December 1981

RADio COMmunication

JAMBOREE-ON-THE-AIR 1981

Right, top. The Icknield District Scout group using the call GB2IDS was operational on three separate stations. Most of the operators were active Scouts or leaders; among them, shown here, were G8KPF, G8IXK and G8SZY (second, third and fourth, standing), and G8CBU and G6EXW (first and third from left, seated). *Photo:* Roy Bushby

Right, bottom. A group at GB4CSC, the Crawfordsburn Scout Camp, Co Down. Left to right: (standing) GI8FLQ, GI8SKR, GI8RLT, GI4MCW and GI4MDD; (seated) GI4CBG, GI3MMF and GI4IYO

Below. At the 72nd Watford Central Scouts site at Phasels Wood, 25 Scouts were camping during the JOTA weekend, and six licensed amateurs operated the station under the callsigns GB4WCS and GB8WCS. Left to right: G3ZER (speaking into microphone), G6CUP, Andrew Clark and Brian Elliott

Journal of the Radio Society of Great Britain

RSGB

CATRONICS FOR TRIO

GET READY FOR THE NEW BANDS WITH A TRIO TRANSMITTER

TS830S
WITH NEW BANDS

TS830S Brief Specification

Frequency Range:	9 bands, 160m-10m
Modes:	CW, USB, LSB
Final Power Input:	220 watts PEP (SSB) 180 watts DC (CW)
RX Sensitivity:	0·25μV at 10dB S/N
Catronics' Price.	**£694**

TS130S
WITH NEW BANDS

TS130S Brief Specification

Frequency Range:	8 bands, 80m-10m
Modes:	CW, USB, LSB
Final Power Input:	~200 watts PEP (SSB) ~160 watts DC (CW)
RX Sensitivity:	0·25μV at 10dB S/N
Catronics' Price.	**£525**

25W PEP version also available TS130V at **£445**

TR2400
2M SYNTHESIZED PORTABLE

TR2400 Brief Specification

Frequency Range:	144-146MHz
Mode:	FM
RF Output Power:	1·5 watts min.
Sensitivity:	1·0μV for 30dB S/N
Display:	LCD
Memories:	10 built in
Scanning:	Auto in 5kHz steps
Catronics' Price:	**£198**

NEW TR7730
2M COMPACT TRANSCEIVER

TR7730 Brief Specification

Frequency Range:	144-145·995MHz
RF Output Power:	H1 = 25W, LO = 5W
RX Sensitivity:	0·25μV for 12dB SINAD
Memories:	5 (scanning)
Autoscan:	5kHz or 25kHz
Repeater shift:	+/− 600kHz
Microphone:	500Ω with UP/DOWN + PTT
Catronics' Price:	**£247**

TS530S
BUILDING ON SUCCESS

TS530S Brief Specification

Frequency range:	9 bands, 160m-10m
Modes:	CW, USB, LSB
Final Power Input:	220 watts PEP (SSB) 180 watts DC (CW)
Receive Sensitivity:	0·25μV at 10dB s/N
Catronics' Price:	**£534**

TR9000
2M COMPACT ALL MODE

TR9000 Brief Specification

Frequency Range:	144-146MHz
Modes:	USB, LSB, FM, CW
RF Output Power:	10 watts
Sensitivity:	SSB/CW 0·25μV for 10dB S/N FM 0·25μV for 12dB SINAD
Frequency Control:	Digital, phase locked VCO
Memories:	5 built in
Scanning:	Auto−25/12·5kHz/100Hz
Catronics' Price:	**£374**

TR7800
2M FM SYNTHESISED

TR7800 Brief Specification

Frequency Range:	144-145·995MHz
RF Output power:	H1 25W, LO 5W (adjustable)
RX sensitivity:	0·2μV for 12dB SINAD
Autoscan:	5kHz or 25kHz
Memories:	15 inc 1 × priority
Repeater shift:	+/− 600kHz & Reverse
Frequency display:	4 digit LED & Mem. No.
Catronics' Price.	**£284**

TR8400
70cm FM SYNTHESISED MOBILE

TR8400 Brief Specification

Frequency Range:	430-439·975MHz
Channel Spacing:	25kHz
RF Output Power:	10W (HI) or 1W (LO)
RX Sensitivity:	0·4μV for 12dB SINAD
Memories:	5 (scanning)
Repeater shift:	±1·6kHz
Catronics' Price:	**£334**

R1000
COMMUNICATIONS RECEIVER

R1000 Brief Specification

Frequency Range:	200kHz-30MHz
Modes:	AM, USB, LSB, CW
Sensitivity	<2MHz: 5μV >2MHz: 0·5μV for 10dB S + N/N on SSB
Digital Readout:	to 1kHz
Clock:	Quartz controlled
Catronics' Price:	**£297**

We always have a good selection of used equipment in stock—ask for current list.

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DECEMBER 1981

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RADio COMmunication

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EDITOR
A. W. Hutchinson

Assistant editor
Miss S. M. Walker

Draughtsman
D. E. Cole

Editorial secretary
Miss H. Samuel

Contributions **(including Members' ads)** and all correspondence concerning the **content** of *Radio Communication* should be addressed to:

The Editor, RSGB,
88 Broomfield Road,
Chelmsford,
Essex CM1 1SS

Tel 0245 84938

Office hours: 0900 to 1700

ADVERTISING

Advertising, other than Members' ads, should be sent to:

Mr C. C. Lindsay,
2 Leyburn Gardens,
Croydon,
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Tel 01-686 5839 *(Not RSGB)*

Hours: 0915 to 1715

EDITORIAL CONSULTANT

J. P. Hawker, G3VA

Correspondence concerning the distribution of the journal and all other Society matters should be addressed to:

RSGB Headquarters,
35 Doughty St,
London WC1N 2AE

Tel 01-837 8688

Business hours: 1000 to 1600

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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 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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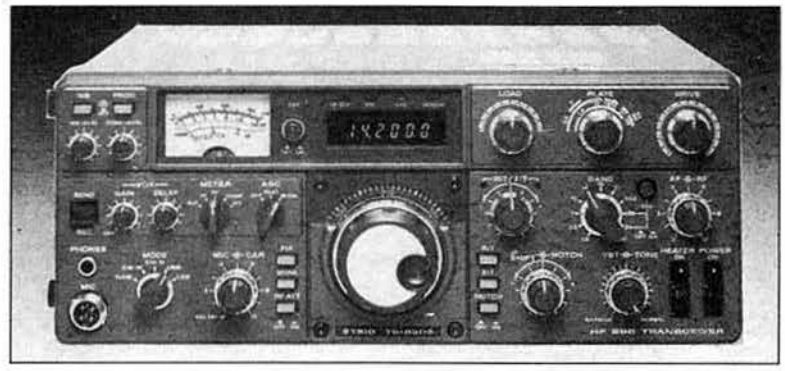
TRIO *pacesetter in amateur radio*

We've handled a lot of equipment in our time as radio amateurs but the TS830S really took us by storm. As you will hear if you listen on the air, it's reputation is high all round the world. We think the TS830S is exactly right for the operator who has carefully considered all the features necessary for top performance, put aside all the gimmickry and found the TS830S. This rig offers you all band coverage; true frequency readout on all modes; variable bandwidth *and* passband tuning; rugged, reliable 6146B valves in the PA; top quaity both in construction and design; and, above all, the Trio reputation for giving you the best equipment at a reasonable price. Thousands of happy users worldwide all confirm that if you want total satisfaction, try the TS830S. Send for comprehensive details today.



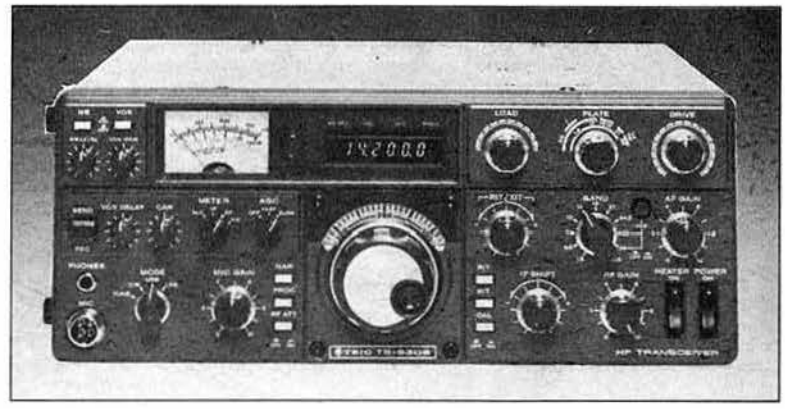
TS-830S

£694.83 inc VAT. Securicor £4.50

A recent addition to the Trio HF range, and proving amazingly popular is the new TS530S. Designed as a "little brother" to the TS830S, the TS530 uses the same PLL system, same RF boards, same readout system and many other features of the 830 but without the variable bandwidth facility. You do, of course, have the famous Trio IF shift system for dodging the QRM.

We really believe that the TS530 is the finest mid-price HF base station transceiver on the market and we would like the opportunity to prove it to you. Why not call us, or call in person to see and try out this super rig.

If you like to read lists of features, how about 160-10 metres including new bands: passband tuning on all modes: 6146B PA tubes for low intermod: low power tune up: digital readout shows *true* frequency at all times: VOX built in: CW sidetone: speech processor: noise blanker: etc, etc.

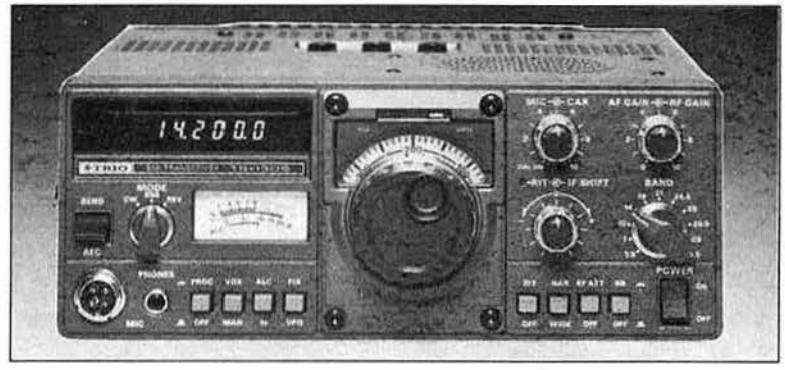


TS-530S

£534.98 inc VAT. Securicor £4.80

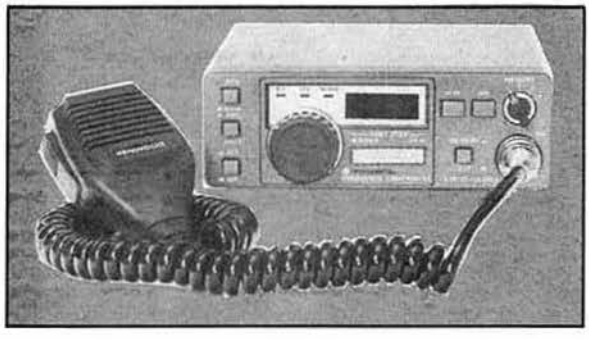
For the keen mobile/portable enthusiast, the "no-tune" solid state transceiver has proved irresistible, and the Trio TS130S is probably the best of the bunch. When the original TS120 was introduced, there were gasps of amazement at Trio's achievement in making a first class HF rig in such a small size. With the advent of the TS130S, the mobile rig really comes to maturity. Imagine an 8 band transceiver with digital readout, I.F. shift, vox, speech processor, single conversion PLL derived transmitter and receiver, 100W output, red hot receiver – and all in a package you can carry on the palm of one hand. It's really a staggering thought.

The unquestioned excellence of Trio design and manufacture shows in every aspect of the TS130S – why not see it and try it for yourself.



TS-130S

£525.09 inc VAT. TS130V £445 inc VAT



MAKE MOBILE OPERATION A PLEASURE

A digital frequency remote controller complete with up/down microphone and having four memories. Ideal for simpler mobile operation. Compatible with the TS830S, TS530S, TS130S and V and the TS120 series.

DFC-230

£179.86 inc VAT. Securicor carriage £4.80

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TRIO *pacesetter in amateur radio*

TR-7730 *the new compact 2 metre FM transceiver*

Once again from Trio an absolutely fantastic 2 metre FM Mobile Transceiver. Compact, simple to operate, full 25 watts output – a truly dazzling piece of gear.
Designed by Trio to provide a miniature transceiver, the TR7730 measures 6in wide by 2in high by 8in deep.
In providing both first class performance in transmission and reception Trio engineers have again triumphed.
Switch on your Rig and listen for the outstanding signal from a TR7730.
The five memories, the band and memory scan facility, together with the up/down mike and comprehensive mobile fixing kit make this the rig you have been waiting for.
Remember, sooner or later everyone graduates to Trio equipment.

TR7730 features:

- Compact and lightweight design measuring 147 (5.9) × 51.5 (2.1) × 198 (7.9). Weighing 1.5kg (3.3lb) such a small compact Rig is easily fitted in any small car or for security can be placed in the glove compartment.
- 25 watts output in high power position for good mobile communications – 5 watts in low position.
- Five memories for either Simplex or repeater operation. The fifth memory is capable of non-standard frequency shift.
- Frequency coverage in either 25 or 5kHz steps. Full 2 metre band 144.000 to 145.995.
- Memory scan. Automatically locks on an occupied memory channel and resumes scanning when the signal disappears or when the scan switch is pushed. Scan hold or mike push to talk switch cancels the scan function.
- Band scan. The Rig scans the band in either 25 or 5kHz steps and locks on an occupied channel.
- Both mobile mounting bracket and up/down microphone included with the equipment.

TR7730 **£247.94** inc VAT
Carriage £4.50

NEW

TR-9500 *70cm FM, SSB and CW multimode mobile*

The TR9500 a 70cm multimode mobile giving SSB, FM and CW operation in a compact rig based on the phenomenally successful 2 metre 9000. Combining the convenience of FM with the "DX ability" of SSB on the 70cm band this is the rig all discerning VHF and UHF amateurs have been waiting for. Used alongside your existing 2 metre equipment a new spectrum of contacts becomes available. Repeaters, satellite working, simplex and with the addition of your 2 metre rig Duplex communications are at your fingertips.

Of course the matching accessories, SP120 speaker, BO 9 system base and PS20 power supply, are all available to enable you to build a base station system second to none.

The TR9500 features:

- FM, USB, ESB and CW.
- Similar in size to the TR9000.
- Two digital VFOs.
- Multiple scan facilities for various modes.
- Six memories, five for simplex or repeater shift – and the sixth memory for a non-standard offset.
- Digital frequency display.
- Covers 430 to 440MHz.
- Up/down microphone for manual band scan.
- RIT (Receiver Incremental Tuning) for SSB and CW.
- RF gain control.
- Mobile mounting bracket. Led indicators for on air and busy.

Optional Accessories.

- PS20 fixed station power supply.
- SP120 fixed station external speaker.
- BO9 system base – with power switch, send/receive switch. memory back up power supply and headphone jack.

TR 9500 **£449.88** inc VAT
Carriage £4.50

NEW

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TRIO

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HC10

WORLD CLOCK

£58.88 inc VAT
carr £1.50

UL1000

£39.50 inc VAT, carr £2.00

The UL-1000 is a new concept in receiving station accessories and will help any keen listener to improve the performance of his station, particularly in the difficult conditions existing in the medium wave band (500kHz-1·6MHz).

The UL-1000 is a self-contained variable gain, tuned preamplifier suitable for use with various aerial systems. A particular feature of the UL-1000 is the use of a high Q loop aerial for the 500kHz-1·6MHz band.

TRIO

pacesetter in amateur radio

Trio 8400 the new way to 70cm FM mobile, a fully synthesized 430 440MHz 10 watt output, mobile transceiver with memories, 2 separate VFO's all in a truly amazing compact package. Complete with up/down frequency shift microphone and car mounting bracket the TR8400 is the way to go. 70cm is on the move.

TR-8400 *70cm FM mobile*

£334.88 inc VAT. Carriage by Securicor £4.50

TR-7800 Trio's remarkable TR-7800 2-metre FM mobile transceiver provides all the features you could desire for maximum operating enjoyment. Frequency selection is easier than ever, and the rig incorporates new memory development for repeater shift, priority, and scan. The TR-7800 by Trio, the only FM mobile.

TR-7800 *The Ultimate 2 Metre Mobile FM rig*

£284.97 inc VAT. Carriage by Securicor £4.50

TR-9000 The exciting TR-9000 2-metre all-mode transceiver combining the convenience of FM with long distance SSB and CW in a very compact, very affordable package. Because of its compactness the TR-9000 is ideal for mobile installation, add on its fixed station accessories and it becomes the obvious choice for your shack.

TR-9000 *2 Metre Multimode*

£374.90 inc VAT. Carriage by Securicor £4.50

A Christmas Message

There were shepherds abiding in the field, keeping watch over the flocks by night. And lo, the angel of the Lord came upon them, and the glory of the Lord shone about them, and they were sore afraid.

And the angel said unto them, "fear not, for behold I bring you good tidings of great joy, which shall be to all people. For unto you is born this day, in the city of David, a Saviour which is Christ the Lord".
And suddenly there was with the angel a multitude of the heavenly host, praising God, and saying:

"Glory to God, glory to God in the highest, and peace on earth, goodwill towards men".

LUKE 2 V 8 to 14

A PEACEFUL CHRISTMAS TO OUR FRIENDS

EMPORIUM NEWS

Hello there.
Here we are again – **Emporium News.**
Glad you turned to this page first and **I hope you enjoy reading this as much as I enjoyed writing it.**

Some more new products: The **SWR427H** which has a self-powered peak power and SWR meter in the frequency range 1·8 to 150MHz. The **SWR427H** is a very well-constructed piece of equipment and the only way to appreciate it would be to see it in operation here at Matlock. This SWR meter is priced at £65.00, carriage on the item being £1.50.

The **Daiwa range of power and SWR meters** is still going strong and just to recap we have the CN520 1·8-60MHz crossed needle power/SWR meter at £32.50 – the VHF version that is the CN540 50-150MHz at £35 – **the super-deluxe gran turismo CN620A 1·8MHz at £52.81** and the VHF/UHF equivalent, the CN630 at £75.

I am sure you know well the automatic antenna tuners from Daiwa – the CNA1001A and the 2K watts CNA2002 **but you will not have heard of the new 3-30MHz 8-band high power manual tuner and crossed needle power meter – the CNW518** which is available at £175. The **CNW518,** which is so new that I have just had to dash to the showroom to pick one up to describe it, is a **2·5k Pep** antenna tuner, a crossed needle power and SWR meter having the ranges **20 watt, 200 watt and 1kW**, switchable on bands from 3·5 to 28 megs, **including the three new bands** and having an **internal antenna switch** enabling one of two antennas to be selected. A front panel switch also enables the unit to be used to couple the antenna direct to the rig and thus bypass the tuner. **A nice piece of equipment** featuring **two-speed antenna** and **transmitting tuning controls** for added convenience available at an extremely realistic price.

For **the VHF enthusiast** who is just starting in the hobby, then the SR9 must be a winner. **A tunable receiver covering 144-146** which will get you quickly on the air and fixed channel crystal positions when you have decided where the locals, and probably not so locals, are to be found. It is also advisable to crystal your SR9 to give greater safety when operating this piece of kit mobile.

A newcomer to the aerial scene is the GPV720 which is a combined Base Station 70cms and a 2m antenna. Coming complete with SO239 base and clamps for your mast at a price of £29.50, this is a fine antenna and at a realistic price. **Ring us for details.**

New from Trio is the MC40 microphone which, for the uninitiated, is the up/down 500 ohm microphone with six-pin plug which is supplied as a standard for most of the current Trio VHF/UHF equipment. Now available as an individual item, this is just the piece of equipment to provide **those of you who own an HC1400** with the up/down mike shift facility. Ring for details.

It is just a rumour but I understand from Tokyo that they have found in a dim and distant part of the factory several **VFO520** units. For those of you with any of the TS520 series who have asked the question in the showroom: **"have we got a matching VFO for the TS520 series?"** and have been disappointed to find that the unit is discontinued, this has to be your last opportunity. Obviously, the VFO is available in limited quantities only and I am afraid it will be a case of first come first served. In fact, by the time you read this we may again, unfortunately, be out of stock. If you have the TS520 and wish to have the digital readout facility then **what about the DG5 – the digital readout and frequency counter** which is still available in extremely limited numbers at £112.01. Joking apart, I think we would find it in our hearts uncharitable to charge the penny!

If you are considering **a TR7800 as the FM piece of equipment for your car,** or possibly your shack, then why not consider **the TR7850** which is the high power version of this rig. Contrary to what has been said elsewhere, the TR7850 is not a replacement for the TR7800 but just a **40 watt** (not 50) version of the same rig, an increase in the size of the heat sink being the only discernible change.

I am sure you will note from the marginal difference in price that this is a rig worth consideration – don't consider too long since the TR7850 is really a **"limited edition"** model and stocks will not last for ever. At the risk of repeating myself, please 'phone David (one of the Davids) for the latest stock situation for this model.

Back to 70cms – let us have a look at the **"Authority on Radio"** equipment again.

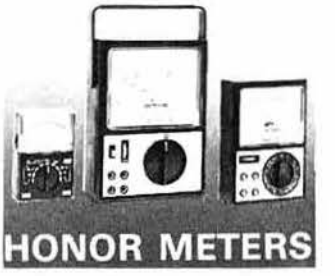
I use a 740A made by this company and enjoy extremely fine contacts **on our local repeater GB3DY.** From the bottom of valleys and under mobile conditions I have used this equipment to access the repeater and **astound** some of the local operators. At £195, a piece of 70cm hand-held equipment having 3 watts output in the high power position and 300 milliwatts in the low power position, a full 10 meg of coverage complete with 1·6MHz repeater shift and having provision for a remote speaker/mike, this is unquestionably extremely good value for money. I am sure many more of you will move to 70cms and **what better piece of equipment to start with.**

Also from Authority on Radio are the 2m hand-held rigs: the 245 and the 240A – **the 240A is available in either of two versions,** the first covering 144-146 and the second (should you be wealthy enough to go State side for your holidays) from 144-148MHz and, would you believe it, **the increased frequency coverage model is being sold at no extra charge.** The AR245 is available at £178.00 and the 240A available at £158.00.

If you do not have the discernment necessary to buy the NRD515 and associated memory and speaker – actually I am sure it is only a small matter of money – have a look at the most economical in our range of general coverage receivers. For world listening for the chap who is just starting in this fascinating and enthralling aspect of amateur radio, to my way of thinking **there is no better way to start than with the SRX30D.**

Full coverage from 200 to 30MHz, digital readout and you are able to listen to the world: shortwave broadcast stations, amateur radio stations, and many others.

I am sure there are many of you who have the new generation of wide band scanner receivers and a new aerial for this receiver is the **Scan-X** which is a **65 to 520 MHz discone** and is priced at **£15.18**. Unfortunately, carriage on this item is £4.50 so why not have a trip over to Matlock and enjoy the delightful scenery in which we are privileged to work and avoid paying the £4.50. If you look as though you are going to buy a piece of equipment, then **I am sure that David will offer you a token for our drinks machine.** Keep away from the Continental coffee. The drinking chocolate is highly recommended **(by the workshop staff)** though rumour has it a drop of the hard stuff is added!



Anyway, that is about it for now as Marlyn, the tealady has arrived and we must get our priorities right so, until next month, gud DX es 73 es FB OM, etc. . . .

Christmas Greetings

To all our valued customers

From Paul G3VJF, Dave G4ELP, Phil G4CZU, Fraser G8FEZ, Chris G8GHH, Jerry G4JMP, Chris G8SWA, Tim G6EMZ, Andy, Don, Ian and Sheelagh.

IC–25E

Again ICOM seem to have got everything right with its new 25W FM mobile. It is one of the smallest around and yet is packed with features which make it really handy to use while still maintaining the very high quality expected in ICOM transceivers.

Like its bigger multimode brother, the IC-25 has TWO VFOs FIVE MEMORIES (which can be used in either simplex or duplex mode) a PRIORITY CHANNEL (which can be any one of the frequencies stored in the memories) full DUPLEX and REVERSE DUPLEX operation and a crystal controlled tone burst. Again the display is brighter and there is an LED Bar-type S-Meter and relative power output meter. The choice of frequency steps is 25kHz and 5kHz. Like the IC-290 multi-scanning functions are available either from the front panel or remotely using the HM-10 scanning microphone.

Again we feel that this beautifully designed and constructed piece of equipment is bound to sell like hot cakes – and again remember that if you buy one directly from Thanet you will get a full two years' warranty and any work will be carried out in our excellently equipped workshop. One of our engineers has been out to ICOM in Japan for a two week course to learn the tricks of the trade.

All this and yet its not much bigger than a car radio!

IC–290E

The IC-290E incorporates all the features you could want in a multi-mode mobile to make it easy to use when driving. A standard 600kHz repeater offset shift is built into its computer's memory but if necessary this can be altered from the front panel for unusual shifts that may be required (such as say 1.6MHz for some transvertors). There are five programmable memories and these can be used in either simplex or duplex mode. Any one of these memories can also be designated as a PRIORITY CHANNEL which can be checked once every five seconds if you wish for that private message you may be expecting. Scanning can be controlled either from the front panel or from the HM10 microphone. There are options to scan the whole band, any selected part of it, or just the memory channels. You do NOT lose the repeater shift when scanning or using either of the VFO's in simplex. Unlike many of its competitors you do have TWO VFO's which can also prove a very useful feature. Further improvements include a brighter frequency readout, an LED bar-type S-Meter and power output meter and the ideal tuning rates of 25kHz per step on FM and 100Hz per step on SSB. Both these rates can be changed to 1kHz steps by use of the TS button on the front panel. For repeater operation both + and − shifts are available and it is possible to listen on the repeater input channel merely by pressing a button. Internal controls allow you to vary scan speed scan delay times etc., Semi break-in CW, and CW sidetone are also available.

Put all these features into an attractive case, add the world wide renowned ICOM quality and performance, and you must see that this is the choice for you. And just as an extra remember, you get a full two years warrenty if you purchase your transceiver direct from THANET or one of our agents listed in this advertisement.

BUY DIRECT FROM US AND GET TWO YEARS WARRANTY ON ALL EQUIPMENT AND BENEFIT FROM OUR SUPERB TECHNICAL EXPERIENCE AND AFTER-SALES SERVICE.

Thanet Electronics

ICOM

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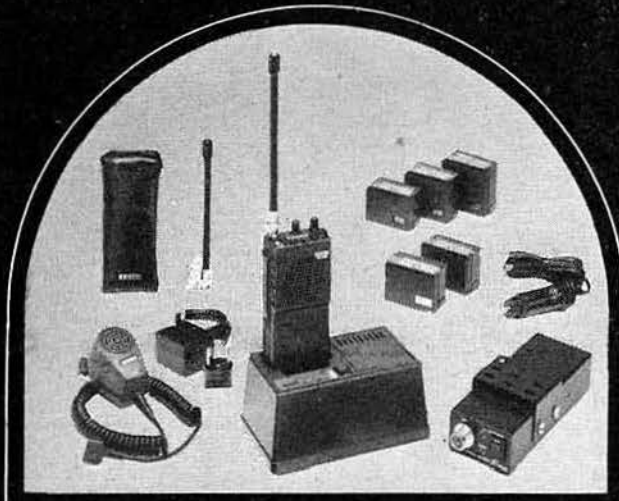
BUY DIRECT AND ENJOY THE BENEFITS



IC–2E (2m)
IC–4E (70 cm)

FULLY SYNTHESIZED – covering 144–145 996 in 400 5kHz steps (2E). 430–440 (4E)
POWER OUTPUT – 1.5W with the 9V rechargeable battery pack as supplied – but lower or higher output available with the optional 6V or 12V packs.
BNC ANTENNA OUTPUT SOCKET – 50 ohms for connecting to another antenna or use the Rubber Duck supplied.
SEND BATTERY INDICATOR – Lights during transmit but when battery power falls below 6V it doesn't light indicating the need for a recharge
FREQUENCY SELECTION – by thumbwheel switches indicating the frequency.
+ 5kHz SWITCH – adds 5kHz to the indicated frequency.
DUPLEX SIMPLEX SWITCH – gives simplex or plus 600kHz or minus 600kHz Transmit (2E) + 116MHz (4E)
HI-LOW SWITCH – reduces power output from 1.5W to 150mW reducing battery drain.
EXTERNAL MICROPHONE JACK – If you do not wish to use the built-in electret condenser mic an optional microphone-speaker with PTT control can be used. Useful for pocket operation.
EXTERNAL SPEAKER JACK – for speaker or earphone.
This little beauty is supplied ready to go complete with nicad battery pack, charger, rubber duck.

A Full range of accessories in stock

IC ML1	
10 Watt Mobile Booster For IC2E	£49.00
BP5 11 Volt Battery Pack	£30.50
BP4 Empty Battery Case for 6x AA Cells	£ 5.80
BP3 Standard Battery Pack	£17.70
BP2 6 Volt Pack	£22.00
BC30 Base Charger for Above	£39.00
BC25 Mains Charger As Supplied	£ 4.25
DC1 12 Volt Adaptor Pack	£ 8.40
HM9 Speaker/Microphone	£12.00
CP1 Mobile Charging Lead	£ 3.20
LC1/2/3 Cases	£ 3.50 each

Agents (phone first – all evenings and weekends only).

Scotland – Jack GM8 GEC (031 665 2420)
Midlands – Tony G8AVH (021 32 - 2305)
Wales – Tony GW3 FKO (0874 2772 or 0874 3992)
North West – Gordon G3LEQ (0565 4040 ansafone service available)

Announcement of the New IC–AT500 Automatic Antenna Tuner

Icom's Research and Design Team is proud to announce the debut of the new IC-AT500 Automatic Antenna Tuner. This innovative piece of equipment is a marvel of electronic circuit wizardry and is the first of its kind on the market anywhere in the world today.

This compact 6.4 kg antenna tuner provides the following features:

Quick tune up
The newly developed detector circuit detects resistance and reactance of the load, and controls powerful motors to tune the two variable capacitors, thus making the tune up time very short.

Auto band switching
When the IC-720A or IC-730 (with the optional LDA Unit installed) is used, band switching of the tuner can be controlled by the band switch of the IC-720/720A or 730. This tuner has dual accessory sockets, so the auto band switching function can be used with the IC-2KL linear amplifier at the same time.

Pre-set capability
The matching circuit can be used for each band, so you are able to make quick QSY's and have trouble-free operation.

Four antenna connectors
This tuner has four coaxial sockets for antennas, and selects the suitable antenna for each band automatically. When the power of this tuner is turned off, this tuner can be used as an automatic antenna selector.

Two way power source
This tuner can be used with DC 13.8 volts or AC240 volts.

Thanet Electronics

ICOM

143 RECULVER RD.,
BELTINGE,
HERNE BAY, KENT.
Tel: 02273 63859

IC–720A

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! 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.

Here are some of the features:-

- Two VFO's with automatic band changing
- General coverage receiver 100 kHz to 30 MHz (with provision to transmit if you have a licence!)
- No PA tuning
- Protection against rotten antennas
- Self cancelling RIT
- Full power capability (even on RTTY) for prolonged periods.
- Automatic control of linear and antenna tuner

IC–730

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 switchtable RF Pre-Amp is a boon on todays crowded bands. Full metering, WWV reception and connections for transverter and linear control almost completes the IC-730's impressive facilities.

IC–2KL

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 30 MHz 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 overridden for use on rigs other than the IC-720A, but can be added to the IC-701 and the IC-730. 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, has a high conductance, several hundred times that of copper and 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–202S (2m)
IC–402 (70cm)

The IC-202S is a very well designed 2m SSB portable. It offers 3W pep output on USB, LSB and CW. Large Battery capacity (HP11 type) or Nicads if you wish. A special VXO circuit to provide smooth tuning and crystal stability needed for SSB operation on 2m. Each of the four 200kHz band positions allows operation anywhere in 2m (Supplied with 144-144.2 and 144.2-144.4) Top of the band Oscar xtals available for cross-pond working. It has a DC socket and SO239 sockets for mobile or base station working barefoot or as a prime mover. Mobile mounting brackets Nicad packs, chargers, cases all available options. You must agree a very versatile well proved rig. The 70cm twin of the 202S has very similar features covering the frequency range of 432-435.2 MHz. Their versatility is well worth an enquiry.

IC–24G

The famous IC-240 has been improved given a face lift and renamed the IC-24G. Many thousands of 240s are in use, and its popularity is due in part to simplicity of operation, high receiver sensitivity and superb audio on TX and RX. The new IC-24G has these and other features. Full 80 channels (at 25kHz spacing) are available and readout is by channel number – selected by easy to operate press button thumbwheel switches. This readout can clearly be seen in the brightest of sunlight. Duplex and reverse duplex is provided along with a crystal controlled tone call Hi–10W and Lo–1W RF outputs is available along with a 12½ kHz upshift, should the new channel spacing be necessary. The old IC240 proved to be the most reliable rig we have ever sold – the IC24G because it is so similar, looks like following the same pattern. Remember for mobile use a rig MUST be easy to operate to be safe. Send for technical details.

IC–251E
IC–451

ICOM produce a perfect trio in the VHF base station range, ranging from 6 Meters thru 2 Meters to 70 cms. Unfortunately you are not able to benefit from the 6m product in this country, but you CAN own the 215E for your 2 Meter station and the 451E for 70 cms.

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

ICOM

NEW! WITH BUILT-IN VDU!! £699

Following the success of the Tono 7000E communications computer, we are now able to announce the arrival of a completely new machine on the market. The CWR 685 Telereader.
BRIEF FEATURES ARE:- Transmits and receives (via a suitable transceiver) CW, RTTY and ASCII (optional) – Built in 5" green display monitor. It will handle the alphabet, numerals, symbols and special codes on CW.
SPEEDS:- CW – 3 wpm to 50 wpm with automatic speed tracking RTTY and ASCII – 45.45,50,56.88,74.2 110 and 300 bauds. (300 bauds speed is possible when external modem or TTL input is used).
INPUT:- AF input for CW, RTTY and ASCII from phone jack (usable from 8 to 1000 ohms, 30 mV to 2 V).
DISPLAY OUTPUTS:- RF output and composite video output 1V P-P 75 ohms.
6 memories – 32 chrs each.
Printer interface – Centronic compatable parallel interface buit-in.
OUTPUT FOR OSCILLOSCOPE:- RTTY and ASCII impedance 200K ohm IV P-P.
NUMBER OF CHARACTERS DISPLAY:- 512 characters x 2 pages – total 1024.
POWER SOURCE – 13.8 V.D.C.
Complete with full size keyboard.
RECEIVE ONLY VERSION CWR 680 – £189 inc.

PRICES OF OTHER TONO QUALITY PRODUCTS

These prices may be subject to change, depending upon the state of the £

All inclusive of V.A.T.

Green Display Monitor CRT 120G	£125.00
Dot Matrix Printer HC 900	£449.00
Printer Socket SK7	£ 8.50
Linear Amplifiers -	
UC 70 (430 mHz 55W)	£149.00
2M–50W (2m)	£ 65.00
2M–100W (2m)	£115.00
MR–150W (2m)	£159.00
MR–250W (2m)	£259.00
MR–28LB (26-30 MHz)	£ 65.00
Mast-Head Pre-amps -	
RX 144 (including control)	£ 65.00
RX 430 (and psu box)	£ 70.00

Remember we also stock Yaesu, Jaybeam, Datong, Welz, G-Whip, Western, TAL, Bearcat, RSGB publications.

Thanet Electronics

ICOM

Tono Theta 7000E £599

A great computer
on offer from Thanet

The new THETA Means that every Amateur can enjoy the visual display of CW, RTTY and ASCII in both transmit and receive modes. Just connect the TONO to any TV set via the antenna terminals or to a page printer from the parallel port provided. Bring up your CW speed in receiving or sending by either watching received signals or from recorded cassettes. Connection to the transceiver is via the key, phone and mic sockets.

Some of the Outstanding Features:

COMMUNICATIONS COMPUTER THETA 7000E.
UHF and Composite Video Output Printer Interface. Wide range of transmitting and receiving speeds 10CW speeds + 8RTTY.
Built-in demodulator for high performance for 170Hz and 820 Hz shift.
Crystal controlled modulator for ASFK Hi or Lo tone.
Convenient ASCII key arrangement. Large capacity display memory. – 2 pages 32 chr x 16 lines split screen to RX and TX if required.
Automatic transmit/receive switch. Anti-noise circuit. Battery backed up memory 7 channels of 64 chrs. Send function. Buffer memory, 53 character type ahead, rub out function. Simultaneous access of the memory – 53 character type ah. LF (line feed cancel function. Cursor control CR/LF 172, 60 or 80 chrs per line) Echo function.
Word wrap around function, Transmit/receive in ASCII or RTTY, CW identification function. Mark and break (space and break) system. Monitor circuit & CW practice functions. Variable CW weights. Cross pattern checking output terminal, log computer output provided. Test message function (Ry and OBF) Receive only version £259

Phone or write for the price list of accessories for this unit

Contact us for advantageous prices.

What are the benefits of buying direct?

1) Full 2 years warranty on all equipment.
2) Excellent back up and after sales service using fully equipped workshop.
3) ICOM trained technical staff.
4) No charge for speedy delivery service.
5) Avoid disappointments – buy direct from the experts with years of experience.

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Please note Access/Barclaycard customers – goods must be sent to address registered with the credit card company.

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TRIO

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HF SSB/CW — **TRIO TS830S**

£694 Free Delivery

USB-LSB-CW. 9 bands 1·8 to 30MHz. 230V AC built-in PSU. 180 watts RF input. 2 × 5146B tubes. Fan cooled.

Digital readout display. RF speech processor. Audio notch filter. Variable IF filter. VOX; NB, RIT, etc.

HF SOLID STATE — **TRIO TS130S**

£525 Free Delivery

USB-LSB-CW. 8 bands 3·5MHz to 30MHz. 12V DC at 18 amps peak. 100 watts RF output. Fully VSWR protected.

Digital readout display. Variable IF tuning. RF speech processor. Optional 230V AC. PSU. VOX; NB; RIT etc.

HF SSB/CW — **TRIO TS530S**

£534 Free Delivery

9 bands 1·8 to 30MHz. 230V AC built-in PSU. 180 watts RF input. 2×6146B tubes. Fan cooled.

Digital readout display. Variable IF tuning. RF speech processor. VOX; N.B; RIT etc. Completely self-contained.

VHF ALL-MODE — **TRIO TR9000**

£374 Free Delivery

FM-USB-LSB-CW. 144-146MHz Digital readout. High or Low Power 1W/10W. 12½ or 25kHz steps FM. 100Hz or 10kHz

10kHz steps SSB. 5 programmable memories. Band scanning and search. Repeater shift and tone-burst. 12V DC 2-9 amps. N.B; RIT; RF gain etc.

VHF FM — **TR7730**

£247 Free Delivery

Ultra compact FM mobile. 144–146MHz coverage. 25 Watts (10W power switch. 12V DC at 5·5 amps. 25 or 5kHz steps. 5 programmable memories. Band scan and memory scan. Repeater shift and tone-burst. Remote up/down mic. Bright digital readout display.

HF RECEIVER — **TRIO R1000**

£297 Free Delivery

inc 12VDC kit & aerial

30 bands 0·2kHz to 30MHz. 230V AC or 12V DC. Large clear digital readout. 3 filters 2·4, 6 and 12kHz. AM-USB-LSB-CW.

Effective noise blanker. RF attenuator. Digital clock and timer. Tone control. Large built-in speaker.

WE STOCK EVERY TRIO ITEM • DON'T TAKE CHANCES • COME TO THE SPECIALISTS

WELZ — LABORATORY STYLE EQUIPMENT AT AMATEUR PRICES! — WELZ

SP15M POWER METER £29.95

Here's a real economy in line power meter ideal for the HF/VHF operator. Maximum handling is 200 watts and forward/reflected power is directly read in 3 ranges:- 0–2·5, 0–20W and 0–200W. Sensitivity is constant throughout the range 1·8–150MHz.

AC 38m 3·5-29MHz ATU £59.00

This is a must for solid state rig owners. Designed for coax feed, this ATU covers 8 bands 3·5 to 30MHz with a straight through position. Rated at 400 watts it will match anything between 10 and 500 ohms.

2 WAY SWITCH DC-450MHz

Now at last we've found a true coaxial switched rated at DC-450MHz at 1kW. Unlike other units the coaxial cavity is perfectly preserved with a small gold plated changeover finger. The insertion loss is an amazing 0·1dB and the isolation an equally amazing 70dB. Made by one of Japan's laboratory equipment manufacturers, this unit is the perfect answer to coax switching at VHF/UHF.

Model CH-20A £15.95 (SO239 sockets)
Model CH-20N £27.95 ("N" sockets)

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YAESU

OUR NAME MEANS A GOOD DEAL

HF SSB/CW/FM — **YAESU FT101ZDFM**

£645 Free Delivery

USB-LSB-CW-FM. 9 bands 1·8 to 30MHz. 230V AC built-in PSU. 180 watts RF input. 2 × 6146B tubes. Optional fan.

Digital readout display. RF speech processor. Variable IF bandwidth. VOX; N.B; RIT etc. Range of optional accessories.

HF SSB/CW/AM/FM — **YAESU FT902**

£859 Free Delivery

USB-LSB-CW-AM-FM. 9 bands 1·8MHz to 30MHz. 230V AC or 12V DC. 180 watts RF input. 2 × 6146B tubes. Fan cooled.

Digital readout display. Variable IF bandwidth. RF speech processor. Audio band pass filtering. VOX; N.B; RIT etc.

HF SOLID STATE — **YAESU FT1**

PHONE FOR PRICE

Free Delivery

USB-LSB-CW-AM-FM-FSK. Tx 9 bands 1·8 to 29·7MHz. Rx continuous 0·15MHz to 29·999MHz. 100 watts RF output. Fully SWR protected. Large digital readout display. Built-in touch pad control. RF speech processor. Comprehensive filtering & scanning. Completely self-contained.

VHF ALL-MODE — **YAESU FT290R**

£249 Free Delivery

USB-LSB-CW-FM. 144-146MHz Digital display. High/low power 2·5W/0·5W. 12½kHz or 25kHz steps FM. 100Hz or 10kHz steps SSB. 10 programmable memories. Band scanning/memory scanning. Repeater shift and tone-burst. 12V DC external. 8 'C' cells internal. Remote mic control etc

HF RECEIVER — **YAESU FRG7700**

£319 Free Delivery

USB-LSB-CW-AM-FM. Full coverage 0·15MHz to 30MHz. 230V AC or 12V DC option. Large clear digital readout. 4 filters 2·7kHz, 6kHz, 12kHz and 15kHz. Effective noise blanker. RF attentuator. Digital clock and timer. Optional 12 channel memory. Optional VHF converter modules.

VHF ALL-MODE — **YAESU FT480R**

£369 Free Delivery

USB-LSB-CW-FM. Full coverage 144-146MHz. High/low power 10W-1W. 12½ or 25kHz steps FM. 100Hz/1kHz/ 10kHz SSB. Programmable memories. Band scanning/ memory scanning. Repeater shift and tone burst. 12V DC at 3 amps max. Remote up/down mic control.

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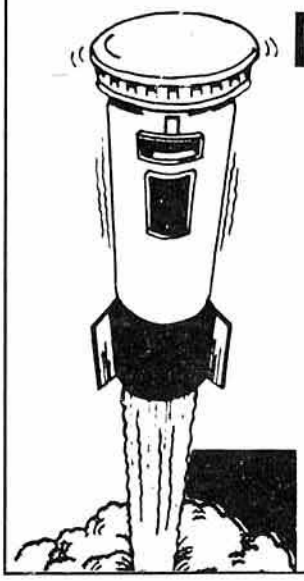

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We are pleased to announce the introduction of the new GLOBAL HP4A TV filter. Even more effective than earlier models, its double action filters both inner and outer coax conductors. Ideal for both VHF and HF operators, it is now so effective it should solve most cases of interference caused by RF down the TV aerial lead. Keep one handy!

MAIL ORDER SLIP to: Waters & Stanton Electronics, Main Road, Hockley, Essex.

