp. 1-3W in	99.00	(3.00)

Converters

MM1000KB	ASC11 morse converter with keyboard	99.95	(3.00)
MM4001	RTTY to TV converter	189.00	(2.50)
MM4001KB	RTTY transceiver	269.00	(2.50)
MM4000KB	RTTY transceiver with keyboard	299.00	(4.00)
MMC28/144	10m to 2m converter	29.90	(1.00)
MMC50/28	6m to 10m converter	29.90	(1.00)
MMC70/28	4m to 10m converter	29.90	(1.00)
MMC70/28LO	4m to 10m with LO	32.90	(1.00)
MMC432/28S	70cm to 10m converter	37.90	(1.00)
MMC432/144S	70cm to 2m converter	37.90	(1.00)
MMC435/600	UHF ATV converter	27.90	(1.00)
MMC1296/28	23cm to 10m converter	34.90	(1.00)
MMC1296/144	1296MHz low noise converter	69.95	(1.00)
MMK1691/137.5	1691MHz meteosat converter	129.95	(2.50)

Morse Talkers

MMS1	Morse tutor 2-20WPM Side tone	115.00	(2.50)
MMS2	Morse tutor (advanced) 6-32WPM + speak back	169.00	(2.50)

Amateur TV

MTV435	70cm 20W (PSP) transmitter	149.00	(2.50)
MMC435/600	Converter ATV UHF output	27.90	(1.00)

Preamplifiers

MMA144V	2m preamp RF switched	34.90	(1.00)
MMA28	10m preamp	16.95	(1.00)
MMA1296	23cm preamp	34.90	(1.00)

Frequency Counters

MMD650/500	500MHz digital meter	75.00	(1.00)
MMD600P	600MHz pre scaler	29.90	(1.00)
MMDP-1	Probe	14.90	(0.50)

Filters

MMF144	2m band pass 40W max.	11.90	(1.00)
MMF452	70cm band pass 40W max.	11.90	(1.00)

Various

MMS384	384MHz signal source	29.90	(1.00)
MMR15/10	15db 10W attenuator	11.90	(1.00)

HI-MOUND MORSE KEYS

HK702	Up down keyer marble base	24.50	(0.50)
HK704	Up down keyer	16.68	(0.50)
HK705	Up down keyer	12.50	(0.50)
HK706	Up down keyer	13.75	(0.50)
HK708	Up down keyer	11.96	(0.50)
HK808	Up down keyer marble base	39.57	(0.50)
MK704	Twin paddle keyer	10.95	(0.50)
MK705	Twin paddle keyer marble base	22.00	(0.50)

MOULDINGS

IK	Iambic keyer	19.95	(0.50)

TOKYO HY POWER

HC150	HF ATU SWR/Power meter 200W PEP	62.50	(n/c)
HC2000	HF 2kW ATU SWR/Power meter 6 POS ant. switch. 6 to 1 vernier high Q coils 2kW peak 1kW continuous	276.55	(n/c)

Antenna Rotators & Accessories

SU2000	Light duty rotator	34.95	(3.50)
9502	Channel master med duty up to 8 ele.	57.00	(3.50)
9523	Alignment bearing for 9502	14.38	(1.25)
KR400	Med/Heavy duty 180° meter (inc. lower casting)	90.85	(3.50)
KR400RC	Med/Heavy duty 360° meter Load 200Kg 1½"-2" masts	102.35	(3.50)
CASTING	Lower casting set (400RC)	15.00	(1.25)
KR600RC	Heavy duty 360° meter Load 200Kg Rot600Kg/cm Brake 4000Kg/cm 1½"-2"masts	136.85	(3.50)

Antenna Switches

SA450	SO239 connectors 1 in 2 out	9.75	(0.50)
SA450N	"N" type connectors 1 in 2 out	12.75	(0.50)

Baluns

BL50A	RAK 50 ohm ferrite BALUN 1:1 1.8-38MHz 1kW	12.88	(1.50)
W2AU	1:1 50 ohm 3-40MHz 1kW	14.99	(1.50)

Dummy Loads

T30	30W DC 500MHz PL259	6.61	(0.50)
T100	100W DC 500MHz SO239	20.12	(1.00)
T200	200W DC 500MHz SO239	31.36	(1.50)
T210	Wide band 10W 1.2G-2.4G	24.50	(0.75)
AW05	Pocket RF wattmeter 5W up to 500MHz BNC	19.75	(1.00)

Filters

AKD	Hi-pass blocks 0-200MHz RF interference to UHF above 400MHz	5.50	(0.50)

Linear Amplifiers

YAESU

FL110	HF 160/80/40/20/15/10m 100W (10W drive)	155.25	(n/c)
FL2100Z	HF warc 1200w PEP, SSB 1kW CW, 400W AM/FM/FSK	449.00	(n/c)
FL2010	2m VHF 10W linear	54.00	(n/c)
FL2050	2m VHF 50W linear 10W drive	115.00	(n/c)
FL7010	70cm UHF 10W linear	91.00	(n/c)

TOKYO HY POWER

HL32V	VHF 30W linear 1-5W drive HI-LOW output	53.50	(n/c)
HL82V	VHF linear preamp output meter 2-12W in 35-85+ out	144.50	(n/c)
HL160V	VHF linear preamp output meter 1-10W in 160W+ out	242.40	(n/c)
HL45U	UHF linear preamp 2-15W in 10-45W out		(n/c)

ADONIS MICROPHONES Mobile/Base

MM202S	Mobile safety mic. (non scanning)	23.00	(1.00)
MM202HD	Mobile safety mic. (scanning)	30.00	(1.00)
AM502	Desk mic. (compressor selectable)	45.94	(1.00)

Miscellaneous

Mutec

SNL144S	2m preamp RF switched	33.90	(1.00)
RPCB	144UB FT221/225 front end board	64.50	(1.25)

Ni-cads

AA	AA size Ni-cad	1.00	(0.20)
C	C size Ni-cad	2.40	(0.30)
NC1850	Ni-cad charger (4 x C or 4 x AA)	9.50	(1.00)

DRAE PRODUCTS

DRAE4	4 amp PSU	30.75	(2.00)
DRAE6	6 amp PSU	48.00	(2.50)
DRAE12	12 amp PSU	74.00	(3.00)
DRAE24	24 amp PSU	105.00	(4.00)
DRAE WM	135-450MHz wavemeter	27.50	(1.00)

"N" Connectors (Silver Plated)

N58	"N" Male connector RG58	2.25	(0.25)
N8	"N" Male connector RG8	2.40	(0.25)
N308	"N" T adaptor (three female)	2.40	(0.25)
N307	"N" L adaptor (1 male 1 female)	2.40	(0.25)
N306	"N" Double female adaptor	1.90	(0.25)
N310	"N" Double male adaptor	2.50	(0.25)
N8304	"N" Female to BNC male adaptor	2.10	(0.25)
N402	"N" Plug to SO239	2.05	(0.25)
N403	"N" Socket to PL259	2.00	(0.25)
N404	"N" Socket to SO239	1.80	(0.25)

Speakers/Headphones

Various

RT650	4 ohm, 8 ohm 3W nom 6W max	6.50	(0.50)
MS60	3W nom 5W max	7.50	(0.50)
S2	Headphones (cobalt magnets)	5.75	(0.50)

YAESU

YH55	Headphones Low Z	10.00	(0.50)
YH77	Lightweight headphones Low Z	10.00	(0.50)

SWR/Power Meters

YAESU

YS200		52.90	(n/c)
YS2000		69.79	(n/c)

Other Makes

RF2000	Twin meter 3.5-150MHz F/Scale 200/2000W	18.25	(1.00)
YM1X	Twin meter 3.5-150MHz F/Scale 12 or 120W	14.99	(1.00)

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SMC SERVICE: FREE FINANCE, FREE CREDIT COVER, GUARANTEE

Earning the title "The Communicators" in the amateur, commercial and marine fields was not gained easily, and we guard our reputation as jealously today, as we did a quarter of a century ago. Maintaining our reputation requires service with a capital 'S'. We offer free Securicor delivery on major equipment, take Access and Barclaycard over the phone, and have superb demonstration facilities.

On many regular priced items for an invoice over £120 we provide *free finance*, 20% down (balance over 6 months) or 50% down and the balance over a year; *you pay no more than the cash price*. Where this service is not available we have taken the worry out of finance: enter a personal loan agreement—remember the deposit can be as low or lower than your monthly instalments—for 12 months to 3 years (at a typical APR rate of 31·8%) and in the event of sickness, accident, compulsory redundancy or death *your credit is covered by SMC*. If you have a card (Access, Barclay or Bankers), or a UK call sign (bring your license with you, or show us the call book entry), it's *INSTANT*.

Should you need a radio repaired, remember we have our own expertly manned service department, equipment with over a hundred thousand pounds of spares and test equipment, and as the importer of most of our merchandise we are in daily contact with the manufacturer.

We are proud to be the largest representative in Europe of Yaesu Musen of Japan who produce the most diverse line of amateur radio equipment in the world. With them, communications is their only business not a sideline, thus providing you with premium products at the forefront of technology.

We are also proud to be chosen as UK representatives by such fine manufacturers as The Japan Radio Company, KDK, Nag, Hansen, Kenpro, TTE, Leson, Telewand, Dengineer, Comet, Fitlay, and Hokushin of Japan, plus HyGain, CDE, Van Gordon, Gem Quad, Channel Master, Mirage, ETO, Dentron, MFJ, and KLM from the Americas.

The items illustrated here form only a tiny fraction of our range: 200 stock lines of Yaesu Musen equipment, 600 different antennas, masts, rotators, coaxes, etc., etc., plus 300 general items of communications equipment, selected as offering the best value in the world from; Jaybeam, Mini Beam, G4MH, Mosley, G-Whip, Bantex, Ascot, Strumech, Microwave Modules, JIR, Bearcat, Delica, Ashidavox, Hi Mound, ICS, Datong, RSGB publications amongst others.

We trust the outline of our services, recommendation from other amateurs (aspiring or veteran) or a visit to your nearest SMC store will convince you to give us a chance to serve.

SMC, your single stop source.

JST100 from JRC

- ★ 160-10 Metres (inc WARC) plus stand service Rx.
- ★ SSB, CW, FSK, 100 Watts output (adustable).
- ★ 2, 10Hz steps, digital variable frequency oscillators.
- ★ Split frequency or cross mode single frequency operation.
- ★ 3 PLLs (inc BFO) locked to 10MHz reference.
- ★ 11 Channel memory retains operating freq. and mode.
- ★ Listen on memory (fix Tx on VFO), microcomputer control.
- ★ Display of memory contents during operation. Up/down/lock.
- ★ Pass band tuning, tuneable notch, 10-20dB attenuator.
- ★ Adjustable noise blanker, switchable AGC, calibrator.
- ★ Adjustable RF output, RF speech processor, Vox.
- ★ Comprehensive metering including compression level.
- ★ Small 300(W), 327(D), 130(H), (mm). 10kg.

NBD500	Mains PSU.	**NFG97**	ATU
NVA88	Ext. speaker.	**CFL260**	600Hz filter
CHG43	Desk mic.	**CFL230**	300Hz filter
CHG44	Hand mic.	**KY3A**	Morse key

FT ONE £1,349 inc. VAT @ 15% & SECURICOR

*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.

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)
247A Freeman Street,
Grimsby, Lincolnshire.
Grimsby (0472) 59388
9.30-5.30 Tue-Sat

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

BUCKLEY
S.M.C. (T.M.P.),
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	
Tandragee	Mervyn GI3WWY	(0762) 840656	
Neath	John GW4FOI	(0639) 52374 Day / (0639) 2942 Eve	
Jersey	Geoff GJ4ICD	(0534) 26788	

FT980 £1,115 inc VAT @ 15% & SECURICOR

INSTANT HP

★ Notch filter in IF (AGC immune to hetrodynes).
★ Full break in keying. 500/600/700Hz beat.
★ Unique analogue scale of digital type.
★ Comprehensive twin meter metering.
★ Memory retains mode information.
★ Rx 150kHz-30MHz.
★ Tx 160-10m 9 bands + 3 × 500kHz Aux bands.
★ All modes AM, CW, LSB, USB, AFSK, FM standard.
★ IF shift + variable bandwidth 2·6kHz-300Hz.
★ Inbuilt keyboard operation + Scanning.
★ Switchable attenuator 10, 20, 30dB.
★ Audio peak + notch filter – 40dB.
★ RF process or Auto mic gain control.
★ 3rd order IMD – 40dB at 100W PEP.
★ AFSK shift 170, 425, 850Hz selectable.
★ Multi channel memory + programmable scan limits.

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 included.
★ 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 included.
★ 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.**

'PLASTIC' BY PHONE

*Option ** D & DE Models

FT102 £785 inc. VAT @ 15% & SECURICOR

FREE CREDIT COVER

★ 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

★ 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 (ZD models).
★ 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

FT101Z £559 inc. VAT @ 15% & SECURICOR

*Option

FT707 £509 inc. VAT @ 15% & SECURICOR

2 YEAR GUARANTEE

★ 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

SMC FM MODIFIED VERSION AVAILABLE; £40 EXTRA

FT230R £239 inc VAT @ 15% & CARRIAGE

- 144-146MHz (extensions possible).
- 25W RF output, 3W on low.
- 25 and 12½kHz steps provided.
- ±600kHz repeater split, 1750Hz burst.
- Tx; 5A. Rx 300mA (standby).

FT730R £285 inc VAT @ 15% & SECURICOR

- 430-434MHz (440-445MHz possible).
- 10W RF output, 1W on low.
- 25 and 100kHz steps provided.
- ±1.6 MHz repeater split, 1750Hz burst
- Tx 3A, Rx 300mA (standby).

2 or 70!

- 150(W) × 50(H) × 176(D)mm.
- Up/down, memory/band scanning.
- Easy "write-in" memory channels.
- Memory backup "5 year" lithium cell.
- Ten memories with priority functions.
- Supplied with scanning microphone.
- Illuminated "any angle" LCD display functions.
- Display to 100's of Hz.
- Two completely independent VFO's.
- Operation between memory and VFO.
- Full reverse repeater function.
- Manual and automatic tone burst.
- Large "full sound" internal speaker.
- Concentric volume and squelch.

'790 EX-STOCK

FT290R £265 inc VAT @ 15% & POSTAGE

- 144-146MHz (144-148 possible)
- 2.5W PEP, 2.5W 300mW out or FM
- 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 £325 inc VAT @ 15% & POSTAGE

- 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
- 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

SMC8C	Slow Charger (220mA)	£8.80
MMB 11	Mobile Mount	£22.25
CSC1A	Soft carrying case	£3.45
FL2010	Linear Amplifier 2m 10W	£59.00
FL7010	Linear Amplifier 70cms	£91.00

6, 2 or 70!

2 or 70!

FT480R (2m) £369 inc VAT @ 15% & SECURICOR

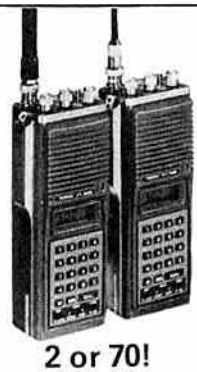
- 144-146MHz (143.5-148.5 possible)
- ±600kHz standard repeater split
- Excellent dynamic range and sensitivity
- FM; 25, 12½, 1kHz steps
- SSB; 1,000, 100, 10Hz steps

FT780R (70cm) £399 inc VAT @ 15% & SECURICOR

- 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 & YD418 mic



FT208R £209 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 £229 inc VAT @ 15% & POSTAGE

- 430-440MHz (440-450 alternative)
- 25kHz synthesizer steps
- ±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 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!!

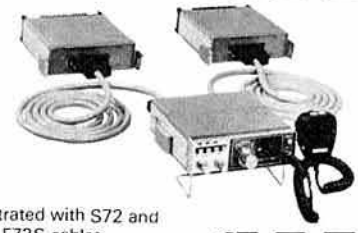
FT720RV £199 inc VAT @ 15% & SECURICOR

- 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 £229 inc VAT @ 15% & SECURICOR

- 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

★ THE FT7B IS DEAD! LONG LIVE THE FT77! ★

The FT77 is an all new 80-10m (inc. WARC) 100 Watt, transceiver, ideal for mobile (no tune, inbuilt SWR meter, only $3\frac{3}{4}" \times 9\frac{1}{2}"$ and less than a foot deep—including heat sink!) or as the heart of a base station with its compatibility with the FTV707 transverter, (N.B. FM option available) and the FV707DM digital external memory VFO etc.

Operational simplicity is the keynote of this design, nevertheless features demanded by today's discriminating amateurs have not been neglected including dual selectable noise blanker pulse widths (eliminates woodpecker or impulse noise) and optional narrow CW filter. The FT77 is the perfect first rig or second transceiver for an OT.

Computer aided design of circuit board for efficient component layout, automatic parts insertion for high reliability at low cost:

FT77	Transceiver 100W	**£475·00**
FT77S	Transceiver 10W	**£359·00**
MARK77	Xtal marker board	**£7·65**
FMU77	FM unit	**£23·75**

COMMUNICATION RECEIVER: NRD515 £985 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

★ NEW—FT726R, 3 BAND, MULTIMODE, VHF/UHF ★

The FT726R is a revolutionary combination of a full feature VHF/UHF transceiver with the deluxe facilities (which you have always wondered why were only available on HF transceivers) such as IF shift and variable bandwidth for SSB and CW operations plus a full duplex option for the ultimate cross band and satellite transceiver!

The transceiver main frame accepts 3 modules, 2 metres (standard), 430-440MHz and 6 metres (options). Modes catered for are SSB-CW-FM with optimum provisions made for each: 20Hz steps for SSB/CW, selectable steps for FM (also preset and programmable repeater splits), plus a A & B VFO system with 10 memory channels.

Surely the development of the decade in VHF/UHF transceiver technology.

FT726R(2)	Transceiver inc. 145MHz	**£649·00**
SAT726	Full duplex unit	**£82·80**
430T726	430-440MHz module	**£208·90**
50T726	Six metre module	**£157·15**

RECEIVER WITH 12 MEMORIES: FRG7700M £399 inc

VAT @ 15% & SECURICOR

- ★ 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.

'7700 THE ONE WITH FM!

NON-MEMORY VERSION £335

- ★ 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.

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)
247A Freeman Street,
Grimsby, Lincolnshire.
Grimsby (0472) 59388
9.30-5.30 Tue-Sat

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

BUCKLEY
S.M.C. (T.M.P.),
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 Tandragee	John Mervyn	GI3KDR GI3WWY	(0247) 55162 (0762) 840656	Neath Jersey	John Geoff	GW4FOI GJ4ICD	(0639) 52374 Day (0639) 2942 Eve (0534) 26788

hy-gain

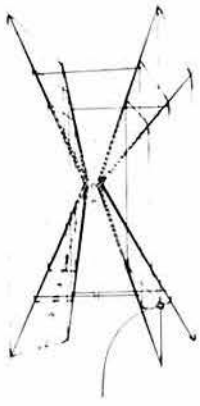
The TH7DXX is a new 7 element (10-15-20M) broadband VSWR less than 2:1 at band edges! Compact 20' (6·1M) turning radius – 31' (9·4M) longest element dual driven element Yagi which by combining monoband *and* high Q, ultra high power, trapped parasitics provides an average front to back of 22dB on 20 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**	£2.50
14AVQ/WB	Vertical 10-40m inc.	**£64.40**	£2.50
18AVT/WB	Vertical 10-80m inc.	**£113.85**	£2.50
14RMQ	Roof mounting Kit	**£38.52**	£2.50
18V	Vertical 10-80m inc.*	**£36.22**	£2.50
103BA	3 Ele Yagi 10m	**£67.85**	£3.50
105BA	5 Ele Yagi 10m	**£155.25**	£3.95
153BA	3 Ele Yagi 15m	**£90.85**	£3.50
155BA	5 Ele Yagi 15m	**£236.90**	£5.90
203BA	3 Ele Yagi 20m	**£178.25**	£4.90
204BA	4 Ele Yagi 20m	**£286.35**	£7.30
205BA	5 Ele Yagi 20m	**£396.75**	£9.40
402BA	2 Ele Yagi 40m	**£247.25**	£6.50
DB10/15A	3 Ele Yagi 10-15m	**£198.95**	£4.80
TH3JNR	3 Ele Yagi 10-15-20m	**£202.40**	£3.50
TH2MK3	2 Ele Yagi 10-15-20m	**£169.05**	£3.50
TH3MK3	3 Ele Yagi 10-15-20m	**£274.85**	£5.30
TH5DXX	"Thunderbird" 5 el.	**£419.75**	£6.70
TH7DXX	"Thunderbird" 7 el.	**£511.75**	£8.75
HYQUAD	2'Ele Quad 10-15-20m	**£354.20**	£6.00
18TD	Dipole Tape 10-80m	**£121.90**	£2.80
BN86	Balun 1:1-3 30MHz	**£16.67**	£1.80
LA1	Lightning Arrestor	**£59.05**	£1.20

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' × 9½'; TR 9½'; 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	**£253.00**	£5.40
GQ3E	3 Ele Antenna	**£425.00**	£9.20
GQ4E	4 Ele Antenna	**£573.85**	£10.00
GQCK1	Conversion Kit 1 Ele	**£172.50**	£4.10
GQCK2	Conversion Kit 2 Ele	**£322.00**	£6.70
GQSPIDER	Centre piece (spare)	**£33.92**	£2.50
GQSPREADER	Spreader Arm (spare)	**£20.13**	£3.20

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

J-BEAM

4 METRES				
4Y/4M	Yagi 4 element	7dBd	**£29.90**	£2.20
PMH2/4M	Phasing harness 2 way		**£16.10**	£1.50
2 METRES				
H0/2M	Halo head only	0dBd	**£5.98**	£1.20
HM/2M	Halo with 24" mast	0dBd	**£6.55**	£1.50
C5/2M	Colinear omni vert	4·8dBd	**£54.62**	£2.50
LW5/2M	Yagi 5 element	7·8dBd	**£14.37**	£2.50
LW8/2M	Yagi 8 element	9·5dBd	**£17.82**	£2.50
LW10/2M	Yagi 10 element	10·5dBd	**£24.15**	£2.50
LW16/2M	Yagi 16 element	13·4dBd	**£35.07**	£3.20
14Y/2M	Yagi 14 element	12·8dBd	**£36.23**	£3.20
PBM10/2M	10 ele Parabeam	11·7dBd	**£44.85**	£3.20
PBM14/2M	14 ele Parabeam	13·7dBd	**£55.77**	£3.20
Q4/2M	Quad 4 element	9·4dBd	**£29.32**	£2.50
Q6/2M	Quad 6 element	10·9dBd	**£39.10**	£2.50
Q8/2M	Quad 8 element	11·9dBd	**£44.85**	£2.50
D5/2M	Yagi 5 over 5 slot	10dBd	**£25.30**	£2.50
D8/2M	Yagi 8 over 8 slot	11·1dBd	**£34.50**	£2.50
5XY/2M	Yagi 5 ele crossed	7·8dBd	**£28.17**	£2.50
8XY/2M	Yagi 8 ele crossed	9·5dBd	**£35.65**	£2.50
10XY/2M	Yagi 10 ele crossed	10·8dBd	**£46.00**	£2.50
PMH2/C	Harness cir polarisation		**£9.77**	£1.50
PMH2/2M	Harness 2 way 144MHz		**£12.65**	£1.50
PMH4/2M	Harness 4 way 144MHz		**£28.75**	£1.50
SEVENTY CM				
C8/70	Colinear Omni Vertical	6·1dBd	**£62.10**	£2.50
D8/70	Yagi 8 over 8 slot	12·3dBd	**£25.87**	£2.50
PBM18/70	18 ele Parabeam	13·5dBd	**£32.20**	£2.50
PBM24/70	24 ele Parabeam	15·1dBd	**£42.55**	£2.50
LW24/70	Yagi 24 element	14·8dBd	**£27.02**	£2.50
MBM28/70	28 ele Multibeam	11·5dBd	**£21.27**	£2.50
MBM48/70	48 ele Multibeam	14·0dBd	**£35.65**	£2.50
MBM88/70	88 ele Multibeam	16·3dBd	**£48.87**	£2.50
8XY/70	Yagi 8 ele crossed	10dBd	**£42.55**	£2.50
12XY/70	Yagi 12 ele crossed	12dBd	**£52.90**	£2.50
PMH2/70	Harness 2 way		**£10.35**	£1.50
PMH4/70	Harness 4 way		**£22.42**	£1.80
1296 MHz				
CR2/23CM	Corner reflector	13·5dBd	**£40.25**	£2.50
PMH2/23CM	Harness 2 way		**£31.05**	£1.50

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Kenpro

KR600RC
£163.30

360° round type meter Max. load 200kg. Rot, 600kg/cm, brake 4,000kg/m. 1¼in-2½in masts Lower casting optional.

KR400RC
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360° round type meter Max. load 200kg. Rot, 400kg/cm, brake 1,500kg/cm. 1¼in-2½in masts Lower casting optional.

KR500
£112.12

Elevation Rotator (180°) Up to 50kg of Load. 1¼in-2½in mast. 1¼in-1⅝in boom

KR250
£54.91

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

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Channel Master

9508
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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.

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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 1¼" stub.

Post and packing **£1.80**
9523 **£15.81**

Rotary bearing 3-way guying.

Takes 1²⁹⁄₃₂" mast.

Post and packing **£1.50**
9525 **£16.67**

NB: PRICES INCLUDE VAT AT 15%
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CDE

AR40
£90.85

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

CD45
£136.85

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

HAM IV
£258.75

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

T2X
£327.75

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

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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

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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	£10.58
L44P	For LDF4/50 Heliax	£10.35
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

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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	£1.66
UG21	Standard type 11.2mm	£1.89
L42W	For LDF2/50 Heliax	£8.51
L44W	For LDF4/50 Heliax	£12.42

N SOCKET 50 ohms

UG58	Standard 4 hole fix	£1.12
UG1052	Free cable end 5.5mm	£2.12
UG23	Free cable end 11mm	£1.70
L42N	Free jack for LDF2/50	£8.51
L44N	Free jack for LDF4/50	£12.42
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

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FS710 £89.70

FS710H: 1·8-60MHz. 20, 200, 2kW
FS710V: 50-150MHz. 20, 200W
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 × 3½"
Time Const: PEP follow 4 second

FS500 £69.75

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 £51.35

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 1:1-3½:1
Size: 6½ × 2½ × 4½"

FS300 £46.40

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 £41.00

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: 6½ × 2½ × 4½". 'N' type sockets

FS711 £36.80

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 × 1¼"

FS5E £37.20

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

FS300M £35.65

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: 6½ × 2½ × 4½"

SWR3S £26.45

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

SWR50B £26.45

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 × 2½ × 2½". 'On the Air' LED

8 new models in stock. Sae for details

NB· PRICES INCLUDE VAT AT 15%
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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		(½λ)	100W	1·72m	£17.65
17SE	17m		(½λ)	200W	1·92m	£15.70
15SE	15m		(½λ)	130W	1·72m	£14.55
12SE	12m		(½λ)	200W	1·92m	£14.20
10SE	10m		(½λ)	100W	1·72m	£13.80
4E	4m	0dB	½λ	150W	1·03m	£7.65
2H/PL	2m		(½λ)	50W	0·17m	£3.45
2QW	2m	0dB	½λ	200W	0·49m	£2.30
2VF	2m	3dB	½λ	50W	1.06m	£11.50
2NE	2m	3dB	⅝λ	150W	1·30m	£6.90
78SF	2m		(⅝λ)	100W	1·42m	£13.80
78F	2m	4·5dB	⅝λ	100W	1·75m	£13.80
78B	2m	4·5dB	⅝λ	150W	1·72m	£13.80
88F	2m	5·2m	⅝λ	100W	2.03m	£18.80
70N2M	2/70	2·7dB 5·1dB	(½λ) 2 × ½λ	100w	0·89m	£16.85
258	70cm	5·5dB	2 × ½λ	100W	0.91m	£12.65
358	70cm	6·3dB	3 × ½λ	100W	1·36m	£16.85

Model	Description	Price
SOWM	Wing Mount. SO239M upper SO239 under adjustable angle	£4.20
TMCAS	Boot Mount c/w 6 mtrs RG58 and PL259 plug	£8.45
GCCA	Gutter Mount deluxe cast type c/w 4 mtrs cable assemble and PL259	£9.95
SOMM	Mag Mount c/w 4 mtrs RG58 PL259 *For use with smaller antennas only*	£9.95

An alternative mounting for any of the two metre antennas listed above is the BSD stainless steel bumper strap at **£8.80** plus the HS88BK extension tube at **£18.80** 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 **£29.90.**

Stop press: ⅞λ 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 **£15.35.**

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

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Receiver 1.8–30MHz
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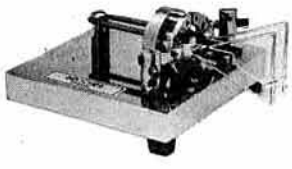
ZA-1A Balun	**£15.00**
ZA-2A Balun	**£17.25**
ZY-2 CW Audio Filter	**£57.50**



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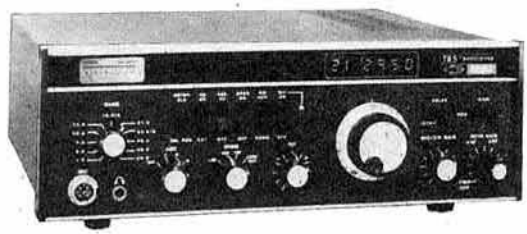
The Transceiver others try to copy
£1199.00

DRAKE TR5



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RSGB QSL BUREAU

QSL cards for distribution should be sent to:
Mr E. G. Allen, G3DRN, QSL Bureau manager, 30 Bodnant Gardens, London SW20 0UD

A list of QSL Bureau sub-managers was published in the January 1983 issue, and amendments appear under "QTC" in this and the February issues.

ANNUAL SUBSCRIPTION RATES

UK corporate: £14.50, incl VAT.
Overseas: £14.50.
Associates under 18: £5.80.
Family member: £5.80.
Students age 18 to 25: £8.70 *(Applications should give the applicant's age at last renewal date and include evidence of student status).*
Affiliated societies: £14.50 (including *Rad Com*); **£8.70** (excluding *Rad Com*).

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 or more weekly.

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
NE from Cambridge	G8HVV	G8BBK	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
Cambridge	G8HVV	G8BBK	1030
Manchester	G3LEQ	G3JWK	1030
Dumfries	GM3MSG	(Vacancy)	1100
Brighton coast	G3ZYE	G8GEZ	1100
Preston	G8WAT	(Vacancy)	1100
Huntingdon, Cambs	(Vacancy)	G8TQI	1100
Jersey	GJ4JWA	GJ8YVL	1100
Barmouth, Gwynedd	GW6CGR	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

1983 RSGB PRESIDENTIAL INSTALLATION

At a social function held at the Bloomsbury Crest Hotel, London, on 15 January, Mr Don Baptiste, CBE, was installed as the 1983 President of the RSGB.

In addition to RSGB members and staff, several visitors were also present —including Mr Richard Baldwin, W1RU, president of the International Amateur Radio Union, who had flown over from the USA with his wife for the occasion. Several of Don Baptiste's former colleagues at the Home Office were also present.

John Allaway, G3FKM, the 1982 RSGB President, introducing Don Baptiste, spoke of the new President's work on behalf of radio amateurs at national and international levels before his retirement, and of the pleasure it gave him to install his successor. In reply, Don Baptiste thanked the Society for the honour it had shown him by inviting him to become its President. He spoke with enthusiasm of the advances which had been made in amateur radio over the past few years, and of the way in which the RSGB's membership had grown. He was confident that with the move to a new and larger headquarters building, the Society would now be able to match this increase with more services to its members. In addition to new sophisticated computerized management techniques, it was now possible to employ more staff in better working conditions.

Don Baptiste (r) with John Allaway, G3FKM, after being installed as the 1983 RSGB President. *Photo:* G3SZJ

Richard Baldwin, W1RU, with Mr and Mrs B. O'Brien, G2AMV and G3WIO, in the background after the installation ceremony. *Photo:* G4FRX

QTC
Amateur radio news

50MHz licensing

During February this year the Home Office issued special transmitting licences for research purposes to 40 UK radio amateurs for 50–52MHz. This was the culmination of many years of work by the RSGB, which had been keen to see UK amateurs joining in the continuing programme of experimentation and learning about propagation in this important region of the radio spectrum: the difficulty being that 50MHz is not an ITU-allocated amateur band in IARU Region 1.

Several years prior to the 1979 World Administrative Radio Conference, the Society—with support from the International Amateur Radio Union and other societies in Region 1—prepared a case for amateur operation at 50MHz. At this conference the possibility of allowing individual Region 1 administrations to allocate some space around 50MHz for amateur operation was narrowly defeated: nevertheless, the Home Office continued to be sympathetic to the Society's request for spectrum space at 50MHz, and subsequently agreed to license the 50MHz beacon GB3SIX on Anglesey outside television broadcasting hours (it is now licensed for 24h operation).

Negotiations continued, and during 1982 a number of meetings were held to explore the possibilities of special 50MHz transmitting licences outside television broadcasting times. Full agreement was reached between the BBC, the Home Office and the Society in the late summer of 1982, which meant that 40 special research licences could be issued for propagation work. Since the number of applicants for licences was likely to be considerably in excess of 40, the Home Office requested the Society to assist with the selection process by sending out questionnaires and advising the Home Office on the results. Some 200 amateurs expressed initial interest, and over 100 completed questionnaires were subsequently returned. When judging the merits of each application, the Home Office had to consider the nature of the proposed research and previous success in activities associated with this band. In addition, it was necessary to achieve a good geographical spread of licensees throughout the UK. It needs to be stressed that, while the Society undertook the considerable amount of work involved in this, the final choice of the 40 recipients of 50MHz special licences was made by the Home Office and not, as reported in some amateur radio publications, by the RSGB. Equally, reports that the RSGB insisted that only Class A licensees were to take part in this research are incorrect—this condition was expressly the decision of the Home Office.

Running in parallel with these events was the Society's submission of a paper to the Merriman Committee, in which we registered a wish for a permanent allocation at 50MHz. The committee's initial report was substantially in agreement with our proposals and recommended that a permanent 50MHz allocation be made to radio amateurs in the UK; clearly, the Society hopes that this might come to pass in the future. It is expected that even with limited access to the band, outside television hours and using the same power as is currently permitted on the 70MHz band, much useful

RSGB Region 9 ORM

An official regional meeting will be held on

Sunday 13 March 1983 commencing at 2pm

at the

Barnstaple Motel, Braunton Road Barnstaple, N Devon

Further details from Mr W. Colclough, G3XC, "Highview", Indian Queens, St Columb, Cornwall.

propagation work will be undertaken and much learned about the nature of this fascinating part of the radio spectrum.

Thirty-nine special research licences have been issued to the following: GM3ZBE, G3LTF, G3COJ, G3PWK, GM4IHJ, GJ4ICD, G3VZJ, GM4ELV, GI4MJD, G5KW, GI3RXV, G3TCU, G3OHH, G3USF, G2AOK, GM4DIJ, G6XM, GM4FDT, GW4HBK, GI3ZSC, GM3DOD, G4GLT, G4BPY, G4HUP, GW4HXO, G3ZIG, GJ3YHU, G4JLH, G3NOX, GM4FZH, GW4BCD, GM3OBC, GM3WOJ, GW4IIL, G4CUT, G4IJE, GM3WCS, GJ3RAX and GW3LDH. Another licence was issued, but the licensee subsequently returned it, and by the time this is read another holder should have been selected to complete the total of 40.

Information required

Cordless telephones

The RSGB has been aware for some time that illegal cordless telephones operate within the 1·8 and 70MHz amateur bands. This problem has been the subject of discussions with the Home Office, and a number of the more intractable aspects of this type of illegal operation should be solved by two approaches—the new Telecommunications Bill, should it become law, and the allocation of legal frequencies for cordless telephone operation.

In the meantime, the Society needs to obtain information regarding the level of usage of illegal cordless telephones within the amateur bands. Mr G. F. Kimbell, G3TCT, 12 Tavistock Road, Fleet, Hants, is acting as co-ordinator for reports on behalf of the Society's Licensing Advisory Committee, and any reports or information would be welcome—especially from operators on the 1·8 and 70MHz bands.

Cable television

The Society is also aware of several potential problems associated with the intended introduction of cable television within the UK. Mr M. S. Appleby, G3ZNU, 45 Cedar Avenue, Kesgrave, Ipswich IP5 7HA, of the Society's VHF Committee, is acting as co-ordinator for information, and members are asked to contact him if they have any specific points to raise.

The Society is also represented on the Department of Industry committee which is considering all aspects of cable television in the UK.

Region 10 representative

Following the resignation of Mr P. A. Jones, GW4HAT, for personal reasons, the office of Region 10 representative is now vacant.

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

All nominations must be made in writing and be delivered together with the written consent of the nominee to accept office if elected to: Mr D. A. Evans, Secretary/General Manager, RSGB, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW, on or before Monday 11 April 1983.

In the event of more than one person being nominated, a ballot will be held, details of which will be published in the June 1983 issue of *Radio Communication*.

Region 7 representative

Mr P. J.Walker, G8HMG, has had to resign from the position of Region 7 representative, with regret, due to pressure of business commitments. An election will therefore be necessary to fill this vacancy.

Any five corporate members resident in Region 7 (Greater London south of River Thames, Surrey including that part of London north of the Thames administered by Surrey) may nominate any other qualified corporate member resident in Region 7 for the office of Region 7 representative. Each nominator may not nominate more than one person to fill the vacancy.

All nominations must be made in writing and be delivered together with the written consent of the nominee to accept office if elected to: Mr D. A. Evans, Secretary/General Manager, RSGB, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW, on or before Monday 11 April 1983.

In the event of more than one person being nominated, a ballot will be held, details of which will be published in the June 1983 issue of *Radio Communication*.

QSL Bureau

Despite the helpful advice contained in the Operating Guide included in the January issue, many members are still sending cards to the bureau sub-managers and/or are not sorting them alphabetically by prefix. These "rogue" packets are certain to be delayed because they are dealt with last.

Many of the sub-managers also report large quantities of unclaimed cards on file, and if envelopes for these are not received within four weeks of this notice appearing, they will be destroyed. In future, similar action will be taken in respect of all cards received for which envelopes are not held, which will leave more space available to cater for those interested in collecting their cards. *G3DRN*

Simpler application procedures for amateur radio licences

The Home Office advises that application procedures for amateur radio licences have been simplified to speed up the issuing process, and to save the trouble and cost of handling original documents such as birth certificates.

Since 1 January 1983, it has not been necessary for applicants to provide proof of age, although they still have to be at least 14 years old. Date of birth still has to be stated, and the new application form requires applicants to state that the information provided is true. If any of the information is false, the application will be deemed to be invalid and any licence issued may be revoked.

The nationality requirement for an amateur licence has also been dropped, so that suitably-qualified foreign nationals will be able to apply. The Class C and Class D licences previously issued to overseas amateurs wishing to operate in this country have also been abolished. In future, overseas applicants will be issued with either Class A or Class B licences with their own callsigns prefixed by either G4 or G6, eg G4EI4ZZZ.

At the end of 1982, approximately 45,000 amateur licences were in force in the UK.

Radio Amateur's Examination

The periodic review of the syllabus for the Radio Amateur's Examination is now due and the City & Guilds RAE Subject Committee has established a working party for this purpose.

The principal objective of the examination is to ascertain the candidate's ability to operate an amateur station within the terms of the licence, and not necessarily to test expertise in particular aspects of the amateur service. Suggestions for alterations or amendments to the existing syllabus would be welcome, and should be sent to Mr S. D. Allison, City & Guilds of London Institute, 46 Britannia Street, London WC1X 9RG.

Other RAE items

John Morris, GU6BGI, who is 17 years old, has just completed his second year as RAE instructor for the Guernsey ARS. In the December examination, his nine pupils of 14 years and upwards passed all 17 of the RAE papers. These combined with the results of last year's course mean that GU6BGI has tutored 14 members of the Guernsey ARS to success in the RAE.

There is a strong demand in the Cobham area of Surrey for an RAE class, but unfortunately it has not been possible to find a qualified amateur willing to run such a course. Anyone interested is asked to get in touch with G8HMG, QTHR.

An opportunity for another bright young man, perhaps—Ed

The G3PAO Memorial Lecture

The Verulam ARC's annual G3PAO Memorial Lecture will this year be given by Dr D. S. Evans, G3RPE, on the subject of microwaves. It will commence promptly at 8pm on Tuesday 22 March 1983, at the Charles Morris Memorial Hall, Tyttenhanger Green, near St Albans. All visitors will be welcome.

Further details can be obtained from G4KLQ, QTHR, tel Redbourn 3291, or G6EQO, QTHR, tel St Albans 58132.

Sri Lanka commemorative stamp

To celebrate the 53rd anniversary of the Radio Society of Sri Lanka, a commemorative stamp has been issued by the Sri Lanka Ministry of Posts & Telecommunications. The stamp is of Rs2.50 denomination with a first-day cover, and the postage cost to the UK is Rs5.

Enquiries should be addressed to: Mr P. Kulatilaka, Director, Philatelic Bureau, 4th Floor, Ceylinco House, Colombo 1, Sri Lanka.

Proposed emergency listening watch

Following the note that appeared in "QTC" in *Radio Communication* July 1982 regarding the proposal for an emergency listening watch on the 144MHz amateur band, only six replies were received to this enquiry. The majority of these stations agreed that S20, 145·500MHz, would be the channel that they would monitor for any emergency traffic. Mr J. Todd,

Another view of the National Exhibition Centre, Birmingham. The RSGB National Amateur Radio Convention on 5-6 March will be held in Hall 6, the entrance to which is shown on the right of the photograph.

A reminder that the

RSGB NATIONAL VHF CONVENTION

takes place at

Sandown Park Racecourse

Esher, Surrey

on

Saturday 26 March 1983

Trade exhibition Lecture programme

Evening social function and buffet supper

For details see *Radio Communication* February

G8SUS, thanks those stations who took the trouble to reply on this matter, and advises that because of the poor response to the proposal it is felt that it would be impractical to form such a watch at this time.

A combination of "Years"

As 1983 is World Telecommunications Year and also Year of the Castle in Wales, the Bridgend & D ARC is commemorating both years by organizing a competition on 24 July. It is proposed that all amateur radio clubs and/or individuals in Wales wishing to participate should adopt a local castle in which they can set up a station, and contact as many other castles as possible between 1000 and 1800 on 24 July. There will be a prize for the station contacting the most castles.

Further information from club secretary Peter Lynn, GW4RMI, 38 Mervyn Way, Pencoed, Mid Glamorgan, CF35 6JH, tel 0656 861115.

Lions International international nets

Lions International amateurs hope to establish a series of Lions nets so that eventually they can communicate worldwide. As a first step, a net has been started between the UK and North America, and this meets every Sunday at 1730gmt on 21,370MHz. A very active Lions net on 7MHz already exists in the UK.

Further details from Sam Brown, G4ISB, QTHR, who thought up this idea.

A Marconi photograph

Ernie Knight, G4NVD, of Grimsby, made a unique contact on 15 December while operating /A from the Marconi College, Chelmsford, where he was attending a course. At 8.20pm he made contact with CG1MCS, the Canadian station set up to commemorate the 80th anniversary of the first-ever transatlantic message. This message was sent on the night of 15 December 1902 by Dr Parkin, correspondent of *The Times* at Glace Bay, Nova Scotia, and read: *"TIMES, LONDON. BEING PRESENT AT TRANSMISSION IN MARCONI'S CANADIAN STATION HAVE HONOUR SEND THROUGH TIMES INVENTOR'S FIRST TRANSATLANTIC MESSAGE OF GREETING TO ENGLAND AND ITALY. PARKIN."*

This unplanned contact between Marconi College and CG1MCS in Nova Scotia, was made 80 years later, almost to the minute, using a Kenwood 520SE transceiver with about 100W output and a G5RV antenna on 14,285kHz. G4NVD is seen here operating his station.

Stolen equipment

On 17/18 January in the Coventry area: 144MHz transceiver type HC1400 serial number 92500131. Information to Coventry police, tel 0203 86821, or G3HEZ, QTHR.

From a car in Salford: FT227R, serial number 8E060721, and 7λ/8 whip. Information to Salford Police, tel 061-736 5877, or G4KUL, QTHR.

Calling BBC micro users

The BBC Micro Club, PO Box 1297, Santa Cruz de Tenerife, Canary Islands, wishes to contact radio amateurs who are BBC micro users in order to exchange programs, technical information etc. The secretary is Mr I. Beng.

OBE for G3CYL

Mr G. J. Bennett, G3CYL, deputy managing director of Racal-Tacticom Ltd, was made an Officer of the Order of the British Empire in the New Year Honours List for his services to export. The RSGB congratulates him on this well-deserved honour.

Pardon our slips

Gremlins got at the "QTC" pages last month: on page 117 under "QSL Bureau", the first callsign on the first line should have read G4SAA, not G3SAA; and on page 118 under "RAF CWR nets" the commencing time of the nets should have been 10am, not 10pm.

On page 117, the international reply coupons item was incorrect in respect of the UK, where there is no time limit and coupons can be exchanged irrespective of their date of issue.

Our apologies for any inconvenience these errors may have caused.

FINDING THE ANSWERS

Following the recent move of the Society's headquarters to Potters Bar, Hertfordshire, there has been a certain amount of internal reorganization in the interests of streamlining and improving the service to members. A Membership Services Department has been established under John Nelson, G4FRX, and the four staff of the department who provide the first line of day-to-day contact with the Society's members are Brett Rider, G4FLQ, Janet Attfield, David Gough, G6EFQ and Kim Mair.

This section of headquarters now handles a very wide range of queries, and also serves other important functions; these include the following:

Provision of standard literature to prospective new members.
Information to members via letters, leaflets and booklets.
News gathering for GB2RS and the Headline News, and the production and circulation of GB2RS scripts.
Answering telephone queries concerning basic problems, and the maintenance of information to solve them on the Society's computer database.
Circulation of specialist newsletters.
Updating beacon and repeater details, and producing lists from information supplied by keepers.
Liaison with the Intruder Watch.
Liaison with the Society's Planning Panel, and solving basic planning problems.
Liaison with clubs—including provision of publicity material and, wherever possible, giving talks to specific clubs.
Liaison with the media.
Processing of special event callsigns in conjunction with the Home Office.
Maintaining the computer database of information for members, containing everything from "abbreviations" to "waveguide"—also the diary of events and the list of stolen equipment.
Book sales over the counter.
Dealing with undelivered copies of *Radio Communication*.
Reciprocal licensing queries.
Operating and maintaining the headquarters amateur radio station GB3RS.
Fulfilling the function of RAE local examinations secretary, and administering two local examination centres.

The department is always pleased to receive information from members on such matters as reciprocal licensing agreements and coming events so that the computer database can be kept as up-to-date as possible. It is the first line of contact with Society headquarters, and its staff will be delighted to assist members in any way possible with their queries and problems: feedback from one member may well solve someone else's problem. Department staff are pleased to visit clubs to talk about the work of the RSGB if requested, and are present at most major rallies throughout the year.

FIFTY-SIXTH RSGB ANNUAL GENERAL MEETING

The fifty-sixth annual general meeting of the Radio Society of Great Britain took place at the Institution of Electrical Engineers, Savoy Place, London, on 4 December 1982.

The following is a brief report of the formal proceedings and the presentation of awards. The official minutes of the meeting and a report on the informal session which followed it will be published at a later date.

The chair was taken by the 1982 RSGB President, Dr E. J. Allaway, G3FKM, who was accompanied on the platform by Bob Barrett, GW8HEZ, executive vice-President; David Cornish, G3COR, honorary treasurer; Basil O'Brien, G2AMV, immediate past-President; Don Baptiste, CBE, President-elect; and David Evans, G3OUF, secretary/general manager. The President announced that 164 members were present, the highest number for some years, and the notice calling the meeting was read by the secretary.

Mr J. P. Hawker, G3VA, receiving the Founders' Trophy from the President

Formal agenda items

The minutes of the fifty-fifth annual general meeting were approved. The accounts for the year ended 30 June 1982 and the reports of Council and the auditors were received and considered.

The President announced the results of the election to fill vacancies on the 1983 Council and also read out the names of the duly elected members of Council—the new members for 1983 are Mr K. E. V. Willis, G8VR, and Mr H. M. Holmden, G4KCC. The appointment of Mr G. R. Jessop, G6JP, to Council was confirmed by the meeting in accordance with the terms of the Companies Act which requires that a successful candidate of the age of 70 or over has his appointment so confirmed.

It was resolved to reappoint Messrs Edward Moore & Sons as auditors of the Society for the coming year, and Council was authorized to fix their remuneration.

The President called for volunteers to act as scrutineers at the election for the 1984 Council, and a list was compiled.

Mrs F. Woolley, G3LWY, a newly-appointed honorary vice-President

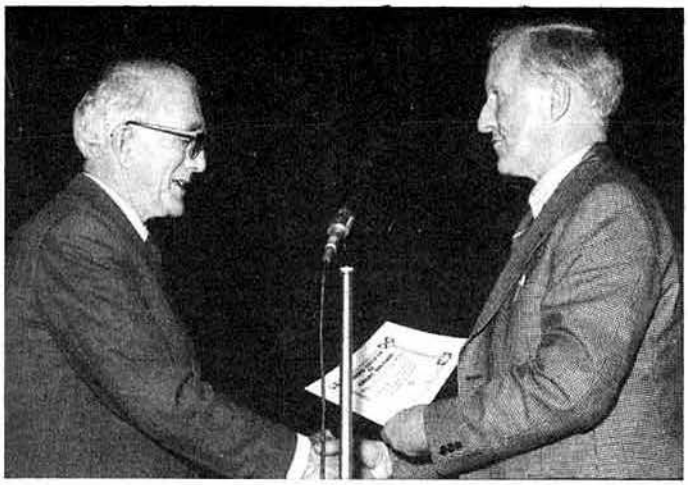
Founders' Trophy

Council having unanimously agreed to award this trophy, presented annually for services to the Society, to Mr J. P. Hawker, G3VA, the President had great pleasure in presenting the award to him.

Other Society awards

At the conclusion of the formal part of the meeting, and before the informal session began, the presentation of other awards to recipients who were present was made. The Rotab Trophy was awarded to Mr W. R. Hawthorne, G3MCS; the Calcutta Key to Mr L. R. Mitchell, G3BHK; the Raynet Trophy to Mr J. J. W. Comberford, GW8ENT; the Ostermeyer Trophy to Mr A. L. Bailey, G3WPO; the Courtney-Price Trophy to the UOSAT team; the Norman Keith Adams Prize to Dr J. N. Gannaway, G3YGF; the Wortley Talbot Trophy jointly to Messrs J. Royle, G3NOX and M. Emmerson, G3OQD; and the Mullard Award jointly to Mr S. J. Davies, G4KNZ, Dr J. N. Gannaway, G3YGF, and Mr H. Griffiths, G4CNV.

Left, Mr A. L. Bailey, G3WPO, receives the Ostermeyer Trophy; right, Mr M. Emmerson, G3OQD, (l) and Mr J. Royle, G3NOX, (c) receive the Wortley Talbot Trophy



The new vice-Presidents receive their certificates from John Allaway, G3FKM. top, l to r, Mr S. Cook, G5XB, and Mr R. Flavell, G3LTP; bottom, l to r, Mr C. Newton, G2FKZ, and Sir Evan Nepean, G5YN

Vice-Presidents and honorary vice-President

The President announced that Council had appointed Messrs S. Cook, G5XB; R. Flavell, G3LTP; C. Newton, G2FKZ; and Sir Evan Nepean, G5YN, as vice-Presidents of the Society, and he presented them with their certificates. He also announced that Mrs F. Woolley, G3LWY, had been appointed an honorary vice-President of the Society, and presented her with her certificate.

Honorary member

Council had unanimously elected N. B. Eaton, VE3CJ, as an honorary member of the Society, but he was unable to attend the meeting to receive his honorary membership certificate. This was received on his behalf by Eric Godsmark, G5CO, secretary of IARU Region 1.

Noel Eaton served as President of the International Amateur Radio Union for many years until his retirement last year.

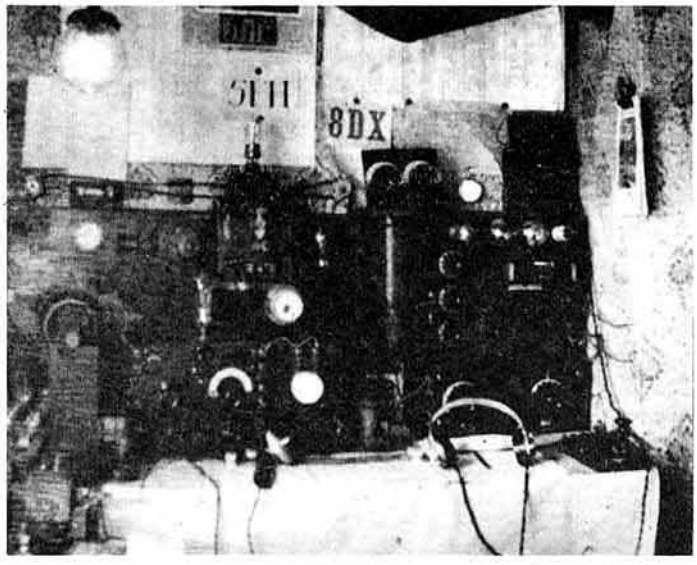
Mr R. J. C. Broadbent, G3AAJ, secretary/treasurer of AMSAT-UK, receiving the Courtney-Price Trophy on behalf of the UOSAT team

Mr C. E. Godsmark, G5CO, receiving the honorary membership certificate on behalf of Noel Eaton, VE3CJ

Mr W. R. Hawthorne, G3MCS, (l) and Mr L. R. Mitchell, G3BHK (r) being presented with the Rotab Trophy and the Calcutta Key respectively

Dr J. N. Gannaway, G3YGF, receiving (l) the Norman Keith Adams Prize, and (r) with Mr S. J. Davies, G4KNZ, the Mullard Award

ANOTHER GOLDEN JUBILEE



On left, the station in 1923 of Mr L. H. Lee, G5FH, who was first licensed in 1922. The equipment is typical of that period: a home-constructed tuned plate, tuned grid transmitter using a single valve (l), and a regenerative circuit receiver with three-valve amplifier (r). The equipment operated on 750kHz (400m), and later on 3·5MHz. The 8DX card on the wall was the first to be received by 5FH, for a phone contact with Pierre Amaraury in Paris.

G5FH is seen in the second photograph with his 1983 station: an FT101ZD and a Trio 530S, with a Yaesu linear which can be switched to either exciter.

A digital slow to fast sstv converter for monochrome or colour

(PART 2)

by B. A. SMITH, G3WCY*

Construction

As stated earlier, construction is quite straightforward, with no difficult components to find—but a word of warning, this is not a junk-box project. Use good-quality components, five per cent resistors, and at least 10 per cent capacitors. Use **mylar, metalised polyester** or **monolithic ceramic** types, particularly in the analogue filter circuitry.

If it is intended to copy or reproduce the pcb designs, note that some component hole spaces are small and are intended for miniature components. The analogue board, Fig 6, is a very easy design to copy; however, the digital memory board, Fig 8, is a little more tricky, and really lends itself towards being a double-sided pcb. The author does not have the means to produce such boards, hence the profusion of links on the top-side of the board. Note that a lot of the links have to run under ic areas, therefore use ic socket strip or soldercon pins plus holders instead of conventional bases for the ics.

When wiring this board fit the socket strips first, then the links—note here that there are six long links using insulated wire labelled with arrows LK1 to LK6, see Fig 9. All resistors are 0·25W types to keep size to a minimum, the only preset, RV201, is a miniature vertical type. If it is not practicable to reproduce these boards, take heart; the author knows of two people who have built this unit on 0·1 matrix Veroboard with no problems—it will just take a little longer. Whatever type of cabinet or chassis is used, provide plenty of ventilation to keep the temperature to a minimum.