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THE LATEST 2m FM 25W RIG

- COMPACT SIZE
- 25 WATTS
- 5 MEMORIES
- MEMORY SCAN
- BAND SCAN

£247 inc VAT & carriage

TRIO

TS 830S	160–10m transceiver 9 bands	£694.00	–
VFO 230	Digital VFO with memories	215.00	(2.00)
AT 230	All band ATU/power meter	119.00	(2.00)
SP 230	External speaker unit	34.96	(1.50)
DFC 230	Dig frequency remote controller	179.00	(1.50)
YK 88C	500Hz CW filter	29.60	(0.50)
YK 88CN	270Hz CW filter	32.66	(0.50)
TS 130S	8 band 200W PEP transceiver	525.00	–
TS 130V	8 band 20W PEP transceiver	445.00	–
VFO 120	External VFO	85.00	(1.50)
TL 120	200W PEP linear for TS 130V	144.00	(1.50)
MB 100	Mobile mount for TS 130/120	17.00	(1.50)
SP 120	Base station external speaker	23.00	(1.50)
AT 130	100W antenna tuner	79.00	(1.50)
PS 20	AC power supply – TS 130V	49.00	(2.50)
PS 30	AC power supply – TS 130S	88.00	(5.00)
MA 5	5 band mobile aerial system	86.00	(5.00)
MC 50	Dual impedance desk microphone	25.76	(1.50)
MC 35S	Fist microphone 50K ohm imp	13.80	(0.75)
MC 30S	Fist microphone 500 ohm imp	13.80	(0.75)
LF 30A	HF low pass filter 1kW	17.90	(0.75)
TR 9000	2m synthesised multimode	371.00	–
BO 9	Base plinth for TR 9000	34.96	(1.50)
TR 7800	2m synthesised FM mobile 25W	284.00	–
TR 7730	2m synthesised FM compact mobile 25W	247.00	–
TR 2300	2m synthesised FM portable	166.00	–
VB 2300	10W amplifier for TR 2300	58.00	(1.50)
MB 2	Mobile mount for TR 2300	17.71	(1.50)
RA 1	Flexible rubber antenna for TR 2300	6.90	(0.50)
TR 2400	2m FM synthesised handheld	198.00	–
SMC 24	External speaker/microphone for 2400	13.80	(1.00)
ST 1	Base stand and quick charger	45.00	(1.50)
BC 5	12V quick charger	18.40	(1.00)
SC 3	Soft carrying case plus belt hook	15.87	(0.50)
PB 24	Spare battery pack and charger lead	15.18	(0.75)
TR 8400	70cm FM synthesised mobile tranceiver	334.00	–
PS 10	Base station power supply for 8400	64.86	(2.00)
TR 9500	70cm synthesised multimode	449.00	–
R 1000	Synthesised 200kHz–30MHz receiver	297.00	–
SP 100	External speaker unit	26.90	(1.50)
HC 10	Digital station world time clock	58.88	(1.50)
HS 5	Deluxe headphones	21.85	(0.75)
HS 4	Economy headphones	10.35	(0.75)
SP 40	Mobile external speaker	12.40	(1.50)

ICOM

IC 730	HF mobile transceiver 8 band	586.00	–
IC 720A	HF transceiver and gen cov receiver	883.00	–
PS 15	Power supply for 720A	99.00	(3.00)
IC 251E	2m multimode base station	499.00	–
IC 25E	2m synthesised compact 25W mobile	259.00	–
IC 290E	2m multimode mobile	366.00	–
IC 2E	2m Fm synthesised handheld	169.00	–
IC L1/2/3	Soft cases	3.50	(0.50)
IC HM9	Speaker/microphone	12.00	(0.75)
IC BC30	230V ac base charger and hod	39.00	(1.50)
IC BC25	230V ac trickle charger	4.25	(0.75)
IC CP1	Car charging lead	3.20	(0.50)
IC BP2	6V Nicad pack for IC2E	22.00	(1.00)
IC BP3	9V Nicad pack for IC2E	17.70	(1.00)
IC BP4	Empty case for 6 x AA Nicads	5.80	(0.75)
IC BP5	11·5V Nicad pack for IC2E	30.50	(1.00)
IC DC1	12V adaptor pack for IC2E	8.40	(0.75)
IC ML1	10W booster	49.00	(1.00)

YAESU MUSEN

FT 902DM	160–10m 9 band receiver	885.00	–
FC 902	All band ATU	135.00	(1.50)
SP 901	External speaker	31.00	(1.50)
FT 101Z	160–10m 9 band transceiver (FM)	590.00	–
FT 101ZD	160–10m 9 band transceiver (FM) digital ro	665.00	–
DCT 101Z	DC/DC power pack	42.55	(1.50)
FAN 101Z	Cooling fan for 101Z	13.80	(0.75)
FT 707	8 band transceiver 200W PEP	569.00	–
FT 707S	8 band transceiver 20W PEP	485.00	–
FP 707	Matching power supply	125.00	(5.00)
FV 707R(2)	Transverter – 2m	198.00	–
FV 707DM	Digital VFO	203.00	–
FC 707	Matching ATU/power meter	85.00	(1.00)
MR 7	Metal rack for FT 707	13.70	(1.00)
MMB 23	Mobile mounting bracket for FT 707	16.10	(1.00)
FRG 7	General coverage receiver	189.00	–
FRG 7700	200kHz–30MHz general coverage receiver	329.00	–
FRG 7700M	As above but with memories	409.00	–
FRT 7700	Antenna tuning unit	37.85	(1.00)
FT 208R	2m FM synthesised handheld	209.00	–
FT 708R	70cm FM synthesised handheld	219.00	–
NC 7	Base trickle charger	26.85	(1.30)
NC 8	Base fast/trickle charger	44.10	(1.50)
NC 9C	Compact trickle charger	8.00	(0.75)
FBA-2	Battery sleeve for use with NC 7/8	3.05	(0.50)
FNB-2	Spare battery pack	17.25	(0.75)
PA-3	12V dc/dc adaptor	13.40	(0.75)
FT 480R	2m synthesised multimode	379.00	–
FT 780R	70cm synthesised multimode (1·6MHz shift)	459.00	–
FP 80	Matching 230V ac power supply	63.00	(1.50)
FT 290R	2m portable synthesised multimode	249.00	–
MMB 11	Mobile mounting bracket	22.25	(1.00)
CSC-1	Soft carrying case	3.45	(0.75)
NC-11C	240V ac trickle charger	8.05	(0.75)
FL 2010	Matching 10W linear	64.40	(1.20)
Nicads	2.2 amp/hr Nicads each	2.50	–
FL 2100Z	160–10m 1200W linear	425.00	(5.00)
FF 501DX	HF low pass filter 1kW	23.00	(0.75)
FSP-1	Mobile external speaker 8 ohm 6W	9.95	(0.75)
YH55	Headphones 8 ohm	10.00	(0.75)
YH 77	Lightweight headphones 8 ohm	10.00	(0.75)
QTR 24D	World clock (quartz)	28.00	(0.75)
YM 24A	Speaker/mic 207/208/708	16.85	(0.75)
YD 148	Stand microphone dual imp 4 pin plug	21.10	(1.50)
YM 34	As 148 but 8 pin plug	21.45	(1.50)
YM 38	As 34 but up/down scan buttons	24.90	(1.50)

FDK VHF/UHF

Multi 700EX	2m FM synthesised 25W mobile	199.00	–
Multi 750E	2m multimode mobile	289.00	–
Expander	70cm transverter for M750E	219.00	–

STANDARD PORTABLES

C58 MULTIMODE
£239 inc VAT & carr.

C78 70cm FM
£219 inc VAT & carr.

STANDARD VHF/UHF

C 78	70cm FM portable	219.00	–
CPB 78	10W matching linear	67.50	(1.50)
C 58	2m multimode portable	239.00	–
CPB 58	25W matching linear	79.50	(1.50)
CM 8	Mobile bracket	19.95	(1.00)
CL 8	Soft carrying case	6.95	(0.75)
C 12/230	Charger	7.59	(0.75)

All prices correct at time of going to press

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All with over-volts—current limit and thermal protection

4 amp	27.95	(1.50)
6 amp	44.95	(2.00)
12 amp	69.00	(2.00)
24 amp	99.00	(3.00)

DESK MICROPHONES

Shure 444D	Dual impedance	29.95	(1.50)
Shure 526T MkII	Power microphone	39.95	(1.50)
Adonis AM502	Compression mic 1 o/p	39.00	–
Adonis AM601	Compression mic + meter 1 o/p	49.00	–
Adonis AM802'	Compression mic + meter 3 o/p	59.00	–

MOBILE SAFETY MICROPHONES

Adonis AM202S	Clip-on	20.95	–
Adonis AM202F	Swan neck + up/down buttons	30.00	–
Adonis AM202H	Head band + up/down buttons	30.95	–
Daiwa RM940	Infra red link	45.00	(0.75)

HAND MICROPHONES

TA 600Ω fist mic	4.95	(0.50)
Power mic wide impedance	9.95	(0.75)
Trio MC 30/35 600/5k imp	13.80	(0.75)
Yaesu YE7A/YD846 600/5k imp	5.75	(0.75)
Shure 201 High impedance quality mic	14.50	(0.75)

SWR POWER METERS

UH74 for 70cm £13.95 (0.50)

MODEL 110 up to 150MHz £11.50 (0.50)

Model 110	HF/2m calibrated power reading	11.50	(0.50)
SWR 25	HF/2m twin meter	11.50	(0.50)
Welz SP15M	HF/2m 200W	29.00	(0.75)
Welz SP200	HF/2m	59.00	(0.75)
Welz SP300	HF/2m/70	79.00	(0.75)
Welz SP400	2m/70	59.00	(0.75)
Daiwa SW110A	HF/2m	35.00	–
Daiwa CN620A	HF/2m cross pointers	52.80	–
Daiwa CN630	2m/70 cross pointers	71.00	–

DUMMY LOADS

DL 30	PL259 30W max	5.00	(0.50)
DL 60	PL259 60W max	8.80	(0.70)
DL 60	N type 60W max	16.50	(0.70)
DL 150	PL259 150W max	14.95	(0.70)
DL 600	SO239 600W max	29.95	(1.50)
DL 1000	SO239 1000W max	39.95	(1.50)

TEST EQUIPMENT

DRAE VHF wavemeter 130–450MHz	24.95	–
FXI wavemeter 250MHz max	28.00	(0.75)
DM81 Trio dip meter	59.95	(0.75)
MMD 50/500 Microwave Modules frequency counter	69.00	(0.75)

ANTENNA BITS

Hi-Q Balun 1:1 5kW PEP (PL259 fitting)	9.95	(0.75)
T-piece polyprop dipole centre	1.00	(0.20)
Ceramic strain insulators	0.40	(0.10)
Small egg insulators	0.40	(0.10)
Large egg insulators	0.50	(0.10)
75Ω twin feeder—light duty per meter	0.16	(0.02)
300Ω twin feeder—per meter	0.14	(0.02)
URM 67 low loss 50Ω coax per meter	0.60	(0.20)
UR 76 50Ω coax per meter	0.25	(0.05)

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

DATONG PRODUCTS

PC 1	General coverage converter HF on 2m rig	120.75	–
VLF	Very low frequency converter	25.30	–
FL 1	Frequency agile audio filter	67.85	–
FL 2	Multi-mode audio filter	89.70	–
ASP/B	Auto RF speech clipper (Trio plug)	79.35	–
ASP/A	Auto RF speech clipper (Yaesu plug)	79.35	–
D 75	Manually-controlled RF speech clipper	56.35	–
RFC/M	RF speech clipper module	26.45	–
D 70	Morse tutor	49.45	–
AD 270	Indoor active dipole antenna	37.95	–
AD 370	Outdoor active dipole antenna	51.75	–
MPU 1	Mains power unit	6.90	–

D70
MORSE TUTOR
£49.45 inc VAT & carr.

MICROWAVE MODULES

MMT 144/28	2m transverter for HF rig	99.00	–
MMT 432/28S	70cm transverter for HF rig	149.00	–
MMT 432/144R	70cm transverter for 2m rig	184.00	–
MMT 70/28	4m transverter for HF rig	115.00	–
MMT 70/144	4m transverter for 2m rig	115.00	–
MMT 1296/144	23cm transverter for 2m rig	184.00	–
MML 144/25	2m 25W linear amp (3W i/p)	59.00	–
MML 144/40	2m 40W linear amp (10W i/p)	77.00	–
MML 144/100S	2m 100W linear amp (10W i/p)	129.00	–
MML 432/20	70cm 20W linear amp (3W i/p)	77.00	–
MML 432/50	70cm 50W linear amp (10W i/p)	119.00	–
MML 432/100	70cm 100W linear amp (10W i/p)	228.65	–
MM 2000	RTTY to TV converter	169.00	–
MM 4000	RTTY transceiver	269.00	–
MMC 50/28	6m converter to HF rig	27.90	–
MMC 70/28	4m converter to HF rig	27.90	–
MMC 144/28	2m converter to HF rig	27.90	–
MMC 432/28-S	70cm converter to HF rig	34.90	–
MMC 432/144S	70cm converter to 2m rig	34.90	–
MMC 435/600	70cm ATV converter	27.90	–
MMK 1296/144	23cm converter to 2m rig	59.80	–
MMD 050/500	500MHz digital frequency meter	69.00	–
MMD 600P	600MHz prescaler	23.00	–
MMD P1	Frequency counter probe	11.50	–
MMA 28	10m preamp	14.95	–
MMA 144V	2m RF switched preamp	34.90	–
MMF 144	2m band pass filter	9.90	–
MMF 432	70cm band pass filter	9.90	–
MMS 1	The Morse talker	99.00	–

MORSE EQUIPMENT

MK 704	Squeeze paddle	10.50	(0.50)
HK 707	Up/down key	10.50	(0.50)
HK 704	Deluxe up/down key	14.50	(0.50)
EKM 1A	Practice oscillator	8.75	(0.50)
EK 121	Elbug	29.95	(0.50)
EKM 1A	Matching side monitor	10.95	(0.50)
EK 150	Electronic keyer	74.00	–

ROTATORS

KR 250 Kenpro lightweight 1–1½" mast	44.95	(2.00)
Hirschman RO250 VHF rotor	49.95	(2.00)
9502B Coloretor (med VHF)	49.95	(2.00)
KR 400RC Kenpro (HF) complete with lower clamps	99.95	(2.50)
KR 600RC Kenpro (med HF) complete with lower clamps	139.95	(3.00)

TV INTERFERENCE AIDS

Ferrite rings 1½" dia. per pair	0.80	(0.20)
Toroid filter TV down lead	2.00	(0.50)
Low pass filter LP30 100W	3.95	(0.50)
Trio low pass filter LF30A 1kW	17.95	(0.75)
Yaesu low pass filter FF501DX 1kW	22.25	(0.75)
HP4A high pass filter TV down lead	5.95	–

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Since opening our doors five years ago, we have always emphasised the very personal contact between ourselves and our customers. And having, in that short time, built up London's number-one amateur radio retail business, we must have been doing at least some of the right things... giving you the widest possible choice of makes and types of equipment PLUS easy part-exchange facilities... passing on the price benefits of keen buying here and abroad... and providing high-grade after sales service on everything we sell.

SONY ICF-2001

Made by one of the world's electronics giants, this unique HF communications receiver is as easy to use as a calculator, and so compact you can slip it into your briefcase. Yet, its combination of keyboard entry and LCD provides exact, drift-free reception right across its range, AM/SSB/CW, 150kc-30MHz and FM 76-108MHz, and allows no less than six station memories.

SPECIAL CHRISTMAS OFFER PRICE £139 or £159 incl matching SONY AC-122 PSU

FT-902DM

Yaesu's top-of-the-range transceiver, and the only HF 100W multimode available to the amateur today.
Here are just some of its special features.

- All bands, top to 10 (including new WARC)
- Multimode – AM/FM/SSB/CW/FSK (RTTY)
- Fitted memory unit for instant recall of any frequency
- RF notch filter – on IF, not AF
- Built-in Curtis kever with dot memory
- Two 6146B PA tubes for greater reliability
- True frequency counter readout with accurate analogue display

Use the FT-902DM together with the matching FTV-901R transverter for a really superior HF/2m/4m/70cm multimode transceiver. BUY BOTH AND GET A FREE HF-5 ANTENNA AND 2m BEAM. Cash or normal HP only.

PHONE FOR PRICES

SPECIAL ANNOUNCEMENT

Something new for the long winter evenings . . .

The ATV 1 AMATEUR TRANSMITTER

Designed and manufactured to the highest standards specially for us, this complete self-contained video transmitting unit is so simple to operate . . . camera and/or VCR in at one end . . . 70cm antenna out of the other . . . just connect to 13·5V . . . and you are on the air in full colour for just **£77** inc. VAT and P&-P.

Team it up with the Microwave Modules MMC 435/600 Converter for a complete fast scan Amateur TV station, receive and transmit.

FT-480R/FT-780R

Yaesu's very popular 2m format now available for 70cm as well with full 10MHz coverage, FM/SSB/CW, and unbelievable front-end sensitivity.
How many other rigs do YOU know with a Gasfet in the front end? Also, *our* FT-780s are fitted with a 1·6MHz shift, so no need to programme two VFOs.

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(FT-480R to include free PSU)

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All prices include VAT, but p&p/carriage are extra.

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However, there are always people who, because it's inconvenient or else they know exactly what they want, either can't or don't come to Ealing to browse. So, to meet their needs, we have also developed our mail-order operation so that we can virtually guarantee same-day dispatch on any orders received by 4pm – just ask for further details. The only thing we can't offer our postal and telephone customers is a cup of Brenda's coffee!

SEASON'S GREETINGS FROM BRENDA (G8SXY) AND BERNIE (G4AOG)

FT-707

The ultimate in HF mobile transceivers from Yaesu. All the new bands, and all the latest technology.

PHONE FOR PRICE– incl. FREE MIC and ATU. Cash or normal HP only.

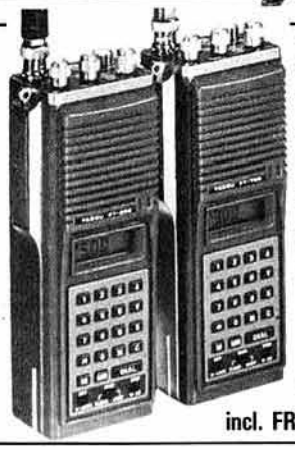
YAESU's LATEST . . .

the all-mode portable FT-290R

So many features ★ 10 memories ★ Memory scan ★ 2 VFOs ★ Band scan ★ Clarifier ★ FM/LSB/USB/CW ★ LCD readout ★ Real S-meter ★ Priority channel ★ 2.5W out

£249 inc FREE ¼-WAVE FLEXI ANTENNA

How about teaming it up with a MICROWAVE MODULES 25W amp to bring it up to base station specification? The cost . . . just £59



FT-208R/FT-708R

Yaesu's marvellous new hand-held for either 2m or 70cm operation. Its LCD display (with night-lamp feature) is coupled to a 4-bit microprocessor giving 10 memories, up/down scanning in 12·5/25/50kc steps (manual or auto) plus memory scan and scanning between two desired frequencies, priority channel with search-back, keyboard entry allowing split frequency for non-standard repeaters... and lots more.

PHONE FOR PRICES

incl. FREE 12V DC to DC CONVERTER

FT101 Mk III

The tried and tested Yaesu HF base station, now with audio peak filter and reject notch filter as standard, and choice of AM or FM.

PHONE FOR PRICES incl. FREE cooling fan and mic.

NEW

FT-ONE

Yaesu's latest HF rig that's going to set the standard for all the rest. Incorporating probably the finest receive section ever built into a Yaesu transceiver, the FT-ONE has so many features . . .

- Solid state all-mode, AM/FM/SSB/CW/RTTY
- General coverage receive and transmit 150kHz–30MHz
- Synthesised tuning and auto-scanning facility
- VFO or keyboard entry
- 10 VFOs
- No band switching
- IF shift and width control
- Audio Peak Filter
- Notch Filter
- Advanced variable threshold noise blanker
- 300 or 600Hz, 2,400-300Hz, 6kHz, 12kHz
- Built-in Curtis keyer
- Built-in SWR bridge
- Memory facility
- Full break-in and variable decay on front panel
- 2 FSK widths
- Mains or 12V

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ICOM

IC2E

- Fully synthesized 144-146MHz
- 1·5 watt RF power with 9V battery
- ±600kHz switch for repeater use
- Optional power packs available
- Light weight only 450gms
- High/low power switch
- Supplied with helical ant.
- Full range of accessories available

£169.00 inc VAT and carriage

IC25E

2 METRE MOBILE

- Features two vfo's
- 25/5kHz steps switchable
- Multi scanning functions
- 25W RF output
- UP/DOWN repeater shift
- Remote scan from mic.

Come and try one soon

£259.00 inc VAT and carriage

IC290

2 METRE MULTI-MODE
Too many features to mention but it has just about everything: two vfo's, priority channel, 1kHz/100Hz steps on SSB, 5/25kHz steps on FM, plus and minus 600kHz for repeater use, full scanning on the front panel or microphone.

£366.00 inc VAT and carriage

IC730

80-10m MOBILE

The 730 is an excellent hf rig with dual vfo's and a 100W PA stage, the receiver is superb using an up-conversion system—so don't delay, come in and see it today.

£586.00 inc VAT and carriage

STANDARD

C58

2 METRE MULTI-MODE
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.

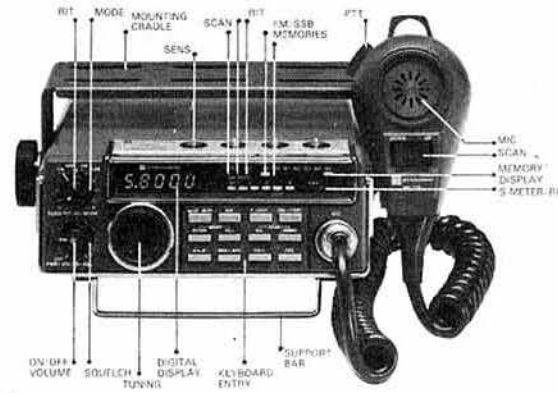
£245.00 inc VAT and carriage

C78

70cm FM PORTABLE
This has all the features of the C58 and uses the same range of accessories (with the exception of the linear amp) so you only need buy one set for both units. With 70cm getting more popular come in and try one.

£225.50 inc VAT and carriage

NEW! C5400



The ultimate in a multi-mode 2 metre mobile transceiver with the built in standard reliability that makes them a winner. For full details give Norman a phone, send for details, or, better still, pop in and try it.

!! PRICE TO BE ANNOUNCED SOON !!

MERRY XMAS AND A HAPPY NEW YEAR TO YOU ALL

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YAESU MUSEN

MERRY CHRISTMAS AND A HAPPY NEW YEAR TO ALL OUR CUSTOMERS

MERRY CHRISTMAS AND A HAPPY NEW YEAR TO ALL OUR CUSTOMERS

FRG7700

The FRG7700 is still the most popular communications receiver on the market today featuring: Digital and Analogue display ● USB, LSB, FM, AM ● 2·7, 6, 12 and 15kHz filters ● variable antenuator ● noise blanker ● etc Options include internal memory unit, external antenna tuner and converters.

£329.00 inc VAT and carriage

FREE VARIABLE PRE AMP WITH EACH UNIT

FT707

A well proven H.F. mobile covering 80-10m with features such as 100W RF output ● Digital readout ● Variable IF bandwidth ● advanced noise blanker ● No tuning of the output stage required.

£569.00 inc VAT and carriage

FT1

YES—A **NEW** HF TRANSCEIVER FROM YAESU

!! COME AND SEE IT !!

FT290

YAESU'S LATEST ALL-MODE PORTABLE

Too many features to mention so come in and see it.

£249.00 inc VAT and carriage

FT902/101 RANGE

The 902 is extremely reliable and has gained the reputation for being one of the best on the market with virtually all features included.

Over the years the FT101 series has earned a reputation for being one of the most reliable H.F. transceivers available.

CHRISTMAS SPECIAL!
FREE! KB105 80-10m vertical (as featured in last month's advertisement) with every 101/902 purchased before January 30th.

FT480

A good multi-mode from Yaesu already proven in the market place

£379.00 inc VAT and carriage

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MERRY XMAS AND A HAPPY NEW YEAR TO YOU ALL

AMATEUR ELECTRONICS UK

Your number one source for YAESU MUSEN

FT-101ZD Mk III

YAESU's FT-101ZD with FM is the most popular HF rig on the market thanks to its very comprehensive specification and competitive price. Incorporates notch filter, audio peak filter, variable IF bandwidth plus many other features.

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

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

FT-707 All solid-state HF mobile transceiver

The definitive HF mobile rig, digital, variable IF bandwidth, 100 watts PEP SSB, AM, CW (pictured here with 12 channel memory VFO). Latest bands.

FRG-7 General coverage receiver

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

FRG-7700 High performance communications receiver

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

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For full details of these new and exciting models, send today for the latest YAESU PRICE LIST and LEAFLETS. All you need to do to obtain the latest information about these exciting developments from the world's No. 1 manufacturer of amateur radio equipment is to send 36p in stamps and as an added bonus you will get our credit voucher value £3.60p – a 10 to 1 winning offer.

FT-ONE SUPER HF TRANSCEIVER

This is the latest and most exotic product from YAESU's superb design team. The new FT-ONE provides continuous RX coverage of 150KHz – 30MHz plus all nine amateur bands (160 thru 10m).

All mode operation LSB, USB, CW, FSK, AM, FM • 10 VFO system • **FULL** break-in on CW • audio peak filter • notch filter • variable bandwidth and IF shift • keyboard scanning and entry • RX dynamic range over 95dB!

and **NO** band switch!!!

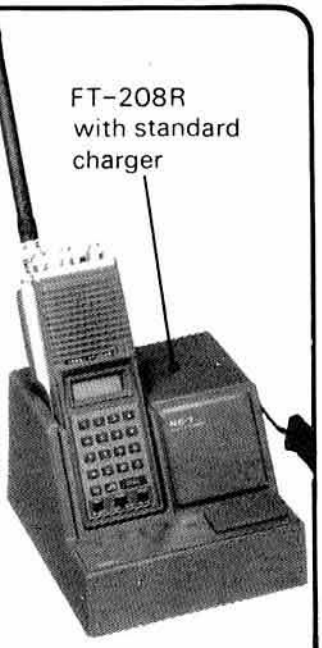
FT-708R

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

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

FT-708R with NC8 standard/quick charger/DC PSU

FT-208R



FT-208R with standard charger

AGENTS

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SOUTH EAST – AMATEUR ELECTRONICS, UK – KENT KEN McINNES, G3FTE, THANET (0843) 291297

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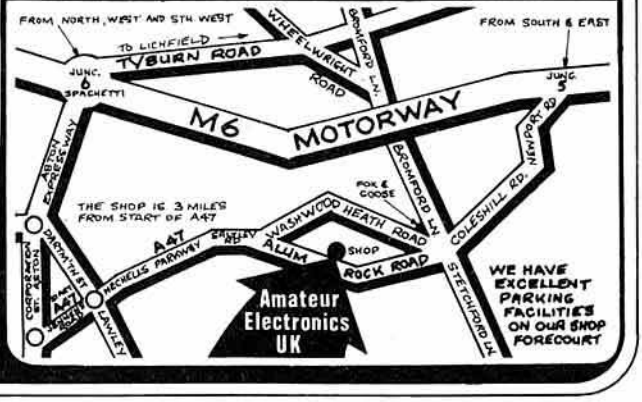


Amateur Electronics UK
508-516 Alum Rock Road · Birmingham 8
Telephone: 021-327 1497 or 021-327 6313
Telex: 337045
Opening hours: 9.30 to 5.30 Tues. to Sat. continuous – CLOSED all day Monday.

DATONG PRODUCTS

DESIGNED BY ENTHUSIASTS FOR ENTHUSIASTS!

KEYBOARD MORSE SENDER – THE ULTIMATE KEYBOARD – CHECK THESE FEATURES

- CONVENIENCE no need for a power cable four internal pen cells last for 300 hours **and** give continuous memory back up
- EXCLUSIVE COLOUR CODED KEYBOARD DESIGN Separate key switches beneath a tough polycarbonate membrane combine excellent feel with a splash proof wipe-clean surface
- LAVISH MEMORY four 64-character memories with auto-repeat and programmable pause function for all the routine sending
- BUFFER MEMORY ensures perfect sending despite less than perfect typing
- COMPREHENSIVE CHARACTER SET includes punctuation procedure signals accented letters Plus a merge key for making any non-standard character
- BEAUTY AND STYLE only one inch thin and with four-colour panel Model MK looks every bit the thoroughbred it is Model MK is supplied with output leads and spare connectors but without batteries (four HP7 pen cells)

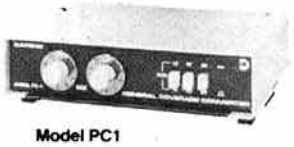
Model MK

MODEL ASP – THE "INTELLIGENT" RF CLIPPER

Model ASP modifies your speech signal direct from the microphone and makes it more effective at modulating your transmitter The effect is as if the transmitter peak power were to increase by between two and three times "Intelligent" means that unlike other speech processors, Model ASP automatically senses your voice level and reacts accordingly to always maintain the degree of true r f clipping selected (in decibels) by the panel push-buttons Special circuitry does this without the undesirable side effects of simple a g c devices Adding a Datong r f clipper to a normal SSB transmitter has a similar effect to adding a linear amplifier but without the high cost and risk of TVI

G8's – ARE YOU MISSING OUT?

Unless you can monitor the other bands you are missing a lot If you have a 2 metre all-mode receiving set up, just add Model PC1 in series with its antenna and you have a superb general coverage receiver What better way to listen in to all the non-VHF amateur bands, not to mention everything else from 60 kHz to 30 MHz? For sheer value for money there is no better way to get high performance general coverage reception After all what a waste it is if your expensive 2 metre all-mode rig covers one band only?



Model PC1

ATTENTION VHF SCANNER OWNERS!

Did you know that Model PC1 will extend the coverage of your SX 200 type scanner to include all the long, medium and short wave bands as well? This is an excellent way to listen to your favourite short wave broadcast stations without the extra expense of a complete new receiver

MINIATURE RECEIVING ANTENNAS

If you don't have enough space to put up traditional receiving antennas, our active antennas are the answer They need no tuning yet have constant sensitivity from 200 kHz to well over 30 MHz

Results are quite comparable to full size conventional antennas but the space saving is enormous The indoor version (AD270) is 3 metres long and the outdoor version (AD370) is 2 metres long

A TV-type feeder cable of any reasonable length can be used yet because the antennas are balanced dipoles any interference picked up by the feeder is rejected

Because of their wide frequency coverage Datong Active Antennas are ideal accessories for modern general coverage communications receivers

Model AD270

Model AD370

Model DC144/28

YET ANOTHER 2 METRE CONVERTER?

Yes but not **just** another Model DC144/28 is designed to overcome the overload and spurious signal problems experienced by conventional converters It uses a Schottky diode balanced mixer with about 7dbm of local oscillator drive This, coupled with a 3SK88 r f amplifier, gives an excellent combination of low noise figure and strong signal handling capability Its input and output gain controls also help you get the best out of your main receiver without flattening it with excessive gain

Model DC144/28 is available either as a complete cased unit (die cast box S0239 connectors) or as a ready built and tested PCB module

MODEL D70: THE GO-ANYWHERE MORSE CODE TRAINER

For building up your morse code reception speed there is no better method than the Datong "Morse Tutor"

You learn the code with the characters at normal speed but with an extra delay between each one As you improve you reduce the "DELAY" control until, with it fully reduced, you find you are reading code at the chosen speed and with correct spacing

An important feature is that the unit is completely portable This allows you to practise wherever and whenever you find it most convenient The all-CMOS design gives about 60 hours of practice from a low cost PP3

Model D70

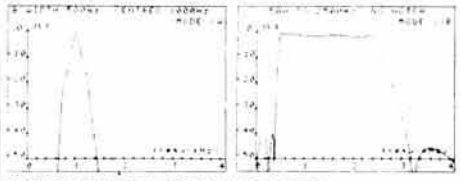
NEW PRODUCTS PREVIEW

Model DF1

Direction finder attachment for FM, VHF receivers/transceivers, gives directional readout on circle of LED's. Connects to loudspeaker and antenna jacks.

Model RFA

R.F. switched broadband preamplifier. Boosts gain and noise figure of receivers from 30 to 200 MHz.



VARIABLE SELECTIVITY FOR ANY RECEIVER

Have a look at these curves (and the others in our data sheet) and you will see why a U.S. reviewer commented that the FL2 is "incredible – it's like having a tunable crystal filter.""

With Model FL2 connected in series with your speaker you can wipe out off-tune "monkey chatter", unwanted tones and sundry "burbles" from SSB, while for CW the ultra-steep skirts allow you to use wider bandwidths for a given rejection of off-tune signals. This makes tuning easier and reduces listening fatigue.

Model FL2 costs little more than a single special accessory filter yet it offers better performance, extreme versatility, and can be used with any receiver.

*R. S. Dicks, 73 Magazine, July 1981 p 119.

Model FL2

Products not shown in this advertisement

Model Datest 1 Transistor Tester
Model Datest 2 Transistor Tester
RF Speech Processor Model D75
Model RFC/MRF Speech Processor PCB Module
Model MPU Mains Power Unit
Accessory Leads
Model VLF
Model FL1

DATONG ELECTRONICS LIMITED

INGENIEURBÜRO ULRICH HANSEN

VHF & UHF PREAMPLIFIERS: A range from Ulrich Hansen of West Germany

A range of high quality in-line preamplifiers for 2 metres or 70 cms featuring ultra-low noise figures and state-of-the-art design The range includes R.F. switching capability from 60 watts P.E.P. to 500 watts P.E.P. and choice of silicon low noise devices or the latest gallium arsenide MESFETs for the best possible noise figure Indoor or mast mounted options are also included Full details free on request These units represent a cost-effective way of improving your DX receiving capability

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

FL1	59.00 (67.85)	VLF	22.00 (25.30)	AD270	33.00 (37.95) MPU 6.00 (6.90)
FL2	78.00 (89.70)	D70	43.00 (49.45)	AD370	45.00 (51.75) DC144/28 31.00 (35.65)
PC1	105.00 (120.75)	D75	49.00 (56.35)	AD270 + MPU	37.00 (42.55) DC144/28 Module 25.00 (28.75)
ASP	69.00 (79.35)	RFC/M	23.00 (26.45)	AD370 + MPU	49.00 (56.35) Keyboard Morse Sender 140.00 (161.00)

DATONG ELECTRONICS LIMITED

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

MICROWAVE MODULES LTD

In this issue of *Radio Communication* we are briefly describing our entire range of top quality British-made products, so that our regular customers and the many newcomers to amateur radio can see for themselves our extensive range we have to offer.

Microwave Modules, formed in 1969, is a wholly independent British company manufacturing quality products to professional standards solely for the amateur market, and it is this dedication together with strong customer loyalty that has enabled us to go from strength to strength in expanding and diversifying our product range.

Please note the addition of four new products which will be in full production by the time this advert appears in print. Full data is available on each of these products upon request.

We would like to take this opportunity of wishing all of our customers, both old and new, all the very best for the festive season and the New Year.

* NEW PRODUCT *

MMS2

This advanced Morse Trainer contains all the facilities of the MMS1 speech synthesised Morse Tutor together with the additional feature of providing talkback of morse keyed into the unit by the pupil.

PRICE: £155 inc VAT (P + P £2)

THE ENTIRE RANGE

* NEW PRODUCT *

MML1296/10

1296MHz 10 Watt solid-state linear power amplifier. Suitable for use with our MMT1296/144 transverter.

INTRODUCTORY PRICE: £199 inc VAT (P + P £2)

TRANSVERTERS

		Price inc VAT	Post Rate
MMT28/144:	2m down to 10m	£99	B
MMT70/28:	10m up to 4m	£115	B
MMT70/144:	2m down to 4m	£115	B
MMT144/28:	10m up to 2m	£99	B
MMT432/28-S:	10m up to 70cm with satellite shift	£149	B
MMT432/144-R:	2m up to 70cm with repeater shift	£184	B
MMT1296/144:	2m up to 23cm	£184	B

CONVERTERS

		Price inc VAT	Post Rate
MMC27/MW:	27MHz down to medium wave	£19.95	A
MMC28/144:	10m up to 2m	£27.90	A
MMC50/28:	6m down to 10m	£27.90	A
MMC70/28:	4m down to 10m	£27.90	A
MMC70/28LO:	4m down to 10m/LO output	£29.90	A
MMC144/28:	2m down to 10m	£27.90	A
MMC144/28LO:	2m down to 10m/LO output	£29.90	A
MMC432/28-S:	700m down to 10m	£34.90	A
MMC432/144-S:	70cm down to 2m	£34.90	A
MMC435/51:	70cm ATV down to VHF	£34.90	A
MMC435/600:	70cm ATV up to UHF	£27.90	A
MMC1296/28:	23cm down to 10M	£32.20	A
MMK1296/144:	23cm down to 2m	£59.80	B
MMK1691/137-5	1691MHz weather satellite converter	£115	B

* NEW PRODUCT *

MMC27/MW

This 27MHz MOSFET Converter will allow reception of the CB allocation on any medium wave car radio.

PRICE: £19.95 inc VAT (P + P £0.80)

FULL DATA ON EACH OF THE ABOVE PRODUCTS IS AVAILABLE UPON REQUEST

* NEW PRODUCT *

MM1000

ASCII to MORSE CONVERTER

With 50 character memory and keyboard input buffer.
SPEED RANGE: 12-30 wpm in 2 wpm increments.

PRICE inc VAT: £59 (P + P £0.80)
OR WITH KEYBOARD: £89 (P + P 2.75)

LINEAR AMPLIFIERS

		Price inc VAT	Post Rate
MML28/100-S:	10m 100 watt/switchable preamp	£129.95	C
MML70/40:	4m 40 watt/preamp	£77	B
MML70/100-S:	4m 100 watt/switchable preamp	£129.95	C
MML144/25:	2m 25 watt/preamp	£59	B
MML144/40:	2m 40 watt/preamp	£77	B
MML144/100-S:	2m 100 watt/switchable preamp	£129.95	C
MML432/20:	70cm 20 watt/preamp	£77	B
MML432/50:	70cm 50 watt/preamp	£119	C
MML432/100:	70cm 100 watt	£228.65	D
MML1296/10:	23cm 10 watt	£199	B

MICROPROCESSOR PRODUCTS

MM2000:	RTTY to TV converter	£169	B
MM4000:	RTTY transceiver	£269	B
MM4000KB:	RTTY transceiver + keyboard	£299	D
MMS1:	Speech synthesised morse tutor	£115	B
MMS2:	Advanced morse trainer	£155	B
MM1000:	ASCII to morse converter	£59	A
MM1000KB:	ASCII to morse converter + keyboard	£89	C

RECEIVE PREAMPLIFIERS

		Price inc VAT	Post Rate
MMA28:	10m low noise preamp	£14.95	A
MMA144V:	2m RF switched preamp	£34.90	A
MMA1296:	23cm low noise preamp	£29.90	A

VARIOUS

		Price inc VAT	Post Rate
MMD050/500:	500MHz frequency counter	£69	A
MMD600P:	600MHz ÷ 10 prescaler	£23	A
MMDP1:	Frequency counter probe	£11.50	A
MMF144:	2m bandpass filter	£9.90	A
MMF432:	70cm bandpass filter	£9.90	A
MMV1296:	70cm to 23cm varactor tripler	£34.50	A
MMS384:	384MHz frequency source	£27.60	A
MMR15/10:	15dB 10 watt attenuator	£9.90	A

POSTAGE

The above prices include VAT but not postage. Please add postage to the above at the following rates:

UNITS 'A' = £0.80 UNITS 'C' = £2.75
UNITS 'B' = £2.00 UNITS 'D' = £3.50

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

Access BARCLAYCARD VISA

WELCOME

MICROWAVE MODULES
BROOKFIELD DRIVE, AINTREE, LIVERPOOL L9 7AN, ENGLAND
Telephone: 051-523 4011 Telex: 628608 MICRO G
CALLERS ARE WELCOME, PLEASE TELEPHONE FIRST

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

NEW BRANCHES SPECIAL OFFER

WE ARE PROUD to announce the opening of two new branches, and would be so delighted if you went along and said hello to Ian G3PRR in Grimsby or Peter G4GSA in Stoke that for the fortnight Monday January 4th until Saturday January 16th, we will be, for personal callers only, offering

FIVE PER CENT OFF OUR LIST PRICE

(see "Free Finance" section for eligible items).

SMC SERVICE

Free Finance on many items. Two year guarantee on Yaesu. Free Securicor on major Yaesu items. Access and Barclaycard over the telephone. Biggest Branch, Agent and Dealer network. Ably staffed, courteous, Service Department. "B Services" Securicor contract at £3.50!! Biggest stocks of amateur equipment in UK. Twenty-two years experience.

FREE FINANCE

On regular priced items from: Yaesu, Ascot SMCHS, CDE, HyGain, Channel Master, Hansen, SMC, MFJ, KLM, Mirage and Hy Mound, on invoices over £100 SMC offers Free Finance! How is it done? Simple, pay 20%, split the balance equally over 6 months or pay 50% down and split the balance over a year. You pay no more than the cash price!!

GUARANTEE

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

The FT-ONE is the culmination of an all-out design project, without the usual cost constraints, a revolutionary blend of computer and RF technology.

GENERAL COVERAGE, ALL SOLID STATE
The FT-ONE is a full-coverage all mode transceiver, equipped for reception between 150kHz and 29.99MHz, and transmission on all nine amateur bands. For commercial use the FT-ONE may be programmed to transmit throughout 1·8-29·99MHz range.

KEYBOARD FREQUENCY ENTRY
Fully digitally synthesized, the FT-ONE uses a front panel keyboard for initial frequency entry. Frequency change is then accomplished via the main tuning dial or the pushbutton scanner, with tuning in either 10Hz or 100Hz steps. The FT-ONE permits extremely fine tuning and instantaneous band changes.

DUAL VFO SYSTEM
Ten digital VFO's with memory are provided, in conjunction with an A-B selection scheme that allows instant recall of any transmit, receive, or transceiver frequency. For split-frequency operation, the operator may select TX on VFO-A and RX on VFO-B, automatically storing the calling and listening frequencies. For net operations, a non-volatile memory board is available as an option, (eliminates the possibility of dumping).

FULL CW BREAK-IN
Recent advances in solid-state technology have made full CW break-in reliable enough to be incorporated into the FT-ONE. You can select traditional semi-break-in (for use with amplifiers not equipped for full break-in) or full high-speed break-in.

SWITCHING REGULATED SUPPLY
Extremely compact and light in weight, the switched mode power supply reduces substantially the space required to produce the operating voltages used in the FT-ONE. It is highly efficient, uniquely stable and provides superb reliability.

'ELITE' CLASS PERFORMANCE
In addition to the full break-in and superb receiver filters, the FT-ONE is packed with subtle virtues that others might have overlooked. Rear panel jacks allow the use of both an external receiver and an independent receive antenna, when scanning, automatic halting on a received signal may be programmed, an optional Curtis 8044 keyer board is available, and there is even a microphone squelch (AMGC) to reduce background noise pickup between words and sentences!

GAIN/INTERCEPT OPTIMIZED RECEIVER
Utilizing up-conversion with a first IF of 73MHz, the FT-ONE RF amplifier stage uses push-pull power transistors configured to produce a typical output intercept of +40dBm. The first mixer utilizes a diode ring module followed by a low noise post amp, for optimum noise figure consistent with modern day intercept requirements. The result is a receiver with a typical two-tone dynamic range well in excess of 95dB (14MHz, CW bandwidth). Additional gain tailoring is provided via a PIN diode attenuator controlled from the front panel.

FILTER READY FOR COMPETITION
Three filter bandwidths are available for CW operation (two for FSK!), using optional 600Hz or 300Hz crystal filters. Filter insertion losses are equalised and an audio peak and notch filter is standard. Both IF Shift and Variable Bandwidth are provided, and two CW filters may be cascaded, for competition-grade selectivity. For SSB work, the Variable Bandwidth feature eliminates the need for costly 1·5kHz or 1·8kHz filters.

EXPANDED OPERATING DISPLAYS
Digital displays for the VFO frequency, memory channel, and RIT offset are provided. The large front panel meter provides easy viewing of transceiver operating parameters, including finals collector current, input voltage, FM discriminator, processor compression, and forward/reflected relative power.

NON OPTIONS
Remember with your FT-ONE the noise blanker, speech processor and power supply are all built-in, not options.

SOUTH MIDLANDS COMMUNICATIONS LTD

S. M. HOUSE, OSBORNE ROAD, TOTTON, SOUTHAMPTON, SO4 4DN, ENGLAND

Tel: Totton (0703) 867333, Telex: 477351 SMCOMM G, Telegram: "Aerial" Southampton

HUMBERSIDE
S.M.C. (Grimsby)
247A Freeman Street,
Grimsby,
Lincolnshire.
Grimsby (0472) 59388

STOKE-ON-TRENT
S.M.C. (Stoke)
76 High Street,
Talke Pits,
Stoke.
Kidsgrove (07816) 72644

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

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

WOODHALL SPA
S.M.C. (Jack Tweedy) LTD
150 Horncastle Road,
Woodhall Spa, Lincolnshire.
Woodhall Spa (0526) 52793
9-5 Tuesday-Saturday

Bangor	John	GI3KDR	(0247) 55162	— SMC AGENTS QTHR —						GW3TMP	(035287) 846/324
Tandragee	Mervyn	GI3WWY	(0762) 840656	**Stourbridge**	Brian	G3ZUL	(03843) 5917	**Swansea**	Peter	GW8EBB	(0792) 872525
Edinburgh	Jack	GM8GEC	(031665) 2420	**Redcar**	Simon	G4EQS	(0642) 480808	**Jersey**	Geoff	GJ4ICD	(0534) 26788

FT101ZD £635 inc VAT @ 15% & SECURICOR

- ★ 160–10 metres including new allocations
- ★ Variable IF bandwidth 2·4kHz down to 300Hz
- ★ 8 pole filters for razor edge selectivity
- ★ Selectable CW fixed bandwidth CW-W and CW-N
- ★ Semi-break in with sidetone for excellent CW
- ★ Digital plus analogue frequency displays
- ★ 6146B PA's with 6dB of negative feedback
- ★ 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, front panel switch
- ★ AGC: slow-fast-off, front panel switchable
- ★ Clarifier (RIT) switchable on Tx, Rx or both
- ★ Low level transverter drive output facility
- ★ Universal power supply 110–234V ac and 12V dc
- ★ Incredible range of matching accessories
  6 modes, Digital/Analogue — AM/FM options

*Option

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
- ★ Digital plus analogue frequency displays
- ★ 6146B's with negative feedback
- ★ VOX built-in and adjustables
- ★ Instant write in memory channel
- ★ Tune-up button (10 sec, of full power)
- ★ Curtis Keyer—Iambic, single or straight
- ★ Switchable AGC and RF attenuator
- ★ Optional 350 or 600Hz CW, 6kHz, AM filters
- ★ Clarifier (RIT) switchable on Tx, Rx or both
- ★ Audio Peak and tunable notch filter
- ★ 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

*Option

FT107M £725 inc VAT @ 15% & SECURICOR

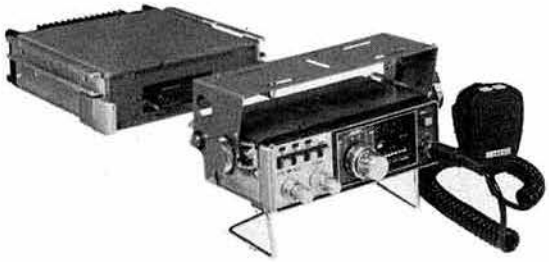
- ★ 160–10 metres (including 10, 18 and 24MHz)
- ★ USB-LSB-CWW-FSK-AM multi-mode
- ★ Full broad band "no tune" power amplifier
- ★ 240W PIP. 75 per cent power output at 3·1 VSWR
- ★ 12 memory channels with clarifier on memory
- ★ Digital Memory Shift gives offset from memory
- ★ Up/down scanning control from the microphone
- ★ Variable IF bandwidth—16 poles of selectivity
- ★ Bandwidths: 6kHz*, 2·4kHz, 300Hz, 600Hz, 300Hz*
- ★ Selectable CW "fixed" widths CW-W and CW-N*
- ★ Tunable Audio Peak (AFP) and Notch filter
- ★ Diode ring mixer for very high Rx dynamic range
- ★ Noise blanker—front panel adjustable threshold
- ★ AGC: slow-fast-off switchable from the front panel
- ★ Attenuator 0·20dB, plus RF gain on front panel
- ★ RF speech processor fitted—front panel adjustable
- ★ Digital (100Hz) plus analogue frequency displays
- ★ Meter Reads: Vcc, Ic, AFC, Compression and SWR
- ★ Semi break-in with side tone, Vox built-in
- ★ Choice of built-in or separate power supply units

*Option

FT707 £569 inc VAT @ 15% & SECURICOR

- ★ 80–10 metres (including 10, 18 and 24MHz bands)
- ★ USB, LSB-CWW, 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 3kHz*, 2·4kHz, 300Hz, 600, 350Hz*
- ★ AGC: slow-fast switchable from the front panel
- ★ VOX built-in and adjustable from the front panel
- ★ Semi break in with side tone for excellent CW
- ★ Digital (100Hz) plus analogue frequency display
- ★ LED level meter reads S, PO and AEC
- ★ Convenient concentric AE, TR gain controls
- ★ Indicators for calibrator, fix, and ext VFO
- ★ Receiver offset tuning (RIT chamber) control
- ★ Advanced noise blanker with local loop AGC
- ★ 25kHz crystal calibrator feature
- ★ Internal, xtal or external VFO control

*Option



FT720RV £245 inc VAT @ 15% & SECURICOR

FT720 Control Head
- ★ Four easy write-down 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 LEDs for 'S' and PO7 status LEDs
- ★ 1½W of audio to internal/external speaker
- ★ 3·3 (4·3)" D × 6" W × 2 (2·2)" H

720RV 10W deck. **720RVH** 25W deck
- ★ 144–146MHz (144–148MHz possible)
- ★ 12½kHz synthesizer steps, 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

720RU 10W, 70cm, deck
- ★ 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

S72 Switching box
- ★ Pushbutton band change
- ★ Auto change of steps/splits

FT290R £249 inc VAT @ 15% & SECURICOR

- ★ 144–146MHz (144–148 possible)
- ★ Multimode USB, LSB, FM, CW
- ★ 2·5W PEP, 2·5W RMS/300mW
- ★ LED's, "ON AIR", "BUSY"
- ★ Moving coil meter for S & PO
- ★ Integral telescopic antenna
- ★ Width 2·4kHz & 14kHz @ 6dB
- ★ Optically coupled main tuning
- ★ 100Hz backlite LCD display
- ★ 10 memory channels
- ★ "Five year" memory backup
- ★ FM: 25kHz and 12·5kHz steps
- ★ SSB: 1kHz and 100Hz steps
- ★ Any Tx/Rx split with dual VFOs
- ★ ±600kHz split, 1,750kHz burst
- ★ Mobile bracket available
- ★ Matching 10W linear Amplifier
- ★ Up/down tuning from mic
- ★ AF output 1W @ 10% THD
- ★ 58(H) × 150(W) × 195(D) (1·3kg)
- ★ Rx, 0·70mA, Tx 800mA (FM max)
- ★ 8 "C" Nicads or Drys Internal
- ★ 8·5 15·2V DC External
- ★ Scan on memory (+10kHz)"
- ★ Long battery life SMC 2·2A/Hr

FT480R (2m) FT780R (70cm)

- ★ USB LSB CW FM (A3j, A1, 13).
- ★ 30W PEP A3j, 10/1W out A1/F3
- ★ Bandpass filter no tune design
- ★ Bandwidth 2·4kHz & 14kHz @ −6dB
- ★ Semi break in with side tone
- ★ Very bright blue 100Hz digital display
- ★ Display shows Tx ÷ Rx freq (inc R11)
- ★ String LED display for "S" and PO
- ★ Digital receiver offset tuning
- ★ Advanced effective noise blanker
- ★ Memory scanning with slot display
- ★ Up/down tuning/scanning from mic
- ★ Priority channel on any memory slot
- ★ Satellite mode allows tuning on Tx
- ★ Scanning for busy or clear channels
- ★ Size (case): 8·3" D, 2·3" H, 6·9" W
- ★ LED's, "On Air", Clar, Hi/Low, FM mod
- ★ Matching FP80 Mains PSU available

FT480R

FT480R £379 inc VAT @ 15% & SECURICOR

- ★ 144–146MHz (143·5–148·5MHz possible)
- ★ Excellent dynamic range sensitivity
- ★ FM, 25, 125, 1kHz steps
- ★ SSB: 1,000, 100, 10Hz steps
- ★ Any Tx/Rx split with dual VFO's
- ★ ±600kHz standard repeater split
- ★ Four easy write in memory channels

FT780R £449 inc VAT @ 15% & SECURICOR

- ★ NMOS four bit micro control
- ★ 430–434MHz (440–445MHz possible)
- ★ GaAs Fet RF for incredible sensitivity
- ★ FM; 100kHz, 25kHz, 1kHz, steps
- ★ SSB; 1,000, 100, 10Hz steps
- ★ Repeater access by use of dual VFO's
- ★ Four easy write in memory channels

1·6MHz shift now available

FT780R

FRG7 £199 inc VAT @ 15% & SECURICOR

- ★ "Industry Standard" value for money Rx
- ★ 30MHz-500kHz in One MHz bands
- ★ SSB (LSB/USB), CW, AM
- ★ Sensitivity AM; 0·7μV 10dB S/N at 30%
- ★ Selectively ±3kHz at −6dB
- ★ Stability; 500Hz after 30 minutes
- ★ Triple conversion, drift cancelling
- ★ Direct frequency readout to 5kHz
- ★ Fine tuning control
- ★ AGC; DC amplified, 3 stage control
- ★ AF; Powerful 2 watts of audio
- ★ Forward facing internal speaker
- ★ Record socket "volume independent"
- ★ Well calibrated "sharp" preselector
- ★ AM automatic noise suppression circuit
- ★ Antenna Hi to 1·6MHz, 50 ohm to 30MHz
- ★ 3 position RF attenuator
- ★ 3 position AF filter (LP, WBP, NBP)
- ★ 110/240V ac and 12V dc
- ★ Lights; battery economy switch
- ★ Illuminated edge type "S" meter
- ★ 2 IC, 9 FET, 13 Tr, 16D (9Ge, 5Si, 2Z)
- ★ Weight; 7kg (without batteries)
- ★ Dimensions: 340 (W) × 153 (H) × 285 (D) mm
- ★ Optional battery holder

FRG7700 £329 inc. VAT @ 15% & SECURICOR

- ★ Wide coverage, *all* mode receiver
- ★ 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 500ohm to 2MHz, 50ohm to 30MHz
- ★ 20dB pad plus continuous attenuator
- ★ Constantly variable tone control
- ★ 110 and 240V ac and 12V dc option
- ★ Switchable speed A.G.C. system
- ★ Signal meter calibrated in "S" and SIMPO
- ★ Accessories; Tuners, Converters, LPF, Memory
- ★ FRT7700; 150kHz–30MHz, Attenuator, 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
- ★ FF5; 500kHz (for improved VLF reception)
- ★ MEMGR7700; 12 Channels (easy internal fitting)

FT208R (2m) FT708R (70cm)

- ★ 4 bit CPU chip frequency control
- ★ Keyboard entry of frequencies/splits
- ★ LCN digital display with backlight
- ★ Ten channels of memory
- ★ Memory back up five-year lifetime cell
- ★ Up/down manual tuning
- ★ Manual or auto scan for busy/clear
- ★ Priority channel with search back
- ★ Memory scanning feature
- ★ Scan between any two frequencies
- ★ Auto scan restart
- ★ Quick change NiCad pack
- ★ 1,750Hz tone burst
- ★ Built in condenser microphone
- ★ 500mW AF to int/ext speaker
- ★ External speaker/mic available
- ★ Keyboard offers 16 tone DTMF
- ★ 168(H) × 61(W) × 39(D)mm
- ★ C/w NiCad pack, helical

FT208R £209 inc. VAT @ 15% & SECURICOR

- ★ 144–148MHz (144–148 possible)
- ★ 12·5/25kHz synthesizer steps
- ★ Any split + or − programmable
- ★ ±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
- ★ Dual conversion 16·9MHz and 455kHz

FT708R £219 inc. VAT @ 15% & SECURICOR

- ★ 430–440MHz (440–450 option)
- ★ 25kHz synthesizer steps
- ★ Any split + or − programmable
- ★ ±7·6MHz EU split standard
- ★ 1W or 100mW RF output
- ★ Rx: 20mA squelch, 150mA (max AF)
- ★ Tx: 500mA at 1W RF
- ★ 0·4μV for 12dB SINAD
- ★ Dual conversion 46·255MHz and 455kHz

SOUTH MIDLANDS COMMUNICATIONS LTD

S. M. HOUSE, OSBORNE ROAD, TOTTON, SOUTHAMPTON, SO4 4DN, ENGLAND

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Tandragee	Mervyn	GI3WWY	(0762) 840656	Stourbridge	Brian	G3ZUL	(03843) 5917		Swansea	Peter	GW8EBB	(0792) 872525
Edinburgh	Jack	GM8GEC	(031665) 2420	Redcar	Simon	G4EQS	(0642) 480808		Jersey,	Geoff	GJ4ICD	(0534) 26788

ASCOT

These are a complete range of mobile antenna accessories developed and manufactured in the UK.

They are extremely rugged, designed to withstand extremes of weather using: fine stainless steel whips, A100 nylon bases, chrome plated brass ferrules, heat treated silver plated beryllium copper contacts and polished stainless steel shock springs.

From the list below, choose the base (¼, ⅜, ½) choose the whip (long or short) and the cable assembly required (cable or magnetic). Then add an accessory if required.

340	Base. Stand 1/4λ 60-550MHz	£2.30	£0.40
310	Base. Swivel 1/4λ 60-550MHz	£4.20	£0.40
344	Base. Sprung 1/4λ 60-120MHz	£6.50	£0.52
440	Base. Stand 5/8λ 145MHz	£2.70	£0.40
330	Base. Swivel 5/8λ 145MHz	£5.00	£0.40
341	Base. Sprung 5/8λ 145MHz	£7.30	£0.52
350	Base. Fine tune 1/2λ 145MHz	£7.30	£0.52
351	Base. Sprung 1/2λ 145MHz	£8.05	£0.63
057	Whip, tapered SS 127cms	£1.95	£0.98
056	Whip, parallel SS 63cms	£0.75	£0.75
085	Mount cable 5/8 & 1/4λ	£3.05	£0.63
085LR	Mount cable 5/8 & 1/4λ	£3.85	£0.63
092	Mount Mag. 5/8 & 1/4λ	£10.75	£0.86
084	Mount cable 1/2λ	£5.00	£0.63
088	Mount cowl 1/2λ	£5.75	£0.40
091	Mount Magnetic 1/2λ	£10.75	£0.86
089	Gutter clip adaptor	£5.00	£0.63
093	Boot lip adaptor	£3.80	£0.52

NB: PRICES INCLUDE VAT AT 15%
Carriage extra, mainland rate shown, max £1.73

hy-gain

The TH3jnr is a 3 element triband (10-15-20m) beam whose compact design (longest element 24·2ft, boom 12ft turning radius 14·3ft) makes it ideal where space is the limiting factor. Separate and matched air dielectric Hy-Q traps are used for each band giving a 52ohm fed with a 1·5:1 VSWR at resonance, 8dB Av gain, 25dB F.B. ratio and a power handling of 600W P.E.P. By using a 1¼in boom the antenna presents only 3·4sq ft of surface area (equals 87lb of load at 80mph). The mast to boom clamp accepts 1-1⅝in masting and, like all the hardware, is Iridite treated to mil specs.

12AVQ	Vertical 10-20m inc.	£43.13	£1.73
14AVQ/WB	Vertical 10-40m inc.	£58.08	£1.73
18AVT/WB	Vertical 10-80m inc.	£90.85	£1.73
14RMQ	Roof mounting Kit	£30.48	£1.73
18V	Vertical 10-80m inc.	£31.97	£1.73
18HT	"HY Tower" 10-80m	£320.85	£12.54
103BA	3 Ele Yagi 10m	£60.38	£1.73
105BA	3 Ele Yagi 10m	£112.70	£3.16
153BA	3 Ele Yagi 15m	£74.75	£2.36
155BA	5 Ele Yagi 15m	£135.13	£4.77
203BA	3 Ele Yagi 20m	£159.85	£3.97
204BA	4 Ele Yagi 20m	£217.35	£5.87
205BA	5 Ele Yagi 20m	£281.75	£7.59
402BA	2 Ele Yagi 40m	£201.25	£5.23
DB10/15A	3 Ele Yagi 10-15m	£146.05	£3.91
TH3JNR	3 Ele Yagi 10-15-20m	£159.28	£2.47
TH2MK3	2 Ele Yagi 10-15-20m	£136.85	£2.59
TH3MK3	3 Ele Yagi 10-15-20m	£205.85	£4.66
TH5DXX	"Thunderbird" 5 Ele	£228.85	£5.41
TH6DXX	"Thunderbird" 6 Ele	£281.75	£6.97
HYQUAD	2 Ele Quad 10-15-20m	£240.35	£4.89
18TD	Dipole Tape 10-80m	£80.39	£2.30
BN86	Balun 1:1·3 30MHz	£15.53	£1.15
LA1	Lightning Arrestor	TOS	£0.75

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

J-BEAM

As well as 2m antennas featured here, the range covers 4m through 23cms. All models offer good 50ohm matches and bandwidths by incorporating such innovations as the inverse balun. Technical details are quoted in accordance with ICE (ICE138 + 138A) and I.E.E.E. (RV481 RE252 Jan 65) recommendations. (Sae for catalogue.)

The 8XY/2m is basically two 8 element yagis mounted at right angles on a common 9ft boom. It is suitable for horizontal, vertical or circular (with PMH/2c) polarisation. 9·5dB gain in each plane. 47° horizontal beamwidth, 10lb weight, 64lb wind load at 100mph an elegant answer to a single antenna installation.

JAYBEAM 2 METRE

HO/2M	Halo, head only	-3·0dB	£5.17	£0.63
HM/2M	Halo, 24in mast	-3·0dB	£5.75	£0.75
UGP/2M	Ground plane	0·0dB	£10.92	£1.73
C5/2M	Colinear omni vert	4·8dB	£47.72	£1.73
LR1/2M	Colinear	4·5dB	£25.87	£1.73
5Y/2M	Yagi 5 ele	7·8dB	£12.07	£1.73
8Y/2M	Yagi, 8 ele	9·5dB	£15.52	£1.73
10Y/2M	Long Yagi, 10 ele	11·4dB	£33.35	£1.73
14Y/2M	Long Yagi, 14 ele	13·0dB	£42.00	£1.73
D5/2M	Yagi, 5 over 5 slot	10·6dB	£21.85	£1.73
D8/2M	Yagi, 8 over 8 slot	12·3dB	£29.32	£1.73
PBM10/2M	10 ele parabeam	12·4dB	£39.67	£1.73
PBM14/2M	14 ele parabeam	13·7dB	£48.00	£1.73
Q4/2M	Quad, 4 ele	10·0dB	£25.87	£1.73
Q6/2M	Quad, 6 ele	12·0dB	£33.92	£1.73
5XY/2M	Yagi, 5 ele cross	7·8dB	£24.72	£1.73
8XY/2M	Yagi, 8 ele cross	9·5dB	£31.05	£1.73
10XY/2M	Yagi, 10 ele cross	11·3dB	£40.82	£1.73
PMH2/C	Harness, Cir. Polar		£8.05	£0.52
PMH2/2M	Harness, 2 way		£10.92	£0.86
PMH2/2ML	Hrns, 2 way long		£11.92	£1.15
PMH4/2M	Harness, 4 way		£25.00	£1.73

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

Kenpro

KR600RC
£132.25

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

KR400RC
£90.85

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

KR500
£86.25

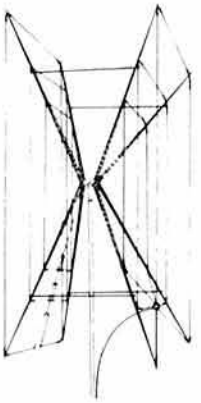
Elevation Rotator (180°).
Up to 50kg of Load.
1¼in-2¼in mast.
1¼in-1¾in boom.

KR250
£44.85

Twist and switch controller.
Rotator 200kg/cm.
Brake 600kg.
1in-1¼in masts.

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

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 tridectic 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	£142.60	£4.31
GQ3E	3 Ele Antenna	£215.05	£7.42
GQ4E	4 Ele Antenna	£286.35	£8.11
GQCK1	Conversion Kit 1 Ele	£72.45	£3.34
GQCK2	Conversion Kit 2 Ele	£143.75	£5.41
GQSPIDER	Centre piece (spare)	£30.19	£1.43
GQSPREADER	Spreader Arm (spare)	£11.33	£1.73

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

CDE

AR40
£65.55

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

CD45
£113.85

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

HAM IV
£189.75

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

T2X
£270.25

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

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

SOUTH MIDLANDS COMMUNICATIONS LIMITED

VERSATOWER

TELESCOPIC & TILTOVER RADIO TOWERS

BEST BUYS LOW COST TOWERS

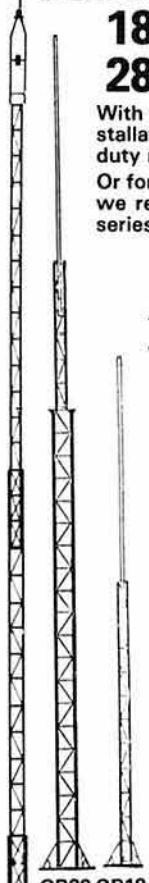
NEW

18FT ONLY £112.70

28FT ONLY £169.90

With tiltover base for ease of installation. These are our latest light duty range.

Or for larger headloads and heights we recommend our post mounted series P60 shown on the far left.



CB28 CB18

STANDARD
Post mounting

13M20P40 40′ £396.75
13M20P60 60′ £485.30

HEAVY DUTY
Post mounting

16M20P60 60′ £671.60
16M20P80 80′ £1012.00

Twelve years of continuous development has produced a range of over 50 models, all of which, being made in England conform to the current B.S.S., requiring minimum designed wind speeds of 85mph and up to 117mph.

Before purchasing a Tower, we strongly recommend consulting one of our engineers for advice regarding the most suitable combination for an installation. *It would be incorrect to nominate a specific headload as this is dependent upon load distribution, geographical location and siting.*

The range encompasses towers between 25 and 120ft in 10, 20 or 40ft sections mounted on ground post, base plate, wall, fixed base or high speed trailer.

SEND NOW FOR SPECIFICATIONS/PRICES

'30ft': 10ft SECTION "MINITOWER"

Capable of supporting a HF beam or several VHF Ants. The head unit accepts 2" tube and provides for a rotator. Operation is easy with single winch system.

10M10P30 Post mount	£353.05
10M10W30 Wall mount (LG1013W extra)	£339.25
10M10BP30 Base Plate (HD Bolts extra)	£373.75
10M10FB30 Fixed base (HD Bolts extra)	£327.75

NB: PRICES INCLUDE VAT (AT 15%)
DELIVERY EXTRA (distance dependent)

HANSEN

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

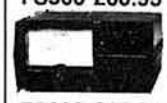
The Hansen range covers 20 quaity models with top-of-the-line the FS710. This is a flat frequency response, peak envelope power and R.M.S. in-line wattmeter with many novel features. Most notable being the 'power independent' SWR scale—no forward power calibration knob, just direct reading SWR.

FS710; PEP AUTO-SWR RMS LEVEL

FS710 £78.20

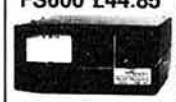
FS710H: 1·8-60MHz. 15,150, 1·5kW
FS710V: 50-150MHz. 15,150W
V.S.W.R: 4:1 and to 20:1
Accuracy: ±7% of FSD
Impedance: 50-52 Ohms
Connectors: SO239
Power: 240 Volts AC 50Hz
Weight: 3·lbs (1·5Kgs)
Size overall: 8 × 4 × 5½"
Size Meter: 2 × 3¼"
Time Const: PEP follow 4 second

FS500 £60.95



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

FS600 £44.85



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

FS300 £40.25

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

FS7 £35.65

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

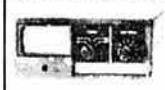
FS711 £32.20

REMOTE INDICATOR TYPE
FS711H 1·8-30MHz 20 & 200W
FS711V 50-150MHz 20 & 200W
FS711U 430-440MHz 5 & 20W
Power ±10% SWR 1:1-3:1 ±3%
Indicator 5 × 2¾ × 1¼"
coupler 3¼ × 2¼ × 1¼"

FS5E £32.20

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

FS300M £31.05



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

SWR3S £23.00

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

SWR50B £23

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

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

SMC=HS

OMNIDIRECTIONAL VERTICAL HF, VHF, UHF ANTENNAS

HF TRAPPED VERTICAL

The SMCHF5V covers five bands, 10 to 80 metres. Only 15ft 9in high, about 1¾in diameter and weighing 6½lb but with PEP handling (within the 1·5:1 VSWR bandwidth) of 500W on 10-20m and 200W on 40 and 80m. It is suitable for ground mounting on a good earth stake (with or without radials) or in an elevated position with resonant wire radials or the SMCHF5R trapped radial kit.

The SMCHF5R consists of five solid rods (between 6½ft and 7¼ft) sloping downwards at 45° to the antenna. It is the perfect answer to restricted locations. Power; 150W PEP, weight 4lbs.

SMCHF5V £40.25 **SMCHF5R £29.90**
(Carriage on either or both together £1.73)

2 METRE COLINEAR

144MHz, 6·5dB gain and low angle of radiation from two ⅝λ phased sections. Height 3·1 metres. Three 48cm radials project from the bottom chrome-plated brass boss. A good 50ohm match offers better than 1·5:1 VSWR at resonance for 100W PEP plus performance over 4MHz of operational bandwidth. Weatherproof design with a SO239M connector recessed 30cm up the detachable 3·2cm OD support tube. Supplied complete with mounting plate and U bolts for 1¼in mast. Weight 1·5kg.

SMCGP144W (P&P £1.73) **£24.95**

70CMS COLINEAR

432MHz, 6·8dB gain and ultra low angle of radiation from three ⅝λ phased sections to a maximum height of 1·7 metres. Three 17cm radials project from the bottom chrome-plated brass boss. A good 50 ohm match offers better than 1·5:1 VSWR at resonance for 100W PEP plus performance over 10MHz of operational bandwidth. Excellent weatherproof design with a SO239M connector recessed 23cm up the detachable 3·2cm OD support tube. Supplied complete with two extruded mast clamps and U bolts capable of taking masts up to 2¼in. Weight 1·1kg, Projected area 0·034 square metres.

SMCGP432X (P&P £1.15) **£28.00**

2 METER AND 70CMS COLINEAR

144MHz 2·8dB gain and 432MHz 5·7dB of gain single 50ohm feed. 1·1m high. 100W PEP.

SMC 70N2V (P&P £1.15) **£27.60**

VHF/UHF DISCONES

The SMCGDX1 is a vertically polarized, 3dB gain, 500W PEP, 50ohm, broad-band antenna. It is constructed of eight horizontal rods (each 40cm) radiating from a central boss, thus forming the disc, and eight rods (each 90cm) radiating from the boss but sloping downward at 45° to form the cone. This configuration produces a 1·5:1 VSWR over the range 80 to 480MHz.

The SMCGDX2 is a development of the GDX1 with every other disc rod extended by 72cm and every other cone rod extended by 1·3m. This reduces the lower frequency limit to 50MHz.

The SMCVHFL is a skeleton discone with three off 53in cone and three off 24in disc elements suitable for listening anywhere between 65 and 520MHz.

All models use a SO239M coax connector, (in the GDX versions it is recessed into an extension of the support mast—which doubles as the coaxial feed) and are supplied with mounting hardware to 1¼in mast.

SMCGDX1 (P&P £1.73) **£41.40**
SMCGDX2 (P&P £1.73) **£47.96**
SMCVHFL (P&P £1.73) **£16.85**

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

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ALL-IN POLICY: ALL ADVERTISED PRICES INCLUDE TAX AND FREE DELIVERY (SECURICOR FOR RIGS)

ARROW ELECTRONICS LTD

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The national society representing all UK radio amateurs

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

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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 before 10am on Wednesdays, athough 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	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	G4IAL	1000
NNW from Cleveland	G4JJB	G8FTZ	1000
W from Carlisle	G4LAA	(Vacancy)	1030
SE from Lincoln	G3NRO	G8OFQ	1030
SW from London	G3FZL/G3VAG	G3IIR	1030
S from Aberdeen	GM8GHV/GM8MBP		1030
W from Bristol	G4CJZ	G3ZWY	1100
W from Bangor, Co Down	GI3TLT	GI3SXG	1130
Frequency: 145·525MHz (S21). Mode: fm (vertical polarization)			
Cornwall	G2ABC	G3NPB/G3VGO	0930
Hampshire, north	G8CKN	G3PZN	0930
Suffolk	G3ZNU	G4FSG/G4FZZ	0930
Leeds	G3SPX	G8XGN	0930
Co Down	GI3WEM	GI4DOR	0930
Edinburgh	GM4EHO	GM4JFS	0930
E Cornwall/S Devon	G3ZYY	G4GWJ/G4KYY	1000
Londonderry	GI2DHB	GI4AHD	1000
London	G3FZL/G3VAG	G3IIR	1000
Birmingham	G3PWJ	G3BA	1000
Lincolnshire	G3NRO	G8OFQ	1000
Tyneside	G4FUT	G3WNR	1000
Glasgow	GM4HCO	GM4CXM/GM3VTB	1000
Elgin	GM4ILS	(Vacancy)	1000
Southampton	G8LVC	G8ADM	1030
E Sussex coast	G8SC	G3ZFE	1030
Bristol	G4CJZ	G3ZWY/G8NNU	1030
Manchester	G3LEQ	G3JWK	1030
Dumfries	GM8TKA	GM3MSG	1100
Brighton and coast	G3ZYE/G8GEZ	G4JGJ/MA	1100
Huntingdon, Cambs	G8BBK	(Vacancy)	1100
Jersey	GJ8KNV	GJ4ICD/GJ4JWA	1100H
Gwynedd	GW4KEV	GW8TTM	1100
Clwyd/Merseyside	GW4IEQ	G8NNS	1100
Leicester	G4JYS	G4MFU	1130
		H = horizontal polarization	

A Christmas message from the RSGB President

The appearance of this message in the December issue of *Radio Communication* means that the year in the presidential chair is rapidly coming to an end. It seems only last week that I was writing the "message" for the January issue!

In the 12 months that have rushed past I have learned much about amateur radio both at home and abroad. One of the most gratifying impressions is the esteem with which the RSGB is held overseas. Indeed all members can be justly proud of the reputation that their Society enjoys around the world.

This goodwill has been created by previous Presidents who have responded to invitations to visit overseas societies, and particularly by our participation in IARU activities. The IARU Regional Conference in Brighton earlier this year was certainly an education—for mò at least. Mixing with 150 delegates from 30 countries was both an enlightening and heart-warming experience.

One cannot write about IARU without recording the sad events of the year. Roy Stevens, MBE, G2BVN, will be sorely missed in this context, and so will Peter Balestrini, G3BPT (last year's President), in the Raynet organization.

This year has not been without its difficulties, as will be appreciated by those who read *Radio Communication* thoroughly. Apart from the well-publicised ones, the larger than anticipated growth in our membership has brought its own problems. For details of the work-load at Doughty Street, members are referred to the Annual Report in last month's issue.

My duties as President have been much helped by the support that I have received from the general manager and also from his staff. My appreciation to Council members for their support and guidance must also be recorded. I have tried to attend as many committee meetings as other duties would allow, and I take this opportunity to thank their members for the welcome that I have received and for the work that they do—I fear much of which goes unsung.

International goodwill has already been mentioned. Goodwill is an important constituent of the Christmas scene. May I then wish all members wherever they may be a very happy Christmas, and may 1982 bring them some at least of the things for which they hope.

Basil O'Brien, G2AMV

QTC
Amateur radio news

Regional representatives

The result of the ballot to fill the vacancies in Regions 5, 14 and 16 was as follows:

Region 5

J. S. Allen, G3DOT.....6 votes.....ELECTED
G. Peck, G8CXK.....3 votes
S. Platt, G6AZI.....3 votes

Region 14

R. James, GM4CXM.....13 votes
V. Kusin, GM4HCO.....45 votes.....ELECTED
Invalid votes: 4

Region 16

D. Cutts, G4FAW.....27 votes
T. D. Howe, G3PLF.....37 votes.....ELECTED
Invalid votes: 3

Christmas holidays

RSGB headquarters and the Chelmsford editorial office will be closed over the Christmas/New Year period to callers and telephone enquiries from 25 December 1981 to 3 January 1982 inclusive.

QSL Bureau—G2 callsigns

The sub-manager for the above callsign group, Mr C. H. Adams, RS10906, reports that he is now holding thousands of unclaimed cards. If these are not claimed within four weeks of this notice appearing, they will be destroyed to make more space available; so will anyone wishing to collect their cards, or with any query concerning same, please contact Mr Adams as soon as possible.

Members are advised that all sub-managers are being instructed to take similar action by getting rid of the "dead wood" at the end of 1981. This will enable us to ascertain which members are interested, and will help the effficient running of the QSL Bureau.

TVI/BCI information sheet

The RSGB Interference Committee has produced an information sheet, entitled *Domestic entertainment equipment and the radio amateur*, for the guidance of neighbours and other interested parties. It deals with the problem of breakthrough due to local amateur transmitters, and sets out some basic technical facts about how it is caused and what can be done about it.

With the advent of legal citizens band radio in the UK, it is important that breakthrough problems are traced to their correct source and dealt with (specifically, so that the radio amateur is not victimized for something which is not his fault), and it is hoped that this sheet will enable neighbours to take the correct action. Some basic facts about amateur radio, which make a point of mentioning the responsibility of the amateur to the Home Office, are also given in the leaflet.

Members wishing to receive a copy of the leaflet should apply to "TVI/BCI information sheet", RSGB HQ, enclosing an sae.

A Raynet tie for Christmas

A tie with the Raynet motif on a navy blue background makes an ideal Christmas gift. Obtainable from Jane Balestrini, Merrivale, Willow Walk, Culverstone, Gravesend, Kent, price £2.80 including p&p.

BAND CHANGES

The Home Office wrote to the RSGB during September 1981 to inform the Society that the new 10, 18 and 24MHz bands would become available from 1 January 1982. **However,** today (6 November 1981) the Society received the following statement from the Home Office with regard to the use of the 18 and 24MHz bands.

"The 18·068–18·168MHz and 24·890–24·990MHz bands will remain allocated internationally to the fixed and land mobile services until existing assignments have been transferred to new frequencies, which must be completed not later than 1 July 1989. Prior to the completion of this transfer of assignments, the amateur and amateur satellite services have no right internationally to use these bands, but the question is nevertheless being examined to see whether they may be introduced before the completion of the transfer, on a secondary basis.

"The outcome will be advised in due course."

This means that the 18 and 24MHz bands will not be available to UK radio amateurs until advised.

Other consequences of the 1979 ITU World Administrative Radio Conference affect the UK 70MHz and 1·3GHz bands. Namely, from 1 January 1982:

(a) The special UK 70MHz allocation will be reduced by 200kHz at the top end of the band. The new band will be 70·025–70·500MHz. A new 70MHz band plan which takes account of this change is published on page 1130 of this issue of *Radio Communication*. The intention is to move 70MHz beacons to the lower part of the band.

(b) The UK 1·3GHz allocation will change to 1,240–1,325MHz, with the earth-to-space amateur satellite service available in the band 1,260–1,270MHz.

The Society is pleased to be able to announce that with effect from 1 January 1982 the new 10MHz band **will be available** to UK amateurs on a **secondary** basis. The modes of emission and output power in respect of 10,100–10,150kHz will be as for other frequencies in the 3·5–29·7MHz hf bands. Members are asked to refer to the 10MHz band plan, which has been agreed internationally, published on page 1135 of this issue of *Radio Communication*.

IEE conference on "HF Communications Systems and Techniques"

From 15 to 17 February 1982 the Institution of Electrical Engineers will hold its second conference devoted to "HF Communications Systems and Techniques". Subjects to be covered include systems design, evaluation of hf links, propagation and signal generation.

The RSGB is pleased to be associated with this event, and its representative on the organizing committee is John Kay, G3AAE.

Registration forms and full programme details may be obtained from the IEE Conference Department, Savoy Place, London WC2R 0BL.

Stolen equipment

From a car in Burgess Hill, Sussex, on 17 September: Yaesu FT290R transceiver, serial number 16020573; and Microwave Modules 40W linear, serial number 4011801323. Any information to G8TOO, QTHR, or any police station.

From a car at Bournemouth on 8/9 October: Trio TR7500, serial number 930058. Information to G3YNR, QTHR, or Bournemouth police.

Missing, believed stolen from Manchester, 50 Philhong 6A psus. The only 6A units sold in Europe, they are marked with an upper voltage limit "245V". Anyone seeing or being offered one of these units is requested to contact G3LLL on Blackburn (0254) 59595/6.

On 15 October from a car in Blackpool; Sommerkamp TS280 fm transceiver (50W version) and attached Trio mic type 2200QX. Information to Blackpool CID or G8HUP, QTHR.

On 19/20 October from a vehicle in Hendon, NW4: Trio transceiver type TR9000, serial number 1020430. £50 reward for return. Information to West Hendon police station or tel 01-203 4506 during office hours.

On 26 October from a vehicle in Southampton: Azden PCS3000, serial number 30156. Information to G6BFB, tel Silchester 701128, or Southampton police.

1982 RSGB PRESIDENTIAL INSTALLATION

The installation of Mr J. Anthony, G3KQF, as the 48th President of the Radio Society of Great Britain will take place during a

SOCIAL EVENING

commencing at 7 for 7.30pm on

Saturday 9 January 1982

at the

MIDLAND HOTEL, DERBY

Admission will be by ticket only. Tickets will be limited to two per member. The number of tickets available is also limited.

Price per person £3.50 (Buffet and dancing)

All applications for tickets must quote callsign or RS number of the applicant, and should be addressed to Miss D. P. Beisiegel, RSGB, 35 Doughty Street, London WC1N 2AE, and must be received by **14 December 1981.**

The Midland Hotel, Derby, is adjacent to the railway station and has only a small car park, but there is a large car park on the opposite side of the station (60p) and ample street parking in the area.

Anyone wishing to book overnight accommodation at the hotel should mention the function, as special terms have been agreed. There is plenty of other hotel accommodation in the area.

Looking ahead

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

5 December—RSGB AGM, IEE, Savoy Place, London.

1982
9 January—RSGB Presidential Installation, Derby.
20 March—RSGB VHF Convention, Sandown Park.
19 June—HF Convention, Belfry Hotel, Oxford.

RSGB RAYNET COMMITTEE

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Supplies: Mrs J. Balestrini, "Merrivale", Willow Walk, Culverston, Gravesend, Kent
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PLEASE DIRECT ENQUIRIES TO THE APPROPRIATE PERSON

The G3MXT third-method Mk2 and polyphase Mk2 ssb generators

by G. V. ENTWISLE, G3MXT*

EVER since ssb began to oust a.m. from the amateur (and commercial) bands, the object of producing a satisfactory ssb signal by any other method than the generally accepted filter method, has from time to time provided the author with an absorbing interest in phasing and third-method techniques. It is well known that the two basic and essential requirements for success with any phasing or third-method ssb generator are:

(1) that the rf and af phase shifting circuits produce a precise and constant 90° phase shift.

(2) That the signals so produced maintain a constant amplitude with respect to each other.

Until recent years it was indeed quite difficult to satisfy these two requirements, as in both cases long term stability appears to have been an ever-present problem. However, the use of ttl to produce rf phase shift (in the case of the "third-method" af phase shift as well) and Mr Gingell's passive RC network to produce af phase shift, together provide an excellent solution to **(1)**, while the use of "on chip" devices such as the Signetics N5596 or Motorola 1496/1596 double balanced modulators assists greatly in achieving a manageable solution to **(2)**.

The first bite of success (ie getting it on the air) at G3MXT was the third-method generator (*Rad Com*, March 1977). This transmitter has seven switched 14MHz crystals in the primary oscillator, thus giving an output on seven spot channels in the 3·5MHz band; the pa is a good old 6AG7 driven in Class A by a 2N3819 fet. Not exactly a rock-crushing signal in a band not particularly noted for a quiet operating background, nevertheless good reports were received from many stations within a 10-mile radius of the home QTH.

A comment often made by the operator receiving a third-method derived ssb signal is "the quality of the audio is very good", the reason for this of course is that the system produces a comfortable and smoothly-defined 3kHz bandwidth which sits neatly between the suppressed lower and upper pilot carriers—provided that the pulse repetition frequency is about 7·2kHz. If the pulse repetition frequency were lowered, the pilot carriers would be closer together, thus reducing the available bandwidth; it would also become necessary to redesign the twin low-pass filters to a lower cut-off frequency. The glowing reports on the "quality of the audio" would also decline.

The G3MXT third-method Mk2

The Mk2 version is currently operational in the 7MHz band, and in a number of respects it is a different animal to the Mk1; the main differences being the much more effective low-pass filters and a much higher output level.

All the components in Fig 1 are mounted on a single pcb measuring 9in by 7in. This circuit board together with the lpfs, 2MHz vfo, and 9 to 7MHz frequency converter is built into a home-brew aluminium box measuring 10·5in by 9in by 4in. The front panel has the vfo dial, and a standby switch to control the +5V supply to the 74S74. The three rf balance controls are on the rear panel, the 7MHz rf output is taken via a short length of coaxial cable to a valve linear amplifier.

Taking the af section first, the quadrature output is taken via the 2N2926 emitter followers to a pair of elliptical low-pass filters (Fig 2). These were designed for a working impedance of 2kΩ, and a cut-off frequency of 1·5kHz, it can be seen from Fig 3 that they provide an ideal curve for the purpose, being down −50dB at 1·8kHz they permanently suppress the two pilot carriers and leave a desirable flat-topped 3kHz bandwidth between them. The fabrication of these filters requires a little patience—and an LCR bridge.

The inductors were wound with 36swg enamelled wire on FX2240 ferrite cores, and the following information is for rough guidance only: 258mH, 270 turns; 169mH, 170 turns; 183mH, 190 turns. Experience with this type of filter generally seems to indicate that departures of five per cent from the calculated values need not greatly affect the performance.

The effectiveness of the filters appears almost to render the two 47kΩ balance potentiometers redundant. They were set to mid-travel and the 5kΩ trimmer was adjusted for maximum attenuation of the undesired sideband by observing the 7MHz output on an oscilloscope; a check with a spectrum analyser indicated that suppression was to the order of −40 to −50dB. This adjustment was carried out over a year ago and has not been touched since.

The second pair of dbms generate the ssb signal at 9MHz; therefore a third-overtone 36MHz crystal oscillator, followed by an emitter follower buffer and a switching transistor, is used to trigger the high-speed 74S74 ttl phase shifter. TR1 and TR2 are ZTX300 and TR3 is a P346A high-frequency switching transistor—the BSX20 should work well in all three positions. L1 consists of 10 turns of 32swg enamelled wire spread over 0·5in on a 0·25in diameter former tuned by a dust iron slug. The Q of this tuned circuit is sufficiently low to allow the crystal to lock over quite a wide range of slug adjustment.