Setting up and calibration

No special equipment is required, just a good multimeter and oscilloscope. The only difficulty is an sstv source, which is essential, but the author started without a source of sstv signals, and overcame the problem by getting it "off air". Armed with a tape recorder, cassette or reel-to-reel, tune the hf bands calling frequencies, 14,230kHz, 21,340kHz or 28,680kHz, or 144·230MHz ssb or 144·500MHz fm—the most active of these is 14,230kHz. Listen for the very distinctive musical tones and 8s bleep, wait for the station to come on audio, and then tune his voice to its clearest point; when he transmits video again, record it on tape, and all should be well. As a means of ensuring a good copy recording, wait until the station has finished a QSO and ask him to verify that the recording is good quality video, and then have the fun of seeing the video when the unit is complete and working. Fig 10 shows a

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Fig 7. Analogue board component layout ▶

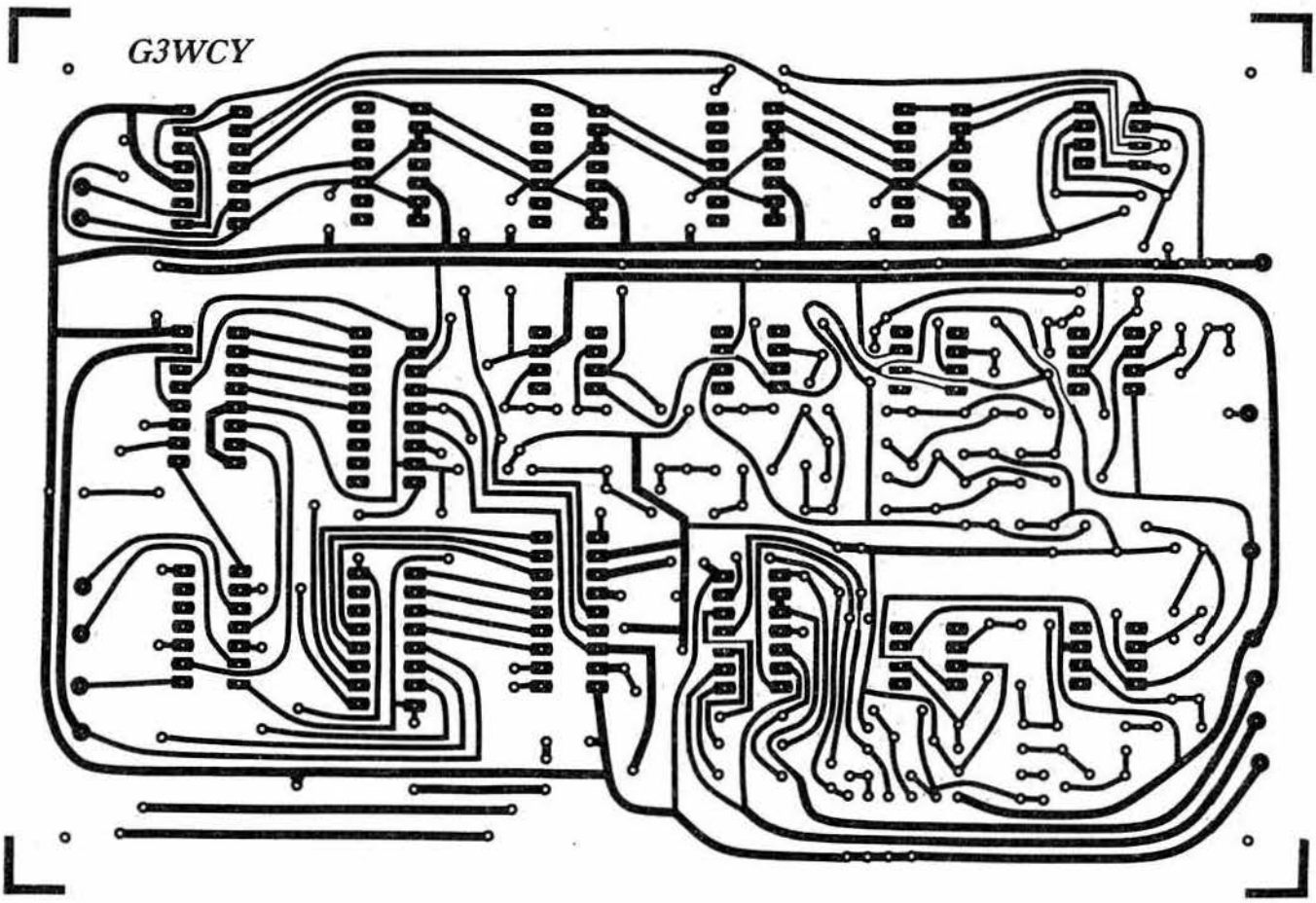
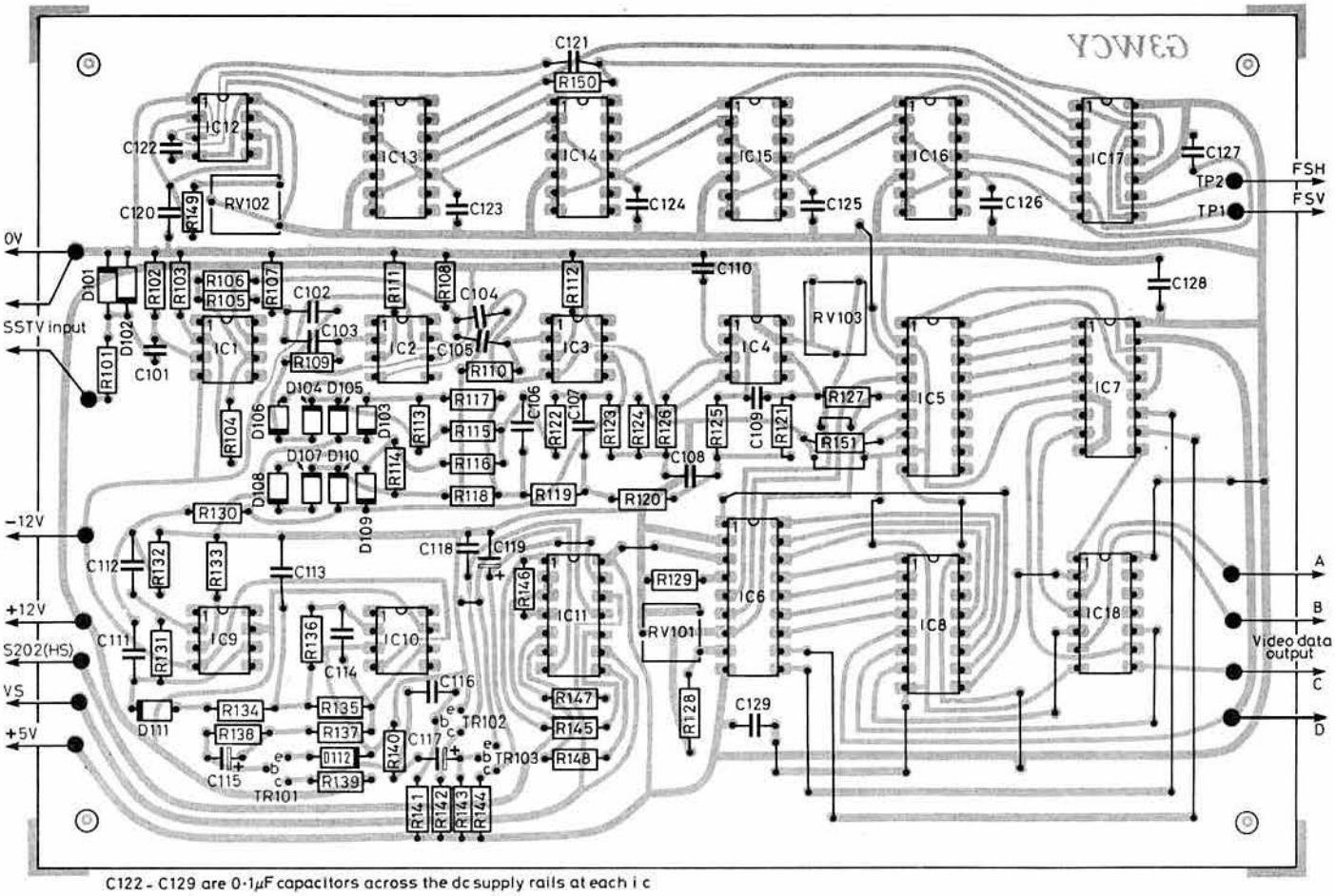
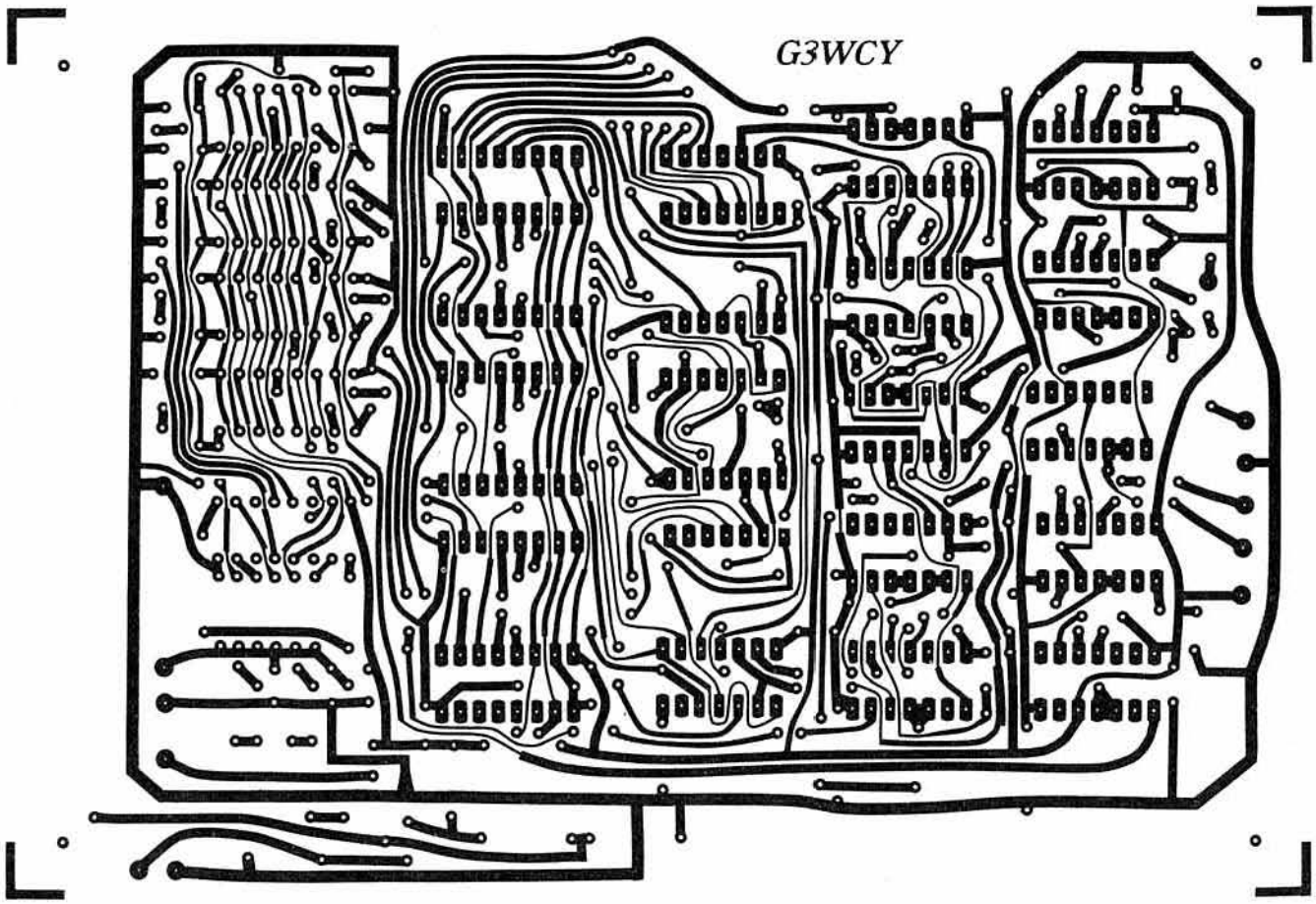


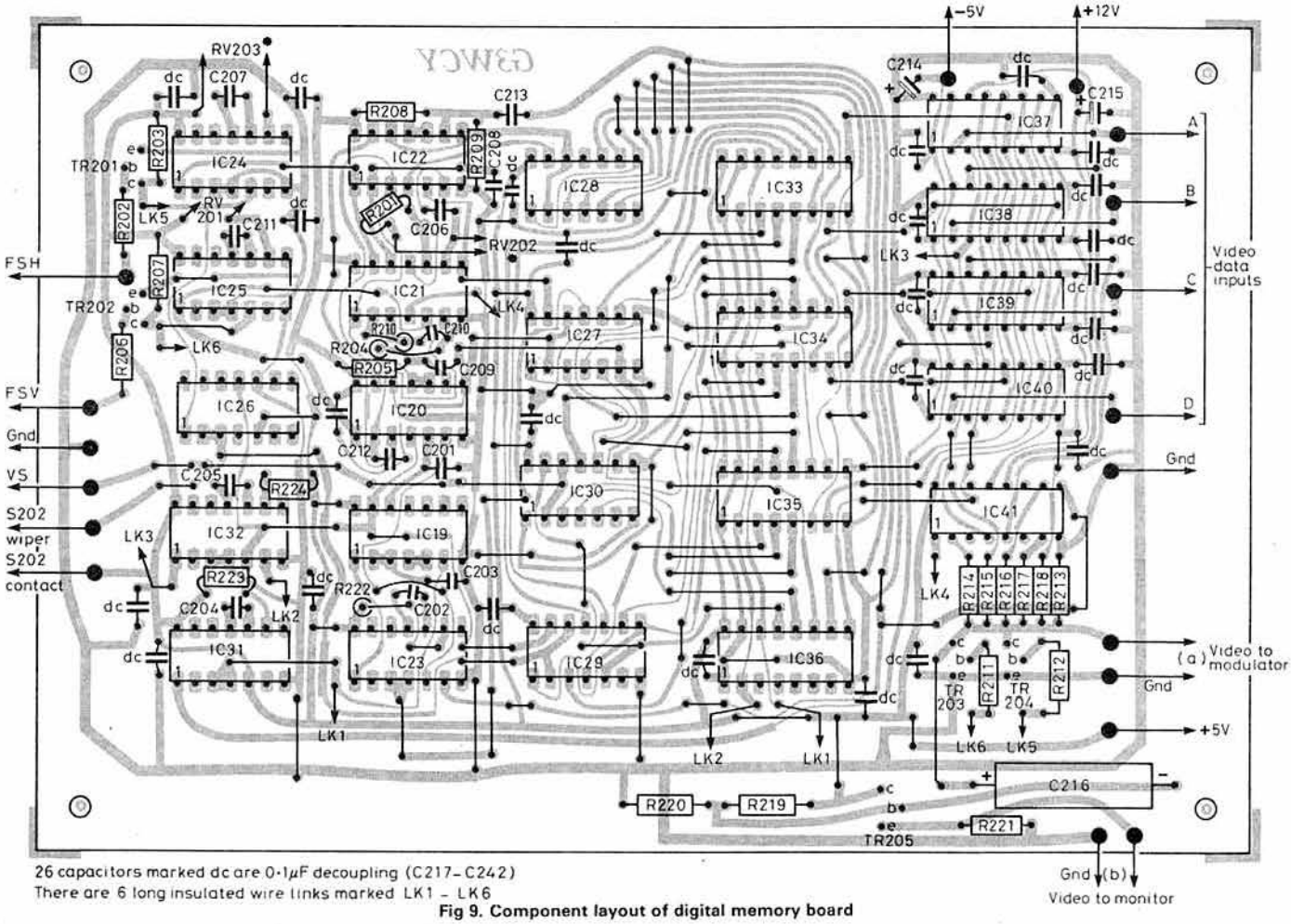
Fig 6. Analogue board pcb ▲

Fig 8. PCB track of digital memory board ▶



C122 - C129 are 0·1μF capacitors across the dc supply rails at each i c





26 capacitors marked dc are 0·1μF decoupling (C217–C242)
There are 6 long insulated wire links marked LK1 – LK6

Fig 9. Component layout of digital memory board

typical gray scale, if an sstv station can be persuaded to transmit a gray scale for recording purposes, it would be an invaluable aid for setting up.

Before using this tape recording, some preliminary adjustments and checks should be made. First check that the psu is working and providing the correct voltages, then connect the analogue board to the psu without ics. Verify that all voltages are correct at the appropriate ic pins, switch off, plug in all ics (watch out for bent-under pins) and again check all voltages. Put all three preset potentiometers at mid-position, and with the aid of an oscilloscope adjust RV102 to give a square wave output at pin 3 of IC12 for a frequency of 31,250kHz, thus giving a corresponding output at TP1 (FSV) of 50Hz, and at TP2 (FSH) of 15,625kHz.

The following checks must be done with the sstv tape recording fed in at the sstv input point. Connect the oscilloscope to TP3 (HS) and, with the tape running, observe narrow sync pulses approximately 5·8cm apart at a timebase speed of 10ms; likewise at TP4 (VS), vertical sync pulses should appear (very quickly) once every 8s. As a reassuring check of TP3 and TP4, stop and start the tape while monitoring with the oscilloscope, and the pulses will appear and disappear accordingly. Now connect the oscilloscope to video data outputs A, B, C and D in turn (IC18), again with the tape running. Varying width data pulses should be seen which verify that analogue to digital conversion is taking place. Leave RV101 and RV103 undisturbed for the time being.

Connect the digital memory board to the psu, without ics as before, and check that voltages are at all ic pins. Again, with ics inserted, now interconnect the two boards as per the circuit diagrams, not forgetting the two front panel potentiometers RV202 and RV203, both of which should be

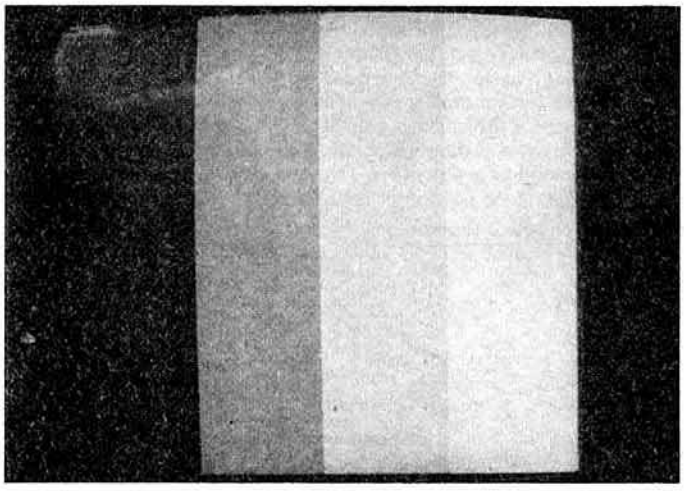


Fig 10. Gray scale

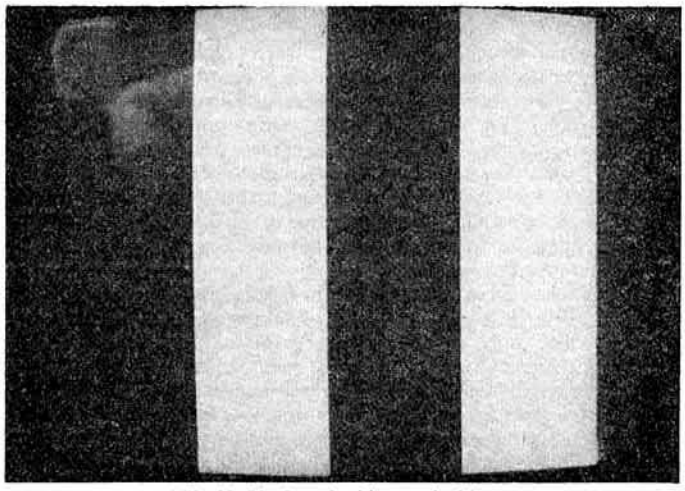


Fig 11. Black and white vertical bars

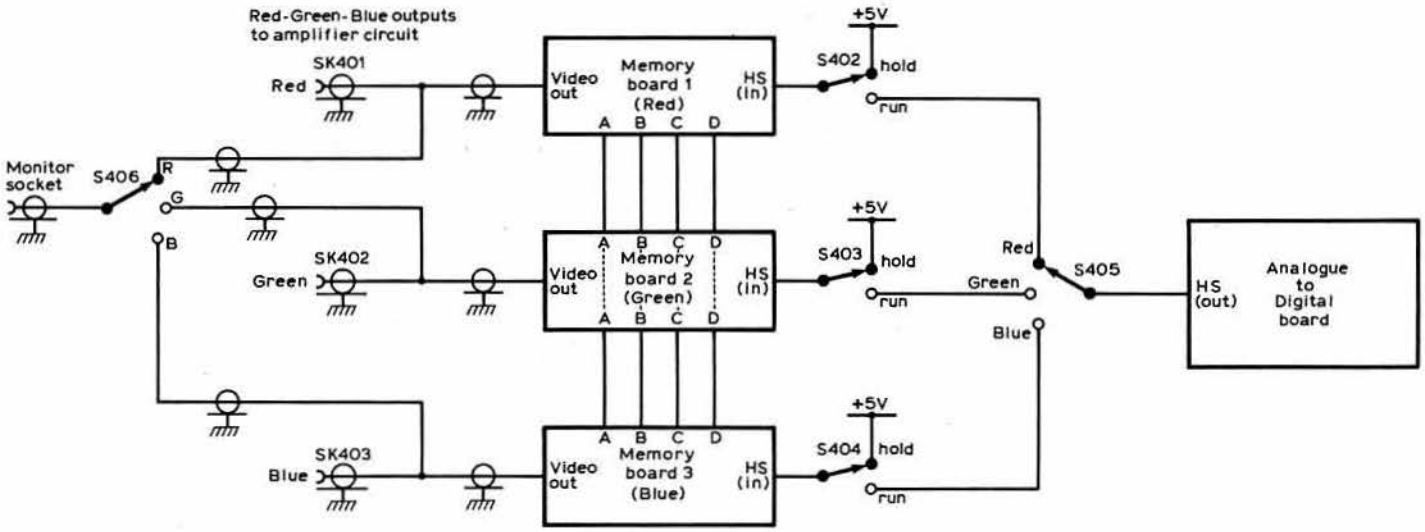


Fig 12. Colour memory switching layout

set at the midway position. Leave the connection of S202 until later. Connect the appropriate video output to the tv set or monitor, switch on, and without an sstv input alternate black and white bands that gradually disappear from top to bottom of the screen in approximately 8s should be seen, see Fig 11.

Adjust the front panel potentiometers to produce a square and centralized format on the screen, with gaps either side; this is normal for sstv. Everything is now ready to feed-in the sstv signal at the input, and some form of picture should appear. Adjust presets RV101 and RV103 on the analogue board for the best shading and resolution—this is where a gray scale is ideal, but not absolutely necessary, for setting RV101 and RV103. There will be some interaction between these two presets, but patience will get it right.

Potentiometer RV201 on the digital board may be adjusted to give the correct vertical position of the picture on the screen. Finally, check the freeze-frame action of S202, and then assemble the boards into a cabinet. All that remains is to connect the converter sstv input to the loudspeaker terminals of the receiver, tune around the sstv calling channels, and enjoy the incoming pictures and captions.

It will probably be found that some sstv stations are more critical to tune-in than others, as many sstvers use tape recordings, for convenience, which can become poor and have weak sync pulses. It will also be noticed while tuning that the picture goes from black to white, with best resolution and shading in between.

Colour sstv reception

Quite a few stations are now exchanging colour sstv pictures. To join their ranks is not as expensive or difficult as one might imagine. Using this design it is only necessary to add two extra memory boards, with the same single analogue to digital board driving all three memory boards, as shown in Fig 10. The complete unit is built and interconnected exactly as a one-memory monochrome version, but it is necessary to upgrade the psu on the +5V and +12V rails, using 78H05 and 78H12 regulators on good heatsinks respectively.

The other variation is the interconnection from the slow horizontal sync pulse on the analogue board to each memory board for red, green, and blue. This is taken via a rotary switch S405, where each memory board has its own individual HOLD switch. In use, when receiving a colour picture, the transmitting station will usually send two or three frames of red, then green and finally blue. The best of each is chosen as transmitted and held via switches S402, S403 and S404 and selected, in that colour order, via S405. If QRM or multi-pathing (QSB) spoils one of the three colour frames, the two good ones can be stored while the spoilt one is refreshed, finally producing a superb colour picture.

The additional circuitry required is the interface between converter and colour tv. There are two main methods of doing this; one is to take the red, green and blue video outputs from each board to a colour encoder/modulator which has a single output that goes to the tv antenna socket, but this still has the previously-mentioned disadvantage that the picture has to go through the tv tuner circuitry and so on, giving low-quality colour.

For the more adventurous, better results may be achieved by feeding the red, green and blue outputs direct to the red, green and blue guns of the tv colour tube via suitable circuitry containing three separate amplifiers, one for each gun, to control and adjust the brightness and contrast for each colour. It will also be necessary to feed-in mixed horizontal and vertical sync pulses from the converter, but minus the video information.

This may be done with the aid of the circuit shown in Fig 13. The inputs to TR401 and TR402 must be taken from the collectors of TR201 and TR202 on any one of the three memory boards. Commoning the collectors of TR401 and TR402 gives the required mixed horizontal and vertical sync pulses which should be fed to the sync line of the colour tv to be used, components C401 and R405 ensure sufficient isolation when the tv is switched to "normal" without the need to disconnect the external sync line.

Referring to Fig 12, S406 is a purely optional switch, to enable individual monitoring of each memory whether operating monochrome or colour. It is also useful for storing pictures, and also see any subsequent pictures being sent by the other station.

A suggested red, green and blue amplifier circuit is shown in Fig 14. This is very straightforward, and can be built on a small piece of Veroboard and easily incorporated inside the most compact of tv sets. Also, a small control panel can be made to house potentiometers RV401–404, S401, BNC sockets for the red, green and blue inputs, and a phono socket for the external sync input, see Fig 15. This control panel may be conveniently positioned internally on the side of the tv cabinet. Alternatively, build the whole unit in an external box, with only the need to fit SK401, 402, 403 and 404 and the dc supply lines on the rear panel of the set. The 115V and 12V dc supply lines should already be available within the tv on its video amplifier panel.

The purpose of S401, a rotary four-pole two-way, is to switch from sstv MONITOR position 1, to NORMAL operation, position 2. The only real modification to the tv set on the video amplifier board is to break the red, green and blue tracks or leads to the red, green and blue guns of the colour tube, and re-route via S401.

One very important safety point, **do not** attempt this modification if the colour tv set does not have an isolating mains transformer. If it is transformerless, an external isolating transformer of suitable power rating (usually 1,000VA) **must** be used.

If a single memory transmit-receive unit is available and it is decided to build the colour version unit described here, it is not necessary to have a colour camera for transmit. It is only necessary to place the chosen colour picture in front of the lens of a black and white tv camera, first via a red filter, and store two or three frames of red on audio-tape, then repeat with green and blue filters in that order, and store each on tape. With the aid of

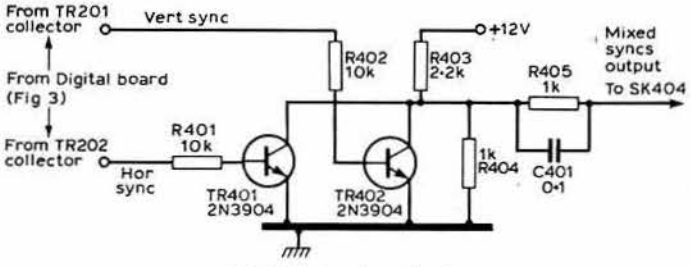


Fig 13. Sync mixer circuit

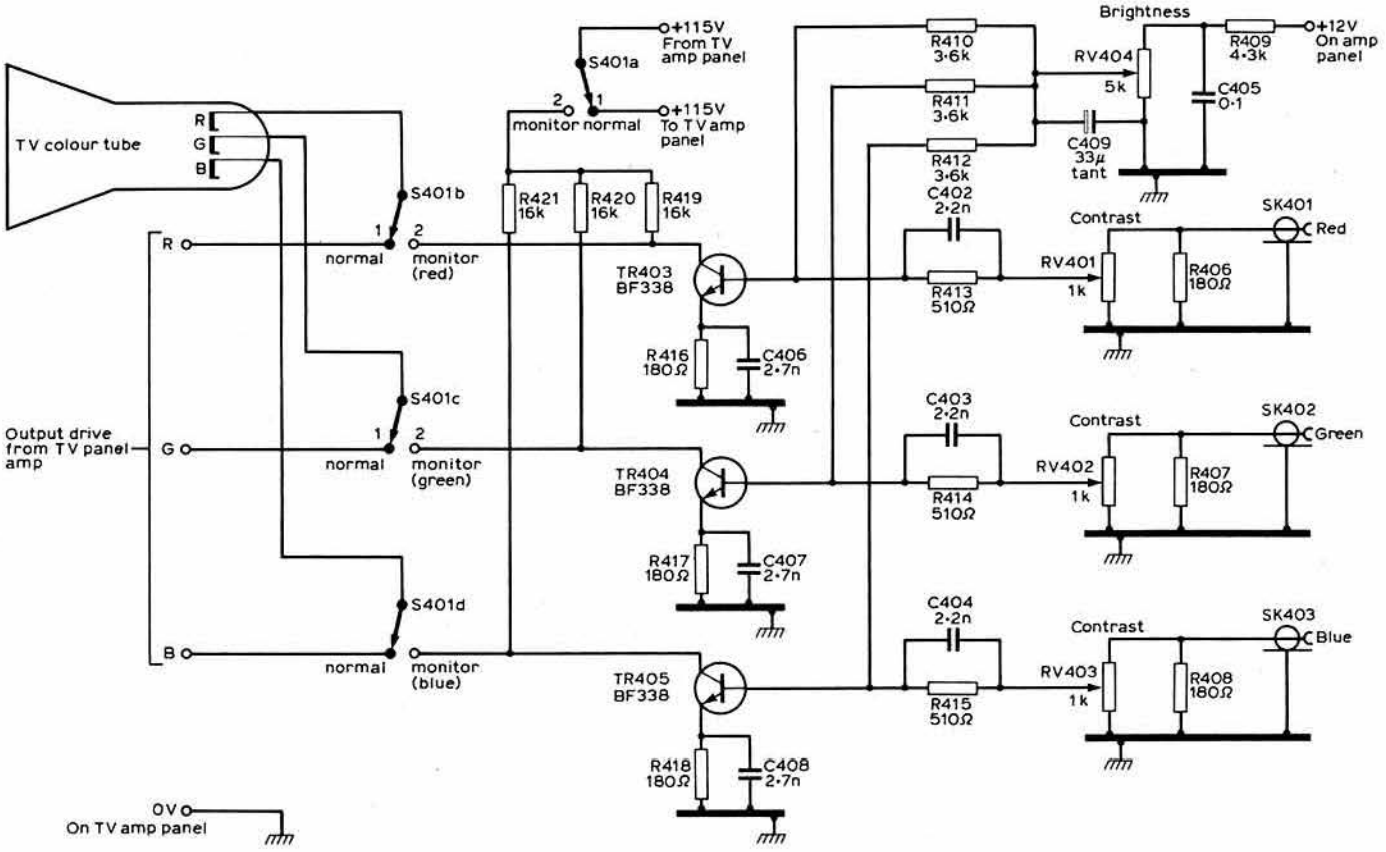


Fig 14. SSTV colour amplifier circuit

this unit it will then be possible to view and transmit colour sstv pictures by replaying the recording. A word of advice here about lighting. When compiling colour sstv pictures, ordinary household lighting will be unsatisfactory. Use "daylight" type fluorescent tubes or quartz halogen lamps, as used in slide projectors.

Alternatively, instead of placing colour filters in front of the tv camera, a slide projector can be utilized. Modify three slide frame holders by replacing the picture area with the appropriate red, green and blue filter material, and use the projector as a source of concentrated red, green and blue light. Again in that order, train the light on the picture in question, this time *without* any other incidental lighting, and store two or three frames on tape as before.

One other point regarding the setting up of colour sstv pictures concerns "Gray scale tracking", as ideally one should have a good source of gray scale to assist in the procedure. Load each memory with gray scale, and as each is transferred to the colour tv set each one should be pure black and white, without any colour tinges in each gray scale area. This balance is determined by the parameters of the colour tube and colour amplifier circuit of Fig 14. If colour tinges do occur, change resistors R410, R411 and R412 to 4·7kΩ presets; in fact, if when constructing this unit, R410, R411 and R412 are mounted on Veropins, a change to presets (if necessary) will be quite straightforward. In addition, if possible, select close-matched transistors for TR403, TR404 and TR405.

Conclusions

The author hopes that this article will encourage an expansion in sstv operation on both the hf and vhf bands. Even those who cannot transmit to start with, can listen for "CQ SSTV" calls, and most sstvers who do get a reply would be glad of a report plus action replay video from a tape recorder.

PCBs and parts will be available from the author if there is sufficient demand.

Finally, the author extends his thanks and gratitude to Martin, G3OQD, for his valued advice on some of the technical points related to the colour section of this article. □

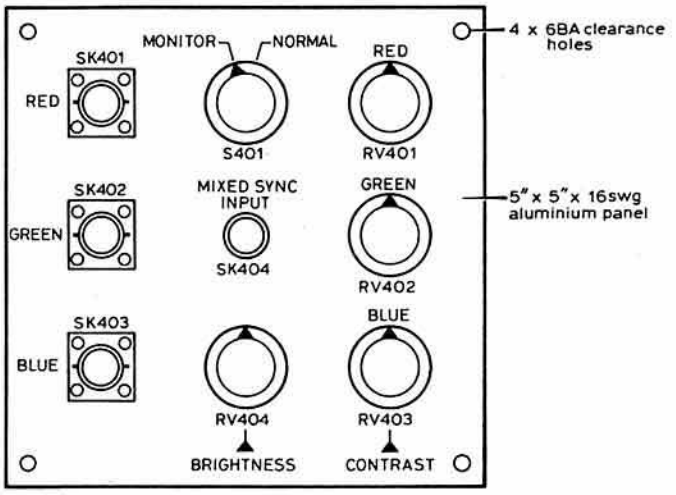


Fig 15. Layout of colour control panel

The G4BWE cw filter

by STEVE PRICE, G4BWE*

THE PURPOSE of this article is to present the author's design for a fixed-frequency bandpass audio filter. It operates at 800Hz and has been so engineered that it will couple into the loudspeaker cable of any amateur radio receiver or transceiver. It provides a facility equivalent to that offered by a specialized intermediate frequency crystal filter of around 300Hz bandwidth, and may be switched in or out of operation at will.

By eliminating features such as tunable centre frequency, variable bandwidth and notch controls, the author has found it possible to formulate a particularly straightforward design which, despite its relative simplicity, offers a high level of performance. Building the filter will pose no special problems, and the project can therefore be recommended to inexperienced constructors.

Design background

A re-examination of the design objectives for bandpass filters provides a good starting point. In a communications receiver, bandpass filters are generally assigned the task of separating the wanted signal from all other transmissions and interference. Fig 1(a) presents a graph of the ideal response shape. The bandwidth must be wide enough to allow all the information contained within the transmission to pass through the filter. For ssb reception a width of between 2·2 and 2·7kHz is demanded, but as morse code contains far less information per unit time than speech, a bandwidth of only a few hundred hertz is quite adequate for reception of cw.

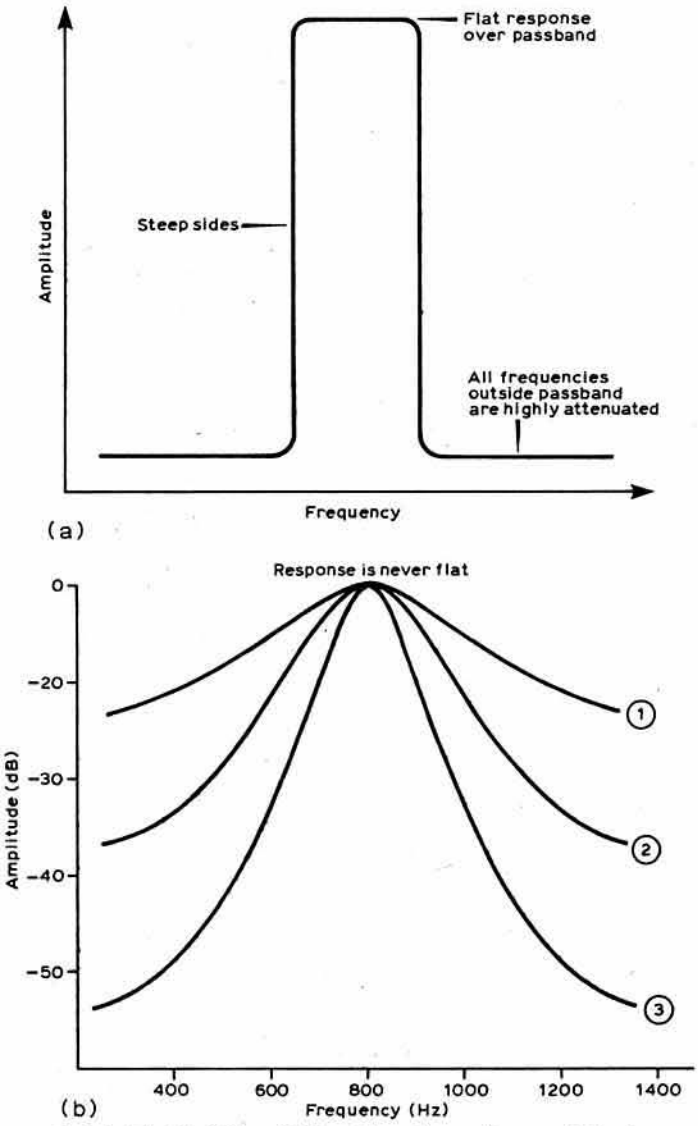


Fig 1. (a) The ideal filter. (b) The effect of cascading tuned circuits

All frequencies adjacent to those which the filter is designed to accept must be highly attenuated, hence the requirement for a very steep-sided response curve. Another important parameter illustrated by Fig 1(a) is flatness of amplitude response within the filter passband. An ssb receiver requires a flat passband response to ensure that all harmonic components of the speech waveform are reproduced with the correct relative amplitude. However, cw signals are far simpler, in that their energy is essentially confined to a single frequency. Nevertheless, a cw filter should also possess a well-defined and uniformly-flat amplitude response across its passband. A cw filter designed with the foregoing requirement in mind will exhibit far better operational performance than the filter which boasts a very sharp, "peaky" response.

One of the first truths with which one must come to terms is that there is no single element, resonator or tuned circuit available which will satisfy all the performance criteria laid down by the ideal filter model represented in Fig 1(a). For a single tuned circuit possessing a Q of 4 and resonant at 800Hz, the -3dB bandwidth will be:

$$\text{Bandwidth (-3dB)} = \frac{\text{Resonant frequency (Hz)}}{Q}$$

$$= \frac{800}{4}$$

$$= 200\text{Hz}.$$

In Fig 1(b), curve (1) illustrates how the above network might be expected to perform as an audio cw filter. At this point it should be emphasized that the term "tuned circuit" applies equally to a single-stage active filter in which the transfer function of a tuned circuit is accurately synthesized by an RC network working in conjunction with an operational amplifier. The performance of such an elementary filter clearly leaves a lot to be desired. The maximum attenuation obtainable outside its passband will be a meagre 20dB, and the resultant shape factor is lamentably poor.

An obvious way of improving matters is to cascade a number of identical filters, thus increasing the slope gradient and producing better skirt rejection. The effect of cascading either two or three tuned circuits, each one being resonant at 800Hz and possessing a Q of 4, is shown by curves (2) and (3) respectively (Fig 1(b)). The three-stage filter could obviously form the basis of an impressive design. It achieves over 50dB of ultimate rejection and has a steep-sided response curve. Unfortunately, however, the amplitude response is nowhere near flat within its passband. Also, the -3dB bandwidth is only about 70Hz, thus making the filter sharper than really desirable.

Luckily there exists a surprisingly simple design technique which enables the production of fixed-frequency audio filters that boast commendably flat passband response. Furthermore, it is an easy matter to compute the desired bandwidth. Fig 2(a) shows how this is achieved. Two filter stages, one having a resonant frequency of 700Hz and a Q of 3·5, the other with its resonance at 900Hz and a Q value of 4·5, are cascaded. Each filter has a -3dB response at 800Hz, the desired centre frequency.

As Fig 2(b), curve (A) shows, the effect of overlapping these two off-set resonances is to produce a perfectly-flat amplitude response extending 100Hz on each side of the centre frequency. With only two stages it is impossible to obtain an adequate shape factor, but if a total of four stages are employed, two operating at 700Hz and another two at 900Hz, the filter's performance improves dramatically; see Fig 2(b), curve (B). For the sake of clarity, Fig 2(c) features block diagrams of the above filters.

The active filter circuit chosen to implement the design is given in Fig 2(d). This is a well-proven configuration which possesses a number of useful features. The network is absolutely stable in normal operation, and by choosing component values appropriately it is possible to extract a predetermined voltage gain from the filter at resonance. The two capacitors are always made equal in value. As the table (Fig 2(e)) shows, the two centre frequencies required are obtained by choosing suitable values for Rx.

Third-generation op-amps

Although a quite acceptable level of performance may be obtained by building the filter around the ubiquitous 741 integrated circuit operational amplifier, the author considers that the falling prices and generally good availability of later, higher performance op-amps most definitely warrants their use in this design. The type LF351 "third-generation" audio op-amp, introduced towards the end of the 'seventies by National Semiconductor, not only features a fet "front-end" for very high input impedance, but it also, and perhaps more importantly, contributes practically no noise. This

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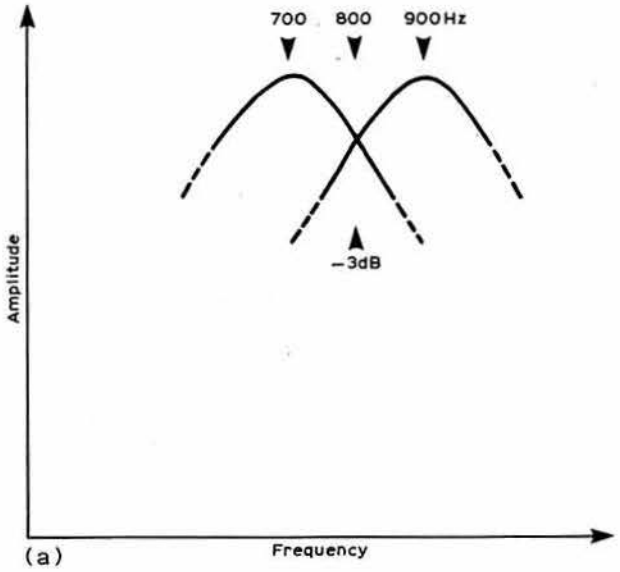
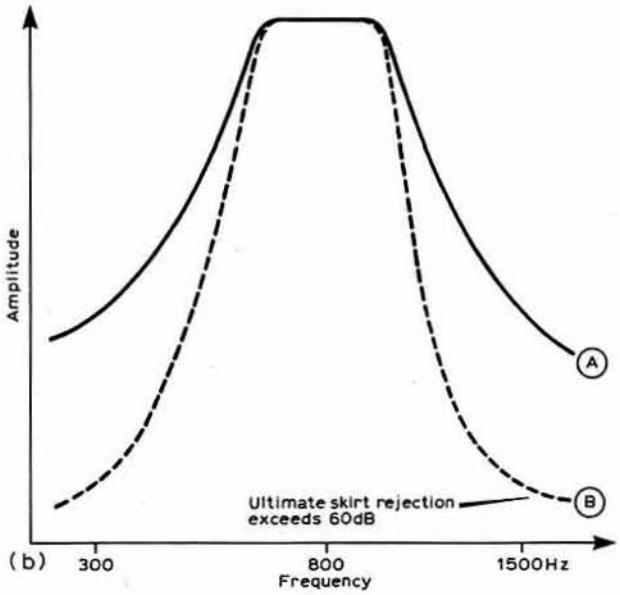
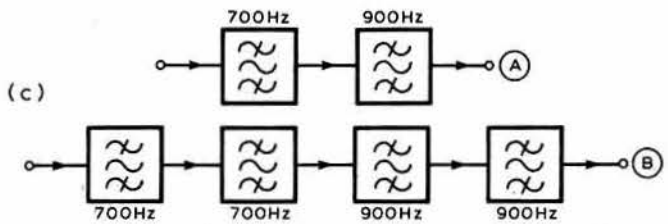
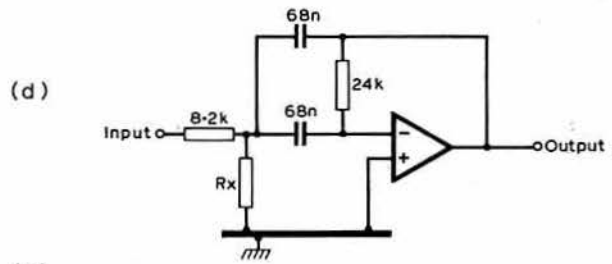








(e)

Rx	Centre frequency	Q	–3dB bandwidth	Voltage gain
510Ω	700Hz	3·5	200Hz	1·4
300Ω	900Hz	4·5	200Hz	1·4

Fig 2. Design background

Components list

FILTER

R1, 5, 8	510Ω	**C1, 2**	4270pF polystyrene
R2	39Ω	**C3**	100nF polyester
R3	22kΩ	**C4-11**	68nF polyester 5% tolerance
R4, 7, 10, 13	8·2kΩ	**C12**	100nF polyester or ceramic
		C13	1μF tantalum electrolytic 35V
R6, 9, 12, 15	24kΩ	**C14**	100μF electrolytic
R11, 14	300Ω	**IC1-5**	LF351
All resistors are 0·33W, 5% tolerance, carbon or metal film types.		**IC6**	LM380N
		RFC1	220 or 250μH
RV1	22kΩ log	**S1**	Toggle dpdt
		FB	Ferrite bead

POWER SUPPLY

IC7	7815 regulator	**C15, 18, 19**	100nF ceramic
IC8	7915 regulator	**C16, 17**	2,200μF electrolytic 25V
BR1	100piv, 1A silicon bridge rectifier	**T1**	240V primary 15-0-15V secondary 250mA minimum
S2	Mains dpst		
FS1	500mA anti-surge		

SINGLE RAIL COMPONENTS (See text)

Two-off	22kΩ resistors	**One-off**	47μF electrolytic 25V
Two-off	100nF capacitors	**One-off**	100μF electrolytic 25V

SUPPLIERS

Siemens B32560, 5% tolerance, MKH polyester capacitors and E24 range, 5% tolerance, resistors obtainable from Electrovalue Ltd, 28 Jude's Road, Englefield Green, Egham, Surrey TW20 0HB.

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

means that the common bugbear of active filter systems, namely the continuous background hiss generated when a number of mediocre ic op-amps are cascaded, disappears almost completely. The LF351 has exactly the same pin-out as a 741, so if dil sockets are employed on the circuit board the two types may be interchanged at will.

Another op-amp worthy of mention is the Texas Instruments TLO71. The LF351 is preferred by the author, however, because the TLO71 employs only rudimentary output short-circuit protection. This consists of an on-chip 128Ω resistor in series with the output connection, and the output transistors are provided with 64Ω emitter resistors—a relatively high value. As the impedances within the filter circuitry have been kept purposely low in the interest of maintaining high noise immunity, the higher output impedance of the TLO71 may result in a slight downward shift of the two resonant frequencies. This is probably not of any great consequence but should nonetheless be borne in mind.

Dual versions of both the above op-amps are readily available, designated LF353 and TLO72 respectively, and these may enable the constructor to produce a more compact layout.

The final design and its construction

The filter circuitry is shown in Fig 3. Input signals are routed via the by-pass switch S1(a). R1 and R2 form a potential divider which serves to attenuate all input voltages by approximately 23dB. This measure ensures that there is no possibility of the filter being overloaded when driven strongly. C1, C2 and RFC1 remove any radio frequency energy and thereby help to provide immunity from transmitter radiation. IC1 with input network C3, R3, serves as a unity gain, non-inverting buffer.

The two 700Hz bandpass filters comprise IC2 and IC3 plus associated components R4-9 and C4-7. IC4 and IC5 with R10-15 and C8-11 form the 900Hz stages. The final stage (IC6) is built around an audio power amplifier chip type LM380N. RV1 is the filter's gain control and is used to set the output at a comfortable listening level. The output socket is fed via the second half of the by-pass switch, S1(b). Inclusion of the LM380N enables the filter to drive a low-impedance moving-coil loudspeaker.

The mains power supply circuitry is entirely conventional. It makes use of two 1A ic regulators to provide ripple-free + 15V and – 15V outputs; see Fig 4. Constructors should note the difference in pin designation between the positive and negative regulators.

The author's prototype is constructed in an aluminium and steel case measuring approximately 6in wide, 4in deep and 2in high. There are only three items mounted on the front panel—S1, S2 and RV1. Two jack sockets occupy the back panel and provide input and output. The mains transformer is bolted to the base. All other components are mounted on a single piece of standard, 0·1in matrix Veroboard measuring 5·8 by 3·4in. The LM380N must be soldered in place as heat is conducted away from the

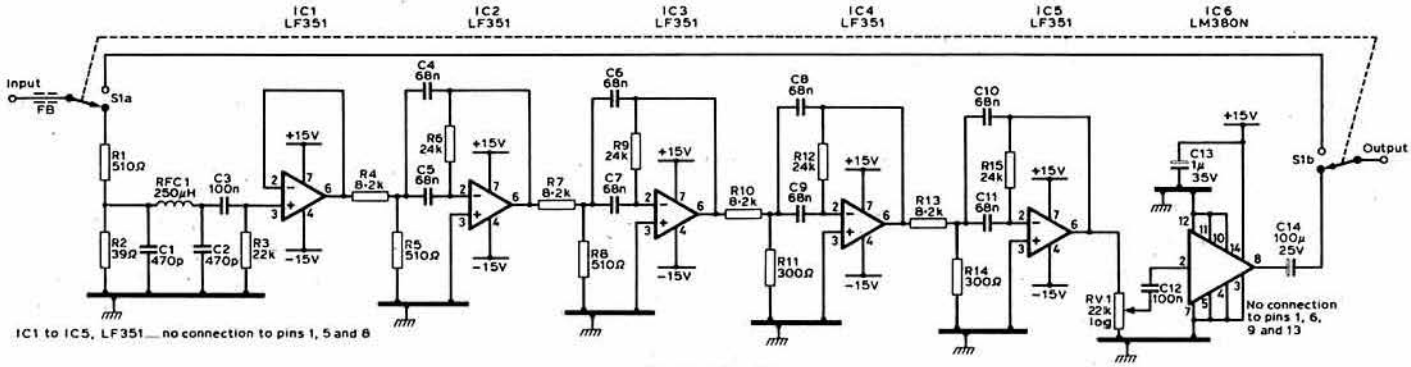
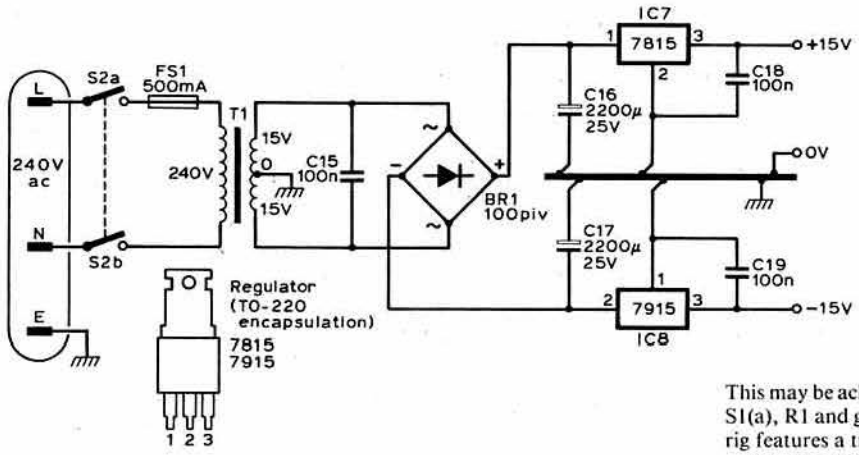


Fig 3. Filter circuitry



◀ Fig 4. Mains power supply

ic through pins 3, 4, 5, 10, 11 and 12. The Vero strips to which these pins are soldered should be left un-cut for a length of approximately 1·5in on either side of IC6.

The 7815 regulator (IC7) also requires a small heatsink, and this is best provided by bolting a piece of 18 gauge aluminium (2in² is adequate) directly to the device mounting tab. The 7915 regulator should not require a heatsink as it supplies only a small current to the op-amps.

Resistors R4–15 must be of five per cent tolerance, 0·33W, carbon or metal film types being suitable. The three E24 range values employed (300Ω, 510Ω and 24kΩ) are available from a number of the larger distributors. Capacitors C4–11 (68nF) must also be of five per cent tolerance. Siemens MKH polyester type B32560 can be recommended.

Modifications and refinements

Many constructors will wish to run the filter from a single supply rail. This is perfectly understandable, as many amateurs already possess a mains power supply designed to produce a +13·8V output, and may not wish to incorporate a separate mains psu within the filter itself. Fig 5 outlines the necessary modifications and shows the additional components marked with an asterisk. A bias supply equal to half the rail voltage is developed at the junction of the two 22kΩ resistors. The 47μF capacitor serves merely as a decoupling component. R3 is now used to feed bias from the potential divider as shown. Pin 4 of each op-amp is connected to ground (ie 0V) and pins 3 of IC2–5 are connected directly to the bias potential divider. Purists may also wish to introduce a 100nF coupling capacitor between the top of RV1's track and pin 6 of IC5, thereby preventing direct current flow through RV1. The circuitry around IC6 remains unchanged.

Any dc supply entering the filter should be decoupled using a physically-small 100nF capacitor. A separate 100μF electrolytic connected across the filter supply rail may also encourage stability, especially where a long supply lead has been employed.

If headphones are to be fed via the filter it is a good idea to incorporate a simple resistive attenuator. Modern hi-fi type headphones with an impedance in the region of 8Ω require a series resistor of 100Ω. Headphones of higher impedance will probably require a series resistor that is proportionately greater in value.

Constructors who will be using the filter in conjunction with an older receiver or transceiver having a valve audio output stage, may wish to ensure that the filter input circuitry presents a realistically low impedance to the rig. This may be achieved by adding a 4·7Ω, 1W resistor between the junction of S1(a), R1 and ground. However, such a measure will not be necessary if the rig features a transformerless, solidstate audio stage.

Finally, the filter's shape factor may be improved still further by the addition of another two stages—one operating at 700Hz, the other at 900Hz. The circuitry remains straightforward and a flat passband response is maintained. The -6dB bandwidth will be approximately 250Hz, as opposed to 275Hz for the four-stage design.

Conclusion

Understandably, no audio filter can be expected to produce the same overall improvement in receiver system effectiveness as a really good 300Hz cw i.f. filter. The simple fact that an audio filter is interposed almost at the end of the receiver signal chain, whereas a crystal cw filter can be inserted after the first or second mixer, is bound to give the crystal filter a better chance of improving reception in difficult conditions. For instance, the receiver's agc loop will automatically respond to all signals falling within the ssb filter bandwidth. Therefore, a strong, interfering cw transmission which produces, say, a 2kHz note at the output of the receiver's product detector will, because of agc action, have the effect of modulating the amplitude of

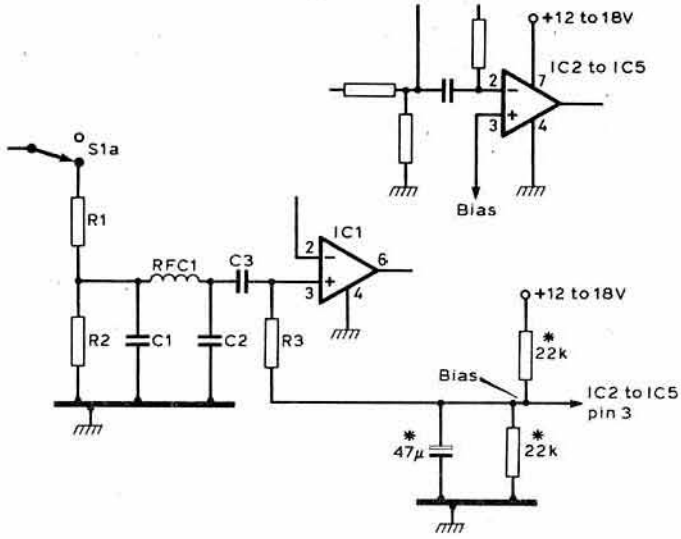


Fig 5. Operation from a single supply rail

a weaker, wanted signal which falls within the audio filter passband. This rather annoying form of distortion can, however, often be eliminated by careful use of the rf gain control.

Another obstacle to the attainment of noise-free, "single-signal" reception is mixer intermodulation and the consequent generation of unwanted third-order products. Such products may, depending partly on the quality of receiver design, be originated within the receiver's product detector. The resultant noise energy is then likely to pollute even those signals which fall within the audio filter bandwidth.

The results obtained in practice, however, are sometimes quite startling. A crowded, noise-ridden segment of the spectrum can often be transformed into a quiet haven in which resides the wanted signal.

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A simple 144MHz portable antenna based on the "J Stick"

by C. N. BAUERS, G4JUV*

Introduction

The J Stick antenna is an end-fed λ/2 vertical. The radiating element has a high impedance feedpoint so a λ/4 stub is used to transform the impedance down to 50Ω for a normal coaxial feed. Most mobile and many portable antennas rely on a groundplane for their function. The J Stick does not have a groundplane, and it is potentially useful for campers, pedestrians, cyclists, and in any situation where none is available. The absence of groundplane radials makes the antenna more compact.

The design described here is self-supporting, which makes it a useful alternative to the Slim Jim made of 300Ω ribbon; both antennas have a similar electrical performance. All the materials used in construction are available from diy and modelling shops. The cost is around £5.