The 10kΩ and the two 50kΩ carrier balance potentiometers must be controllable from either the front or rear panel. The centre carrier, if present, appears in a correctly-tuned monitoring receiver as a 1·8kHz tone; the method used at G3MXT is simply to balance out the tone. It is of course necessary to provide means to attenuate the signal input to the receiver during transmit periods, but this is no great problem and has been standard monitoring practice at many stations for years. During receive periods the following valve linear amplifiers and antenna are switched by relays in the normal way, while the entire solidstate generator is normally left running as it does not affect reception.

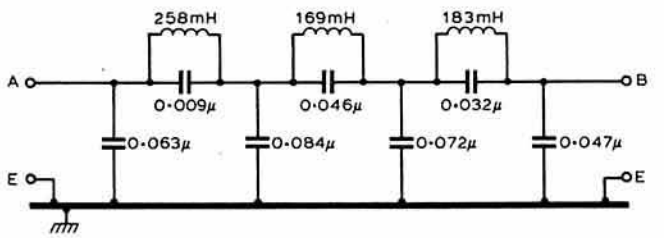


Fig 2. Elliptical low-pass filter. Designed for a working impedance of 2kΩ and a cut-off frequency of 1·5kHz, suppression at 1·8kHz is −50dB. Two of these filters are required and they are connected as shown in Fig 1

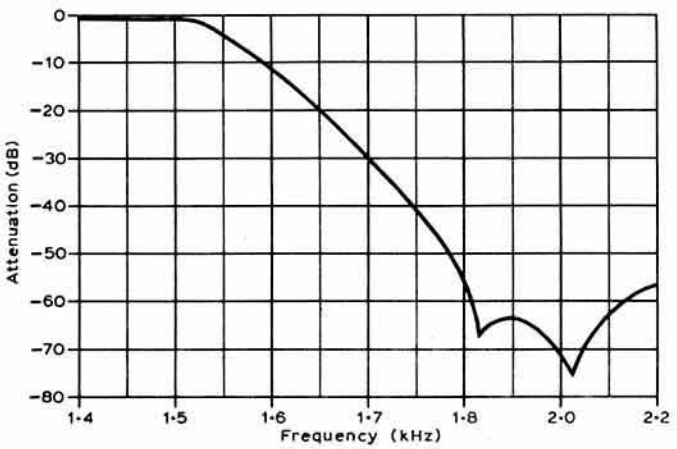


Fig 3. Characteristic curve of the elliptical low-pass filter (Fig 2)

*12 Booths Hall Grove, Boothstown, Worsley, Gtr Manchester M28 4LQ.

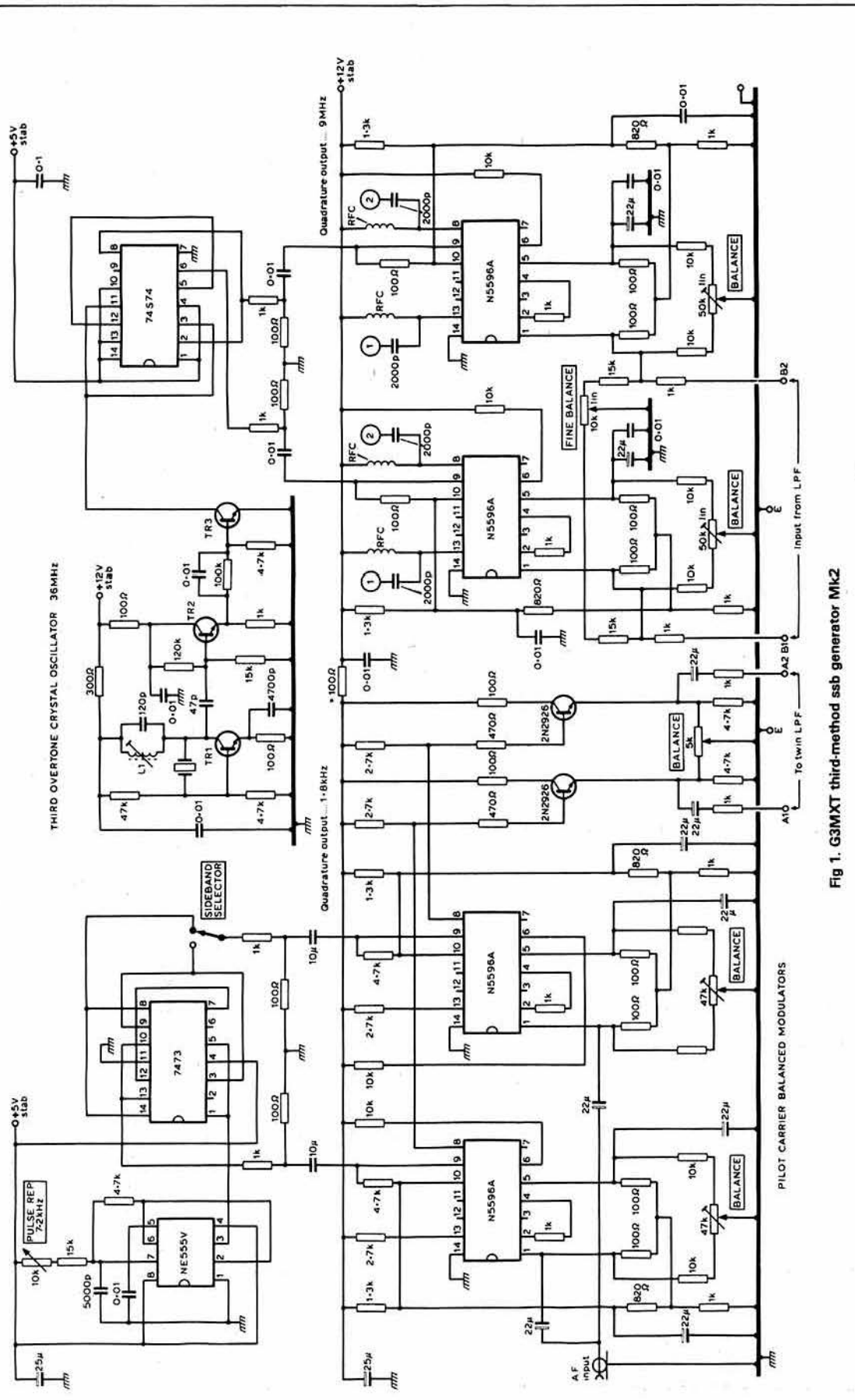


Fig 1. G3MXT third-method ssb generator Mk2

Output is taken from all four output ports of the dbms via 2,000pF silver-mica capacitors and connected to L2 as indicated. The four rfcs have an inductance of 100μH, and were easily made by winding 100 turns of 38swg enamelled wire on miniature ferrite rods (13mm by 2mm) FX2917 (B2). They were wound in five-pie form, 20 turns per section secured by resin glue, and after setting were fixed to the circuit board with a spot of Evostick. If FX2917 rods are not to hand, four dust iron slugs removed from 0·25in diameter formers may be wound in a similar manner after filing down the middle section of thread, it was found that 85 turns produced 100μH on the slugs which were tried.

The balanced mixer circuit, Fig 4, converts the 9MHz ssb signal to the 7MHz band and provides sufficient output to drive a valve such as the 6AG7 or 6CH6 in Class A.

The coupling circuit L2–L3 feeds the 9MHz signal in balanced fashion to the dbm, L2 is 20t 32swg enamelled wire closewound on 0·25in diameter slug-tuned former, L3 is 7t 32swg enamelled wire, centre-tapped and wound over the centre of L2. The 7MHz output circuit, L4, is 30t 32swg enamelled wire closewound on 0·25in diameter slug-tuned former, the output coupling coil, L5, is 7t wound over the earthy end of L4. Screening cans are used for both tuned circuits. The purpose of the 50kΩ trimmer is to prevent any 2MHz signal from the vfo from appearing in the output; it is best adjusted with the aid of an oscilloscope or sensitive absorption wavemeter coupled to the output circuit L4–L5.

The vfo circuit is an old favourite, properly constructed and with positive supply well regulated, it has inherent frequency stability; no reports of frequency drift have been received. Another very desirable characteristic of this circuit is that it will maintain a constant level of output even when made to tune over a much wider range than this one is required to do. L6 consists of 30t of 24swg enamelled wire closewound on a 0·38in diameter former and given a thin coating of Avdel epoxy resin, C is adjusted to bring to the required frequency range, 1·9 to 2MHz. The 0·5mH choke was home-brewed in the manner described earlier, 190t of 38swg enamelled wire wound in 6-pie form on an 8mm dust iron core produced an inductance of 550μH.

The microphone amplifier and the stabilized +12V and +5V power supplies are external to the main unit. A variety of audio amplifiers has been used, but the simple circuit of Fig 5 is quite adequate and could be fitted inside the unit.

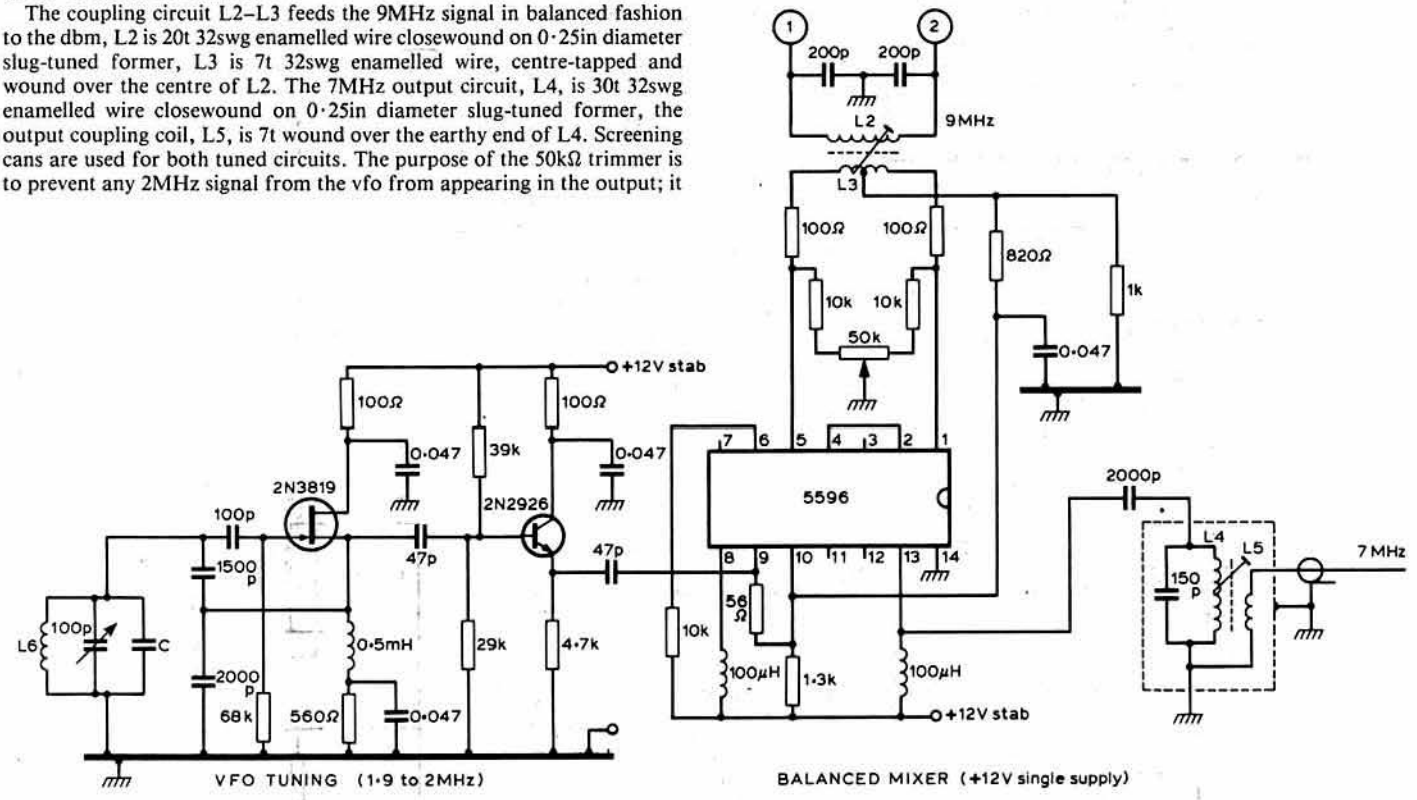


Fig 4. Circuit of the vfo, tuning 1·9 to 2MHz, and the balanced mixer (12V single supply) which converts the 9MHz ssb signal to the 7MHz band as used with the third-method generator. The input connections to L2, (1) and (2), are connected to the four output ports of Fig 1 as indicated. The same vfo circuit is used with the polyphase system (Fig 6) but in this case, the frequency converter is run between +8V and −8V lines; also note that the four output ports are connected in a different sequence to L2

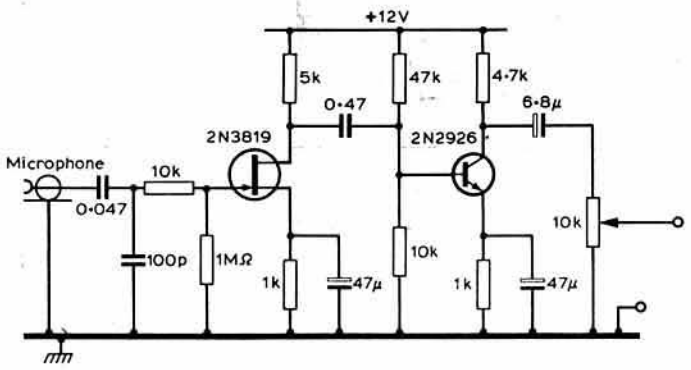


Fig 5. Medium or high impedance microphone amplifier for use with the third-method generator

The G3MXT polyphase Mk2

The first operational G3MXT polyphase generator went on the air on Easter Monday 1980 in the 7MHz band. It formed part of a self-contained 180W p.e.p. transmitter, the valve line-up being EF80, 6CH6 and two QVO6-20s. The first station worked happened to be G3WVZ/M, followed by a session with G3SIG/A and the Royal Signals ARS net which produced reports from various parts of the country in a very short space of time. During his Christmas break from university, Peter Bradbury, G4EXK, of Sheffield, built a Mk1 generator which he uses to drive the linear in his FT101B; he uses the homebrew 2MHz vfo to give output on 7MHz, and the internal 5MHz vfo to give output on 14MHz.

Before the Mk2 version, Fig 6, goes on the air at G3MXT, the EF80 will have to go, as there is considerably more output available. This is due to the method used to couple the 9MHz ssb signal into the 7MHz converter. RV1A and RV1B are carrier balance potentiometers and should be controlled from the front panel, the potentiometers themselves should be mounted fairly close to the dbms. RV2A, RV2B and RV3 (Fig 7) are preset trimmers which are adjusted to suppress the unwanted sideband; this is done by injecting an audio tone and observing the 7MHz output on an oscilloscope.

Changing over the input connections to either A and B or C and D changes the sideband. If a pair of rf inputs to a dbm were changed over, the corresponding outputs to L2 would also have to be reversed.

Comparing Fig 6 with the circuitry of the third-method generator (Fig 1) it can be seen where the two circuits have much in common: coils and rfcs

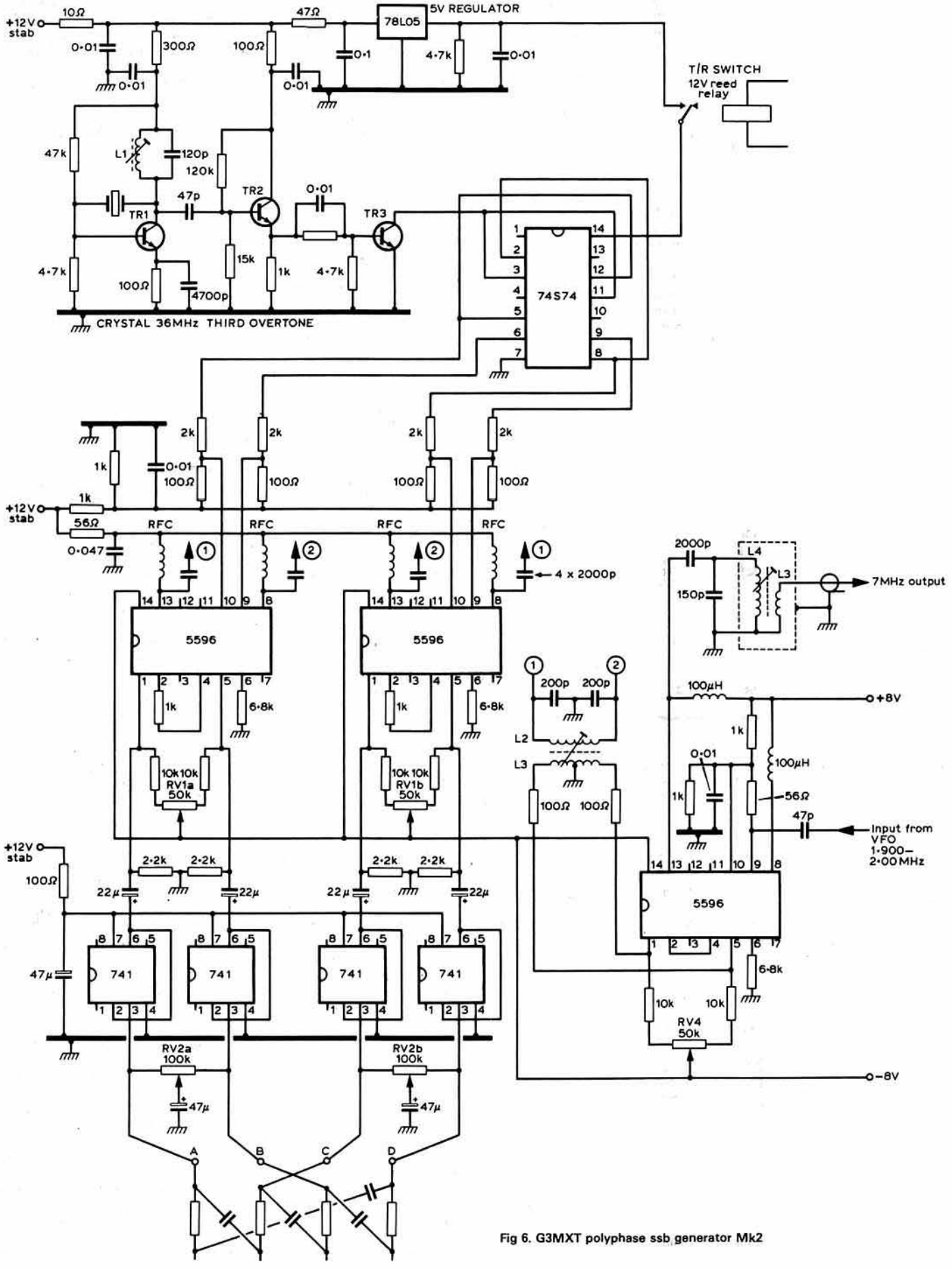


Fig 6. G3MXT polyphase ssb generator Mk2

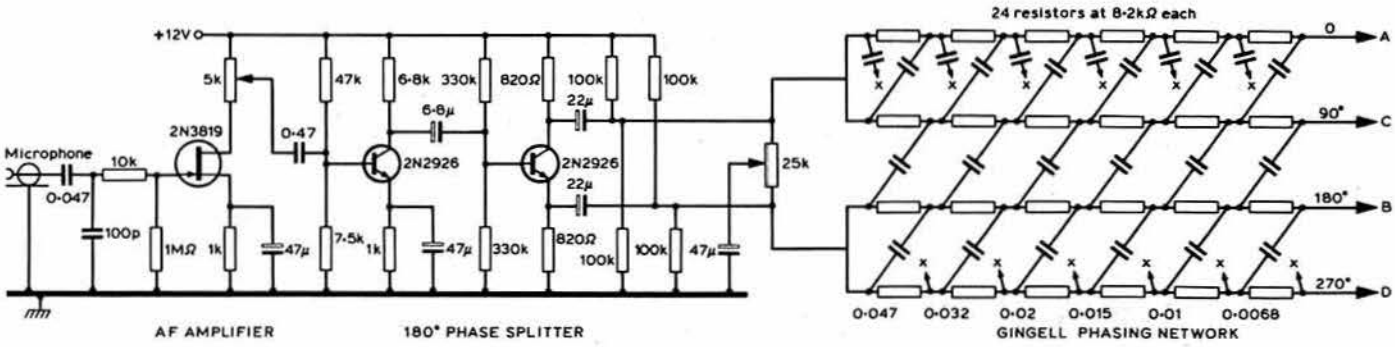


Fig 7. Audio amplifier, 180° phase splitter and Gingell phasing network used with the polyphase system. RV3 is adjusted in conjunction with RV2A and RV2B (Fig 6) to suppress the undesired sideband (see text)

are identical, but there is one major difference concerning power supplies. In the polyphase circuit the dbms are run off +12V, +8V and −8V supply lines; there seems to be no particular advantage in doing this, and if appropriate circuit modifications are made the polyphase system could be made to run off a single +12V supply, as is the third-method.

Both of the units described generate the ssb signal at 9MHz; if a 28MHz vfo is substituted for the crystal oscillator, the signal will be generated at 7MHz, thus obviating the need for a frequency converter. In fact this was done successfully with a polyphase system by Roy Yarrow and Mark Humphries as part of their student project work at Salford University. The fact that they made a 28MHz vfo sufficiently stable for the purpose is much to their credit; they would probably agree that it is not the type of project to be undertaken in a garden shed.

However, this approach becomes much more viable if direct output in the 3·5 or 1·8MHz bands is desired. To cover the range 3·6 to 3·8MHz, the vfo would tune 14·4 to 15·2MHz, a top band vfo 7·2 to 8MHz; stability at these lower frequencies being much easier to obtain. As the output frequency of the 74S74 is one quarter of the oscillator frequency, it follows that any drift in the vfo frequency is also divided by four, a comforting bonus.

Fig 7 shows the audio amplifier, 180° phase splitter, and the "Gingell" phasing network. Here again, an LCR bridge is useful, particularly with regard to the tolerances of some capacitors. Several of these phasing networks were constructed, some with greater care than others, and all appeared to perform well in operation. The audio amplifier provides more than sufficient amplification for this application.

The dbm used in all the G3MXT units has been the Signetics 5596; the Motorola MC 1496/1596 would serve just as well and appears to be more easily obtainable. Unfortunately, in the plastic dil packages the pin connections are different; Fig 8 is included to illustrate the point.

Conclusions

Having found a considerable measure of enjoyment and satisfaction in playing around with the third-method and polyphase techniques, the author would like to think that this article will encourage at least a few more kindred spirits to venture into this fascinating aspect of our hobby.

The advanced radio amateur will be familiar with good rf practice, and therefore should not experience any difficulty in producing an ssb transmitter based on either of these systems. This statement is not intended to dampen the enthusiasm of the less experienced. On the contrary, there is no other way of acquiring the necessary knowledge, skill, and artistry required for success in the field of home construction generally, than the patient and dedicated application of one's own talents.

Acknowledgements

The author wishes to thank the University of Salford for the use of their excellent laboratory facilities. Also for the keen interest shown by the following members of Salford University Communications Society (G4GSU): Roy Yarrow; Mark Humphries; Peter Bradbury, G4EXK; Paul Wells, G4GMV; John Pownall, G8YHA; Barrie Clark, G3VCL; Steve Richards, G4HPE; Hugh Badham, GW8ZBS; and Mark Bover, G8KCY. □

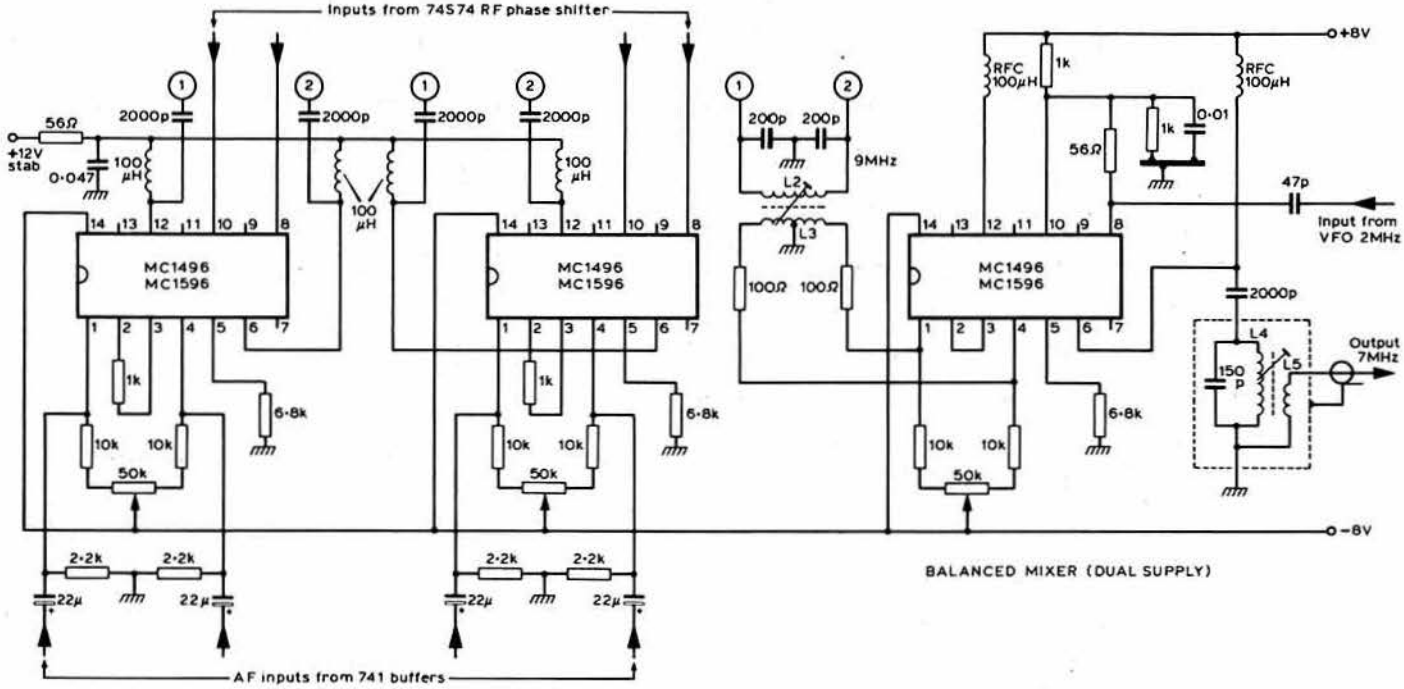


Fig 8. This circuit is essentially the same as Fig 6 but uses the Motorola MC1496/1596, the plastic package pin connections being different from the Signetics 5596. In the 10-pin "K" package the pin connections are identical

Portable antennas for 432MHz

by T. P. HOPKINS, MSc, G8TYY*

THE 430–440MHz band is a fascinating one, and surprising results can be obtained with quite low output powers. The author has a home-constructed fm handheld transceiver for this band, and the following notes are based on his experiences with antennas for "pedestrian portable" use.

An advantage of 432MHz from the point of view of antenna experiments is that quite large antennas (in terms of wavelength) can be constructed with small physical size. The author has made a sizeable collection of antennas of different types, and, as there is a trade-off between size and performance, he is able to select the smallest and most convenient of them with the required performance.

λ/4 antennas

The λ/4 on groundplane (Fig 1) is probably the simplest of all antennas for uhf portable use, and displays a surprisingly broadband characteristic. A wide range of frequencies will be matched by an antenna of a particular length; conversely, a wide range of lengths will provide a low standing wave ratio (swr) at a given frequency. A length of about 7in (178mm) is about right for a match to 50Ω at 433MHz; however, this will vary slightly with different materials and construction, and on the groundplane effect of the transceiver.

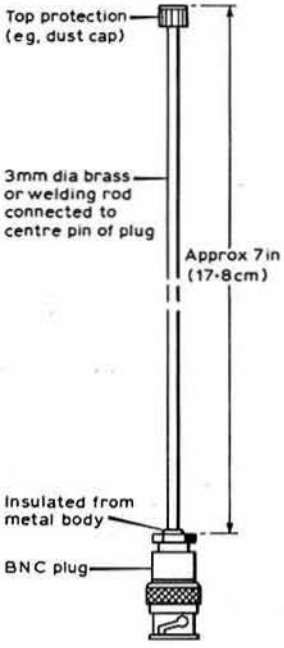


Fig 1. λ/4 antenna

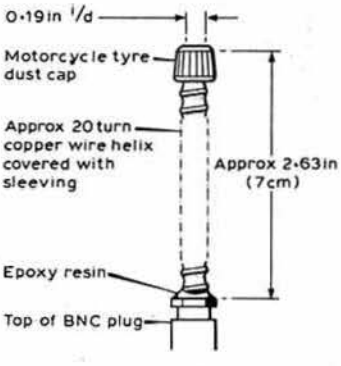


Fig 2. "Long" helical antenna (≈ λ/10)

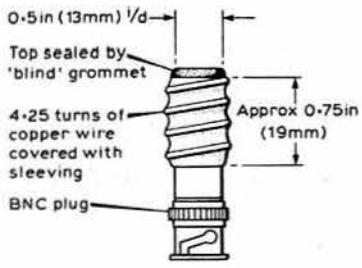


Fig 3. "Short" helical antenna (≈ λ/40)

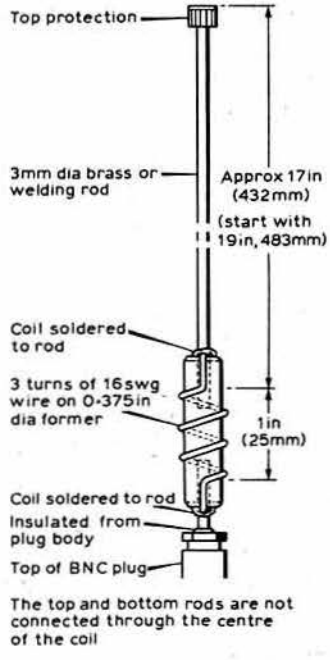


Fig 4. 5λ/8 antenna

The author's transceiver has a bnc antenna socket, and most of the antennas described are mounted on bnc plugs. Other connectors are equally suitable, especially the "tnc" type (as bnc, but with a screw-thread fixing instead of a bayonet action) which are often available at rally stalls. The "uhf" series of connector (PL259 etc) have also been used, but these exhibit quite poor characteristics at 432MHz, and should be used with caution. The antenna elements can be made from brass rod or copper-plated steel (welding) rod of about 0·125in (3mm) diameter. Alternatively, short sections from broken telescopic antennas have been used, but these are rather fragile compared with solid rods.

The elements may be fixed by filing down and soldering one end of the rod to the centre pin of the plug, fitting the appropriate insulators, and filling the remaining space with Araldite or similar epoxy resin. This provides a rigid mounting and has proved to be extremely successful in practice. As an alternative, the rod may be filed to the same shape as the centre pin of the plug, and used instead of this pin. This has been especially useful with bnc plugs, as the centre pins are very small and easily lost or damaged. Plugs which would otherwise be useless may be utilized in this way.

Antennas of this type should always be made oversize and cut to length, using either an absorption wavemeter or a reflected power (vswr) bridge as a guide. The resonant length will be affected by the available groundplane. For the λ/4 antenna, it is suggested that a length of about 8in (200mm) be used as a starting point. This should be shortened by no more than 0·125in (3mm) at a time until a peak in the radiated power, or a minimum reflected power reading is just observed. This peak will be fairly broad. If this is done carefully, a very good match can be obtained.

Rod antennas of this sort can be dangerous if the cut end is not protected in some way. One method is to solder the top from a scrap telescopic antenna or a domed brass nut onto the end of the rod. This will slightly affect the resonant length of the antenna, but this effect is usually insignificant. Another (possibly better) solution is to glue a suitable plastic moulding onto the end of the rod; bicycle valve dust caps have proved useful for this purpose.

An alternative to a stiff rod is a flexible wire antenna. One convenient method is to use a length of coaxial cable (eg RG-58C/U or UR-76), using the *braid* as the radiating element. Most plugs can be modified so that the braid can be connected to the centre pin. The centre conductor of the coaxial cable can be left in place to provide a degree of stiffness. The antenna should be trimmed to length as described previously, and a bicycle dust cap used to seal the cut end of the cable. This type of antenna is particularly convenient to use, as it combines the mechanical flexibility of a helical with the performance of a λ/4 whip.

Helical antennas

Normal-mode helical antennas ("rubber ducks") are well known at vhf and uhf, and can be regarded as electrically shortened λ/4 antennas. Antennas of this sort may be made much shorter than λ/4 and still have usable efficiency.

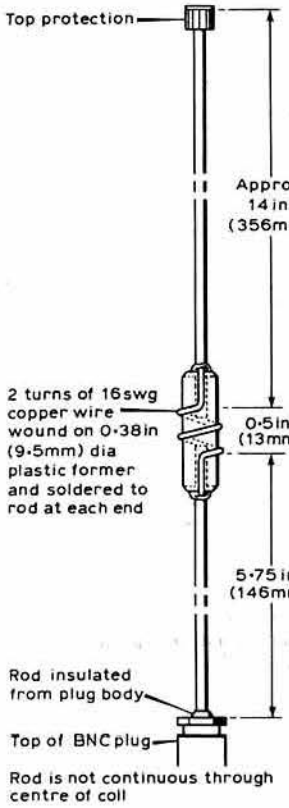
For design information on these antennas, the excellent article by D. A. Tong [1] is strongly recommended; some of this data is reprinted in [2]. The information given allows the constructor to choose two parameters (eg the length and diameter of the antenna), and predicts the third parameter (number of turns). This enables the constructor to make helical antennas of almost any size. Here the author will give two examples of dimensions, and some notes on practical construction.

The material used by the author is 16 or 18swg tinned copper wire. While this is not as flexible as steel springs, the copper wire helices have proven to be adequately robust. Two examples are shown in Figs 2 and 3. The antenna in Fig 2 was made by winding 23 turns of 18swg wire on to a 0·18in (4·7mm) drill shank as a former and stretching it out to a length of about 3in (75mm). This leaves plenty of scope for trimming the antenna for best performance. Sufficient wire was left to connect the helix to a suitable plug, and this should be fixed with Araldite as before.

The antenna should be trimmed to length, for best performance, removing not more than one half-turn at a time. After trimming, the antenna may be covered with "heat shrink" sleeving. This is an irradiated polyolefin tubular material which shrinks to about half its original size when heated. Convenient sources of heat are a gas stove or electric bar fire. Care should be taken not to overheat the plastic. The open end of the antenna may be sealed by glueing a motorcycle tyre valve dust cap over it.

The helical shown in Fig 3 is made in a similar way, except that only 5·5 turns of 16swg wire, with 0·5in (13mm) inside diameter and 0·87in (22mm) length, should be used as a starting point. The open end may be sealed with a "blind" rubber grommet.

*102 Bollington Road, Heaton Chapel, Stockport SK4 5ES



◀ Fig 5. λ/2 over λ/4 colinear

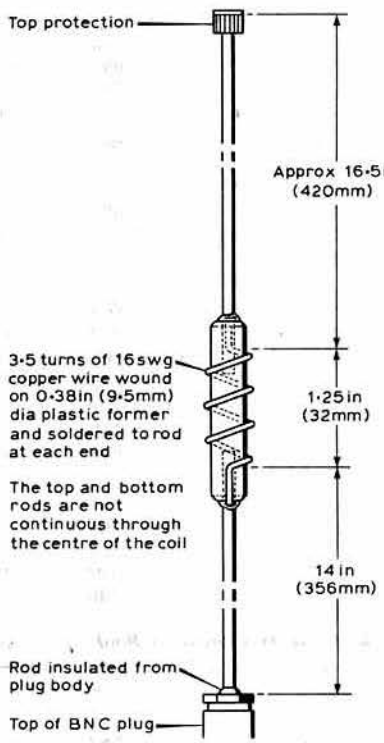


Fig 6. 5λ/8 over 5λ/8 colinear ▲

Colinear antennas

The antennas to be described here are the "5λ/8", the "λ/2 over λ/4" colinear and the "5λ/8 over 5λ/8" colinear, shown in Figs 4, 5 and 6 respectively. The first two are quite convenient to use portable, as they are only slightly longer than the usual λ/4 whip at 144MHz. The latter is included only for completeness, as it is rather long and unwieldy. However, this may be used as a mobile or fixed station colinear, in conjunction with a suitable mount or groundplane.

All these antennas are constructed in the same way, using brass or plated steel rod for the elements, and plastic rod as formers for the phasing coils. The material for the formers will depend on what is available to the constructor; ideally this should have a low loss characteristic at uhf. However, perspex and paxolin rod (both non-ideal materials) have been used successfully.

The antennas may be assembled with epoxy resin at both the plug and coil former. The coil can then be wound with 16swg copper wire and soldered to the elements. The top element should be made oversize and trimmed to length as discussed previously. After trimming, the cut end should be covered, and the coil should be weatherproofed in some way. Heat-shrink sleeving, self-amalgamating tape and multiple coats of paint and varnish have all been used for this purpose.

In conclusion, it is hoped that the notes presented here will encourage others to construct their own antennas. Similar techniques may be used to make antennas for other bands, particularly 144 and 70MHz, and for mobile and (with a suitable groundplane) fixed station use on all three bands.

References

[1] "The 'normal mode' helical aerial", D. A. Tong, *Rad Com* July 1974, pp 432–7.
[2] *Radio Communication Handbook*, Vol 2, Ch14, pp24–5. □

A capacitance-inductance meter

by P. B. BRODRIBB, G3ONL*

THIS instrument is a direct descendent of the capacitance meter originally described by GM3DXJ in 1964 [1]. It differs from the original and from later variations [2], [3] by using different frequencies for different ranges, and by the use of a negative resistance oscillator as the driving source.

The use of frequencies related by a factor of 10 extends the range of the instrument and simplifies calibration. Each range presents the same reactance to be measured. The ranges and oscillator frequencies are:

Range 1. 10–100pF and 60–600μH	2MHz
Range 2. 100–1,000pF and 600–6,000μH	200kHz
Range 3. 1,000–10,000pF and 6–60mH	20kHz

A negative resistance oscillator using p-channel and n-channel fets is ideal for this application. A potentiometer, RV sets the voltage across the fets to the middle of the negative slope region of the VI characteristics. There is no need to plot the characteristics to find this point. It is sufficient to vary the potentiometer setting for maximum oscillator output. This bias voltage will in general lie between four and six volts.

The bipolar transistor, which may be almost any small-signal device, is connected as an emitter follower in order to isolate the oscillator from the meter section. The use of an inductor L4 in the emitter lead improves the gain and can be the winding of a miniature af transformer, provided that the resistance is about 1,000Ω. If the meter sensitivity is sufficient, this inductor may be replaced with a 1kΩ resistor. The inductor L5 in series

*22 Ipswich Road, Debenham, Stowmarket, Suffolk.

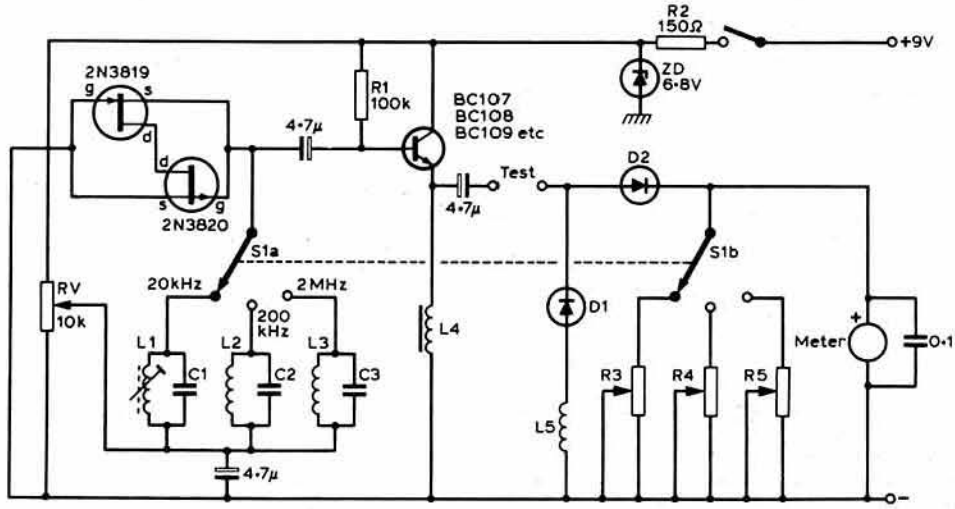


Fig 1. Circuit diagram. Values for the oscillator tuned circuits are discussed in the text

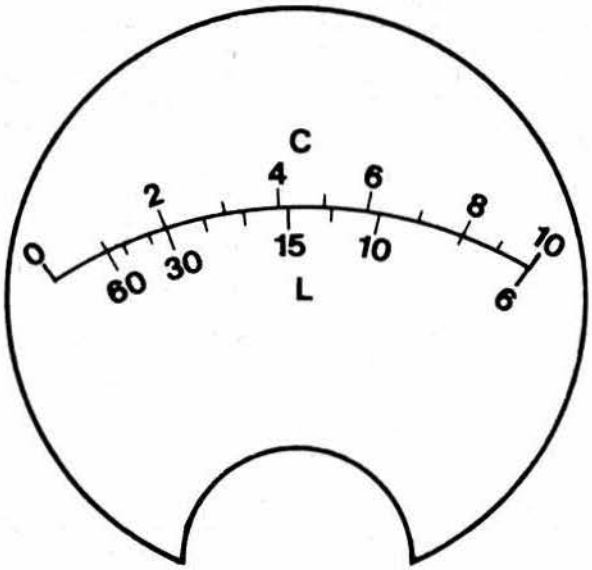


Fig 2. Showing how the meter may be scaled using precision capacitors

with the shunt diode D1 improves the rectifying efficiency on the 2MHz range, and may be omitted if full scale deflection can be obtained with no inductor present. The value of this inductor, if it should be required, is not critical and need only be a few hundred microhenrys.

The meter in the author's instrument is a surplus "ammeter hf". These may often be picked up fairly cheaply. While they may suffer from a damaged thermocouple, this is of no consequence if the movement is intact. Full-scale deflection with a current between 1 and 2mA seems usual for these surplus meters.

A junk-box valve-type i.f. transformer supplied the inductors for L1 and L2. One winding was fitted into a ferrite pot core for L1, and the other winding with no core became L2. A similar winding with turns removed supplied L3. A miniature af transformer of suitable inductance could also be used for L1.

In any case, some experimenting with each tuned circuit is necessary in order to obtain an oscillator frequency within a few per cent of nominal. If the frequencies differ too much from a factor of 10 relationship, it will be necessary to calibrate each range. The frequency of each range may be measured with a counter if one is available, but sufficient accuracy may be obtained by listening to the signals on a general coverage receiver. A short length of wire connected to the TEST terminal on the emitter side to act as an antenna may help. Locating 2MHz at the top end of the 1·8MHz band should give no difficulty, and the 200kHz signal should be readily detectable with the receiver tuned to BBC Radio 4 long wave. The tenth harmonic of the 20kHz signal should also be detectable on Radio 4. Confirm that you are in fact listening to the tenth harmonic by tuning to 180kHz and 220kHz, corresponding to the ninth and eleventh harmonics respectively. Alternatively, measuring 20kHz should be well within the capability of even the most modest oscilloscope.

The meter shunts are 100Ω miniature preset potentiometers. They are adjusted to give full-scale deflection when 100pF, 1,000pF and 10,000pF capacitors are connected across the TEST terminals and the range switch set accordingly.

Calibration need only be carried out once for capacitance and once for inductance. The other ranges merely need a multiplying factor. The author's instrument is calibrated 0–10 for capacitance, with the range switch, SW1, marked pF × 10, pF × 100, pF × 1,000. The 0–10 and intermediate calibration points were located with the pF × 100 range using one per cent mica capacitors. Various combinations of capacitors to give 100pF, 200pF etc to 1,000pF were used. This range was chosen for calibration because suitable capacitors were available.

Calibration for inductance is almost as simple. Precision capacitors are easier to come by than precision inductors, so the inductance range may be calibrated using capacitors. Assuming that calibration is to be carried out in the middle range, 600–6,000μH, for which the oscillator frequency is 200kHz, it will be noted that the minimum value, 600μH, has almost the same reactance as a 1,000pF capacitor, and the maximum value, 6,000μH, compares with a 100pF capacitor. Thus these two inductance values are located when the capacitance scale is calibrated. Other scale points for intermediate values of inductance can be found by using a capacitor of a suitable value, eg 1,500μH at 200kHz has a reactance that is very nearly the same as the reactance of a 400pF capacitor. The inductance scale can thus be calibrated 60–6 with the range switch marked μH × 10, μH × 100, μH × 1,000. A reactance-frequency nomogram is very useful here [4]. The final scale could appear as Fig 2.

The accuracy of the instrument should be sufficient for most applications, though the range using the highest oscillator frequency may not be quite so accurate as the other two ranges when measuring inductance. This is because of the increased circuit losses at the higher frequency and because the instrument is in reality measuring impedance rather than reactance. Whilst most self-respecting capacitors have negligible inductance at these frequencies, an inductor may have significant capacitance at 2MHz.

Finally, the range of both capacitors and inductors could be increased to 0·1μF and 0·6H by adding another tuned circuit and decreasing the oscillator frequency to 2kHz. Increasing the oscillator frequency to 20MHz in order to measure capacitors of less than 10pF and inductors of less than 60μH is not feasible. Most capacitors and inductors that require measurement fall within the three ranges specified, and inductors of a few microhenrys are easily wound with the aid of charts and tables. [4].

References

[1] "A simple direct reading capacitance meter", T.H. Holbert, GM3DXJ. *Rad Com* March 1964.
[2] "Capacitance meter", "Technical Topics", *Rad Com* October 1969.
[3] "More uses for the capacitance meter", "Technical Topics", *Rad Com* January 1970.
[4] *Radio Data Reference Book*, fourth edition. RSGB Publications. □

NEW PRODUCTS

Thin edgewise meters from Sifam

Sifam Ltd, moving-coil meter and panel accessory specialists, of Torquay, Devon, are to market in the UK a range of very thin edgewise meters manufactured by General Electric, USA.

There are three sizes in the range, with case widths of 38mm, 63mm and 89mm (1·5, 2·5 and 3·5in), scaled for vertical or horizontal presentation. A significant feature of the GE design is its extreme thinness; the smallest has an overall depth of face of only 13mm (0·5in) and the two larger sizes about 17mm (0·673in).

They are, therefore, very compact and, because they can be stacked vertically or horizontally, a considerable density of meter readouts can if necessary be accommodated in a very small space.

The smallest model has a rear-access zero set and a simple spring-clip type of mounting. The two larger models have front-access zero set at end of scale, and a slide bracket form of mounting.

Standard GE meters, available ex-stock from Sifam, have a maximum sensitivity of 50μA, and scale markings can be produced to suit individual requirements. Though the company has its own range of edgewise meters, they are more traditional in styling than those now available from GE. Further information from Sifam Ltd, Woodland Road, Torquay, Devon TQ2 7AY.

LAR swl omni-match

Whether the swl has a modest receiver or the very best, it may benefit from the swl omni-match. This new design matches random wires or coaxial-fed antennas, and can give a dramatic improvement to the received signal. The omni-match is intended for receiving use only.

The frequencies covered by the unit are:

Range	Frequency	Range	Frequency
A	200–400kHz	F	3–6MHz
B	400–750kHz		6–9MHz
C	750–1,100kHz	H	9–12MHz
D	1·1–1·8MHz	I	12–20MHz
E	1·8–3·0MHz	J	20–30MHz

There is also a by-pass switch which takes the omni-match completely out of circuit and connects the antenna straight through to the receiver.

The unit is available, either direct or through dealers, price £29·95, inclusive of VAT, £2 extra if coaxial SO239 sockets are fitted. Post and packing is £1·75. Further information from LAR Modules Limited, 60 Green Road, Leeds LS6 4JP. Tel 0532 782224.

The effects of preamplifiers on receiver performance, and a review of some currently available 144MHz preamplifiers

by J. N. GANNAWAY, DPhil, G3YGF*

PART 2

THE first part of this article described some of the factors governing receiver and preamplifier performance and, in particular, explained the compromises involved in using the two together in a receiving system at 144MHz. This second part consists of reviews of a number of commercially available preamplifiers for 144MHz, and the results of these reviews should be seen in the context of the considerations outlined in the first part.

Preamplifiers tested

All those tested used field effect transistors, which are considered to have better strong signal performance than bipolar devices. The devices used are: junction fet, U310; dual-gate mosfets, second generation, 3N204, and the latest types BF960, BF981, 3SK88. The way in which the noise figures have improved through the various developments is interesting; the current best being about 1dB. All the preamplifiers tested were negative earth, except for the Burns MA1 which was fully floating.

Specifications

Various parameters have been measured for each of the preamplifiers, and the results are presented in Table 1. The results should be considered in two ways:

(1) How important is each parameter to the system in which the preamplifier will be used?

(2) If a specification is given for the parameter, does the equipment meet it?

Noise figure

Several noise figure columns are given: "claimed" and "as received" are self-explanatory. After these measurements the noise figure was measured when all the available adjustments had been set for *(a)* best noise figure, and *(b)* for maximum gain: *(a)* to see if the manufacturer had aligned the adjustments correctly, and *(b)* to see what noise figure would be obtained if they were just set for maximum noise output—as it might be by someone without any test equipment. When two adjustments are provided on the input so that the correct matching conditions can be set up, the difference in noise figure between the two conditions is quite large. When only the input tuning is adjustable, there is a much smaller difference; in principle, this is a good thing, provided that the matching components have been chosen correctly, as it makes setting-up without test equipment much easier.

Very low noise figures at vhf/uhf are very hard to achieve, and even harder to measure accurately. The difficulty of achieving them is not really conveyed by the relatively small changes of a fraction of a dB of noise figure involved. 0dB is unattainable, rather like absolute zero. Even using commercial instrumentation, noise figure measurements can be subject to quite considerable errors in both calibration and technique. These measurements were performed using the hot-cold load technique, using room temperature and liquid nitrogen, which is capable of high accuracy at low noise figures (±0·2dB, or much better depending on technique).

The point is that very low noise figures are also very hard to achieve in an actual system without a lot of careful optimization, measurement, and attention paid to many details. This is something to which few manufacturers give any guidance in their data sheets. It would be very helpful if they gave some idea of the accuracy of their measurements and claims, particularly in the case of noise figure, and also of the requirements on the rest of the system in which it is installed for the specified performance to be met. The overall noise figure achieved in the system will invariably be worse than that of which the device itself is capable.

Table 1. Results of the measurements performed on the various preamplifiers

Preamplifier	Burns MA1	Lunar PA144	Microwave Modules MMA144V	Microwave Modules MMA144V/3	muTek	SEM Sentinel	SEM Sentinel fet stnrd	Wood & Douglas 144PA2	Wood & Douglas 144PA3
Device used	3N204	U310	BF981	3SK88	3SK88	–	3SK88	3N204	BF960
Noise figure (dB)									
(a) optimum	2	1·5	1·7	1·3	1·2	2·6	1·4	1·6	1·2
(b) claimed	2·5	1·5	1·3	1·3	<1·5	1	1	–	–
(c) as received	n/a	1·5	1·8	1·3	1·4	2·6	1·4	–	–
(d) max gain	2·5	1·5	1·8	–	1·4	2·6	–	2·9	–
Gain (dB)									
(a) measured	18	10	1·6	17	14	21	0→15	16	18
(b) claimed	18	11	–	17	15	18	–	16	–
−3dB bandwidth (MHz)									
(a) measured	8·5	4	13	20	5	1·4	11	11	10
(b) claimed	–	2·5	144–148 (1dB)	10	30(−50dB) >2 <25 (−50dB)	–	–	–	–
Third-order intercept (dBm at input)									
measured	+1	+6	−1	–	−3	−15	–	−2	−3
1dB gain compression point (dBm at input)									
(a) measured	−9	−2	−10	−13	−14	−17	−12 (G = 13dB)	−14	−12
(b) claimed	–	+1	–	–	–	–	–	–	–
SWR when aligned for best noise figure									
(a) input (both measured)	1·7	2·6	2·6	3·5	9	1·2	9	7	>11
(b) output	1·9	1·3	1·9	3	2	2·5	6	1·5	3·6
Supply required	9–15V 5–12mA	12V 10mA	12·5V 80mA (relay on)	12V 18mA (relay on)	12–15V 3mA	12V 6mA	12V 3mA	12V 3mA	12V 3mA
AGC range	Gate 2 ≈18dB	–	–	–	–	–	13dB on pot	Pin diode −35dB	Pin diode −35dB
Type	pcb	boxed	boxed (obsolete)	boxed	ready-built pcb, or boxed	boxed (obsolete)	boxed	pcb	pcb
Price (incl VAT) Nov 1981	built £10.56 kit £7.94	pcb £11.50		£34.90 (rf switched)	boxed £20.38 pcb £12.40	Belling-Lee £13.22 bnc or uhf £14.95	£17.25 £19.24	built £7.35 kit £6.07	built £8.10 kit £6.95
Size (inches) excluding connectors	1·5×1·7 ×0·6	0·7×1·5 ×1·9	4·3×2·4 ×1·2	4·3×2·4 ×1·2	3·5×2·7 ×1·1	3·3×2·7 ×1·6	3·3×2·7 ×1·6	1·7×1·1 ×0·5	1·7×1·1 ×0·5

*31 High View, Pinner, Middx.

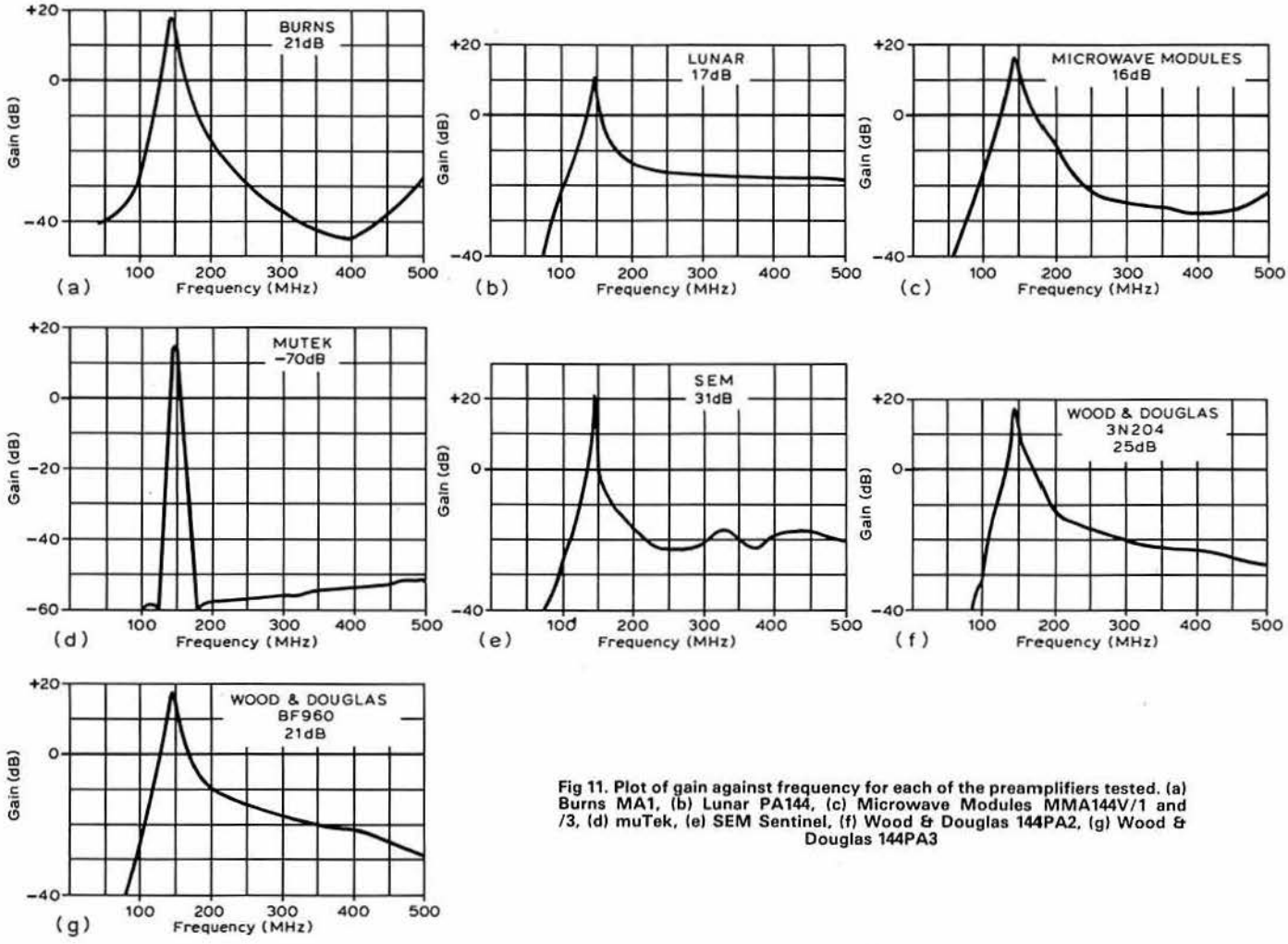


Fig 11. Plot of gain against frequency for each of the preamplifiers tested. (a) Burns MA1, (b) Lunar PA144, (c) Microwave Modules MMA144V/1 and /3, (d) muTek, (e) SEM Sentinel, (f) Wood & Douglas 144PA2, (g) Wood & Douglas 144PA3

Gain

The gains of each preamplifier are plotted against frequency in Figs 11 a-g from 4–500MHz. Their performances are all basically similar, giving moderate rejection of out-of-band signals, except for the muTek one which has a very sharp, well-defined passband, and an outstanding stopband attenuation. The relative response at a typical image frequency, around 125MHz, is given on each graph. The average value is about 20dB down. The 3dB bandwidth should be wide enough to cover the whole band without significant loss of gain or noise figure. This may not be the case with the Sentinel or the Lunar.

Third order intercept

The strong signal performance of all the preamplifiers, except perhaps the Sentinel, is going to be better than that of most of the receivers with which they are used. So while a high value for the preamplifier is desirable, variations of a few decibels between the types is not going to have much effect on the overall system performance.

1dB compression points

These all correspond to output powers from the preamplifiers of around 0dBm, and very few receivers will be usable with inputs at this level. Provided that they are in this region, small variations will not be very important.

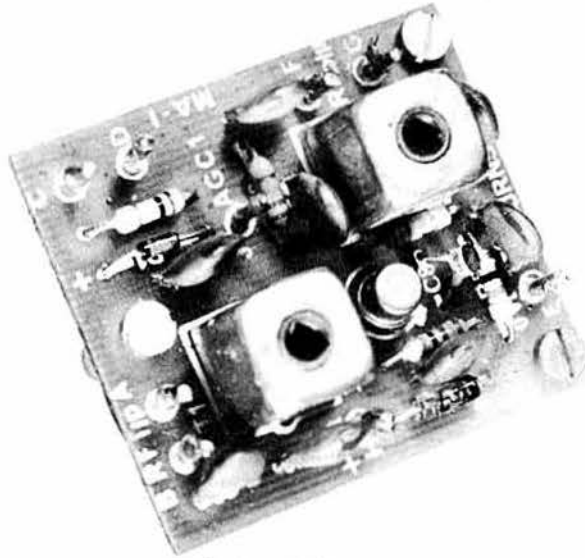
Input and output swr

These were measured for two reasons. The output should present a reasonably good swr so that the noise figure of the amplifier or receiver that follows it is not degraded by being fed from the wrong source impedance. The input swr is a useful check on other measurements, and can indicate lossy input circuitry, and whether the circuit has been gain or noise matched. A high input swr is usually unavoidable on very low noise figure amplifiers.

Report on each preamplifier tested

Burns MA1

This is an unboxed pc board, available as a kit, or made and tested. With it there is a very detailed nine-page typed instruction booklet explaining the basic operation of the preamplifier for the beginner, giving very detailed step-by-step constructional information and brief details of the alignment procedure. With information as detailed as this, the inexperienced should



The Burns MA1

have no fears of tackling the project. Construction was quite straightforward, taking about half-an-hour. The board comes complete with 6BA mounting pillars and bolts, so is very easy to install.

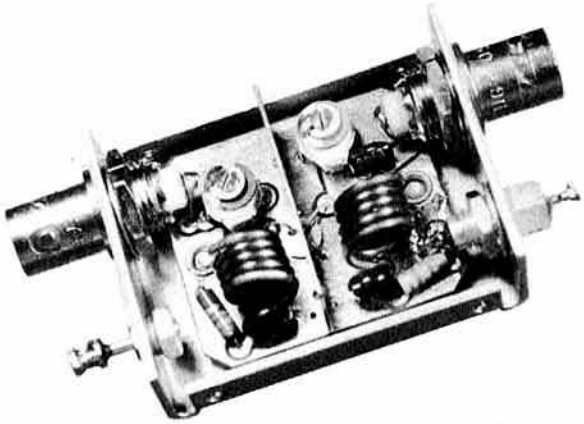
A 3N204 device is used, although a 40673 is shown on the circuit diagram, and it betters the claimed noise figure of 2·5dB. The 12V supply and both input and output link coils are fully floating, so it can be used in equipment of either earth polarity. The floating output coil could be used to feed the 12V supply down the coaxial cable. A reverse-polarity protection diode is included on the board.

Provision is made for agc to be applied to Gate 2 of the fet, giving a measured 13dB gain reduction with the agc pin at 0V. 18dB are claimed, but more attenuation could be obtained by taking the control voltage negative. It is a pity that the noise figure is not as good as the other preamplifier using the 3N204. This is probably due to the input-tuned circuit being matched for gain, instead of noise figure, or the inductor may be of low Q and hence lossy. The noise figure obtained at maximum gain could not be improved on.

Lunar PA144

This is a very compact boxed preamplifier, using bnc connectors (tnc or sma are available on special order). It uses a U310 fet in common gate mode, unlike all the others which use a common source, hence its lower gain of only 10dB. The measured noise figure was within the specification of 1·5dB, and could not be improved by the available adjustments.

The data sheet gives a brief explanation of the reasons for its relatively low gain, and instructions for peaking the output tuning capacitor which is accessible through a hole in the lid. This should not need adjustment if the preamplifier is installed in a system which is accurately 50Ω, but in practice it will probably need peaking for maximum gain. The input tuning should only be adjusted if some form of noise figure meter is available. The lid detunes both the tuned circuits significantly, so they should only be adjusted with the lid in place, through the hole provided.



The Lunar PA144

This preamplifier had very good strong signal performance, having both the highest third-order intercept and 1dB compression points. It is intended to improve reasonably sensitive receivers while maintaining a good strong signal performance, rather than to obtain the last 0·1dB of sensitivity. It will not be able to give an overall noise figure of 2dB with receivers which have noise figures above 6dB.

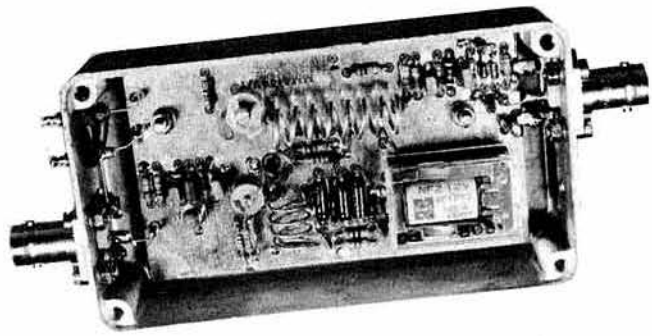
The 12V supply is fed in through a very effective filter type of feedthrough capacitor, which is 10–20dB better than the average "1,000pF feedthrough".

(The boxed version is now discontinued, but it is available boxed with rf switching at £23, or as a pcb at £11.50.)

Microwave Modules MMA144V

Two models of this preamplifier were reviewed: the MMA144V/1, and the later MMA144V/3 which incorporates some improvements. This preamplifier is built in a diecast box, with bnc connectors. The 12V supply is fed in on solder pins. It incorporates an rf-actuated relay which bypasses the preamplifier on transmit, so that it can be fitted in the antenna lead of a transceiver, or possibly at the masthead, to reduce the effect of feeder losses. If this is done, then it needs to be thoroughly waterproofed. The relay rests in the bypass state when no dc power is applied, so that the preamplifier will not be damaged by rf power, even if it is switched off.

On transmit, the insertion swr is 1·1:1, and the loss less than 0·2dB. It claims to be able to carry 100W. The relay needed at least 11V to make it



The Microwave Modules MMA144V/1

go over, and this must be borne in mind when it is used at the end of long leads, eg at the masthead, as it may not go over if the supply is a bit low.

The data sheet gives the basic specification of the preamplifier, but does not say much about the rf switching, and problems may be encountered if its operation is not fully understood. A power of greater than 0·8W was needed to switch the unit to transmit, and it returned to receive when the power fell below 70mW. These figures are for a 50Ω load on its antenna socket, but they will depend on the actual impedance that the antenna presents at the preamplifier, as it is operated by the rf voltage on the line. If the rf power falls to between these two levels, the relay oscillates between receive and transmit at about 1Hz.

The unit can therefore only be used with transmitters giving well over 2W at the preamplifier, allowing for feeder losses if it is at the masthead. It will operate quite satisfactorily on fm or a.m., as there is always a carrier present to hold the relay over. However, on ssb or cw, particularly at the lower power levels, 3–20W, the relay may clip the start and finish of words quite badly, or cut them out altogether if they do not reach the necessary power level. The time constant on the relay is quite short, a small fraction of a second, so it will not hold on during speech pauses. This problem will be less noticeable at higher power levels, 50–100W, as the background noises may hold the relay over. RF switching is really not suited to the ssb and cw modes, and it would be far better to link the switching to the ptt line in the transceiver.

In rf switched circuits there is a risk that the preamplifier may be damaged by the rf in the few milliseconds before the relay goes over. Fast-acting electronic attenuation is included, with back-to-back diodes across the input and output of the preamplifier, and these should prevent this problem, though it would be wise not to test it by applying power just below the switching level for a long period of time.

The preamplifier uses a BF981, although a 3SK88 is shown on the circuit diagram, but the claimed noise figure could not be achieved by adjusting the input tuning. This device ought to be capable of better performance than this, and it is not certain whether this is due to incorrect matching, or losses in the relay or protection circuitry.

The MMA144V/3 has a much less complicated rf sensing circuit which switched cleanly to transmit when the power exceeded 100mW, and returned to receive when the power dropped below 20mW, with a hang time of just under 1s. A connection is provided for an external ptt line, although the 1s delay still occurs when this is used. If the rf-operated changeover is used with ssb, it would be wise to use powers well in excess of the switching level to ensure reliable operation.

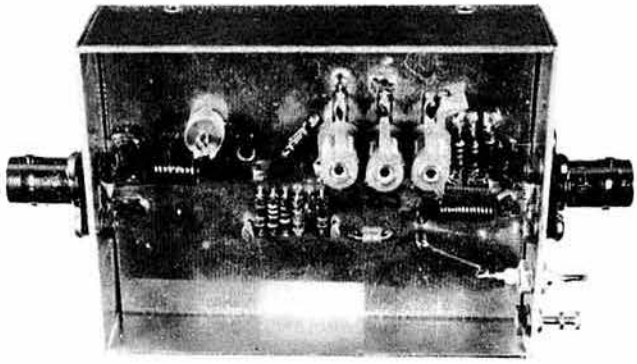
The relay now takes much less current, and will operate provided the supply is over 10V. On transmit the performance is similar to the first version, the insertion loss being 0·25dB, and the insertion swr 1·2:1. The device used is now a 3SK88, and the noise figure now meets the specification of 1·3dB. This new version seems to have solved most of the problems encountered in the first one.

muTek

This is available as a ready-built pcb, or in a box, with bnc connectors. The 12V supply enters the box via a decoupling feedthrough capacitor. It uses a 3SK88, and betters the specified noise figure of 1·5dB when tuned either for gain or best noise figure. This preamplifier had the lowest noise figure measured, at 1·2dB.

The data sheet is well written and gives a brief explanation of the effects of a preamplifier on receiver sensitivity and dynamic range, and its relevance to 144MHz.

A 2dB attenuator is built into the output of the preamplifier as standard, giving an overall gain of 14dB. The data sheet gives an explanation and graph showing the gain needed for various receiver noise



The muTek preamplifier

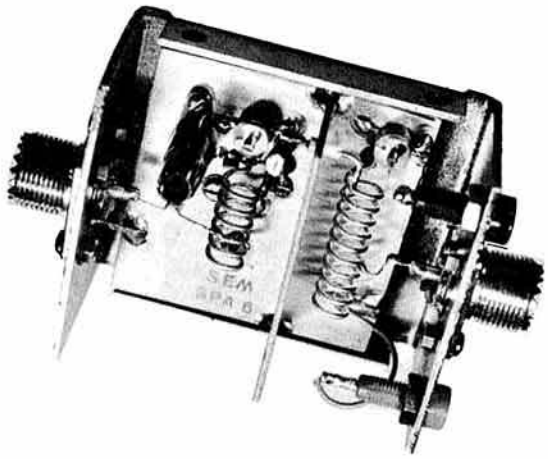
figures, along with a table of resistor values so that the attenuator can be altered to suit the gain required. It recommends that the antenna should present an swr of less than 1·3:1 to prevent it degrading the noise figure. Reverse polarity and over-voltage protection are provided, and the supply is well decoupled. By linking two pins on the board, the 12V supply can be taken from the inner of the coaxial cable.

The circuit includes a three-pole bandpass filter which gives it a very high rejection of out-of-band signals, as can be seen in the gain plot in Fig 11(d). This filter is on the output of the preamplifier, as its loss would degrade the noise figure quite badly if it were in front of the 3SK88. Consequently this filter will not prevent the 3SK88 being overloaded by out-of-band signals, but it will prevent them from reaching the receiver and causing problems there, which is the more likely cause of trouble.

SEM Sentinel

This is a boxed preamplifier, available with Belling-Lee, SO239 ("uhf") or bnc connectors. The 12V supply uses wander plug type sockets (3·5mm). The data sheet gives little information other than the circuit diagram.

The device used is a "jfet, selected for 1dB noise figure" in a neutralized common source circuit. The device type is not specified. The noise figure measured was considerably above that implied by the claim. The input circuit seemed to be of quite high Q, but the circuit was matched for optimum gain, not best noise figure. No improvement was possible using the tuning or neutralizing adjustments. This preamplifier had the lowest third-order intercept and 1dB compression points, so that, if used with higher performance receivers, the assumption that spurii generated in the preamplifier would be inaudible may not be valid.



The SEM Sentinel

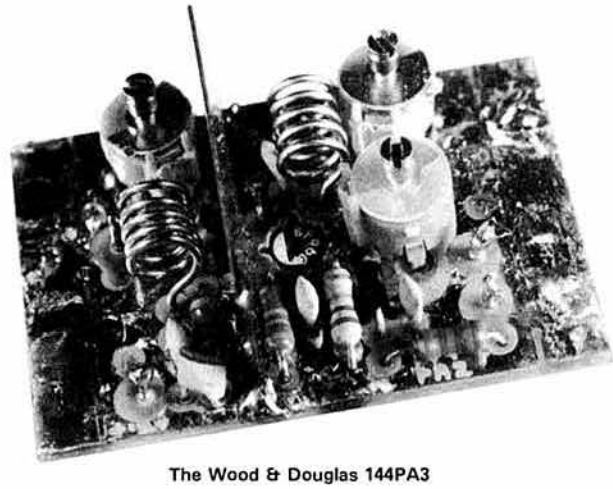
It is claimed to make the difference between "no copy and Q5". For this to be the case an improvement of some 10–15dB in signal-to-noise ratio would be needed, so the receiver noise figure would need to be well over 10dB. Receivers as bad as this are not very common. While the narrow bandwidth (1·4MHz) is beneficial for rejecting out-of-band signals, it will cause the gain to vary by about 4dB over the band.

In response to the above review, SEM supplied a more recent model which has superseded that reviewed. This uses a 3SK88 in a neutralized circuit, and improves on the noise figure of the previous version, but it still does not reach the claim of 1dB.

It has an externally accessible potentiometer for varying the gain from 0 to 15dB by altering the voltage on Gate 2 of the fet. There is some rf present on the 12V supply lines, as the wire from the 0V socket on the box forms a loop that is very near the output tuned circuit, and so couples power from it. The bandwidth is wider than the previous version, so it will now cover the whole band without any problem.

Wood & Douglas 144PA2 and PA3

This is an unboxed pc board, available either as a kit or ready-built. Brief assembly and testing instructions are given in the data sheet, but the circuit layout and parts list are a bit hard to read. (The instructions for the PA3 are now typed and quite detailed.) No problems were encountered during construction, though the board is quite small and some of the components are quite close together.



The Wood & Douglas 144PA3

No claims were made for the noise figure, and versions using the 3N204 (PA2) and the BF960 (PA3) were tested. Both gave quite good results, the BF960 giving the best noise figure measured (1·2dB), although it did show tendencies to instability, and needed the screen across the device, and was unstable with no load on its input.

A pin diode attenuator is included in the input circuit, either to protect the fet on transmit, or for use as an attenuator on receive. It has a range of about 35dB as shown below.

V	Gain reduction (measured) (dB)	Claimed
0	0	
1	20	20
1·5	25	
12	35	35

An rfc can be supplied so that the dc supply can be fed up the coaxial feeder. These are the only preamplifiers in which the input matching is fully variable, using two trimmers, so they can be set either for maximum gain or best noise figure, and can also be adjusted to give their optimum performance from source impedances other than 50Ω. This feature might be useful for 75Ω antenna systems, or when using the preamplifier straight from a mixer diode. The difference between the two is very marked in this case. The ability to adjust the matching fully is a slightly mixed blessing. Although with the right test equipment one can get the best possible noise figure; without it, it is equally possible to get it badly wrong! In the absence of test equipment, the input match will have to be adjusted for best s:n on a weak signal; with care this should get the noise figure quite close to the optimum value. The BF960 could not be set for maximum gain, as it began oscillating near that setting.

If correctly set up, they are very good value, but particular care will need to be taken in mounting the BF960 properly in a screened box to avoid instability due to stray coupling between the input and output circuits.

Acknowledgement

The reviewer would like to thank G4CNV for help with some of the measurements, and the following for supplying the preamplifiers for review: Burns Electronics, Sota Communications Systems, Microwave Modules, muTek, SEM, and Wood & Douglas. □

TECHNICAL TOPICS

Pat Hawker, G3VA

THERE is a paradox that increasingly faces those of us who wish to see the continuation of technical experimentation and at least some home-construction within the hobby of amateur radio. In any discussion about what members would like to see more of in *Radio Communication*, someone is certain to advocate strongly "more constructional articles of simple equipment". Fair enough, and the point is well taken. But if you ask those same homebrew enthusiasts what equipment they are actually using, what was their last major purchase, or what they are planning to buy next, the chances are that the answer will prove to be a factory-built transceiver or (less likely) factory-built separates or factory-built linears etc.

The complex transceiver

In recent years transceivers for both hf and vhf bands have become very convenient, very effective, yet increasingly complex: it is no longer feasible for the majority of "non-professional" amateurs to design or build (except perhaps from partly pre-assembled kits) comparable equipment. Of course you can still build some of the accessories, but nowadays almost all of the useful "extras" are built into the basic equipment.

When, in the late 'sixties and early 'seventies, the general trend towards hf and vhf transceivers really began to gain momentum, the basic block diagrams were mostly simple and straightforward—and just about within the grasp of those who had struggled through their RAEs. Newcomers were not usually advised to attempt to duplicate such designs, but at least it was reasonable to expect that they would understand how the stages functioned, what were the design features, and have some idea about how to go about checking performance and making simple adjustments and repairs.

But is this any longer true? Consider the transceivers that are currently on offer. Fig 1 shows a *simplified* block schematic of the Icom IC730 which I have chosen for no other reason than that I came across a more complex version of the diagram in a recent *Radio-REF* advertisement (few UK firms would attempt to provide even this degree of technical information in their magazine advertisements!). This solidstate fixed/mobile rig represents a "middle price" 200W p.e.p. hf transceiver with most of the facilities that amateurs are coming to expect. Although I have not counted them, I believe it contains about 71 bipolar transistors, 15 field effect transistors, 25 integrated circuits, one lsi (large scale integration) device and some 212 diodes. It has been designed with careful attention to strong signal performance (intercept point is claimed to be about +12dB, although the conditions under which this figure was obtained are not given).

I have no idea how good or bad, how reliable or unreliable this particular equipment may be; on paper it looks good but what really counts is on-air performance. The point I am trying to make is that no matter how much one

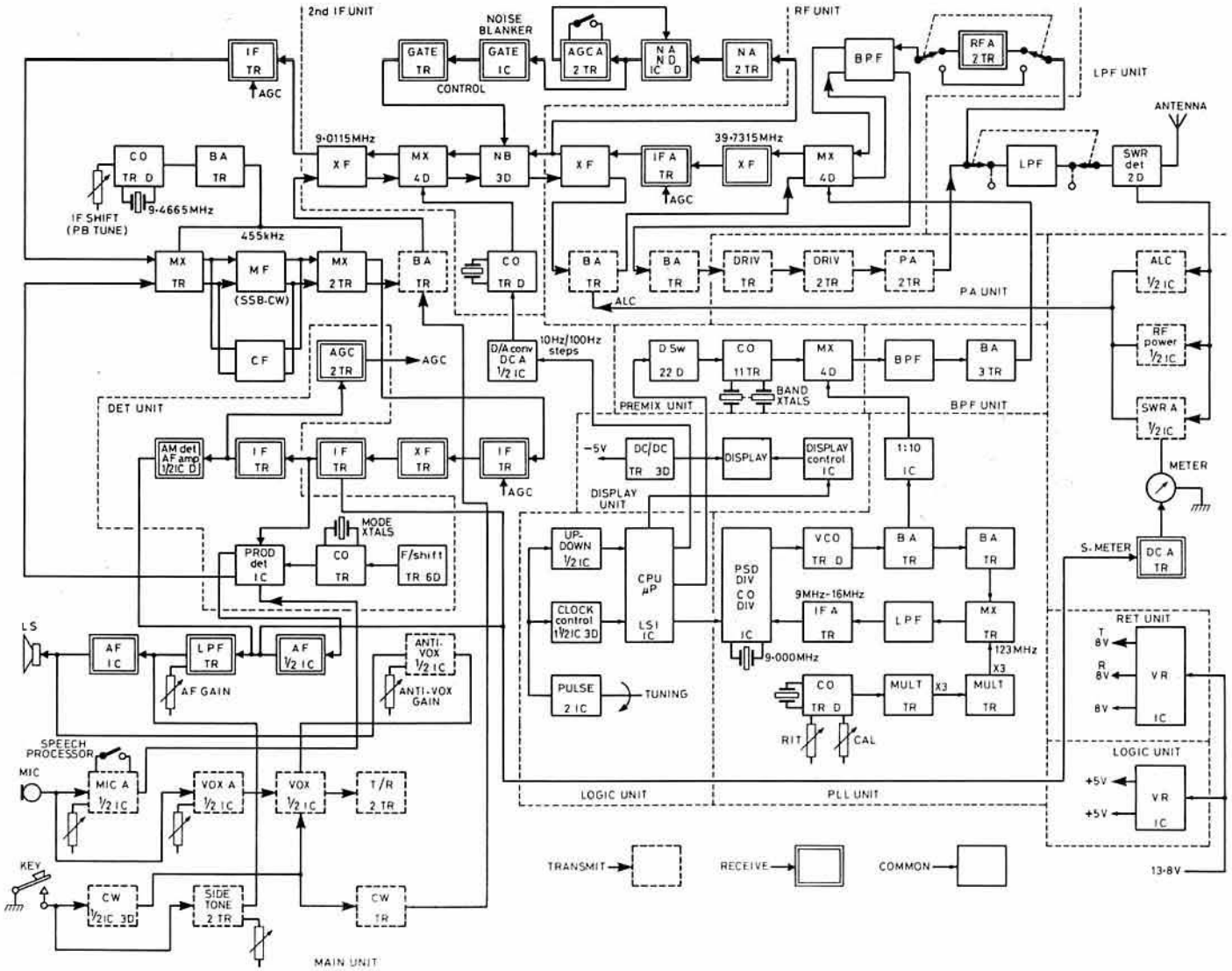


Fig. 1. "Simplified" block diagram of the Icom 730 solidstate hf transceiver showing the relative complexity of modern factory-built transceivers. This rig uses some 71 bipolar transistors, 15 field effect transistors, 25 integrated circuits, 1 large-scale-integrated circuit, and some 212 diodes. In the above simplified diagram, TR represents a transistor or fet, IC integrated circuit, D diode, MF mechanical filter, CF ceramic filter, XF crystal filter, BPF bandpass filter, LPF low-pass filter, PB passband, NB noise blanker, MX mixer. There are four "mode" crystals and 11 "band" crystals, dual vfo, memory etc

believes in the value of home-construction, it would be utterly irresponsible to suggest that newly-licensed amateurs should attempt to build equipment of this complexity in a 94 by 241 by 275mm unit. An RAE course would come nowhere near to preparing anyone to cope with such complex units. Some of our more experienced readers could cope with modifications, and some with repairs, alignment etc, but the majority of us would be ill-advised to undertake any major work on such units. Like Pandora's Box, these black boxes are not something to be lightly opened!

There is another problem. Any equipment with so many mixers and filters as the IC730, with its up-conversions and down-conversions, may be either very good or very bad, depending on the dynamic characteristics of the mixers and the filters. You cannot judge just by looking at Fig 1. With quadruple conversion the intermediate frequencies are: (1) 39·7315MHz; (2) 9·0115MHz; (3) 455kHz (including mechanical filter); (4) 9·0115MHz. Equipment of this complexity really requires careful tests with laboratory instruments even to begin to determine whether it meets its specifications, and such measurements can do little to determine its operational reliability.

As we have written before: "Amateur radio over the years has become virtually a small segment of the vast 'consumer-electronics' industry. The purchase of new equipment presents great problems to those of us who do not have access to laboratory facilities or detailed truly-independent appraisals of random samples of different models. It is becoming increasingly difficult to interpret makers' and retailers' promotional material in terms that relate meaningfully to operational performance."

It would of course be possible to build a 200W p.e.p. transceiver along much simpler lines; similarly one could still build effective cw transmitters along classic lines (although not so easy with the non-harmonically related 10, 18 and 24MHz bands). Another possibility is simple QRP equipment.

Experimenting with QRP

The low-power valve or solidstate transmitter is still something that can be built in an evening or two on the proverbial kitchen table. In *QST* (September 1981) Doug De Maw, W1FB, in one of the "basic amateur radio" series writes: "Experimenting is half the fun of amateur radio! QRP (low power) gear is great for the newcomer to this fine art . . . You've never built a piece of amateur equipment? You don't know anything about circuits, so you just operate? Well if this description fits you, at least half of the thrill of being a ham has eluded you! For many of us the greatest excitement in amateur work came from building and using that first transmitter. 'The rig here is home made'—if you haven't been able to make this statement over the air, perhaps it's time you did."

In the article, W1FB describes several very simple hf crystal-controlled QRP transmitters with rf outputs from under 50mW to about 1·5W. All these rigs are undoubtedly capable of making two-way cw contacts on 3·5 or 7MHz *in the skilled hands of QRP enthusiasts.*

But, and to my mind it is an important but, such mini-rigs are unlikely to satisfy the newly-licensed Class A amateur (and have even less to offer to Class B licensees). If I had just struggled through my 12wpm morse test and had had no on-air cw operating experience, I just do not believe that a crystal-controlled 50mW rig would prove an ideal, or satisfying, introduction to amateur radio operating, though great fun for experienced operators.

Last year, the Cornish Radio Amateur Club put together a composite "typical enthusiast" from 80 replies to 200 questionnaires sent to its members. This showed that most members used as an initial transmitter a new factory-built rig with a dipole antenna. It was only *subsequently* that they had become interested in home-construction. I believe that if a newly-licensed amateur without previous experience wishes to start out on hf cw with a home-built rig, he needs to think in terms of at least 10 to 25W. This can be done at low cost, particularly by someone prepared to use a valve power amplifier; but one has to accept that most newcomers tend to think in terms of phone operation—and have come to believe that they really need a rig with something like the complexity of Fig 1! Those of us who still advocate "kiss" (keep it simple, stupid) are in the minority.

Low-cost bench clamp

From Des Vance, GI3XZM, comes a useful note on an improvised, but effective, bench clamp for use while working on small pcb assemblies, small components etc. He writes:

"For years I have chased small boards, components and the like around the bench with a soldering iron, in the mistaken belief that a suitable, adjustable bench clamp would cost money. Only recently did it occur to me that all I need do was to bolt a large 3in traditional Bulldog paper clip to a heavy object from the junk box in such a way as to hold small objects steady and at a suitable height. In my case the heavy object is a large 8μF, 2kV paper capacitor as shown in Fig 2. Then by setting the capacitor on its side, end etc, the little workpiece can be tackled from various angles. An extension piece allows me to support a small module temporarily wired into equipment.

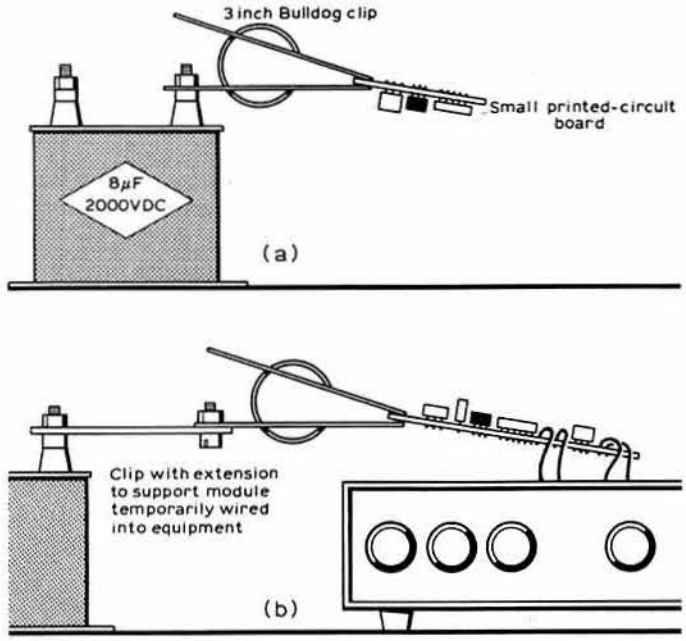


Fig 2. Low-cost bench clamp as used by Des Vance, GI3XZM, based on a 3in Bulldog paper clip fastened to a suitable heavy base. (b) An extension to the clamp allows small modules to be temporarily wired into an equipment for testing

"My 'bench clamp' is now a treasured tool. Perhaps one day I will get around to replacing the capacitor with a 4in cube of hardwood and lining the jaws of the clip with rubber inner tube so that boards could be tested 'live' with greater ease and confidence—but in the meantime the existing arrangement gives me a third hand."

"Ugly" (no pcb) construction

The August *TT* drew attention to ZL1TXB's feeling that many amateurs are put off even simple constructional projects by the belief that for good results it is necessary to go to the trouble of making a one-off printed circuit board. It would seem that ZL1TXB is by no means alone in urging constructors not to forget that it is often easier, and just as satisfactory, to use "old-fashioned" point-to-point wiring.

In *QST* (August 1981) Roger Hayward, KA7EXM, and Wes Hayward, W7ZOI, in presenting the design of "The Ugly Weekender" (a vfo-controlled 7MHz QRP solid-state transmitter with an output of about 1·5W) include some pertinent remarks on this subject, as follows:

"The largest obstacle to some builders is the circuit board layout. The use of circuit boards has become so popular over the last decade that many amateurs are afraid to attempt a project that is not accompanied by a board layout or referenced to a source where an etched board may be purchased. This is unfortunate!

"Numerous methods may be used in the construction of electronic equipment. The assumption that a design might function better if built on an etched and drilled circuit board is false.