All the critical lengths are adjustable during construction and when a good vswr has been obtained the structure is made permanent. This should enable the first attempt to work perfectly, and the shack will not be littered with bits of wire of the wrong length. The antenna can be constructed for the 70 and 432MHz bands by scaling the lengths in proportion to the wavelengths of these bands.

Construction

The antenna is made of springy piano wire which can be soldered and does not rust. It sits on a length of 15mm copper waterpipe. The length of this is not critical and should be chosen for convenience. The author used a 0·8m length which was ideal for mounting on a pushbike for pedal powered portable. Three strands of 18swg piano wire were tied and soldered side by side for extra rigidity, and single-strand copper wire was used to tie the whole structure together. The wire wrapping was soldered to make the structure permanent. To solder onto the copper pipe, a blow torch or a gas ring will be needed.

The antenna should be tied and soldered with a movable shorting strip and feed point with adjustable lengths left at the end of the radiating element and λ/4 section; these are tied but not soldered until the vswr has been optimized. The vswr is optimized by adjusting the position of the feedpoint and shorting strip and by sliding the ends of the radiating element and λ/4 section—these adjustments should be done in the open away from any obstructions. The vswr can be brought close to 1:1 on 145MHz, and should be better than 1·2:1 over the whole band.

The coaxial feed is routed up the copper pipe, but should not be installed until the soldering on the pipe is finished. It can be clamped at the bottom of the pipe, and the connections at the feedpoint should be waterproofed with silicone bath-sealing compound. The λ/4 section is spaced with plastic sheets held in place by solder blobs above and below them. The sharp ends are fitted with solder blobs to avoid the risk of poking out an eye. Piano wire is usually sold in 3ft lengths, which makes things difficult; any joints in the antenna should be at the current node shown on the diagram, and it is a good idea to overlap the wires at the joints.

To prevent corrosion due to electrolytic effects, the copper/solder joints can be painted over. This was not done on the author's antenna, but it has not been exposed to the elements for long periods. The structure can be installed in a length of plastic waterpipe, and this would be excellent for a permanent base station antenna.

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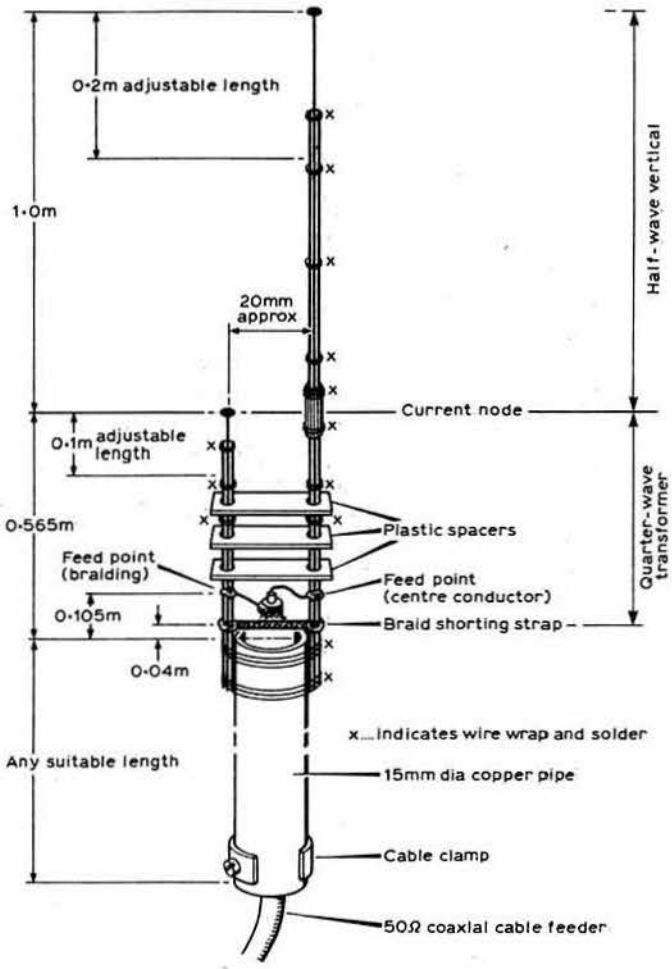

Fig 1. Constructional details of the antenna

Performance

The antenna is electrically similar to a centre-fed λ/2 vertical, and to the Slim Jim which is simply a folded version of the J Stick. The radiation pattern is omnidirectional in azimuth, and is at a maximum horizontally if the antenna is clear of the ground and local obstructions. The gain is theoretically 1·2dB over an isotropic radiator and 3dB over a λ/4 groundplane. Comparisons were made with a λ/4 groundplane, and the J Stick performed as expected. Thanks are due to local stations who supplied comparative reports. The vswr was better than 1·2:1 over the whole band. Mechanically, the antenna was sound; it survived hundreds of miles whipping about on the back of a bicycle and survived a number of arguments with trees. The feeder needed replacing once but this is a simple task.

Conclusions

This design is ideal where a high gain is not needed and a simple, cheap, and compact antenna is wanted. There are mechanical and electrical advantages over a centre-fed λ/2 vertical and the Slim Jim, both of which have similar performances. The construction on a length of pipe makes the antenna very easy to tie or clamp in temporary positions, and it can be weather proofed for permanent installation. □

TECHNICAL TOPICS

Pat Hawker, G3VA

JACK MALING, G5JL, noted the "interpretations" of phrases so often used in technical writing (*TT* December 1982). On a slightly cynical note he recalls a phrase all too often used in some factories when the product is proving a little suspect and the quality assurance people (if any) are getting worried and talking about "reject". The cry would go up: "We must take a calculated risk".

Translation: "Let's flog this stuff quickly and see if the customer spots the problem."

Let us hope that such production techniques are nowadays not to be found in any factory producing amateur radio equipment or components. One hopes not, but sometimes one wonders!

The prediction of hf propagation

For over 50 years those who use hf for professional rather than purely amateur operation have sought and refined methods of predicting optimum working frequencies for specific point-to-point routes at specific times in specific months in specific phases of the sunspot cycle. The monthly hf predictions in *Radio Communication* reflect this work. However, as every dx operator soon discovers, such charts still provide guidance only on likely average conditions rather than, so to speak, tablets of stone.

Monthly predictions, even when statistically accurate, remain subject to significant day-to-day variations that we tend to call "conditions". Despite many attempts by radio-physicists to use advanced statistical modelling techniques, nobody has yet succeeded in finding a satisfactory way of forecasting either short-term or long-term optimum frequencies with the required degree of accuracy. For amateur radio, this is perhaps just as well, as much of the fascination of hf operation is that until the bands have been given a whirl there is no way of knowing just what you may be missing.

Indeed I suspect that accurate ionospheric prediction is one of those subjects that fall within what scientists are coming to call the "chaos concept"—the idea that there are macroscopic systems whose future behaviour *cannot* be accurately predicted. As *Nature* put it recently: "The old saw is that fourteen-day weather forecasting is impracticable because, over such a time-scale, disturbances initially as negligible as the flapping of a single seagull's wings may turn out to have a worldwide effect. In meteorology, the problem is to know which seagull's flapping wings matter."

At a 1982 IEE conference on "Antennas and propagation" at York University (IEE Conference Publication No 195, Vol 2, pp 229-236), Charles M. Rush of the US Department of Commerce, NTIA/ITS, Boulder, Colorado, gave a paper "HF propagation: what we know and what we need to know". This paper indicates in summary what 50 years of propagation studies have discovered about the ionosphere from the viewpoint of optimizing the performance of ionosphere-dependent radio communication systems. Fig 1 shows the structure of the ionosphere and the atmospheric layers.

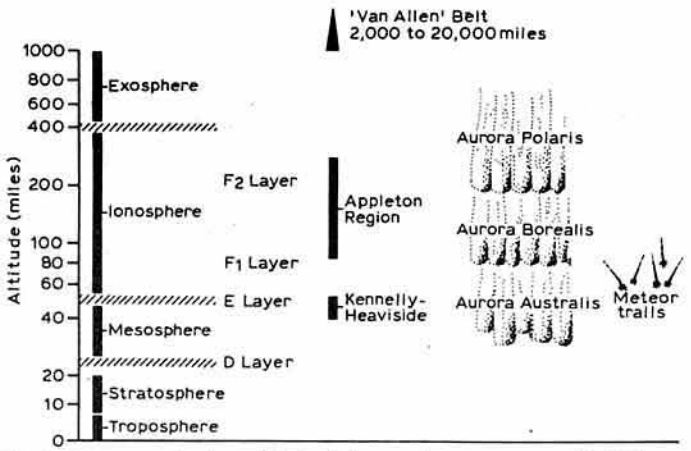

Fig 1. The atmospheric and ionized layers above us—most of which can affect radio propagation. At night the F1 and F2 layers combine, resulting in dusk and dawn "tilts". This makes possible, at these times, chordal hop dx propagation rather than the lossy multiple-hop form of long-distance propagation which tends to require significantly higher power. Meteor-trail reflections occur about 85-115km (about 70 miles) above the earth at roughly the same height as sporadic-E, so that the maximum range of both these forms of hf/vhf propagation is roughly the same, about 2,000km

Charles Rush points out that great strides have been made in recent years in understanding how and why the ionosphere varies, and just how these variations affect communications and radar systems. But he stresses that nobody is yet in any position to claim that the limitations imposed by the ionosphere are "assessible, quantifiable and predictable". He highlights, for example, the need to obtain more information about night-time propagation in the lower hf and mf bands (ie 1·8 and 3·5MHz in amateur terms). Similarly he feels more needs to be discovered about hf signal fading, multipath effects, scatter and how ionospheric irregularities result in interference between transmissions (eg ionospheric non-linearity giving rise to the "Luxembourg effect" of cross-modulation on high-power transmissions). He notes that daily hourly variations for the F2 layer amount to 10-20 per cent and display a marked dependency upon geomagnetic latitude. It is not always appreciated by amateurs that it is the much lower D region that acts principally as an attenuator of hf signals and so contributes directly to "conditions" on hf. For low-power transmissions we need not only an F2 or night-time combined F1/F2 path that is open, but also a weakly-ionized D region to let the signals pass without excessive losses; this is the reason why darkness paths, if open, tend to be better than daylight paths, since the D region is much more densely ionized during daylight. Optimum paths are those that do not involve intermediate ground reflections, and these are very reliable around dawn and dusk.

Charles Rush notes: "Month-to-month, seasonal and solar cycle changes in hf propagation can be readily obtained from existing techniques. Changes in hf propagation associated with day-to-day, hour-to-hour and minute-to-minute variations in the ionosphere are more difficult to quantify. This is particularly the case during times when the ionosphere is undergoing changes that are induced by solar flares and geomagnetic storms." Nor can the maxima and minima of future sunspot cycles yet be accurately predicted.

For those with a serious interest in hf propagation studies, Charles Rush notes such phenomena as "electro-dynamic drift, diffusion, natural-air winds and particle precipitation that compete for control of the ionization distribution in the low- and high-latitude F-region".

The problem for many of those more interested in the effects of the ionosphere on propagation at hf, and occasionally at vhf, rather than in the basic physics, is that as the studies advance so the terminology becomes more and more specialized and presents a formidable barrier to understanding.

Radiophysics, predictions and dx

From time to time readers point out, for instance, that a lot of the information on the state of the ionosphere, as given in *Radio Communication* and on the GB2RS news bulletins, tends to be pretty obscure. Many of the terms and abbreviations are indeed almost meaningless to those of us who think of ionospheric layers as a means of communication rather than for the study of radiophysics.

From an amateur radio point of view, there is usually less requirement than for professional work for accurate prediction of the times when a path to a fixed location is open, since most dx contacts are made on a random basis. Nevertheless we do need to be aware of the natural phenomena that affect skywave propagation—and also why conditions vary so much from day to day, in addition to the regular diurnal and seasonal changes.

The following notes are partly based on some useful guidance given in the Rockwell International (Collins Radio) *HF Communications Data Book*; partly on information previously given in *TT*.

The sun. The sun is the source of most of the energy that creates the ionospheric layers, emitting electromagnetic radiation in the form of X-rays, ultraviolet and visible light, radiowaves (noise) and energetic particles in the form of protons, electrons, alpha particles etc that are carried to the earth on the *solar wind*. The radiation takes place mainly from *sunspots* and is much intensified when these give rise to solar flares.

Sunspots. In general the greater the number of sunspots the greater will be the ultraviolet radiation. This means that the more sunspots there are the greater the density of conductive ions in the earth's layers, and the higher the frequency that will be reflected. Sunspot activity is usually stated in terms of the Zurich (Wolf) *sunspot number* (ssn); this takes into account not only the number of sunspots but also the number of sunspot groups. The ssn can vary from about five in the minima of the sunspot cycle, rising

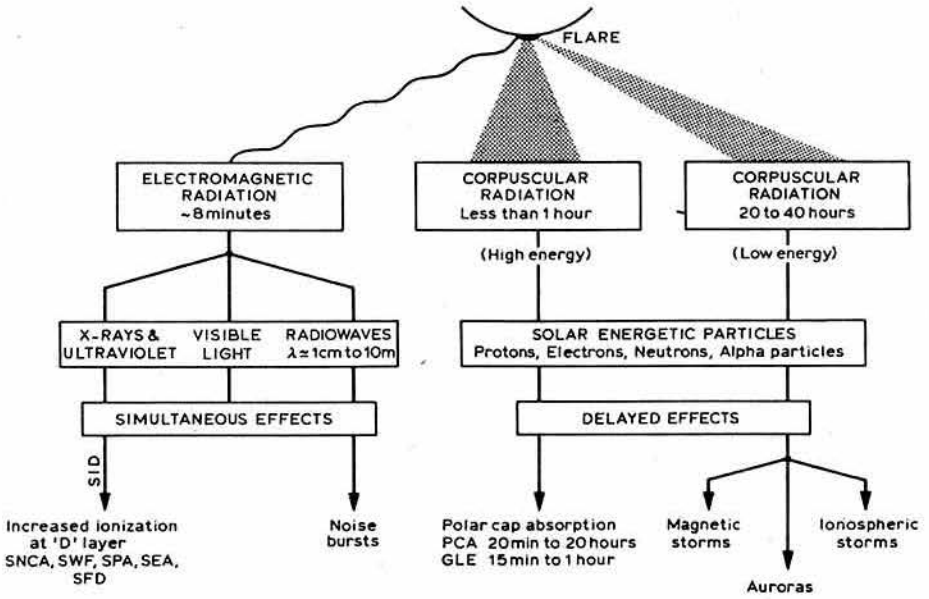

Fig 2. Effects of a solar flare. The effects due to fast-acting electromagnetic radiation (uv etc) include such daytime "sudden ionospheric disturbances" as swf (sudden shortwave fadeouts), scna (sudden cosmic noise absorption), spa (sudden phase anomalies on vlf signals), sfd (sudden frequency deviation). Effects caused by particle radiation take much longer to materialize but can last longer and occur both night and day. Solar flares tend to be most severe in the period following a sunspot maximum, and were a notable feature of 1982

to 100 or 130 or more in peak periods. The last maxima was 1979–80, with a peak of about 150. The monthly figures peak about February–March and again in September–October.

Sunspot cycles *average* about 11 years, but although it is likely that this is a regular period at the centre of the sun, the practical start of the cycle varies, sometimes by one or two years. Since there is a change of polarity each 11 years, the true cycle can be considered as 22 years—nevertheless from a radio communications viewpoint it is more usual to think of a cycle in terms of 11 years.

Critical and maximum frequencies. Long-distance hf skywave communication depends mainly on the highest and most densely ionized region (F layer, which in daylight tends to split into F1 (lower) and F2 (higher) layers). The greater the ionization the higher the frequency that will be reflected. The *critical frequency* (cf) is the maximum frequency that will be reflected directly back; the *maximum usable frequency* (muf) is the higher frequency that will be reflected when the signals strike the layer obliquely: it is generally assumed that for a 2,500km one-hop path the muf may be three times the critical frequency *at the intermediate reflection point* (1,250km from the transmitter): the cf increases as one goes south towards the equator so that the muf for north–south paths is considerably higher than for west–east. Stations in the Mediterranean area have a useful advantage over those in the UK or Scandinavia.

Solar flares. At times of high sunspot activity (especially in the period soon after a maxima) an intense solar flare will occur, greatly increasing both ultraviolet and particle radiation from the sun: Fig 2.

One effect of a solar flare is in much increased ionization of the lowest layer, the D-layer, which normally exists only in daytime. The D-layer is a highly absorptive layer rather than a reflective layer; a solar flare can thus cause a *sudden ionospheric disturbance* (sid) which can be severe enough to result in a virtual black-out of hf signals. This may extend from about 4 to 14MHz, but has less effect at about 15 to 30MHz. Solar flares and sunspots may last for one or more of the 27-day rotations of the sun, and the effects may thus reappear at 27-day intervals. A complete blackout occurs *only* during daylight.

Magnetic storms. Magnetic storms are also associated with solar flares and likely to re-occur in 27-day periods, but result from the slower solar particles and tend to effect communications some 18 to 36h after a sid. In the first phase of a magnetic storm the critical frequency falls, but otherwise "conditions" may continue to be quite good; however, in the second phase, the electron density of the highly aborptive D and E layers may increase greatly, particularly in the geomagnetic polar regions. This often affects most severely the North Atlantic path although signals radiating southwards may still get through. The effects of a severe magnetic storm may last several days; the onset is often quite sudden though recovery may be only gradual.

RNIB Talking Book Service

In *TT* (November 1982) in showing the way in which amateurs with the necessary skill and time could render extremely useful aid to local associations for the handicapped by repairing radios for the blind, I may have inadvertently given the impression that there is no longer any requirement for volunteers to provide similar assistance to users of the long-established Talking Book Service of the Royal National Institute for the Blind. In fact some members who responded to the original RSGB appeal in 1948 are still helping, along with others who have offered to take part in this most useful service in the interim period. Some areas of the country are well served, but in many other areas further volunteers would be most welcome.

A member of the West Kent ARS writes: "There is a continuing need for volunteers to repair the Talking Book machines. It may *not* be necessary even for a volunteer to be mobile or have transport, since machines (for example, in the Sevenoaks area) are usually delivered and collected by the Social Services department of the local council. On average we find that perhaps only one machine per fortnight needs some attention, and this may amount only to cleaning the head.

"Several members of the West Kent ARS in the area from Tunbridge Wells to Sevenoaks are repairing Talking Book machines, but it is apparent, for example, that there is nobody doing such voluntary work in nearby Swanley. There are probably many areas of the country which totally lack a suitable volunteer. We would warmly commend this work to amateurs as a worthwhile and interesting service. The headquarters address for this service is: The British Talking Book Service for the Blind, Mount Pleasant, Wembley, Middlesex HA0 1RR."

A similar point is made by Philip Brown, G3WUZ. He writes:

"I was one of those who responded in 1948 to the RSGB appeal and, apart from two years in the RAF, have been a servicing volunteer ever since, for some years acting as the servicing co-ordinator for Somerset. I know that on a national basis there are many areas where help is needed. In my own area we need more assistance in Yeovil and south Somerset. Anyone interested in helping in this area is welcome to ring me on 0278 786330 (Burnham-on-Sea). The modern machines are a far cry from the original clockwork disc machines and are very reliable. Breakdowns are not frequent but the important thing is that there should be someone available to help the blind user when the need arises."

Now is the time to do something about it—and show that amateur radio can still serve the community!

Surplus to some

It seems a long-time since surplus ex-Government equipment formed an economical approach to amateur radio operation, often with only minor modification, or as an invaluable source of high-grade components. Indeed the prime attraction was often the professional grade, "milspec" components that sometimes seemed to have been specified on a price-is-no-object basis. An era when Lisle Street was a respectable mecca for some, whatever it may have been for others.

John Stebbings, G4BTV, draws attention to an item of ex-Government surplus that is still sometimes available. This is the ex-RAF T4188 hf amplifier. It consists of a 6CH6 buffer amplifier, 5B254 (miniature 807) driver, and two 4X150A valves in parallel as the power amplifier. With three roller-coaster coils and relay-switched wavechange, it covers 2·8 to 18MHz in two wavebands. G4BTV, seeking two 4X150A valves for a 144MHz linear amplifier, obtained one from A. H. Supplies of Sheffield

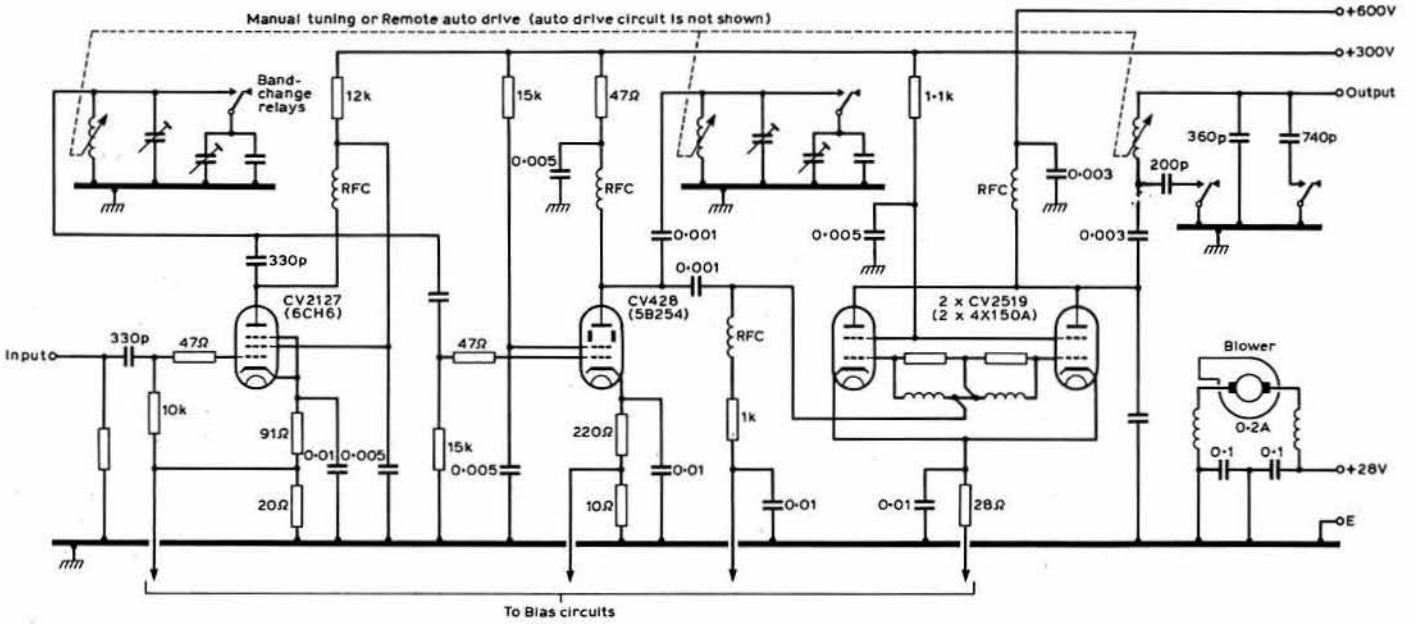

Fig 3. Simplified circuit of the RAF T4188 hf power amplifier covering 2·8 to 18MHz in two wavebands. It requires only 2W rf (75Ω) for 150W input as a cw transmitter. With small modifications psu requirements can be reduced to: 600V, 250mA; 300V, 150mA; 12V, 4V ac; +28V dc

for £37. It was in excellent condition and it was some time before he could bring himself to dismantle such a well-made piece of equipment that would form an excellent hf cw transmitter requiring only power supplies and 2V rf into 75Ω from a vfo for 150W input. A simplified circuit is given in Fig 3.

The pa bias circuit is rather complicated and involves the 28V dc supply used also for the blower. The power requirements are: (1) 600V at 250mA; (2) 300V at 150mA; (3) 19V at 1A dc; (4) 12V at 2·6A dc; and (5) 28V dc, current depending on whether remote control is used. However, G4BTV points out that the 19V and 12V dc supplies are not required if one thermal delay relay in the 19V filament circuit is removed; both (3) and (4) can then be met by 12V ac at 4A.

He feels that the frequency range could probably be extended to 21MHz and possibly also to 24 and 28MHz. While his unit has been duly broken down for parts and he is busy building his 144MHz linear, he feels that this unit indicates that there is still excellent value in some ex-Government surplus.

Components—make do and mend?

There is, my dictionary tells me, a Latin phrase *laudator temporis acti* which can be roughly translated as "one who prefers the past to the present", describing anyone who consistently praises times past and is critical of times present. It would be unfortunate if readers came to associate such a phrase with this column. For most amateurs the present abundance of effective factory-built designs—both for hf and vhf—provides a convenient and cost-effective means of operating on the amateur bands; my criticism of their use is limited mainly to the problem that, unless supported by some other activities, they will not produce self-reliant amateurs capable of keeping stations on the air when the shops are shut.

Frank Shaw, G4HYJ, reminded me recently of the wartime *RSGB Amateur Radio Handbook Supplement* which usefully complemented standard handbook-type material with extended chapters on fundamental principles, a notable introduction to radio mathematics and radio circuit mathematics, introductions to the cathode-ray oscilloscope and to direction-finding, and a helpful "service operator's *vade mecum*" that, in effect, showed how improvised repairs and substitutions could keep receivers and transmitters in operation in circumstances where the user was on his own and the nearest workshops were far away—a 160-page book for 2s 6d (12½p).

It could be argued that the type of field repairs described in the *Supplement* would today be termed "bodging"—not to be recommended on equipment that is expected to retain a good resale value. But for the constructor make-do-and-mend is fast becoming a way of life; this is particularly true of any equipment using high-voltage thermionic valves. The problem has been caused by the progressive disappearance of so many of the components that a few years ago were readily available—and specified in the publications.

Five years ago, *QST* was bemoaning the drying up of one-off component supplies, at reasonable prices, with distributors insisting that any profits were eaten up by the paperwork in handling small orders. The ARRL was finding that component lists were frequently out-of-date even before they were published as more and more items vanished from the catalogues. High-voltage capacitors, coils, slow-motion drives, and many valves are often available economically only on the secondhand "flea" market.

G4HTJ has a callsign that one might not associate immediately with an old-timer, but he was presented with his copy of the *Supplement* when passing out of the Royal Corps of Signals's OCTU at Catterick during the second world war. One wonders how many people would today tackle "repairing" a small carbon resistor, swapping round the connections to a variable resistor to avoid a badly-worn portion of the track, using a mains transformer as a substitute for an audio output or amplitude modulation transformer, deal with a broken top-cap to a valve, or deal with a recalcitrant vibrator unit (even if you remember what these were!). G4HTJ notes that advice was even given on make-shift soldering fluxes: "possibilities include ordinary household soap, clean lubricating oil, waxes, tallow, borax and sal ammoniac (found in houses where the bells are operated by Leclanché cells). In plumbing work, a candle is very widely used as a flux, and this seems satisfactory for many metals, excepting brass".

I am reminded of the story of the New Zealand amateur who constructed an hf receiver while a prisoner-of-war in Hong Kong, where solder was scrounged from tag boards of old power equipment, flux made from pine-gum scraped from firewood, silver paper and wrapping paper from cigarette packets used for smoothing capacitors, while a 4in nail and some sheet metal were made into a variable capacitor.

I must admit that once, immediately post-war in Germany, when unable to locate an auto-transformer I successfully operated a 110V HRO from 220V mains supplies using an old electric fire element guided only by the S-meter pilot light—but I would not guarantee that this was within the recommended five per cent tolerance.

Factories far away

It is not only the problem of repairing equipment that worries some readers. Gerald Garratt, G5CS, is dismayed at the way the British radio communications industry has, over the years, made so little effort to cater for the amateur market. He points out that high-grade British communications receivers, built to meet demanding professional requirements, cost around £7,000; yet imported receivers—Japanese and American—with many of the same design features (though admittedly to relaxed stability/temperature etc specifications) are available around the £1,000-£1,500 mark. "Are we allowing others to deprive us of a share in the market which our firms are perfectly capable of filling if we really put out minds to it?"—G5CS asks.

The answer is not a simple one. The Japanese made a determined effort over a number of years to capture a large share of the world market for amateur gear. I recall Racal once introduced an RA171 receiver as a lower-cost version of their professional RA17 intended for the amateur market,

but I doubt if they had much success as it needs different marketing techniques; similarly one remembers STC taking over in the 'sixties the successful *small* firm Electroniques and launching into the amateur market in quite a big way, but closing it all down when they found it difficult to be price-competitive.

In its 1983 annual survey of world markets, *Electronics* (13 January 1983) "US communications consumption" table estimates the market for amateur mobile and base stations, a $32·2m market in 1981, dropping to $27·9m in 1982, but hopefully rising to $29·8 in 1983 and $38m in 1986 (a relatively small part of the total 1982 $7,000m communications market).

The "West Europe" table does not even list the amateur radio equipment consumption. The "Japan" table estimates are $9·5m for 1981, $13·4m for 1982 and $15·5m for 1983, in a $2,500m market. We do not form a large part of the electronics equipment market; yet clearly Japanese firms go to considerable trouble to make sure they capture and retain a large part of it.

Solidstate relays in three chips

For some 20 years or so I seem to have been reading that the mechanical relay is about to give way to a fully solidstate approach. Yet somehow there still seem to be plenty of electromagnetic relays going into modern equipment. Solidstate ac power relays for example require up to 20 or so discrete thyristors, transistors, resistors and capacitors.

A new approach to the problem is reported in *Electronics* (29 December 1982) in an article "Solidstate power relays enter the ic era", based on current work by the International Rectifier Corporation. Using a three-chip approach dubbed S'X (solidstate switch with zero crossing), they combine bipolar with complementary-mos technology in the form of two power-output integrated circuits and one light-emitting diode, with claimed performance better in a number of respects to discrete-component solidstate relays. To be marketed by IR's Crydom division this spring, will be devices with output ratings in the 1-5A range with a blocking capability of 450V. It is also claimed that these relays will generate much less rfi than alternatives. While ac power relays have only limited application in communications equipment, there are a number of ways in which such relays may find application in amateur radio; for example, control of fractional-horsepower motors of many kinds etc.

Leaky tv cable systems

American amateurs are not the only users of the radio spectrum in that part of the world who have reason to complain about leaky cable tv systems which use large chunks of the vhf spectrum to distribute large numbers of programmes. Amateurs often depend upon the co-operation of the cable operators to overcome (or fail to overcome) the problems; but some of the other users have more muscle and do not have to pull their punches. A note in *Broadcasting* (8 November 1982, p9) reports: "Signal leakage has gotten a couple of San Diego county cable operators in hot water. Following reports that cable systems in the county were interfering with the firefighting communications of the California Department of Forestry during a recent rash of fires in the county, the FCC's San Diego field office ordered two cable systems in the county to quit using midband Channel F, which has a vision carrier at 151·250MHz . . . In an open letter to all cable systems in San Diego county and adjacent Imperial county, William Grigsby, engineer in charge of the field office, called upon cable operators 'to ensure that leakage radiation from your cable system complies with FCC rules . . . and that you promptly remedy any cases of harmful interference. . . It should be noted that the obligation to remedy harmful interference is independent of the signal leakage criteria, and that compliance with the radiation standards may not be enough to remedy the harmful interference'."

UK authorities please copy!

PVC cables—a fire hazard?

In a *TT* item (December 1980) Cecil Broadhurst, G3PH, drew attention to the danger of causing house fires by such practices as leaving soldering irons switched on when out of the shack, or from generally not treating mains power supplies with sufficient respect. At the time I added a few do's and don'ts and mentioned an incident when a transmitter caught fire.

Since then two further incidents have shown me that the tendency of equipment to catch fire is by no means as rare as I had thought. In one case an old black-and-white tv set, which I was using as a standby, caught fire while I was watching it, apparently due to the overheating of a pre-set resistor combined with combustible insulating material. Fortunately the fire was only a small one, but it could have been a lot more serious if it had happened when nobody was in the room.

The other, even more worrying, case has been reported by Brian Johnson, G3LOX. His 'sixties hf transceiver recently caught fire, although he was able to put this out before much damage had been done. He believes the fire started due to deterioration with age of one of the tightly-laced multi-cable harnesses. Over the years the plasticizer of the pvc insulation seems to have dried out, the pvc hardened and became brittle, and then under the pressure of the lacing short-circuited the 12V heater wiring. As shown in the Falklands, pvc cables can be highly combustible and present the additional hazard of giving off toxic fumes.

Although there appears to have been no earlier recorded instances of this happening in amateur transceivers, a large firm of electronic instrument makers confirmed to him that they are experiencing problems arising from the deterioration of 15- to 20-year-old plastic-insulated wiring cables. The combination of the lacing pressure and the drying out process is presenting an unexpected difficulty. The old type of rubber-covered heater wiring certainly suffered severe deterioration with age with the rubber vulcanizing, but usually, unless disturbed, the wires remained separated.

A good deal of 'sixties equipment with tightly-bound pvc cabling is in use, and G3LOX advises checking to see whether the lacing has begun biting into the pvc.

Paralleled ic regulators as pass elements

Three-terminal ic regulators have deservedly achieved wide recognition as a well-protected form of series pass element for low-voltage power supplies. However, unlike the use of pass transistors, the ic regulator is less flexible in terms of high-current output; most ic regulators are limited in current rating to a maximum of 1·5A or, for the more costly heavy-current types, to 5A.

T. Kanthimathinathan and Prema Haridas of the ISRO Satellite Centre, India, in *Electronic Design* (9 December 1982, p188) point out that simply to parallel ic regulators can be tricky, since simple resistive techniques for current sharing tend to result in poor load regulation and temperature sensitivity. They have found that superior results can be obtained by using the ic devices as pass elements, and having an additional 741 op-amp and zener diodes as regulators. They point out that while such an arrangement may appear a more expensive approach, it is in fact cost-effective, when the higher reliability and absence of components to provide the protection built into the regulators, including current-limiting and thermal shutdown circuitry, are considered.

Fig 4 shows two LM317 ic regulators paralleled to provide a maximum combined output load of 3A. However, as many regulators as required can be paralleled to increase output current, provided the op-amp has sufficient drive capability. The Indian engineers describe operation of the circuit as follows:

"In operation, the output voltage variation of the individual regulators is a maximum of 0·2V. This difference, however, is swamped by equalizing

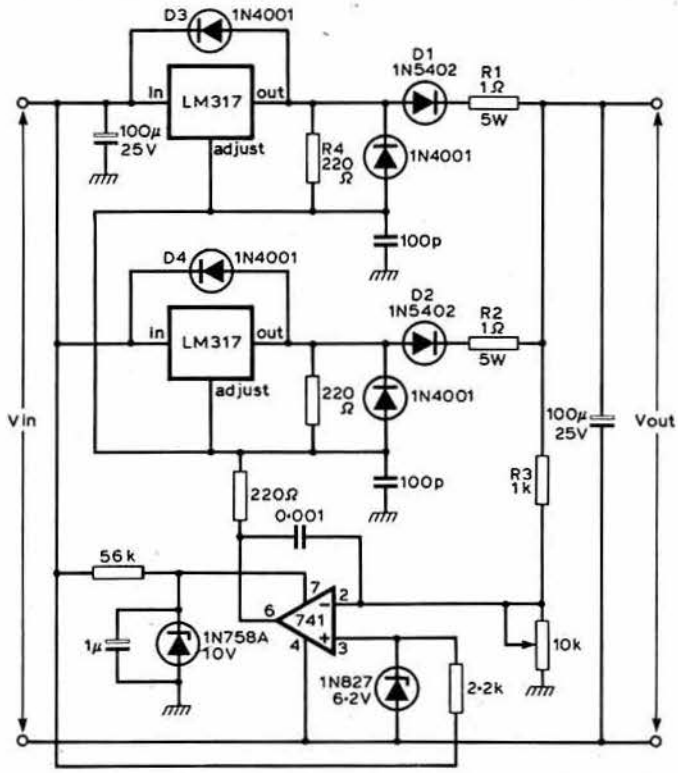

Fig 4. Paralleled three-terminal ic regulators used as pass elements in a reversal of their usual role. As shown, suitable for 3A output, but additional regulators may be fitted

resistors R1 and R2. Diodes D1 and D2 ensure that one regulator does not force current into the other. Because the output is sampled after D1 and R1, and because the op-amp rather than the regulators controls the circuit, good regulation is maintained."

It is claimed that with a 3A load, current sharing in the ic regulators is better than five per cent. Change in output voltage is less than 1mV for a load change of 100mA to 3A. For optimum performance, a minimum bleeder load of 10mA for each regulator is recommended.

Using car batteries

Frank Harris, G4IEY, agrees with the comments by Barrie Spink, GM6CBF, (*TT* December 1982) on the value of lead-acid batteries as a power source, provided that these are in good condition. He writes: "Old batteries can give a lot of trouble and often cannot be satisfactorily rejuvenated. It is much better to start with a new or nearly-new one. Even so, car batteries can still be superior in terms of cost/kWh if recharged carefully."

G4IEY draws attention to the arrangement he has been using: an Australian-built "Exide Torquestarter" battery claimed never to require topping up, to have no acid spill or leak (even if the battery is accidentally inverted), and no corrosion. While this type of battery is available also in South Africa it has not yet been marketed in the UK, and it may be some months before this happens. Capacity of the Australian battery is 12V 47Ah, and G4IEY keeps it recharged using a 13·8V regulated supply, although there seems no reason why up to 14·5V should not be used.

The battery even has a built-in carrying handle. According to a Chloride SA sales leaflet the wonders of this battery are brought about by a "recombination electrolyte (re)" system. The battery contains no free acid with the electrolyte held in sub-micron glass wool—a special separator material—and has a totally sealed battery case.

The re system will clearly make the use of car batteries for this type of application much more convenient and attractive. But in the UK it is still the shape of things to come, unlikely to be on the market this year.

QST (November 1982, p39) has an interesting item on an energetic young college professor—Elliot B. Kleiman, WA4YDK—who has succeeded in working all US states and is on his way to DXCC while operating "bicycle mobile" using a battery and an Atlas 210X plus 66in whip antenna. In his case he has found that a 9Ah motorcycle battery gives him rather over an hour's operation on 21MHz per charge. The battery (Sears 12N9-4B-1) weighs 8lb and measures 5·25 by 3 by 5·5in and had a sale price of $25.

Flexible logic and continuity tester

TT (January 1983) provided circuit details of a useful continuity-tester using two CA3096 transistor arrays and a ceramic resonator to provide an audible indication. Some similarities, but also a number of differences, can be found in a continuity and logic tone-tester developed by Jan-Martin Noeding, LA8AK: Fig 5. He has made extensive use of similar arrangements to trace logic and keying faults both for amateur radio and in connection with his professional work in Norwegian telecommunications and broadcasting.

He lists the features of this useful tester as:

(1) Low battery drain (about 5mA) depending on tone output level; virtually no current drain in "off-state".
(2) Provides a logic tester, selectable for negative- or positive-grounded systems.
(3) Tone output may be selected to indicate either "high" or "low" input state.
(4) Such a tester provides a better indication than an oscilloscope for slow functions or random pulses.
(5) Relay contacts may be checked in circuit even with voltage applied.
(6) Unaffected by over-voltages and is capable of withstanding several hundred volts at input (S3 open).
(7) Provides a continuity tester with selectable sensitivity.
(8) Based on a single cmos ic device CD4030BE (CD4070BE); laboratory tests indicate that cmos ic devices tend to be far better protected against static charges than either standard or Schottky ttl devices.

With S2 closed the circuit operates with gates A, D and B forming a nand-multivibrator; with S2 open, gates A, D and B form a nor-gate multivibrator.

FT101, FT7—some oddities?

Most successful factory-built models are subject to progressive modification over the years—and some amateurs advise their friends that it is not necessarily a wise policy to rush to buy from the first production run; contrariwise, you may find that these are available at a particularly attractive introductory price and that subsequent models are significantly higher priced. Then again, where a model stays in production over a long period, as for example the FT101-series, there may be small batches produced for a specific market that differ in some ways from the standard design.

Arthur Biddell, GM3GNM (ex G3GNM), came up against an unexpected problem when he got ready to convert his FT101-E for operation on 10MHz by using the WWV-receive band and adding a transmit facility. But then he found, to his disgust, that the WWV range on his transceiver is for 15MHz! Since nobody else seems to have encountered this problem, GM3GNM is left wondering how he came to find himself on the wrong side of Murphy who has dealt him this maverick hand. He would be interested to know whether there are many other similar FT101 models. The result has been that to get on 10MHz he has had to go to the trouble and expense of building a transverter.

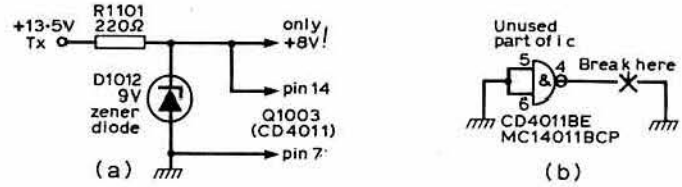

Fig 6. (a) Curious circuitry noted by LA8AK in the FT7 transceiver. (b) How the zener diode can be made to work effectively by reducing current drain by about 15mA

Jan Martin Noeding, LA8AK, finds it most illuminating sometimes to sit down and study, with a critical eye, the circuit diagrams of factory-built transceivers. He finds considerable variation in the skill displayed in different parts of some designs, and wonders whether this may be due to the main design engineers leaving some part of the work to junior or otherwise less-skilled engineers. For example, LA8AK has already drawn attention to audio quality of the Trio TR7010 (*TT* December 1982). This month he reports on his study of FT7 circuitry, that resulted from an investigation into the cause of key-clicks and "noisy" ssb.

On the "pre-drive" pcb he notes a 9V zener diode which with a 12·5–13V supply is across only 8–8·5V. In any case, adds LA8AK, the zener diode will not stabilize over the full recommended input voltage: Fig 6 (a). The reason for this voltage shortfall turned out to be an unused part of the logic ic, CD4011BE/MC14011 BCP, having pins 5, 6 and 4 all connected to chassis. By breaking the connection to pin 4, current drain is reduced by some 15mA. When this is done, 9V is applied across the zener diode with only 10·5V supply voltage!

LA8AK has made an improved keying circuit, using a germanium-type AC162 transistor as the keying device, with reversed logic drive levels. This provides, for such applications as meteor scatter, a possible keying speed limit of about 1,000 letters/min. LA8AK offers to send circuit details to readers seeking such a facility for an FT7 transceiver (J. M. Noeding, Voielia 39/B, N4620 Vagsbygd, Norway, with irc etc). LA8AK mentions that he is glad that he has saved a number of obsolescent germanium transistors which perform better than silicon types for some applications.

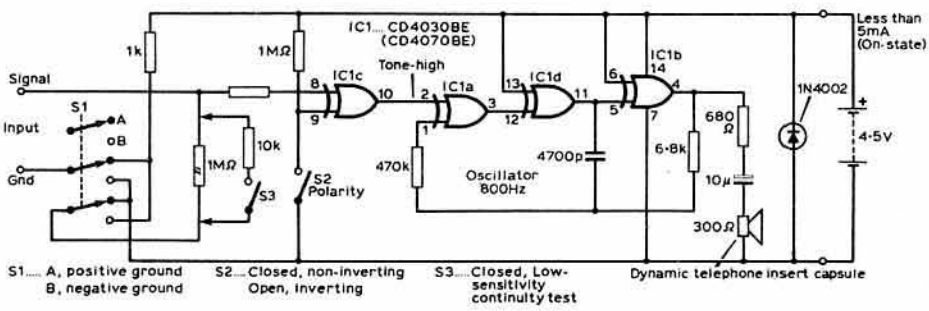

Fig 5. LA8AK's Mk4 logic probe and continuity tester, using cmos quad exclusive—or gates with audible indicator

EPHEMERIS
Satellite news and views

R. O. Phillips, G4IQQ*

Satellite status reports

Progress continues in the attitude control manoeuvres of UOSAT (AMSAT—Oscar 9). Unfortunately some of this work was undone during a short rest period over the Christmas break, but with their growing experience in this area the team at Surrey hoped to complete the remaining work by early February. Further evaluation of the ccd camera has been successfully carried out and a checkout of the 2·304 and 10·47GHz beacons has indicated that all is well. On most weekends the 145·825MHz beacon is set to provide periods of telemetry and news bulletin transmissions using various of the onboard systems. The news bulletin is updated weekly and includes information on the satellite orbital parameters. Transmission is at 300 or 1,200 baud ASCII which may be decoded using many of the small computers or the Microwave Modules MM2001 rtty to tv converter. Martin Sweeting, G3YJO, would appreciate reception reports, which should be sent to him at the University of Surrey or via AMSAT-UK.

Oscar 8 celebrates its fifth birthday on 5 March with continuing excellent performance of both the Mode A (144 to 28MHz) and Mode J (144 to 432MHz) transponders. Dave Rowan, G4CUO, and a number of the regular Mode J operators have been extending the distance records by making use of satellite orbits which barely rise above the horizon.

The active Russian satellites (RS3 to RS8) continue to provide good downlink signals at 29MHz, with the robot transponders on RS5 and RS7 operational for much of the time. The Christmas break gave rise to very high levels of activity on the transponding satellites with many new callsigns heard.

Phase 3B

There still appear to be delays in the ARIANE launch programme, and despite many rumours no date has yet been fixed for the L6 launch which will carry ECS-1 and the AMSAT Phase 3B satellite. Further details of the spacecraft have come to light, indicating antenna gains of approximately 11, 9 and 7dB at 1,269, 435 and 145MHz respectively.

Getting started—1

The difficulty with attempting to describe how best to set up an amateur station suitable for satellite operation is knowing the right place to start. Rather than attempt to describe the mechanics of the satellite orbit it is proposed to concentrate on the practical aspects, making suitable approximations and simplifications where appropriate. As may be seen above, there are currently a number of satellites available both with and without communication transponders. The most abundant transponders are those referred to as Mode A transponders; these receive signals in the amateur satellite sub-band at 145·8–146MHz and retransmit at around 29·5MHz. The precise frequencies and bandwidths vary between satellites but in all cases the transponders are non-inverting; ie, if you transmit an uplink signal as upper sideband the relayed signal is also upper sideband. On the subject of modulation, the modes most frequently used are cw and ssb (upper sideband). Except under special circumstances, both amplitude modulation (with full or partial carrier) and frequency modulation are prohibited, as their use results in far fewer signals being able to be accommodated by the transponder.

Mode A transponders are currently active on five satellites—Oscar 8, RS5, RS6, RS7 and RS8. The frequencies used by each of these are indicated in Table 1. The two major requirements to enable communication through amateur satellites are, first, the appropriate transmitter, receiver and antennas, and second, information relating to the time that the satellite will be in range of a particular location.

This month I will concentrate on the equipment side, where the requirements are in fact quite modest, and in many cases little, if any, modification or addition will be required to existing amateur stations. Clearly a reasonable quality receiver will be required which covers the frequency range 29·4 to 29·5MHz with facilities for reception of cw and ssb modes of modulation. The frequency stability of the receiver should be good, and it is also desirable to have good selectivity and a slow tuning rate. In practice most modern receivers intended for amateur use will be quite adequate in these areas. However, there is one important characteristic where almost all existing receivers (and transceivers) could benefit from improvement when used at the frequencies mentioned. This is the receiver sensitivity—a combination of its noise figure and gain. For normal terrestrial communications atmospheric/ionospheric noise usually dominates the receiver noise and sensitivity may not be as important. This deficiency is quite easy to rectify by use of a 29MHz preamplifier with a noise figure of 1 to 2dB and gain of around 20dB. These are available either readybuilt or in kit form from a number of suppliers who advertise regularly in *Rad Com.* The improvement in performance obtained by use of a preamplifier can be quite dramatic even with current models of equipment (including my own FT101ZD and FRG7700).

Table 1. Frequency plans for Mode A transponders

Satellite	Uplink (MHz)	Downlink (MHz)
Oscar 8	145·85-145·95	29·4-29·5
RS5	145·91-145·95	29·41-29·45
RS6	145·91-145·95	29·41-29·45
RS7	145·96-146·0	29·46-29·50
RS8	145·96-146·0	29·46-29·50

Next, the 29MHz antenna. To a large extent this depends on the existing hf antennas available. Practically any antenna used for transmitting at this frequency will be quite suitable for satellite purposes. If no antenna is available then the simplest solution is a dipole cut for 29·45MHz. Ideally this should be as high as possible and clear of trees and buildings, but it is amazing what you can get away with and still receive good signals. One further feature is that since the satellite will not always approach the station from the same direction, it is useful to be able to change the direction of the antenna. If this is not easy then the best arrangement, at least for the early days, is to arrange the antenna for maximum gain in a north-south direction.

Many of the more recent multimode transceivers for 144MHz are very well suited to provide the uplink to the satellite. Generally these will provide between 10 and 30W p.e.p. output for ssb transmission. The actual amount of power required depends on the gain of the antenna to be used and the loss of the feedline between the transmitter and antenna. The product of the power fed to the antenna and the antenna gain (the effective radiated power) should under no circumstances exceed 100W. This can obviously be achieved by means of various combinations of equipment ranging from 5W into a 13dB antenna up to 100W into a dipole. Each approach has its individual advantages—for instance a 100W power amplifier and associated power supply is likely to cost much more than a reasonably-sized 144MHz antenna. A further consideration is that if a beam is used some means of rotation in the horizontal plane is essential, and it is also desirable to have some control over the elevation angle for overhead passes. The final solution will be a compromise involving availability of existing equipment, cost of alternatives and ease of operating the station. There are, of course, many refinements that can be made, but there are a great number of amateur satellite stations operating with the equipment outlined above. Next month I will move on to the subject of satellite predictions, but in the meantime a spot of evening listening at frequencies around 29·4–29·5MHz should give an insight into the possibilities that are available.

Other news

The annual general meeting of AMSAT-UK will take place on 9 April 1983 in the Churchill Room, London House, Doughty Street. The meeting is due to start at 1pm and lunch may be obtained, at reasonable cost, after noon.

At the recent meeting of the AMSAT board of directors it was decided to continue with the publication of *Orbit* magazine in spite of the high production costs involved and the unexpectedly low readership.

Annual membership dues for AMSAT (not to be confused with AMSAT-UK) will rise from April 1983 to $26 for overseas members, or if you can afford it, twenty five times the annual rate (yes, $650) for life membership.

Finally, on the question of operating procedures a number of UK operators have been heard recently on the satellites describing their 144MHz equipment as a 100W linear into a nine-element beam. This probably accounted for their very high signal strengths at 29MHz, particularly as this occurred on a Monday when effective radiated powers of no more than 10W should be used. Further reminders have also been received that the satellites should not be used at all on Wednesdays unless specifically authorized by the respective operating agencies. □

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4-2-70

Ken Willis, G8VR*

THE WEATHER PATTERN throughout most of January was dominated by exciting-looking high-pressure areas which continued to develop over the Atlantic one after another, but which were pushed away by fronts before they could settle for any length of time over the British Isles and Europe. One or two of them lingered long enough to provide some ducting, the path down the western side of France to the Mediterranean being particularly favoured. But the event of the month was a major opening over the weekend of 22-23 January when much dx was worked and the bands stayed open right through the day.

Also during the month, the Quadrantids meteor shower peaked and gave some the opportunity of working dx by the ms mode. There was virtually no auroral activity outside the most northerly regions, but most operators will be happy with what was available in the way of dx on both 144 and 432MHz.

Letters to *4-2-70* from overseas readers are arriving in increasing numbers, and are much appreciated since they help to provide a picture of the vhf/uhf scene worldwide. When the Phase 3 satellite is up, it will be fun to talk to some of these stations who are outside vhf range of the UK, and perhaps a "vhf net in the sky" will develop to rival the one currently operated on 14MHz. This would be fine, since it could be used by all British amateurs irrespective of their licence category.

Beacon information

As reported last month, immediate success followed the change of the 50MHz beacon GB3SIX to daily 24h operation. It is now beaming 290° with 25W to a three-element Yagi (erp 100W). The frequency is 50·020MHz and the QRA XN49f.

G3NAQ reports that a new beacon has been audible for some months in the Geneva area and, despite the proximity of the Alps in the path of the beam heading, it is a consistent S7 signal there. The callsign is IX1A and the QRA transmitted is DF15b.

Via the vhf net, DK1PZ reports good reception via ms of the GB3ANG beacon on 70·060MHz. On one day, around 1830gmt, in a single 15min period, he copied four bursts and nine pings from it. One burst was longer than 10s, one at 6s and the rest between 2 and 3s. He is now listening for the GB3SIX beacon on 50MHz.

Several stations reported good reception of beacon FX8VHF from AF79h on 144·955MHz during the openings to the south of France. Although believed to run quite low power, it is obviously well-sited and provides a very good indication that the band is open to ZE, AE and that general area.

The Emley Moor beacon GB3EM on 432·910MHz is changing its callsign to GB3MLY to bring it into line with other call configurations now used by the UK beacons.

4U1ITU

The International Amateur Radio Club station 4U1ITU, located at the ITU headquarters in Geneva, is operated by amateurs on the United Nations staff, and incidentally it counts as a separate country. The interests of British amateurs are well taken care of by Geoff Grayer, G3NAQ, who regularly operates the station on the vhf bands when conditions are favourable into this country. On 144MHz the station uses four 19-element Cushcraft Boomers, and has full eme capability. Contacts so far have been made with K1WHS, WA1JXN, W5UN, VE7BQH, KI7D and SM7BAE.

The station is also active on 432MHz, currently using an MM transverter into a 50W amplifier (3CX1000), feeding a 19-element Tonna. However, a K2RIW amplifier is approaching completion and, if the antennas are forthcoming, eme capability will be achieved on that band also.

Stations requiring skeds in any mode (including ms) are invited to write to Geoff Grayer, G3NAQ, c/o IARC, PO Box 9, 1211, Geneva 20, Switzerland. Due to the very large postbag at 4U1ITU, those writing are requested to enclose a self-addressed envelope for a reply, plus one irc or a 15½p stamp. During tropo openings to HB9, however, keep an ear open for this rare station in the knowledge that at the other end will probably be an operator who in the past has shown himself only too willing to give UK stations a new square (DG) and country.

Meteor scatter

The Quadrantids shower peaked sometime in the early hours of 4 January. Opinions are somewhat divided as to the exact time. G4IJE (Essex) puts it at around 0300-0400gmt, while GM4COK thought that it was an hour or so later. This precision is of some importance since this shower lasts only about nine hours. Those who arrange skeds on the days before and after the shower could be deluding themselves, as only sporadic meteors may be involved at such times.

By and large the event was not regarded by most as exceptional. There was much activity on the calling channels, both ssb and cw, on 144MHz, but little appeared to be worked. YU3ZV and YU3ES were very good signals on ssb, and attracted a large calling. Many newly-licensed stations were trying their luck, and the discipline was again very good indeed. The attraction of this mode is the blissful silence of the listening period compared with the mayhem of the calling cycle! For those who despair of combatting the QRM, tests have shown that reflections are very directional and you can be only a few miles from a neighbouring station calling on the same frequency and at the same time, yet a distant station will receive many reflections containing signals from only one station.

GM4COK had 24 skeds arranged, all on ssb on 144MHz. He had only six complete contacts, and none of his USSR stations were heard at all. His bag comprised SM3COL (IW), F6FHP (AE), IW5AVM (FC), DL1MF (GH), DL9MCC (GH), YU3ES (GF). Only one new square was worked during the shower.

From farther afield, DJ5MS is understood to have worked a UY5 station in SK square, followed by UQ2GLO (KQ), UK3AAC (Moscow) and YU6AA (JB). Peter actually had 25 completed contacts. He also works wonders on eme using a single Yagi, so perhaps he could be persuaded to write and tell us how it is done.

G4IJE worked OH3MF by tail-ending a QSO with a Dutch station, but was not so successful with his skeds. Several stations report hearing nothing from their sked partners, and in such circumstances one never knows whether conditions are to blame or if the other station was unable to be QRV.

G8VR struck lucky. G3NAQ telephoned him from London en route to 4U1ITU on the afternoon of 3 January and proposed a sked on 144MHz cw ms for 0400gmt the following morning. The result was a rapid QSO for a new square and country. Geoff followed up by calling "CQ" and was answered by G4IYA (Gravesend, Kent) who worked him easily. Thanks are due to Geoff, who arrived in Geneva in the small hours and yet was prepared to open up the station just to provide these contacts. He sent a QSL card too!

G6HKS had some skeds on ssb but was limited to only 30W. He may have completed with YU2JL, but this is not certain since there was at least one other station co-channel, but he was very encouraged by the results he achieved and will no doubt go on to great things in the future.

On the cw calling channel, on the evening of 3 January, UQ2GLO (KQ) was a terrific signal, but either could not hear or did not want to work the many G stations calling him.

There will be quite a long period before the next major shower is due. There are the Lyrids (in April) followed by the Eta Aquarids (in May), neither of them very intense showers. However, there are minor showers almost every week and sporadic meteors every day for those who like to work the mode all the year round. The only difference is that there is little or no activity on the random channels between major showers, so skeds should be arranged to work sporadic meteors.