"A virtue of 'ugly' construction is great flexibility. The builder may use the parts on hand, something that is often difficult to do with projects utilizing etched boards. The circuit may be changed with ease to facilitate experimentation. Speed is the greatest virtue of 'ugly' construction.

"Whatever is being built, it is always worth questioning the need for an etched circuit board. Construction is also simplified if extreme miniaturization is avoided."

Such sensible advice should not be taken to imply criticism of pcb techniques as such, as these have a useful role to play, but it is sometimes worth recalling that the original concept of "printing" the complex wiring of electronic equipment (first proposed by John Sargrove in 1947) was intended to reduce costs of mass-produced equipment rather than with the intention of improving the performance of one-off equipment. Indeed, apart from such specialized techniques as "stripline" or the use of double-sided boards to provide screening, the pcb has very little to recommend its use, particularly for experimental prototypes and "test-bed" units. The pcb does help manufacturers to turn out large numbers of units of similar performance, and may also help the constructor of complex units such as

complete hf receivers where point-to-point wiring can be tedious and liable to introduce errors.

It is also worth remembering that the pcb is much less suitable for valves than for semiconductors; yet there can be little doubt that valves are still incomparably more suitable than rf power transistors for home-built transmitters of more than a few watts output.

Simple speech processor

From B. S. Jones, G4ISQ, comes a simple, low-cost speech processor arrangement based on the Plessey SL1626 ic: Fig 3. Although he makes no claims to originality, G4ISQ has found that it makes an excellent system when used with both hf and vhf transmitters, introducing little audio distortion. He has used it at powers up to the full legal limit without af feedback problems, and it is readily reproducible. The unit was built on double-sided pcb with one side used as a groundplane, and can be installed in a small diecast box to form an external add-on unit capable of providing compression ratios up to some 40dB.

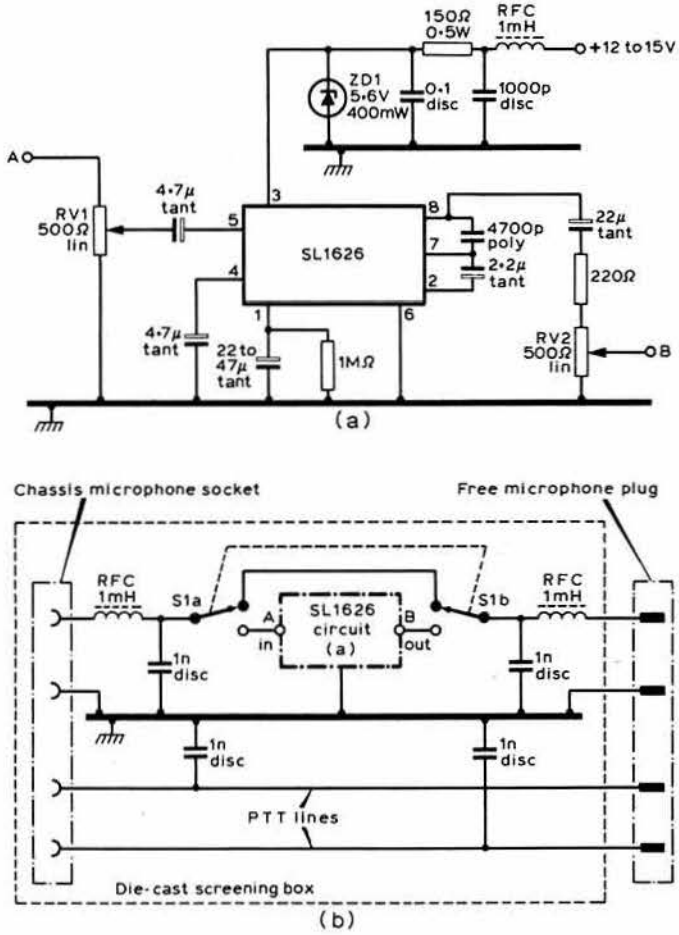


Fig 3. Low-cost speech processor based on the Plessey SL1626 and suitable for use as an external unit with hf and vhf transceivers. (b) Unit within a die-cast box with suitable rf shielding

The law of large numbers

Radio-REF (No 7, July 1981, p522) shows that by making use of a "mathematical trick" a constructor can put together a low-tolerance, precise-value component from a handful of 10 or 20 per cent components, a particularly useful dodge when you need fairly accurately matched resistors. In effect, the law of large numbers indicates that if a large number n resistors of nominally $R\Omega$ and $\pm X$ per cent tolerance are connected in parallel (or series), the result will tend towards a total resistance of R/n (or $nR\Omega$ with a tolerance of X/n per cent. While strictly this law applies only to very large numbers of resistors, the French author has carried out a number of experiments using a relatively small number of resistors, yet achieving a substantial improvement in tolerance.

For example, requiring four well-matched 600Ω, 5W resistors, he connected 12 resistors of 200Ω 2W five per cent rating in four strings of three resistors. These series strings were then carefully measured on a laboratory ohmmeter, obtaining the following results: 605·4Ω, 604·6Ω, 604·8Ω and 607·7Ω. This represents a maximum error of 1·3 per cent for one unit; with three better than one per cent; and all four matched within 0·5 per cent.

In a second example, he needed two matched 300Ω resistors. For each he connected nine resistors, each 2·7kΩ, five per cent in parallel. The result was one unit of 296·4Ω and the other 296·5Ω, representing an error of 1·2 per cent but matched to within 0·1 per cent.

Clearly in any small batch of wide-tolerance resistors, it is unlikely that these will have values spread randomly, they are likely, as in the above examples, to show a common bias; but one can obtain very accurately matched pairs in this way.

Beverage and rhombics

For those with plenty of space, long-wire antennas such as the Beverage and rhombic can still exert considerable fascination. There is also the point that for vhf and uhf the rhombic fits conveniently into an average back garden or even a loft-space. In *QST* (September 1981, p51) John S. Belrose provides some basic information on the long-wire, low Beverage antenna:

(1) For frequencies around 2MHz a Beverage antenna has *better* performance when the ground conductivity is *poor*.

(2) Gain and directivity increase with length of antenna.

(3) Gain increases with height of the antenna above ground but the difference is not large.

(4) For a 100m-long antenna only 1m above ground, the azimuthal bandwidth on about 2MHz is about 77°, vertical beamwidth about 60°, and take-off angle about 42°.

The characteristic impedance of a Beverage antenna is about 500Ω, and this is the value for both the terminating resistor and the antenna matching impedance. It should be appreciated that the main attraction of a Beverage antenna is the good signal-to-noise ratio when used as a receiving antenna; for transmission, radiation from a low Beverage will tend to be less than from a dipole.

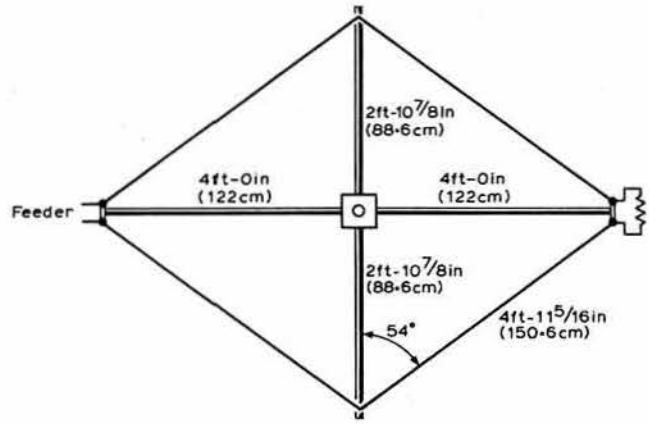


Fig. 4. N3AWE's 432MHz rhombic antenna only 8ft in overall length yet capable of gains of the order of 18dB. Terminating and input impedances about 300Ω

On uhf the dimensions of a rhombic become very attractive, and it is even possible to think in terms of a rotary system. From *Old Man* (no 9/81, p21) comes a 432MHz rhombic only 8ft overall length yet claimed to provide a gain of about 18dB: Fig 4. The design is credited to N3AWE and *CQ Magazine* of unknown date. The non-inductive terminating resistor is 300Ω, and the array can be fed directly with 300Ω balanced feeder. Without the terminating resistor, the array will be bidirectional; wattage of this resistor depends upon the duty cycle of the transmitter, but even for fm should not need to be more than about one-third of the output wattage of the transmitter, and less for low-duty-cycle transmissions.

EMP and lightning

The references in the October *TT* and recently in *QST* to the question of protecting defence communications equipment against the devastating effects of the electromagnetic pulse (emp) that would follow the explosion of a thermonuclear bomb in the upper atmosphere have generated a reaction from readers. For example, Graham Edy, G4AXD, has drawn attention to a revealing, though worrying, survey article "Electromagnetic pulses: potential crippler" by Eric J. Lemer in *IEEE Spectrum*, May 1981, pp 41-6. This carries the dramatic introduction: "Three bombs, exploded in space over the USA, could black out the nation, wipe out communications, and make computers useless." While of course every one of us hopes that such

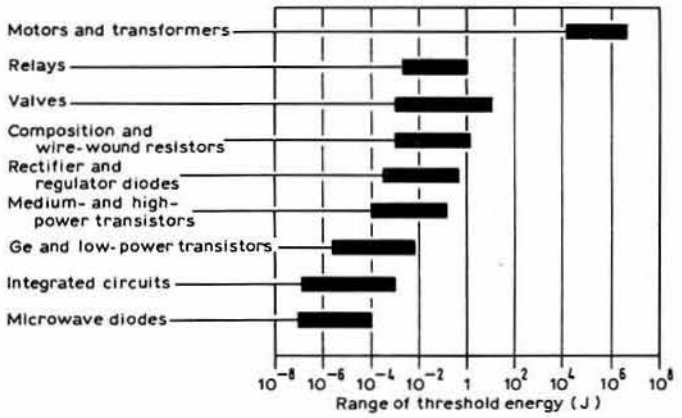


Fig 5. Relative vulnerability of different components to transient electromagnetic pulses etc. It takes 100 times more emp energy to damage valves than transistors and 10,000 times more energy to damage valves than integrated circuits, while computer memories (not shown) can be upset through memory erasure or state changes with 100 times less energy than is required to damage an ic

ideas will never be put to the test, the danger with recent nuclear weapons would appear to be that they open the way to their "limited" use: a purely emp attack might so disrupt a country that it would then fall an easy victim to "conventional" attack: the more advanced a country, the more it could be disrupted by emp alone.

From an amateur point of view, there is another reason to be interested in emp protection: such measures would provide good protection against the effects of lightning and other induced transients on semiconductor equipment. So it is worth considering what we could be up against. To quote the *Spectrum* survey:

"All nuclear explosions produce electromagnetic pulses. However, only high-altitude bursts produce pulses whose effects extend far beyond the radius of direct destruction. Because the high-altitude source region exists between 20 and 40km, and because this source region can extend many thousands of kilometres in diameter, the area of emp coverage on the ground is relatively large. Typically, the maximum effects occur at a burst height between 40 and 400km.

"At these high altitudes, gamma rays produced in the first few nanoseconds of a nuclear explosion can travel hundreds of kilometres before encountering electrons in atmospheric molecules. When they collide with these electrons, an emp of high intensity is produced that radiates to the ground over an extremely wide area. The pulses rise very rapidly, reaching a peak field in only about 10ns, then tail off in about 1μs. As a result of this sharply peaked waveform, the power of the emps is spread over a broad band of frequencies.

"EMPs may affect an area of 500 to 800km or even more in radius, depending on the height and yield of the burst. A typical one-megaton warhead can produce peak fields within this area of 50kV/m. The instantaneous peak power density over this area is very high—typically about 6MW/m^2, or 4,000 times the radiation power received on earth from the sun. However, since the pulse is of short duration, the total energy received is relatively small—about 0·6J/m^2."

Any conductor in the field of an emp acts as an antenna; the larger the antenna the more of the low-frequency energy it will pick up. For that reason overhead telecommunication or power lines form very good antennas for emp, while an mf/hf antenna would pick up more energy than a vhf/uhf array. In all this there is a clear similarity with lightning discharges: the voltages and ampereages of emp-induced currents are comparable with those of the very largest lightning bolts, but the rise times of the pulse are considerably faster.

As mentioned in the October *TT*, some components and devices are far more vulnerable than others. Fig 5 is derived from the *IEEE Spectrum* article in which it is noted that "just as vulnerability to ionizing radiation increases with biological complexity (the cockroach, for example, is 100 times more resistant than humans) so vulnerability to an emp increases with electronic complexity. It would take 100 times more emp energy to damage valves than transistors and 10,000 times more than integrated circuits. The upset of computers through memory erasure or state changes can be achieved with 100 times less energy than is required even for damage to ic devices."

Some writers have suggested that amateurs should retain unused valve equipment, keeping this disconnected from any antenna and preferably in a shielded container, which might possibly be just a wrapping of tin foil. The protection of active equipment is much the same as for surge protection against nearby lightning strikes or mains transients.

Lightning presents particular problems with solidstate equipment used in remote sites or connected to physically large antenna arrays, not only from catastrophic direct strikes or static build-up but also because of the high overvoltages it induces into telecommunications or mains power lines. Over the past decade many forms of surge protection have been developed or refined, though even today severe thunderstorms can still cause disruption to some services, particularly where good earthing systems cannot be used, possibly because of poor local earth conductivity.

While different manufacturers make strong claims for specific forms of surge protection, the telecommunications industry tends to pin its faith on carbon air-gap arrestors and two- and three-electrode gas discharge tubes; for mains-connected equipment a combination of gas tubes and solidstate metal-oxide varistors is often favoured. Even so, few would claim that the problem of solidstate susceptibility to lightning-induced transients into overhead lines or antennas, let alone emp, has been entirely overcome.

Ionospheric outlook

Those of us who depend on the ionosphere for most of our contacts have had, for many years, some misgivings that man's activities may be introducing subtle changes in those fickle layers. Why, for example, were there numbers of apparently authentic reports of long-delay echoes in the decade before 1939, yet so very few, if any, in modern times? The phenomenon of ionospheric cross-modulation and the creation of artificially enhanced layers resulting from very high power transmissions can be ascribed to increasing the temperature of free electrons, but does such radiation have any permanent effect? Then again there is the very real worry that many aerosols may eventually strip away part of our protection from high-energy ultra-violet rays, so it is not only hf operators who have some cause to worry.

There continues to be genuine concern that highpower elf and vlf transmissions, such as those used to communicate with submarines, or for the Omega navigational system, induce the precipitation of electrons from the earth's magnetosphere into the ionosphere. Such precipitation is believed to cause irregularities in the ionosphere sufficient to disrupt or degrade vlf and vhf communications. A research programme aimed at determining whether such transmissions affect the free electron content of the ionosphere, and thus have effects beyond the vlf and vhf range, is being undertaken by Lockheed under contract to the US Office of Naval Research. This includes a seep (stimulated emission of energetic particles) satellite that will carry sensors able to observe electron precipitation while a number of high-power terrestrial transmitters are keyed on and off.

Hybrid microelectronics

By now most of us have at least a nodding acquaintance with integrated circuits (including, these days, lsi "large scale integration", and vlsi "very large scale integration") and also, of course, with the use of discrete components assembled on printed circuit boards. But there is an increasingly important intermediate step, no longer considered a merely transitional stage, between the use of pcb assemblies and fully-integrated circuits. This is the so-called "hybrid technology", in which circuits are assembled as hybrid modules using "thick" or "thin" film circuits, often with special "chip" forms of discrete components. The hybrid manufacturers often buy-in standard types of ic devices in "chip carrier" form for fixing into the hybrid modules. The modules may finish up looking like large ic devices but inside may include single or multi-layers. A wide variety of enclosures and packages has been developed, some suitable for the dissipation of appreciable electrical power. Marconi, for example, have designed transmitter-receivers in hybrid form dissipating up to 100W.

Hybrid technology is already being used increasingly in large-volume consumer electronics, in power-supply regulators, fusible resistors, and in-car electronics, medical "pacemakers" and the like. There do seem to be many potential applications in amateur radio equipment, provided that hundreds or thousands of identical modules are required. Clearly the technique is *not* suitable for one-off prototype equipment, but on the other hand would be very well suited for kits or perhaps as building-block modules. For communications applications they have a useful advantage over fully integrated devices, in that, by using lasers, it is possible accurately to trim resistor values during manufacture; they can also provide significant size reduction over conventional pcb techniques.

Racal, for example, use thick-film hybrid circuit modules for a number of communications units, including lightweight man-pack transceivers incorporating frequency-hopping (spread-spectrum) based on custom lsi and thick-film hybrid circuits. Indeed, this technology seems to offer quite substantial advantages over the rival techniques, in being rather more

flexible and more suited to circuits requiring critical adjustment than the fully integrated approach. But it is not a technology for experimental "breadboard" units!

Sampling the propagation path

Some recent notes in *TT* on various propagation quirks have shown that there is still a lot of genuine interest in this subject, and that any idea that there is nothing left to find out about ionospheric oddities is very far from the truth. But propagation research, if it is to be rewarding, does call for patience and for the ability to record and study (and to *think* about) masses of data. From Professor Martin Harrison, G3USF, comes a useful suggestion on the first of these problems. He writes:

"Quite a number of amateurs are interested in watching the performance of one or other propagation path, and the proliferation of vhf and hf beacons has greatly increased the possibilities of doing so on a consistent and objective basis. But how to go beyond the stage of periodically 'checking the beacon' to more systematic observations? Often pen recording will be the simplest and most effective technique, though at the higher chart speeds you can soon run up a hefty stationery bill. And many of the recorders most likely to be available to amateurs on the secondhand market do not cope all that well with low-level signals in QRN and QRM. As my own interest is in discovering whether 28MHz paths are go/no-go, rather than in monitoring relative signal strengths, I have employed audio recording. This is more time consuming but presents fewer ambiguities of signal identification. But as recorders have a limited time capacity I sample rather than record continuously.

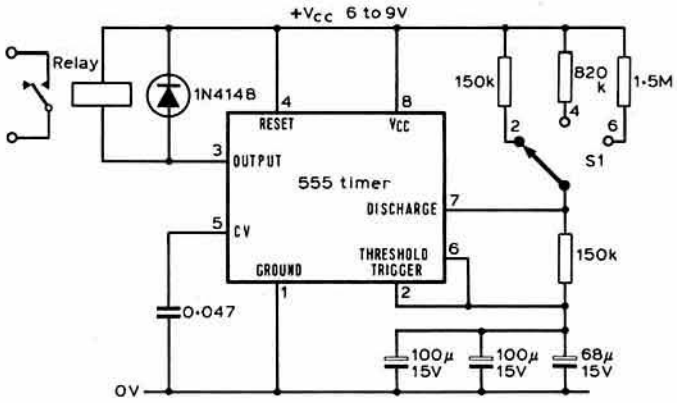


Fig 6. The 2-4-6 minute timer used by G3USF to start and stop the sampling of 28MHz beacon transmissions

"The very simple device, employing that old *TT* standby the 555 timer, is inserted in the external microphone socket of the recorder to start and stop recording. As Fig 6 shows, the 555 opens and closes the relay at intervals determined according to the resistance values selected. Those employed here provide a constant 'on' period of about 30s and three switchable 'off' periods to give cycles of approximately 2, 4 and 6min. A wider range of cycles can be built in, up to the number of positions available on the switch. On the other hand, should an invariable cycle be more suited to the needs of the situation, the switch can obviously be dispensed with. This system has been in use for more than five years in conjunction with a Sony TC800B domestic open-reel recorder. This is ideal for such work because—with the cycle lengths selected—I can cover some 70h of real time on a 1,200ft tape, thanks to its 15/16ths in/s recording speed. Subsequently I can play back at 3·75 in/s timing against a stop watch. While the Sony has, sadly, long since been off the market, this system ought to work with any open reel or cassette recorder where start/stop can be controlled by switching from the 'external mic' socket."

Surface acoustic wave devices

On several occasions mention has been made of surface acoustic wave (saw) devices. These seem set to become very valuable additions to the components available for radio communications equipment having potentially important applications in oscillators, bandpass filters and as delay lines.

In *Electronics* (8 September 1981) R. J. Murray and P. D. White, of Philips Research Laboratories, survey how these devices work and how they can be used. In practice, most amateurs will tend to think of them rather like quartz crystals that can work at much higher frequencies. For example, they can provide resonators for oscillators of good frequency stability and having fundamental frequencies in, say, the 144 or 432MHz band, so eliminating frequency multiplier chains or overtone circuits etc, and reducing the number of spurious frequencies.

The authors quote a typical saw oscillator working on 400MHz as having a long-term stability of better than three parts in a million per year, with short term stability of the order of one part in 10^9over periods less than 10s. Frequency variation with temperature is small and can, if necessary, be improved by various temperature compensation techniques. Spectral purity (ie low-noise sidebands) is good, with a typical noise figure at 400MHz of -140dB/Hz at 10kHz from carrier. By using a voltage-controlled element such as a varactor, the oscillator can be frequency modulated. In theory, saw resonators could be produced with fundamental frequencies up to or even beyond 1·5GHz, although at present 500MHz is more practicable.

Although such saw resonators could be used to form bandpass filters in the classic configurations of crystal filters, the insertion losses would tend to be high, and the more usual arrangement is the transversal filter, such as those already finding application as i.f. filters in television receivers. These eliminate any need for alignment (rather like the ceramic filters commonly used in the i.f. stages of broadcast radio receivers). Insertion loss of transversal filters tends to be 15 to 25dB.

It would be as vhf/uhf oscillator resonators that saw devices would seem to have most immediate application to amateur radio; however, what the amateur needs is the ability to specify a required "one-off" frequency at relatively low cost, as can be done with hf quartz crystals. Since the devices are made using standard photolithographic techniques, this may present some difficulties (one wonders if frequency trimming during manufacture would be possible using laser techniques); yet clearly these are devices which could have a big future.

Cable and 144MHz

In the October *TT*, I referred briefly (p930) to a problem reported by an American amateur: tvi and reverse-tvi (ivt) on 144MHz in areas where wideband cable distribution of television channels include frequencies within the 144MHz band. In doing so I added the comment that fortunately this does not seem to be a problem in the UK. Unhappily it now appears that this may not always be the case. Shaun Shannel, G3ZSU, warns that translated 625-line wideband tv cable systems in the UK do provide for the use of 144MHz as a standard distribution frequency. He writes:

"The systems concerned are those that use a pilot carrier on a frequency of 159·625MHz. In these systems the maximum number of channels that can be carried at present is seven. The vhf carrier frequencies are: 144, 176, 192, 208, 224, 240 and 256MHz. Translation to the uhf television channels is achieved by mixing these vhf frequencies into Band 4 by adding twice the 159MHz pilot to 176, 208, 224, 240 and 256MHz to produce uhf channels 26, 28, 30, 32 and 34. By adding three times the 159MHz pilot (= 478·625MHz) to 144 and 192MHz, output is achieved in Band 5 at channels 40 and 44 respectively.

"I understand that in most of these cable systems the 144MHz 'slot' is not at present in use, but, in view of the fact that it is a standard frequency, amateurs in the UK may begin soon to experience the same problems as our American counterparts are apparently already experiencing.

"This is partly because of the extra channels that will be used when the new Channel 4 programmes begin about November 1982, and partly because even before then extra channels are being used in a number of 'subscription' television experiments in the UK; there is also the possibility that cable tv companies may begin to distribute additional channels picked up from distribution or direct broadcast satellites.

"It seems rather ironic that most of the frequencies used in these cable systems are at present 'lined up' within television Band 3 and/or fairly clear of other services such as the private mobile radio allocations, yet right in the middle of the amateur segment—with all the problems that brings in residential areas!"

Tips and topics

M. Simmonds, WA3WAS, in *QST*'s "Hinks & Kinks" column recommends a liberal coating of motorcycle chain oil for the protection of the winch, pulley and cables of crank-up towers, etc. "Spray all moving surfaces when the tower is down; then when you crank the tower up, spray the cable as it is wound on to the winch."

Earl P. Anderson, WD9DID, similarly recommends speedometer cable grease as a suitable lubrication for slow-turning rotators, since it maintains viscosity at low temperatures down to well below zero Fahrenheit.

Tip by A. Williams in *Electronics Australia:* "Place a dab of clear lacquer on the top of integrated circuit devices and transistors etc to protect the identification lettering and prevent it rubbing off." □

MICROWAVES

Charles Suckling, G3WDG*

Africa active on 1·3GHz eme

The continent of Africa is now active on 1·3GHz eme for the first time, represented by Peter Carey, ZE5JJ. After many years of 432MHz operation he recently completed his equipment for 1·3GHz, which consists of a 0·5dB noise figure preamp using a Plessey GAT6 gasfet, a two-valve power amplifier, which delivers 70–80W, and a 32ft diameter homebuilt dish with a W2IMU circularly-polarized feedhorn. The elevation/azimuth readout system of the dish is unique—it uses homemade shaft encoders (11-level Gray code) to provide 0·2–0·3° readout accuracy—vital since the beamwidth of the dish at 1·3GHz is only about 1°! Cable losses on transmit are minimized by mounting the pa stage at the dish.

ZE5JJ's first contact was on 13 September with G3WDG. This was not only his first eme QSO on 1·3GHz, but also his first QSO ever on the band, since there are no other stations active in Zimbabwe on 1·3GHz. Unfortunately it was not possible for ZE5JJ to be active during the September skeds weekend due to a transmitter problem, but he was on in October, and worked VE7BBG, G3LTF, SM6CKU and PA0SSB.

Peter has also taken the opportunity to do some radio astronomy on 1·3GHz, using a special 1MHz bandwidth 30MHz receiver/detector built by G4CNV, to provide clear indications of small changes in noise levels. So far he has observed 0·4dB moon noise, 1·2dB from Cassiopeia A and 1·1dB from Cygnus A. The ground noise to cold sky ratio with the dish is 6dB.

As yet there are no stations active in Asia or South America on 1·3GHz eme, so it will still be some time before the first 1·3GHz WAC is made!

Modifications to the WA9HUV 2·3GHz power amplifier

A 2C39 power amplifier capable of providing 30W output on 2·3GHz was described by WA9HUV in *Ham Radio* (February 1975). G3ZEZ has modified the input and output couplings to make them adjustable, which he has found improves the performance considerably. Details of the modified couplings are shown in Fig 1. These were made by turning and drilling a piece of brass rod off-centre in a four-jaw chuck.

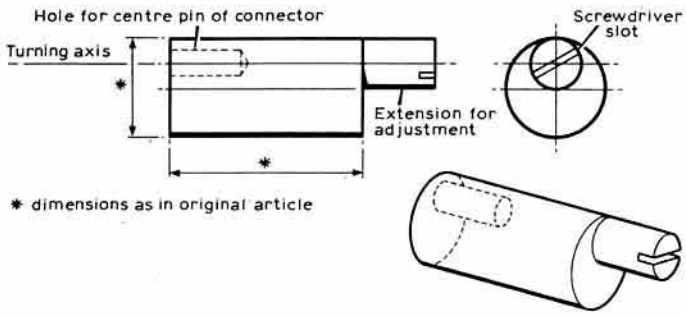


Fig 1. Modified input and output couplings for WA9HUV 2·3GHz power amplifier

Increasing the tuning range of the IC202

Recently, after installing a new beacon-band crystal in the writer's IC202, it was found that, before alignment as per the IC202 handbook, the tuning range was considerably in excess of the normal 200kHz.

Following some recent frustrating experiences on 5·7GHz where stations were not operating within the normal tuning range of G4KGC's IC202 "prime mover", she decided to find out just how large a tuning range could be achieved on one crystal position. A 144·8–145·0MHz range crystal was fitted to auxiliary crystal socket "B", and the appropriate coil former and two associated trimmers (see IC202 manual for details) were adjusted for maximum tuning range using a frequency counter. A general-coverage 144MHz transceiver could equally be used to monitor the frequency. Considerably over 1MHz was obtained, and it was decided to set the coverage to 143·8–144·8MHz to cover the cases of stations being either below or above the normal 144·0–144·4MHz range. However, it was not possible to linearize the tuning over this wide range, and a calibration graph had to be drawn.

In use, the "wide tuning" range seems to be perfectly stable with no sign of fm or chirp on ssb or cw when transmitting. The tuning rate is of course much faster than normal, and care must be taken when looking for weak signals. This modification would seem to be particularly worthwhile for anyone using the IC202 as a microwave "prime mover", especially when going out for the first time with narrowband equipment when frequency calibration may be somewhat uncertain!

Chain noise figure calculations

Very often one wishes to calculate what noise figure a receiver will possess given various known factors, eg preamplifier noise figure and gain, second stage noise figure and gain, third stage noise figure, the cable losses between the various stages, etc. Angus Mackenzie, G3OSS, has developed a program for the HP85 computer for such calculations. It is then very easy to see which part of the system is the weak link if extra gain is needed or whether the gain needs to be distributed differently, and so on.

Anyone interested in receiving a listing of this very useful program can obtain one from the writer by sending an sae.

Other 1·3GHz eme news

The other main news on the 1·3GHz eme scene is the recent successful first-ever eme QSO (on any band) by a station using all solid-state equipment. The contact was between WA2FGK and G3LTF, and followed a CQ call by the latter station. The transmitter at WA2FGK was developed by WA2FGK and K2TKN and used a pair of MSC bipolar transistors in the pa, delivering over 160W of rf! The transistors are intended for long-pulse operation in L-Band radar applications. The remainder of the equipment was the normal K2UYH eme system (28ft dish). Apparently WA2FGK and K2TKN are working on a four-transistor amplifier which should produce over 300W output. Perhaps the days are numbered for multiple 2C39 amplifiers for eme!

G3LTF has been exploring the potential of ssb communication on 1·3GHz eme, following the successful completion of his homebuilt six-valve amplifier using 2C39s. He has recently made two-way contacts with several stations, as well as hearing his own echoes Q5! It appears that the stronger signals available on 1·3GHz do allow genuine conversational ssb eme QSOs to be made, which is not often the case on the lower frequencies.

G3WDG and G4KGC are now operational again on 1·3GHz eme after approximately six months enforced QRT following the dismantling of the 20ft dish at Oxford, the site of which was required for other uses by the university. Unfortunately their home QTH does not possess a very large garden, and the maximum size of antenna which could be accommodated was a 13ft dish. It was hoped that the 3·5dB lower gain of the new dish would not prove to be too disastrous on 1·3GHz, where there tends to be more signal in hand than on 432MHz. The results so far have agreed: using G4CNV's UPX4 amplifier, contacts have been made to date with DJ4AU, G3LTF, PA0SSB and ZE5JJ, and a number of other stations have been copied at good strength. Echoes can be heard reliably whenever the moon is available.

A feature of the new installation is that the dish-mounting structure is hinged at ground level so that when the dish is not in use it lies on its back. Apart from then being relatively invisible, the dish is also safe from bad weather. It takes only about 20min to push the dish into operating position and install the feed to become fully operational.

Another station making a reappearance on 1·3GHz eme was SM6CKU, who has recently repaired his 8m dish, which is now in excellent shape. With only 25W at the feed, he recently made QSOs with PA0SSB, G3LTF, DJ4AU, ZE5JJ and VE7BBG in one morning! His own echoes were copied consistently, and were even detectable on ssb. SM6CKU also copied G3WDG calling CQ, but we could just not identify his callsign. The main problem at SM6CKU is the high feeder loss (6dB), which he hopes to overcome by mounting the pa at the dish. □

*46 Windsor Close, Towcester, Northants

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John Morris, G4ANB*

Amateurs all over the world were saddened by the news of the death of Roy Stevens, G2BVN. VHF enthusiasts have as much to thank him for as any other group, and his boundless enthusiasm and dedication will be greatly missed. Perhaps the greatest tribute we can pay to G2BVN is to give our whole-hearted support to his ideals of co-operation and fellowship between all the amateurs of the world.

70MHz band reduced

The Home Office has announced that on 1 January 1982 the upper limit of the 70MHz band, which is allocated for amateur use "until further notice", will be lowered from 70·7 to 70·5MHz. The lower limit will remain unchanged at 70·025MHz. While 70MHz continues to grow in popularity, it is by no means as crowded as many of the other bands, and so the loss of 200kHz, although very regrettable from an amateur point of view, should not be disastrous.

Examination of the current 70MHz band plan (*Rad Com* January 1981, p50) reveals the part of the band to be lost as being occupied by part of fm, all-mode (including rtty calling), and beacon sub-bands. At a meeting held a few days after the Home Office announcement, the VHF Committee agreed a new, provisional 70MHz band plan, shown in Table 1, to take effect from 1 January 1982.

Table 1. UK 70MHz BAND PLAN (from 1 January 1982)

70·025		
Beacons only		
70·075		
CW only		
70·150		
SSB and cw only	70·200	SSB calling frequency
70·260		
All modes	70·260	National mobile calling frequency
	70·300	RTTY calling frequency
	70·350–70·400	Raynet
70·400		
FM simplex only	70·450	FM calling frequency
70·500		

Frequencies above 70·500 not allocated to amateur use from 1 January 1982

Frequencies between 70·025 and 70·075MHz are rarely used, even during contests, and so 70·025 to 70·075MHz will become the beacon sub-band. Arrangements are being made to move the four operational or proposed UK 70MHz beacons, GB3ANG, GB3CTC, GB3SU and GB3SX, to this part of the band. Exact frequency details will be given when they become available.

The section 70·075 to 70·150MHz will remain cw only. This part of the band is also used by the two 70MHz dx beacons, ZB2VHF (70·120MHz, XW64g) and 5B4CY (70·113MHz, QU51b). No moves for these beacons are suggested, as their frequencies were selected to be clear of eastern European broadcast interference, and both transmitters are themselves used for contacts when conditions permit.

The ssb/cw segment will be unchanged, as will the ssb calling frequency, 70·200MHz, and the revered national mobile calling frequency, 70·260MHz. The all-mode section will be trimmed at the top, becoming 70·260 to 70·400MHz, and will take in the new rtty calling frequency, 70·300MHz. The Raynet allocation, 70·350 to 70·400MHz, will be unaffected.

The top 100kHz of the contracted band will be allocated to fm simplex, giving room for three 25kHz channels, including a calling frequency in the middle on 70·450MHz.

*24 Collett Way, Grove, Wantage, Oxon OX12 0NT.

Although these changes do not come into effect officially until the new year, there is no reason why they should not be adopted at once, as any transmission which follows the constraints of the new band plan would also be acceptable under the old. The 70MHz beacons in particular are almost certain to move before the end of the year; although beacon keepers give dedicated (and often poorly acknowledged) service, it would be a bit much to ask them to break off their Hogmanay celebrations at the stroke of midnight to change a crystal.

Any comments on the new band plan may be sent to G4ANB, and will be forwarded to the VHF Committee. Remember, from 1 January 1982 any amateur use of frequencies between 70·500 and 70·700MHz will be *illegal*.

Aurora

There were a few small auroral openings on 144MHz during early October. G8LFB (ZL30f) heard a weak event at 1440–1710gmt on 11 October. The activity was mainly at the cw end of the band and confined to Scotland. On ssb GM3SNO (YR59g) was heard at 5/1, but could not be raised for a contact. For GM4IHJ in Fife the event was only apparent from 1630 to 1720gmt. G8LFB heard a weak, Scottish-type aurora on 14 October.

GM4IHJ in Fife had his 50MHz listening activities disrupted by strong auroral events on 20 and 22 October. The first of these started at about 1300gmt and carried on intermittently until the late evening. GM4IHJ heard stations from Norway down to northern France on 144MHz, and also saw a superb visual display. The 22 October event was even better, starting at 1245gmt, and GM4IHJ worked French stations as far down as BI locator square.

Reports are still coming in about dx worked during the massive aurora of 25 July. These will all be forwarded to the Propagation Studies Committee of the RSGB, but a couple of contacts are worth noting even at this late date. The club callsign F6KBF will be familiar to many operators. During the aurora, at 1450gmt, F6KBF (B101j) worked YO2IS (KF17e) for what is thought to be the first F-YO auroral contact on 144MHz. Altogether F6KBF worked 13 countries during the opening, the antenna beaming northeast throughout. On 432MHz, G3LTF in Essex made auroral contacts with DL7HR (FI square), DL7QY (FJ), DF1OH (EM), F6CER (BJ), DJ9DL (DL), DF3XU (FN) and DJ6MB (DK).

50MHz

The 50MHz band opened on the north–south path on 20 September with several ZS6 stations having been heard. This was some weeks earlier than the start of 50MHz openings last autumn. Shortly after the South African opening the ZB2VHF beacons on 50 and 70MHz were heard in the UK. Another 50MHz opening occurred on 27 October at 0725gmt, when crossband 28–50MHz contacts with ZS3E were made by HB9BZ, G3WBQ and G5KW.

There were high mufs again on 3–4 October, and on 4 October 50MHz opened for those in the south of England. At 1648gmt G4IDE in Wolverhampton positively identified 50MHz signals from ZD8TC on Ascension Is. ZD8TC was worked by G5KW at about 1705gmt (the first G–ZD8 crossband?) and by G4IDE at 1710gmt. ZD8TC had apparently been trying to get his 50MHz signals into the UK for over a year, and was delighted by his eventual success.

The first report of the season of transatlantic 50MHz signals came from G4BPY, who heard the FY7THF beacon at 1239gmt on 7 October. The first crossband contacts took place on 13 October. G4HUP has reported GJ3YHU as being the first with a contact with VE1AVX at 1315gmt. WA1EKV made 28–50MHz crossband contacts with four UK stations, including GB3CTS, operated by G4HUP, at 1328gmt. Two Midlands operators, G4HUP and G4IDE, commented on the difference in strength of 50MHz transatlantic signals across the UK, southern stations apparently enjoying an advantage. However, on 18 October G4IDE completed crossband contacts with VP2VGR, KV2FZ, VE1BPY, KA1PE, AF1T and EL2AV between 1130 and 1420gmt.

On the Isles of Scilly G5KW is nearing the end of his stay, being due to return to the mainland in mid-December; although he hopes to make another trip in January–March 1982 if permission can be obtained. On 28–50MHz G5KW added three new countries to his bag during October, bringing his total to 27. The stations worked were ZD8TC on 4 October, HI8DAF on 14 October, and K2QIE/8P6 on 21 October. The G5KW–HI8DAF contact is thought to be yet another crossband "first". HI8DAF was also heard by GM4IHJ on 16 October.

RSGB member VK6RO is very interested in dx working on 52MHz (amateurs in Australia are only allocated the band 52–54MHz) and in September drove 2,000km to the northwest of Australia to work JA stations on the band. During 12 days, and from several sites, he worked a total of 434

JA stations; 233 on ssb, 47 on cw, 89 on a.m., and 65 on fm, some with only 1W to a λ/4 whip on the car roof. In general the muf would stay below 43–45MHz during the day, but rise rapidly at sunset. TV from Malaya was very strong on 53·750MHz, and fm carriers were heard on 50·540, 50·550 and 50·642MHz nearly every night—as was an fm broadcast station on 52·600MHz, apparently coming from China. Since October 1979 VK6RO has made *mobile* 52MHz contacts with 754 JA stations, KG6DX and HL2JD; and has heard H44, P29 and ZS2. On the subject of 52MHz operating, VK6RO commented: "You may have heard a JA pile-up on ssb, but you haven't heard anything until you hear a pile-up on a.m.. The capture effect on an fm pile-up was remarkable to listen to, with signals at 5/9+ coming in."

Amateur television

Over 500 visitors attended the BATC atv exhibition in Leicester on 4 October. Among the many attractions were GW3JGA and GW8PBX demonstrating their "Golf Whiskey colour fiddle box" and receiving live colour pictures from G3FDE/M in the car park. The Narrow Band Television Association had an excellent working display which created a lot of interest. Pictures were transmitted at 12·5 frames/s and the video bandwidth was a mere 7kHz. The most striking feature was that, unlike sstv, moving pictures were displayed. The BATC stand enrolled a healthy number of new members and sold out of just about everything on display. The new *Amateur Television Handbook* is also reported to be going well, with over three-quarters of the original print-run having been sold already.

A view of the outside trade area (*Photo:* G3XKX)

Receiving atv pictures has never been easier, thanks to the introduction of atv converters by two manufacturers. The TVC 435/40 made by Fortop Ltd, and MMC435/600 from Microwave Modules, both convert signals in the 430–440MHz range up to around 600MHz, in the Band 4 uhf tv broadcast band. By attaching a normal 432MHz antenna to the converter input, and feeding its output to a standard uhf tv receiver, atv signals can be received. This approach is reported to give much better results than modifying a standard receiver to tune down to 432MHz. Both units retail for around £25–30. Fortop Ltd also supply a down-converter to allow 1,296MHz atv to be viewed on a broadcast set.

Repeater news

GB3KL (RB4, Kings Lynn), GB3LS (RB2, Lincoln), GB3NX (RB2, Crawley, Sussex) and GB3SR (R3, Brighton) were all reported to be temporarily off the air during late October. GB3NA (R3, Barnsley) is operational again. Site changes are pending for GB3SY (RB6, Barnsley) and GB3TR (R2, Torquay), the latter being off the air until the move is made. A proposal has been submitted to the Home Office for GB3LH (RB4, Shrewsbury) to change channel to RB15. The proposed channel for GB3HA (Hornsea, Humberside) has been changed again, this time from RB15 back to RB6.

The Repeater Working Group has received proposals for two new vhf repeaters. GB3PA (Paisley) has been provisionally allocated to Ch R1, and GB3OC (Orkney) will probably be submitted for either Ch R2 or Ch R5. Following the closure of GB3WS, a small group of amateurs in Bury St Edmunds has expressed interest in taking over the licence, and is reported to have found a good site.

A proposal has been received for a separate 10GHz input to GB3IW (RB4, Isle of Wight). This idea is currently under discussion. One point which must be given careful consideration is how to arbitrate between simultaneous inputs on 434MHz and 10GHz.

An error in the RSGB computerized repeater list caused G8YAL to be shown as the "contact" for GB3YL (RB14, Lowestoft) in the table published in October. In fact this function is performed by G8TAD, while G8YAL is the "contact" for GB3NB (R1, Wymondham, Norfolk).

Beacon news

In early October GB3VHF (144·925MHz, AL52j) was noticed to be off-frequency, and was temporarily closed down for investigation. The problem turned out to be failure of the temperature sensing element in the crystal oven, and has now been cured. Early in 1982 the antennas of both GB3VHF and the co-sited uhf repeater GB3NK (RB4, Wrotham, Kent) are due to be moved to a new tower, about 100m from the present location. Before this happens the Radio London broadcast transmitters will be moved from Wrotham to Crystal Palace, making two long lengths of very low-loss coaxial cable redundant, and it is hoped to use these for GB3VHF and GB3NK. While GB3VHF was off the air for repairs, the opportunity was taken to re-program the keyer memory. The impending move represents a change of a few seconds of arc in latitude and longitude, and the rtty message sent at intervals by GB3VHF has been suitably amended. At the suggestion of BARTG, "RYRYRY" will also be sent at the start of each rtty sequence.

G3XC has kindly volunteered to take over as beacon keeper for the Cornish vhf beacon, GB3CTC (144·915MHz). A new site at Hensbarrow Down has been found, and negotiations for its use are in hand. A licence and hardware for a 70MHz GB3CTC beacon have been available for some time, and G3XC is willing to bring this unit on the air from the same location. Details of the 70MHz beacon frequency, and dates on which the 70 and 144MHz units are due to come on the air, will be given in *4-2-70* and on GB2RS as soon as they are finalized.

The GB3ANG 70MHz beacon (70·690MHz, YQ35c) did not come on the air during September as had been hoped, but is expected to be operational soon, although the changes in the 70MHz band will of course mean the selection of a different frequency.

Awards

The 4-2-70 Squares Awards system was introduced at the beginning of 1979. Within four months John Hunter, G3IMV, of Bletchley, had amassed enough cards on 144MHz to be able to claim certificate No 1 on this band.

Two-and-a-half years later he had worked no fewer than 264 squares and 44 countries on 144MHz, and in spite of the notorious difficulty of getting QSL cards back with any speed, he was able to provide the vhf awards manager with evidence of contacts with 206 squares and 37 countries. This came in the form of a packet of 65 photocopies of the cards plus a meticulously-ordered five-page checksheet itemizing the squares worked in alphabetical order. It should be mentioned that this method of submitting a claim is quite acceptable and obviates the need to part with those precious pieces of pasteboard. In the G3IMV case, many of the cards carried relevant information on both sides, and in these cases G3IMV was careful to ensure that both sides were photocopied. This is a point which other claimants who use the photocopy technique should observe.