G3NAQ has sent details of the activity at 4U1ITU during the Geminids shower. Between 2100gmt on 13 December and 0800 on 14 December, stations worked on 144MHz using cw ms were DK6AS, DL7YS, YU2EZA, HG1YA, SM5GMU and OZ1ASL. Nothing was heard from UK3AAC, and skeds with LZ1AB and ON6UG were not completed. In the case of LZ1AB, only the final RRRRs were missing, so for those wanting LZ this station appears to have good ms capability.

G3IMV (Bucks) had difficult skeds during the Quadrantids with UA3 stations in SP and SS squares—very long distances these, plus some OH7 and OH8 stations running low power, so his success rate was not good. He managed one new square with IW5AVM in FC however. He also found the peak to be in the early hours of 4 January.

During the evening of 14 December, 4U1ITU worked G4IJE, UC2ACA and SM7BAE. Geoff points out that when writing for ms skeds, you should state the length of period preferred since he likes to use 2min periods when operating cw.

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On 70MHz, GM3WCS and G4IJE had an ms cw contact on 14 January which took only 30min. G4IJE sent a 37 report and copied 25 bursts and 39 pings. GM3WCS sent Paul a 26 report and copied 35 bursts and 15 pings. His best burst was of 15s duration. Both stations used four-element beams, but G6DFT (Hoddeston) monitored the sked using a simple dipole antenna, and after a careful check found that in the 10 bursts and 15 pings which he copied (longest 4s) there was absolutely no correlation with the reflections received by G4IJE who was only 10 miles distant.

During the Quadrantids shower, DK1PZ used only 432MHz. He arranged three schedules, none of which were completed, but the results were very interesting. With GW4LXO, Heinz copied one burst. In the sked with G3WOH seven pings were heard, while with F1JG three pings resulted, so all were actually heard. DK1PZ used 700W to 4 × 24-element Yagis. In a backscatter test with DK5AI, Heinz copied two bursts and six pings from him and sent an R26 report, but the QSO was not completed.

Transequatorial propagation

From August last year, two members of the Eastern Cyprus Electronics Club, Geoff Obermaier, ZC4GO, and Neil Barker, ZC4NB, were co-operating with Ray Cracknell, Z22JV in Harare, Zimbabwe, in the conduct of 144MHz tep tests. These experiments resulted in a number of one-way paths when the 200W transmitter in Harare could be heard and recorded in Cyprus. There was also one memorable occasion, on 18 August 1982, when ZC4GO, using ZC4NB's 60W transverter, was able to respond to Z22JV and hold a short QSO. Both ZC4 stations used homebrew 13-element ZL-special antennas. The path for these tests is around 4,000 miles, with the two countries nicely spaced above and below the equator to make them ideally situated for such experiments.

For the future, the ZC4 operators plan to phase and stack the two antennas at the QTH of ZC4GO, who now has a 60W amplifier of his own. These operators sent me a tape-recording of the Z22JV signal, which sounds strangely auroral in tone, though this may to some extent have been due to the cw filtering used at the receiving end. The signal level is well clear of noise. The Cyprus stations wish to place on record their grateful thanks to Ray Cracknell, Z22JV, for his tireless devotion to tep tests. Considering the power used, the results obtained so far must be regarded as exceptional, and we look forward to receiving further information on this subject in the future.

Repeater dx

Roger Piper, G3MEH, of the Aylesbury Vale Repeater Group, disliked the reports on repeater dx working which appeared in this feature in October and December 1982. He points out that it is the policy of the RSGB to discourage the use of repeaters by fixed stations, and especially not to use them to communicate over long distances when propagation permits.

There is no doubt that the main role of the repeater is to permit mobiles to work vehicle-to-vehicle in built-up or "difficult" areas, but it is equally true that, for much of the day, repeaters are accessed by fixed stations. When I operated as G8VR/W1 in Connecticut, I was a member of the Pioneer Valley Repeater Group which successfully operates a number of repeaters in southern New England. By mutual consent these "machines", as the Americans call them, were given over to mobile operation during morning and evening commuter hours. Outside these hours hundreds of amateurs used the Naugatuck repeater for informal discussion throughout the evening and over weekends. This particular repeater became known as the "human computer", as anyone coming on and announcing any sort of problem was almost bound to receive an answer from among the many listeners who would keep a receiver tuned to it all day long. The repeater was almost never abused, and provided a link with the outside world for numerous flat-dwellers and others unable to erect a large antenna.

In contrast, the only time I accessed a London repeater from my car, I was unceremoniously jammed off the air by fixed stations giving no identification, but who seemed to regard the system as their own as of right. Repeaters do not appear by magic. Someone has to plan them, build them, licence them and maintain them, and all this costs money. It is not an easy matter to prevent them from being accessed by operators who do not contribute to their upkeep. This is generally acceptable, because members of a particular repeater group may travel into the area served by another group where they will generally be welcomed by the regulars using that installation, rather like the "knock-for-knock" system of car insurance. However, not all repeater users are RSGB members, and since the current licence terms do not spell out the details of such operation, we are left with a situation similar to the band plans. One can only recommend and hope for conformity, but not insist upon it without the backing of over-rigid legislation, which I believe none of us wants.

To clarify my position however, I can confirm that the RSGB *does* wish to see repeaters used for their primary purpose of mobile communication, including handheld portables. There seems to be no reason why repeaters should not be used rather more extensively than this when the demands of the mobiles are at a low level, rather than have them remain idle. However, this is a matter for the "owners" who, having created the facility, may have their own views on how it should be used. But to sum up, since real dx working through repeaters only becomes possible on rare occasions when conditions permit, it would be a very unusual amateur who could hear a call from deep inside Europe come up on his favourite repeater channel and not be tempted to reply. As there are no awards for working dx, counties or squares through repeaters, I doubt whether the situation will become unmanageable. As a courtesy, any fixed station using a repeater channel who hears a mobile come up on frequency could allow that station to come in and receive priority. A final point: since repeater frequencies are duplicated throughout the world, we cannot stop someone outside the UK accessing our repeaters when conditions make this possible, whether he be a mobile, fixed station or pirate. This is one of the hazards of being in the repeater business.

ZC4GO and ZC4NB report that from Cyprus it was possible last summer to access several repeaters in Israel and one in Jordan, as well as the two available locally, using only milliwatts of power from handheld portables. They say it would have been possible to get into Bahrein were it not for the fact that their local repeater shares the same channel. In view of this they recommend any amateurs holidaying in Cyprus to take along some 144MHz gear, as the contacts can be very rewarding. The Eastern Cyprus Electronics Club has its own premises equipped with hf transceiver, a computer system and workshop facilities.

Tropo

January provided three tropo openings, the third of them an outstanding one with very large coverage.

During the afternoon of 11 January the bands opened to the south of France and to the Spanish border. This is a generalization since stations in various parts of the country may have heard more or less, but most seem to agree that the opening was sharply defined along a north-south corridor embracing the Z and A squares down to ZD and AD, and both 144 and 432MHz provided excellent dx contacts. On 432·870MHz, beacon FX4UHF (ZD) was heard by many stations for the first time since it was peaking S6. A high pressure area just declining apparently produced these conditions which lasted for more than 12h. A few reports of station activities were taken over the air. For example, on 144MHz, G6GGE (Chiswick) worked F1GHP (ZG) and F1BPS (AE) and heard stations in ZF and CG, all difficult directions for him. EA2LP was also heard. G6JRH (Northfleet) running 18W on 432MHz worked ZE for a new square, and heard, but could not raise, EA2CA (ZD). G6JFQ (Hornchurch) also found 432MHz very good, and worked F6CIS (ZE), F1BUT (AD) and F1FHI (ZH). He heard stations in ZE, ZD, YD and AD, the last being EA2CA in San Sebastian who created a big pile-up. G6JFQ was actually working a local station when F1BUT broke in to say he was hearing him, and the French station was much louder than the local.

On 17 January there was a repeat performance with almost the identical lines of squares being heard and worked. It seems that these openings went north to a line between the Isle of Man and Lincolnshire, with the northerly stations doing better than those near the south coast.

The event of the month was undoubtedly the major tropo opening on 22 and 23 January. A very large high pressure area moved in from the Atlantic and settled over Europe for about 48h, long enough to produce an opening which has seldom been excelled. It commenced late on 21 January, with the south of France being particularly accessible, plus some HB9s. As the pressure declined, the action moved around and until late on the evening of 23 January almost all of Europe could be heard by British stations, though conditions were quite patchy. Contacts were made by British Isles stations with F, ON, PA, D, Y, OE, OK, HG, EA, I, OZ and SM. Throughout 22 January, strings of OK and OE stations were worked, but in the south London and north Kent areas they were largely inaudible, although others only 20 or so miles away were giving S7 reports. Both 144 and 432MHz were wide open, and on the afternoon of 23 January the stations in the extreme north of England were working deep into Europe, while the beacon GB3LER in the Shetlands was an incredible S6-7. At the same time GB3CTC in Cornwall was S9 plus in Kent, and numerous European beacons were being copied on both 144 and 432MHz. On 70MHz all the UK beacons were very strong, as were amateur signals since activity was high, and at G8VR the Derbyshire beacon GB3BUX was overloading the receiver using only an indoor dipole.

The event occurred too close to deadlines for full reporting to be possible, but here are some typical claims made over the air from stations who were active. Contacts were apparently made between GI and deep into Germany,

while OZ stations worked as far as XI square. G8JVM worked an impressive list of squares, and on 432MHz his best dx was into II square. G8KAX worked a lot of dx, his best on 432MHz being into FI square (a portable OE station), and he heard several beacons, notably OK0EA. He said that it was rumoured that YU was worked on 432MHz. G4KUX worked Y22ME on 144MHz, a very good distance this as Nick is in ZO square. On 432MHz G6NVC (Essex) was measuring 750mW out of his 790R, and he knows his feeder loss to be a good 6dB, thus with about 300mW to the antenna and an erp of 6W he worked squares DH, DK, DL and EI. In all of the recent openings, stations with very low power on 432MHz have had excellent contacts, "away from the splatter of 144MHz" as one put it.

This was a very good opening generally, but very much better in some parts of the UK than others. If reports are received, a more detailed analysis of it will be included next month—unless an even bigger event makes prior claim to the space. Meanwhile, if 144MHz is getting too noisy, why not try 432MHz. At least the antennas may make your neighbours think you have gone over to watching breakfast tv!

Late news. Some further news has come in which gives a better indication of the extent of the opening on 22/23 January.

GW4HBZ travelled yet again to his mountain site, this time accompanied by GW4RWR. On arrival on the evening of 22 January they found the HB9HB beacon on 144·865MHz coming in at S7 on a λ/4 antenna, and S9 plus 10dB on a nine-element Tonna. On 144MHz they worked numerous HB, OK and OE stations as far away as II square. They then worked 4U1ITU and two Italians in the Milan area, namely IW2BNA and I1KTC (both in EF), getting and receiving S5 reports. GW4RWR had received his call only two days earlier (he was previously GW6JJU)! Sunday 23 January was exceptional: this time GW4HBZ was at a /A site near Denbigh using a slant-polarized five-element antenna, but with only 30W he worked many more OK and OE stations. The best dx, however, was to JH square in the form of HG7KPL and HG7PL at a distance of nearly 1,730km. Brian had much QRM from German stations who refused to be shaken off, and he says he has never heard so much cw activity. Others made this point also.

A first-time report to *4-2-70* arrived from Dave, G4KTP (Co Durham), who is still at school. His location is 900ft asl and good in all directions except the west. Using an FT290 with 3SK88 preamplifier, a homebrew QQVO6-40 and a 12-element ZL special, he worked several F, D, HB9, OK and OE stations at distances between 1,000 and 1,685km. His best, however, came from four contacts with Hungarian stations HG2KML (JH), HG4KXG (JG), HG7PR (JH) and HG4YF (JH). He had a pile-up from HGs, some of whom waited patiently while he repaired a t/r switch. All this was on 144MHz. Dave also worked into AE square and bemoans the fact that no Polish stations were able to be active.

On 432MHz, G8XPZ (Notts) using only 10W to a 48MBM antenna worked 11 new squares, mostly German stations, and heard OEs but could not work them because of the Dutch stations calling.

On the evening of 23 January, G8XPZ worked fast-scan tv two-way with G3UMF (ZL), F1EDM (AJ) and F3LP (AJ), the best being over a near-400km path. These were on 432MHz with 144·750MHz talkback. He wishes to thank G6IPC who went QRT to avoid jamming Stephen's signals even though he could not receive the dx stations himself.

GW6MTV, who is the brother of G8XPZ, took his FT290 up Snowdon on the evening of 23 January and worked Dutch and German stations from that site. His home QTH is Caernarvon, and he is willing to give skeds to people wanting to work XN square. To quote him, "It's not worth getting a bigger antenna when I have a mountain on my doorstep".

50MHz

During December the 50MHz band continued to provide some interesting crossband possibilities for the devotees of that part of the spectrum. The sun was quite active at times, and on every day from 14 to 19 December there was some sort of opening on the band. On 15 December CT2EE had a sidescatter contact with VE1YX, while G4JLH in the Isle of Wight worked VE1YX crossband, hearing him on the direct path. The Venezuela beacon, DL3ZM/YV5, was 439 at the QTH of G4GLT at this time, as was FY7THF which peaked 599 plus 20dB. Later the same day the Venezuelan beacon also reached 599, and G4GLT was able to have partial contacts with DL3ZM and 9Y5OLL.

For 16 December G4BPY takes up the story, for on this day he also worked DL3ZM and 9Y5OLL crossband. Around midday FY7THF was peaking 589 at his location. There was an aurora on 17 December during which G4BPY copied tv video signals on 50·743MHz with his beam to the north, and beacon EI4RF on 70·130MHz was 41A.

Around noon on 18 December G3WBQ was able to work PJ9EE (Curacao) crossband using the ssb mode. Meanwhile G4BPY was again copying the DL3ZM/YV5 beacon at good strength and hearing, presumably from the Caribbean area, a carrier on 49·985MHz which persisted for more than 2h. Between 1507 and 1520gmt on this day, Gordon noted a solar noise storm on both 50 and 70MHz, at S9 plus 20dB on the higher frequency. G5KW had a marginal cw contact with PJ9EE during this opening.

On 19 December there was an opening to the Caribbean which was probably the best this season. Around 1415gmt, G3UUT reported reception of the Columbian (HK) repeaters on 50·075MHz fm. G4BPY could also copy these signals (see comments on repeater dx working above). G3UUT later heard the beacon 6Y5RC on 50·025MHz, as well as TI2JIC, TI2HK, HC2FG, HI8WPC and HK0BKX, the last on San Andreas Island. John could not work any of them crossband, and says that stations "kept popping up out of noise at good strengths but for short periods, a most odd form of propagation almost like meteor scatter".

SM6PU is reported to have worked crossband with PJ9EE, while G4BPY worked the Costa Ricans TI2JC and TI2HL. Gordon also heard the San Andreas station calling "CQ" on 50·11MHz. To round off his day he worked W1JRA, WD4IYS, K1IKN, VE3FIB and VE1YX. These were sidescatter contacts, and the interesting thing was that K1IKN was inaudible at Gordon's location when the two stations beamed directly at one another; when K1IKN turned his beam to the south his signals came up to 429.

G4GLT was unfortunate to miss most of this, but he returned to his shack in time to have crossband contacts with WA1OUB, W1JRA, WB2RYY and K2OVS, all between 1542 and 1554gmt. Signals were all around 559 with deep fading. G4BPY reports that the last signal heard on the band on this opening was VE1YX calling G4GLT at 1600gmt.

Apart from some minor openings to VE1YX, things then went fairly quiet until 27 December when, between 1450 and 1515gmt, G4GLT had brief crossband contacts with WA1OUB, W1GCI, W1QXX, W1JRA, K2MUB, W3JO and K1EM. All were on cw with signals varying between 539 and 579 with deep QSB.

G4GLT reported that on 28 December between 1241 and 2025 he continuously monitored the beacon GB3SIX (50·020MHz), which he regards as an excellent F2 propagation indicator for the States-side operators. The strength of GB3SIX at Dave's location varied between 549 and 569, and he assumes the propagation to have been tropospheric.

A fascinating letter has arrived from Jerry, G4CJG, normally from Co Durham, but at the time of writing, in Sydney after a voyage to Australia. He said that he expected to be back in the UK by mid-February. From a location given as 160°W and 20°S, which on my map puts him in the South Pacific near the Cook Islands, he reports reception of signals on and around 50MHz.

He says that he copied GB3SIX around 1700gmt using a 50MHz converter and a 30ft whip antenna. Though he mentions this quite casually, the comment will provoke both joy and despair among the 50MHz fraternity when they read it, because this beacon is not very high-powered, and reception of it would suggest that the path was open to the Pacific at this time. This report, coming so soon after the reception of the beacon in Hartford, Connecticut, has already more than justified the decision to operate the beacon 24h daily and to beam it towards the west.

Jerry goes on to say that he has been able to copy the ARRL amateur news bulletins on 50MHz (they are transmitted on all the main amateur bands), and has heard much fm from amateurs in the USA on the frequency. There was even some European tv on 49·75MHz. He experienced hf blackouts lasting over 2h on 15 December, during which time there was "crunch" noise on 50MHz at S9 plus. On the same day there was an eclipse of the sun, while in the evening hordes of JAs appeared on the 50MHz band, plus very strong BBC World Service signals from the Caribbean on both 30·14 and 45·2MHz. It is interesting to compare what he was hearing in that part of the world with reception reports from UK amateurs. It was on this day that stations in South America were heard here and the path to the Caribbean was also open.

When Jerry arrived in Sydney he found 52MHz (the VK allocation) very quiet there, and much troubled by the local tv channel "O" which causes much QRM. It will be very interesting to learn what he hears on his return trip.

This has been a very interesting period for those "hooked" on 50MHz. By the time this is in print, the Home Office may have authorized 40 lucky stations to use the band outside tv hours. G4BPY and G4GLT have already discussed how they might stack two Yagis on 50MHz, and Gordon has a 6-over-6 in mind, but to put this up he would need to forfeit another antenna, probably the 70MHz one.

On the topic of antennas, Jaybeam have produced a two-element antenna for 50MHz which can be mounted either horizontally or vertically, and, being relatively close-spaced, is not too conspicuous in a typical amateur setting. Details are available from G3LPA, QTHR.

(Continued on page 241)

SWL NEWS

Bob Treacher, BRS32525*

Lower frequency band dx

The Christmas holiday conditions on the lower frequency bands certainly made up for the poor conditions experienced in early December. With a number of listeners involved with the lower frequency challenge (even including several listeners in Belgium), reports of loggings on all three bands are too numerous to mention, but information received from BRSs 1066, 8841, 18529, 25429, 35509, 44703, 48909, 50134 and 62088 helped to make the following reasonably exhaustive list.

7MHz: A22BW, A71AD (remember, he does not QSL swl reports), AG6D (1534), FB8XAB (best dx on the band for many months), FM7WS,JW5VAA, JX1CY, K6HNZ (1532), KM6B (1511), KC0AT (1107), LU1FDG, TR8IG, TU2JL, F6FIC/TZ, VP8LP (via G3VPW), VU2ALI, XE3AR, YB2CR, YC2CGW, ZD7BW, ZP6EM, ZS4PB, ZS6WB, 4S7OM, 5N3RTF, 5N9FDR, 5T5TO, 5Z4SA, 6W8AR, 9L1JW/P, 9N1RFT, 9X5BG, 9X5SL.

3·7MHz saw increased activity during the period around sunset in late December and early January. Many Europeans were on the band, and the dx capabilities were enhanced with the arrival of the VKs in the top 6kHz of the band. The period between 1500 and 1730 saw dx on the band from W6, W7, JA, VK, ZL, ZS, 4X4 and 5N8. By far the best dx for several years was the appearance of H44SH who gave many a very nice new one. Plenty of dx was available at other times too, with JAs over the long path audible at 0830, and ZLs until 0900. Other notable dx mentioned included AP2KS, A92NH, FK8CR, FY7AN, JAs till 2230, J73BB, VK1-8, VP2MIX, VS6DO (2315, his sunrise), YK1AO, 5N0ATW, 6Y5IC, 6W8DY and 8P6OX.

Late January provided yet more tasty morsels, all good strength at my QTH; DU9RG, JT1AN, YB0WR, JD1ALZ (Ogasawara Is) and 9X5SL being the most notable dx heard during the evenings between 1715 and 2015 up to 24 January. Later in the evenings the band opened to the Caribbean, with HH5CB and VP5RAC the best catches.

1·8MHz produced some interesting dx too. I hear that JAs, VS6DO and VU2WTR were worked on cw, while Brad, BRS1066, and Robert, BRS8841, reported the following on cw: EA6JD, EZ8AAA, I2UBT, LA1EKO, OE8LKK, SM6ESY, UF6FFW, VE1BVL and 4X4NJ. On ssb the band has provided good signals from 5N8ARY, plus good signals from the east coast of the USA, (0100, 0300 and 0700-0800), VE1YX and YV3AZC. HB0LL had also been active, along with several French stations. Peter Norris, G6PIK (ex-BRS47513), reported that he had been informed by a French amateur that Class A stations in that country were to be allowed to use 100W. More activity from France is therefore highly likely.

The operating position at the QTH of ORS46084, showing his FRG7700M

*79 Granby Road, Eltham, London SE9 1EH.

FINAL 1982 HF COUNTRIES TABLE

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS8841	209	225	232	147	117	28	958	ssb/cw
BRS25429	199	198	207	158	124	46	932	ssb
BRS47745	177	199	211	139	123	40	889	ssb/cw
BRS25901	162	201	218	131	107	42	861	ssb/cw
BRS44703	156	179	178	118	115	38	784	ssb
ORS46084/7Q7	179	218	221	94	35	1	748	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
BRS1066	118	153	141	108	71	48	639	ssb/cw
BRS35509	126	144	159	95	96	11	631	ssb
BRS31440	134	134	140	96	74	27	605	ssb
BRS50134	126	138	146	77	89	27	603	ssb
BRS48675	110	132	131	81	65	25	544	ssb
GW4RGA (ex-BRS30694)	124	152	116	61	53	29	535	ssb/cw
BRS18529	55	88	76	120	122	37	499	ssb
BRS45033	161	123	183	3	6	0	476	ssb
RS45466	51	102	92	54	57	16	372	ssb
G6LAU (ex-BRS30493)	54	95	115	40	32	6	342	ssb
ARS50886	63	101	88	30	28	2	312	ssb
RS45184	43	62	60	25	43	3	236	ssb/cw
RS44984	43	40	106	26	13	1	229	ssb
RS49327	44	43	94	11	10	14	216	ssb

ALL TIME COUNTRIES LIST

(Starting score 750)

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	275	307	331	241	225	68	1447	ssb
BRS32525	267	301	317	244	247	58	1434	ssb
BRS8841	250	278	310	195	178	36	1247	ssb/cw
A8808	235	271	291	166	166	55	1184	ssb/cw
BRS48909	208	238	248	156	112	41	1003	ssb
BRS1066	186	201	260	152	97	60	956	ssb/cw
BRS44703	190	210	213	150	133	44	940	ssb
BRS47745	178	201	213	146	123	42	903	† ssb/cw
GW4RGA (ex-BRS30694)	182	242	244	114	75	33	890	ssb/cw
BRS18529	127	186	231	139	105	39	837	ssb
BRS31440	173	183	215	112	96	31	810	ssb
ORS45992/7Q7	196	232	234	75	32	0	769	ssb
ARS50886	183	183	211	86	69	22	754	ssb
ORS46084/7Q7	181	218	222	94	36	1	751	ssb

1983 HF COUNTRIES TABLE

(Starting score 150)

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS8841	57	60	78	47	69	22	333	ssb/cw
BRS48909	69	65	66	53	46	10	309	ssb
BRS1066	50	55	58	53	38	21	275	cw
ORS46084/7Q7	42	36	63	6	4	0	151	ssb

News from abroad

Stan Porter, ORS45992, returned to 7Q7 in January after a stay in G-land. John Lord, ORS46084, who is also due back in G-land soon, submitted an extremely interesting list of stations heard on each band during 1982 (7MHz boasted 7P8BJ, Z22KP, 5H3KG, A22RB, FH8OH, ZS5OM/3D6, 9U5JM, FB8WG and H44SH. Oh, to hear these countries on 7MHz in Europe!) News from other overseas listeners would be appreciated, as it would be interesting to hear how our overseas colleagues view the dx world.

HF activity

At the time of writing, VK0CW and VK0HI were active and had been heard on 7 and 14MHz. The VK0JS expedition was only seven days from the island too, so hopefully by the time this is read everyone will have deleted VK0 (Heard Is) from their "wanted" lists.

G6PIK reported his greatest thrill so far as working the USA from the station of G3NT. With 28, 21 and 14MHz all closing very early during the period under review, we have very few reports of good dx. FB8WH, FB8XAB and FB8ZQ had all been copied around 1630 between 14,100 and 14,150kHz. FB8XAB was the 283rd DXCC country for Paul, BRS48909. Brian Wainwright, BRS44703, reported VK9YE, G4KLX/DU1 and 9N38 on 28MHz, plus FK8CE and H44CF on 21MHz. Brad, BRS1066, reported his latest additions on the "new" bands. On 10MHz he had heard 40 countries including, during December, J28DO, J3AAC, N6YK/V2A, KP4CKY, 4X6CA, G6ZY/EA6, PJ2MI, HI8RPD and 6Y5SN. On 18MHz his total has reached 18 countries, having added DL2GG/YV5, C6ABA and OY1R. Norman Jennings, BRS48675, mentioned 6C35O, 3B8FK and PJ8UQ for three new countries on 21MHz, but queries EPA1BT/M. Has any reader any information on this Spanish station operating from a caravan in Cadiz, Northern Spain?

Jim Dunnett, ex-BRS30694, is now GW4RGA. He will be continuing to give callbook information to those who want it, and will with pleasure confirm all swl reports he receives.

Andrew Smith, BRS50134, wrote from Guernsey, where he now has an FRG7700M with an FRV7700A for 144MHz and an AD270 antenna in the loft of his bungalow. His all-band country total now stands at 234, helped considerably by CQ WW last October. Andrew also mentioned a "lift" on 144MHz over 29-31 December when he heard French, Dutch and German amateurs. This was his first taste of 144MHz dx, and it made him more

determined to improve his set-up in readiness for the summer dx season. Last, but not least, Robert Small, BRS8841, has submitted a list of his 10 best dx QSLs as follows: 1S1DX, 3Y1VC, JF1IST/7J1, BV2A, BY1PK, HK0TU, XF4IX, XU1DX, S9VCT and AD0S/KH5K. If other readers would be interested in submitting their "best 10 QSLs", they will be included in future issues.

1·8MHz slp

The lower frequency slps have tended to attract only modest interest. However, the following three entries were received for the 1·8MHz events in mid-December:

		Stations heard			
SSB	**Countries**	**5pts**	**10pts**	**15pts**	**Total**
1. BRS28198	5	7	0	0	175
2. BRS44395	2	17	0	0	170
CW					
1. BRS44395	5	18	0	0	450

Both entrants commented on poor conditions, with much QRN evident during both events. The current round of slps is now concluded, but the possibility of another set of listening periods is being considered, perhaps including several 28MHz events in view of the fall of the sunspot maximum.

Here and there

A mixed bag under this heading this time to show how much variety there is in short wave listening. Some say that the listener only requires sufficient technical information to pass the RAE and skill to master the morse test to become a licensed radio amateur. This indeed is true, but to become a "good" amateur who is capable of working the world on the higher frequency bands with skill and efficiency, and who knows the dx capabilities of each of the bands at any particular time, I would assert that a good firm base is required in the art of short wave listening. Many recently-licensed amateurs have only a few *hours* of listening under their belts when they get their licences, and presented with the same dx conditions as a newly-licensed amateur with a couple of *years* experience as an active swl, I would suggest that the latter would make more of those conditions, given that the location, power and antenna systems were similar in both cases. To those who might wrongly imply that the listener's role is a minor one, I would also suggest that the more time which can be spent listening to the dx bands, the better the operator will eventually become.

As many new listeners join the Society each month, it would be pleasant to hear from some of them. This column aims to cover a wide range of swl subjects, as well as reporting on listeners' news, and I invite anyone who thinks he has something to offer to send it to the address below, and some space will always be devoted to news from the Society's newer members.

On the operating side, attention is drawn to the Barking R&ES 144MHz contest, rules for which appear under "Contest news" in this issue.

With the issue of a limited number of 50MHz licences, the listener's role on this band will be as important as that of the transmitters, and reports from listeners with receive capabilities on 50MHz will be more than welcome.

It will be interesting in the coming months to devote space to the lesser-known aspects of listening, eg cw on the lower frequency bands, plus news of activity on 10, 18 and 24MHz, dxing on 432MHz, rtty dx news etc. If anyone can boast an unusual listening interest, please share those interests with us.

For those keen on vhf listening and interested in purchasing a new antenna, Jaybeam Ltd, Kettering Road North, Northampton NN3 1EZ, have a new amateur radio antenna catalogue and price list available which they will send on receipt of a medium-sized self-addressed envelope complete with 12½p stamp.

With the 1982 dx season on 144MHz still in several listeners' minds even now, the new season is eagerly awaited. It is hoped that others will report on the dx which is available in 1983, as on some occasions in 1982 the 144MHz band really did sound like 14MHz.

Dave Whitaker, BRS25429, has mentioned the aftermath of the November gales "up north". One gust of wind took the reflector element of his TA32 into the air and dumped it 30ft away. His eight-element 144MHz beam suffered a similar fate—it is now a seven-element beam, and Dave has still not recovered the missing element!

However, Dave commented on the good tropospheric conditions of 21–23 January which provided him with 14 new QTH squares, mainly in the south of France. Openings to this area from ZN square have tended to be rather sparse since he commenced listening on 144MHz, so he took full advantage of the conditions (neglecting 3·7MHz in the process). Much dx was heard from F, DL, ON, PA0, OE, Y2, HB9 and OZ, but QTH locators of the following stations were not copied. If any reader can send me QTH information of OEs 2CAL, 3BEA, 5ORM; HB9s AEN/P and AJF, and Ys 24UN/A and 21VC/P, the information will be passed on.

Finale

News, views, table scores etc for the May issue should arrive by **Saturday 19 March**, with short late items by **Monday 29 March**. Please remember that CQ WPX is on 26/27 March and that the Society's new 1·8MHz contest, which is open to listeners, is on 19 March. Finally, congratulations, to Robert Small, BRS8841, who came first in the 1982 countries table. □

MICROWAVES

Charles Suckling, G3WDG*

A simple preamplifier for 3·4GHz

At present there are only a few stations operational on the 3·4GHz band, although activity is improving. In an attempt to stimulate more activity, I intend to publish designs for various pieces of equipment for this band over the next few months. This policy started last month with the design for a receive converter, and continues here with a design for a preamplifier.

The noise figure for a typical receive converter for this band is quite high —a figure of 16dB was measured for the interdigital mixer described last month. The need to reduce this to a more reasonable figure motivated the design of a preamplifier. It was decided to aim for an unconditionally stable "gain-block", with low input and output vswr. This would allow several stages to be cascaded with predictable performance, to achieve a lower overall noise figure. At 3·4GHz, bipolar transistors such as the NE64535 are particularly attractive for this type of application compared to gallium arsenide fets, since they have adequate performance, are completely stable, are generally simpler to use, as well as being somewhat cheaper. The best place for a gallium arsenide fet is in the front-end.

Following measurements of the device S-parameters, the circuit shown in Fig 1 was designed. The purpose of the series capacitors on input and output is twofold. They act both as dc blocking elements and as part of the matching circuitry. In the latter function their values are fairly critical and, since suitable capacitors are not available commercially, they have to be home-made. The capacitors in the prototype were made from pcb material (RT/Duroid type 6010, 0·025in (0·63mm) thick). The material was cut and then filed to shape. The dimensions are critical to 0·05mm and should be checked with a micrometer during the filing operation. The required dimensions are 1·6 by 1·6mm for the input capacitor (0·36pF) and 1·84 by 1·84mm for the output capacitor (0·47pF).

Other constructional details should be apparent from Fig 2. Dimensions are given for the transmission lines on 0·020in thick RT/Duroid type D-5880. This material was chosen as it is a good medium for microstrip circuits at this frequency (it is usable to beyond 10GHz), and because it was

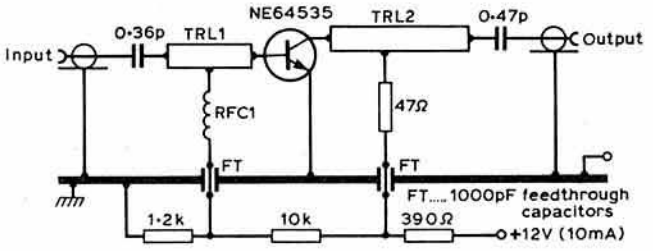


Fig 1. Circuit diagram of the G3WDG 3·4GHz bipolar preamplifier. TRL1: 0·128λ length of 50Ω transmission line, tapped midway for RFC1. TRL2: 0·336λ length of 50Ω transmission line, tapped 0·14λ from transistor end. RFC1: 5t, 0·4mm diameter enam copper wire, 1mm id. See text for availability of components

*46 Windsor Close, Towcester, Northants

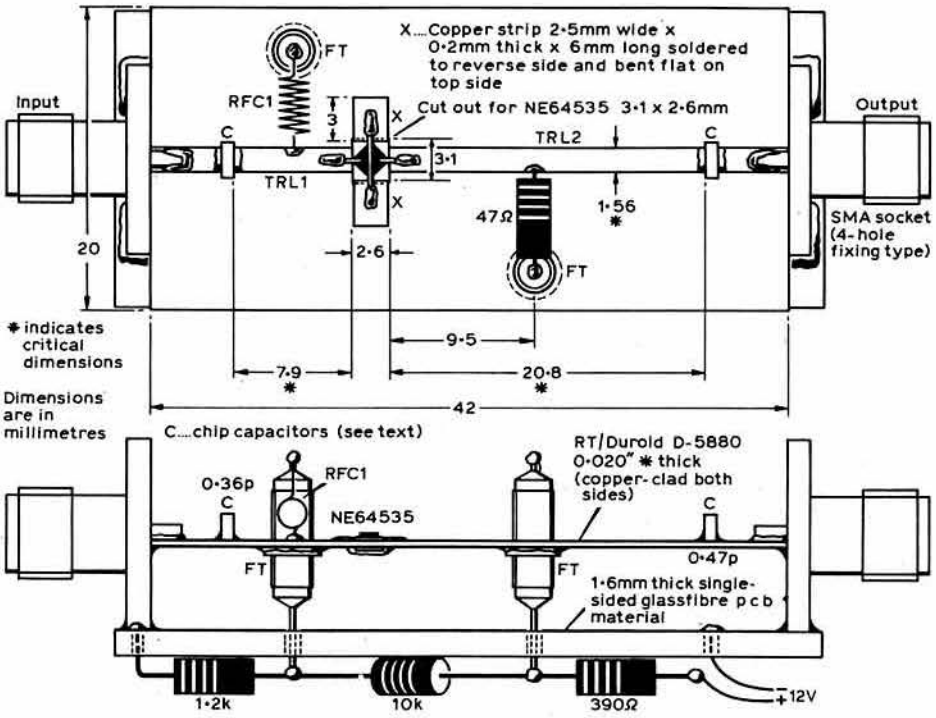


Fig 2. Constructional details of the preamplifier

available. Conventional 1·6mm thick Teflon board or epoxy glass fibre are certainly not suitable for this application. The connector types shown (sma) were chosen because of their excellent performance and size compatibility with the microstrip. The socket bodies are soldered to the reverse side of the pcb, and to the "chassis". BNC connectors were tried but proved to be intermittent, and therefore unsatisfactory at this frequency. N-connectors are under investigation.

The cut-out for the transistor is made using a sharp blade, such as a scalpel. After fitting the emitter grounding strips, and soldering them to the reverse side, they should be flattened to be flush to the board and filed slightly. This ensures that the transistor is located with only a small gap between the base-collector leads and the microstrip. When soldering in the transistor (which should be the final operation) cut all leads to about 3mm length, and ensure that they are soldered to the microstrip directly at the ends of the microstrip. Note that the *base* connection has a chamfered end.

Provided that the preamplifier has been constructed carefully, it should work immediately on application of power. The only "adjustment" which may be necessary is to set the collector current to 10mA by making small changes to the 1·2kΩ or 10kΩ bias resistors, by adding a suitable resistor in parallel with one or the other. Do not make any changes to the 390Ω resistor..

The performance of the prototype is shown in Fig 3. It can be seen that the design goals have been met. The input and output vswrs are low, the gain is exactly that predicted for the device at this frequency, and the noise figure is only 0·7dB higher than the minimum possible for this device when "noise-matched". In use, an overall noise figure of 7·7dB is predicted for the combination of this preamplifier with a 16dB noise figure mixer, and 4·5dB when two preamplifiers are used with such a mixer.

Because a number of the components used in this design are not commonly available, I would be happy to supply all or any of the parts used, including etched pcb and transistor, to anyone wishing to build this preamplifier. □

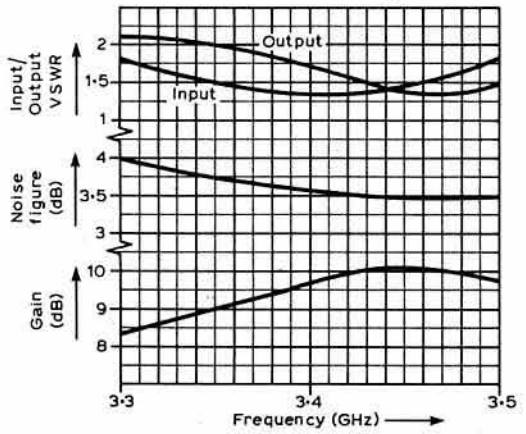


Fig 3. Measured performance of the prototype preamplifier

4-2-70

(Continued from page 238)

From here and there

Microcomputer enthusiasts may not have heard of a new book of programs written by John Branegan, GM4IHJ, and distributed by AMSAT-UK. The programs cover Oscar 8, Phase 3 satellite, the RS series and other satellites, and is altogether a very useful publication. To learn more about this and other AMSAT-UK publications, send a largish stamped addressed envelope to G3AAJ, QTHR.

Those who have ever built a preamplifier for 432MHz will know that the tuned circuits are always a problem. They are either small metal strips or very tiny coils, and their Q often leaves much to be desired. In a new state-of-the-art preamplifier offered by Silverstone Electronics Ltd, a high-Q coaxial line input inductor provides very accurate noise-matching to the input of a gallium arsenide fet, resulting in a claimed noise figure better than 0·5dB and a gain of 15dB. Further information can be obtained by telephoning Silverstone (0327) 857352.

G4CJG, now "down under", apologises for the lack, so far, of QSL cards for the 70MHz contacts made by GM4CJG/P during the Perseids period. This also co-incided with an aurora of some intensity, so many stations were able to work G4CJG/P in rare WR square. Jerry says that cards have now been received from the printer, and G4KUX is acting as QSL manager. All who contacted G4CJG/P will receive confirmation.

EI2CA, the IRTS vhf manager, has drawn attention to the fact that the Irish spring cumulative contest will take place on the three Sundays 13, 20 and 27 March from 3pm to 4.30pm. A number of portable stations in rare squares in both Northern Ireland and Eire are likely to be active, while the hour following each leg of the contest will be designated an "activity hour" when stations in EI and GI will beam to the east. The event proper is open only to stations in EI and GI, but those stations will want to work as many dx contacts as possible.

EI2CA also says that when the UK 50MHz permits have been issued, some EI stations will be active crossband 50/70, as EIs do not yet have any authorization to use the 50MHz band for transmitting.

THE MONTH ON THE AIR

John Allaway, G3FKM*

Guidelines for calling dx stations

Operating practice when calling dx has deteriorated alarmingly over the last few years. Inexperienced dx operators are being forced to close down or, even worse, resort to list operation because of inconsiderate and lengthy calling. It is proposed that the following guidelines be observed when calling dx:

1. Use a clear frequency to tune up. Do not tune up on the dx station's frequency.
2. Listen carefully for the dx station's callsign, his listening frequency and operating technique before calling. The dx station may send his callsign infrequently to control the pile-up, so be patient and do not send "?" or "What is your call?".
3. Send your callsign a few times only, and then do not transmit again until after the dx is heard. Repeated calling introduces large gaps between QSOs and may cause the dx operator to move frequency or close down.
4. If the dx station is calling a specific station or area only make a call if you fall within the group he is listening for. Good dx operators do not answer those who call out of turn.
5. Use standard phonetics on ssb. On cw send no faster than the speed of the dx station.
6. If the dx station is working "split", call on the specified frequency to minimize interference to other band users.
7. Do not break in on an existing contact.
8. Once contact is established, pass only as much information as is passed to you and, if it is known that others are waiting, do not request a change of frequency or for the dx station to listen for a friend or list.

G4BUO

DX news

As part of the celebration of World Communications Year, stations in Portugal are being allowed to use special prefixes. Until 31 March they may use CQ1 and CQ4, until 30 June CR1 and CR4, until 30 September CS1 and CS4, and then in the last quarter of the year CU1 and CU4.

SU1ER, and his daughter SU1MR, are active mostly on Fridays and Saturdays from 1700 to 2000 near 14,280kHz. They have a Collins KWM2A with TL922 linear and three-element beam, SU1MR is the youngest lady operator in Egypt (she is 14). QSLs go to the address in "QTH Corner".

According to *DX'press* UA3CR and two other operators will be joining 4K1J in Antarctica. They will use the callsigns 4K1CR, 4K1KP and 4K1QCG. They will be active on cw and ssb, and also work via the satellites. There is now a regular USSR dx net on Tuesdays and Thursdays on 3,640kHz at 2030. Late this month or early in April Y44RK will be in Antarctica and located at 12E 72S. He will be there for a year and his callsign will be Y83ANT.

Activity from the French territories in the Indian Ocean is considerable.

Magy Ezzat Ramadon, SU1MR (l) and her father Ezzat Sayed Ramadon, SU1ER

* 10 Knightlow Road, Birmingham B17 8QB

HF CONVENTION

The following series of lectures will be given in the Pendigo Room at the NEC at the same time on each of the two days of the RSGB National Amateur Radio Convention, 5-6 March.

1100 "RTTY", by J. P. Martinez, G3PLX
1200 "Parameters for hf receivers", by P. E. Chadwick, G3RZP
1300 (Break)
1345 "Amateur radio—an alternative approach", by Rev G. Dobbs, G3RJV
1500 Talk by members of the Interference Committee
1615 Forum—members of HF and HF Contests committees answer your questions. On the Saturday this item will commence with the presentation of hf contest trophies for 1982.

Other activities of hf interest are also being arranged. There will be a display of QRP equipment, and a competition for the most attractive QSL card—do not forget to bring your card with you!

FB8XAB (F6GVH) is active most days just above 14,100kHz and around 21,170kHz as well as at the low end of the 14 and 21MHz cw bands—in each case in the late afternoon gmt. F6CIA is FB8WI on Crozet Is (he was FB8XR in 1977 and 1979) and has a TS530S and VFO230. His antenna is a rhombic pointing towards FR7, but he also has dipoles for 21 and 28MHz. Bernard (F6AIN) is FB8WH and will be there for the rest of 1983; at the time of writing he had no equipment but hoped to use the TR4C belonging to the club or FB8WI's equipment. FB8ZQ (F6DWQ) will also be on Amsterdam Is for a year and has 40W from his TS530S to dipole antennas but is hoping to acquire a TS830S. FB8ZR (F6AJW) has no equipment but will use the club equipment. FH8OM is believed to have left Mayotte, and QSLs should now be sent via DJ1TC.

3B8DA was scheduled to arrive on Rodriguez Is early in the year for a six-month stay as 3B9DA. 5R8AL has been active again and should be sought on Mondays and Wednesdays on 21,330kHz at 1800, when he keeps a schedule.

UK1PGO in Franz Josef Land is believed to operate around 14,300kHz at 1500 on Mondays with UK3SAB, as well as on 14,180 or 14,200kHz at between 1100 and 1500 on Mondays, Thursdays and Saturdays. At 1500 on Thursdays there is often some cw operation on 14,030kHz.

Activity from Lebanon has been at a low level because of the disturbances, but OD5FB is now active regularly after 0130 in the area of 14,220kHz, and OD5LX frequents 14,030kHz at the same time. VS5GU should now have returned to Brunei. Phil, VS6CT, is now to be found on Wednesdays at 1400 on either 14,115 or 21,165kHz, and on Sundays from 0900 to 1030 on 28,450kHz.

According to *DX News Sheet* operator Jiao of BY1PK was heard to say that the station would be off the air from mid-January until the end of February. However, BY8AA has been fairly active. VE7BC was expecting to be in China again during February and March and hoping to get on the air on ssb as BY1BC.

DL2GG/YV5 is now active on all three new hf bands, and has been worked from the UK. PY1RR is reported as saying that he and several other PYs will be on the monthly supply ship destined for Trindade Is during the next few trips and they will operate for several 24-36h spells as PY0AA and PY0A1.

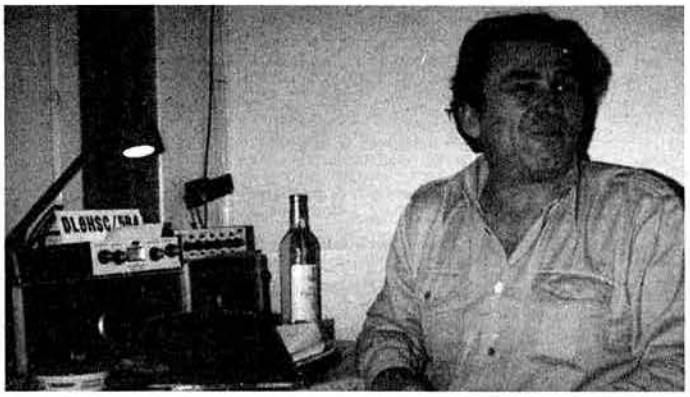
Anyone looking for 3C1AB should look around 21,200 or 28,500kHz at 1300, especially at weekends. F6FIC/TZ has now received the antenna donated by IDXF and is often on after 2200 between 14,020 and 14,030kHz. He also can be found on 14,285kHz around 2300 and, on Sundays, on 14,220kHz after midnight.

Overseas news

V3PGL closed down in January after four years operation from Ponta Gorda in Belize. Peter found it very enjoyable and hopes to be posted to another dx location in due course after a period as G8AET in the UK. He had some frustrating moments when faced with a modern transceiver after being away from amateur radio for 16 years, and its breakdown resulted in some rapid "self training". Working other rare stations is very difficult —this is when a rare call is not worth an extra few S-points! He still managed some rag-chews, and thanks all those who did not try to break in and allowed him to continue. QSLs should go via G8AET or direct to the address in "QTH Corner".

Nasir, 9K2AN, now has permission to operate from Pakistan when he is on holiday there. He has been allocated the callsign AP2NK and will be at the address in "QTH Corner".

A letter from JARL asks that in future all QSLs for the Japanese QSL



Ed, DL6MK, one operator of DL0HSC/5B4 which was active from Pera-Pedhi, Cyprus, last November

bureau should be sent to the address in "QTH Corner" and no longer to PO Box 377.

WIA has confirmed changes affecting Australian amateurs since 18 December 1982. The 18 and 24MHz bands have been released for use on a secondary basis—with a request that frequencies ± 4kHz of the following be avoided: 18,075, 18,105, 18,125, 18,128, 18,130, 18,145,18,160 and 24,900kHz. These are presently used by other Australian services, and 18,147 and 24,901kHz are likewise to be avoided because of similar use in New Zealand. At the same time, 1,800-1,825kHz became primary amateur, and a new allocation from 1,825 to 1,875kHz (with avoidance of 1,866-1,874kHz) became available on a secondary basis. On 3·5MHz 3,794 to 3,800kHz (except 3,793-3,795kHz) is a new secondary allocation, and on 7MHz 7,100-7,300kHz is now available on a secondary use basis to the broadcast service.

ITU has notified that in future San Marino will use the series T7A-T7Z in place of the former 9AA-9AZ allocation. Amateur calls will be as follows: T70AAA-ZZZ (club stations), T71AAA-ZZZ (special prefixes), T72AAA-ZZZ ("B" licence) and T77AAA-ZZZ ("A" licence).

Matthew Reed, G4NPX, will be in the USA from 1 to 15 April using the station of WA2JAS (Syosset High School RC). He hopes to be on all hf bands as G4NPX/W2.

Expeditions

In a bulletin dated 8 January, Iris and Lloyd Colvin reported that they had just concluded their operation from Oman as W6KG/A4 after making 5,000 QSOs with amateurs in 127 countries. They were active on all bands 3·5 to 28MHz (but not on the new bands) with roughly half cw and half ssb operation. They were very grateful to the authorities for issuing them permission to operate, as this is unusual for tourists. They were moving on from Oman to Qatar.

A team from Bash Educational Services will be operating as KL7IHP/VS6 from Hong Kong for 20h daily between 26 March and 2 April. They will use ssb and cw and work on 14, 21 and 28MHz, with some activity possible on 3·5 and 7MHz with their ICOM740 and IC2KL linear. Simultaneous activity from Macao as CR9FE may take place.

There are rumours of an expedition to Spratly Is being planned by DU1JMG this month.

Drew Givens, GM3YOR, managed a few days on the air as GM3YOR/ZB2 from Gibraltar at the beginning of December, initially only on 14MHz with an FT7 transceiver. This developed a fault and the remainder of the 600 QSOs were made with the help of ZB2EO's equipment and location.

NCDXF beacon net

Information on this experiment was given in February *MOTA*. The *NCDX Foundation Newsletter* for Winter 1982 gives suggestions on how the system may be used to learn more about propagation. It says: "How will these observations correlate with the various A, K and other indices transmitted by WWV? Will anyone hear all eight beacons in one sequence? At sunrise, if you can or cannot hear a given power level from a particular beacon, will that predict or foretell anything about band conditions that day?

"The beacon net is an educational tool for the listener to use. However, we are interested in hearing from listeners who make extensive observations. W6RQ has volunteered to co-ordinate reports, and is particularly keen to find worldwide volunteer observers who can make observations at the same time each day. He is interested in daily observations just before and after local sunrise and sunset. Please report the date, time and lowest power level dash heard for each beacon monitored." (Copies of report forms are available from G3FKM—sae please).

If you would like to volunteer as a regular observer, send your report and tell W6RQ that you will be sending a report each month. Please write to Al Lotze, 46 Cragmont Avenue, San Francisco, Cal, 94116, USA. The beacon JA2IGY is due to come on the air later this month.

QSL via...

C6ADV via N7YL
ED9ICH via EA9JV
FH8OM via DJ1TC
J87BI via KA2GMT
OD5FB via WA2QAU
OD5LX via SM0DJZ
ZK1XX via K6DZL
ZP5PX via W3HNK
5Z4CS via JI1VLV
6Y5IC via G3XTJ
VE3LGC/8P6 via VE3LGI
9N1AW via W1GAY
9N1NFO via W1GAY
9N1OAT via W6OAT
9N1YOU via K4YT

World QRP Federation news

G8PG has concluded his two-year term of office as secretary. The new secretary is Jack Swiney, VK6JS, 59 Collova Way, Wattleup, 6166 W Australia. The UK representative is now Colin Turner, G3VTT, QTHR. WQF has named 1983 as a year of technical development, when all QRP operators will be encouraged to undertake home-construction projects, antenna experimentation and propagation investigations. It is hoped to publish the more outstanding projects in the journals of member organizations.

Welcome

The following joined the Society during November and December 1982—due to the move of RSGB HQ, not all who joined will necessarily appear in this list but should be included later: DJ5LA, DJ6TJ, EI3BQB, F8CE, N0DMR, SM0NYR, TG9AZ, ZC4ESB, ZL2AXZ and 8P6QG. Listeners who joined include B. Ridge (Z2), G. Moore (9Y), G. Clem (ZB2) and H. Van Dyk (PA).

Hong Kong activity day

HARTS is pleased to announce that once again there will be a VS6 activity day between 0001 2 April and 2359 3 April. As in previous years many VS6 stations will be active on all bands and modes.

During 1983, World Communications Year, the special callsign VS6WCY will be in use by the HARTS club station. Special QSL cards will be issued and application should be made via the HARTS QSL Bureau Manager, PO Box 541, Hong Kong.

Contest

CQ WW WPX Contest (SSB section)
0000 26 March to 2400 27 March

1·8 to 28MHz. Contacts with one's own continent count two points on 14, 21 and 28MHz, and four on the others. Contacts with stations in different continents count three and six respectively. Stations in one's own country may be worked for multiplier credit only. The multiplier is the number of different prefixes worked—each counts once irrespective of band worked. Exchanges consist of RS plus serial number (from 001). There are single-operator single- and multi-band and multi-operator single-transmitter all-band categories. The last mentioned must only use one transmitter and the same band for the same 10min period (changing to another band to work a multiplier is not allowed during this period). There is also a multi-operator multi-transmitter category in which all equipment must be located within a 500m diameter. The final score is QSO points multiplied by the total number of prefixes worked. There is a QRP section for stations running no more than 5W output and "QRP" must be clearly

Jo, DL1RK (l) and Ben, DF8ZH, two other operators from DL0HSC/5B4

ALL-TIME COUNTRIES TABLE

Scores received to the end of January are as follows (band leaders in bold type):

Callsign	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3KMA	69	**208**	**283**	326	**328**	**312**	1,526
G3GIQ	47	165	201	323	326	303	1,371
G3MCS	29	175	201	314	313	300	1,332
G3UML	3	187	189	325	290	251	1,245
G3HTA	42	153	190	296	271	237	1,189
G4DYO	39	101	156	298	291	278	1,163
G4FAM	41	143	197	257	254	239	1,131
G3XTT	66	147	186	234	255	239	1,127
G2DMR	35	126	133	277	287	250	1,108
G3NOF	4	79	58	**337**	315	271	1,064
G3RUV	6	141	145	261	274	228	1,055
G3XJS	26	87	109	271	282	269	1,044
G3IGW	**87**	127	226	215	191	170	1,016
G3TXF	29	147	152	240	241	196	1,005
G3XQU	1	80	114	253	240	223	911
G3RUR	1	101	132	261	205	200	900
G4FXT	1	87	115	174	258	223	858
VK9NS	5	114	169	218	187	160	856
G3VKW	20	71	74	237	236	213	851
G3JJG	23	68	92	185	236	185	789
G3YMC	60	77	124	174	193	159	787
GM3YOR	36	62	99	161	159	161	678
G4KPE	1	121	151	132	121	86	612
(Average)	*29*	*120*	*152*	*251*	*250*	*224*	*1,027*

The next table will be in the June issue—please send your scores to reach G3GIQ no later than 20 April.

1983 28MHz COUNTRIES TABLE

To date only five entries have been received: G3XBY (78), G3KDB (52, cw only), G4OBK (29), G3XBM (18, mostly with 1W), and G4EHQ (15).

marked on the entry sheet. Note that single-operator entrants may only operate for 30h, with the remaining 18h taken in up to five rest periods. They must operate for at least 12h in order to qualify for an award, and multi-operator entrants must operate for 24h. Logs should show date, time, station worked, numbers sent and received, if new prefix, and points claimed. A prefix check list must be enclosed. Entries must be postmarked no later than 8 May to *CQ Magazine*, WPX Contest, 76 N Broadway, Hicksville, NY, 11801, USA. Please remember to mark envelopes "SSB" (there is a cw section later).

Awards

RSGB 28MHz Counties Award

This is a new award being offered by the Society to encourage more use of the 28MHz band. It is available to licensed amateurs and listeners for contacts/reports on or after 1 April 1983, and the basic award will require confirmation from 40 UK counties/Scottish regions on 28MHz. Endorsements will be available for 60 and all (77) counties/regions confirmed. Endorsements will be made for all-cw, all-ssb, all-fm, 2x sstv, 2x rtty, or mixed modes. Cross-mode contacts will not count. The award is free to members of the RSGB who should provide proof of membership with their applications. To non-members the cost is eight ircs, US$3, or £1.50. Send QSL cards plus list of contacts and counties to: RSGB HF Awards Manager, G3KDB, PO Box 73, Lichfield, Staffs.

The IARU Region 1 Award (28MHz)

This newly-designed and attractive certificate is a special version of the already well-known IARU Region 1 Award for the original requirements but with all QSOs made on 28MHz. It will be issued in three classes for confirmed contacts made on or after 1 July 1983. Class 3 will require 20, Class 2 35, and Class 1 all IARU Region 1 member society countries (53 at the time of writing). Eligible countries are: 7X, OE, ON, LZ, A2, A9, 5B, OK, OZ, DL, ZB2, OY, OH, F, 9G, SV, HA, TF, EI, 4X, I, TU, Y, JY, C5, T7, J2, OD, EL, LX, CN, 9H, 3B8, 3A, PA, 5N, LA, A4, SP, Z2, YO, 9L, ZS, EA, SM, HB, G, U, YU, 9J, CT, 5Z and C3.

RNARS World-Wide Award

Available to any licensed amateur/listener who has evidence of working/hearing RNARS members in at least 10 countries in at least two continents. Additional credits will be given for 25, 50, 75 and 100 countries and 3, 4, 5 and 6 continents. Starting date is 1 July 1960, and applicants should send log extract showing callsign, country/continent claimed, date of QSO, RNARS number (if known), band and mode, signed by the applicant and another amateur that "log entries and/or QSL cards for continents/countries claimed have been sighted". The fee is £1 (UK and Europe), and £1.50 (rest of world). Stickers cost £0.25 (plus sae please). Awards manager is Mark Mullins, 24 Rigby Close, Waddon, Croydon CR0 4JU.

World Communication Year Award

This is being issued by DARC to those who work 15 special event stations during the year which are using the suffix WCY (only five are needed on vhf). Send certified list and DM5 to DARC Award Manager, DL9XW, Am Strampel 22, 4460 Nordhorn, FR of Germany.

QTH CORNER

W6KG/A4 **W6KG/A7**	YASME Foundation, Box 2025, Castro Valley, Cal, 94546, USA.
AP2NK	Nasir Khan, 30 Street No 28, Shalimar F-6/1, Islamabad, Pakistan.
CG1MCS	Sydney ARC, Box 1051, Sydney, NS, B1P 6J7, Canada.
IDXF	(new) RD2, Box 341, Hyde Park, NY, 12538, USA.
JARL QSL Bureau	(new) JARL, 14-2, Sugamo 1-chome, Toshima-ku, Tokyo, Japan.
LU1ZR	LU2CN, Malabia 3029, 1425 Buenos Aires, Argentina.
LU5ZA	LUZA, PO Box 100, 1428 Buenos Aires, Argentina.
P42J	via W1RM, Box 1188, Burlington, Ct, 06013, USA.
PY0TA	PY1VOY, PO Box 18046, Rio de Janeiro, 20772 Brazil.
SU1ER **SU1MR**	Box 33, Air Port, Cairo, Egypt.
F6FIC/TZ	via F6CRS, J. Luurent, Bourg Bas, Saint-Agne, 24520 Mauleydier, France.
V3PGL	P. G. Lee, 103 Furze Park Rd, Bratton Flemming, Barnstaple, Devon.
VK0CW **VK0HI**	N2DT, Dr D. Handelsman, 16 Attitash, Chappaqua, NY, 10514, USA
VP2MDB	via W2WSE, D. Benton, 201 Seagirt Av, Sea Girt, NJ, 08750, USA.
G4NPX/W2	M. Reed, PO Box 30, Shepshed, Loughborough, Leics LE12 9SQ.
XO2JCG	PO Box 212, Chicoutimi, Que, G7H 5B7, Canada.
5N0ATW	via ON5NT, G. Penny, 46 Lindestr, B-9880 Aalter, OV, Belgium.
9X5SL	via DL8DF, Graacher Weg 10, D 6600 Saarbruecken 2, FR of Germany.

Around the bands

G8KG has kindly supplied his usual summary, and will probably report in alternate months in future now that the sunspot activity is declining. It reads as follows: "Last year saw a marked downward trend in average solar activity as reflected in the 2,800MHz solar flux observations. The downward movement was not continuous however, but nearly all occurred in a single drop at the end of the first quarter of 1982, when the quarterly average fell from 197sfu to around 170sfu, where it remained for the rest of the year. The most active months were February (209), March (208), and December (193) and the least active was May (148). Geomagnetic activity passed through a peak in the third quarter of the year, and this may prove to have been the peak of the geomagnetic cycle.

"There was a short sharp peak in solar flux during December, with daily values soaring to 282sfu by 10 December and remaining above 200sfu for a further week. During that week there was brief return of the very high F2 mufs seen in previous years, but the high activity was not sustained. Twentyseven days after the peak the flux had fallen by over 100 units, and by 22 January 1983 daily values were below 120sfu, from which a modest recovery can be expected."

The following provided logs from which the listing below was compiled: G2s CDT, HKU, G5s JL, YY, G3s AAE, BDQ, GHY, GIQ, GVV, IMW, G4EHQ, GW4KGR, G4s LDS, LRS, OBK and RS1066.

Stations listed in italics were using A1A.

1·8MHz. 0000 *EA8QO, UA9ADE, ZB2EO, 4X4NJ.* **0300** *W1-W4.* **0600** *PY1ZAE, VE1BNL.* **2100** *VK6HD, YB5AES, 5Z4CS.* **2200** *G6ZY/EA6, UH8DC,* **2300** *EA6JD, RF6FFW.*

3·5MHz. 0000 C6ADV, *9N38.* **0100** *TI2DL, UJ8JBR, UL7CT, VP2MIX, ZC4BI.* **0200** *7X4AN.* **0400** A4XFF. **0500** *5T5TO.* **0600** D44BC, FP8MX, J6LB, *KH6AT,* TG9NX, ZF2FK, ZP5PX, 6W8AR. **0700** JW5VAA, ZL1AMO, 8P6KY. **0800** FK8CR, FG7CB/FS, HI8GB, KP4DEX/V2A, ZL2BT. **1900** VK7AE, 5N7ARY. **2000** *UI8LBA, UL7ECH.* **2100** JA1s BRK, HLQ, WTZ, JA4, JA5, JA6, *UH8EAD,* 9X5SL. **2200** *FC9UH, JH3BGG.* **2300** *JA4BJO, JA5RM, JT0GM, PY2BW,* VP5WJR, VS6DO, *VU2BX, 4K1D.*

7MHz. 0000 SV5OX, *TI5BGA,* ZD7BW. **0200** *N6YK/V2A, ZF2AF, 3B8CF.* **0600** *CO, JW5VAA, PY, W6-W7, XE3YL, YV.* **0700** *CE1FA,* UA9KD, *JA* (LP), *LU, XT2AW, ZF2FK, ZL.* **1600** *CN8AT.* 1800 CR9CT, FB8XAB, 6W8DY. **1900** *W6KG/A4,* A71AD, *VU9TTC.* **2000** *ZS1XR.* **2100** *5Z4CS.* **2200***VU2BK,* 7X2HM. **2300** ZP6CJF.

10MHz. 0700 *ZL* (to 0900). **0800** *EA8, EA9, JA, NL7J.* **0900** *G6ZY/EA6, PJ2MI, VE3MZ, VK. W.* **1000** *FO8GM, ZB2GR.* **1300** *OY7ML.* **1400** *KG6RT.* **1700** *DL7AD/EA8, DL2GG/YV5.* **1800** *PA0WAY/A6, VE5RA, XT2AW, G3KTR/5N0.* **1900** *OX3CS, 5Z4CS, 9J2BO, 9U5AC.* **2000** *DU1EQ, ZL4LZ.* **2100** *HI8RPD, YV5ANF.* **2200** *C6ABA, HZ1HZ, KP4CKY, VK6RZ, 4U1ITU.* **2300** *KV4BD, 5N7HKR.*

14MHz. 0100 *LU3ZI.* **0500** W6-W7. **0600** KL7 (to 0900). **0700** TL8GE. **0800** G4DUW/DU1, KC4USV, VK9NL, VP2MKS. **0900** AH2AI, *EK9C/0,* T30DB, VS5GA, *ZK1XX,* 9M8PW. **1500** FB8XAB. **1700** *FB8XWS, FB8ZQ,* VK0HI, 3B8DA/3B9. **1900** G5ACI/AA, DP0LEX, FB8ZP, *KH6AK,* VK0CW. **2000** VP8MT. **2100** LU3ZI, VP8s SB, WA, ZD8DA. **2200** W6HLH (LP). **2300** AH2AI.

18MHz. 0900 *DL, LA, OE.* **1000** *5N7HKR.* **1200** *VK3ABR.* **1300** *OY1R.* **1600** *C6ABA, DL2GG/YV5.*

21MHz. 0800 JA, VK, XT2AU. **0900** G4DUW/DU1, ZL. **1000** DU1CK. **1100** *W6KG/A7,* 4S7OM. **1200** OD5YU. **1300** *FB8ZQ.* **1400** VP2MSS, 9L1YL. **1500** FB8XAB, 9Y4RD/SU. **1600** *LU3ZI,* W5TIY/TI2, *VQ9CI,* W6-W7, *4U1VIC.* **1800** A22FY, HC8GI, J73AH.

24MHz. 1200 *VK5MV/P, VK6.*

28MHz. 0800 *JA,* TR8JD, VQ9SB. **0900** JT1BG, 6T1YP, 9N1YOU. **1000** CR9CT, 9N38. **1100** W6KG/A7, VK6UA, ZS3AK. **1200** W6KG/A4, A71BJ, FK8CQ, J88AB, V2AS, 3B8FK,VE3LGC/8P6. **1300** *F6DZD/FH8.* **1400** *CO, LU3ZI,* VP8LP. **1500** C6ACZ, HK0COP, J3AE, PY, DF3NZ/ST2, ZD7BW. **1600** C53EK, W6 (to 1700). **1900** VP9AM.

Many thanks to all who supplied information for this month's column, and also to the following for items extracted: *Long Skip* **(VE3EUP),** *DX'press* **(PA0GAM),** *CQ Magazine* **(W1WY),** *DXNL* **(DL3RK),** the *DX Bulletin* **(K1IN),** the *Long Island DX Bulletin* **(W2IYX),** *DX News Sheet* **(G3XTT/G3ZAY),** and the *Ex-G Radio Club Bulletin* **(GI3OEN/W6).**

Items for inclusion in the **May** issue must be sent to reach G3FKM no later than **1 April,** and for **June** by **28 April.** □

HF propagation study

Band predictions for May 1982

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.

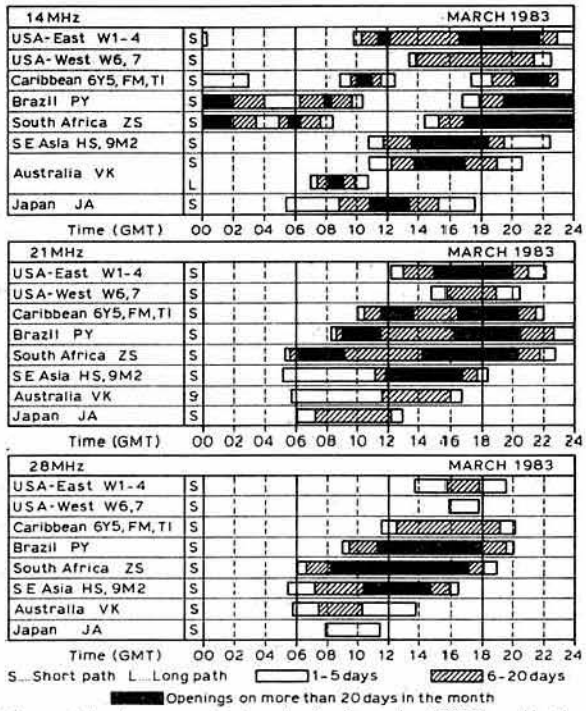
GMT	28MHz	21MHz	14MHz	10MHz	7MHz	3·5MHz
	000001111122	000001111122	000001111122	000001111122	000001111122	000001111122
	02468024680 2	02468024680 2	02468024680 2	02468024680 2	02468024680 2	02468024680 2
EUROPE						
Moscow	....12232...	....577873..	...677778841	533654446886	875322223689	+53.....3++
Malta	....12322...	....778885..	11.677778972	764755456898	998522223689	+++2.....3++
Gibraltar	.....1111...	....366565..	...188778971	452675556897	998743223689	+++4.....3++
Iceland	.....	.....13332..	....2777885.	21.166556785	874643334578	+++4.....24+
ASIA						
Osaka	.....1.....	....462.....	...26432331.	31113662	....1...1362	.....3.
Hong Kong	....2341....	...2677521..	...13434672.	1...11.13674	1.....1475	42
Bangkok	....3454....	...3677751..	24346731	3....1.13687	2.....1477	44
Singapore	...144453...	...3677773..	1...14346842	3....1.13687	1.....1476	44
New Delhi	...14555....	...467774...	1.1113346432	621....13687	62.....1478	3.....45
Teheran	...156663...	...5667883..	312422346853	8541...13688	851.....1478	+2.....45
Colombo	...156664...	...4567884..	1...12346854	62.....13688	61.....1478	3.....45
Bahrain	...266664...	...5667783..	412311336865	863....13689	861.....1478	+3.....45
Cyprus	...1666751..	...68888971.	533755567986	987432335799	8852...12588	+++2.....25+
Aden	...2677761..	...56567872.	72331.136887	974....13689	861.....1478	+4.....45
OCEANIA						
Suva (S)	.....	.....23421..	....14434572.	...43211361.	...21...13..	.....
Suva (L)	....1.....2.	21.1632..273	112664223751	..1531..362.	...21....3..	.....
Wellington (S)	.....1.....	....145431..	....35434661.	...43111363.	...21...131.	.....
Wellington (L)	.....	11..3....32	223463...463	..2431..153.	...21....3..	.....
Sydney (S)	....2321....	...3776641..	....46434672.	...131.13652	.....143.	.....
Sydney (L)	.....	....31....31	111164211174	...231..2452	....1....32.	.....
Perth	...15641....	...4787532..	1..134346753	2...11.13686	1474	.....4.
Honolulu	.....	.....2..	....1321462.	..12321133..	..241....1..	.....
AFRICA						
Seychelles	...2445521..	...55577762.	7321..236887	962....13689	84.....1478	+.....45
Mauritius	...1677762..	...556788831	742211336898	962....13689	84.....1478	+.....45
Nairobi	....1556753..	1..555588842	8633...36899	9951...13689	882.....1377	+5.....45
Salisbury	....5678751.	2..465679963	973411136899	9961....3689	883.....1378	+5.....45
Capetown	....5678862.	2..276678974	962631136899	9963....3689	8851.....378	++2.....45
Lagos	....6888872.	32.186568984	993741.15899	99851...2689	7873.....368	4+4.....45
Ascension Is	....4755651.	22..87556863	996462..1699	99863....389	88741....168	555.....35
Dakar	....3788872.	11..87667983	886463112699	99963....379	87741....158	555.....25
Las Palmas	....2666661.	78888961	564476666898	999753333689	988521..1378	+++2.....4+
S AMERICA						
South Shetland	.....67872.	11...4778873	786454334567	789631..1235	57741.....12	245.....
Falkland Is	.....287772.	.1..26777772	786464332367	899631....36	78741.....3	4+5.....
Rio de Janeiro	.....563452.	.1...8755772	786354211268	999631....38	88741.....15	+55.....2
Buenos Aires	.....376672.	17766672	676354311257	899631....26	78841.....3	4+5.....
Lima	.....55562.	765551	454142321.25	798531.....3	58841.....1	2+5.....
Bogota	.....54552.	765551	343123321.26	898431.....4	68841.....1	3+5.....
N AMERICA						
Barbados	.....265562.	6766661	454134311147	898531....16	88741.....3	+++4.....
Jamaica	.....44441.	765551	332.23321125	787432.....3	68841.....1	3+5.....
Bermuda	.....43441.	2766661	332.14321256	887332....25	78841.....2	4+5.....
New York	.....12331.	566651	32...3332246	776222....14	58741.....2	2+5.....
Mexico	.....2331.	.....16653.	22...2.332113	476231.....1	27741.....	.45.....
Montreal	.....1222..	.....46665.	22...3332355	7752221...24	58741.....2	2+5.....
Denver	.....1..	.....2443.	21....134223	46422.111..1	25741.....	.25.....
Los Angeles	.....1..	.....542.	11.....25211	243221.12...	.3741.....	..4.....
Vancouver	.....	.....11.	1.....14432	24222..131.1	13641.....	..3.....
Fairbanks	.....	.....	11123441	221331113432	12341...11..	.....

Propagation predictions

During March the seasonal decline in F2 mufs in the northern hemisphere begins. This, together with the decline in solar activity, will lead to steady worsening of conditions on **28MHz**. Traffic with North America and Japan will be difficult. Only South America, Africa and South-East Asia will be heard with certainty.

The decline in F2 mufs will be noticed on **21MHz** by a gradual worsening of dx conditions on this band. Traffic with western North America, Australia and Japan will become most uncertain. Shortening nights will keep this band as well as **14MHz** open longer in the later afternoon-early evening. Conditions on **14MHz** will improve considerably during the latter half of the night compared to February. Towards the end of April-beginning of May this band will become an exclusively dx band.

There will be little change in conditions on **7** and **3·5MHz** compared with last month.



The provisional mean sunspot number for December 1982 issued by the Sunspot Index Data Centre, Brussels, was 126·4. The maximum daily number was 194 on 12 December, and the minimum was 62 on 31 December. The predicted smoothed sunspot numbers for March, April, May and June are, respectively: (classical method) 94, 92, 90 and 88; (SIDC adjusted values) 89, 87, 85 and 83.

Changes to the "predictions"

Following the retirement of Dr G. Lange-Hesse, DJ2BC, who has supplied "Propagation predictions" for many years, this issue is the last in which these predictions will appear. The thanks of all users of the predictions have been conveyed to Dr Lange-Hesse, and to Mrs Anna Williams, recently-retired member of RSGB HQ staff, who has translated them from German into English since 1967.

The propagation predictions table originated by the RSGB Propagation Studies Committee, and published in parallel under the title "HF propagation study" for the past seven years, will in future be renamed "HF propagation predictions". At the same time, advantage will be taken of the extra space made available to increase the type size used for this table.

However, the opinion of users is sought on the form in which the predictions are presented. Is the present tabular form preferred to the bar-chart presentation of the German predictions, or would a chart form of presentation, which may have to contain less detail than the table, be preferred? Please write to: The Editor, *Radio Communication*, 88 Broomfield Road, Chelmsford, Essex CM1 1SS, giving your views.

HF predictions on the home computer

by E. L. DEVEREUX, G3CCZ*, and D. WILKINSON, BSc, CEng, FIEE, FIERE, G4LEH**

Introduction

Comprehensive programs for predicting hf circuit performance have been developed [1,2] but due to complexity and data volume are impossible to implement on a home computer. A method of calculation known as Minimuf [3] can, however, be easily implemented as it only has about 150 lines of Basic language code and is entirely analytic (ie requires no data).

The authors have used Minimuf as a starting point, modified it to cover long-path routes and extended it to include lowest usable frequency (luf) predictions. This extension amounts to about 20-30 lines of code.

In use the program requires only that latitude and longitude of the distant point be entered, together with the month and sunspot number. If the longitude difference is more than 120° the program will request whether the long or short route is required. It will then print the highest possible frequency (hpf) and luf, at one hour intervals of universal time (gmt) throughout the day.

Constraints

Every effort has been made to ensure that the program will run on the majority of home computers, and the printout has been designed to fit a 32 × 16 line display.

Significant effort was expended in the elimination of the problems caused by the trigonometric identities having the same values in two quadrants. Extensive use was made of the Basic SGN() function as a neat way of removing these ambiguities, though it would be possible to use the IF . . . THEN statement.

The inverse functions have been limited to ARCTAN, as some versions of Basic will not support the ARCSIN and ARCCOS functions.

Since versions of Basic differ in the range of numeric values they can accommodate, the argument of the EXP() functions has been limited to the range −85 to +85. There is also a small risk of "divide by zero" errors occurring, though traps have been provided in many cases.

On a microcomputer using the M6800 microprocessor and TSC Basic, pairs of luf and hpf values are produced at 2-3s intervals.

HPF calculation

This uses the original Minimuf method described in [3] with a few additions. Results for six major routes from the UK were compared with the results from a large scale program similar to [2], and then certain constants were adjusted for best agreement. The original program correction for transequatorial routes has been replaced with one dependent on control point location, time of day and the geomagnetic field. To obtain the hpf, the muf is multiplied by 1·27.

LUF calculation

There are numerous difficulties and uncertainties in producing an accurate luf prediction [4]. However, simple luf methods which do not take detailed account of atmospheric noise, transmitter power and antenna gain have nevertheless proved worthwhile [5]. Such methods are based on the E-layer screening frequency.

In this program the E-layer critical frequency is found from a simplified version of the method in [6] using sun zenith angle obtained during the maximum usable frequencies (muf) calculations. The highest effective radiation angle is taken to be the elevation of the "minimum plus one" hop F2-layer mode, or 18°, whichever is the larger. This enables the corresponding angle of incidence with the E-layer and then the E-layer screening frequency to be found. Corrections derived from the results of a large-scale computer method and from further comparisons with the band predictions ("HF propagation study") produced for *Radio Communication* are then applied.

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**43 Castleford Avenue, London SE9 2AH.

The program

```
10 REM EMUF - VDU VERSION
20 REM VERSION: 9/11/82
30 REM BASED ON MINIMUF-3 PROGRAM DEVISED BY:
40 REM P.H.LEVINE, R.B.ROSE & J.N.MARTIN
50 REM MODIFIED BY G3CCZ AND G4LEH
60 DIM L(1),T1(1),T3(1),T4(1),C0(1),T9(1),M(1)
70 DIM G6(1),G7(1),G8(1)
80 P1=3.14159 : J9=P1/180
90 INPUT "ROUTE",L$
100 INPUT "LATITUDE", L6
110 INPUT "LONGITUDE", W6
120 INPUT "MONTH (1...12)", M0
130 INPUT "SUNSPOT NUMBER",S0
140 L5=51.5
150 W5=0
160 P$="S"
170 IF ABS(W5-W6)<120 THEN 190
180 INPUT "LONG OR SHORT PATH (L/S):", P$
190 D0=15
200 W1=-(W5-180*(1+SGN(W5-.001)))*J9
210 W2=-(W6-180*(1+SGN(W6-.001)))*J9
220 L1=L5*J9 : L2=L6*J9
230 PRINT "ROUTE ";L$;" MONTH: ";M0;"S.S.No: ";S0
240 REM ROTATE LONGITUDES
250 W3=W2-W1+.001
260 W3=P1*(1-SGN(W3))+W3
270 REM PATH LENGTH
280 H1=SIN(L1)*SIN(L2)+COS(L1)*COS(L2)*COS(W3)
290 G1=ATN(SQR(1-H1*H1)/H1)+P1/2*(1-SGN(H1))
300 IF P$="L" THEN G1=P1+P1-G1
310 REM PATH LENGTH IN 4000 Km UNITS
320 H0=INT(1.59*G1)+1
330 REM BEARING
340 H9=(SIN(L2)-H1*SIN(L1))/SIN(G1)/COS(L1)
350 H9=ATN(SQR(1-H9*H9)/H9)+P1/2*(1-SGN(H9))
360 H9=H9*SGN(W3-P1)*SGN(P1-G1)
370 H9=H9+P1*(1-SGN(H9))
380 PRINT "LONG/SHORT: ";P$;" BEARING:";INT(H9/J9+.5)
385 PRINT "GMT    ";"HPF ";"LUF      ";"GMT   ";"HPF ";"LUF"
390 Y6=ATN(1/TAN(G1/(H0+1)))-.952/SIN(G1/(H0+1)))
400 IF Y6<.314 THEN Y6=.314
410 Y6=1/SQR(1-.965*COS(Y6)^2)
420 Y1=.0172*(10+(M0-1)*30.4+D0)
430 Y2=.409*COS(Y1)
440 Y1=.13*SIN(Y1)+.156*SIN(Y1+Y1)
450 REM DIRECTION COSINE
460 H9=(SIN(L1)-COS(G1)*SIN(L2))/SIN(G1)/COS(L2)
470 REM "M" FACTOR
480 M9=SIN(2.5*G1/H0)
490 M9=1+2.5*M9*SQR(M9)
500 K1=1-.5/H0
510 FOR N=0 TO 1
520 REM CONTROL POINTS
530 L9=COS(G1*K1)*SIN(L2)+SIN(G1*K1)*COS(L2)*H9
540 L0=P1/2-(ATN(SQR(1-L9*L9)/L9)+P1/2*(1-SGN(L9)))
550 W0=(COS(G1*K1)-SIN(L2)*L9)/COS(L2)/COS(L0)
560 W0=ATN(SQR(1-W0*W0)/W0)+P1/2*(1-SGN(W0))
570 W0=P1-SGN(P1-G1*K1)*(P1-W0)
580 W0=W3+W0*SGN(W3-P1)*SGN(P1-G1)+W1-.001
590 W0=W0-P1*(1-SGN(P1+P1-W0))
600 REM LOCAL NOON
610 T0=3.82*W0+12+Y1
620 T0=T0-12*(1+SGN(T0-24))*SGN(ABS(T0-24))
630 IF COS(L0+Y2)>-.26 THEN 670
640 T1(N)=0
650 GOTO 790
660 REM DURATION OF SUNLIGHT
670 T1(N)=(-.26+SIN(Y2)*L9)/(COS(Y2)*COS(L0)+.001)
680 T1(N)=12-ATN(T1(N)/SQR(ABS(1-T1(N)*T1(N))))*24/P1
690 REM T(dawn)
700 T7=T0-T1(N)/2
710 T3(N)=T7+12*(1-SGN(T7))*SGN(ABS(T7))
720 REM T(sunset)
730 T7=T0+T1(N)/2
740 T4(N)=T7-12*(1+SGN(T7-24))*SGN(ABS(T7-24))
750 C0(N)=ABS(COS(L0+Y2))
760 REM RELAXATION TIME
770 T9(N)=9.7*(C0(N)^8)
780 IF T9(N)<.1 THEN T9(N)=.1
790 K1=1-K1
800 REM f0f2 MULTIPLIERS
810 M(N)=M9*.75*((12/T1(N)-1)*SGN(INT(12/T1(N)))+1)
815 M(N)=M(N)*(1+S0/100*(1-(T1(N)/12-1)*SGN(INT(T1(N)/12))))
820 L9=ABS(L0+.21*SIN(W0+.35))
830 G2=0.5
840 IF L9<P1/4 THEN 870
850 M(N)=M(N)*(1-.1*(1+COS(L9*4)))
860 G2=0.2
870 L(N)=SIN(L9*4)*G2
880 REM EFFECTIVE COS X PRESETS
890 G8(N)=P1*T9(N)/T1(N)
900 T7=T1(N)/T9(N)
910 IF T7>85 THEN T7=85
920 G7(N)=C0(N)*G8(N)*(EXP(-T7)+1)
930 G6(N)=G7(N)*EXP((T1(N)-24)/2)
```

```
940 NEXT N
950 FOR T5=0 TO 23
960 J9=100
970 K9=0
980 FOR N=0 TO 1
990 G0=0
1000 G3=P1/2
1010 IF T1(N)=0 THEN 1200
1020 IF T4(N)<T3(N) THEN 1070
1030 REM DAYTIME?
1040 IF (T5-T3(N))*(T4(N)-T5)>0 THEN 1090
1050 GOTO 1250
1060 REM NIGHT TIME?
1070 IF (T5-T4(N))*(T3(N)-T5)>0 THEN 1250
1080 REM EFFECTIVE COS X (day)
1090 T6=T5+12*(1+SGN(T3(N)-T5))*SGN(ABS(T3(N)-T5))
1100 G4=P1*(T6-T3(N))/T1(N)
1110  T8=(T3(N)-T6)/T9(N)
1120 IF ABS(T8)>85 THEN T8=85*SGN(T8)
1130 G0=C0(N)*(SIN(G4)+G8(N)*(EXP(T8)-COS(G4)))
1140 G3=P1/2
1150 IF T6-T3(N)>T1/2+3 THEN 1170
1160 G3=(T6-T3(N))/(T1/2+3)*G3
1170 G3=G3*(1+SGN(L(N)))
1180 IF G0<G6(N) THEN G0=G6(N)
1190 REM foF2
1200 G2=SQR(7+45*SQR(G0/(1+G8(N)*G8(N))))
1210 REM HPF
1220 G2=G2*M(N)*1.27*(1+SIN(G3)*L(N))
1230 GOTO 1310
1240 REM EFFECTIVE COS X (night)
1250 T6=T5+12*(1+SGN(T4(N)-T5))*SGN(ABS(T4(N)-T5))
1260 G4=P1*(T6-T4(N))/(24-T1(N))
1270 G0=G7(N)*EXP((T4(N)-T6)/2)
1280 G3=G4+(P1-G4)/4*(1+SGN(L(N)))
1290 G4=0
1300 GOTO 1200
1310 IF G2<J9 THEN J9=G2
1320 REM E LAYER
1330 Y8=.2: IF T1(N)=0 THEN 1400
1340 IF T1(N)*G4=0 THEN 1400
1350 Y9=C0(N)*SIN(P1*(T6-T3(N))/T1(N))
1360 IF Y9>.174 THEN 1390
1370 Y8=(ATN(SQR(1-Y9*Y9)/Y9)*180/P1-76)^(-.4)
1380 GOTO 1400
1390 Y8=Y9^(.3)
1400 Y9=(3.4+.00544*S0)*Y8*Y6
1410 IF Y9>7 THEN 1440
1420 Y9=.91*Y9-.37
1430 GOTO 1450
1440 Y9=(1.33*Y9-3.31)^(2)/7
1450 IF K9<Y9 THEN K9=Y9
1460 NEXT N
1470 PRINT T5;"  ";INT(J9+.5);INT(K9+.5);TAB(16);
1480 IF T5/2<>INT(T5/2) THEN PRINT
1490 NEXT T5
1500 END
```

Emuf program comments

(1) Some variables (eg H9) are used more than once and are redefined.
(2) Some variables (eg T1) are, in fact, arrays (T1(N)) and are calculated for each control point (Lines 60, 70, 510, 980).
(3) Time of required hpf/luf is T5 in program, corrected to T6 to allow for 24h clock, but shown as T below.
(4) The many lines containing SGN ( ) statements are used as a more compact version of the IF . . . THEN . . . ELSE conditional assignment statement to correct for trig function quadrant ambiguities. Also used to insert latitude-dependent multipliers.
(5 The co-ordinate system operates with latitudes 0 to 180 from the North Pole. This is effected by using geographic latitude (±) values and reversing the sin and cos functions. Longitude is converted to 0-360W (line 200).

Symbols

L1, L2 ..... Station latitudes
W1, W2 ..... Station longitudes
D0 ..... Day
M0 ..... Month
T ..... Time for which hpf/luf required
S0 ..... Sunspot number

Path length = G1 =
arccos (sin L1 sin L2 + cos L1 cos L2 cos (W2 − W1)) (line 290)

Bearing = H9 =

$$\arccos \frac{(\sin L2 - \cos G1 \sin L1)}{\sin G1 \cos L1} \quad (340/370)$$

Number of F2 hops = H0 =

$$\text{int}\,(1 \cdot 59 . G1) + 1 \quad (320)$$

Direction cosine = H9 =

$$\frac{\sin L1 - \cos G1 \sin L2}{\sin G1 \cos L2} \quad (460)$$

Fraction along path to control point = K1 =
(1 − ·5/H0) for Station A (500)
or 1 − K1 for Station B (790)

Control point latitude = L0 =
arcsin (cos (G1.K1).sin L2 + H9. sin (G1.K1) cos L2) (530)

Control point longitude = W0 =

$$\arccos \frac{(\cos (G1.K1) - \sin L2 \sin L0)}{\cos L2 \cos L0} \quad (550)$$

Magnetic latitude = L9 =
L0 + ·21 sin (W0 + ·35) (820)

Local noon = T0 =
3·82 W0 + 12 + (·13 sin Y1 + ·156 sin (2 Y1)) (610)
where: Y1 = ·0172 (10 + 30·4M + D0) (420)
note: 3·82 W0 (radians) = W0/15 (degrees)
note: 2π/365·4 days = ·0172, offset for longest day.

Duration of sunlight = T1 =

$$\arccos \frac{(-\cdot 26 + \sin Y2 \sin L0)}{\cos Y2 \cos L0} \times \frac{24}{\pi} \quad (670/680)$$

where: Y2 = ·409 cos Y1 (430)
Time of sunrise = T3 = T0 − T1/2 (700/710)
Time of sunset = T4 = T0 + T1/2 (730/740)
Cos of noon zenith angle = C0 =
cos (L0 + Y2) (750)

HPF
Relaxation time = T9 =
9·7 $C0^8$ or 0·1, whichever is the greater (770/780)

Effective cos X (night) = G0 =
C0 (exp (− T1/T9) + 1) (exp ((T4 − T)/2))π . T9/T1 (1250)

Effective cos X (day) = G0 =
C0 (sin (π(T − T3)/T1) + (exp ((T3 − T)/T9) − cos (π(T − T3)/T9)) T9/T1) (1130)
or C0 (exp (− T7) + 1) (exp ((T1 − 24)/2))π T9/T1, whichever is the greater.

MUF factors
Distance: M9 = 1 + 2·5sin $(2 \cdot 5 G1/H0)^{3/2}$ (480/490)
Season: M = M9 × ·75 if T1 > 12
otherwise = M9 × 9/T1 (810)
Sunspot: M = 1 + S/100 if T1 < 12
otherwise = 1 + S/100 × T1/12 (815)
Geographic: L = sin (L9 × 4) × G2 (870)
where G2 is 0·5 for control point lat. <45°
or 0·2 for control lat. > = 45°
Diurnal factor is sin (G3) term in line 1220
Daytime G3 = 0 for c.p. lat. > = 45° (1140/1170)
= 90 for c.p. lat. <45° at times after noon + 3 hours
$= \frac{90\ (T6 - T3)}{T1/2 + 3}$ for c.p. lat. <45° at times before noon + 3 hours
Nighttime G3 = $\frac{180\ (T6 - T4)}{24 - T1}$ for c.p. lat. > = 45° (1260/1280
modified to G3 + (180 − G3)/4 for c.p. lat <45°

LUF
Cos X = Y9 =
C0 sin (π (T − T3)/T1) (1350)

Highest effective radiation angle = Y6 =
arctan (tan (G1/(H0 + 1)) − ·952 sin (G1/H0 + 1))) (390)
or 18° (·314 radians), whichever is the greater.

Secant of angle of incidence with E-Layer = Y6 =
$(1 - \cdot 965 \cos^2 Y6)^{-\frac{1}{2}}$ (410)

E-layer screening frequency = Y9 =
(3·4 + ·00544 S0) . Y6 . Y8 (1400)
where: Y8 = $(\cos X)^{0 \cdot 3}$ by day (1390)
and: = $(X - 76)^{-0 \cdot 4}$ by night (1370)
LUF = 0·91 Y9 − ·37 if Y9 < 7 (1420)
= $(1 \cdot 33\ Y9 - 3 \cdot 31)^2$ /7 otherwise (1440)

Accuracy

All in all, it should be remembered that hf predictions are more of an art than a science. The authors of Minimuf identified residual errors of 3-5MHz in the results of several full-scale programs as compared with sounder data. It should also be remembered that all predictions are based on the assumption of an undisturbed ionosphere.

Examination of some long path results shows that muf errors of up to 14 per cent can be expected, which is of the same order reported in [3] for paths up to 9,000km. LUFs agree closely with the propagation study predictions, as the constants have been chosen to make this so.

Use

Load the program, taking due care to ensure that the trigonometric expressions and all the brackets are entered exactly. While doing this, check that the PRINT statements are in the correct format. Also check that the functions are correctly entered (ARCTAN or ATN depending on the version of Basic, for example), and that two statements per line and the format of INPUT used can be accommodated, otherwise extra intermediate lines must be added.

On running, the program will be self-prompting. Latitude should be entered as +ve in the northern hemisphere, and longitude as ±180° east of Greenwich. (Longitude is subsequently converted to "positive—West" within the program). The sunspot number is usually given with the predictions in *Radio Communication*. If predictions for a particular day of the month are required, the day should be entered in line 190.

Table 1. Printout to Wellington

```
ROUTE NZ MONTH:  4 S.S.No:  124
LONG/SHORT: S BEARING: 19
GMT   HPF LUF    GMT  HPF LUF
 0    10  17     1    15  18
 2    18  17     3    20  16
 4    21  14     5    22  11
 6    22  10     7    23  11
 8    23  11     9    24  12
10     24  12    11    24  12
12     24  12    13    24  12
14     23  12    15    23  11
16     23  10    17    22   9
18     21   7    19    20   6
20     19  10    21    16  13
22     12  15    23    10  17
```

As a test, the printout for Wellington is given in Table 1. This is based on latitude = −40, longitude = 175, month = 4 and sunspot number = 124. The results can be compared with the April 1982 *Radio Communication* predictions.

To use a plotting routine, hpf is given by J9, luf by K9 and the time by T5. An example for the New York route is given in Fig 1. If it desired to have the calculations centred on other than the UK, then L5 and W5 in lines 140 and 150 should be changed, or another pair of INPUT statements added.

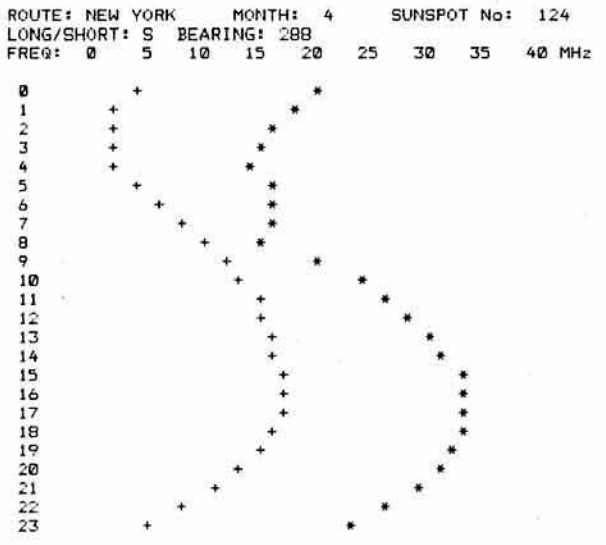

Fig 1. The New York route

Conclusions

The hpf and luf values produced are intended to match the 10 per cent probability values (ie 1 on the 0-9 scale) of the "HF propagation study" tables given in *Radio Communication* [7].

The inclusion of long paths is a useful addition to the original program for amateur purposes.

The luf values are also a useful addition and, despite the limitations of extreme simplicity, have been found to be worthwhile.

Sufficient flexibility exists within the program to modify the output to use a plotter, or to give data band by band.

References

[1] BLUE DECK, RED DECK, HFMUFES programs originating in reports published by OT/ITS, Boulder, Colorado, USA, 1969 onwards.

[2] CCIR Report 252-2, New Delhi, 1970 and Kyoto, 1978.

[3] Minimuf-3—A simplified hf muf prediction algorithm, P. H. Levine et al, IEE Conference on Antennas & Propagation, 1978.

[4] HF propagation study, *Rad Com* September 1979, p 837.

[5] "The Australian Ionospheric Prediction System", M. Harrison, J. Turner, *IPSD Project Report*, May 1972.

[6] "A method of predicting foE at any time and place", L. M. Muggleton, *Telecommunication Journal* Vol. 42, pp 413-418.

[7] HF propagation study, *Rad Com* May 1981. □

The rook syndrome

by PETER McBEATH, RS44030*

As any good ornithologist knows, the rook tends to make its nest from bits and pieces thrown together in what appears to be a haphazard manner. My efforts at radio construction follow this pattern, and my latest bid to outsmart the Far Eastern nations has to be seen to be believed. In order that readers may care to reproduce what I laughingly call "RS81 Mk 1", not to be confused with one of similar designation, a short description follows. No circuit diagram will be given, as this could only serve as a deterrent.

Variable capacitors are expensive luxuries which I generally reserve for definitive versions of my "bird's nests" or, to put it another way, we have an arrangement that if I get a VC at £3.95 *she* gets a meal at the Indian restaurant of equal value or spending money of £3.95—and even my accountancy training can perceive a flaw in this arrangement. I found some tuning beads at 35p each, and even with a bar of chocolate for the lady, that was item one and I had saved £3 already.

I have never been successful with Toko inductors. This is largely because I don't know what I am doing. The only success I ever had was picking up a local cb enthusiast, I suspect from 12 miles away, which wasn't very impressive. So I use Denco, which stick out and the coils catch you unawares (mostly in the eye), and my one and only stockist doesn't keep them any more, but they do work and there is an abundance of published circuits using them.

Mosfet mixers are the best, I am told, although the best one I have is made from an E-Line. In my normal way of working I destroyed the first E-Line because the circuit caused it almost to glow red. However, I went back to the mosfet circuit which recommended a zener diode to stabilize. A zener diode inserted the wrong way is the ultimate deterrent as far as a working circuit is concerned. My mixer is now unstabilized but working.

The i.f. strip has a number of characteristics. The first tuned transformer was originally in a bfo unit which would only work if I shuffled the core up and down, possibly to coincide with the sunspot incidence, and as a consequence its performance in the i.f. strip tends to be a little erratic. Another characteristic of the strip is its ability to transform itself into a machine gun, or a metronome at 112, without any effort and without any obvious cause. If I put my finger on the underside of the double-tuned transformer this usually cures the problem. I tried to make a metronome the other day to improve my organ playing. I used a brand-new transistor, which was unusual, but I think it was too advanced for the circuit because it didn't work. If I knew why the i.f. strip changed to a metronome maybe I could build one on purpose.

With a.m. amplifiers I suppose I have always had trouble. You would think it was an easy matter to buy a 741 or LM380, attach the few components necessary, and you have sound. One circuit for the LM380 only had four other components and I still couldn't get it to work. I took it back to the shop and I got a replacement. The replacement only worked briefly, quietly and then faded away altogether. The 741 never worked.

I have about seven or eight circuits for simple (?) straightforward amplifiers made from discrete components. I have Vero-boarded them, point-to-pointed them, blobbed them, tag-stripped, S-Decked, and only two work reasonably well. I gave up on the others.

I'm sitting here with the headphones on and the lady has just announced she is STOCKHOLM, so the rook syndrome has some merit. I would never have known if she hadn't said, because I don't have sophisticated add-ons like calibrated dials, frequency read-out, S-meters, usb and lsb switches. The only calibrator I ever made didn't oscillate, and I couldn't tune it even if it had because the only radio I had with long wave and 200kHz was in the car, and the ignition had decidedly more effect than the calibrator.

The great thing is not to succumb to the temptations like the gentleman on the front of one of the recent monthly magazines with, I suspect, £3,000-worth of amateur gear.

I would like to see published a basic shortwave set designed from simple components costing £10 or below and used as a basis of a competition for dx. On most of my sets I have trouble finding ssb at all, never mind resolving it. I've only done this once, and that was perseverence and a lot of luck. And it was only about 150 miles away, but sitting in front of some of the equipment advertised the miracle would be if contact was not made. But the biggest deterrent I've got is the arrangement with Madame. If she ever sees this, I'm sunk! □

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COUNCIL PROCEEDINGS

A brief report on the Council meeting held on 11 December 1982

Present: Dr E. J. Allaway, (President, in the chair), Mr D. Baptiste, CBE, (by invitation), Dr D. S. Evans, Messrs F. Hall, L. N. G. Hawkyard, Mrs J. Heathershaw, Messrs I. Kyle, T. I. Lundegard, W. McClintock, B. O'Brien, H. S. Pinchin, (members of Council), D. A. Evans (secretary/general manager), A. W. Hutchinson (editor), Mrs H. M. Allin (minutes secretary).

Apologies for absence were received from Messrs Barrett, Bazley, Cornish, Fisher, Jessop and Pratt.

Organization of committees
Dr Evans introduced the main agenda item by giving a brief review of the background to the Forward Planning Group's report and recommendations dated 4 December 1982.

One of the major difficulties with the present system was the overloading of Council in its attempt to cope with the great detail of committee work contained in committee minutes. The FPG felt Council should not concern itself with the routine matters of committee work.

One of the proposals being put forward by the FPG was the appointment of committee chairmen by Council. Under the present system, chairmen had no status and no formal backing by Council and therefore no real authority over their committees. The proposed procedure was one which had been adopted by similar professional bodies, whereby a chairman appointed by the Council was responsible for inviting persons to serve on the committee.

Dr Evans also explained the reasoning behind the proposed committee year being from 1 July to 30 June. This would bring it into line with the financial year. If the proposals were accepted, it was planned to retain committee membership as it was currently, using the six months to 1 July to contact existing chairmen and assess the committees' reaction to the changes; check the need to change structure/terms of reference of any committee; and to ascertain each committee's objectives for the following year. A detailed report, together with recommendations to chairmen, would be produced by the FPG and submitted to Council for their approval prior to 1 July.

Mr Baptiste was then asked if he would like to comment on the proposals at this stage. He said he agreed with the idea of chairmen being entirely responsible for the work of their committees, and this was only possible if each chairman agreed the objectives of his committee. He stressed the fact that the proposed procedure would forge a partnership between Council and its committees.

Mr Lundegard drew Council's attention to a paper he had distributed, in which he suggested that committee chairmen be drawn from within Council. He also spoke of the importance of introducing new people to committees regularly.

Each member of Council was asked for his/her views and much discussion ensued, after which the proposed new committee standing orders were agreed.

Retention of trophies
A letter from Mr P. Miles, G3KDB, trophies manager, had been circulated. This recommended that in future all Council and committee-awarded trophies (with the exception of vhf) be presented at the AGM or hf convention, and that winners no longer be allowed to retain the trophies.

This general principle was agreed. It was felt that the vhf awards should be included in the new system, and that winners should receive a framed certificate and, if practical, a photograph of the presentation.

Committee recommendations
Council considered the following committee recommendations:

Education Committee
The following representation on the City & Guilds of London Institute Subject Advisory Committee for the RAE was agreed: Dr C. Jane Houghton, GW4JNE, Mr G. C. Oxley, G8MW, and Mr M. Shardlow, G3SZJ.

Licensing Advisory Committee
The recommendation for Dr J. N. Gannaway, G3YGF, to join the committee was not within the 1982 committee's terms of reference and was referred to the 1983 committee chairman.

VHF Committee
The recommendation for Mr B. Bower, G3COJ, to be transferred to full membership of the committee, was referred to the 1983 committee chairman.

VHF Contests Committee
The following awards were agreed: Mitchell Milling Trophy—G4LIP/P; Thorogood Trophy—GJ4ICD.

Retirements
The retiring members of Council, Dr Evans and Mr O'Brien, were thanked by the President for their services during their terms of office. Dr Allaway continued by thanking Council for its support during the year, and concluded by wishing Mr Baptiste a successful year of office as President.

OBITUARIES

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

Mr H. J. Barlow, G4LQ
Mr Barlow died on 12 December 1982. He had been a radio amateur since the 'thirties, when he held the call 2ARX. He encouraged many young people to become amateurs, and was very keen on the 1·8MHz band.

Mr S. G. Charles, G8IHZ
Stan Charles died on 13 October 1982, aged 67. He was a keen amateur and his interest in radio went back to pre-war years.

Mr W. S. G. Cowl, G3RBS
Stan Cowl died on 30 December 1982. He was a founder member of the old West Cornwall Radio Club, now the Cornish Radio Amateur Club, and was also a member of the Royal Signals Amateur Radio Society. Before his illness he was very active on local nets, and especially in field days. He would help anyone he could, especially swls.

Mr M. Darke, GM3KGK
Michael Darke, who died on 11 November 1982, was active mainly on the hf bands. He had been a member of Edinburgh & DARC, of which he was a past-president.

Mr C. J. M. Head, G2ADW
Martin Head died on 5 December 1982, aged 77. He was first licensed at the age of 18 when, as a minor, his father had to vouch for him in order to obtain the necessary permit. He did not qualify for his full licence until after the war. He was a member of Verulam Amateur Radio Club and a keen amateur, but owing to his life-long sickness, coupled with loss of vision, his activities were restricted and he was not as well known or as active as he otherwise might have been.

Mr E. A. Kingscote, BRS479
Tony Kingscote died on 26 October 1982. He will be remembered for his work in the development of radar with the RAF during the second world war. He had been chairman of Gloucester ARS for many years, and his interest in amateur radio went back to the early 'twenties.

Mr S. Leith, GM4HX
Sam Leith died at the start of November 1982. He was active on both hf and vhf until he died. He was keen on construction, both of receivers and transmitters.

Mr G. C. Manning, G2IK
Geoffrey Charles Manning died on 18 December 1982, aged 72. He was a very active radio amateur and could be found almost every day on the bands. He was an original member of the RSGB Bristol Group, and a founder member of the Longleat Mobile Rally Committee 25 years ago. Geoff was also a founder member of the North Bristol ARC, where he was very active in club affairs. He taught the RAE and was responsible for many of the club's members attaining their licences.

Mr O. Ovington, G2DKH
Oswald "Ovid" Ovington died on 8 October 1982. He had been a keen amateur in his younger days, and was very active on 144MHz and mobile top band. Lately he had spent most of his time listening on 144MHz.

Mr L. Smith, GM3SKX
Laurie Smith, who died on 7 November 1982, was a founder member of Unst Radio Club. He was a very keen dxer, particularly on cw, and operated mainly on the hf bands.

Mr G. Spriggs, G4KG
George Spriggs died on 27 November 1982, aged 76. He was first licensed in 1937, and apart from a couple of periods off air, was active until the end. He mainly worked dx stations. During the second world war he served at the Hanslope Special Communication Unit, and was a member of the Royal Signals. He was active in the Royal Signals ARS.

Mr N. Tyldesley
Norman Tyldesley, who died recently, was a keen listener and had been studying for his RAE. He was a keen constructor.

Also:
Mr W. J. Ayles, G3HHA, on 6 October 1982;
Mr J. H. Baker, RS49829;
Mr A. A. Barrett, G5UF, on 6 November 1982;
Mr A. E. Dennard, G4BHR;
Mr H. Eastwood, G4GS, on 10 April 1982;
Mr K. J. Gurney, RS42456, on 20 November 1982;
Mr F. E. Herzog, G2UM, on 18 October 1982;
Mr P. Kearney, GM6FCF;
Mr M. McLeay, GM3GAY, on 2 October 1981;
Mr J. J. Macpherson, GM4MCP;
Mr L. J. Osborne, G3GHH;
Mr A. C. Ramsay, GM8ZUG;
Mr D. Stewart, GM4JAP, on 23 December 1982;
Mr E. W. J. Theobald, G2DWI, on 10 December 1982;
Mr A. Stock, G3PPH, on 5 December 1982;
Mr D. Wilkins, G4CZF; *and*
Mr J. Wylde, G8BM.

YOUR OPINION

CONTEST WORKING
The Editor
Radio Communication
Sir—As a licensed amateur for the past 12 years, and a fully-paid up member of RSGB, I would like to air my personal views on the subject of contest working.

It has, and will always be, my objective to view the excellent and rewarding hobby of amateur radio as "all things to all men", be it dx hunting, rag-chewing, construction, or whatever. In this viewpoint I also accept the desires of those who wish to participate in contests. Such operators I am sure obtain a great deal of pleasure from participating in same, and while this

particular operating "bug" has not bitten me personally, I recognize the rights of those it has done.

It is to the extent of such rights that this letter is directed. Quite frankly, it would appear that contest working pays no direct consideration to those of us without interest in the subject. If proof of same were needed, any weekend gives ample demonstration. Every band in normal use (with possible exception of the top end of 29MHz) filled with the "nonsense" represented by 5/9 14, or such. If one is lucky enough to find a vacant spot on some band for a general "rag-chew", invariably some contest operator will encroach into the frequency.

Some of us within the ranks of amateur radio have employment or other time-consuming activity during the week—sufficient to limit operating time. Therefore we look forward to weekends—the only criterium under consideration being "will the bands be open". To have this weekend period, however, "locked-out" via contest working is, to say the least, frustrating. Surely the powers-that-be of world amateur bodies could recognize this fact and do the obvious, ie legislate for contests to be performed within specific segments of each band. After all, cw, rtty, sstv etc are all rightly catered for in this manner.

The counter-argument used in the past by dedicated contest operators, that the rest of us should be content with the system since contests are only in operation for a few weekends in the year, is, with respect, a selfish nonsense. The fact that remains is that the weekend is a very valuable time and should be available for *all* to utilize as they see fit.

Gerry Ward, GI3ZCK

QSL CARDS

The Editor
Radio Communication

Sir—I would like to comment on the issues raised regarding QSL cards in "Your Opinion" November 1982.

A QSL card remains the final courtesy of a QSO, if either party is interested in a confirmation of a contact. However, it is understandable that a lot of amateurs nowadays simply cannot afford the expense of printed cards.

Surely, multicolour and gloss are dispensable items; what counts is the information on a confirmation card. Any piece of paper roughly postcard sized can be used, if it is not too flimsy and therefore difficult to handle at the QSL Bureau. The information on it must contain: both callsigns, frequency, mode, date and time of contact and signature. No more is required for a valid confirmation; but it should be pointed out that, in addition, reports, QTH and/or QTH locator and equipment details are of great interest for vhf, uhf and microwave QSL cards.

Such homemade QSL cards are indeed already in use, and they are accepted by award managers for awards.

Petra Suckling, G4KGC

Sir—It was with interest that I read the comments on the subject of QSL cards and certificates. The article by G3BDQ, the comments by the QSL Bureau manager G3DRN, the letters of GW3LIY, and G3GDU and G4MDQ all provided food for thought.

I can understand and sympathize with the points raised. The cost of cards, ircs and postage keeps on creeping up, making one think seriously before putting in a claim for a certificate.

While certificates on the walls of your shack may not impress anybody, to me they represent something achieved—my WAS for 20m cw took me five years to get! I've been working on my CQCA since 1957, aiming for the 1,000 county total—to date, 545 worked, 513 confirmed. DXCC 180 worked, 171 confirmed, so 200 counties is the target there.

Whatever your hobby, I feel that you should set yourself a target to be achieved. Be it designing something, building something, sending perfect morse etc. Although your circumstances may alter, do enjoy your hobby. I firmly believe that if we all tried to follow the guide lines laid down by Paul M. Segal in the "Amateurs Code" (ARRL *Handbook*), the amateur world we live in would be a much better place for us all.

Would it not be possible for national societies to assist each other in the matter of certificates by appointing a member of their society for the purpose of checking out claims. If, for example, DXCC and WAS claims could be checked in the UK by RSGB, a considerable amount could be saved on postage and irc costs.

As I said at the beginning, "food for thought". Enjoy your hobby and remember that it's just that. It's not the end-all and be-all of everything.

Hve fun es cu dwn the log.

Harry Pain, G3ATH

Sir—The three letters in the November issue of *Radio Communication* were most interesting, and confirm the writer's experiences over several years of sending, receiving and handling QSL cards.

It seems a pity that there is not some way of stopping unwanted cards. Large quantities of these cards collect in the sub-managers' cupboards and are ultimately destroyed. The postage incurred by the bureaux around the world and the time wasted in sorting these cards is quite considerable and could be avoided if some suitable indication could be made at the time of the contact that no card is required.

In my own section of the bureau I have one QSL manager for a dx station who refused to collect any cards, and two other managers who have not collected any for nearly a year. Why, I wonder, do these people act as managers for dx stations? I also have several overseas stations who ask for cards to be sent to their home callsign and then make no attempt to collect them.

However, in fairness to the vast majority of my customers, may I simply say "Thank you for your co-operation—we aim to please".

Peter Lumb, G3IRM
QSL sub-manager, G3IAA to G3KZZ

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.

10 April—Lough Erne ARC Mobile Rally. Killyhevlin Hotel, near Enniskillen. Opens 12am. Talk-in on S22. Trade stands, book stall, bring & buy, films for children, boat trips, full hotel facilities, plus snacks. Further information from GI4CZW, QTHR.

10 April—East Cleveland ARC Mammoth Bring & Buy. The Leisure Centre, Marske-by-the-Sea. Open 11am. Talk-in on S22. Free use of stalls, clothing and footwear at spring clearance prices. Bring the family. For details send sae to sec Ken Turner, G8JLA, QTHR.

1 May—Maidstone YMCA ARS Mobile Rally. Y-Sportscentre, Melrose Close, Cripple Street, Loose Road, Maidstone. For details and stand bookings contact G3ISD, QTHR, tel Sittingbourne 77431.

8 May—Lincoln Hamfest, organized by the Lincoln Short Wave Club. Lincolnshire Showground, (four miles north of Lincoln City on the A15). Opens 11am-5.30pm. Talk-in on 144MHz (S22) and 432MHz (SU8). Ample car parking, refreshments, licensed bar. Many attractions for junior ops. Facilities for the disabled. Further details from G8VRJ, c/o City Engineers Club, Central Depot, Waterside South, Lincoln.

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.

22 May—Barry College of Further Education RS Welsh Amateur Mobile Rally. Memorial Hall, Barry. Open 11am to 5pm. Talk-in on S22, licensed bar, refreshments, bring & buy. Enquiries to Reg Rowles, GW4FOM, tel Cardiff 565656.

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—Elvaston Castle Mobile Rally. Elvaston Castle Country Park, 5 miles south-east of Derby on the B5010. Organized by the Nunsfield House ARG. Opens 10am. Talk-in on 144 and 432MHz by GB2ECR. All the usual facilities including full on-site catering facilities. Further details from Ian Cage, G4CTZ, QTHR, tel Derby (0332) 799452. Trade enquiries to Mr R. Woolley, G4HIJ, QTHR, tel Ashbourne 43241.

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.

19 June—Denby Dale & DARS Mobile Rally. The Shelley High School, Skelmanthorpe, nr Huddersfield. Open 11am. Something for all the family including excellent refreshments and bar. Details from J. Clegg, G3FQH, QTHR, tel 0484 862390.

26 June—Longleat Mobile Rally, Longleat Park, Warminster. Preliminary enquiries to G4FRG or G8GLQ, both 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.

17 July—RAIBC Picnic, The Fairground, Broadlands Estate, Romsey, Hants. Talk-in on S22. Details from G4COM, QTHR, tel 0703 693017.