Analysis of the claim, which puts G3IMV way ahead as "top operator" on 144MHz, shows that 84 of the contacts were via tropo, 81 by ms, 20 by Es, and the remaining 21 by auroral propagation. Browsing through the checklog, G5UM noted that 125 of the contacts were made using cw, 80 using ssb, and just one on fm—a Spanish station under Es conditions.

The future of atv on 432MHz

Judging from letters received by the vhf manager, the VHF Committee, BATC, and even AMSAT-UK, many atv enthusiasts are under the impression that their favourite mode is to be "removed" from the 432MHz band. This is not so.

Much of the correspondence stems from the fear that the future Phase 3 satellites, using the WARC allocated 435–438MHz sub-band, will "take over" the top of the band, leaving no room for atv. This fear pre-supposes the impossibility of atv and satellites operating on the same frequency; but is this necessarily the case? The following is part of a statement issued by AMSAT-UK earlier this year:

"It should be realized that at the present time 70cm satellite operators, atv operators, and other specific groups do co-exist with apparently no mutual interference.

"Communication between atv stations invariably employs rotary beam arrays, with little pick-up in the undesired directions. The pick-up of a Yagi array from a satellite of the Phase 3 series is expected to be very low. The received field strength from these satellites, paticularly at apogee, should cause few problems. Also, atv arrays are predominantly horizontal; Phase 3 satellite arrays, in all probability, will have to be accurately aligned in elevation."

A statement from BATC expresses similar sentiments:

"BATC considers it unfortunate that we did not have fm repeaters,

amateur satellites and the present high level of tv activity on 432MHz a decade ago when we lost the G5UM campaign of 'use or lose'. We are, of course, against any moves to remove tv from a band we have been using for 30 years.

"Unfortunately, in Europe we now only have an allocation to 440MHz, which in the rest of the world the band extends to 450MHz, giving space for different modes to use different parts of the band.

"Although tv and satellites 'share' the same part of the 432MHz band, at the present time there is little or no evidence of any significant interference. Even with Oscar Phase 3B satellites we do not expect this situation to change materially, as these semi-geostationary satellites will be, for most of the time, at high elevation and, therefore, out of the beamwidth of the horizon-pointing tv antennas."

In other words, the two expert organizations, BATC and AMSAT-UK, both believe their specialist interests *can* live together.

Conventions

The Midlands VHF Convention made a welcome return to the amateur calendar on 10 October after an absence of 15 years. The organizers deliberately set out to create an environment where vhf enthusiasts could meet and talk without the hurly-burly of many events, and they were eminently successful in their aim. The venue was Wolverhampton Polytechnic, which proved to be ideal, apart from a tortuous walk from the exhibition area to the lecture theatre.

G3USF lecturing on sporadic-E propagation (*Photo:* G8DJC)

G4ASR setting up the noise measuring equipment (*Photo:* G8DJC)

Attendance at the daytime session was about 340. A varied lecture stream was backed by an exhibition of trade and special interest group stands, with emphasis on components, antennas and accessories—not a black box in sight. In the refreshments area a series of poster displays on subjects of interest to vhf operators was mounted. The "RSGB Awards" display attracted particular interest, as it included a compilation by G5UM of all the RSGB vhf/uhf awards issued to date, making quite a thick volume. A separate "measurements room" contained professional noise factor measuring equipment for visitors to use on their own receivers. The day was rounded off by an excellent buffet supper.

The organizers are to be congratulated on their thorough and meticulous preparation. Specialist conventions have a completely different purpose to the many large trade shows and rallies which take place each year, but in their own way are just as important. It is to be hoped that more such events will be organized in all parts of the country. The 1982 Midlands VHF Convention has been provisionally set for 9 October.

Preparations are continuing for the 1982 RSGB National VHF Convention at Sandown Park on 20 March. As usual there will be three lecture streams, including one devoted to microwave subjects. Other planned lectures include "Amateur satellites, research and development" by members of AMSAT, which should be particularly interesting following the successful UOSAT launch. The VHF Contests Committee will also be doing its stuff, ready to receive your brickbats or bouquets.

EI repeaters

The licensing of repeaters in the Republic of Ireland has not yet been finalized, but several vhf units have been given permission to operate for test purposes and site evaluation. EI7DG, the IRTS Repeater Co-ordinator, has kindly provided details of the status of the various machines. The following were operational in mid-October:

Callsign (temporary)	Channel	Location	Locator
EI1DK	R0	Dublin	WN69j
EI2WRC	R3	Waterford	WM65b
EI7CS	R1	Sligo	VO48d
EI7DAR	R3	Dundalk	WO79j
EI7DJ	R5	Cork	VM75d
EI7LRC	R2	Limerick	VM18j
—	R6	Galway	VN55e

Several groups are also considering uhf repeaters. It was decided at a recent meeting between EI7DG and representatives from all the EI repeater groups to adopt the UK "RB" system for 432MHz repeaters. So far four units have been proposed; for Cork (Ch RB10), Dublin (RB0), Galway (RB14) and Limerick (RB2).

Close links are being maintained between IRTS and RSGB on repeater planning to minimize interference, and the RSGB is supplying information on the technical aspects of uhf repeaters.

Expeditions

GM3WOJ has provided a report on the 70MHz ms expedition to the north of Scotland during the Perseids meteor shower. Twenty-eight stations were worked from the first site, in locator XS79f. The second location, YS54g, produced 13 dx contacts, but the local topography prevented any contacts being made from a site in ZR square. From XS and YS squares, stations as far south as Kent were worked. During one 20min period the ZB2VHF 70MHz beacon was audible in XS79f, but ZB2BL could not be raised for a contact. Attempts at 50-70MHz crossband contacts with VE1AVX and W2IDZ were also unsuccessful.

Although it did not achieve all its aims, the expedition certainly gave 70MHz operators the chance to work some new and rare squares, and altogether seems to have been a success. Preliminary plans are being formulated for another expedition during the 1982 Perseids, this time to the Shetlands.

A group of Dutch amateurs are planning to be operational on 144MHz ms from ZR42h during the 1982 Perseids. Skeds can be made either via PA3BBA on the European vhf net, or by letter to: Rudi E. Pels, PA3BBA, PO Box 10315, 2501 HH Den Haag, The Netherlands. The frequencies will be 144·116MHz for cw and 144·316MHz for ssb, and the maximum cw speed 1,000lpm. Official IARU procedure will be used, so it is hoped that all QSO partners will know the meanings of "B", "M", "O", "S" and "Y" on ms. The group also hopes to be operational on 432MHz tropo. The callsign to be used is not known at the time of writing.

On several occasions during the summer, GM8SAU was again operational on 144 and 432MHz from St Kilda, in VR locator square. The best 144MHz dx was G3ZPJ (XK63a), and many others in ZL, ZM and YN squares were also worked. On 432MHz a regular sked with GI8YDZ (WO69) produced excellent signals on most days with just 10W of ssb and fm. Next summer GM8SAU is planning to take sstv equipment to St Kilda and send out "live" pictures on 144MHz. GM8SAU has reported that the newly-formed radio society on the island is equipped for all bands, 1·8-28 and 144-1,296MHz. GM6BXE, G3WLY, GM4GDJ and G3COX have also been active from St Kilda, and several others have made short stays.

MS techniques

During the GM3WOJ/P 70MHz ms expedition to the north of Scotland, a rather novel technique was tried in an effort to speed up the completion of ms contacts. While GM3WOJ/P was transmitting on 70·175MHz a separate receiver was used to monitor French broadcast tv sound on 52·4059MHz. Whenever a meteor burst was heard on the tv sound signal the 70MHz station would be set to receive and quick-break procedure started. This technique gave some success, although only moderate correlation was found between usable bursts on 52 and 70MHz.

Presumably much of the difference was due to the tv transmitter being further away from the expedition site than most of the 70MHz stations. Meteor trails which could reflect signals from France to Scotland would in many cases be too far south to be useful for G-GM contacts. The quite large difference between "indicator" and "communication" frequencies would also have played a part.

This idea certainly seems worthy of further investigation although, as 70MHz is not generally available, tests on higher frequencies may produce more data. For example, when setting up a 144MHz ms sked it could be worth asking the distant station about the frequencies of any nearby broadcast stations operating in Band 2. If any of these turn out to be free of local QRM it may be interesting to rig up a suitable antenna and monitor the broadcast frequency during the sked.

After a few such trials it should be possible to get some idea of how signal strength and burst duration on 144MHz relate to those on Band 2 for the same meteor trail. As well as the power levels and antenna gains, the relationship between the two signals will clearly depend on the distance between the amateur and broadcast transmitters, and on the location of the trail. Nevertheless a series of simple trials ought to give a good indication as to whether monitoring another frequency could be a useful technique for amateur ms.

It would be very interesting to hear from anyone who has made or is planning experiments along these lines.

30 and 10 years ago

"G8DM (Shrivenham) has now had an opportunity further to test his N.B.F.M. on 144·78 Mc/s., and has been in touch with G3DJQ, near Birmingham, the first station to be worked beyond local range. It was found that the fm signal came through fading surprisingly well. Local interference is very much reduced, and the spread of the signal at a distance of only half a mile is much less than with am with only slight over-modulation. Cross-modulation and splatter are completely non-existent."—G2UJ in *Around the V.H.F.'s*, December 1951.

"In the past, cw on 70cm was not worthwhile because most of the occupants were G8 men who do not use it. This is no longer true; and if telegraphy for long haul coverage on 432MHz is to develop as it has manifestly done on 144MHz, more encouragement to use it is required."—G5UM in *Four Metres and Down*, December 1971.

Scatter

G3DRN, the QSL Bureau manager, has pointed out that many amateurs do not collect QSLs. Some of these inform the bureau, which is fine, but unfortunately the stations they contact may not be aware of the position, resulting in lots of wasted cards flowing through the already over-worked bureaux of the world. G3DRN has suggested we should devise a "Q" code, or other abbreviation, which can be used to indicate "no card required, thanks". Any ideas?

G3LTF is still active on 432MHz eme. On 22 August he worked K5AZU, OE9XXI and VE1OD by this mode. On 18 September ZS6NG was worked for what is thought to be a G-ZS "first" on 432MHz, and giving G3LTF his 68th station off the moon on that band.

On 29 August G4DVS undertook what he modestly called "a long walk", traversing the 14 peaks in Wales over 3,000ft. His route was as described in *The Big Walks* compiled by Ken Wilson, although G4DVS traversed it in the reverse direction to that described in the book. G4DVS was accompanied on the trip by a Zycomm Z5800 handheld rig, and made a 144MHz contact from every peak, using fm simplex and repeaters. The total time taken was 9h 40min; is this a record?

For a two-month period during the summer, G4HUP in Staffordshire used a pen recorder to monitor the ZB2VHF 50MHz beacon. The recording showed many spectacular openings, often several hours long. On both these recordings, and on others monitoring the 70MHz ZB2VHF beacon, a variation in the background noise level was noticed for about 4h around midnight. This did not happen every night, but did show up quite often, and, as the recordings were not made at the same location, G4HUP feels the cause was not just local noise. Can anyone offer an explanation?

One of the most interesting letters of the month was an auroral report from G8ZOS, who claimed to have read through every *Rad Com* from 1945 without seeing his callsign mentioned and wanted to rectify the situation. Sadly, his letter arrived after the deadline for last month's issue, and so G8ZOS still has not received a mention. To avoid the same fate, please make sure your contributions for the February issue reach G4ANB by 12 December (late news by 28 December) and for March by 16 January (late news by 26 January).

Finally, as the festive season is once more upon us, may I wish you all a very happy holiday, and say "thank you" to all those who have written over the past year with news, views, comments and suggestions. □

RAYNET

G. Cluer, G4AVV*

As this year draws to a close we can look back on a busy year of discussions and planning in order to prepare the framework for the organization of Raynet in the future. May I thank all those members and groups who contributed their ideas, and hope that the final plan—a necessary compromise—will enable the Raynet Committee, the RSGB and the individual Raynet groups to work together in the most effective way for the best interests of the service.

Earlier in the year Tayside Raynet assisted the Red Cross at the Kenmore to Aberfeldy raft race, and provided communication when all about them were losing their's. During this event a rafter suffered a major accident resulting in the loss of some toes, and Raynet members themselves had first-hand experience of the effects of the River Tay when some of the group entered the water to pull people to safety. GM4FLP is the group controller of a very active group in that area.

G8XAJ reports on his group's involvement at the preparation of the Royal Wedding bonfire in mid-Bedfordshire at the request of the local police.

The Solihull & Chelmsley Wood Raynet Group (controller G3NXC) was also involved at a raft race at the request of the St John Ambulance. Although there were no major incidents your scribe was amused by the report that council officials were so impressed by the "official-looking Raynet badge" that they even turned to Raynet personnel to "book" an illegally parked car! The controller also relates that an onlooker, after deciding that all the mobile equipment was not cb, called to his friend "It isn't cb, its radio . . ."

Robert McKillop, secretary of the Kent Raynet Association (county controller G3VFC) reports on a countywide exercise making use of rtty. Data supplied by the user service (the cepo) was sent from Maidstone to Dover, Tunbridge Wells and Sevenoaks using members' own teleprinters, although it is reported that due to adverse weather conditions it was not possible to provide teleprinter links in the reverse direction and voice was used instead. The exercise was called "First Try", and it is reported that a smaller exercise will be conducted later in the year as part of a large scale home defence exercise. Kent Raynet Association also reports on the successful use of talkthrough, as does South Sussex.

Norfolk & SE Suffolk (G3HRK) has sent details of the group's involvement at the Royal Norfolk Show and other events.

Finally, a number of copies of the following have come to my attention. I am not sure who originally wrote it, so I am unable to give credit for it, but as it seems so universally appropriate I hope that the author will not mind its reproduction here.

13 ways to kill a Raynet group

1. Don't come to meetings or keep regular skeds,
2. but if you do, be late.
3. Never accept an office; it is easier to criticize than to organize things.
4. If asked to make comment on some important matter, tell the controller that you have nothing to say.
5. After a meeting, tell everyone how it should have been run.
6. Hold back your membership re-registration for as long as possible, or—better still—don't re-register at all.
7. If you disagree with something occurring inside the group, make sure that your disagreement is heard only outside the group.
8. When all else fails, abuse the office bearers.
9. Don't bother about recruiting new members—leave that to someone else.
10. Talk co-operation for the other fellow with you, but never co-operate with him.
11. Don't tell the group how it can be of better service, tell everyone else it is useless.
12. Do nothing more than is necessary, but when other members roll-up their sleeves and willingly, unselfishly, use their ability to help matters along, complain that the group is run by a clique.
13. Above all be petty, snide and critical. Grumble about everything and do nothing about getting it right. Treat the whole thing like a club which is failing to provide you with entertainment, and forget that it was you who volunteered your services in the first place. □

*12 Bingham Road, Addiscombe, Croydon CR0 7EB.

THE MONTH ON THE AIR

John Allaway, G3FKM*

"QRS"

As a "sprog" swl I was told that to go back to another cw station at a greater speed than he was using showed that one was neither an operator nor a gentleman.

At Alexandra Palace I overheard the following conversation between two recently licensed G4s: "I can manage cw okay at 12wpm but get flustered if they come back faster, so I now work only phone". What a loss. Here we have a man who has sweated to get up to the magic 12wpm, done the really hard work and now thrown it away. All because some people send too fast. Shame on us.

But what about the other side of the coin? I wonder how many QSOs he had with 18wpm stations and sent "R" every time? How many times did he call "CQ" at 15wpm—ie saying "I want to contact anybody and can operate at 15wpm." How many times did he send "QRS"?

Proficiency at cw only comes with practice. Courtesy and encouragement will always help, but you need to do your part. So remember: "QRS 12wpm" —if that's what you mean—and not "R Solid" or "Sri OM NIL CPI QRM" . . .

Gerald P. Stancey, G3MCK

KB0JW (Shelby Haukos, 1239 N Baird Ave, Fergus Falls, Minn, 56537, USA) has written to ask if anyone would care to correspond or set up schedules. Please write direct.

Overseas news

The Girl Guide Association of New Zealand is organizing a jamboree in Rotorua from 29 December to 7 January. Some 4,500 Guides and 1,000 adults will be under canvas during this time, and an amateur radio station will be established. The callsign will be ZL1GGA and it will operate on 3,690, 7,080, 14,200, 21,350 and 28,550kHz. All contacts will be QSLd.

Circular No G14/81 from IARU Region 3 Association reports that the situation for amateur radio in Bangladesh is not good. A decision was taken late in August not to issue licences for the time being. This is a setback for president Saif Shahid and his colleagues in BARL. Nevertheless they will continue working towards their goal of amateur radio in their country. As a consequence of this decision there can be no legal activity from Bangladesh at the present time.

An annexe to the circular mentioned above refers to the recent activity in China by the BEARS. It says that the Chinese administration now needs full details of amateur radio regulation in other countries and is expected to follow the procedure: (1) laying down rules and regulations for amateur radio internally on a club basis, (2) authorizing the Beijing and Shanghai clubs to communicate with each other, (3) licensing more clubs who will have to build their own equipment, (4) authorize communication between Chinese club stations and Hong Kong, and (5) authorize contacts on a dx basis. The last step is believed to be about 16 months away, and the licensing of individual stations could well be many years delayed.

Sqn Ldr Roy Handley, formerly G3GJQ, is living in Morocco for a couple of years and is now on the air with a TS820, Dentron linear, and TH3 beam as CN8CY. He is active on all hf bands, but there is no 1·8MHz allocation available. He offers to advise anyone hoping to get a Moroccan licence, and feels that he may be able to help them to avoid some of the frustrations.

Prefixes

LABRE has informed the Society that special prefixes have been allocated to Brazilian amateurs for contest and special event use. They are as follows: ZV2 (Distrito Federal), ZZ8 (Acre), ZZ7 (Alagoas), ZZ8 (Amazonas), ZY6 (Bahia), ZV7 (Ceara), ZZ1 (Espirito Santo), ZZ2 (Goias), ZX8 (Maranhao), ZY9 (Matto Grosso), ZV9 (Matto Grosso do Sul), ZY4 (Minas Gerais), ZY8 (Para), ZX7 (Paraiba), ZY5 (Parana), ZY7 (Pernambuco), ZW8 (Piaui), ZY1 (Rio de Janeiro), ZW7 (Rio Grande do Norte), ZY3 (Rio Grande do Sul), ZZ5 (Santa Catarina), ZY2 (Sao Paulo), ZZ6 (Sergipe), ZV8 (Amapa), ZZ8 (Rondonia and Roraima), and ZY0 (Fernando Noronha, St Peter & Paul Rocks, Trindade, Rocas and Martin Vaz). Expeditions to the last mentioned islands will use the PY0 prefix, and the first letter of the suffix will indicate the location (eg PY0F . .would be on Fernando Noronha).

ARI has also supplied details of Italian prefixes which, since 1 March 1978, have indicated the following locations: I0 (Lazio, Umbria), I1 (Liguria, Piedmonte), I2 (Lombardia), I3 (Veneto), I4 (Emilia-Romagna), I5 (Toscana), I6 (Abruzzi, Marche), I7 (Puglia, Basilicata), I8 (Calbria, Campania Molise, Basilicata), IT9 (Sicily), IS0 (Sardinia), IX1 (Valle d'Aosta), IN3 (Trentino, Alto Adige), IV3 (Friuli, Venetia Giulia), IA5 (Tuscan Is), IB0 (Ponziane Is), IC8 (Napoletane Is), ID9 (Eolie Is), IE9 (Ustica Is), IF9 (Egadi Is), IG9 (Pelagie Is), IH9 (Pantellaria Is), IJ7 (Cheradi Archipelago), IL7 (Tremiti Is) and IM0 (minor islands off Sardinia).

DX news

Victor Rivera, who has operated as 5W1DJ and KA7HRK/KH8, as well as under his present call of ZK1CG, asks for QSLs to be sent to the address in "QTH Corner". Cards sent via the bureaux take up to one year, but requests with three ircs will be answered by air-mail direct. Victor has an IC730 and IC701, and TH6DXY and CL36 antennas.

ARRL has announced that mixed-mode contacts for the cw, ssb and rtty DXCC awards will not be acceptable for contacts dated 1 October 1981 and after. Cross-mode contacts made previous to this date will only be accepted for credit if submitted before 31 December 1981—these may be sent in regardless of the number held and without reference to the rule defining the number of QSLs to be sent in at any one time.

Another item from ARRL is the approval of country status for the Sovereign Military Order of Malta. QSLs for recent contacts will be valid but may not be submitted for credit before 1 January 1982.

The confused political situation in Burma is leading to a belief that the activity of XZ5A and XZ9A from Kaw Thoo Lei, Karen State, should be granted a separate country status. The situation is similar to that obtaining in S Sudan.

VK9XW, on Christmas Is, is being reported as often found joining in the YL ISSB net on 14·331kHz around 0945. He has also been noted around 14,260kHz between 1300 and 1600 on Sundays.

FB8WG, on Crozet Is, has been causing great interest. He tends to join the French nets on 14,170 and 21,170kHz, mostly after 1400, and has also been working from lists. Increased activity is promised, particularly on cw. The station is said to have a rhombic antenna directed towards France.

Stations in Thailand have been off the air for a period. The reason seems to be an attempt by the authorities to regularize the licensing position.

According to the *Lynx DX Bulletin*, both Alberto, 3C1AB, and 3C0AL are active. The former should be sought on 28MHz, particularly on Sunday between 1400 and 1600, but he has been noted on 14,190kHz around 1900 working into the UK. 3C0AL has been heard around 14,170kHz a little earlier.

Following the representation made by 6O0DX (reported in an earlier *MOTA*) ARRL has agreed to grant credit for all contacts made by him on and after 20 July 1981.

DXpress reports two stations claiming to be located in Libya. They are 5A7BQ, who has been worked on 28MHz ssb, and 5A9BQ who favours 21MHz ssb. It would be interesting to hear from anyone who has actually received a QSL card from either station.

Another "funny" reported by *DXpress* is the appearance of P5AC and P5PC, both on 14MHz and claiming to be in North Korea. The prefix is correct but more information is awaited with interest.

QRZ DX reports on activity from the Vatican in view of the special award (described in October *MOTA*). HV2VO's operator has been to the USA but should have returned during November, and HV1CN (who is chief engineer at the broadcast station) has not been very active. HV2VO may be operated by I0MGM on cw during the relevant period, and new antennas are being erected. Unfortunately it seems that HV3SJ, usually operated by I0DUD, is also not very active but may sometimes be found around 21,295 and 28,595kHz in the evenings, and on 14,210kHz in the morning.

KH6SP will operate from Pearl Harbour from 4 to 6 December to commemorate the 40th anniversary of the attack on the area during the second world war.

Anyone looking for a contact with Hong Kong on 28MHz is advised to look for VS6BT, who appears on 28,440kHz at 0800 on most Saturdays and Sundays.

Louis Varney, G5RV, will be in Uruguay for the next few months and on the air as CX5RV. He will favour 7,030, 14,030, 21,030 and

* 10 Knightlow Road, Birmingham B17 8QB

28,030kHz. Louis will be home again in time to give a lecture at the Society's HF Convention on 19 June 1982.

Dave Gynn, G3SBP, has started a two-year tour of duty in the Maldive Is, where he will be on the air as 8Q7BN. He has a Kenwood 830 with beam and groundplane. Initial activity will be on 14, 21 and 28MHz but may spread to others if enough interest is shown. QSLs should go either via the bureau or to the address in "QTH Corner" with ircs if direct reply is required. Dave was previously 5N2RDG, VP2VD and G3SBP/KV4.

BV2A/BV2B is now believed to have permission to operate on 21MHz. Known frequencies and times to find him are as follows: 1200 to 1400 Wednesday on 14,025 or 14,040kHz, from 1400 onwards on 14,218, 14,225 or 14,250kHz as BV2B. Of rather academic interest to UK readers are his appearances at 0000 on Saturdays on 28,030, 28,530 or 28,575kHz.

10MHz

With effect from 1 January 1982, Class A licence holders will be permitted to use the new 10MHz band. The IARU Region 1 band plan was agreed at the Brighton conference and is as follows:

10,100-10,140kHz	CW only
10,140-10,150kHz	CW and rtty

The band is allocated to the amateur service on a *secondary* basis and this means that we are required to avoid interference to the other (primary) users.

(At the time of writing, negotiations are still continuing for the use of 18 and 24MHz. For the latest possible information see "QTC" in this issue).

Expeditions

A group of Netherlands amateurs will be in Monaco from 24 December to 2 January and will operate about 25kHz above band edges, except on 3·5 and 7MHz where they will remain close to the low ends. Callsigns will be PA0LVB/3A, PA0VDV/3A and PA0WRS/3A.

Nets

G3FKM is preparing a detailed list of regular nets for publication in a new IARU Region 1 Handbook and would appreciate help. Information on all nets on the hf and lf bands—including those in languages other than English—would be greatly appreciated.

G5ZN QSL card hangs proud

Probably the most striking G QSL card of all time (unquestionably the largest)—that of Philip Nicoll, G5ZN, when operating in the 'thirties—has found a fitting home, the National Wireless Museum at Arreton Manor, Isle of Wight. This follows a visit by Douglas Byrne, G3KPO (curator and secretary) to G2NJ at Peterborough who had carefully preserved the QSL card which confirmed his 7MHz phone contact with G5ZN on 26 January 1937. Dimensions of the card are 9 by 6·75in, and the callsign in bright red covers a space of 7·25 by 2·5in. A very professional job, the QSL card now hangs proudly on the museum wall in a vintage frame. On being given the news, G5ZN—residing at Withernsea these days—promptly mailed an identical replacement to G2NJ and told him that it is surprising how many old-timers work him to say that they remember his QSL card. Before being licensed in 1929, Philip was BRS269, and he has been a member of the Society ever since.

Contests

AGCW Contest

0800 to 1200 1 January.

CW only and restricted to 3,500-3,600kHz, 7,000-7,040kHz and 14,000-14,100kHz, with suggested meeting points around 3,560, 7,030 and 14,060kHz. Four classes: 1, up to 500W; 2, up to 100W; 3, up to 10W input; and 4, listener. Exchange RST and QSO number (from 001); AGCW members will add their number. Each QSO counts one point, and each with an AGCW member counts as a multiplier. A station may be worked once on each band. Send logs before 31 January to Werner Hennig, DF5DD, Mastholdre St. 16, D-4780 Lippstadt, FR of Germany.

Canada Contest

0000 to 2359 27 December.

CW and phone but no cross-mode, 1·8 to 144MHz. Single-operator single- and multi-band and multi-operator single-transmitter classes. Same station may be worked twice on each band—once on each mode. Exchange RS/T and serial number (from 001). VE1 stations will indicate their province (NB, NS or PEI). Each contact with Canada counts 10 points, with others one point. Ten bonus points are gained by working any CARF official station (indicated by the TCA or VCA suffix). Multipliers are the number of Canadian provinces and territories contacted on each band and mode. Activity will centre around 1,810, 3,770, 3,900, 7,070, 7,230, 14,150, 14,300, 21,200, 21,400 and 28,500kHz (phone), and 1,810, 3,535, 7,025, 14,025, 21,025 and 28,025kHz (cw). Send logs (plus dupe sheet and summary sheet listing multipliers and score calculation) to CARF, PO Box 2172, Stn D, Ottawa, Ont, K1P 5W4, Canada. In the 1980 event G4BWP submitted the only UK log and came seventh on 28MHz with 10,020 points.

3rd International 160m Phone Contest

0000 16 January to 2400 17 January.

Sponsored by *73 Magazine*. Single-operator single-transmitter and multi-operator single-transmitter categories. The former may only operate for 36 hours. Exchange RS and country (W and VE will give state, province, or territory). The QSO points detailed in the rules supplied to G3FKM do not seem appropriate for European entrants (ie five for QSOs with W/VE and 10 with other countries). The multiplier is the total W/VE states/provinces and DXCC countries worked (W and VE not counting as countries). Photocopies of the rules and entry form are available from G3FKM (sae please).

1st International 40 and 80m Phone Contest

0000 to 2400 9 January (40m).
0000 to 2400 10 January (80m).
Rules also available from G3FKM.

ARRL 10 Meter Contest

0000 12 December to 2359 13 December.

Stations may be worked once on phone and again on cw, but no cross-mode QSOs are allowed. Maximum operating time is 36h. Exchange RS/T plus serial number (from 001), W/VE stations will also indicate state or province. Stations not land-based will send their ITU region number. Each QSO is worth two points—four if with a Novice or Technician—and the multiplier consists of the total of USA states, Canadian call areas, and DXCC countries worked (W and VE do not count). ITU regions as sent by non-land based stations also count. Logs must be posted before 15 January to ARRL Communications Dept, 10 Meter Contest, 225 Main St, Newington, Ct, 06111, USA. Log forms and summary sheets may also be obtained from this address but *not from G3FKM*.

Awards

Nine Dragons Award

Issued by HARTS for confirmed contacts with Hong Kong and at least one country in each of the *CQ* zones 18, 19, and 25 to 30 inclusive (a total of nine) since 1 January 1979.

Firecracker Award

For confirmed contacts with six different VS6 stations since 1 January 1964. Applications for either award should consist of certified log extracts plus the appropriate fee—in the case of the Nine Dragons Award this is US $3, 25 ircs, or £1.50 in the form of a postal order. The Firecracker Award costs US $2, 10 ircs, or £1. Postal orders should be left blank, and claims should be sent to: Awards Manager, HARTS, GPO Box 541, Hong Kong.

The 88 Certificate

Issued by DYLC (the Dutch YL Club) for proof of contact with club members to gain 88 points—each QSO with a member counts eight, with other Netherlands ladies four. Applicants outside Europe count 11 points for either category. Listeners may apply and follow the same scoring system. All contacts must have been made since 9 May, 1981. Send certified list of QSLs with eight ircs to M. Wolf-Wildebuer, Pilotenweg 14-b, 8303 EJ Emmeloord, Netherlands.

Worked All Hawaii Award

For contacts with Hawaiian stations after 31 December 1981. The Class C award requires that at least 25 have been worked; the islands of Hawaii, Maui, Oahu, and Kauai, as well as three BIARC members must be included. Class B requires 50 different stations, including five BIARC members and the previously mentioned islands plus Molokai. Class A requires 100 stations, including 10 BIARC members and the addition of Lanai to the islands; the counties of Hawaii, Maui, Kalawe, Honolulu and Kauai, and one of the following islands: Kure, Midway, Necker, Laysan, French Frigate Shoals, Niihau and Kahoolawe, must also be included. Send detailed log data, certified by a club official, plus US$3·50 for any class of the award to Big Island ARC, PO Box 1688, Kamuela, Hawaii, 96743, USA. The Class A award consists of a wooden tiki.

QTH CORNER

A4XCA **A4XIH** **A4XIY** **A4XJH**	PO Box 981, Muscat, Oman.
A4XJL	via A4-16746, ISWL, or Box 981, Muscat, Oman.
CN8CY	R. Handley, Villa Hind, Km 5·2, Route des Zaers, Rabat, Morocco.
FG0DDV/FS	via W2QM, D. Beckwith, 151 Whitney Av, Pompton Lakes, NJ, 07442, USA.
FM0GA	N6ZV, Don Jones, 1349 Winchester, Glendale, Cal, 91201, USA.
FO8FB	*(WW Contest)* WB6GFJ, R. Forbes, 12866 La Cresta Dr, Los Altos Hills, Cal, 94022, USA.
J5HTL	via SM3CXS, J. Svensson, Berghemsv 11, 86021 Sundsbruk, Sweden.
J6LIR	*(WW Contest)* WB6FCR, A. Crespo, 216 Sussex St, San Francisco, Cal, 94131, USA.
HL9JV	B. Richards, HQ CO 304 Sig. Battalion, APO San Francisco, Cal, 96301, USA.
OH0BH	OH2BH, M. Laine, Pyorrekuja 4 C 43, SF 01600 Vantaa 60, Finland.
VP8ANT	PO Box 146, Cambridge.
ZF2DR	K5RQ, D. Brandenburg, 5515 Westgrove Dr, Dallas, Texas, 75248, USA.
ZF2RJ	N6RJ, J. Rafferty, Ham Radio Outlet, 2620 W. La Palma Av, Anaheim, Cal, 92801, USA.
ZK1CG	(see 5W1DJ).
ZK2WW	NCDXC, Box 608, Menlo Park, Cal, 94025, USA.
5W1DJ	Victor Rivera, Private Bag 15, Rarotonga, Cook Is.
8P6QL	YASME Foundation, PO Box 2025, Castro Valley, Cal, 94546, USA.
8Q7BN	D. Gynn, c/o Cable & Wireless Ltd, Male, Rep of Maldives.

Around the bands

A slightly depleted list of contributors this month, no doubt partly caused by the early copy date. However, G8KG has kindly supplied his summary, which reads as follows: "For the next few months it would seem a risky business to try and forecast the progress of Cycle 21! While we are roughly at the stage where a fairly steep decline in solar activity might be expected, there are, as yet, no signs of this. At the time of writing (26 October) the 27-day average solar flux had been above 200 sfu for 96 days, which is the longest spell of sustained activity during the cycle. It looks as if the monthly mean flux will again be close to 220 sfu, and daily values reached 305 on 16–18 October.

"One consequence of this was that 50MHz openings to the Americas began about a week earlier than in the past two seasons. On the other hand the average level of geomagnetic activity continues to rise, and there are now few days in any month with the A-index below 10. As a result, hf band conditions are becoming rather less consistent and reliable despite the high flux levels. The RSGB 21/28MHz Contest was an unfortunate casualty of high magnetic activity, and conditions could have been better during the CQ WW Phone event—which is not to say that they were all that bad!"

The following very kindly provided logs from which the next section has been compiled: G2HKU, G5JL, G3s GIQ, GVV, IMW, KSH, NWG, GW4KGR, G4LRS and RS15429.

Stations listed in italics were using cw.

1·8MHz. 0000 EA9EU, 4X4NJ. **0500** EA6CE, EA8AK. **1200** PA0PN. **1800** 4U1ITU, 4X4NJ. **2100** HB0BHA. **2200** OH0NA. **2300** EA6CE.

3·5MHz. 0500 *CN8AD,* JX5VAA, VP2EC, XE1AE. **0600** K6HNZ/CT3, *EA9EU,* FP0GAQ, HC1MD/5, J6LIR, KH6XX, OE2VEL/KH6, KN6M, PT7WA, *ZL3GQ,* 7X4MD. **0700** HI8PGG, HP3FL, VP2VD, ZL4AP. **2100** EP2TY, IF6FCN. **2200** *UK8WAA.* **2300** UK9AAN.

7MHz. 0500 *CM, HP1UR, PY,* VE7EPA, *W6-W7, ZL.* **0600** FO8FO, J73PP, KL7U, KL7Y, T2VEL, T30BF, *TU2JT,* YJ8RG, ZD7HH, *ZL.* **0700** JX5VAA, *OE1ETA/KH6,* P41C (= PJ2), TI9FAG, VP2s EC, KAE, MBA, VD, ZL1AZV. **0800** *VK,* 4U3UN. **1700** FR0FLO, YB1AW, ZS6AYU. **1800** VU2YK, ZS3WK, G3LJF/3B8, 3B8AE/3B9, 5NACO/8. **2000** 9K2DR. **2200** *KV4AA.*

14MHz. 0000 VE8MC. **0100** OX3TQ. **0600** *FO8NA.* **0700** *FO8DF,* KH6ITY, *XT2AW,* ZK2ZZ, ZL. **0800** CE0AE, D4CBC, *GU5BJB* (Sark), KC4BH/KH0, *T2ETA,* VK9NS, ZK1CG, ZK2ZZ. **1000** *VK1RM.* **1400** *HZ7AT, VS6EY.* **1500** BV2B. **1600** C21NI, KC6IN, XZ9A, G3LJF/3B8. **1800** YI1BGD, *ZL4KI.* **1900** T30BG, VP8AEN. **2000** A71AU, *JF1KVV,* TL8GE, VP8ZR. **2200** J28DM, J5HTL, *VK2-VK3-VK7.* **2300** *VU2BK.*

21MHz. 0700 *FO8EW,* HL, YC1HX/8, ZL. **0800** HL1KT, JA, *KH6JVD,* VK, ZL, 9M8PW. **0900** KL7, OE3JTL/YK. **1000** KG6RE, T2ETA, VK, DJ5CQ/3A. **1100** *FG7BI,* HV1CN, VE5UF, *ZL.* **1300** *ZL1, ZL2.* **1400** CR9AN. **1600** DU1DBT, 7Q7LW. **1700** FP0GAQ, P41C, VQ9AB, *WA7CWM* (Nev), W6. **1800** ZI1AH. **1900** S79MC. **2000** VU2s RPS, VRG. **2100** TYA11.

28MHz. 0700 S83W, 5N9ACO/8. **0800** UK8MAF, VU2LQA, ZS3HL. **0900** D4CBC, FR0FLO, HL9DX, JD1BAT, T2VEL, G4JOA/TR8. **1000** CR9AN, HL8A, SP2DHZ/JW, VK6CF, **1100** A71AA, FR7BT, JT1BG, P29NAB, VP2, ZD8RH. **1200** FK8DD, KC6MM, VK9YC, 3B8LH. **1300** CR9AN, N6KT/HK0, VS6GZ, 7X2BK. **1400** J6LIR, 9G1TO/OD5, TA1SU, VK9NYG, VP9AD, VU, XE7J, IV3OSH/5R8. **1500** C6AES, VP5IW, 3D6BA, *9U5WR.* **1600** A6XWT, *EA9KS,* N6KT/HK0, JY1, LU, OA1BU, PY, VP8NO, XZ9A, *ZB2EO.* **1700** VP2EC, VU2GI, W6, W7, W0, YC1BSA, G3LJF/3B8, 9Q5FL. **1800** FG7AR/FS7, TI9FAG, VP5WJR, W1-W0. **1900** N7BNM (Mont) S83H, 5H3PA. **2000** CE0AE, 9Q5TV, 9X5MB. **2100** FY7BY, 8R1J.

Many thanks to the authors of the following for items extracted: *CQ Magazine* **(W1WY)**, *DX NL* **(DL3RK)**, *Lynx Dx Bulletin* **(EA1QF/EA2JG)**, the *DX Bulletin* **(K1TN)**, the *Long Island DX Bulletin* **(W4UL/W2IYX)**, *DX News Sheet* **(Geoff Watts)**, the *Ex-G Radio Club Bulletin* **(W3HQO)**, *Long Skip* **VE3EUP)**, *DX press* **PA0TO)**, and *QRZ DX* **(K5FUV)**.

This is the last column this year, and your scribe would like to take this opportunity to thank all those who have supported it during 1981; to wish all readers a very happy festive season; and to express the hope that 1982 will be a very successful year for all.

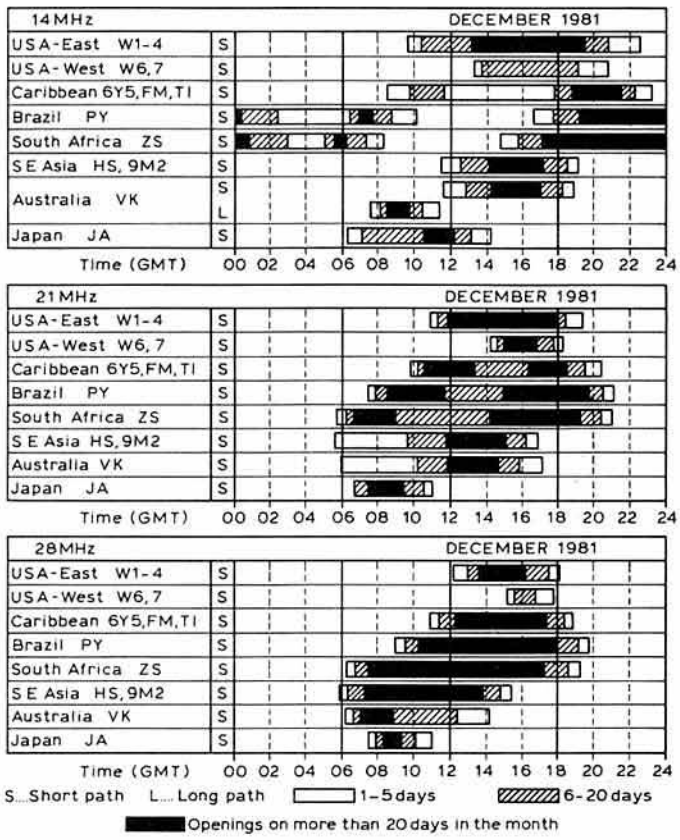
Please send all items for **February** issue **to reach G3FKM** no later than **30 December.** □

Propagation predictions

Experience shows that conditions worsen during December compared with the two previous months. This has two causes: first, the midwinter conditions reach their maximum, ie because of the shortening days traffic times on the hf bands are also much shorter, and second, the F2 mufs in the northern hemisphere are much lower than in the previous month because of the seasonal changes. This is much more noticeable this year as we are in the declining arc of the sunspot cycle (the last maximum was during the winter 1979–80). This is a steady decline, but sudden changes can occur. Within a few months there can be a considerable decline of conditions. This is unfortunately very difficult to forecast, so there will be uncertainties in the forecasts for the coming months.

Accepting that solar activity is slowly decreasing in the coming months, **28MHz** will be open in all directions on days without disturbance, but traffic with western North America will only be possible on favourable days (days with above average mufs). The possibility of reaching western North America will be greater the further south in the UK the station is based. Traffic with all continents will be possible on **21MHz.** Midwinter conditions will allow extra traffic via the indirect (longest) path, especially traffic with South America and East Asia. Traffic via the indirect path will mainly occur at dawn and dusk.

Because of the low mufs and long winter nights, **14MHz** will cease to be the main night-time dx band which it was during the summer. A noticeable improvement of night-time dx on this band will not occur until the end of February–beginning of March. As on **21MHz,** traffic with various dx regions will be possible on **14MHz** via the indirect path. As **14MHz** will frequently fade, **7MHz** will become more important as a dx band during this period. DX conditions always exist on this band when the longer part of the path lies in darkness. During daytime, **7MHz** will be the ideal band for local and European traffic, which will not be interrupted by the dead zone. The seasonal condition of low static favours dx traffic on both **7** and **3·5MHz;** the latter band will at times be interrupted by the dead zone just before dawn.



Radio Amateurs' Examination May 1981

Report of the City & Guilds of London Institute on the examination

STATISTICS

OVERALL RESULTS

Year	No of candidates completing exam	UK candidates qualifying for award No	%
1979	2,800	1,788	63·8
1980	3,559	2,488	69·9
1981	5,869	3,961	67·5

COMPONENT RESULTS FOR THIS EXAMINATION SERIES

Component No	Name of component	No of candidates	Distinction %	Credit %	Pass %	Fail %
1–01	Licensing, Conditions and Transmitter Interference	5,743	12·6	47·7	13·4	26·3
1–02	Operating Practices, Procedures and Theory	5,534	12·0	40·3	19·7	28·0

Reports on multiple-choice question papers

PAPER 1-01

Syllabus topic or objective	No of items	Comments on performance of candidates
1. Licensing conditions	23	The performance of candidates in this section was very good indeed and showed a comprehensive knowledge of the licence conditions. Some confusion was evident between the meanings of "maximum dc input power" and "radio frequency output peak envelope power", but apart from that candidates did well.
2. Transmitter interference	12	Not so consistently well done as the questions in Section 1, but a very satisfactory performance none-the-less. No serious weakness in any topic in this section.