24 July—McMichael ARS Mobile Rally, Bells Hill, Stoke Poges, nr Slough. Open 10am. Trade stands and fleamarket. ATV exhibitions, hf station, S22 talk-in. Details from David Cochrane, G8IHF, c/o McMichael Ltd, Wexham Road, Slough, Berks SL2 5EL.

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 G4EYM, tel Derby 556875.

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.

Looking ahead

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

5-6 March—RSGB National Amateur Radio Convention, National Exhibition Centre, Birmingham.

26 March—RSGB National VHF Convention, Sandown Park Racecourse, Esher, Surrey.

15-16 October—EI—GI Convention, Ballymascanlon.

CONTEST NEWS

1,296MHz Trophy Contest rules

1600-2400gmt, 2 April 1983

The following general rules, published in the January 1983 issue of *Radio Communication*, will apply: 1, 2, 3, 4d, 5a, 6a, 7b, 9, 10a, 11a, 12a, 13-26.

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

432MHz Trophy Contest rules

0900-1700gmt, 3 April 1983

The following general rules, published in the January 1983 issue of *Radio Communication*, will apply: 1, 2, 3, 4d, 5a, 6a, 7a, 9, 10a, 11a, 12a, 13-26.

All entries and check logs to: VHF Contests Committee, c/o C. Sharpe, G2HIF, 20 Harcourt Road, Wantage, Oxon OX12 7DQ.

144MHz CW Contest rules

0900-1500gmt, 17 April 1983

The following general rules, published in the January 1983 issue of *Radio Communication*, will apply: 1, 2, 3, 4d, 5a, 6b, 7a, 9, 10a, 11a, 12a, 13-26.

All entries and check logs to: VHF Contests Committee, c/o Mrs P. Suckling, G4KGC, 46 Windsor Close, Towcester, Northants NN12 7JB.

432/1,296/2,320MHz Contest rules

1400-1400gmt, 7-8 May 1983

Multi-operator stations may operate concurrently using different callsigns. Individual band and overall tables will be published. On 432MHz scoring will be by the radial ring system, and at 1pt/km on the other bands.

The following general rules, published in the January 1983 issue of *Radio Communication*, will apply: 1, 2, 3, 4d, 5a, 6a, 7a & 7b, 8b, 9, 10b, 11a, 12b, 13-26.

All entries and check logs to: VHF Contests Committee, c/o W. J. McClintock, G3VPK, Maple Leaf, Great Braxted, Witham, Essex CM8 3EJ.

144MHz Low Power Contest rules

0900-1700gmt, 8 May 1983

The transmitter output must not exceed 25W p.e.p. The following general rules, published in the January 1983 issue of *Radio Communication*, will apply: 1, 2, 3, 4e, 5a, 6a, 7a, 9, 10a, 11a, 12b, 13-26.

All entries and check logs to: VHF Contests Committee, c/o J. H. Quarmby, G3XDY, 12 Chestnut Close, Rushmere St Andrew, Ipswich IP5 7ED.

432MHz CW Contest rules

0900-1500gmt, 22 May 1983

The following general rules, published in the January 1983 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6b, 7a, 9, 10a, 11a, 12a, 13-26.

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

ROPOCO 1 1983 rules

1. The general rules for RSGB hf contests, published in the January 1983 issue of *Radio Communication*, will apply.

2. Eligible entrants. All paid-up members of the RSGB resident in the British Isles holding a Class A licence. Single-operator entries only.

3. When. 0800-1000gmt, Sunday 3 April 1983.

4. Contacts. CW in the 3·5MHz band only. Entrants are requested to confine their operations to 3,510-3,590kHz. Send RST plus—for the first contact, entrant's own postal code; for the second and subsequent contacts, the postal code received in the previous contact. Contacts with European stations will not count for points.

5. Scoring. 10 points per contact.

6. Entries. Logs must be sent to E. C. Hodson, G3XTJ, 20 Spencer Avenue, Palmers Green, London N13 4TR, postmarked not later than Tuesday 19 April 1983.

7. Awards. Certificates will be awarded to the first, second and third placed entrants.

21/28MHz Telephony Contest 1982 results

This contest was a great improvement on the 1981 event—conditions being very much better, and the number of those taking part (and actually sending in logs!) greatly increased. The UK entry was almost twice last year's, and the overseas nearly three times as large. The receiving section again produced a disappointing number of entrants—the HF Contests Committee would like to see the interest in this competition increase, and several suggestions made by listener entrants will be considered.

The winner of the Whitworth Trophy for the first place in the UK transmitting section was GW4BLE. The Powditch Trophy for 28MHz operation went to G4GIR, who scored a record number of points on the band. The Metcalf Trophy for the receiving section was won (yet again) by RS32525, and the Powditch Receiving Trophy by RS47778.

In the overseas section CN8CY won handsomely from UB5FDF, whose score exceeded that made by third place OH6GZ by over 30,000 points.

The committee would like to draw UK entrants' attention to the rules concerning log sheets and summary forms. Quite a few entrants submitted logs on other forms (including those used for vhf/uhf contests) and there is really no excuse for this, bearing in mind that the proper forms can be obtained easily from RSGB HQ. A lot of time is spent on the contest—a few more minutes filling in proper log stationery is surely worth while. Congratulations particularly to GW4BLE and G3PMX for neatness, and also to those who provided details of band activity and QSO rates—very interesting and unfortunately necessarily omitted from this report on grounds of brevity.

GW4BLE used an FT107M plus linear and TH3 Mk3 at 60ft. G4GIR used a TS830S and linear with TH6DXX at 50ft. Comments with logs included the following: "Conditions hopefully as good in 1983"—*G4GIR;* "Conditions super—sorry I was not able to do justice to them"—*G3TR;* "Did not really intend to enter seriously until I found the stations could hear me for a change. Do I take the prize for the worst receiver?" *(He used a home-built TRF)*—*G4PIQ;* "A very enjoyable contest. A good introduction into hf contests for brother G6ICQ soon after receiving his licence" *Ann, G4EYL;* "New recruit straight from cb and only licensed two weeks. Number of QSOs limited by inability to copy some callsigns first time due to strange phonetics" —*G4PKP;* "Pleased to hear so many stations on the band—hope a good number of Gs send in logs"—*G4KIU;* "I should like to thank the HFCC for organizing such an enjoyable contest. One day was quite sufficient and fortunately conditions were good"—*G8DR;* "As for the weather, in true RSGB contest style around 1700 down came a cloudburst complete with lightning flashes. Was tempted to disconnect and earth the antenna but braved all and carried on"—*G3CMN.*

A special mention for GM4ELV who operated with less than 5W input to dipoles, and for the apparently harmonious "time-sharing" which took place between Diana, G4EZI, and husband G4DZI, who operated the family rig and each put in an entry!

The committee would once again like to thank all entrants for their logs and also those who sent in check logs. *G3FKM*

UK TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	GW4BLE	502,656	31	G4PKP	53,439
2	G3RRS	495,816	32	G4EYL*	48,573
3	G3VPW	429,216	33	G8DR	48,276
4	G6UW*	376,272	34	G4EZI	44,604
5	G3NUT/A	570,170	35	G4LDS	35,100
6	G4GIR†	321,264	36	G4AZN	33,660
7	GW4BKG	314,184	37	G4DZI	33,432
8	G3FXB†	305,181	38	G4KAL/A	32,088
9	G4AAQ*	275,319	39	GM5AXY	31,089
10	G4MBC	229,740	40	G4AMT	28,968
11	G4IUF	225,990	41	G3TXF	26,970
12	G4HVR*	220,806	42	G4FKS	24,705
13	GU3KFT	182,850	43	GM4ELV	20,862
14	G3PMX	174,084	44	G4GNK	19,866
15	G3PJK	169,533	45	G4MLN	19,740
16	G3TR	151,998	46	G3ZGA	18,432
17	G4ATH/A*	125,952	47	G4KIU	15,729
18	G4BUO	125,757	48	G4FJT	13,080
19	GM4JDU	117,822	49	G4OKN	12,255
20	G3CMN*	105,999	50	G4DXW	10,824
21	G2QT	102,960	51	G4PIQ	10,179
22	G3NOK*	97,920	52	G4IWO	10,080
23	G4JMO	92,820	53	G3WTP*	8,262
24	GM3ZRT	88,452	54	G3SWX	6,432
25	G4OSY	86,412	55	G4OVG	5,940
26	G2VJ	84,783	56	GI4MWA	4,680
27	GM4HQF	78,888	57	G3UKH	2,238
28	G2BRS/A*	78,402	58	G2AJB	2,160
29	G6AJ/P*	77,562	59	G4AFJ	2,073
30	G3YXR	57,828	60	G4KUD	1,989

†28MHz only.
*Multi-operator.
A check log was received from G3WP.

UK RECEIVING

Posn	Station	Points	Posn	Station	Points
1	RS32525	119,616	5	RS44395	26,910
2	RS47778	73,170	6	RS20249	24,924
3	RS48909	43,497	7	RS28198	14,606
4	RS26407	30,015	8	RS46702	9,102

A check log was received from RS25419.

OVERSEAS TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	CN8CY	71,808	63	WA2UDT	2,070
2	UB5FDF	61,425	64	UK4NAA	2,058
3	OH6GZ	30,144	65	JG1RVR	2,046
4	UB5QAV	27,090	66	UO5OCL	1,989
5	LZ1KSN	25,872	67	CT4MS	1,947
6	LZ2KK	25,728	68	ZL2BED	1,846
7	9K2BE	24,570	69	ZL1AAS	1,728
8	UA3DFK	24,300	70	OK1AGA	1,683
9	ED6MD	19,824	71	OH2BUZ	1,638
10	KN2N	19,125	72	K6SVL	1,530
11	UA9CJA	15,957	73	SM0ARR/5	1,476
12	N4MO	14,472	74	HA5KDQ	1,440
13	KA1CY	14,256	75	OH1FM	1,404
14	UM8MDX	13,572	76	YO4BXX	1,368
15	HA4ZZ	11,715	77	P29CH	1,365
16	YU7MAT	9,867	78	JA3HTT	1,260
17	OH3BI	9,360	79	YO6BGT	1,134
18	UA9MBC	8,970	80	LA1K	1,071
19	UA9UUN	8,856	81	RA3DQP	1,050
20	HA0KDA	8,850	82	WA3HAE	1,032
21	SK0EJ	8,460	83	LA1IE	1,020
22	HA4XX	7,888	84	JA7NTY	1,003
23	VE1CEG	7,518	85	UB5VAZ	936
24	UP2DM	7,062	86	DF4ZL	918
25	RA9AKM	6,972	87	JA7KM	840
26	UA9AKO	6,900	88	UA9LBC	825
27	EA7DHK	6,726	89	JA6GGD	784
28	UR2QD	6,237	90	SM4BTF	783
29	EA3JUM	6,120	91	JM1NKT	759
30	OH3BU	5,616	92	JA6LDD	756
31	UA9LAX	4,900	93	JH8JVY	748
32	KA1UE	4,860	94	YU7SF	675
33	YO7ARZ	4,818	95	JA6EFT	672
34	UL7PAE	4,500	96	YO4BMJ	651
35	OH7EU	4,428	97	JE1SLP	600
36	OK2BVE	4,242	98	UK2WAC	594
37	YU3HAM	4,212	99	OK1DVK	540
38	YU4EXA	4,071	100	JA9YBA	484
39	OH3EB	3,783	101	Y37ZE	432
40	UA1AWO	3,486	102	EA2CR	378
41	YO9HT	3,432	103	UP2PBM	360

Posn	Callsign	Points	Posn	Callsign	Points
42	OK3CRH	3,315	104	LA9PT	315
43	UY5TE	3,264		W8VE	315
44	UA3DGU	3,168	106	Y34XF	294
45	EA8TE	3,111	107	VO1AW	288
46	UA9UCU	3,060	108	TI2LO	276
47	RA9UAD	2,808	109	WA8RYD	264
48	UC2AHL	2,792	110	SM6LAZ	240
49	PY4KL	2,736	111	JA3COA	234
50	UW9FD	2,691	112	OK2SWD	228
51	UA9UAR	2,652	113	Y79WN	210
52	UA9XWR	2,613	114	Y43UM	180
53	WA4QBX	2,592	115	YO3SF	175
54	UB5ILW	2,436	116	UK5HAS	174
55	I8BYG	2,403	117	Y72VL	150
56	SM0FSM	2,352	118	JA1HGY	140
57	IK4BHO	2,340	119	UA9OAQ	120
58	OK1DKS	2,304	120	EA8AGH	108
59	SM0ATN	2,250	121	JA3BLN	84
60	HA3KNA	2,189	122	JA0HJI	72
61	YU2QU	2,145	123	YO6CBH	42
62	JH8GOZ	2,090	124	OZ1GRS	36

Check logs were received from VK3DMI, Y42YC, Y53ZL, SP5KCR, EA3AVX, EA5BVG, Y35WF, UA6HCS, OK2KVI, UA3AGF, UA3TAM, UB5MQF, UA4UBC, UA0ADR, UA1AUA, UA9CIH, UT5OV, UA0WAY, UA3IAM, and UA9FAT.

OVERSEAS RECEIVING

Posn	Station	Points	Posn	Station	Points
1	UB5-073-3135	15,471	11	Y2-11148/F	1,092
2	UB5-066-286	11,856	12	NL 7724	918
3	OK1-22310	5,076	13	YO8-18318/VS	738
4	OE1-114081	4,950	14	Y2-16841/G	693
5	UB5-067-1457	3,942	15	Y2-16835/G	594
6	YO8-18312/VS	3,528	16	YO9-8705/PH	504
7	JA6-9330/JA1	2,376	17	JA6-9330/JA1	403
8	YO3-2201/B	1,692	18	ONL 383	180
9	LZ1C-68	1,520	19	Y2-16870/G	105
10	Y2-11153/F	1,131	20	JA1-7777/KH0	84

432MHz and 1,296MHz Cumulative Contests 1982 results

The cumulatives have again lived up to their reputation for "enjoying" poor conditions, but in 1982 propagation seems to have been the worst for several years. The fact that only one of the seven sessions gave above-average conditions may have contributed to the 25 per cent reduction in entries. Nevertheless, activity within G was at a creditably high level, and one or two stations even suffered QRM problems. The cover sheets show that most entrants enjoyed the contests, although several would like the 1·3GHz sessions to start earlier, and there may well be a case for having these sessions first.

Congratulations go to G4HWA/P, who has again pipped G4FRE/A to the post, making his team the winner of the 1,296MHz event for the third year running. In the 432MHz event G8ZHP takes the honours, with G8TFI as runner-up, both stations having improved their positions from the previous year. Certificates go to all four.

G3VPK

432MHz

Posn	Callsign	Points	QTH	Power dBW	Ant	Best dx	Km	Sessions
1	G8ZHP	1,410	ZM29	+21	2×21Y	DJ9DL	542	3, 4, 5
2	G8TFI	1,357	YL29	+26	4×16Y	DG9ZH	781	4, 5, 6
3	G8RZP	1,298	AL45	+25	88MB	GD2HDZ	470	3, 4, 5
4	G4LOJ	1,171	AM37	+26	27QLY	DC2KI	452	3, 4, 5
5	G8REQ/P	1,007	YN37	+20	17QLY	G3MMN	364	4, 5, 7
6	G3YTE	825	AL13	+20	46MB	DK3OL	449	4, 5, 7
7	G4APA/P	777	YN79	+19	2×19Y	G3PBV	293	1, 4, 6
8	G4IOG	738	AL54	+22	21Y	DK3OL	444	4, 5, 6
9	G3TDG	729	AL51	+16	21Y	GD2HDZ	442	4, 5, 7
10	G4FRE/A	659	AM76	+25	18PB	DJ9DL	423	4, 5, 7
11	G4NBS	590	ZL48	+21	88MB	—	—	4, 5, 6
12	G8DKK	587	ZL08	+18	2×21Y	PA0VVH	435	3, 4, 5
13	G4BVY	563	YM79	+17	21Y	ON4YZ	517	4, 5, 7
14	GD2HDZ	530	XO68	+25	18PB	G8RZP	470	1, 4, 5
15	G4DDL	390	ZL47	+9	19Y	PE1CKK	418	4, 5, 6
16	G4MUT	363	ZL46	+17	21Y	DL2KBB	497	1, 3, 7
17	G8PTP/P	277	ZL18	+17	12Y	PA0VVH	444	3, 4, 5
18	G8CTT	244	AL41	+10	19Y	G8REQ/P	302	5, 6, 7
19	G6CHK	232	ZL27	+18	19Y	PE1CKK	402	5, 6, 7
20	G8AAY	214	YK20	+10	18PB	G3KMS	318	4, 5, 6
21	G4HAY	213	ZL30	+10	18Y	G8REQ/P	260	4, 6, 7
22	G8ABI/A	199	ZL39	+18	46MB	PA2GBK	370	3, 6
23	G4AFJ	186	ZM05	+10	18PB	G3PBV	314	1, 3, 4
24	G8BHD	132	AL41	+10	16Y	PA0VVH	396	1, 2, 4
25	G8FMK	86	ZL26	+0	11Y	G4APA/P	170	1, 2, 5

1,296MHz

Posn	Callsign	Points	QTH	Power dBW	Ant	Best dx	Km	Sessions
1	G4HWA/P	499	ZL53	+23	4×23Y	PA0EZ	463	3, 4, 5
2	G4FRE/A	409	AM76	+19	1·2m dish	PE0PJV	274	4, 5, 7
3	G4APA/P	241	YN79	+0	27QLY	G3TDG	251	3, 4, 5
4	G8DKK	226	ZL08	+17	2×25QLY	G4KCT	231	3, 4, 5
5	G3TDG	189	AL51	+16	2×23Y	PE1ALA	343	4, 5, 7
6	G8LMW	162	ZM24	+25	48QLY	G3GRO	186	4, 5, 6
7	G3COJ	102	ZL37	+16	23Y	G4FRE/A	138	4, 5, 7
8	G3GRO	70	ZL80	+20	4×15/15	G8LMW	186	5, 6, 7
9	G8FMK	60	ZL26	+13	27Y	G4FRE/A	154	1, 3, 5
10	G3ZQB	54	ZM35	+0	27QLY	G3TDG	161	1, 2, 6
11	G8CTT	33	AL41	+1	QLY	G4HWA/P	110	5, 6, 7

Check logs acknowledged from G6CSY/P, G8ACJ, and G8BHD.

RSGB UHF/SHF Contest October 1982 results

This year conditions were very varied over the country, favouring the east coast operators with strings of long distance QSOs on the Saturday. Further inland the going was very much tougher, coupled with low G-activity. Foreign calls outnumbered the total of all G-calls appearing in the logs by a factor of almost two.

Comments from logs illustrate the differences in conditions: G4LOJ found that "A great deal of dx was available, mainly into central Germany and France". He also noted that ". . . only 15 per cent of my QSOs were with G. They were just not about". At G3SEK's QTH conditions were "foul, improving on Sunday to poor", and G6CHK reports that it was "jolly hard work finding contacts".

During the contests a weather front was passing through the country with rain for most but shine for some: The South Manchester RC enjoyed "the driest contest we have known", and "T-shirts were the order of the day on Sunday" (G3FVA/P, G3UHF/P). On the other hand the Leicestershire SHF Group got "very wet under foot", but nevertheless endured the "heavy rain and mud" with a sense of humour; they observed "waves in the waterguide!" (G8LMW/P, G3TQF/P).

The showing on the bands above 1,296MHz was very encouraging indeed compared to last year, and quite a few stations made use of the new rule whereby crossband contacts count for half points in the RSGB event. G4MBS thinks that more QSOs could be achieved if beam-headings were calculated accurately when high gain/small beamwidth antennas are used, and he suggests that operators should know their national grid references for this purpose rather than aligning-up antennas on the 432MHz signals.

Congratulations and awards go to the winners in all sections. *G4KGC*

432MHz MULTI-OPERATOR

Posn	Callsign	QTH	Score	Best dx	Km	Power	Ant	QSOs
1	G4JAR/P	AL47d	108,748	F1BOF/P	711	400W	2×21-el Yagi	398
2	G4NXO/P	AL45e	90,479	DK0NA	756	400W	4×16-el Yagi	322
3	G4LIP/P	AN61c	75,588	DB2FB	702	400W	4×21-el Yagi	266
4	G4MRS/P	AM67f	65,241	F1BUU	816	400W	23-el loop Yagi	248
5	G3PIA/P	ZL23f	38,185	DJ9DL	604	300W	21-el Yagi	202
6	G4OUF/A	ZM29h	24,948	DF3EE	533	120W	4×21-el Yagi	113
7	G3TQF/P	ZM26c	21,977	DD1JT/P	595	150W	21-el Yagi	111
8	G3UHF/P	ZN61a	20,485	F1FHI	677	100W	4×23-el Yagi	116
9	G8BQO/P	YN38g	12,343	ON4YZ	607	50W	21-el Yagi	82

432MHz SINGLE-OPERATOR

Posn	Callsign	QTH	Score	Best dx	Km	Power	Ant	QSOs
1	G4LOJ	AM37c	55,835	DK0VL	706	400W	27-el loop Yagi	193
2	G3SEK	ZL24e	24,783	DJ9DL	585	330W	21-el Yagi	136
3	G8JVM	ZL31c	15,094	DL0BX/A	585	150W	21-el Yagi	91
4	G8KEN	AL77h	13,010	DC6BB/P	473	50W	19-el Yagi	54
5	G6CHK	ZL27c	4,995	DK8VR/A	586	80W	19-el Yagi	57
6	G3COJ	ZL37a	3,102	ON4YZ	393	100W	14-el Yagi	24
7	G4LRT	ZM45d	1,129	F6CTT/P	312	30W	2×18-el Yagi	11

1,296MHz MULTI-OPERATOR

Posn	Callsign	QTH	Score	Best dx	Km	Power	Ant	QSOs
1	G3XDY/P	AM67f	17,982	F2TU/P	614	250W	4×25-el loop Yagi	72
2	G4HWA/P	AN61c	15,295	DL0HC/P	545	250W	4×23-el Yagi	59
3	G4BAR/P	AL47d	9,247	F1KNO	440	60W	30-el loop Yagi	46
4	G3ZUD/P	ZM26c	5,659	PA0JRS/A	500	300W	2m dia dish	35
5	G3FVA/P	ZN61a	4,569	G3DAH	295	30W	2m dia dish	29

1,296MHz SINGLE-OPERATOR

Posn	Callsign	QTH	Score	Best dx	Km	Power	Ant	QSOs
1	G4KIY	ZM40j	7,281	DL0HC/P	542	10W	1·5m dia dish	35
2	G3COJ	ZL37a	1,439	F1DPX/P	222	40W	23-el Yagi	15
3	G4LRT	ZM45d	667	G3XDY/P	157	30W	26-el loop Yagi	9
4	G4PMK	ZL34b	638	G4KDH	129	24W	21-el Yagi	9

2,320MHz MULTI-OPERATOR

Posn	Callsign	QTH	Score	Best dx	Km	Power	Ant	QSOs
1	G8LMW/P	ZM26c	464	G4BYV	121	1W	1·2m dia dish	6
2	G4FAW/P	AM67f	661	G4LRT	157	20W	2×44-el loop Yagi	9
3	G4OHM	ZM41f	149	G8LMW/P	82	3W	1·2m dia dish	3

2,320MHz SINGLE-OPERATOR

Posn	Callsign	QTH	Score	Best dx	Km	Power	Ant	QSOs
1	G4LRT	ZM45d	283	G4FAW/P	157	14W	42-el loop Yagi	4
2	G4MBS	ZL65e	46	G8EUQ	92	2W	1·35×1·8m periscope	1

3,456MHz MULTI-OPERATOR

Posn	Callsign	QTH	Score	Best dx	Km	Power	Ant	QSOs
1	G3TQF/P	ZM26c	35	G4LRT	35	1W	0·9m dia dish	1

3,456MHz SINGLE-OPERATOR

Posn	Callsign	QTH	Score	Best dx	Km	Power	Ant	QSOs
1	G4MBS	ZL65e	75	G3BNL/P	75	2W	1·35×1·8m periscope	1
2	G4LRT	ZM45d	35	G3TQF/P	35	0·5W	1·2m dia dish	1

5,760MHz SINGLE-OPERATOR

Posn	Callsign	QTH	Score	Best dx	Km	Power	Ant	QSOs
1	G4MBS	ZL65e	75	G3BNL/P	75	2W	1·35m×1·8m periscope	1

10,368MHz MULTI-OPERATOR

Posn	Callsign	QTH	Score	Best dx	Km	Power	Ant	QSOs
1	G4FRE/P	AM67f	13	G3LQR	13	0·0005W	0·7m dia dish	1

10,368MHz SINGLE-OPERATOR

Posn	Callsign	QTH	Score	Best dx	Km	Power	Ant	QSOs
1	GW3PPF/P	YM55f	511	G8MWR/P	121	0·01W	1·2m dia dish	5
2	G4FHQ/P	ZM31j	339	GW3PPF/P	92	0·01W	0·45m dia dish	5
3	G4MBS	ZL65e	60	G3BNL/P	75	2W	1·35×1·8m periscope	2

144MHz CW Contest November 1982 results

Conditions for this contest were appalling, and this perhaps accounts for a small drop in support compared with 1981. Nevertheless, participants remained enthusiastic about the event, which was arranged to occur at the same time (24h section) as the IARU Region 1 Marconi Memorial CW Contest. Several entrants asked for their logs to be forwarded for the latter event. Comments included: 'Once again a very enjoyable contest with good operating standards—but please next year can we omit the full QTH details"—*G4IYA;* "Will not be entering next year unless a more sensible start and finish time are adopted—say 1000 to 1600 or even 0900 to 1500"—*G4AYM/P;* "Great idea tying in with the IARU/Marconi contest—at least they turn their beams west"; "More cw contests on 2m—how about a dedicated cw section

in VHF NFD?" — *G3BZU;* "Not worth the effort scoring for IARU entry as the rules were different, having to exchange QTH for RSGB contest and not so for IARU event . . . why do the rules have to be different?" — *GD4IOM.*

Regarding the question of full QTH, QTH locator only is a "hardy annual" and has caused considerable comment this year, all in favour of dropping the full QTH. DK3UZ, winner of the 24h single-operator section, experienced considerable difficulty in getting the QTH from UK stations, and it has been noted that several entrants who worked DK3UZ failed to record his QTH "nr Hamburg" in their logs. Also worthy of mention are the outstanding dx contacts achieved by DK3UZ, including several OH and OK stations, all by tropospheric propagation.

Overall the contest was well enjoyed by participants, in spite of conditions, and the enthusiasm for cw contests remains undiminished. Certificates go to the winners of each section. *G3FZL*

SINGLE OPERATOR 6h

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G4MDZ	1,190	94	AL76	DK3UZ	667
2	G3BDQ	1,173	95	AK04	DK3UZ	733
3	G4DCV	956	83	AL67	DJ9MH/P	611
4	G3NNG	849	87	ZL23	DL2OM	661
5	G4DEZ*	820	68	AL35	DK5HE/P	689
6	G4KKC/A	373	42	AM49	DF0VK	421
7	G4HVC	326	42	DK11	DL8YR/P	526
8	G3DAO	169	17	XK30	F6APE	440
9	G5UM	164	32	ZM35	ON7JT	323
10	G4NYS	145	38	ZL37	GM4CXM	535
11	G4JFN	128	28	ZL57	ON7KM/A	377
12	G3TUX	92	28	ZL77	G3DAO	245

SINGLE OPERATOR 24h

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	DK3UZ	2,823	193	EN20	OH4UC	1,353
2	G4IYA*	1,739	171	AL43	DF2HC	702
3	GW4ALG*	429	59	YL37	PA0MS/A	567
4	G4LIZ	405	45	ZN19	DL9GS	574
5	G4GGV	319	61	ZL37	DF9KT	508
6	G4NBS*	317	71	ZL48	DL0CK/P	528
7	G4AGQ*	305	55	ZL66	DL0CK/P	547
8	G4NNS	270	50	ZL48	DL8YR/P	460
9	G2WS	109	23	YL56	F9XG	305

MULTI-OPERATOR 6h

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G4MRS/P	1,493	109	AM67	F8OP/P	696
2	G4EKT/P	326	32	ZN10	DK1BM	531
3	G4JKG*	278	46	AL33	DL9GS	470
4	G3GJL	285	39	YM60	PA0MS/A	523
5	G4AYM/P	194	40	YL08	GM4CXM	488

MULTI-OPERATOR 24h

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G4NUT/A*	1,364	156	ZM77	DK0SM/P	684
2	G4LKM/P	975	101	YN38	DF0VK	730
3	GD4IOM	855	64	XO67	DK1BM	816
4	G3BZU	827	105	ZK05	F6HNX	577
5	G4ODA/A*	769	87	ZM29	DL0WW	710
6	G4KTP	596	49	ZO11	DL1LE	759
7	G3WKS/A	585	91	AL73	DL2OM	516
8	G3TCR/P	462	70	ZL75	DF8JD	573

*Logs forwarded for Marconi Memorial Contest

Verulam ARC Contest 1982 results

SECTION 1: 1·8MHz

TRANSMITTING SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	G4NUT	7,560	12	G4IUZ	720
2	G4O8K	4,802	13	G3PZF	702
3	G3VER/A	4,230	14	G2PA	384
4	G4HXC	4,092	15	G4HKA	308
5	G3UJV	3,870	16	G4NVA	231
6	G6UW	3,120			
7	G4ENB	2,686			
8	G3PPG	2,310			
9	G3ASR	2,108			
10	G4NDL	1,736			
11	G3BBD	1,566			

RECEIVING SECTION

Posn	Station	Points
1	N. Henbrey, 28198	2,660
2	J. Goodrick, 44395	640

SECTION 2: 144MHz

TRANSMITTING SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	G3NNG	9,168	28	G6EQO	1,440
2	G3YLG/P	7,181	29	G4PUR	1,188
3	G8NQP	6,960	30	G8PNM	990
4	G8RXK	6,762	31	G3WFM	976
5	G4ARI	6,678	32	G6FQN	975
6	G4NUT	6,552	33	G4NRJ	688
7	G8MZV/P	6,342	34	G2PA	684
8	G8RZP	5,845	35	G3PZF	672
9	G8PTP	4,644		G4PDP	672
10	G8VVG/P	4,585	37	G6NDQ/P	608
11	G6JFQ/P	3,836	38	G4JIU	592
12	G3VER	3,600	39	G6NHU	517
13	G8NRC/P	3,588	40	G8VRO	516
14	G6ECM	3,162	41	G8ZYL	462
15	G4HLX	3,038	42	G6JMI	420
16	G8XVJ	2,912	43	G3LXP	400
17	G6IHQ	2,604	44	G6PHP	342
18	G6HKM	2,600	45	G6BQJ	264
19	G6EKL	2,592	46	G6LER	144
20	G4NVA	2,465			
21	G8NNJ/P	2,369			
22	G6NUS	2,070			
23	G3UFB	1,944			
24	G8GHU	1,890			
25	G8RZA	1,722			
26	G6BDV/A	1,660			
27	G8JXV/A	1,449			

RECEIVING SECTION

Posn	Station	Points
1	N. Henbrey, 28198	1,300

Check log received with thanks from G8YGD.

Contests calendar

5-6 March	144MHz/432MHz/SWL *(Rules in January issue)*
5-6 March	ARRL International DX (Phone) *(Rules in February* MOTA*)*
12-13 March	Commonwealth *(Rules in November 1982 issue)*
19 March	1·8MHz Town & County *(Rules in February* MOTA*)*
19-20 March	Bermuda AR 1983 *(Rules in February* MOTA*)*
19-21 March	BARTG Spring RTTY *(Rules in February issue)*
26-27 March	CQWW WPX (SSB) *(Rules in March* MOTA*)*
27 March	Barking R&ES 144MHz *(Rules in March issue)*
April-September	10GHz & Microwave Cumulatives
2 April	1,296MHz Trophy *(Rules in March issue)*
3 April	432MHz Trophy *(Rules in March issue)*
3 April	ROPOCO 1 *(Rules in March issue)*
9-10 April	BARTG Spring RTTY *(Rules in January issue)*
10 April	Stevenage & DARS 144MHz FM
17 April	144MHz CW *(Rules in March issue)*
17 April	Low Power *(Rules in February issue)*
7-8 May	432/1,296/2,320MHz *(Rules in March issue)*
8 May	144MHz Low Power
15 May	Region Round-up
22 May	432MHz CW *(Rules in March issue)*
4-5 June	NFD *(Rules in February issue)*
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

Barking R & ES 144MHz Contest rules

Date. 27 March 1983.
Time. 1300-1700gmt.
Sections. 1) Low power (10W output, fm, a.m., cw, or 40W p.e.p. output ssb).
2) High power (full legal limit).
3) SWL.
Contest exchange. Will consist of a) callsign, b) RS(T), c) Serial number commencing with 001, d) Postal county.
Scoring. One point per contact (contacts with the BRES club stations G3XBF and G8XBF count 10). Final score is the total number of contacts multiplied by the number of counties. Countries outside the UK and Ireland count as additional counties.

For entrants in Section 3 the following additional rules apply: only stations taking part in the contest may be logged for points. Logs must show date, time, station heard, station contacted, RST and serial No sent, county sent. No station may appear in the station contacted column more than three times in any 10 contacts.
Additional rules. The following rules from the RSGB general vhf rules published in the January 1983 issue of *Radio Communication* also apply: 4a, 5a, 6a, 11a, 16-22, and 25.
Awards. Certificates will be awarded to the winner and runner-up in each section. Additional certificates will be awarded if the level of entries in any section warrants it.
Logs. All logs should be sent to M. G. Toms, RS31976, 43 Waterloo Road, Barkingside, Ilford, Essex IG6 2EG, to arrive not later than Thursday 14 April. Entrants are requested to use RSGB contest log sheets or a close approximation, and to enclose a declaration that these rules have been observed.
Enquiries. Written enquiries to the above address with an sae please, or by phone to 01-550 2902, weekends only.

Stevenage & DARS 144MHz FM Contest rules

10 April 1983, 1300 to 1700gmt
144·500-144·845MHz and 145·200-145·575MHz
The contest is open to members and non-members of the society and there will be three classes of entry:
1. Stations running up to 25W output.
2. Stations running more than 25W output.
3. Short wave listeners.

Further information is available from The Contest Secretary, Bernard Dean, G6NZC, 82 Lingfield Road, Stevenage, Herts SG1 5SN. Please enclose sae.

Special event stations

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

2-4 April, GB2NAM
The Newark & D ARC will operate this station at the Newark Air Museum when it is open to the public at Easter. Special QSL cards will be issued. A new exhibit at the museum will be a Vulcan which was involved in the Falklands conflict.
3 April, GB2TM
The station will operate during the Thanet Marathon. It will monitor and report on runners' progress to contacts on hf and vhf. It will operate from the Radio Club of Thanet's HQ at Birchington Village Centre from approximately 10am to 5pm. There will be a special QSL card. Details from K. R. Lown, 119 Sea Road, Westgate-on-Sea, Kent CT8 8QE.

CLUB NEWS

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

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **May** issue should reach them by **17 March** and for the **June** issue by **16 April.**

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

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

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

Please note that D. Fleet, G8MAI, is area representative for South Cheshire, and *not* Stoke-on-Trent, as shown in the January issue.

Accrington (NW Repeater Group)—17 March (Surplus equipment sale and a pie and peas supper), 8pm. Globe Bowling Club, Willows Lane, Accrington. Sec Howard Aspinall. G3RXH.

Ainsdale (AARC)—1, 15, 29 March. Scout HQ, Ainsdale. Changes following the AGM in January are that G2CUZ has completed his stint as secretary, just 26 years! (Many thanks to him from the RR). The new incumbent is John Wollaston, G6JOE, 54 Hesketh Drive, Southport, tel 0704 27219.

Barnoldswick (Rolls-Royce ARC)—2 March (Construction contest), 4 March (Club social and annual presentation), 6 April (Film show by Michael Crawshaw, G4BLH), 8pm. Rolls-Royce Sports & Social Centre, Barnoldswick. Sec Leslie Logan, G4ILG, tel 0282 812288.

Blackburn (East Lancs ARC)—1 March (Surplus equipment sale), 7.30pm. Shadsworth Leisure Centre, Blackburn. Sec Simon Eatough, G4GVQ. 5 April (A talk on "Computers and amateur radio" with a demonstration). The club now has a new pro, Graham Pountain, G4MWY, tel 025-482 2767.

Bolton (B & D ARS)—Wednesdays, 8pm. Horwich Leisure Centre, Bolton. The club now has a new public relations officer, Keith Pope, G6CGZ, tel 0204 62443.

Bury (BRS)—8 March ("RTTY", by Bob Jackson, G8VLJ), 1, 15, 22, 29 March, 5 April (Informal meetings). Mosses Community Centre, Cecil Street, Bury. Sec Brian Tyldsley, G6OKE, 4 Colne Road, Burnley, tel 0282 24254. PRO Malcolm Pritchard, G3VNQ.

Leyland (LHARG)—14 March, 7.30pm. Astley Park Sports Club, Hallgate, Astley Village, Chorley. Sec Arthur Jolly, G4JCO.

Liverpool (L&DARS)—1 March (Quiz forum), 8 March ("Club Vintage" preparation for NARSA), 15 March ("Weaving", by John, G6KWW), 22 March ("Sub aqua", by Eric Grossmith, G3WOH), 29 March ("German radio", by G. Donn, G4IHS), 5 April ("Further aspects of the computer in amateur radio", by Al Neilson, G4CVZ), 8.15pm. Wavertree Conservative Association, Church Road, Wavertree, Liverpool. Sec Gordon Purslow, G6MHG, tel 051-263 5837.

Manchester (South Manchester RC)—4 March (Club quiz), 11 March (Surplus equipment sale), 18 March ("Computer communication", by Trevor Hopkins, G8TYY), 25 March (Spring direction finding contest), 1 April (Club closed), 8pm. Sale Moor Community Centre, Norris Road, Sale. Informal meetings in the club shack Mondays, 8pm. Sec David Holland, G3WFT, tel 061-973 1837.

Thornton Cleveleys (TCARS)—7 March (A visit from Tony of Dewsbury Electronics), 14 March (Natter night), 21 March (Film show), 28 March ("Radio controlled model aircraft", by Tom Anyon, G3YEI), 4 April (Natter night), 7.45pm. Scout Hut, Norbreck 1st Scout Group, Carr Road, Bispham. Sec Mrs Jen Ward, G8YOK, tel 0253 890114.

Warrington (WARC)—1, 8 March (Subjects to be arranged), 13 March (Dummy run for the NARSA show stand), 15 March (Final preparations for NARSA), 22 March (Discussion of club organization), 29 March (To be announced), 5 April (AGM), 7.30pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Chris Crotty, G4PDJ.

Warrington (UK FM Group Western)—3 March, 7 April, 8pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Wirral (WARS)—2 March ("The world of amateur tv", by Alan Smith, G4EFP), 16 March (Inter-club QSO on the air), 6 April (Sale of surplus equipment), 7.45pm. Minto House School, Birkenhead Road, Meols, Wirral. Sec Cedric Cawthorne, G4KPY, tel 051-625 7311.

RSGB Region 1 Contest Awards 1982

HF NFD

RR's Cup to the highest scoring station overall, Stockport RS "B". Region 1 Field Day Trophy for the best score on 3·5MHz, Preston ARS. Harold Hilton Rose Bowl for the leading band station, Stockport RS "B".

VHF NFD

G2AMV Quarter Century Trophy for the best score by a Region 1 group was won for the second consecutive year by the Westmorland VHF Contest Group.

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel 094-786 333.

Denby Dale (DD&DARS)—9 March ("Oscar", by G4JJ), 16 March (Rally committee), 30 March (Committee), 13 April (Visit from Lowe Electronics), 7.30pm. Pie Hall. At the AGM on 10 January, G3YWI was elected chairman, G3OYI, treasurer, while G3FQH continues as sec. He says the committee is representative of the newer licensees. Planning is well in hand for this year's DD Rally on 19 June. Sec J. Clegg, G3FQH.

Goole (GRES)—Note the club has a new name, meeting date and time. 1 March (Natter night), 8 March (Emergency communications), 15 March (film night), 22 March (RSGB regional rep), 29 March (On the air), 5 April (Natter night), 7.30pm. The Junior Chamber Buildings, Boothferry Road, Goole. Sec Richard Sugden, G8IOH. Details from G8IOH or G8VHL.

Halifax (H&DARS)—First and third Tuesdays in each month, 15 March ("Top band dxing", by G3IGW and G4MH), 19 April ("AMSAT", by G4JJ), 7.30pm. Clairmount Liberal Club, Belgrave Avenue, off Clairmount Road, Halifax. Sec G4LEC, tel 0422 33080.

Halifax (Northern Heights ARS)—9 March ("Amateur radio", by G4MH), 23 March (Visit to Bradford Police HQ), 6 April (AGM), 8pm. Bradshaw Tavern, Bradshaw, Halifax. Sec G6OJL. Club net frequency is 145·275MHz.

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. Planning is complete for the White Rose Rally on 27 March. Sec G3KWT.

Pontefract (P&DARS)—3 March ("HF antennas", by G3HCW), 17 March (On the air), 24 March (Construction evening), 31 March ("AMSAT", by G4JJ), 7 April (Informal), 8pm. The Carleton Community Centre, Wakefield. Sec Nial has retired from his post. Many thanks for all the updates. The new sec is Ron Tams, G6PEX, who has reminded me of the Component Fair on 13 March.

Spen Valley (SVARS)—Thursdays, 3 March ("Assembly language", by G8ZXF and G6JLI), 17 March (Preliminary AGM), 31 March (AGM), 14 April ("Police communications", by G6GMO), 8pm. Old Bank Working Men's Club, Mirfield, W Yorks. Sec G4MLW.

Wakefield (NWRC)—Thursdays, 10 March ("Computers", by G8PUT), 17 March (Visit to BBC tv at Leeds), 14 April (G4DAX, RR2), 7.45pm. Carr Gate Working Man's Club, Wakefield. Sec G4RCH.

Wakefield (W&DRC)—8 March (Electric power generation), 22 March (On the air/natter night), 5 April (Question night), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G4BLT, tel Wakefield 255515.

York (YARS)—Fridays, 11 March (Amateur satellites), 7.30pm. United Services Club, Micklegate, York. Sec Keith Cass, G3WVO. Following the January AGM this year's officers are president, G3TMN, chairman, G4ESU, vice-chairman, G4NPQ, and Keith continues as sec. Member G3TMN is currently airing his VK1TN call. Plans are already being made to run GB2GYS from the Great Yorkshire Show again this year.

Now is the time of year when new club secs struggle to produce an interesting programme of talks for the year. I was present at a local club recently when the subject of formal versus informal meetings was discussed. There was no doubt that there is a desire for the occasional informal chat night, but in visiting clubs in the region I must say that it seems that the strongest, healthiest (and most financially sound) clubs appear to be those with a set programme and structured meeting. Make your sec's job a little easier. You probably know quite a bit more about some subject (even non-amateur) than other members of your club, and it really is quite easy once you take the plunge.

REGION 3—RR L. W. Craven, G4EQI, Grass Moor, Radford Road, Alvechurch, Birmingham B48 7DT. Tel 021-445 1347.

Please note that J. K. Harvey, G4IVJ, is area representative for *South* Birmingham, and not the whole of Birmingham, as shown in the January issue.

Birmingham (Midland ARS)—15 March ("New

Members of Scarborough ARS at their Golden Jubilee dinner, which was held on 17 December 1982 at the Rivelyn Hotel, Scarborough. Back row, l to r: Robin Boddy, G4MGQ; Henry Wiggins, G2CP (founder member); Jim Rank, G4NSE; Cyril Ginders, G3XHA; Gordon Brown, G3FVW; Paul Consitt, G4OBR; Peter Tipper, G3JBR; Cliff Renshaw, G2AQN; John Symonds, G8LPU. Seated, l to r: committee members Mick Jefferson, G8WYB; Skim Simpson, G3CAA; Mike Eggleton, G4IZZ; Eric Blake, G4HWQ (chairman); Margaret Crofts, G4JAQ (secretary); Frank Crofts, G4FLM (president); David Warwick, G4EEV; Jack Taberner, G6BWO. Front: Tim Jefferson, G4IAJ; and Robin Jefferson, G8UZM. *Photo: Courtesy of Scarborough & District Newspapers*

Midlands vhf repeaters", by G4KZH), 7.30pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham RS)—2 March (Surplus equipment auction sale), 7.45pm. Hamstead House, Fairfax Road, West Heath, Birmingham B31. Sec G8RGQ, tel 021-459 8312.

Bromsgrove (B&DARC)—11 March (AGM), 8pm. Avoncroft Art Centre, Bromsgrove. Sec G4LVK, tel 021-445 2088.

Coventry (CTARS)—21 March ("QRP", by Rev Dobbs). Winfray Annexe of Coventry Technical College. Sec C. J. Reed, G8MFP, tel 0203 542877.

Lichfield (Lichfield Chad RC)—Members please note change of meeting day from Wednesdays to Mondays commencing Monday 7 March, 8.30pm. Naval Club, Burton Old Road, Lichfield. Sec Grahame Benson, G4ESK, tel Lichfield (54) 23919.

Much Wenlock (Wenlock ARES)—14 March (Natter night and night-on-the air), 28 March ("Introduction to satellite communication", by Ed Green, G3ZSL), 8.30pm. Raven Hotel Club Room, Much Wenlock. Sec G3ZSL, tel Bridgnorth (0746) 861332.

Redditch (RRC)—10 March (Surplus sale), 24 March (Natter night and morse practice), 8pm. WRVS Centre, Ludlow Road, Redditch. Sec G3EVT, tel Alcester (0789) 762041.

Shrewsbury (Salop ARS)—Thursdays, 5 March (Trip to Culham Laboratories, Abingdon), 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec Edwin Arnold, G6AKE, tel Shrewsbury (0734) 66969.

Stourbridge (StARS)—7 March (Natter night), 21 March (AGM), 7.30pm for 8pm. Cross Inn, Hagley Road, Oldswinford, Stourbridge. Sec Malcolm, G8JTL, tel Lye (038482) 4019.

Stratford-upon-Avon (S-upon-A & DARC)—14 March (Review and discussion of members' equipment), 28 March (AGM, and cine film of radio interest). Bearley Radio Station. Talk-in on S22. Programme sec Ian Hopwood, G6CWK, tel Stratford (0789) 68863.

Sutton Coldfield (SCARS)—14 March (General discussion evening), 28 March ("Setting up an amateur station", by Fred Ward, G2CVV), 7.30pm. Central Library, Sutton Coldfield. Sec G8TUR, tel 021-353 2061.

Telford (T&DARS)—2 March (Discussion evening and G3ZME on the air with the new club hf rig), 9 March ("The Yaesu FT290", by Deryck, G6ECA), 16 March (Monthly club projects progress evening), 23 March ("Japanese morse", by Norman, G3CSE), 30 March (Pre-AGM committee meeting), 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec Jim, G8UGL, tel Telford (0952) 584173.

Wolverhampton (WARS)—21 March ("RSGB", by Leo Craven, G4EQI, RR3), 8pm. Wolverhampton Chamber of Commerce, 93 Tettenhall Road, Wolverhampton WV3 9PE. Sec G6AKN, tel Wolverhampton (0902) 730300.

Worcester (W&DARC)—7 March ("VP Land", by Andy Hawkins, G4GKK, ex-VP8QI, The Oddfellows Club), 21 March (Informal evening), 8pm. Old Pheasant Inn, New Street, Worcester. Sec G4NRD, tel Evesham (0386) 41508.

RR3 will be on the RSGB stand on 5 and 6 March at the RSGB National Amateur Radio Convention (National Exhibition Centre, Birmingham) and will be pleased to meet all Region 3 members.

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

Derby (D&DARS)—2 March (Junk sale), 5 March (Annual dinner at Derbyshire Yeoman), 9 March ("Royal Crown Derby", a talk by Betty Bailey, ladies night), 16 March (Natter night), 23 March (AGM), 30 March ("My visit to Japan", a talk by G3YUT), 6 April (Bring & buy sale), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Derby (NHARG)—4 March ("Aerials", by G3ALA), 11 March (Technical film show), 18 March (Activity night), 25 March ("Trio equipment", by G8GIY), 7.45pm. Nunsfield House, Boulton Lane, Alvaston, Derby. Sec Ian Cage, G4CTZ, tel Derby 799452.

Hinckley (HAR&ES)—Wednesdays, 7.30pm. John Cleveland College, Butts Lane, Hinckley. Sec Tony Chamberlain, G6HQT, tel Leicester 870137.

Lincoln (LSWC)—9 March ("Satellites", a talk by G4CUO), 23 March ("Fast scan tv", a talk and demonstration by G8GTG), 8pm. City Engineers Club, Waterside South, Lincoln. Sec Pam Rose, G8VRJ, tel Gainsborough 788356.

Melton Mowbray (MMARS)—18 March ("Resonating aerials", a lecture by G3WKM and G3NVK), 7.30pm. St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 63369.

Newark (N&DARC)—3 March ("Talk on basics and antennas", G3PJR and G3ZOA), 2, 3 and 4 April (Special event station at Newark Air Museum), 7 April (Workshop construction project, by G4MDV), 7.30pm, Palace Theatre, Appleton Gate, Newark. Sec Roger Hiscock, G4MDV.

Nottingham (ARCON)—3 March (Forum), 10 March (Video film), 17 March (Activity night), 24 March (Junk sale), 31 March (Construction trophy), 7.30pm. Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham. Sec Paul Chapman, G4IJL, tel Nottingham 623828.

Scunthorpe (SARC)—1 March ("Video editing", by G8HUA), 8 March ("Radio control models", G4OGB), 15 March ("Antennas", by G3PDL), 29 March ("Aircraft communication", by G4OCU), 7.30pm. Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. Sec Joe Sheardown, G8TIY, tel Scunthorpe 732438.

Spalding (S&DARC)—11 March ("Planning aspects of amateurs' aerials", a talk by the planning officer of South Holland District Council). Maple Room, White Hart, Market Place, Spalding. Sec Ian Buffham, G3TMA, tel Spalding 3845.

REGION 5—RR J. S. Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT, Bedfordshire. Tel 0582 508515, or at work, 0582 21151 ext 200.

Bedford (B&DARC)—Wednesdays, 2 March (Constructors' competition, for the club plaque), 8pm. The Club House, Ravensden, Bedford. Sec J. Ferguson, G6JJT.

Leighton & Linsdale (LLRC)—7 March ("Why is rubber, rubber-like?", by G6JFN), 21 March (Natter night), 7pm. Vandyke Community Centre, Room A64, Vandyke Road, Leighton Buzzard. Sec P. Brazier, G6JFN, tel Heath & Reach 270.

Luton (Kent Process Controls ARC)—16 March (Note the change of date. The sec will, hopefully, tell you of his trip to the Orlando ARRL Hamfest), 8pm. Kent Club House, Tenby Drive, Luton. Sec J. Allen, G3DOT.

Northampton (NRC)—10 March ("QRP working", by the Rev Dodds, G3RJV), 23 March (Construction contest), 8pm. Kingsthorpe Community Centre. Sec G3VMU, tel Northampton 28516.

Shefford (S&DARS)—3 March (Natter night and contest planning), 10 March (Junk sale), 17 March (Talk by G2DPQ), 24 March ("My impressions of the USA, or the part that I saw", by G3DOT), 8pm. Church Hall, Shefford. Chairman G3DOT. Sec Brian Elliot, G4MEO.

Wellingborough (Nene Valley RC)—16 March (The scope and test equipment and their uses), 8pm. The Royal, Knox Road, Wellingborough. Sec L. Parker, tel Wellingborough 79539.

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

Aylesbury (AVRG)—Details from sec Roger Piper, G3MEH, 8 Osborne Way, Wigginton, Tring, Herts HP23 6EN.

Harwell (HARS)—15 March ("Synthesizers", by Peter Chadwick, G3ZRP), 7.30pm. The Social Club, Harwell. Club callsign, G3PIA. Club net -Tuesdays (except club night), 2100 on 144·190MHz. Net chairman, G3NNG or G4HLX. For details of meetings contact area rep, G2HIF, 20 Harcourt Road, Wantage, Oxon OX12 7DQ.

Maidenhead (M&DARS)—3 March (TBA), 18 March (AGM), 7.30 for 8pm. Red Cross Hall, The Crescent, Maidenhead, Berks. Sec Roger Hemmings, G3VCT, tel Bourne End (06285) 21036.

Maidenhead (Home Counties ATVG)—23 March (Equipment and calibration evening), 8pm. Richings Park Sports & Social Club. Contact G4REE for details, tel Maidenhead 76020.

Milton Keynes (MK&DRS)—14 March ("Contests and how to win them"), 8pm. Lavatt Hall, Silver Street, Newport Pagnell, Bucks. Details from A. R. W. Date, RS48849, tel Bedford 711950.

Reading (R&DARS)—12 April (SMC demonstration), 26 April (Contest committee talk), 8pm. The Club Room, The White Horse, Peppard Road, Emmer Green, Reading, Berks. Details from Chris Young, G4CCC.

REGION 7—RR Pat Walker, G8HMG, 12 Brownlow Road, Redhill, Surrey RH1 6AW. Tel Redhill 64035.

Biggin Hill (BHARS)—Meetings are usually on the last Tuesday in the month, 22 March (Junk sale), 8pm. Biggin Hill Memorial Library. Sec Ian Mitchell, G4NSD, tel Biggin Hill 75785.

Croydon (Surrey Radio Contact Club)—7 March (Surplus equipment sale), 4 April (AGM), first and third Mondays in each month, 8pm. TS Terra Nova, 34 The Waldrons, Croydon. Sec Ray Howells, G4FFY, tel 01-642 9871.

Crystal Palace (CP&DRC)—19 March (Quiz arranged by John Perrin, G8NLL), 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, 11 March (Tag sale, an interesting variation of the usual junk sale), 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec Helen Mullenger, G4OJO, tel Aldershot 20384.

Kingston (K&DARS)—Third Wednesday in each month, 8pm. Alfriston, 3 Berrylands Road, Surbiton. Sec Brian Smythe, tel Epsom 26005.

New Cross (Clifton ARS)—Fridays, 11 March (Test gear evening by Steve Fletcher, G4RFC), 25 March (Contest discussion on performances by G3GHN in 1982), 8pm. Above the New Cross Inn, Clifton Rise, London SE14. Details of programmes from R. Hinton, 42 Sutcliffe Road, Welling, Kent.

Redhill (Reigate ATS)—15 March ("RTTY", by G3RIM), 8pm. Constitutional & Conservative Club, Warwick Road, Redhill. Sec Chris Barnes, G8FEE, 25 Hartswood Avenue, Reigate RH2 8ET.

Sutton & Cheam (S&CRS)—Fridays, 11 March (Talk on contest working and scoring by G3LCH (SCOLA)), twice monthly 7.30pm. Sutton College of Liberal Arts, Nicolas Way, Sutton, and at the Carshalton Sea Cadets HQ, Church Path, Beddington. Sec G4CMU, tel Banstead 54497.

Thames Ditton (Thames Valley ARTS)—1 March (AGM), 5 April (Caernarvon Trophy), at 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec Julian Axe, G4EHN, tel 01-946 5669. Congratulations to the society on reaching its golden jubilee this year. A celebratory function will be held on 22 October.

Wimbledon (W&DRS)—11 March (Morse practice), 25 March (Talk on df foxhunts by Ken Bailey, G3EPU), 8pm. St John Ambulance Hall, 124 Kingston Road, Wimbledon SW19. Sec Geoff Mellett, G4MVS, tel 01-644 8249.

REGION 8—RR K. A. Crouch, G8KEN, 14 Victoria Road, Capel-le-Ferne, Folkestone, Kent. CT18 7LR. Tel 0303 55241.

Chichester (CARC)—1 March (Club meeting), 17 March ("Wartime radar", by Les Carden, G8HY), 7.30pm. Green Room, Fernleigh Centre, 40 North Street, Chichester. Club net on 145·275MHz (S11) Wednesdays, at 1900 local time.

Dartford (DDFC)—2 March (Meeting at Malt Shovel), 6 March (DF hunt). Malt Shovel PH, Eynsford, Kent on the Wednesday before the hunt to sort out any queries. Details from G4NKM.

Dover (SEKYMCAARC)—2 March (Natter night and committee meeting), 9 March ("Old Dover, part 2", by Budge Adams), 16 March (Surplus sale), 23 March (Construction contest), 30 March (Talk on aerials by G3LCK), 7.30pm. YMCA, Leybourne Road, Dover. (Talk-in is available on S20 or GB3KS.

Eastbourne (Southdown ARS)—7 March (Junk sale), 4 April (No meeting), 7.30 for 8pm. Chasley Home, Eastbourne. Details from sec Tom, G4MVN, or Peter, G8IQO, tel 0323 763123.

Hastings (HERC)—16 March (AGM. Please attend for your own interest). First, second, fourth and fifth Wednesdays (Micro nights, Ashdown Farm Community Centre. Also the first is a committee meeting), third Wednesday (Main meeting at West Hill Community Centre). Details from Alan Beecher, G8VEM, tel Hastings 216516.

Swale (SARC)—This club is still very new. Mondays, 2 March (Junk sale), 7.30pm. Nina's Restaurant, 43 High Street, Sittingbourne. Details from sec Brian Hancock, G4NPM, tel Minster 873147.

Thanet (RCT)—4 March (Mini talks), 18 March (G3XDV on RSGB Repeater Working Group), 8pm. Birchington Village Centre. 3 April (Listen for GB2TM when annual Isle of Thanet Marathon is on). Details from Ken, G4PTE, tel Thanet 32198.

Tunbridge Wells (WKRS)—4 March (TBA), 18 March ("Amateur radio research projects", by Charlie Newton). Adult Education Centre, Monson Road. Informal meetings held alternate Tuesdays, Drill Hall, Victoria Road. Contact Brian, G4DYF, for further information.

Worthing (W&DARC)—1 March ("DSB transceiver", by G4CST), 8 March ("SSTV", by G4ILY), 15 March (Annual dinner), 22 March (Construction contest), 29 March ("Fire Brigade radio communications", by G4EFO), 7.30 for 8pm. Pond Lane Amenity Centre, Worthing. Sec Joyce Lillywhite, tel Worthing 63062.

A lot of clubs are sending in their information several days after the deadlines, and in some cases after I have sent "Club news" to the editor. They then complain that no club info is printed. Does your secretary do this?

REGION 9—RR W. J. Colclough, G3XC, Highview, Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Camborne (CRAC)—3 March ("Audio aspects of hi-fi", by Wallace, G6CZX), 7 April (AGM). Computer section: 21 March (Floppy disk tutorial (third and final part), by Des, G3CZZ), 7.30pm. SWEB Clubroom, Pool, Camborne. 17 July (Annual rally, to be held in the Refectory at Cornwall Technical College commencing at 0900). Members will be sorry to learn of the death of Stan Cowl, G3RBS, a founder member of the club. The annual dinner is to be held at the White House, Penhallow, in March (date not available when writing these notes). Details from G8XAI. Club details from Simon Rodda, G4PEM, QTHR as G6DFE, tel Penzance 3948. Computer section from sec, G4GFB.

Exeter (EARS)—14 March (Measurements), 7.30pm. Community Centre, St Davids Hill, Exeter. First and third Mondays (Informal). The Scout Hall, Emmanuel Road, Exeter. Chairman, R. Williams, G3RSJ; treasurer, R. Donno, G3YBK. Contact pro Andy Lake, G8YOA, tel 0392 39597.

Newquay (N&DARS)—Would members please note as from March, meetings will be held only on the second Wednesday in the month, 9 March ("Video recorders", by Frank Kneebone, G6CEP). Treviglas School, Newquay. Officers elected at the AGM: chairman, Frank Kneebone, G6CEP; vice-chairman, Joe Johnson, G3THT; treasurer, Brian Pearce, G8GOR; secretary, Pat King, G4GFY; club repeater, GB3NC; manager and secretary, Bill Colclough, G3XC; and treasurer, Ted Warne, G3YJX. Contact sec Pat King, G4GFY, tel 0872 771133.

North Devon (NDARC)—23 March (Bideford "rag chew"), 7.30pm. Odd months, Community College, Abbotsham Road, Bideford, Devon. Even months: Community College, Pilton, Chaddiford Lane, Barnstaple, Devon. Sec G. Hughes, G4CG, tel 0271 3683.

Plymouth (PRC)—7 March ("Test equipment", by G2BCB), 21 March (Quiz), 7.30pm. Tamar School, Paradise Road, Millbridge, Plymouth. Details from Peter Connor, G8XTE, tel 0755 37319.

Saltash (S&DARC)—4 March (Activity night), 18 March (Talk by S. G. Abbot on weather (meteorological)), 7.30pm. Toch H, Burraton, Saltash. Officers elected at AGM: president, H. Griffiths, G2DFH; chairman, A. Hayden, G4LZU; sec, R. Rayment; treasurer, G. F. Huntley, G4LXB; pro S. Hills, 5 Wearde Road, Saltash, tel 4461. The new editor of the club magazine *Tamar Pegasus* is Martyn Pridham, G8YRZ, and not unexpectedly he is looking for copy for future issues, a few lines from members in faraway places would I am sure be more than welcome and of interest to home members. Being the editor of a club magazine is a thankless task without any input, please help Martyn fill *Tamar Pegasus* with interesting topics.

Torbay (TARS)—March meeting ("Marine biology", by M. L. Jackman), 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay. Members will be sorry to learn of the death of Fred Leeder, G3OTP, who had been a member of the club for many years. The club dinner will be held on 12 March, details and tickets £6.50, from Mrs Rider, 7 Kingston Close, Kingskerswell, tel 0804 75130. New calls at the club: G6PYK, G4PTH, G4PYF, congratulations to all.

Treverbyn (English China Clay RC)—All meetings after 1 April for the summer season will take place at The Club Room, Treverbyn, on Monday evenings, hf/vhf alternately. Contact Jack Redfearn, G8HSZ, tel 0726 3647.

RSGB ORM: Barnstaple Motel, Braunton Road, 2.30pm, Sunday 13 March. The primary purpose of this meeting is to give members the opportunity of discussing amateur radio matters with Society representatives. The President, executive vice-President, and the general manager, together with the zonal manager, regional representative, and area rep, will be attending to answer your questions and tell you something about running a large society like the RSGB. This is your opportunity to meet us face to face—look forward to meeting you all. *RR9.*

REGION 10—RR to be appointed.

Mr Philip Jones, the representative for Region 10, has resigned for personal reasons.

Any affiliated clubs or groups in the region who would like to have an entry in "Club News" should send it direct to the Editor until a new regional representative is appointed.

Cardiff (CRSGBG)—7 March ("Current design of commercial equipment", by Ross Clare, GW3NWS), 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Details from sec Cyril Laws, tel Cowbridge (044630) 3212.

Pembroke (PRGSBG)—25 March ("Antennas and propagation theory"—first of three lectures by GW3MOP). Defensible Barracks, Pembroke Dock. Details from sec M. A. Shelley, tel Pendine (09945) 267.

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

Anglesey (ARG)—8, 22 March, 7.30pm. Primary School, Benllech, Anglesey. Sec Mr C. Williams, GW6DOK, tel Gaerwen 77603.

Colwyn Bay (Conwy Valley ARC) (GW6TM)—10 March (Dr David Last gives a talk on "Radio navigation for aviation"), 7.30pm. Advance warning for April, when John Lawrence will give a talk on "The use of computers for amateur radio". Green Lawns Hotel, Bay View Road, Colwyn Bay. The annual dinner was a great success with 72 in attendance. The following Thursday Ian, GW6OM, gave an interesting talk on "Amateur radio, 1924 to date". Sec Mr J. R. Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL22 7DS, tel 0745 823674.

Rhyl (R&DARC)—10 March (Activity night), 24 March (RSGB film), 7.30pm. 1st Rhyl Scout HQ, Tynewydd Road, Rhyl. Sec Mr B. Jones, 6 Rhodfa Maes Hir, Rhyl, tel 0745 37284.

REGION 14—RR Vic Kusin, GM4HCO, 109 Weymouth Drive, Glasgow G12 0EL.

Ayr (AARG)—11 March ("RTTY", by GM6BSN), 25 March (Junk sale), 8 April (Film night), 7.30pm. Community Leisure Centre, 24 Wellington Square, Ayr. Details from R. D. Harkess, GM3THI.

Central (Central Scotland FM Group)—Operates three repeaters in central Scotland. Quarterly magazine *FM News*. Details from Colin Dalziel, GM8LBC.

Irvine (Cunninghaeme & DARC)—Thursdays, 7.30pm. 1 Bonnyton Row, Girdle Toll, Irvine. RAE classes on Tuesdays. Details from GM3JOB.

REGION 15—RR J. T. Barnes, GI3USS, Whitegables, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ. Tel 0247 3948.

Bangor (B&DARS) (GI3XRQ)—4 March ("Repeaters", by GI4BMW), 1 April (Talk by GI4AXV (subject to be announced)), 8pm. Sands Hotel, Bangor. 18 March (Annual dinner dance in Strangford Arms Hotel, Newtownards. Tickets from committee members, £8.50). Sec GI4JTF.

Ballyclare (East Antrim ARC) (GI4KKK)—Second Tuesday in each month, 7.30pm. Fairview Primary School, Ballyclare. AR GI4LKA.

Belfast (BRSGBG)—16 March (Test equipment & mobile clinic, GI4BWM, GI8AYZ, GI3USS), 20 April (Rockets & satellites—the art of launching). 90 Belmont Road, Belfast. AR GI6DGP.

Belfast (Queens UoBRC) (GI3LLQ, GI6FQB)—Tuesdays in term time, 7pm. 37 Fitzwilliam Street, Belfast. Club stations GI3LLQ, GI8FQB, active all bands, 3·5-432MHz. Details from sec, Victor Fails, GI6JHF, tel Belfast 703027 (home), or GI6KFE, or GI4MXW.

Coleraine (North West ARC) (GI4DBB)—1 March ("Amateur radio as it was", by GI3ZX), 5 April ("Masts I have lived with", by GI8NBW). Red Cross Rooms, White Hall Chambers, New Row, Coleraine. Chairman and AR, GI4HVI, sec GI8NBW.

Craigavon (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. Chairman GI4CZW, sec GI4PCY (ex-GI6EZT). 10 April (Mobile rally at Killyhevlin Hotel, near Enniskillen. Opens 12am. Talk-in on S22, trade stands, book stall, bring & buy, films for children, boat trips, full hotel facilities plus snacks. Info from GI4CZW).

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Canvey Island (South Essex ARS)—2 March (Practical evening), 9 March ("G2DAF receivers", by G4GVO), 12/13 March (Phoenix Club sponsored W/GA), 16 March (Film show), 23 March (Junk sale), 30 March (Talk on vhf by G4FUF), 7pm. The Paddocks Community Centre, Long Road, Canvey Island. Details from G6BYV, tel Canvey Island 683526.

Colchester (CRA)—10 March ("Car interference suppression", by G4AZR), 24 March ("Maps and map reading", by G6HIR), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 70189.

Ipswich (IRC)—9 March (Constructional contest), 30 March (Spring sale of surplus equipment), 8pm. Club room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

Norwich (ARC)—2 March (Short meeting), 9 March (Initial VHF Field Day meeting), 16 March (Short meeting), 23 March (Surplus equipment auction), 30 March (Short meeting), 7.45pm. Crome Community Centre, Telegraph Hill East. Details from Paul Gunther, G8XBT, tel Norwich 610247.

Stowmarket (S&DARS)—7 March (AGM), 7.30pm. Red Cross Hut, Station Yard. Details from Jim Lowe, G8SCB, tel Needham Market 721296.

Vange (VARS)—Thursdays, 3 March (Junk sale), 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.

Andover (ARAC)—First Tuesday and third Wednesday in each month, 8pm. Wolversdene Club, Love Lane, Andover. Sec G4OZL.

Basingstoke (BARC)—8 March ("VHF operating", by G8VR), 7.30pm. British Legion Hall, Crown Lane, Old Basing, Basingstoke. Sec G6KVN, tel Tadley (07356) 3004.

Bournemouth (BRS)—4 March ("Aerials", by Stephen Prior), 18 March ("RF transformers", by Mr Gale), 1 April (Junk sale), 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel Ferndown (0202) 877945.

Farnborough (F&DRS)—9 March (Natter night), 23 March ("Satellite communications", by G3OQB), 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane. Sec G4BJQ, tel Farnborough (0252) 43036.

Gillingham (Blackmore Vale ARS)—8 March ("VHF repeaters", by G3VEH), 7.30pm. Sherman Chemicals, Station Road, Gillingham. Sec G3WRV.

Gosport (Rowners & DARS)—This newly formed club meets at the Hardway Community Centre, Gosport on the first and third Monday in each month at 7.30pm. An RAE course is available under the direction of G4NEJ. Prospective members should contact the sec, G6OTY, tel Locksheath (04895) 2541.

Guernsey (GARS)—4 March (Visit to States Airport), 18 March (Home brew competition), 8pm. The Lodge, La Corbinerie, Oberlands, St Martins. Sec Carolyn Wild, tel 25858.

Horndean (H&DARC)—10 March ("Interference and the radio amateur", by G4JXO), 7.30pm. Merchiston Hall, Horndean. Sec G6GBM, tel Horndean (0705) 593429.

Weymouth (SDRS)—1 March (Annual constructors contest and junk sale), 7.30pm. Army Bridging Camp, Wyke Regis, Weymouth. Sec G3ZGP, tel Weymouth (0305) 812893.

Wimborne (FRARS)—6 March ("Power supplies part one", by G4JET), 13 March ("Power supplies part two", by G4JET), 20 March (Informal natter by G8MCQ), 27 March ("DF hunting", by G8EOJ), 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Sec G8VFY, tel Wimborne (0202) 882271.

Winchester (WARC)—19 March ("Silent Key" equipment sale and junk sale), 7.30pm. The Log Cabin, Stockbridge Road, Winchester. Sec G6FBR, tel Winchester (0962) 66764.

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

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. The club's 144MHz contest is on 27 March, 1300-1700. Full details can be obtained from the sec, or on 01-550 2902, weekends only.

Cheshunt (C&DARC)—2 March (Natter night), 9 March ("VSWR and all that", by Les, G6BTQ), 16 March (Natter night), 23 March (Junk sale), 30 March (Natter night), 8.15pm. The Church Room, Church Lane, Wormley, nr Cheshunt, Herts. Details from Roger Frisby, G4OAA, tel 09924 64795.

Chiswick (ABCARC)—15 March (An introduction to cw), 7.30pm. The Committee Room, Chiswick Town Hall, High Road, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.

Edgware (E&DRS)—10 March (Informal), 24 March (To be announced), 31 March (SKE—the straight key evening on 3·5MHz). The Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Details from sec H. Drury, G4HMD, tel 01-952 6462.

Havering (H&DARC)—Wednesdays, 8pm. Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Details

from A. Negus, G8DQJ, tel Upminster 24059, or G8ZKZ, tel Romford 69770.

London (City University ARS)—The club has recently restarted its operations and meets Thursdays at the City University, exact location not specified in the letter. Contact Robert Benyon, G4KSK, Flat 4, Bullen House, Collingwood Street, London E1, tel 01-253 4399.

St Albans (Verulam ARC)—22 March (G3PAO Lecture. Dr D. S. Evans, G3RPE, will talk on microwaves). 8pm. Charles Morris Memorial Hall, Tyttenhanger Green, St Albans. Details from Ed Bailey, G4KLQ, tel St Albans 58132.

Southgate (SARC)—10 March ("Modern receiver design", by B. Bond, G3ZKE), 7.30 for 8pm. St Thomas's Church Hall, Prince George Avenue, Oakwood, London N14. Details from publicity sec, G8EWG.

Stevenage (S&DARC)—Please note the following: all meetings are now held at T S Andromeda, Shephall View, Stevenage, Herts. Morse classes at 7.30pm. Meetings at 8pm. 1 March, 15 March. Details from T. Bailey, G6CRF, tel Stevenage 62860.

Wanstead (ELRSGBG)—20 March (RSGB, your Society, which direction? Don't just complain on the air, come and question your elected representative). The Green, Wanstead, London E11. Info from G6DXW, tel 01-550 7013.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ. Tel 0272 848140.

Bristol (BARC)—1 March (Computer group meeting), 8 March (Bring & buy sale), 15 March (ATV demonstration), 22 March (Projects, night on the air), 26 March (Coach from BARC to the VHF Convention, Sandown Park, details from Mark Goodfellow, G4KUQ), 29 March (Computer group meeting), 3 April (Easter activity contest), 7.30pm. YMCA, Park Road, Kingswood. Mark Goodfellow, G4KUQ, has been appointed public relations officer, and club activity information can be obtained from Mark, or Trevor Cockram, G8GFZ.

Bristol (BRSGBG)—28 March (Chris Morcom, G3VEH, will be giving a talk on setting up repeaters), 7.30pm. Queens Building, University Walk, Bristol University. Details from Chris Short, G8GLQ, tel 0272 621253.

Bristol (NBARC)—Fridays, 7.30pm. Self Help Enterprise, Braemar Crescent, Northville, Bristol. Morse instruction is now given by Bill, G4FMH, and details of the club's programme will be advised next month. Further details from Ted Bidmead, G4EUV, tel 0272 691685.

Cheltenham (CARA)—First Thursday and third Friday in each month, 3 March (Constructor's contest), 7.30pm. At the time of going to press the club is still at the old address, The Old Bakery, Chester Walk, Clarence Street, Cheltenham. Changes since the AGM: John Holt, G3GWW, chairman; Gill Harmsworth, G6COH, sec. Details from John Holt, G3GWW, tel Witcombe 3435, or Gill Harmsworth, G6COH, tel Cheltenham 25162.

Gloucester (GARS)—2 March ("Crime prevention", a talk by local police), 4 March (Annual dinner/dance), 9 March (Club junk sale), 25 March, (No meeting), 6 April (Constructor's contest), 7.30pm. St Barnabas Church Hall, Stroud Road, Gloucester. Details from Tony Martin, G4HBV.

Portishead (Gordano ARG)—23 March (A talk on wt experiences and conditions), 7.30pm. Ship Hotel, Down Road, Portishead. Details from Bob Coles, G8ROC, tel 0272 691685.

Shirehampton (SARC)—Fridays, 7pm. Twyford House, High Street, Shirehampton. In addition to the usual film and lectures the club is starting a 144MHz df hunt season on Sunday afternoons. Details are available from Ron Ford, G4GTD.

Thornbury (T&DARC)—2 March (Talk on hf station equipment), 6 April (A talk on rtty). White Horse, on the A38, at Grovesend. Details from Alan Jones, G8AZT, tel 416381.

Weston-super-Mare (WsMRS)—Second Monday in each month, 7.30pm. The Rugby Club (off Drove Road), Weston-super-Mare. Details from F. Sargent, G3BLO.

Yeovil (YARC)—3 March ("BBC-IBA television transmitting aerials", by G3GC), 10 March ("Morse keys", by G3KSK), 17 March ("How to build an absorption wavemeter", by G3MYM), 24 March ("A.M. and ssb", by G3MYM), and 31 March (Natter night and committee meeting), 7.30pm. As the club will no longer be at Houndstone Camp, information as to where the meetings are being held for the time being, can be obtained from Adrian Dening, G4JBH, tel 0935 23873. Due to health reasons Adrian has also temporarily taken over the secretarial work from Don, G3NOF.

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 **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

Collins tx/rx, exc cond, FC902 atu, new. *Wanted:* Collins KWM 380, in wkg order. G4OWC, QTHR. Tel Derby 557705.

Trio TR7010 2m ssb/cw 8W rig, 144·100-144·340, late model, mobile mount, mint, £120 ono. Trio TR3200 70cm fm, 3W portable/mobile rig, 12 channels, all fitted, nicad charger, magmount mobile colinear, all for £130 ono. G4IZL, QTHR. Tel Northwich 48424.

MM2001, £155. Bencher BY1 paddle, £25. Trio AT130, £55. G3TUX, QTHR. Tel Chris, 0428 3229.

Trio TR7100 10W fm tx/rx, fitted S20-23, R0-7, £65 ono, or will swap or px for Yaesu FRG7. Mobile mount for FT290R and 15W homebrew linear, ideal for FT290R, offers? G4KFK/GM4KFK, QTHR. Tel Mike, 0895 834167.

Icom 211E fm ssb cw base station, ICRM3 remote control pad, ICSM2 desk mic, orig packaging, exc cond, £375 ono. G8ZPK, QTHR. Tel Crewe (0270) 661187.

Muirhead decade oscillator, 1Hz-111kHz, built-in frequency checking oscilloscope, metered op, £50. Jaybeam 2m 14-el Parabeam, as new, £30. Mains distribution board, six 13A sockets in metal base, 6m connecting cable, £10. G3VWE, QTHR. Tel 0272 656783.

SRX30, fb cond, two minor mods, £100. FT101Z, immac cond, as new, hardly used, fitted fm, £450, no offers. GW4PJQ NOT QTHR. Tel St Asaph (0745) 582032.

40ft galvanized free standing tower, triangular crank-up, tiltover, £130. Buyer collects. Tel Maidstone 50581.

Trio TS120V, matching power supply, spkr, mic, all in good cond, part-built homebrew atu for above, all components etc, box, £380, will split. G4NJX, QTHR. Tel Norwich (0603) 47804.

US AM913 tuner unit, Mallory spiral, two valve, input 90/220MHz, output 30MHz, £25. Pye mobile AM10D, glider channels, 130·1/130·4, £60. Both vgc. GU3HKV, QTHR. Tel 0481 47278, 6-7pm only.

250Hz cw filter for TS520 series, £18. 18AVT vertical 10-80m, £48. Four-el 2m beam, £5. Tel 0302 884651.

Drake TR4C hf tx/rx AC4 power supply, 80-10, fully xtalled up for whole of 10m band, good cond, £500 ono. G8TVV, QTHR. Tel Gosforth 842495, weekends after 6pm. This is due to my working shifts.

FR100B, FL200B, lf filter, swr meter, mic, key, all in good cond, £100. TR7500, as new, in orig packing, £190. Micronta multi meter, 17 range, £15. Property of deceased G3ZAX. Buyer inspects and collects. G3TPN, QTHR. Tel 0385 884298.

FT200, FP200, vgc, spare pa valves, etc, £195 ovno. Yaesu FP707 20A psu, mint, £85 ono. G4OWY. Tel Weymouth 786930.

Dragon 32 computer, callsign, log stores 450 callsigns and data on each, menu driven, incl useful search option, very fast, simple to use, a real gem, £4 for cassette incl post. G6HQK, QTHR. Tel Wolverhampton (0902) 69796.

KW204 with mic, £155. KW202 and spkr, £90. KW Vespa Mk2, with mic, £90. Trio QR666, mint, incl phones, Joystick atu, £75. Twin swr meter, £7. All exc cond. G4JVS. Tel Loughborough 230898.

Shack clearance: all types of equipment, 2m hf etc. Tel for details, 041-554 0516.

Heathkit HW8 QRP tx/rx, 80, 40, 20, 15, comp with Heath psu, manuals, orig packing, £95 incl carriage. Liner 2 2m ssb, fitted preamp, extended coverage, £75 incl carriage. Tel 0504 48295, after 6pm.

Icom IC720A, PS15 power supply, unused, £795. Tono 9000E, new, £525. GW4ACO, QTHR. Tel 0492 55240, evenings.

SX200N scanning rx, mint cond, full service manual, discone antenna, £180. G6LMO. Tel Maidenhead 27236.

Linear FL2100, used little, unmarked, box, handbook, etc, £285. G4PCK. Tel Torquay 38134.

Narco Mk7 certified aircraft tx/rx, 360 channels, 12V mobile and base station antennas, px either way for late model 2m multimode tx/rx, will consider 70cm or hf tx/rx. RS51652. Tel Poynton, (Cheshire) 876192, evenings.

Sansui D100 hi-fi cassette deck, metal tape cable, l.e.d. peak, analogue vu meters, only one year old, beautiful cond, selling due to purchase of DBX model, cost £140, no reasonable offer refused. G4IAC, QTHR. Tel 06755 2745.

Epson MX100 dot matrix printer, 80 character per second, bi-directional, tractor or friction paper feed, prints graphs, diagrams or illustrations, £350 ono. Collect. G3AZI, QTHR. Tel Preston (0772) 37815.

Sirius 1 16-bit, 128k micro, £1,500 ono. Collect. *Wanted:* FV901DM; SP901; YO91P; FAX receiving equipment; Thruline elements 250H etc; Microscope accessories, slides, etc; Lopass filter hf; Bencher lever. G3AZI, QTHR. Tel Preston (0772) 37815.

Heathkit tx DX100U, manual, £30 ono. Many radio mags. Frank Sweeney, G3TFS, 58 Grosvenor Road, Epsom Downs, Epsom, Surrey. Tel Ashtead 72689.

FT ONE, comp with fm board, ram board, all filters, keyer, factory mods fitted by supplier, 10 months old, immac cond, must sell, finance required for new project, cost £1,420, first £1,100 cash (ovno) secures. G3LPA, QTHR. Tel Kettering 760336, after 6pm.

Heathkit HW101 ssb tx/rx, recently built, factory tuned, comp with mains power pack PS23, manuals. R. McGloin, 72 Maree Drive, Cumbernauld, Scotland G67 4LP. Tel 023 67 33770.

FT221, vgc, used little, no mods, orig packing, handbook, £295. Prefer buyer collects. G4GTX. Tel Sunderland 284435, evenings.

Yaesu FT101Z fm hf tx/rx, £480. Yaesu FT290R 2m tx/rx multimode, psu, mobile mag mount, £200. Both items new November 1982. G6CHB, QTHR. Tel 0632 462606.

Racal RA17 rx with cabinet, beautiful cond, £220. KW204 tx, £90. G3RTB, QTHR. Tel 0904 57587 day, 641011, night.

KW204 tx, needs attention, KW202 rx, KW160/KW E-Zee atus, swr meter, spare valves etc. Suitable for club

station. Any sensible offer secures. Buyer collects/inspects. GM3ANO, QTHR. Tel 0577 62783.

Trio 2300 incl charger, two sets nicads, £100. Icom IC202E 2m ssb tx/rx, £75. Heathkit 2m 10W pa, £10. MMT 70/144 2-4m transverter, £70. G4FUY, QTHR. Tel Reading 733633.

30ft heavy steel mast, buyer collects, £50. G3YRR, QTHR. Tel 0472 54718.

G4MH mini beam, £40. Buyer collects (Harlow). G3WRO, QTHR. Tel Harlow (0279) 30609.

Drake RV7 remote vfo, £100. Drake SL500 cw filter, £25. D. Poulter, G3WHK, QTHR. Tel 01-330 5795, after 6pm.

Free morse trainer program for BBC micro. Send cassette and stamped addressed padded envelope. Program sends groups, pseudo words, plain language, or numbers, variable gap. *Wanted:* Cheap 10MHz counter timer wkg or repairable. GW3ECH, QTHR. Tel Brecon 5871.

FT101ZD fan, mic, used little, £425. G4EBX, QTHR. Tel 0773 812766.

Lowe SRX30 rx, 0·5-30MHz coverage, good cond, valued at £80, swop for anything interesting, ie hf beam, 144MHz fm/ssb box, W.h.y? Cash adjustment possible. GW4BCD, QTHR. Tel 065671 8963, after 6pm.

Eddystone EC958 professional class comm rx, 10kHz-30MHz, vgc, £435. Marconi H2301 (880/2) rx, high stab, 0·5-30MHz, 30 bands, £250. RCA CR91 (AR88) rx, £65. Jaybeam PBM 14-el, 2m, new, £35. Pye Pocketphone, £5. Part exchange? G4AFY, QTHR. Tel Bob, Kidderminster (0562) 753358.

FT221RD, matching spkr, £300. TR2400 2m handheld tx/rx, charger, £135. DX 100L gen cov rx, £40. All in mint cond, hardly used. Alan Morrison, G8KUJ. Tel 0902 755634.

TS120V, TL120 linear, 200W p.e.p. input, £365 ono. PS30, 13·8V 20A psu, £60. All vgc, cables, manuals, packing. Tel 04536 3994, after 6pm.

Kenwood surplus to requirements: SP180, £25; VFO520S, £45, plus postage. SEM50, £40. Packer 2m atu, £12 incl postage. *Wanted:* Kenwood DG5,HQ1 mini-beam. Both must be perfect. G4OLC (G8XZM) QTHR. Tel 0670 813352.

Star ST700 ssb/cw tx, 180W p.e.p., 80-10, £70. Matching Star SR700A hf rx, £75. These units will work transceive or as separates, immac cond, one owner since new, manuals, schematics. Prefer buyer collects. G3XJJ, QTHR. Tel 0604 716196.

Pace (MM) audio mixer, eight channels into two, fold back, vgc, used little, £210 ono. *Wanted:* w.h.y? Handheld, atu, rotator? G6DHY. Tel Calne (0249) 812329.

AOR AR240 2m handheld, pll synthesized 5kHz spacing, 1·5W out, 800 channels, λ/4 whip, rubber duck, wall charger, spare battery pack, leatherette case, hardly used, access tone, standard duplex-simplex shifts, £115 ono. G3RDX, QTHR. Tel 0395 32364.

Yaesu FRG7000 gen cov rx, exc cond, hardly used, as new, features 250kHz, 29·9MHz a.m./ssb digital frequency readout, digital clock/timer, preselector, fine tuning volume/tone control, £179. Harding. Tel Ingrebourne (Romford area) 45374.

Shack clearout: psus 24V, 12V, 5V to 30A, keyboards, 444 teleprinter, SP101 spkr, swr bridge, 4CX250 and base, roller coasters, antique AVO oscillator, 2m tx, 4118 S-rams, transformers, capacitors, etc. For details, prices, contact G4GXE, QTHR. Tel 053871 760.

Trio 2400 2m handheld, comp with supplied accessories, spare nicad pack, λ/4 telescopic antenna, recently serviced, so in vgc, £130. G6FSE, QTHR. Tel Sevenoaks (0732) 450491.

Yaesu FT200 and homebrew power supply, new valves, £160. Europa 2m transverter, £20. Heathkit scope, 10-18U, 4·5MHz bandwidth, £35. All vgc. 14AVQ, new, unused, £45. G4AIJ, QTHR. Tel Ludlow 3197.

88mH toroids, American open pattern, suit BARTG tu etc, £2.25 each incl. *Wanted:* 14AVQ or 18AVT. Datong PC1 or UC1. Chris Pedder, G3VBL, Thorncliffe, 5 Royalty Lane, New Longton, Preston PR4 4JD. Tel 0772 612289.

TR9000 and BO9 base, need cash, going QRT, £280 ono. G4MBY. Tel Paul, Chipping Sodbury 310811.

TS120S, PS30, SP120, not used mobile, Securicor arranged, £360. G4NTX, QTHR. Tel 020881 3386.

Kenwood/Trio TS120S hf tx/rx, AT120, handbooks, connectors, orig packaging, not used mobile, £350. RS50148. Tel 031-664 2099, evenings.

FT101 tx/rx, 240/12V, 160-10m, 10MHz WWV, 11m, vox, etc, 100 per cent mint cond, 20-10m vertical ant, mic, handbook, £350 ono, or exchange for R1000 and MM2000. G4AMZ NOT QTHR. Tel Wilmslow 533857.

Sommerkamp/Yaesu FT290R 2m multimode portable tx/rx, ssb, usb, lsb, cw, fm, comp with nicads, charger, as new, in orig packing, virtually unused, £230 ono. Tel Leeds (0532) 672797.

Heathkit HW101, comp with psu, cw filter, Shure 444 mic, realigned to orig spec, £180 ovno. GI3ZCK, QTHR. Tel Ward 702555, business hours.

Acorn Atom rtty program, rx/tx, 1-600 baud, auto letts/figs shift, auto transmit QTH, callsign, etc, program on cassette, interface, terminal details, £12. PCB for above, £8. ASCII software for use with above, £5. Tel Melton Mowbray, (Leics) 69119.

TS180S tx/rx, WARC bands fitted, fully tested by Lowe Electronics, £400. G3POX, QTHR. Tel 0480 811549.

Due to the recent death of G4AGF the following items are for sale: FRG7 rx, good cond, £110. Yaesu FLDX400 hf tx, £120. Reace SWR3 bridge, £10. Two sets headphones, offers. Tel Blandford (0258) 55995.

KP202 2m handheld, S16, S19-22, R6, nicads, charger, carrying case etc, £50 ono. Microwave Modules MMC 432/144S, MMC 144/28LO, MM 2m preamp, all three in case, psu, £50 ono. Heathkit sig gen RF1U, £5. G6EDS. Tel Flitwick 712743, after 6pm.

TS515 and psu, only five bands, hence £150. Prefer buyer collects. G3XAQ, QTHR. Tel Canterbury 52131.

Sommerkamp FR100B rx, FL200B tx, some spare valves, £170. Europa B 2m ssb transverter, matching psu, spare valves, £60, or £210 the lot. Starphone M5/5CH plus unit for spares, £45. Exchange tx/rx, FT101, 820/520/S, W.h.y? G4NPY, QTHR. Tel 05436-5737, or 76101, daytime.

Towermast, 28ft, rotator, all cables (not tilt), £75. 600MHz frequency counter, new, £75. Marconi sig gen, a.m./fm, vhf/uhf, £65. Burndept 471, current model, xtalled on 70cm, some extras, offers. Part exchange or swops considered. G4JKP. Tel Russ, Leicester (0533) 899958.

Brookes MB6R rtty terminal unit, £65. MML 144/100 100W 144MHz linear, £80. Datong PC1 gen cov up-converter, £85. Monochrome 14in uhf tv, £30. 2A 13V psu, £8. 15W 144MHz linear, £20. G8KMV, QTHR. Tel 0438 54689.

Shimizu tx/rx, 10-80m, ssb/cw, £190. Altai 12V 6A psu, £7. Eagle condenser mic, £6. 48k Sinclair Spectrum computer, psu, introductory software, books, £150. All in good wkg order. No offers. G4LKT, QTHR. Tel 01-504 4149.

Trio TR7850, 40W 2m mobile, £235 ono. Trio TS700G 2m all mode base station and vox unit, £250 ono. G4OVQ. Tel Godalming (Surrey) (04868) 4491.

FTDX560 160-10, incl 10MHz fan, cw filter, FV400S ext-vfo, Comdel rf speech processor, mic, all good cond but fault on 10m transmit, good dx set-up, £250. Tel Steve, Exeter 216579.

QY3-65, three new pa triodes, 280W at 50MHz, see handbook for data, £15 each, post paid. Tel 0642 784915, after 6pm.

Trio 2300 mic, case, charger, dc lead, £120, or exchange for Sony ICF2001. G3JKN, QTHR. Tel Denham (0895) 832229.

Trio 9130, 2m, all-mode tx/rx, new July '82, all accessories, mobile bracket, boxed, immac, £345. 25W or 5W power. Will exchange Trio JR310 rx, 80-10, for MML 144/100S linear rx, vgc, or £65 cash. G6HJF. Tel 0772 792935, evenings.

QTH: Poole boundary, four-bedroom modern split level house, superb radio site, 0·75 acre garden, panoramic views, open on all sides, overlooking private golf course, luxury fittings throughout, large roof area could easily be converted, £73,500. For further details tel 0202 697779.

FT225RD, exc cond, £485. Acorn Atom computer, 12k, floating point, word processor, toolkit roms, printer interface, QRA scoring, morse tutor, games tapes, £140. G4PEO, QTHR under old callsign, G8XBH. Tel Croydon (01) 689 2928.

FT101ZD, fan, recently serviced, £440. SEM Z-Match, 160-10, £50. EK150 electronic keyer, £45. HF5 vertical with radial kit, £50. All in exc cond, £550 the lot. Robert Gilchrist, G3WUD. Tel 01-423 5809.

HF5 five-band vertical, matching radial kit, good dx performance, £45. G4MUW, QTHR. Tel Winchcombe (0242) 603682.

Yaesu FT480R 2m tx/rx, multimode, extended coverage, new pa, 18 months old, £275. 2x25m low loss coaxial, £20. Rotator 9502B, top bearing, 20m cable, £45. Cushcraft 10XY 2m ant, £40. All vgc. All above carriage extra. GW4RLP, ex-GW8ZZQ NOT QTHR. Tel 0286 5322.

Tri-band beam, Cushcraft A3, new, recently refurbished, £125 ono. G3VQQ. Tel Bradford 721787.

TS520SE, immac, only £350. 33 Liversedge Hall Lane, Liversedge, West Yorks.

A new Microwave Modules 2m converter, 28MHz i.f., £19. HF balun, 50Ω, £5. New Ross Studio stereo headphones, £19. Pye mobile spkr, £5. New Yaesu desk mic, boxed, £14. Tel Richard, 0376 21869, evenings only.

Lifetime's collection of ham gear: EA12s B40/41, 940, HRO, AR88D, LM14, 770R. 100s valves, morse tapes, records, cassettes, code oscillator and electronic keyer by Heathkit, xtals, meters, etc. *Short Wave* magazine and *Radio Constructor* 1946-82. Tel Portsmouth 733573, evenings.

Shack clearance: ant gear incl winches, pulleys, ropes, cables, tube couplers, turnbuckles, 20ft dural 7g tubes, steel tubes, base plate, 0·25in alloy special made fittings. SAE for list. GW3CBA, QTHR. Tel Barry 741520.

450 books ranging from *Ham Radio, A Beginner's Guide,* to *Microelectronics.* Lots of projects on vhf, transistor, ic ham equipment, *Radio Communication,* etc. Tel Portsmouth 733573, evenings.

TS700S 2m multimode digital tx/rx, exc, no mods, orig packaging, £390. TR7600 2m fm 10W digital tx/rx, ideal mobile, noise-cancelling mic, £125. Western UHD-2 32ft telescopic tiltover mast, new, collect, £240. G8NCC, QTHR. Tel 06076 65874 (Derbyshire).

FT101B, comp with mic, fan, six bands. Property of late GM4FAC. Offers to GM3PZG, QTHR.

2m transverter, MMT 144/28, £65. RTTY equipment, Creed 7E, silent cover, ST5 tu reperforator, tape reader, £55. Trap dipole, 10, 15, 20m, TD3JR, assembled, £20. G4NRG. Tel Brentwood 810831.

2m fm base station: Icom IC210 tx/rx, mic, manual, leads for 12V mobile working, own inbuilt psu, good wkg order, £160. G3WPO dip oscillator, £15. G4MPD, QTHR. Tel Northwich 47552, after 5pm.

Radio Communication 1951-62, £25. Yashica 124G and accessories, £50. *Wanted:* pre-1933 *Bulletins.* G4HUE, QTHR. Tel Andy, 01-554 0399.

Bargain—new Icom 720A and PS115, new FC902 atu, Collins KWM2, exc cond. *Wanted:* Collins linear amp, Drake L4B linear amp, or Kenwood linear amp. Tel Derby 557705.

Trio TR7600 2m fm tx/rx, incl RM76 microprocessor control unit, 5kHz steps, 10W output, scanning facility, used little, orig packing, £160 ono. G8VAS, QTHR. Tel Bishop's Stortford 57448, evenings.

Transam Triton home computer, level 5 Basic, machine code facility, comp with Motorola vdu and very comprehensive instruction manual, £80. Sterling manual typewriter in vgc, £40. G3WDW. For further info tel Bradford (0274) 633387, evenings.

Azden PCS300 2m fm handheld, lcd readout, scanning, memories, boxed, as new, ready to operate, £165 or swop for mint Trio R600, or R1000 rx with cash adjustment. Tel 0373 64694 (nr Bath).

Mosley TA33 with TA40 (40m) attachment, £55 or split TA40 sections, ideal h/b vertical. Rotator CDE44, £45. Stainless steel poles, 2in od, 20ft lengths, £10 each. GM3OXC, QTHR. Tel 0224 832544, day, 0224 646984, evenings.

Receivers: aircraft vhf monitor, Heathkit GR98, Eddystone 750, Lowe SRX30D, service oscilloscope, Heath OS2, power pack, regulated 1-30V dc Heath model 1P28, world clock, Kenwood HC10. Bob McGloin, 72 Maree Drive, Cumbernauld, Scotland G67 4LP. Tel 02367 33770.

Multi U11 70cm fm tx/rx, 10W 22ch, boxed, comp with all fittings, £95. G3VZV, QTHR. Tel 0525 5343.

TS520SE, £360. FT7B, £300, or with FP12 psu, £350. G4NVD, QTHR. Tel Grimsby 71999, weekends.

TA33JR, driven element recently replaced, £40. Buyer collects. G2FLB, QTHR. Tel 01-467 1078.

QTH: three bed detached in Aldridge, W Midlands: 600ft asl, full planning permission for large rotary hf and vhf ants, £30,000 ono. 60ft crank-up tower included in above price. G3NAS. Tel Aldridge 53718.

Japanese desk mic, stand, as new, bargain, £20. Desynn N-S-E-W indicator, xtals, holders, 32·22222MHz, 33150·0kHz, 25·00600, 32·00000, 18·00600, eight jack plugs, ant in/out control box homebrew, homebrew lp filter, two Eddystone dials, indicators, small box bits and pieces, £1. Offers? G3XWV, 13 Grimpits Lane, Kings Norton, Birmingham 38. Tel 0564 822280.

PET Commodore computer model CBM4032, comp with Commodore tape cassette C2N, basic programmer's toolkit, arrow features, users manuals, PET/CBM personal computer guide, PET Basic, PET and the IEEE, 14 months old, used little, bargain, £400. G4BWU, QTHR. Tel 0438 54261.

Heath SB301 rx in superb cond, peaked and lined, compares with two modern rxs at QTHR fitted professionally, stepped attenuator 6-20dB with phones, £75. G3RHM. Tel 01-423 0306.

Yaesu FT290R with ARE mods, nicads, charger, MML 144/30LS, swr meter, cables, immac, £200 the lot, no split. Going QRT on 2m. Buyer collects. G6AWI, QTHR. Tel 01-423 1602.

RTTY fabulous modern dedicated micro-processor by Norden, nice keyboard, see *Rad Com* June '79, p578 for picture and info, as new, just connect to tv and rig, then send-receive, £250. G4IBK, QTHR. Tel 01-346 5841.

Mains transformers and chokes, mostly high-grade Cossor oil-filled types, eg 650-500-0-500-650V at 250mA rms transformers, 5·9H-450mA chokes. Many other types. SAE for details, G4KJS, QTHR. Tel Canterbury (0227) 64683, evenings.

Trio TS510 and psu, £190. VFO5D, £25. BC221 built-in stab psu, £20. ACCU keyer, built-in stab psu, monitor, £20. Miniciter, mini pa, £5 each. G3FIU, QTHR. Tel 021-355 5487.

TenTec PM1 QRP cw tx/rx, 80-40, £25. Heathkit HD10 keyer, no manual, £10. Drake xtals, 25·6 and 39·1, £3 each. HB 10m fm QRP tx/rx, built from Cybernet boards, repeater offset, £30. G5EBA, QTHR. Tel Bob, 981 2705.

British National Radio School RAE course, comp, used once (successfully), £25. Mizuho KX2 sky coupler, as new, £20. G4OJQ, 4 Cleave Crescent, Morwenstow, Cornwall EX23 9JH.

TS770E 2m/70cm dual band base station rig, mains or 12V, unmarked cond, all accessories, packing, etc, £585. Matching SP70 spkr, £15. Will separate. Only reason for sale updating to TS780. Deliver to 50 miles. G8CCI, QTHR. Tel Oxford 880229, evenings or weekends.

Icom IC251E multimode base tx/rx, no mods, £420 ono. Jaybeam 14-el parabeam, £35 ono. Eight-el vhf broadcast beam, £10. G3POX, QTHR. Tel 0480 811549.

Storno 600 oscillator modules, £6 pair. 2m xtal pairs, 12/52MHz for repeater/simplex channels, £3. Marconi 2m cavity filter, £10. Storno 500 2m handheld, charger, nicads, handbook, case, £60. 5V stabilized/protected psu, £5. Low-band Viscount, £5. G8AKA. Tel Reading 701163.

Yaesu FT707, SMC modified for fm, perfect cond, mobile bracket, mic, £375. 13·8V 20A mains power supply, £50. FDK700E 2m fm 25W, £100. G3KCR NOT QTHR. Tel Seaford (Sussex) (0323) 890726.

Antennas: vertical No1 in canvas bag, £20; HF5 vertical, 80-10m, £25. Steel teleprinter table, £20. Creed 7B/N3 teleprinter, silence cover baseboard, £20. Creed auto tx, £10. PO66A psu, 80 + 80, 160-250V dc, £15. 45AH nicad battery, £25. G3JFC, QTHR. Tel Crayford 522489.

Three 813s, two 805s, with bases, £5 each. Transformer, 1500-0-1500, 300mA, 650-0-650, 200mA, £10 each. All plus heater windings. Several chokes. All carriage extra. G3AUZ, QTHR. Tel 0909 473893.

Matrix printer, Dolphin BD80, 80 cols, 112cps, 9·5in pin feed, £100. Apple 2 parallel interface, exc cond, £50. Buyer collects. G6XD, QTHR. Tel Teignmouth 2611.

Belcom Liner 2 ssb 2m tx/rx, 144·10-144·33, fitted with preamp, working well, in good cond, £70. G6IVC, QTHR. Tel Southport 35775.

Ferguson Videostar colour camera 3V17, comp with power supply, cables, used little, £230. G4GBB, QTHR. Tel 03045 61085.

TS120S, bargain price for little used tx/rx, vgc, service manual, £305. Datong rf clipper D75, £25. Eddystone 888A amateur bands and 670 gen cov rxs, £50 each. G4HQ, QTHR. Tel 01-508 1620.

Trio TS530S, in mint cond, MC30 mic, orig boxes, £455. ZX81 computer, 2k memory, power supply, £35. G4MDR, QTHR. Tel Newport Pagnell (0908) 613215.

Keyboard (ex-terminal), 76 good quality reed keys, decoded/various options, in smart case, ideal for rtty or micro-computer use, £10. G4PEY. Tel Horsham (0403) 69835.

Icom 202S 2m, ssb/cw, 3W, £80. Trio 7010 2m ssb/cw, 10W, £80. Eight-el Yagi, £12. G8WSK. Tel Portsmouth 752204.

PW Helford i.f. board G3CLF design, built, £35. PW Nimbus main board, rx wkg, most components for tx side, pair xtals, R0, £15. G4IOK, QTHR. Tel Witney 4867.

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. Tel 093586 3265.

Trio 7010 2m ssb tx/rx, mobile mount, 5λ/8 antenna leads, cable, £75. Yaesu FC707 antenna tuner, perfect, £50. Pocketfone PF1, suitable 70cm conversion, £7.50 pair. *Wanted:* Yaesu FTV707R with 2m conv. G4DIC, QTHR. Tel 0455-636315, evenings or weekend.

KW202, (Decca) with fm KW204, both good cond, wkg, could do with overhaul, Heathkit SB610 monitor, all with manuals, comp, £260. G4GEW. Tel Downland (Surrey) 54388.

FT208R 2m handheld, homebrew regulator, 13W power amplifier, λ/4 whip, 8-el Yagi, £170, no splits. Datong up-converter, converts your 2m or 28MHz multimode into gen cov rx and 2m rx, £75. G4NAB NOT QTHR. Tel Fareham (0329) 662144, any reasonable time.

DX33/34 conversion kit, (Director), new and unused, £35. Tel 0463 41211.

FT7, mint cond, all 10m xtals, mic, power lead, mobile mount, orig packing, £250. Microwave Modules dual output 144MHz preamp, £12. *Wanted:* FT301, FT101, or similar hf tx/rx. G8GHU, QTHR.

TS820S digital, 500Hz cw filter, dc/dc inverter, mint, £425. VFO520, £50. SP520, £12. AT200 six-band atu, 20/200W, £70. All with leads, instructions, etc. G4FQF, QTHR. Tel Romford 47998.

Part-built G2DAF Mk3 tx, chassis comp, filter, all major components, requires xtals, £25. PU for above, built, wkg, £10. Prefer buyer collects. G4JGG, QTHR. Tel John, 0908 368420.

RTTY program for BBC micro model B, split screen and type ahead while receiving, pre-programmed messages, auto tx/rx switching, cw indent, many other features, cassette and instructions, £7.50. G3WHO, QTHR. Tel Gt Alne (078981) 377.

Realistic PRO47 10ch scanning rx, £50. Williams, 11 Cedar Avenue, Sleaford, Lincs NG34 8BW. Tel 302937.

KW600 linear amp, £175. Buyer to collect or pay carriage. Southwell, G4FEU, QTHR.

ZX81 program, fully structured morse learning program, not just another tutor. Learn at your own pace, letters, numbers, punctuation. Full 16k user friendly program, full listing, notes etc, £5. Donald Gray, G3YPL, QTHR. Tel West Coker (093586) 3265.

Trio TR2300, comp unit, all mods, rubber duck, mobile mount, £120. Have to sell as want 100cc motorcycle. Probably could deliver to your door, just ask. G8XEB NOT QTHR. Tel Chris, Liverpool (051) 922 5508, after 6pm.

Coutant 20A power supplies, cont rated variable output, set to 13·8V dc, load reg 1mV or 0·02 per cent from no load to full load, overload protected, can be doubled/trebled. G4AQV, QTHR. Tel 0533 552809, evenings/weekends.

KDK 2030 25W tx/rx, as new, never used, £160. Post free. J. Trevett, G4GKX, QTHR. Tel 0202 690599.

35ft steel tower in two sections, offers, or exchange for Eddystone 770R Mk2, must be good cond. Macey. Tel Burley (042-53) 3559.

TR2300, as new, incl nicads, mobile mount, £150. G6BAP NOT QTHR. Tel Tunbridge Wells 28947.

RAE correspondence course, comp, offers or w.h.y? Tel 0582 606983, evenings.

FT290R 2m multimode portable, mint cond, boxed, hardly used, nicads, charger, case, whippy λ/4 ant, £200. G4OQN. Tel 01-898 9856, work hours, 01-977 2658.

KW202, hf rx, calibrator, Q-multiplier, notch filter, no mods, handbook, immac cond, £170 ono. KW204, tx exc cond, handbook, £150 ono. G3ZHJ. Tel Luton (0582) 583593.

Trio TS130V 25W p.e.p. hf tx/rx, in perfect cond, only five months old, £395. Homemade 12V 5A power supply to suit TS130V, £30, if bought together. Tel Fareham 236906, weekends or evenings only please.

ITT 2020, 48k, green vdu, disc unit, manuals, books, etc, fully compatible with Apple 2 hardware and software, £500, no offers. G4KPN. Tel Guildford 68595.

FRG7, Yaesu YH55 headphones, 2m converter, power pack, Ringo Ranger, 100ft dipole antenna, *RSGB Amateur Radio Guides,* all mint cond, for quick sale, £165 ono. Transport included in price to most parts of UK. Tel 0621 55433, evenings.

FT101, 80-10m, cw fan, mint cond, no mods, £200 ono. SSM Europa 2m transverter, £30. Olympus OM2N, cw case, mint, £120. G3TC. Tel Sheffield (0742) 303408.

Trio 2300, used little, nicads, whip, helical, case, charger, orig packing, £110. KW107, 1kW hf atu, dummy load, swr power meter, £60. Buyer collects. GM4CUX, QTHR. Tel 031-332 5300.

MMT 28/144 linear transverter, 10W output on 10m when driven by 2m rig, ssb/fm/cw (15dB attenuator included), £75 ono. G4ABF. Tel Chris, Malvern (06845) 66202, before 7pm.

Drake line R4B/T4XB, MS4 spkr, power supply, vgc, spare valves, £400. G3YHX, QTHR. Tel 0922 27719.

Yaesu FT101ZD,comp with fm board fitted, dc powerpack, 500Hz cw filter, spare a.m. board, spare pas, driver, used little, reason for sale upgrading, £475. Trio R1000 communications rx, mint cond, £180. G4OCO, QTHR. Tel 0295 721123.

Yaesu 101ZD/FM, eight months old, £500, or Sommerkamp FT277ZD, 18 months old, (same as 101ZD a.m.), £450. I am selling *one* of the above rigs. G8ZCK, QTHR. Tel Potters Bar 43879.

Generator, 40/50V variable, ex-WD, still mothballed, Villiers petrol, £65 ono. Buyer collects. *Wanted:* FT101, Cushcraft AV4 or AV5 or similar. W.H.Y? Tel Earlswood (Warwickshire) 2449.

Icom IC720A ham bands and gc tx/rx, mint cond, orig packing, accessories, manual, etc, serviced by UK distributor, bargain, £630 ono. Lonnon, G3ZUM, QTHR. Tel Long Sutton 298 until 20 March, then 021-747 5077 (Water Orton).

Yamaha electric organ model B2R, dual keyboard plus pedalboard, rhythm generator etc, in exc cond, perfect wkg order, a nice piece of furniture, comp with matching stool, £350. G3WDW. Tel Bradford (0274) 633387.

Icom 260E, 2m multimode, comp with box, handbook, etc, mount, TAL antenna, as new, £235. Tel 0724 762281.

Variac 240V, 3A, good cond, two available, £10 each. *Wanted:* 1,000pF sprague 2,500V capacitor, ex-TU5B tuning unit type, state price. G3SIH, QTHR. Tel Melksham (0225) 703443.

FDK750E continuous coverage, 144-146MHz, ssb, cw, a.m., fm, hardly used, mint cond, boxed, λ/4 gutter mount antenna, £195. G4GKN NOT QTHR. Tel Camberley 682157.

ZX81 with psu, manual, one tape, as new, boxed. G4GKN. Tel Bristol 833572.

Morse tuition programs on tape for VIC20, ZX81-1K or ZX81-16K (specify) with full operating and learning, instructions. A complete, flexible system, sending characters in easy, selectable stages, to get you that A licence. £5 each. GW3RRI, QTHR. Tel 0286 881886.

Cue Dee 17-el 70cm beam antenna type 17432AN, portable use only, in exc cond, £30. G8URI, QTHR. Tel Romford (0708) 751808.

RTTY Macrotronics TM800 tu interface for TRS80 16k level 2, comp with all leads, ready to go, cost £362, £200 ono. TRS80 in screened case, £100 ono. Netronics keyboard, 45·5 baudot or 110 ASCII, TTL or RS232C in/out, vdu op, £60 ono. Brooks tu, £40 ono. All with manuals. G4CEQ, QTHR. Tel Downland 55908.

Rack, 19 by 40 by 18in with back, £25. Electrosonic pro amps, 60W, 8Ω, £30 each. Mobelec electronic ignition, new, £10. Bits of Rover 2000. Phil Moss. Tel 01-337 7309 (Surbiton).

FT101B, superb cond, perspex cover, cw filter, fan, 12/240V, hardly used, £320. G4NXM, QTHR. Tel Bagshot 75672.

Microwave power meter, Hewlett Packard type 430C, HP477B detector, manual, 10MHz-10GHz bandwidth, Texscan uhf sweep generator for sale or exchange, offers. G8GLL NOT QTHR. The Elms, Trewdon, Mullion, Helston, Cornwall.

2m magmount, 5λ/8 whip, £10. NEC pa, driver valves for FT101, unused, £10. 2m converter, SEM, 2-4MHz i.f., £5. Tangerine and minimum Tanex, 6502 books, £90. Intersil dfm kit (built), £10. G3ZXY, 8 Davenport Lane, Arclid, Sandbach, Cheshire. Tel Smallwood 545.

Trio TS500, PS500, VFO5, £150, no offers. G4MYC. Tel Guisborough 38103.

Yaesu FRG7 gc rx, £100. Datong PC1 converter, £75. Brand new dc power supply for FT101Z, £30. MM 144MHz converter, i.f. 28-30MHz, £15. Trio TR3200 70cm tx/rx antenna, lots of extras, £150. G3IDW, QTHR. Tel Swindon 822055.

TS130S tx/rx, boxed as new, used little, cash offer of £475 secures sale. Tel Richard Jones, Newport (0633) 270110, ext 2222, working hours.

Daiwa CNA2002 auto antenna tuning unit, £160. Osker swr meter, £18. HQ1 mini quad and Stolle rotator, £95 pair. Property late G4KG. G3GIQ, QTHR. Tel 01-567 6389.

FT101E, cw filter, £290. IC240, £90. KW108 monitor-scope, £38. Each item good cond, handbooks, orig packing, would deliver within 50 miles. G3GHY, QTHR. Tel Southampton (0703) 846568.

70MHz Pye Cambridge FM10D, cradle, manual, xtalled on 70·26MHz, £20. BC221, charts, psu, £20. Reason for sale QSY to 50MHz. Shack clearance, sae list; PO Box 30, Shepshed, Leicestershire LE12 9SQ. Tel 05095 4163, after 6pm.

FRG7700, FRT7700 atu, superb rx, mint, one year old, unopened, £260. Need cash for hf tx/rx for new G4. G8ZMZ. Tel 0822 853991, evenings.

IC202 cw 15W linear, £85. Belcom FS1007P 144MHz scanning tx/rx, 16 popular channels, mains/12V integral psu, nice teak case so xyl won't object, £100 ono. KF430, 3W, xtalled 10 channels, £90 ono. *Wanted:* FT101 or equivalent (max £300). 18AVT/WB. G8GHZ, QTHR. Tel 0249 654188, ext 146, office hours.

Yaesu YR901 cw rtty reader, mint cond, cost over £400, £190. DL6WU 11-el Yagi, £25. KDK mobile rig, mint, £100. Standard 8800, £150. VDU with full keyboard, £50. G3XNH, QTHR. Tel Godalming 29757.

Foretop tv video converter, new, unused, £5. Westminster boards, new, rf B band, £5. Audio board, £1. Nine xtals for TM56B, £1 each. Three repeater, six simplex. G8BWI, QTHR. Tel Cambridge 314532.

TR2200G, 12ch, R0-7, S20-23, nicads, charger, £75 ono. Codar AT5, mains psu, £15 ono. Wood & Douglas 2m tx, built, wkg, £20 ono. Prefer buyer inspects/collects. G4EZR, QTHR. Tel Mark, Orpington 30124.

Eddystone Mk1 and Mk2 EC10, Mk1 in vgc, Mk2 needs attention but still wkg. Part exchange or sell. Tx/rx FT7 or FT200 or transmitter with cash adjustment. Tel Ken, Bushmills 31086.

FT101EE 160-10m six bands plus WWV, exc cond, plastic cover on front panel, manual, 12V and mains leads, mic, bargain, £299. G4JYH, QTHR. Tel 01-886 0126, daytime.

KW204 tx, Shure 201 hand mic, KW202 rx with

matching spkr, mint cond, manuals, will sell separately. Reasonable offers only. Buyer collect or arrange carriage. G2DZ, QTHR. Tel Byfield 60530.

Yaesu FRG7000 rx, mint cond, used little, £180. CD45 rotator, new ring gear fitted, (no control box), £45. GW6PIL NOT QTHR. Tel Wrexham (0978) 757449.

Bearcat 220 scanning rx, £120 ono. G6AHN, QTHR. Tel S. J. Reynolds, 01-954 2311, ext 4387.

Trio/Kenwood R300, service manual, good cond, £95. Yaesu spkr in cabinet, as new, £10. Quantity Denco octal coils, valve type, 50p each. Toshiba PC3110 stereo tape deck, mains, £30. Eagle intercom, battery operation, new, £10. C. M. Lindars. Tel 01-647 6157.

TS120V, never used, £285. 80W 2m pa, Mirage. *Wanted:* Handheld 2m. G6HXD, QTHR. Tel 0909 474420.

CD1400 scope, 3019H bw with 2X CX1441 and CX1443 plug-ins, £35. Beckman dual pulse gen model 4904, £25. Wayne Kerr universal bridge B221, Q221 low-Z adaptor, £40. Airmec 248A wave analyzer, £45. Furzehill vtvm type 3788/2, £10. BC221, psu, charts, £12. Telefunken VF14M tubes, unused, £2 each. RCA7035 4X150D tubes, unused, £4 each. RCA 931B tubes, unused, £5 each. AR88D and LF manuals, £4 each. Buyers collect or arrange carriage. Manuals for some. G2FDF, QTHR. Tel 0932 45214.

On the air or spare for £45. Pye Cambridge FM10D, 10W output, S20-22, R0, R4, R6, toneburst, spares, manual, or swop for handheld 2m hf trap vertical iambic paddle key, atu. G6PHP. Tel Luton 581545.

Sony ICF 6800W communications rx, a.m. 0·530-30MHz, lsb/usb cw, filters, fm 88-108MHz, mains/batt, manual, exc cond, performance, new cost £416, for sale at £140 incl MMC435/600 amateur tv converter, 2m converter, high quality Yaesu YH55 headphones, Rama digital frequency counter F50, 1kHz-54MHz, cost £40, unused, £20. Tel Bulls Green 219 (Hertfordshire).

Code Master CWR600 morse and rtty to tv converter, as new, £128. G4ANH, QTHR. Tel Rickmansworth 779935.

Tektronix 502 dual beam scope, recently calibrated, looks new, £60. SSM Europa 4m 28/70MHz transverter, 60W output, ideal with FT101 series, £50. G4KWH, QTHR. Tel Bedford 56139.

IC2E helical whip, λ/4 whip, spare nicad, charger, manual, £100 ono. G3DOR, QTHR. Tel Staines 54236.

KW equipment, comp station: KW2000 tx/rx, mains psu/ls unit, KW600 linear amplifier, KW107 Supermatch atu, Shure 444 mic, all vgc, manuals, serviced or checked by KW, £375 ono. May split, individual prices negotiable. G4GXM, QTHR. Tel Hitchin 53001.

Trio TR3200, SU8, SU20, RB0, RB2, RB4, RB6, RB10, RB11, RB13, RB14, nicads, charger, £75. G8FSL, QTHR. Tel 01-360 5221.

Wireless World teletext decoder, all facilities except alarm clock, boxed, separate psu, circuit diagrams, requires interface, £30. Buyer collects. G8NEY, QTHR. Tel Yateley 872305.

KW2000E, with Q-mult, £220. FT107M less pu, £500. CNA1001 Daiwa auto atu, £90. CWR680 Tasco telereader, £135. Xitex MRS100, £50. Yaesu XF8HCN, 300Hz, £10. Hartley 13A dB scope, manual, needs repair, collected, £20. SP101, £20. Callbook, 1981, foreign, £5. Amstrad multiband 6010 air-fm etc, unused, £25. MWM 432/28 converter, £10. SEM 144/4·6 converter d/sh, £10. SEM 144 preamp, £5. Trio ham clock, £10. ASP667 432 mobile colinear, never used, £10. All carriage extra or collect. G4IOT, QTHR. Tel Folkestone 76063.

Daiwa auto atu CNA1001, 200W, one year old, as new, £90. Carriage extra. G4ODG, QTHR. Tel 0778 422795, evenings.

Morse, rtty, ASCII reader, MBA-R0, as advertised in *Rad Com*, 32 character fluorescent display, auto tracking etc, three months old, used for one hour only, £100. G4NGX. Tel Chris, 01-898 5417, evenings.

Hill-o-Mast pump-up 14ft 6in to 48ft, compressor, brackets, £350. FT290R, £170. 48-el 70cm, never used, £15. 144-70cm transverter, Microwave Modules, used once, £150. 144 8/8 beam, £15. 144 10-el Tonna, £10. Tel Doug, Basildon 418180.

Eddystone EA12 amateur bands rx, matching Eddystone ED20 panoramic display, both manuals, £150. Buyer to collect. G3KAS, QTHR. Tel York 27123.

Yaesu FT7 hf ssb/cw mobile tx/rx, £180. Trio TR7010 2m ssb/cw mobile tx/rx, £110. Trio VFO120, £60. G4OIG (Ex-G8CXK) QTHR. Tel Northampton (0604) 408438.

Trio R1000, as new cond, £200 ono. Tel Bristol 672814.

FRG7700, used little, boxed, still in guarantee, going G4, £245 ono. 9 Tolstoi Road, Parkstone, Poole. Tel Parkstone 730263, evenings.

Eddystone EB35 rx, £40. Standard C146A handheld tx/rx, charger, helical antenna, leather case, £65. Professional 2m/70cm varactor tripler, £15. Piptone oscillators for Icom or other tx/rx with electronic ptt switching, £6.50 incl postage. *Wanted:* SSTV monitor. G8CJM, QTHR. Tel Medway 47280.

Rotator, CDE AR30, with cable, £35. Racal RA17 communications rx, 0·5-30MHz, superb device, checked out, aligned/re-valved by expert, £180 ovno. Operator's upholstered swivel chair, £20. ATCO 18in rotary mower, £70. Folding bicycle, £25. G6ASA. Tel Oxford 863333.

Datong DC144/28 high performance 2m converter, £20. MM 70cm converter, 28MHz i.f., £15. Adonis MM202H mobile mic, £20. Mobile gutter mount, coaxial assembly, £5. 2m crossed dipoles, £5. G4PSU. Tel Alan, Abingdon (0235) 23034, after 6pm.

KW G-line, KW204 tx, KW202 rx, KW107 Supermatch, spkr, Shure 201 mic, mint cond, will not separate, £400. Local delivery possible. G4KKG, QTHR. Tel Yeovil (0935) 25327.

TS520, mint cond, Trio fist mic, £250 ono. MMT144/28 2m transverter, mint cond, power supply, £50. New GPV5 2m base station, 2m colinear, £20. Buyer collects. No reasonable offer refused. G8AZF, QTHR. Tel Hayling Island (07016) 5095.

R216 psu, manual, Uher SL recorder, GDX2 antenna, Heath signal tracer, rf gen TE20, 1930 Marconi radiogram, clearing shack, sae for full list. G8XCQ, QTHR. Tel 01-720 5839, evenings.

Yaesu FT101Z Mk3 fm, mic, fan, £480. G4JCG. Tel Measham 72275.

Drake C-line, R4C, with noise blanker, MS4, extra xtals, three optional filters, 0·5, 1·5, 6KC, T4XC, with AC4, fan, dx eng speech processor, extra valves, £600. C4 station console, remote ant switch, 50 cycle clock, ac outlet, £225. MN4C ant tuner, £100. C-Line and C4, £775. C-line and MN4C, £675. Complete package, £825. Drake TR4NB, RV4 remote vfo, AC4, fan, noise blanker, extra valves including finals, £250. Vomax speech processor, £50. G5EBA, QTHR. Tel Bob, 981 2705.

Racal RA17L 0·5-30MHz rx, cw matching 19in cabinet, £260. KW Viceroy tx, cw psu, manual, £30. SMC SP4 rf speech processor, £40. Morse key (ex-Naval), £25. G4PSU. Tel Abingdon (0235) 23034, after 6pm.

Yaesu FRDX400S amateur-band rx, 160-10m, 10MHz, 2m, 6m, converters, fm, squelch, calibrator, two cw filters, psu fan, built-in spkr, read-out to 1kHz, comp with 200W SSTT2 atu, all for £170, plus postage. Jon Kempster, BRS45205. Tel Berkhamsted (04427) 4175.

Enclosed rack for traditional 19in panel equipment, height 83in, width 23·25in, front to rear 26·5in, clear plastic front door, sheet metal rear door, blue pvc finish, mains-driven cooling blower in drawer, ideal to house QRO station or ultimate stack hi-fi, potential as complete shack for slim QRP operator or for conversion to field-day thunder-box or allotment tool shed, bargain at £12 ono. Appointments to view. Deliver reasonable distances at cost. G8ZKZ, QTHR. Tel Romford 69770.

Microdot cw/rtty terminal, new June 1982, repaired and brought up to latest specifications by manufacturer in October, unused since, £325 ono. Consider exchange and cash adjustment hf linear or Icom 740/720A. GW2FWD, QTHR. Tel 0222 63974.

Eddystone 840C hf rx, 2m converter, i.f. 4-6, £50 ono. G6NVP NOT QTHR. Tel 021-475 6099.

Yaesu FT480R 2m all-mode tx/rx, as new, in box, handbook, never used mobile, prefer buyer inspects and collects, £250 for quick sale. HF now taking priority! G4OYY. Tel Wilmington (Devon) 616.

Trio TR2400 handset, 1·5W fm, soft carrying case, spare nicads, spkr/mic, charger etc, as new cond, very clean, rarely used, £145 ono. G6JCN, QTHR. Tel Ron, Hartlepool (0429) 76840.

Mast, 35ft steel frame, base, £35. Parts for unbuilt hf linear, chassis, PL905(3), bases, coil former capacitors, chokes, knobs, transformer, £35 ono. TR2200G, xtalled 12ch, charger, nicads, preamp, £70 ono. Buyers collect. G4BPW NOT QTHR. Tel 0283 813395.

Sprite 10ft four berth caravan, awning, toilet tent, new Elsan, £350. Hallicrafter Skyrider, Defiant SX24 rx, wkg order, spare valves, £25. *Wanted:* Yaesu or Trio hf tx/rx. G4REY. Tel Knott End 811162, evenings.

KW2000A tx/rx, psu, mic, £150. Trio 7010 2m ssb tx/rx, home brewed vfo, £110. Buyer inspects and collects. G8WTY, QTHR. Tel Malvern 4968.

Icom 701, comp with psu/spkr, SM2 mic, good cond, £450. Standard C432, 70cm, 6ch, handheld, rough inside but works, £45. Eddystone EC10 rx, fair cond, £40. *Wanted:* Icom 740 or 720A. GW2FWD, QTHR. Tel 0222 63974.

Sony ICF2001 ppl synthesized rx, fm/a.m./ssb, AC14A psu, as new, £110. Trio TR7200G fm tx/rx, fitted S18-23, all repeaters, external vfo, 30G 144-146 continuous, mobile mount, λ/4 magmount, £170. G4HBU, QTHR. Tel Les, Bristol 611093.

Jaybeam 70cm 8-el crossed Yagi, £25. DAC 3A 13V psu, £12. SF250 power/swr meter with freq counter, £16. MML 144/100 144MHz 100W linear, £80. 10W linear, £25. G8KMV, QTHR. Tel 0438 54689.

Hallicrafters SX111 rx, 80-10m, £80 ono. SR9 mon rx, 2m, £35 ono. Pye Ranger, 2m, £15 ono. 19 set valves, offers? 2m conv, 4-6MHz i.f., £10 ono. BSA Bantam parts, offers? Buyers collect. G6ANP, QTHR Avon. Tel 027583 2768, weekends.

G-whip, 20m, 15m, 10m, 80m coil, telescopic whip, vgc, offers? Microphones: Trio MC35S, £11; Shure 201, £11; D52 double beam cro, manual, needs attention, £18 ono. Carriage extra. *Wanted:* old hf rx. W.h.y? G4EQX, QTHR. Tel 0705 816176, evenings or weekends.

Yaesu FT480R, incl listen on repeater input, £295. Microwave Modules transverters, MMT144-28, £84. MMT432-28S, £123. All above items 18 months old. Telequipment D54R dual-beam 10MHz bandwidth scope, less ÷10 probes with/without case, £300. G4ITF, QTHR. Tel Cosham (0705) 386184.

Yaesu FT902DM, £750. Matching transverter (2m installed), £225, pair, mint cond, £940. 1kW 2m amplifier kit, 2×4CX250B SK620A bases, relays, cabinet, all parts, W1SL, design as *ARRL VHF Handbook*, £240. G4KLN, QTHR. Tel Ian, Leeds (0532) 821020, evenings and weekends.

SR9 2m rx, seven xtals, £30. B40 gen cov rx, £45. 10A 240/12V Bremi psu, as new, £30. Tel Alex, Wymondham 604626, after 6pm.

FT901DM tx/rx, cw, a.m. filters, fm unit, keyer unit, memory unit, history, as new in every respect, £495. G3KDH, QTHR. Tel Tring 3505.

FT200 hf tx/rx, FP200 ac psu/spkr, speech clipper, spare pa valves, orig packaging, £200 or offers. G4EOG, QTHR. Tel Chelmsford (0245) 465468.

Yaesu FT290R 144/148, mobile mounting bracket, MML 144/30LS, 5/8 mobile whip, all as new, orig packing, £220. Tel Bruce, Biggin Hill 74082.

IC202, 144·0-144·4, 144·8-145·0, manual, carrying strap, mic, £95. G4RSD. Tel Cromer 511459.

Trio TS520S, hf tx/rx, 160-10m, VFO520S, both exc cond, instruction manual, plugs, etc, both boxed, £430 ono. G2BAR 10m 3-el beam, boom to mast plate, £25. Reason for selling all equipment, need the money. Tel Dave, Bristol (0272) 836562, after 6pm.

FT290R, mint cond, 2·2A/h nicads, charger, rubber duck, carry case, 12 months old, owner giving up amateur radio, orig cost over £250, will accept £185. Buyer collects, Ipswich area. G8PYG NOT QTHR. Tel 0473 626283, evenings only.

IC730 tx/rx, all new bands, transmit and receive capability, IC PS20 240V power supply, incl internal spkr, £475. History. G3KDH, QTHR. Tel Tring 3505.

FT101 Mk2, inbuilt G3LLL clipper, FV101 remote vfo, spare pa and driver valves, £300. FRG7 with ssb filter, £100. G3NMZ, QTHR. Tel 0582 591749.

KW2000B, Shure 201 mic, handbook, vgc, £195. G2BJK, QTHR. Tel Cheddar (0934) 742568.

Yaesu FT101Z Mk2 incl mic, fan, exc cond, surplus to requirements, used very infrequently, sensible offers please. SW200B Oskerblock swr/power meter, Mosley TD3JR trap and balun, offers please. G4IWA. Tel John, Atherstone (08277) 3670, after 6pm.

FTDX560 tx/rx, 80-10m, QRO tx, 560W input, facility to add two new bands, 10MHz rx fitted, just returned from comp service, £235 ono. Carriage at cost. GM4KAV, QTHR. Tel 0382 24362, evenings only.

Trio TS820S, £450. Icom IC245E, £250. Sony ICF2001, £110. G3AOS, QTHR. Tel 061-980 2415.

Pye Ranger, 2m tx/rx (high band), tx modified for 2m, £10. Pye Ranger (low band), suitable for 4m, no mods, £10, 2m a.m. tx, BC625A (522), psu required, £10. Buyers inspect/collect, carriage extra. G4EHT, QTHR Lichfield, Staffs.

Linear 2m 50W SEM, 10W input, as new, £35. Post paid, G3MEW, QTHR. Tel Portsmouth 820315.

IC2001 rx, cw mains psu, manual, £150. Katsumi EK121 keyer, £18. *Wanted:* S-meter for AR88. G8LT, QTHR. Tel 0327 860321.

Homebrew 2m 7W pa, preamp, suit 2300 etc, £23. 2m rf switched preamp type MMA144V, £20. Trio mic type MC50, dual impedance, as new, £18. G4NTY, QTHR. Tel 061-790 7673, after 6pm.

TR2300 2m tx/rx, exc cond, nicads, charger, boxed, £140. Battery-powered morse practice key, £4. Valved Murphy wireless, missing one valve, £10. Tel 01-399 2502.

QTH: 80m asl above Winchester city, semi-det, planning permission for 30ft pole. G6FBR, QTHR. Tel Winchester (0962) 66764.

RTTY Creed 7ERP, absolutely mint cond, incl base, silence cover, auto reader 6S6M, 150VPS tuning fork, paper, tapes, PAG tu for this gear, allows 45·45 and 50 baud operation, all connectors, £50. GM4AGS, QTHR. Tel 0382 543113.

Icom 740, brand new, comp with fm board, used very little, offers around £600. G4JKM, QTHR. Tel Gloucester (0452) 411409.

Drake TR7A comp with 300 and 500Hz cw filters, NB7, fan, PS7, service manual, all in as new cond,

£1,100. Little used Hygain TH2 beam, slightly damaged but complete, £75 ono. G3PEK, QTHR. Tel 0244 300897.

Daiwa Search 9 2m rx, seven xtals fitted, £30. Would exchange for 10A 13·8V psu. G6RIX. Tel Warrington 64435.

FRG7700 gen cov rx, memory unit incorporated, FRT7700 antenna tuning unit, mint cond, very little used, full instruction manual, £260 for quick sale. Orig packing available but prefer buyer collects. G5CS, QTHR. (Esher, Surrey). Tel 01-398 1582.

Trio 770, as new, with Mutek preamp, £530. Microwave Modules 70cm 50W linear, £80. Toyo Truline swr bridge, 2m, 70cm, £25. 19-el Tonna, 70cm, £10. G8MXP, QTHR. Tel 0249 814315 (Wilts), after 5pm, weekdays.

Trio TS130S, WARC, six months old, £425. Buyer collect or carriage extra. Cragg. Tel Bournemouth (0202) 426647.

G4MH minibeam hf tribander antenna, £45. Pair xtals for FT2F 144-95, £2 pair. G4ISN, QTHR. Tel 0509 267309, evenings.

Tono MR250W 144MHz linear, 200W output, preamp, £195. Yaesu FT620B, 50-52MHz a.m./ssb/cw tx/rx, £175. MM 50-432MHz transverter, £85; the pair £245. Bird 43 elements, 250C, 100D, £30 each or swap for lower powers. HC25U xtals, 8.000, 8.250, 8.300, 45.100, 50.900, 20.000, 94.000, 96.000. 97.333, 116.000. £1 each, 24V psu, 3·5A, £12. Trio R600 rx, immac, £180. Sabtronics 2033 dmm, £29. *Wanted:* fix xtals for FT225RD, Bird Thruline vhf/uhf elements. Tel John, Hornchurch 57782, evenings or weekends (not 5/6 March).

70cm amplifier, preamp, Wood & Douglas, 1W in, 10W out, tested and aligned by W&D, £23. Post paid. G3MEW, QTHR. Tel Portsmouth 820315.

Trio JR310 eight-band ham rx, 160-10m, immac cond, combines with TX310 tx, £200 ono. Realistic DX200 comm rx, immac cond, £120 ono. Will swap both for good FRG7700. Mickey MK4000 vhf rx, 70/87MHz, 140/175MHz, scans in 12·5kHz steps, auto or man, eight memories, dig clock, exc cond, £80. Marsden, RS52722, 59 Front Street, Sacriston, County Durham DH7 6JW. Tel Sacriston 710230.

Drake TR7, all options fitted, PS7 power supply, WH7 wattmeter, SP7 spkr, all band coverage, 0-30MHz receive, 1·8 and 500 filters, noise blanker, fan on psu and rig for continuous 100W output for rtty etc, mint cond, new price today over £1,600, bargain at £725. Datong FL1, £32. Pair Bowers & Wilkins three-way DM2 monitor hi-fi speakers, superb quality, £95. Sansui A80 80W stereo amplifier, £30. Technics 615 stereo cassette deck, £30. Four-el hf quad, fibreglass, £175. G3HCU. Tel Evesham (0386) 870052.

10m hf mobile rig, American manufacture, frequency from 28·365 to 28·805, digital readout, ssb/fm/a.m., 18W p.e.p., ideal first G4 rig, worked Stateside many times, £85. 7λ/8 whip, 2m, gutter mount, coaxial, unused, £10. Tel Birmingham (021) 360 9307.

Complete station, 1·8-30MHz, 2m, 700m, 23cm, comprising RA117E rx, RA63H ssb adaptor, MA350A synthesizer, MA79G exciter, 100W hf linear power amplifier (solidstate), Microwave Modules 2m, 70cm and 23cm transverters, MML432/100 linear amp, neatly houses with power supply unit, station control unit, which includes pip and access tones, syllabic vox, sequential switching of tr functions, completely enclosed in modern rack cabinet (rx in orig Racal cabinet), all requisite power supplies, cables, mic, incl comp manuals, may be seen operating, £1,200 ono. G3OQB, QTHR. Tel 0923-779103, evenings.

KW2000, ac psu, handbook, circuits, spare valves, good clean wkg order, £120 ono. Shure 201 ptt mic, Datong rf speech processor, £20. G8MY, QTHR. Tel 0252 511086.

70cm transverter, MM432/144, £120. PET computer, morse send and receive programs, £5 each. *Wanted:* FV901, YO901P, Thruline elements (particularly 250H), FAX equipment, microscope slides, KW low pass filter, bencher lever, 4in planer, router bits. G3AZI, QTHR. Tel Preston (0772) 37815.

TR2400 synthesized handheld, carrying case, belt clip, standard battery charger, £140. ST1 quick-charger/base stand, £25. BC5 12V dc quick-charger, £10. Spkr/mic, £4. All in exc cond, used little, G3ZNI, QTHR. Tel Oxshott (037 284) 3321.

TS820, Yaesu YD148 mic, £400. Leader LAC895 ant tuner, £60. Three-el triband beam, three months old, £100. Buyer collect. G3JPJ, QTHR. Tel 01-958 6887.

FRG7, rx, 2·4kHz filter, exc cond, handbook. G4IMS. Tel Chelmsford 420564.

Linear amp, 2×4CX250Bs, comp in self-contained floor standing cabinet, power supplies, blowers, relay co system, all circuits etc, may be seen wkg, £350. G3OQB, QTHR. Tel 0923 779103, evenings.

TR2200G, carrying case, nicads, charger, helical antenna, four simplex, five repeater xtals, mobile mounting brackets, £70. VB2200 10W linear for use with the 2200G, £12. 2m λ/8 mag mount mobile antenna, £8. G3ZNI, QTHR. Tel Oxshott (037 284) 3321.

Epsom MX100 printer, 80 characters per second, bi-directional, logic seeking, tractor or friction feed, any width of paper up to 15·5in, £350 ono. (IEEE 488 interface available). G3AZI, QTHR. Tel Preston (0772) 37815.

Two Robot 400 sstv pcbs, instruction manuals etc, £50 each. Microwave Associates gunnplexer with dish, £90. G4HQX, QTHR. Tel 0453 45461 or 0453 833411, evenings and weekends.

Yaesu FT200, psu, £200. Mobile psu for above, £40. SSM 2m transverter, plugs for FT200, £50. Modular Electronics 70cm transverter, £65. MM converters, 2m, £17. 70cm, £22. Burndept handheld, 70cm, £45. Car mobile, £35. Icom IC4E psu charger, £170. Icom IC202, £85. Ken 2m handheld, £60. Akai VC110S camera, £30. G4EVZ, QTHR. Tel Romford 45733.

TR2500 2m scanning handheld, used little, mint cond, manual, packing, SC4 case, SMC25 spkr/mic, spare PB25 nicad, BT1 AA battery case, £190. FT290 multimode portable, mint, case, £190. VB2300 10W pa, £35. MMC432/144 70cm converter, £23. G8MYX, QTHR. Tel 0993 841305.

Shack clearance: 2m rigs, Trio 2400 fm hand portable, charger, spkr, mic, case, £140. 7090 ssb 10W, £95. Tama T150S 10W fm synth mobile or portable, £110. Comms rx, Yaesu FRG7, £130. Mazuho rx atu, £20. G6FIF. Tel Ted, Blackpool 700637.

Pye PF2UB uhf handheld, new, requires xtals, with manual, £65. Marconi uhf/vhf sig gen, TF1064 with manual, £95. Microwave Modules MMT1296/144 23cm transverter, £140. G8DIY, QTHR. Tel 0353 778846, evenings.

Sommerkamp FRDX500 hf rx, exc cond, all modes incl fm, narrow cw filter fitted, homebrew digital frequency display, great for swl, or G6 wanting hf experience, £100 only. Brian Peart, G4RKF NOT QTHR. Tel Oxford (0865) 66466.

Swan Astro 200 80-10m ssb tx/rx, digital, tuned, synthesized, broad band, incl pu, manual, £300. PKW trap dipole, 80-10m, £24. G6PO, QTHR. Tel 0253 885893.

IC21 xtal fm rig, 10W S16-23, six repeaters, toneburst, built-in psu, G8WDT, QTHR. Tel 021-430 7784.

WANTED

Catronics vdu model CD310. RTTY monitorscope, must be in good cond and wkg. J. Wixon, 34 Lime Road, Hanham, Bristol. Tel Bristol (0272) 601576.

For the National Wireless Museum: old radio books, magazines, catalogues, QSL cards, service manuals, callbooks, valves, keys, cartridge eight-track player, any old knobs! B40 gen Tractrix Voight horn, ribbon pickup..Details please to hon curator, G3KPO, QTHR. Tel Ryde 62513.

Kokusai 455 KH2 mechanical filter type 15K, prefer with xtals. G3AMF, QTHR. Tel 01-989 9224, evenings.

Coil packs for 46 set, any range. 18 set, 48 set case. Manual for Cossor CC3/AB3 tx/rx. Canvas cases for 38, 46, A510. 38AFV, 38 Mk3, comp. Navy underwater rebreather apparatus, twin hose dvs, weight belts, torches. G8MQT. Tel Terry, 07073 27233.

2m rigs, one fm, one ssb, or multimode, slight faults considered. GW4HBZ. Tel Denbigh 2777.

Dish for *PW* EXE 10GHz. G4ARI, QTHR. Tel Markfield 243258.

FT290R for disposal. Hallicrafters S27 rx, 28-143MHz, a.m., fm, bfo, free if collected. Tel Collins, 01-579 9455.

Still required: small Taylor tx valve with ceramic base, transformer for 7·5V filaments. Western Electric 316A, Hammarlund UX5 ceramic valve holder. G4IMT, QTHR. Tel Marshfield 254.

Private collector wants (very cheaply or free of charge) old wireless equipment, working or not, any cond 19 sets, HRO, etc, any old junk welcome, Can collect or pay carriage. G6OFF. Tel 01-952 5709.

Instruction manual for Trio Kenwood R1000 rx. G3RAE, QTHR. Tel Beccles 712129.

US Army Signal Corps Wilcox-Gay master oscillator MI L9467 (AP59595) and xtal multiplier MI 19468 (AP 59594), any cond if complete. Will arrange collection. GI3GGY, QTHR. Tel 0504 51973, after 6pm.

PO type morse key, only exc cond required, needed for coming hf base station, send short description of cond with offer. S. Collings, 9 Barnfield, Crowborough, Sussex TN6 2RX.

Exchange three-bar electric fire, coal flame effect in wooden cabinet, brand new, boxed, unwanted with new house, worth £85, for morse tutor or desk mic and base loudspkr or w.h.y? S. Clifton, G6MEF, 97 Redland Drive, Northampton.

Circuits or handbooks for Airmec sig gen 701. CRO type CT316. Hudson txs FM120 and AM109L. Any info please, original or photo copy. G4FUY, QTHR. Tel Reading 733633.

Wireless set C12 owner requires control box, psu, atu, or w.h.y. for same? Cash or other rubbish in return. G3TAG, QTHR.

Help! Starting again: manual for Heathkit SB102, about 1970-ish, buy or borrow to copy. Antenna, callbooks, mini beam, KW600 linears, desk mic. G3ICG, 14 Willoughby Road, Ipswich Road, Ipswich, Suffolk. Tel 0473 50009.

KW160 tx. Good cond, wkg order. Codar T28 or similar rx. G4BKM, QTHR. Tel Denham (0895) 834358.

2m multimode tx/rx TR9000, FDK750E or any good multimode. DX60 Starflight txs. Letters only in first instance. Walker, 16 Himley Road, Clayton, Manchester M11 4JF.

FT101 or FT101E, two required. Must be good cond, unmodded, wkg, with manuals, fan dc convert, usual accessories. Will collect. Pay cash. G4NIP, QTHR. Tel Ivybridge 4383, or Peter, Plymouth 23727.

Codar AT5 mains psu (will buy rig if necessary). Codar T28 rx. G4BKM, QTHR. Tel Denham (0895) 834358.

About six vhf/uhf enthusiasts nationwide to form dx warning group. The qualifications: (1) You must be active on vhf/uhf ssb/cw (2) You must have a phone. Interested? Contact Steve White, G3ZVW, QTHR. Tel 01-882 5125.

R1155 cross needles df meter, A1134 amplifier, loop antenna, for R1155, J-type antenna switch. Valves, all types. Your list please. HF gc rx. Have marine doppler log, sounder, unused vhf antenna. exchange or sell. G3DVF, QTHR. Tel Alnwick 602487.

FT101ZD in exchange for 1966 Triumph Bonneville. Bike was restoration project but lost interest. Can be seen running, engine very good, some new parts, manuals etc. G6MOH. Tel Storrington (090 66) 2979.

Manual or circuit and details for Codar CR70A rx, needs replacement mains transformer and front panel. SSTV gear and monitor, AT5/T28 tx/rx. G3RCX, QTHR. Tel Southend (0702) 585920.

Prop pitch motor, not cowl gil, or gearbox alone. Jaybeam X6/2M/X12 70cm. G3AAG. Tel 01-499 0264.

TS700, details and price. *For sale:* AR240 handheld, 144-148MHz synth fm, charger, case, £95. Delivered UK. G3JMO, QTHR. Tel 0642 486155, after 6pm.

SP400 or SP500 to suit FTDX400. Yaesu FL2500 linear to match FLDX500. G4LMA. Tel Telford 49306.

Trio TS820S tx/rx, mint cond essential. G3WEX, QTHR. Tel 021-354 4265.

KW107, KW109, mint cond, or similar. G3ANG, QTHR.

C/handbook, Telequipment T360, Racal 815R, Venner TSA/3336/1, Advance TMC/1, GEC tube 2D924E, Mullard valve tester. *For sale:* Cossor 1035 scope, Trans/US, £10 ono. Radio 2-valves cone/spkr, £15 ono. KT66, £5. Jennings organ osc/box, 60 valves, 10W, amp, £25. AC valve voltmeter, £10. D. Griggs, G6DDZ, 5 Collingwood Avenue, Muswell Hill, London N10 3EH.

Information and circuits on Telford communications TC5/6 2m tx. Out-of-pocket reimbursement, Wyn Mainwaring, G8AWT, 235/CIV, Arctic Road, Cowes, Isle of Wight.

KW Supermatch required or similar atu. KB105 or similar five-band vertical antenna. G4DYN, QTHR. Tel Oakham 2721.

Good price paid for R1155 type N or L rx, preferably good wkg order and unmodified, but anything considered. Output/mains power supply unit also sought. Collection arranged if necessary. Write full details. Required by ex-RAF member. G3WHM, QTHR.

Atlas DD6C digital dial for Atlas 215X. Tel 01-455 5039.

Microwave Modules MMT 432/144R transverter, urgently required. G6KYK. Tel 0228 60398.

FT707 needed. *For sale:* set ZL1LM pcb for slowscan converter, requires approx £15 components to complete, £25 for quick sale. G8OOC. Tel 01-748 2040, bleep Dr Morecroft.

Flat dweller, hopeful G4, requires Joystick vfa with Joymatch atu, tx version, artificial earth if possible, honest price paid for good cond system, collection/carriage arranged. G8ZON, QTHR. Tel 0705 829129.

Information, please! For copy and return, on Eddystone vhf rt HR86A. ZX81, wkg or not. All mail answered. P. Morgan, 21 Trafalgar Road, Portslade, Brighton BN4 1LD.

Liner 2 or similar 2m ssb tx/rx, in good wkg order, I offer in exchange Quartz 16, 10ch, hardly used, possibly Sinclair ZX81 for really good tx/rx. Tel Robert, Rustington (Sussex) 4351.

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PSU console for Atlas 210X. G3JHI, QTHR 1980. Tel Hornchurch 54301.

Antenna tuner, Yaesu FC902 or similar. G3NDC, QTHR. Tel 01-954 1309.

Rad Com Aug 66, Oct 73; *QST*s pre-Oct 81; any copies *VHF Communications*. 8874 valve. Dish and coaxial relay for 23cm. W.H.Y. for moonbounce? G4NVA, QTHR. Tel Holmes Chapel (Cheshire) (0477) 33011.

FRT7700 Yaesu atu, £22. Jaybeam D8/70 70cm 8-over-8, used only in loft space, £12 inc carriage. G3TDJ, QTHR. Tel Bude (0288) 3701.

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DC psu for KW2000. 19 set, preferably unmodified. G4NVV, QTHR. Tel Farnborough (Hants) 543665.

£200 available for hf tx/rx (FT7, 101 or similar). *For sale:* DX300 gen cov rx, vgc, £100 or in part exchange for above. Will collect/deliver anywhere within 2h drive. GW6MPY. Tel Mold 56486.

Circuit/manual and address of agent UK/Europe/Japan for Scooper fm scanner rx (2m), type MR3000A. Suggestions/replacement chip to repair lo fault? Write/phone A. Gordon, GM6RXQ, c/o 57 Craigleith Hill Crescent, Edinburgh EN4 2JS. Tel 031-332 5428.

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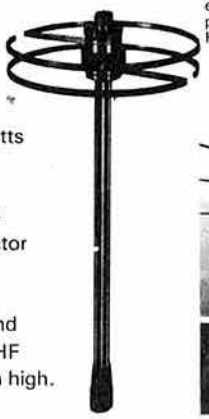

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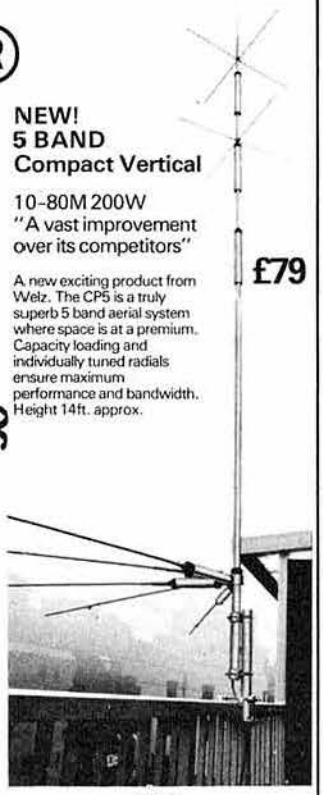

CP5

GLS

MB

Model No	Description	Price
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EL40	40m base loaded whip 2·45m PL259 con	£28.95
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MB	Deluxe magnetic base (SO239) with 5m cable	£11.50
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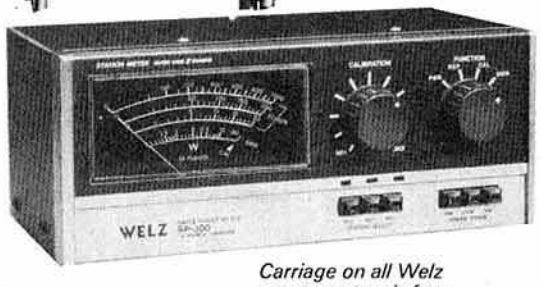
KB101	40-10m vert 1kW 5m high	£54.00
CP5	80-10m compact vertical with radials 200 watts	£99.95



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20/200 watts
VSWR and power
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Sens = 3 Watts
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Ideal for mobile
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Performance coaxial switch
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SP10X

CH20A

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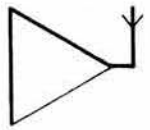
21st RADIO & ELECTRONICS EXHIBITION



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AINSDALE, SOUTHPORT
(Formerly held at Belle Vue, Manchester)

Saturday & Sunday 19th/20th March 1983
Open at 11.00a.m. each day

It will include an inter club quiz, construction contest, grand raffle, R.S.G.B. bookstall, amateur computers, N.A.R.S.A. stand and trophies, demonstration station, AND trade stands featuring all types of radio and electronic equipment.

Trade stands will be presented by J. Birkett, Radiotronics, Amateur Radio Exchange, John's Radio, New Cross Radio, Wilson Valves, C.B. Electronics, S.O.T.A., The Computer Junk Shop, W. H. Westlake, D.S. Electronics, Arrow Electronics, Green's Telecom, Royd Electronics, Newton Engravers, Leeds Amateur Radio, Macro Trading, R.A.I.B.C., Micro-print Limited, 2J Sound, Gemini Communications, Radio Surplus, B.N.O.S. Electronics, D. Currie (printers), G. Jackson, W. E. Griffiths, Waters & Stanton, Ham Radio Today, Garex Electronics, Electro Supplies, P.L.M. Communication Supplies, Tricon Supply Company.

ADMISSION— 60p daily or £1 for both days.

ENTRY— Groups of 20 or more can book in advance at 20% discount. Payment and S.A.E. should be sent to: Mike Bainbridge G4GSY, 7 Rothbury Close, Bury, Lancs BL8 2TT.

ACCOMMODATION— Self-catering chalets available to those wishing to stay overnight. Some catering facilities on site.
2 person chalet, £10, + VAT.
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Further details from Pontins. (Tel 0704 77165).

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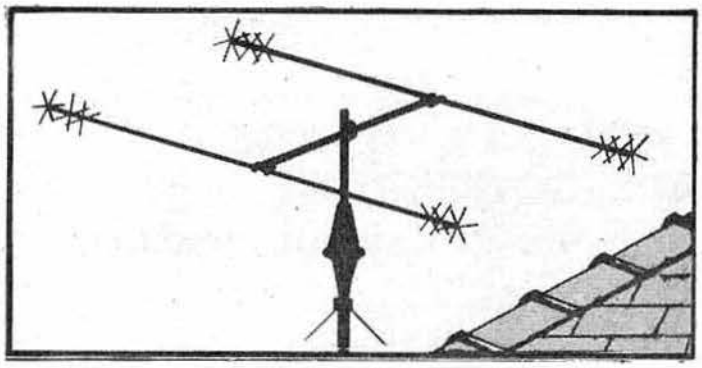
Talk-in will be on S22 and other available simplex channels.
Car parking is FREE *but PLEASE follow the parking attendants instructions AND the notices so as not to cause congestion.*
Enjoy yourselves at this Family Week-end Exhibition!

THE G4MH MINI BEAM



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AERIAL ONLY: ..... £ 82.50
SELF ASSEMBLY KIT: Coils, spokes etc., ... £ 65.00
(Carriage UK mainland £2.50 – kit £1.50)

SPECIFICATION:

Element length	11 feet	SWR at resonance	1·5 to 1:00 max
Boom length	60 inches	Power rating	1400 watts PEP
Turning radius	7 feet	Input impedance	50 ohms
Operating frequencies	10m, 15m, 20m	Wind resistance	80 mph
Forward gain (ref D pole = 1:00)	3·6 dB	Weight	14 lbs
		Rotator requirements	AR40

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Jaycee Electronics, Fife
Lowe Electronics Ltd, Matlock
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Stephens-James Ltd, Leigh, Lancs.
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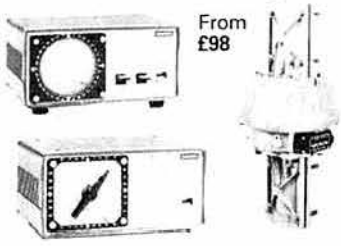

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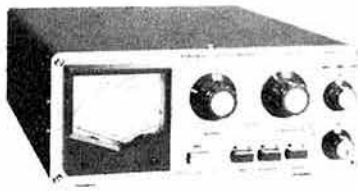

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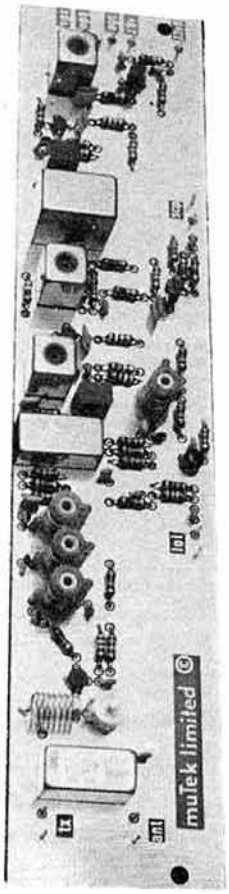

For some time we've had people worrying us to produce a replacement front-end for 144MHz transceivers other than the FT221/225 series. Finally we've done it! Our new front-end for Icom's IC251 and 211 series transceivers offers all the performance improvements associated with the well established RPCB 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 expensive 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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SLNA 70u	Unswitched version of the SLNA 70s	20.38
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SLNA 144s	144MHz switched preamplifier	33.90
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TLNA 432s	432MHz 1·4dB nf/13dB gain switched preamplifier	54.90
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TLNA 432ub	Unboxed TLNA 432u	18.50
BLNA 432ub	1·3dB nf/13dB gain sub-min 432MHz preamplifier	12.43
GLNA 432u-1	432MHz gasfet unswitched preamplifier .8dB nf/13dB gain	46.90
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GLNA 1296u	1.3GHz gasfet unswitched preamplifier 0.75dB nf/20dB gain	85.25
HDRA 95u-1	1.5dB nf/8.5dB gain professional Band II high dynamic range (i/p intercept +22dBm) preamplifier	29.90
HDRA 95u-2	11.5dB gain variant (i/p intercept +16dBm)	29.90
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BBBA 860u	250-860MHz broadband low-noise preamplifier	20.50
XBPF 700ub	Band IV-V tvi filter (a true bandpass on microstrip!)	2.95
PPSU 112	Preamplifier (12V nominal) mains power supply	6.90
CISA 001	SO239 to BNC male adapter—if you must!	1.60
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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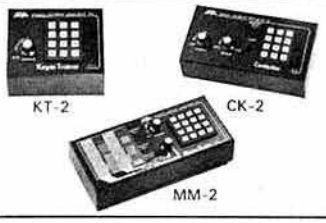

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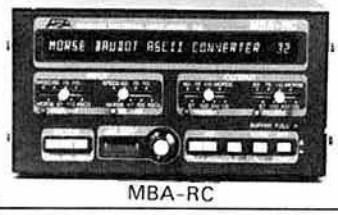

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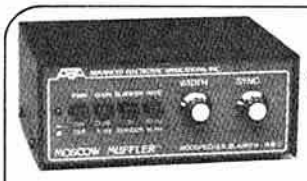

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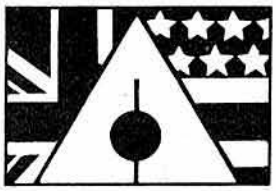

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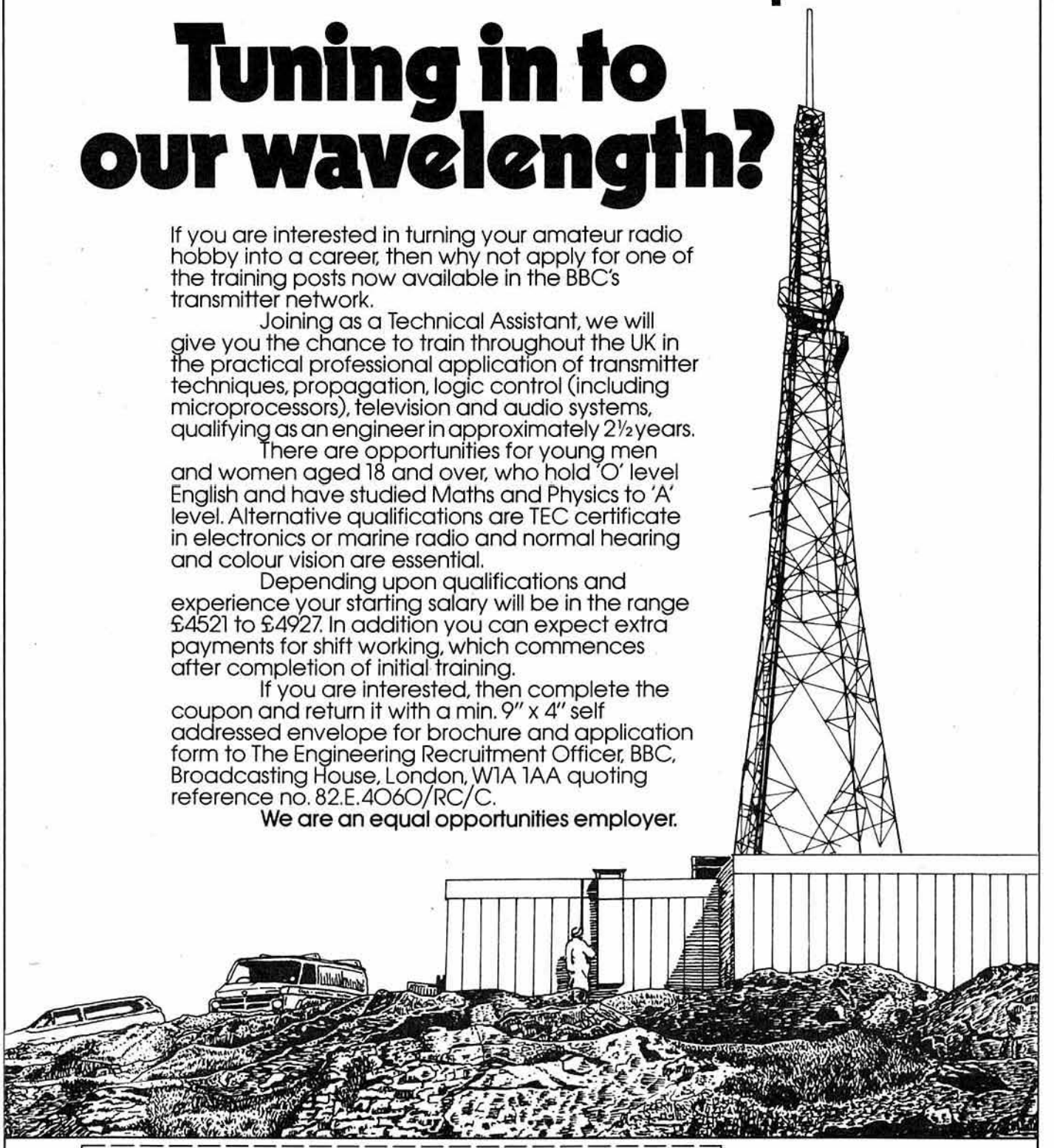

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20209	2m 9 el. port	17.46
20118	2m 2 × 9 el. cross	28.51
20113	2m 13 el. port	27.20
20116	2m 16 el.	29.95
20419	70cm 19 el.	18.12
20438	70cm 2 × 9 el. cross	30.05
20421	70cm 21 el.	25.98
20422	21 el. ATV	25.98
20199	2m + 70 Oscar	30.05

Full range of Tonna accessories stocked.

G-WHIP MOBILE ANTENNA RANGE

Tribander helical for 10/15/20 metres	25.80
Base mount single hole fixing + 3m cable	6.30
LF 40m coil for above aerial	6.55
LF 80m coil for above aerial	6.55
LF 160m coil for above aerial	6.55
LF telescopic resonator whip	4.25

We also stock flexiwhip & multimobile G-whips.

WELZ

SP 10X	Mini meter 1·8-160MHz 200W	19.95
SP 15M	1·8-150MHz 2·5W-20W-200W	29.95
SP 45M	2m/70cm 100W	45.00
SP 200	1·8-160MHz 20W-200W-1kW	59.95
SP 300	1·8-500MHz 20W-200W-1kW	79.95
SP 350	1·8-500MHz 200W	49.95
SP 400	130-500MHz 5W-20W-150W	59.95
SP 250	1·6-60MHz 2kW	45.00
SP 380	1·8-500MHz 20W-200W	49.95
AC 38M	8 band ATU	59.00
CH 20A	<450MHz coax switch	15.95
CT 150	150/400W D/load	31.00
CT 300	300/1kW-250MHz D/load	43.00

TONO

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

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

ADONIS MICROPHONES

MM 202S	Safety mic. Lapel type	20.95
MM 202HD	Safety mic. head band	29.00
MM 202HM	Headphone & mic.	39.00

ALINCO

AL 230	2m 30W Linear 1-3W in FT 290R etc	39.00
AL 710	70cm 10W Linear	65.00
AL 730	70cm 30W Linear	79.00

SAGANT

MT 240X	HF 80-10m Wire array	49.50
MTE 40X	80m + 40m array	45.00
BL 40X	1:1 Balun SO 239	12.65

FRITZELL

FD 4	Windom Array HF bands	31.50
FB 16	1:6 Balun for DIY	17.45

Send for details NEW RANGE.

HALBAR

LIN 5	70cm 5 el. Yagi	7.99
STR 5	2m 5 el. Yagi	9.99
FOLDI	2m 5 el. Foldup	13.00
TWIN	2m Vert.	14.95
TWIN 70	70cm Vertical	7.99
DIP 2	2m Dipole	3.95
HALO	2m Halo	5.50
LPA	Log-periodic 70cm	15.00
QUAD 6	2m 6 el. Quad	25.00
QUAD 4	2m 4 el. Quad	17.50

DAIWA

DR 7500X	up to 3 el. HF beam preset controller		98.00
DR 7500R	as above round cont.		107.95
DR 7600X	Heavy duty w. preset cont.		141.00
DR 7600R	as above round cont.		152.00
KSO 65	Stay bearing		18.50
CS 201	2-way switch 0-500MHz		11.98
CS 201N	above w. N sockets		19.00
CS 401	4-way w. SO 239		34.95
RM 940	Infra Red mic.		45.00
CN 520	1·8-60MHz SWR/PWR		32.50
CN 540	50-150MHz SWR/PWR		35.00
RX 110G	2m GaS Fet Preamp	NEW	39.00
RX 430G	70cm GaS Fet Preamp	NEW	63.00
RF 670	RF Speech Proc.	NEW	44.00
FD 30LS	Low pass Filter		11.50
FD 30M	LP Filter HD		19.50

MISCELLANEOUS

CANTENNA Dummy Load	14.95
ARROW 15Amp PSU with meter	82.00
COAX SEAL for sealing antennas etc against weather	20p foot
SWEDISH KEY Brass on Teak beautiful straight key	49.00
VIBROPLEX various types in stock 64MHz minibeam	80.00
Microwave Modules stocked.	
KENPRO KP 100 Keyer	69.00

TET

HB 33SP	3 el. Tri-Bander HF Beam	189.00
MV 3BH	Tri-Band vertical	40.25
MV 5BH	5 Band Vertical	71.25
SQ YO 8	8 el. Quagi 2m	48.96

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ALL PRICES INCLUDE VAT, ITEMS OVER £50.00 VALUE **OR** TOTAL ORDERS OVER £50.00 ARE CARRIAGE FREE. SECURICOR (OUR OPTION) FOR MAJOR ITEMS. ALL DESPATCHES ARE INSURED BY US—NO RISKS TO YOU IF LOST OR DAMAGED.

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FT-790R
FT-290R
(+FT690R, 6 metres)
MULTIMODE
MULTI-ROLE
VHF/UHF TRANSCEIVERS

MULTIMODE OPERATION
Never before possible from such a compact package, true multimode —USB, LSB, CW & FM—operation is yours to enjoy. With CW and SSB activity at an all-time high, you will not be left out of the satellite or DX action and you can still ragchew on FM simplex or even via a repeater (inbuilt shift and 1750Hz tone burst).

ADVANCED MICRO CONTROL
Advances in microprocessor circuitry allows selectable synthesizer steps, up/down scanning from the microphone, priority channel operation, and ten memories (with memory scan), all called up with fingertip ease.

LCD DISPLAY
A large, newly developed Liquid Crystal Display provides readout of the operating frequency, and an indication of a number of the control functions. It is highly readable under conditions of bright sunlight and is backed up by a lamp for night-time operation.

PROGRAMMABLE SYNTHESIZER
The optimum synthesizer steps for SSB/CW or FM operation are very different. That's why Yaesu gives you the flexibility of two synthesizer steps per mode: 100Hz or 1kHz per step on SSB and CW, and 12½/25kHz (2m), 25/100kHz (70cm). When changing modes from SSB/CW to FM, your transceiver is automatically set to the nearest standard channel when you start scanning or tuning.

TEN MEMORY CHANNELS
As many as ten frequencies may be stored into memory, for instant recall. The priority feature allows you to check a favourite frequency every few seconds, with automatic halting (FM mode) when the channel is clear or busy, as desired. Memory backup is provided by a built-in lithium cell, with an estimated lifetime of five years.

DUAL VFO SYSTEM
These transceivers feature a digitally synthesized dual VFO system which provides tremendous flexibility in day to day operation. For example, one VFO may be set up in the SSB portion of the band, and the other in the FM sub-band, for immediate QSY when changing modes.

CONVENIENT FEATURES
Among the many features adding to the convenience of the transceiver is a supplied portable antenna, a high-performance noise blanker, a high/low power switch, and a battery condition meter. A clarifier (offset tuning) allows you to follow unstable or Doppler-shifted signals.

FT690R
In addition to the two metre and 70 centimetre units detailed here, the FT690R six metre (50-54MHz) transceiver completes *for the time being*, the range. The general specifications are similar but modes are USB-CW-AM-FM, power is 2½W PEP [0.8W AM—for which a 4kHz filter is fitted]. Further details on request.

GENERAL FEATURES

Modes of operation:
SSB (USB, LSB) CW & FM

Frequency response:
300-2,700Hz @ −6dB

Carrier Suppression:
Better than −40dB

Sideband Suppression:
Better than −40dB

FM Deviation:
±5kHz (max)

Tone burst frequency:
1,750Hz

Selectivity:
SSB/CW: 2.4kHz @ −6dB
4.1kHz @ −60dB
FM : 14 kHz @ −6dB
25 kHz @ −60dB

Image rejection:
Better than −60dB

Audio output:
1 Watt @ 10% THD

Audio output impedance:
8 Ohms

Dimensions:
58H × 150W × 195D mm
1.3kg (without cells)

Power requirements:
8 × C size dry cells
8 × C size Nicad cells
External 8.5-15.2VDC
Memory backup: Lithium cell

Microphone:(YM47 supplied)
600 ohms ppt with scan

ACCESSORIES

YM49
Remote speaker mic

YM50
DTMF keyboard mic

MMB11
Mobile mounting bracket

FL2010
2 metre 10W amplifier

FL7010
70cms 10W amplifier

CSC1A
Vinyl carrying case

NC11C
Battery charger

FLC11
H.D. Leather case

YHA15
Helical antenna (FT290R)

FT-290R

Frequency coverage (MHz):
144-146 or 144-148

Synthesizer steps:
SSB/CW: 100Hz/1kHz
FM : 12.5/25kHz

Current consumption:
70mA receive
800mA Tx (2.5 W RF FM)

Antenna:
SO239 on rear
Telescopic ¼ Wave supplied

RECEIVER

Intermediate frequencies:
1st IF 10.81MHz
2nd IF 455kHz (FM)

Sensitivity (better than):
SSB/CW: 0.5μV for 20dB S/N
FM : 0.25μV for 12dB SINAD

TRANSMITTER

Power Output:
2.5 Watts at 12VDC

Spurious radiation:
Better than −60dB

Repeater split:
600kHz (+ and −)

FT-790R

Frequency coverage:
430-440MHz

Synthesizer steps:
SSB/CW: 100Hz/kHz
FM : 25/100kHz

Current consumption:
100mA receive
750mA Tx (1W RF FM)

Antenna:
BNC on top panel
¼ Wave flexi supplied

RECEIVER

Intermediate frequencies:
1st IF 67.3MHz
2nd IF 10.7MHz
3rd IF 455kHz (FM)

Sensitivity (better than):
SSB/CW: 0.16μV for 10dB S/N
FM : 0.25μV for 12dB SINAD

TRANSMITTER

Power Output:
1 Watt at 12VDC

Spurious radiation:
Better than −50dB

Repeater split:
1.6MHz (input listen)

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