PAPER 1-02

Syllabus topic or objective	No of items	Comments on performance of candidates
1. Operating practices and procedures	5	Quite well done generally.
2. Electrical theory	11	The performance of candidates in this section was poorer than in any other section. There appeared to be general weakness in all topics.
3. Semiconductors	7	Quite well done with no general or widespread difficulty. Most weakness in this section occurred in the operation of simple transistor amplifier circuits.
4. Radio receivers	9	Many candidates had difficulty with the measures taken in superheterodyne receivers to minimize image frequency and adjacent channel interference. There was also some confusion over the operation of a beat frequency oscillator in a receiver for the reception of continuous wave telegraphy.
5. Transmitters	8	Very good. No great difficulty evident with any question in this section. In each case a high proportion of candidates gave correct answers.
6. Propagation and antennas	14	The questions on fading exposed gaps in candidates' knowledge of this topic.
7. Measurements	6	A very large number of candidates did not appreciate the effect the current taken by a meter can have on the circuit to which it is connected.
General comments		As shown by the overall number of successful candidates the paper was very well done, and it was noticeable that the upper group of successful candidates consistently scored good marks in all sections of the examination, both Paper 1 and Paper 2.

SWL NEWS

Bob Treacher, BRS32525*

Finale for 1981

As another year draws to a close, it is time to reflect on 1981 and look forward to 1982. During the year many listeners have graduated to the transmitting ranks, but many more people have joined as listeners, and it is hoped that they will make their names and BRS numbers known to your scribe. To those who now hold G4 or G6 licences, the highlight of the year was undoubtedly receiving the pass-slip. For others the highlight might have been buying that new receiver, or logging that rare station or choice dxpedition. Whatever it was, your scribe sincerely hopes that 1982 is even more successful for you.

On the subject of 1982, time to repeat the countries table rules. The table will appear in the same format next year and will reflect the number of countries, taken from the ARRL Countries List, heard on each band between 1 January and 31 December 1982. Note each new country heard and let your scribe have the *totals only* (not a list) for each band, giving a grand total and indicating the mode(s) used. The all-time list will continue to appear in the March, June, September and December issues. The starting score for the yearly table will be 200, while the all-time list starts at 750.

Lower frequency band challenge

Regular readers will know that your scribe normally throws out a challenge about now concerning listening on 7 and 3·5MHz. Normally the aim is to try and log 100 countries on either band during January, but this year the challenge is slightly different. For January 1982 the challenge is a total of 175 countries on 7, 3·5 and 1·8MHz, with at least 10 countries being heard on 1·8MHz, and at least 40 dx countries on each of 7 and 3·5MHz—and this year there might even be a small prize. Entries to your scribe before 12 February 1982, giving date, time, RST and the full callsigns of the stations heard. Good luck.

Newcomers

Colin Watson, BRS46598, uses an ex-Army receiver, and enjoys cw dxing on 3·5MHz. T. D. Gentle, BRS41680, specializes in QSLs from the Pacific area, and also finds 3·5 and 1·8MHz the most interesting bands to monitor.

Brian Kilshaw, RS46773, just failed to make the deadline last time. He was to sit the RAE shortly and had recently bought an FT101ZD in readiness for the big day. He expressed a desire to obtain some sstv equipment after visiting G3NOX. Brian had received a good response to the reports he had sent during 1981, and had also received a great deal of help and assistance from the licensed fraternity in his area.

P. Johnson, BRS41331, uses a Yaesu 7700 receiver, FRT tuner with Mizuho audio processor, and an HF5 28-3·5MHz trap vertical. He listed some of the dx stations which have appeared in his log, particularly on 28MHz, where he was interested to note the propagational changes.

As for JT1AN, his manager is W7PHO, who unfortunately is known not to acknowledge listener reports. Some, however, have sent QSL cards direct to JT1AN and obtained a card.

QSL cards

Cliff Adams, RS10906, is the G2 QSL Bureau sub-manager for the Society. He noted the comments on QSL returns and remarked that quite a number of stations do not use the bureaux. He receives thousands of cards for G2s who never send envelopes, and these cards never reach their destinations. This obviously happens abroad as well, and he offered this as one reason why QSL returns can be so low. Cliff is sure though that two ircs with each dx QSL card sent direct pricks the conscience of the station receiving the card, and thus direct QSLing has many advantages.

Cliff also reported that G2FS recently received a QSL card from Eric Trebilcock, BCRS195, reporting a 7MHz QSO G2FS had had with G5PQ. Cliff subsequently found a note by Eric in the September 1935 issue of *Television & Short Wave World* reporting reception of several G2s on 7MHz

* 79 Granby Road, Eltham, London SE9 1EH

1981 hf countries table

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS14585	203	213	219	154	125	19	933	ssb/cw
RS42604	202	213	206	158	118	29	926	ssb
BRS25429	197	216	222	138	112	33	918	ssb
BRS8841	186	209	234	120	100	8	857	ssb/cw
BRS48909	175	219	223	104	65	19	805	ssb
A8808	172	166	164	106	96	34	738	ssb/cw
BRS1066	142	170	167	85	65	41	670	ssb/cw
BRS44703	133	155	169	105	93	11	666	ssb
RS46228	62	120	128	140	50	2	502	ssb/cw
BRS35509	91	131	145	62	45	2	476	ssb
ORS45992/7Q	134	173	143	4	12	0	466	ssb
BRS44266	126	96	143	50	37	11	463	ssb
ARS42503	92	125	146	28	32	0	422	ssb
BRS31440	109	119	93	57	39	3	420	ssb
BRS41992	56	74	131	65	50	16	392	ssb
BRS18529	48	60	111	69	71	20	379	ssb
A9191	81	92	102	27	29	3	334	ssb/cw
RS44218	81	85	111	26	21	5	329	ssb/cw
BRS40705	95	85	92	31	24	1	327	ssb
BRS46708	71	40	85	40	57	0	293	ssb
ARS41349	44	73	51	25	34	2	229	ssb

All-time countries list
(starting score 750)

Station	28	21	14	7	3·5	1·8	Total	Mode
G3KMA	303	322	325	258	192	55	1,455	ssb/cw
BRS17567	285	320	351	214	227	34	1,431	ssb/cw
BRS25429	270	304	329	233	223	58	1,417	ssb
BRS32525	263	295	317	232	243	41	1,391	ssb
BRS25901	264	290	321	205	201	32	1,313	ssb/cw
RS42604	275	282	271	234	177	46	1,285	ssb
G3GIQ	300	321	322	171	130	29	1,273	ssb/cw
A8808	235	271	292	159	163	53	1,173	ssb/cw
BRS8841	231	268	309	163	170	18	1,159	ssb/cw
G3ALI	194	228	301	164	186	0	1,073	ssb/cw
G4FAM	206	226	236	176	118	31	993	ssb/cw
G3IGW	170	189	213	218	127	84	991	ssb/cw
G3XTT	211	210	177	158	119	52	927	ssb/cw
BRS1066	167	188	254	130	84	46	869	ssb/cw
A9191	177	219	251	95	106	18	866	ssb/cw

cw. This shows that 7MHz was a good dx band in 1935, and that Eric's ears must be as good now as they were then!

Brian Russell, BRS33915, also mentioned QSL returns this time. He offered a 34 per cent return via the Society bureau since 1972.

Yet another is Basil Woodcock, BRS44266, who appeared rather hurt that of 200 cards sent via the bureau only 27 had so far been answered and that even some direct QSLs had not materialized, even though he had sent the required ircs.

It is true, I imagine, that unfortunately some licensed amateurs do not find swl reports useful or worthwhile, but I am sure the majority do. After all, at some time they were swls themselves and it might be worth suggesting that, when that next swl report is filed without being answered, he just thinks of his swl days and how disappointed he was that his QSL cards were not answered. I am sure we will hear more of this topic next time.

DX news

Brian Russell has disciplined himself to take the RAE only after hearing all countries. FB8WG provided No314 so he only needs BY, VS9K, XU and ZA to complete the set and sit the exam. Another thinking on those lines perhaps is Dave Whitaker, BRS25429, who needed BY, CE0X and HK0, Malpelo Is, to complete his set. Neville Spry, BRS17567, "retired" to become GW4KGR needing just 7O.

Paul Tittensor, A8808, centre, receiving the White Rose ARS SWL LF Band Contest Award from club chairman David McGregor, G4IDJ. On the left is David Whitaker, BRS25429, the contest organizer. *Photo:* **G4HSZ**

Basil Woodcock listed some interesting dx—C21AH, ZK1CV, 5W1DG and 7Q7LW—to lend support to the wide view that the higher frequency bands certainly improved in October, especially 28MHz. Towards the end of the month, this band was open until 2300 on several evenings.

Graham Powell, RS46228, made the most of his listening time in October, spending up to 36h during weekends on the bands. He was rewarded with D68AM, IV3OSH/5R8, VK9XV, 5V7HL and 9M2GS.

David Hawes, A9191, caught the poor conditions for the 21/28MHz SSB Contest, as did several other reporters. He mentioned SU1AA on 28MHz, A71AD on 21MHz, and FK8DD, KS6DV and VK9NS on 14MHz.

Paul Crankshaw, BRS48909, finally felt that he had mastered 7MHz ssb —obviously by turning the rf gain back. FO8FO and YJ8RG duly obliged, plus VE8YQ and TI9FAG.

Peter Norris, RS47513, sent his QSL card. A really amusing example of imagination, with a caption of "£4,300 worth of the best equipment money can buy, so nothing can go wrong here om" and a design showing the operator's xyl about to use the scissors to cut the mains lead!

Concerning his latest dx, Peter commented on 1·8MHz conditions—UA, EA2, C31 and 4U1ITU, all being new countries in October. Recent verifications on 1·8MHz included GJ2CYZ, DL8WW, OE6CR and LZ1KDP. Plenty of wire and an atu are Peter's ingredients for good 1·8MHz reception.

Brad Bradbury, BRS1066, also commented on 1·8MHz QSL cards from GD4BEG, EA8AK, UL7TBM and OY7ML.

Roger Pols, BRS31440, had been monitoring 3·5MHz and reported hearing AH6BK, ZL2BT, ZF2CS, JA4GQS and 7X5AB, while 7MHz provided CM8AF, J28DM, PJ2EP, TG9WE and VP2VB.

The highlight of Mark Rogers, RS46276, letter was that a near neighbour, G3ZQF, was to pay him a visit to see what dx could be worked using Mark's antenna system.

Mark Mullins, RS42604, reported less activity since taking up full-time employment, but he still had the unique knack of missing virtually nothing

HF propagation study

Band predictions for December 1981

	UTC	28MHz	21MHz	14MHz	7MHz	3·5MHz
		000001111122	000001111122	000001111122	000001111122	000001111122
		024680246802	024680246802	024680246802	024680246802	024680246802
EUROPE						
Moscow		....6+83...	....99998....	...2887896..	885533246888	++42....3+++
Malta		....68774...	....999993...	...18778994..	886632236899	+++3....3+++
Gibraltar		.....7654...	....599993...	....9878895..	886453235899	++++2....25++
Iceland		.....3774...	.....89991...	....488898..	676.64346886	+++53..235++
ASIA						
Osaka		....51.....	....96.....	1..37631...2	....21.14673	.....45.
Hong Kong		....9971....	...28885....	1....5656631.	1.....14785	453
Bangkok		....1+++93...	...268898...	1...15568722	2.....14787	454
Singapore		....178884...	...368898...	1...15568721	1.....14785	452
New Delhi		....14+96....	...468883...	1..114568212	72.....14788	4.....455
Teheran		....2+++94...	...7778981..	311522568842	873....13778	54.....455
Colombo		....2+++95...	...3478992..	2....2568842	51.....13778	2.....455
Bahrain		....3++083...	...7568983..	4113.1468964	872....13778	54.....44+
Cyprus		....+++96....	...4989994..	21.765678952	88621.125888	++4.....25++
Aden		....2+89961...	...64579972.	7312..268997	872....13677	54.....444
OCEANIA						
Suva (S)		.....2451....	.....16887...	....666785..	...131.131..	.....
Suva (L)		....3321.121	21..87754653	..147546761.	....12...21.	.....
Wellington (S)		....15631....	....68885...	....1766783..	.....21.141.	.....
Wellington (L)		....11.....	11..65421333	..117545652.	.....2...2..	.....
Sydney (S)		....66772....	...388898...	...16557861.	.....1..1451.	.....2..
Sydney (L)		.....	....4531.122	65555751	.....1...23..	.....
Perth		....266654....	....4688882..	1...15568842	13761	.....43.
Honolulu		.....	.....4..	.33.412.461.	..3631.131.	....3.....
AFRICA						
Seychelles		...2557521..	...43478772.	621...268997	73.....13678	5.....445
Mauritius		...2577762..	1..334699831	74....168998	62.....13788	3.....45+
Nairobi		...18778641.	2..544589962	8612...58999	872.....3787	54.....454
Salisbury		....4566652.	31.434479984	9812...27999	861.....2688	53.....3++
Capetown		45666641	52.143358996	9813....4899	862.....378	53.....4+
Lagos		....9+889741	53..85458997	99364...5899	7783.....488	455.....++
Ascension Is		58766421	43..85446877	99625...1699	8784.....158	555.....2+
Dakar		....5++88841	32..97547996	986173..2799	77862.....168	5453.....3+
Las Palmas		....399995....	89889951	442.86557898	888741..1489	+++4....25+
S AMERICA						
South Shetland		24455221	32..78765556	67516511135	12321.....	.....
Falkland Is		25467541	21..78644565	787.751...26	36652.....1	.342.....
Rio de Janeiro		17545421	11..67443575	887.73....58	87862.....4	5453.....
Buenos Aires		....2444663.	1...78533365	877.75....26	57862.....1	2453.....
Lima		.....++873..	13854453	646.655...15	57863.....	2453.....
Bogata		.....++873..	1854463	646..55...26	67762.....1	4454.....
N AMERICA						
Barbados		.....4++883.	8854673	646.164..158	87763.....4	5443.....2
Jamaica		.....8++72..	1865462	546.2552..27	777631.....2	4454.....
Bermuda		.....19++82.	6876772	536.36521268	777631.....5	4443.....2
New York		.....7++71..	2887861	446.35553467	776631....14	4433.....
Mexico		.....9+71...	196531	446.52561...4	377631.....	.444.....
Montreal		.....7++71..	2888851	445.36565567	776631....14	4433.....
Denver		.....285....	.....6873..	345.41165334	477631.1...1	.443.....
Los Angeles		.....64.....	.....872..	345.42.56322	267631.11...	.343.....
Vancouver		.....12.....	.....671..	355.43.37653	257631.121.1	.243.....
Fairbanks		.....	.....12..	354.45457832	346631.13432	.233.....

in the way of real dx. Latest verifications included A35BG, ZK2BM, 3D2GM and 5W1BP to bring his confirmed score to 102.

October brought eight new countries to Robert Small, BRS8841, but unfortunately not KF1O/CE0X, who seemed to evade 99 per cent of dxers in Europe. 14MHz provided T2ETA, FB8WG, FO8GW, ZL4PO/C, ZK1CV, YJ8RG and AH2AI, while 7MHz loggings were H44DX, KV4CI, VK6HD and VP2MIX. 28MHz seemed the best for dx at Robert's QTH—CR9AN, FK8DH, KC6IN, TI9FAG, UA1PAM and UM8MKF (all new countries on the band), plus G4LJF/3B8 (via G4DYO), FP0GAQ (via K8CJQ), and JD1AEV on Ogasawara Is.

Dave Whitaker, BRS25429, had mainly concentrated on 7MHz with ZK2, T30, T2 and YJ8, all new on the band. He had also logged HH2SD, VK9NS, FO8FO, 9K2DR, KG4KK, VU2YK, VP2VGR and ZD7HH—a good selection. On 3·5MHz Dave had heard his first KH6s—KH6XX (via W3HNK) and OE2VEL/KH6.

VHF news

Dave Whitaker mentioned his recent QSL returns for 144MHz—SP6JLW/6, SP6PHH/6, both IK65a; EA5AMR, ZZ47a; EA7AJX, YX12f; EA6FB, AY07j; and SM6JDO, GQ02c. Reported from other sources were GI4BAC/P, WO square, and I4CIL (ms), GE41d.

The vhf awards manager, G5UM, recorded that the first SWL Squares Award has been issued. He said "The claim is the first ever for the Squares Award to be made by a listening member and should be recorded in *SWL news*." The claim was for 60 squares/15 countries, and was submitted in September by BRS32525, your scribe (how embarrassing!). Seriously though, the award is first class and would grace any shack wall. The easier award is 40/10 but 60/15 shows slightly more hard work in collecting the cards. I hope that my first paves the way for many other claims.

Finale

A brief reminder that the White Rose Second SWL Contest occurs in January. Full rules were in October's "Contest news". If readers thought that the photograph added something to October's issue, how about sending a photo of *your* shack for publication? Copy date for February 1982 is **11 December (late** items by **24 December),** and do not forget to update your 1981 table score. □

Mobile rallies calendar

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

13 December—Leeds & DARS Christmas Rally, The Pudsey Civic Centre, Pudsey, near Leeds. Convenient access M1, M62, M621 and rail station 1min walk away. Ample car parking, licensed bar, excellent catering facilities. Talk-in on S22 and SU8. The rally will cater for all electronic and radio hobbies. Further information from G4FIM, G4IMF or G6CNP, or tel 0532 794507.

1982

14 March—Pontefract & DARS Components Fair, Carleton Community Centre, Pontefract. Open 11am. Talk-in, on-site parking, licensed bar, refreshments, bring & buy, RSGB publications, more space than last year. Emphasis on build-your-own. Details from G4AAQ, QTHR, tel 0977 71071.

21 March—White Rose RS Rally, now at University of Leeds. Open 11am. Talk-in on S22 and 432MHz. Details from Richard Hughes, c/o Moortown RUFC, Moss Valley, Alwoodly, Leeds 17.

23 May—The Northern Mobile Rally, The Great Yorkshire Showground, Harrogate. 10am-6pm. Ample car parks; bar; refreshments. Many attractions for the xyl and junior ops. Facilities for the disabled. Lectures etc. Further details from G8KRU, 14 Fieldhead Road, Guiseley, Leeds LS20 8DT. **Please note change of venue.**

13 June—RNARS Mobile Rally, HMS Mercury. Open 10am to 5.30pm. All usual trade stands, and arena events. Talk-in on S22, 432MHz, and 3,660kHz after 0830. Raffle and picnic facilities. Details from A.G. Walker, G4DIU, 103 Torrington Road, North End, Portsmouth PO2 0TN.

Contests calendar

November/ December	BATC Cumulative *(Rules in July issue)*
6 December	144MHz Fixed *(Rules in October issue)*
12-13 December	ARRL 10 Meter *(Rules in December MOTA)*
27 December	Canada *(Rules in December MOTA)*
1982	
January	Cumulative Activity Periods *(Rules in December issue)*
1 January	AGCW *(Rules in December MOTA)*
10 January	Affiliated Societies *(Rules in December issue)*
16-17 January	Third International 160m Phone *(Rules in December MOTA)*
17 January	70MHz CW
23-24 January	White Rose SWL *(Rules in October issue)*
31 January/ 28 March	70MHz Cumulative
6-7 February	7MHz Phone *(Rules in August issue)*
7 February	432MHz Fixed
13-14 February	1·8MHz (First)
27-28 February	7MHz CW *(Rules in August issue)*
6-7 March	144, 432MHz & SWL
13-14 March	Commonwealth *(Rules in November issue)*
20 March	AGCW—DF UHF/VHF CW (432MHz) *(Rules in June issue)*
3 April	1,296MHz Trophy
4 April	432MHz Trophy & SWL
4 April	ROPOCO 1
18 April	144MHz CW
18 April	Low Power
1-2 May	432/1,296/2,304MHz
2 May	144MHz Low Power
16 May	Region Round-up
22-23 May	144MHz
5-6 June	NFD
13 June	70MHz & SWL
26-27 June	1·8MHz (Summer)
3-4 July	VHF NFD
18 July	3·5MHz Field Day
1 August	144MHz QRP
15 August	70MHz Trophy & SWL
29 August	ROPOCO 2
4-5 September	144MHz & SWL
4-5 September	IARU 144MHz
4-5 September	SSB FD
2-3 October	432MHz-2·4GHz & SWL
2-3 October	IARU VHF
10 October	21/28MHz Phone
17 October	21MHz CW
October/ December	432MHz Cumulatives
October/ December	1,296MHz Cumulatives
6-7 November	144MHz CW
6-7 November	Marconi Memorial CW
13-14 November	1·8MHz (2nd)
5 December	144MHz Fixed

OBITUARIES

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

Mr W. Farquhar, GM3LML
Bill Farquhar died on 24 September, aged 76. He was an active and well-known member of the Scotch Corner and Fife Nets.

Mr D. H. Jones, G3BO
Donald Jones died on 10 August. He had been an enthusiastic member of the Society for many years.

Mr W. A. Levett, G8JLL
Bill Levett died on 19 August. He passed the RAE and joined Maidenhead & DARC as a blind operator, but later partially regained his sight and became very active on 144 and 432MHz. He had earlier radio experience in the RAF and at Heathrow. He was keen on construction and built his own base station. He was also a member of the RAISC, the Southern FM Group and Bracknell Repeater Group.

Mr M. McLeay, GM3GAY
Murdo McLeay died on 2 October, aged 75. He was licensed shortly after the second world war. He encouraged many to take up amateur radio, worked on GB3GN, and was active on the hf bands.

Mr B. R. Meredith, G2CYV
Bert Meredith died on 12 August, aged 66. He operated on the hf bands and maintained a number of regular schedules on the 14MHz band with VK and ZL.

Mr E. C. Norris, RS45556
Mr Norris died on 13 August, aged 69. Although he passed the May RAE, his illness prevented him from taking up an amateur transmitting licence.

Mr F. T. Wilson, formerly G2XX
Frank Wilson died on 28 September, in Adelaide, Australia. He was involved in radar at the Malvern Radar Establishment during the war.

Also:
Mr E. G. Fry, G4FTM, on 17 June;
Mr G. P. Grant, RS45439, on 21 June;
Mr W. L. Johnson, G6LQ;
Mr R. F. Luntley, G3OOG;
Mr A. Schapp, DF5TB;
Mr D. R. Spearing, G3JG;
Mr R. A. Wheldon, RS36261;
Mr A. Trevena, G3ADB;
Mr M. Turnbull, G4ESA.

COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 1 October 1981

Present: Mr B. O'Brien (President, in the chair), Dr E. J. Allaway, Messrs J. Anthony, R. J. Bellerby, Dr D. S. Evans, Messrs K. A. M. Fisher, L. N. G. Hawkyard, Mrs J. Heathershaw, Messrs G. R. Jessop, I. Kyle, W. J. McClintock (members of Council), A. W. Hutchinson (editor) and Mrs H. M. Allin (minutes secretary).

Before the meeting, the President referred to the death of Mr Roy Stevens, MBE, G2BVN, on 30 September. A minute's silence was observed in remembrance and respect.

Apologies for absence were received from Messrs R. Barrett, J. Bazley, P. F. D. Cornish, D. Pratt, G. M. C. Stone, and D. A. Evans.

Cost of equipment
The President reported that he had now received a reply from the Amateur Radio Retailers Association regarding the cost of Japanese equipment, and that this would be published, together with the Society's original letter, in the November issue of *Rad Com.*

Novice licence
Mr Fisher said that the original proposal for the novice licence had the support of the VHF Committee, which had stressed its hope that consideration would be given for a vhf allocation in the future. Some discussion ensued on the future of the novice licence and the Class B licence.

Financial report
Mr O'Brien read a letter from the honorary treasurer, which gave details of the recently-completed audit.

Several Council members said they had received comments from members about the latest subscription increase. After a short discussion, the President drew attention to the cost of receiving by post a year's supply of another well-known electronics magazine which was £1.50 less than the RSGB subscription, and commented that this seemed very little to pay for the services detailed on the Society's "jigsaw" poster.

Mr Jessop felt that the Shirley-Price legacy should be kept entirely separate from other Society funds and left to accrue interest, which could be used without touching the original legacy.

General manager's report
The general manager was on holiday in Greece but had sent a telex from Athens, stating that positive moves had been made to conclude a Greek-UK reciprocal licence agreement which would, hopefully, be finalized in the near future.

IARU Region 1 Conference 1981—report from G3GVV
This report had previously been circulated to Council.

The President read a memo he had received from Mr Stevens, G2BVN, as IARU Region 1 Secretary, concerning Item 5 in Mr Hughes' report, regarding invitations to meetings organized by various national societies.

Some discussion followed regarding the future of IARU Region 1 secretaryship following the death of G2BVN.

CB Working Group recommendations
Dr Evans stressed that the items under consideration were guidelines rather than recommendations, and had not yet been discussed by the relevant committees.

Discussion then followed on each recommendation.

Recommendation E was put to Council formally and subsequently accepted, with 9 for the recommendation and 1 against. It was thus agreed that it was Council's policy not to accept any cb advertising, either from traders or members.

Mr Bellerby suggested that amateur radio could compete openly with cb, and added that there was a need for a publication to bridge the gap between cb and amateur radio. Mr O'Brien replied that this was under consideration and might perhaps be similar to an ARRL publication entitled *Stepping up to amateur radio.*

After further discussion it was agreed that the CB Working Group minutes would be circulated to regional representatives (for their consideration prior to the RRs Conference on 17 October) and committee chairmen, for their comments.

VHF manager's report
Mr Fisher said that he was still receiving complaints from holders of two-letter callsigns, objecting to their calls being allocated to repeaters. After consideration by the RWG and the VHF Committee, he had replied to each letter stating that the suffix should not be considered unique and that it was in order to use it for a GB-call.

Mr Fisher further reported that the problem of Syledis continued. An information sheet had recently been produced by Mr Stevens, G2BVN, and would be circulated to Council for information. The matter was still under discussion within the Home Office.

Referring to the IARU beacon band on 144MHz, Mr Fisher confirmed that negotiations were continuing to solve Raynet's problem caused by the loss of two frequencies.

Review of committee business
Education
Mr Anthony commented that the possibility of an Open University-type RAE course looked promising.

Finance & Staff
A brief discussion took place on HQ attendance at rallies and exhibitions. This was considered to be beneficial.

HF
Minutes of a meeting of this committee were accepted without comment.

HF Contests
Minutes of a meeting of this committee were accepted with one amendment.

Interference
Mr Anthony spoke of an invitation received from the IARU EMC Committee to present an EMC paper in Poland next year. After a brief discussion, Mr Anthony agreed to present estimated costs to the next meeting of the Finance & Staff Committee before again referring the question to Council.

Membership & Representation
The minutes of a meeting of this committee were accepted without comment.

Microwave
The following awards were proposed and agreed by Council: Marconi Medal to G8DEK, Mullard Award to G3HWR, and the Fraser Shepherd Prize to G3JHM.

Propagation Studies
A recommendation to Council that Mr M. R. Lee, G3VYF, be invited to join this committee was approved.

Rally & Exhibition
Mr Hawkyard voiced the committee's concern over estimated costs of an RSGB exhibition at Alexandra Palace next year. A full report would be prepared, and it was felt that careful consideration should be given to the future of exhibitions.

Raynet
Minutes of a meeting of this committee were accepted without comment.

Technical & Publications
Dr Evans reported that a print order for a further 15,000 copies of the *RAE Manual* had just been placed; judging by current sales figures, this printing would last for approximately six months.

He also reported that the draft Green Book was almost complete and would be discussed in detail at the next meeting of Council. He would ask committee chairmen for their comments prior to Council's next meeting. Relevant sections of the Green Book would also be circulated to committee members for comment.

Telecommunications Liaison
The President read a letter sent to the GM from the Home Office, dated 21 September, which set out the following changes to amateur frequencies:
(1) 10,000-10,150kHz. This band will be available to the amateur service on a secondary basis from 1 January 1982.
(2) 18,068-18,168kHz and 24,890-24,990kHz. These bands will remain allocated to the fixed and land mobile services until existing assignments have been transferred to new frequencies. Until that time (and from 1 January 1982) the amateur and amateur satellite service will operate on a secondary basis. **(At the time this report goes to press, UK amateurs have not been given permission to use the 18 and 24MHz bands —See "QTC" for latest news.)**
(3) From 1 January 1982 the allocation at 70MHz will be reduced from 70·025-70·7MHz to 70·025-70·5MHz. Since this allocation does not appear in the Radio Regulations, ie is not available in other countries, it is not proposed to allow access to the band by Class B licensees.
(4) From 1 January 1982 the allocation to the amateur service at 1·3GHz will be changed to 1,240-1,325MHz. In addition the amateur satellite service (earth-to-space) may operate in the band 1,260-1,270MHz.

Concern was expressed at the recent lack of meetings of this committee because it had not been possible to obtain a quorum, and the general question of the figure required was raised. In the draft Green Book, Dr Evans had proposed that the required figures be lowered.

Mr Jessop proposed that the required quorum for the Telecommunications Liaison and Finance & Staff committees be amended to half of the full committees. This was seconded and agreed.

RWG
Some discussion took place on the work undertaken by this committee. It was felt that much of the detailed information given was duplicated in the minutes of the VHF Committee. However, Council viewed the work done by RWG, as indicated by their minutes, as highly satisfactory.

VHF Contests
The minutes of two meetings of this committee were accepted with one amendment.

Correspondence
Dr Evans had received a report from Mr D. Simmonds, G3JKB, co-ordinator of the audio tape and slide library, which would be circulated to Council for information.

The President and the general manager had received invitations to attend a convention at Ballymascanlon on 10/11 October.

Mr D. Baptiste had written to Mr O'Brien, expressing his pleasure in accepting Council's invitation to become an Honorary vice-President of the Society.

Emergency communications
Dr Allaway reported on his recent visit to the Emergency Communications meeting in Sicily, as a representative of IARU. Presidents and emergency communications managers from many national societies had attended this meeting, where many aspects of emergency communications had been discussed. The President added that Dr Allaway had been proposed to chair the meeting, and thanked him for his report.

YOUR OPINION

RAE AT 14
The Editor
Radio Commuication
Sir—Recently my son, Mark Ryder, RS43580, received the result of his RAE which he sat in May. I am pleased to say he passed both parts of the exam, with a pass in part 1 and a credit in part 2. Many people will have passed, but what pleases us more is that he is still only 14 years of age and his interest in radio listening began only just over 20 months ago, when he was given an old domestic valve radio. He listened to short wave, and as his interest grew we purchased a Sanyo R8880 multiband radio and later an FRG7 (secondhand).

He tried to enrol for the RAE course at the local technical college, but as he was still at school he was not allowed to do so. This made him more determined, and armed with *Radio Amateurs Examination Manual* (8th edn) he got "stuck in". He is now going to concentrate on morse, and his sights are set on an FT101ZD. I have no knowledge at all of amateur radio, so I was of no assistance to him whatsoever, but I would like to encourage other budding amateurs to persevere even when there are obstacles in their way. A genuine interest and dedication to the hobby will help them through. *G. Ryder*

1981 VHF National Field Day results

	OPEN SECTION	RESTRICTED SECTION
Winner	Martlesham & Ipswich RS	Westmorland VHF CG
Runner-up	Bracknell ARC & G4ERP CG	Reading ARC
Band leaders:		**Band leaders:**
70MHZ	South of Scotland VHF CG	Lagan Valley ARS
144MHz	Hants & Dorset WG	AERE Harwell ARS
432MHz	Martlesham & Ipswich RS	Reading ARC
1·3GHz	Bracknell ARC & G4ERP CG	Westmorland VHF CG
Leading GD	University of Southampton	No entry received
Leading GM	South of Scotland VHF CG	Glenrothes & DARC
Leading GW	Bracknell ARC & G4ERP CG	Blackwood ARS
Leding GI	North West ARC	Lagan Valley ARS
Leading GU	Guernsey ARS	No entry received

The 1981 VHF NFD saw the introduction of the Restricted section, and from the total number of entries and comments received it looks as though it was successful. The number of entries was up by 11 per cent. Although the entries were not equally balanced between the two sections there was still a good entry in the new section. It was clear during adjudication that many groups would have achieved a better overall position if all their stations had conformed to the requirements of the Restricted section. There were several groups who used low power on 70,432 and 1,296MHz, but thought it necessary to use much higher power on the 144MHz band. Perhaps after seeing the results tables and using their calculators they may change their minds for next year.

One thing that did make a large difference to some groups' positions in the tables this year was the standard of log keeping. A number of groups sent in very neat, typed or computerized logs, which made checking very simple, while at the other end were the nearly illegible logs, which looked as if they were the ones written on the day. Several hundreds of points were lost by one group, who obviously did not even read their logs carefully before sending them in, as "GM4JRC/P" was logged as "8km N Ely", many QTH locators ended in the letter M and a host of PE stations were clearly logged as FE stations. It was also stated by one group that a fortnight was a very short time to prepare and score its logs and suggested that the period be extended to 21 days. However, the problems encountered this year with adjudication put the results back and delayed publication to the December issue. Your thoughts would be welcome—are you prepared to wait for the results for the sake of an extra week?

The Cat & Custard Pot Contest Group enclosed some very interesting observations with its logs, one being the fact that no guidelines are available on how points are lost for incorrect information logged, and from this the VHF Contests Committee is now in the process of crafting an artcile for a future issue of *Rad Com*. Another point it mentioned concerned computer scoring, as various types of machine will give a different answer, and on 1,296MHz this could give a pronounced advantage. The VHF Contests Committee is fully aware of the problem and re-scores every 1,296MHz log using one standard computer.

Congratulations must go to the Martlesham & Ipswich Radio Society for maintaining its long-standing position as overall leader in the Open section. However, this year its margin was by no means so commanding. In the Restricted section the Westmorland VHF Contest Group must also be congratulated, not only for winning, but for showing that VHF NFD in its new form can now be won from a site outside the Home Counties.

The Surrey Trophy will be awarded to the Martlesham & Ipswich Radio Society, and the Tartan Trophy to the South of Scotland VHF/UHF Contest Group. The terms of reference for the Arthur Watts Trophy have now been amended and this trophy will be awarded to the Westmorland VHF Contest Group as winners of the Restricted section of the contest.

Comments

Many groups commented that they appreciated the introduction of the Restricted section, and that it made their equipment more competitive and did not leave them at the end of the event bemoaning the lack of 400W. Other groups felt that it was too restricted—the main moan being the size and height of antenna system permitted. Further comments on these points would be welcome.

"Hells Angels tried to steal the generator." — *Watford Group.*

"Where were the inspectors?" — *Hastings Group. (Your turn will come).*

"Nobody nearby seemed to be running high power and the general lack of QRM was pleasant." — *Havering & DARC.*

70MHz

Activity on this band has undoubtledly increased considerably since last year's event. GW3SNN/P managed to make 157 contacts, setting a new record for VHF NFD.

It was also noted that some different callsigns are appearing nearer the top of the tables, and not necessarily those who were located in the remote parts of the country, as has been the norm over the past years.

A number of comments were again received regarding closing the station on this band during the night, the VHF Contests Committee is still looking into the feasibility of this and will be doing its homework again on this year's logs.

Conditions on the band were described as average to good, thus aiding dx working. Equipment is still improving, with many more groups using 6, 8 or even 10 element antennas. Larger power amplifiers also seem to be more popular.

Congratulations to the winners and runner-up in both sections.

G5HD

144MHz

This band as usual produced most of everything—good dx, high activity, poor quality signals and most of the headaches for the VHF Contests Committee.

Although conditions were described as "average to slightly better than", the best dx distances were very high for such an event. There were also many reports concerning the quality of signals being radiated by contest stations, some of these undoubtedly caused by different members of the group bringing their piece of the station and then "plumbing" it all together for the first time on the day. *Please* check all the equipment you are going to use *before* the event and under field conditions, ie running on a generator, etc. Get a local station to give a report on your signal by not only listening to it when correctly tuned, but listening to see how far your sidebands spread. Then do the same on the day to see if anything has changed. It is also a good idea to note the callsign of the checking station(s) on the logsheet, so that if there are any complaints aimed at your group after the event, you can remember who gave you the clean bill of health.

Congratulations to G3SOU/P, operating from the YK square, who took advantage of the abnormal conditions and became band leader, leaving some of the better-known callsigns down the tables.

Many thanks to all who sent in check logs.

G2HIF

432MHz

Conditions on this band were generally found to be about average and many groups agreed with the feeling, expressed by G4HTD, that the going was "plodish". The weather, although generally good, caused some difficulties, and at least two groups suffered damage when, perhaps being over ambitious, antenna arrays failed to stay above ground level.

It was noticeable that a lot more care was necessary in correctly recording callsigns. A little more time taken to confirm this, and to some extent location information, would have saved several groups a number of points. One group was forced to change its QTH exchange when it discovered that stations "did not believe or would not write it as spelt", and yet another had one operator who got a little mixed up and used a different exchange to the remainder of his team. Both these variations were fully explained on the cover sheet and, on this occasion, no points were deducted.

Only one group commented on the effect of the low and high power sections, and it must be assumed that the arrangement was generally acceptable on this band. Relatively few stations used other than commercially available equipment and this usually consisted of a 28MHz or 144MHz transceiver driving a transverter, often used to feed the antenna direct but otherwise followed by a linear capable of up to 100W output. Very few stations used home-built linear amplifiers, and these were generally found to be designed for over 200W output.

One log was found to be unacceptable due to the only contact recorded being with one of the two listed operators.

Check logs are gratefully acknowledged from G8WYR/P.

G3LCH

1,296MHz

The combined total entry of 55 plus 15 was 10 up on 1980. Equipment again has advanced, with most stations having 10W of rf or more and some running the legal power output with a 6 × 2C39 configuration as the final amplifier. However, the 1W transverter was still used by some with surprising results—one dx contact at 383km was reported.

Conditions were generally judged poor although lift conditions did exist for short periods. G3SPJ/P had many long distance contacts from 5km SE Wearhead and claimed a record for constructing his 6ft dish reflector on site in the 8h preceding the contest. This antenna worked well—making a Yagi array "feel like wet string". However, the GW portables placed first and second had a commanding lead over all other entrants, the leading score of 23,638 being a large increase over the leading 1,296MHz station in 1980, G3XDY/P, with 15,721 points.

Overall there is no doubt that 1,296MHz has "come of age" and contacts pre-arranged on 432MHz are now the exception rather than the rule. In fact, the sophistication of the equipment used for the band is much the same as on 432MHz, and the level of activity and results obtained demonstrate this.

G3FZL

OPEN SECTION OVERALL RESULTS

Posn	Group	Total points	Band position 70MHz	144MHz	432MHz	1,296MHz
1	Martlesham & Ipswich RS	3,347	7	3	1	4
2	Bracknell ARC & G4ERP CG	3,337	5	6	3	1
3	Parallel Lines CG	3,291	16	2	5	2
4	HADRABS & Addiscombe CG	3,274	2	7	2	3
5	Hants & Dorset Wireless G	3,031	6	1	4	5
6	Wulfrun CG	2,704	9	5	7	6
7	Norfolk VHF/UHF CG	2,681	4	8	6	12
8	Cray Valley RS	2,425	8	4	11	10
9	The Hillbillies	2,249	18	14	9	9
10	Albright & Wilson ARS	2,025	10	13	18	15
11	Bedford & DCG	1,957	36	9	12	13
12	Leicester & M Mowbray RS	1,902	27	18	14	11
13	S Scotland VHF/UHF CG	1,881	1	34	19	33
14	Quantock CG	1,879	13	30	17	8
15	Sutton & Cheam RS	1,782	26	16	15	19
16	Plymouth RC	1,720	3	19	25	40
17	Horsham ARC	1,691	29	12	24	21
18	Medway VHF/UHF CG	1,679	52	23	8	14
19	Martlet CG	1,630	15	33	22	17
20	Hastings & Southdown ARS	1,582	43	10	10	–
21	Norfolk ARC	1,561	35	21	21	20
22	Hull & DARC	1,512	19	15	42	36
23	Crawley ARC	1,396	22	41	41	18
24	PACT	1,372	11	24	29	–
25	Worthing & DARC	1,360	17	32	40	26
26	Crawley Court ARG	1,351	39	36	35	16
27	Scunthorpe VHF CG	1,324	–	26	23	7
28	Hornsea RS	1,323	12	39	26	44
29	White Rose RS	1,288	23	25	32	52
30	Southgate RC	1,285	24	28	34	41
31	Crystal Palace/Socom RC	1,237	–	11	20	–
32	Tamworth ARS	1,215	40	22	38	34
33	South Manchester RC	1,174	31	35	46	30
34	Malvern Hills RAC	1,167	33	52	13	–
35	South Bucks CG	1,137	28	59	28	27
	Great Lumley ARS	1,137	26	40	37	50
37	Northern Heights ARS	1,091	21	37	53	–
38	Ebor Group	1,057	14	27	–	–
39	ARC of Nottingham	1,037	38	50	30	32
40	Mid Lanark ARS	1,034	42	17	68	–
41	Clifton ARS	999	51	48	43	22
42	Cheltenham ARA	988	47	20	58	–
43	Telford & DARS	986	25	54	47	46
44	Guernsey ARS	975	32	42	52	–
45	Newbury & DARS	959	37	31	56	–
46	Grafton RS	891	44	56	31	48
	Guildford & DRS	891	41	67	36	35

Posn	Group	Total	Band position 70MHz	144MHz	432MHz	1,296MHz
48	South Dorset RS	858	53	43	50	37
49	Brighton & DRS	796	44	55	44	–
50	Cornwall RAC	777	34	61	72	43
51	Preston ARS	765	30	68	60	–
52	Yeovil ARC	764	54	44	39	–
53	Dunstable Downs RC	735	–	29	59	24
54	Kidderminster ARC	677	48	57	55	–
55	Chester & DRS	669	–	46	27	39
56	Mid Sussex ARS	625	–	63	33	23
57	Newquay ARS	603	20	–	75	54
58	North West ARC	601	46	58	73	–
59	Ayr ARG	588	49	66	70	51
60	Farnborough & DRS	584	–	47	49	28
61	Bournemouth RS	570	–	45	54	29
62	University of Southampton	535	–	38	48	–
63	Doncaster ARC	531	55	74	45	45
64	North Liverpool CG	506	–	–	16	31
65	Bristol ARC	497	50	73	71	53
66	Bury St Edmunds RS	407	–	53	63	42
67	Lincoln SWC	397	–	51	57	–
68	Barry CFERS	396	57	49	64	–
69	Ealing & DARS	356	58	60	64	47
70	Warrington & DARS	347	56	64	66	–
71	Basingstoke ARC	332	–	62	51	–
72	Wirral & DARC	289	–	65	61	–
73	Conway Valley RS	266	–	71	67	49
74	Greater Peterborough ARC	243	–	69	62	–
75	Borders ARS	168	–	72	74	–
76	Bridgend & DARC	142	–	70	0	–
77	Kelly College ARS	101	–	75	68	–

G4BEL

RESTRICTED SECTION OVERALL RESULTS

Posn	Group	Total points	Band position 70MHz	144MHz	432MHz	1,296MHz
1	Westmorland VHF CG	3,012	2	19	5	1
2	Reading ARC	2,882	3	8	1	3
3	AERE Harwell ARS	2,611	16	1	6	2
4	Cat & Custard CG	2,548	5	6	3	4
5	Blackwood ARS	2,463	10	2	2	–
6	Lagan Valley ARS	2,198	1	3	24	14
7	Surrey Radio Contact C	2,110	14	12	4	6
8	South Birmingham RS	2,012	6	13	7	5
9	RS of Harrow	1,868	4	4	15	12
10	Maidenhead & DARC	1,720	8	15	16	7
11	Coulsdon CG	1,719	12	20	9	8
12	Stowmarket & DARC	1,605	19	7	13	11
13	Five Bells Group	1,464	29	5	11	13
14	North Kent RS	1,316	15	14	14	–
15	Edgware & DRS	1,305	17	24	7	–
16	Vale of White Horse RS	1,217	20	9	23	–
17	Swindon & DARC	1,199	21	16	12	–
18	Bolton QRPG	1,196	7	32	22	–
19	Havering & DARC	1,141	27	25	19	10
20	Saffron Walden/G4KF CG	1,057	18	22	25	–
21	Six Fifty CG	1,053	31	11	10	–
22	Mid-Cheshire ARC	1,040	22	26	20	–
23	Glenrothes & DARC	968	9	18	–	–
24	Bury RS	927	23	33	27	–
25	Exeter ARS	865	28	22	26	–
26	Shirehampton RC	862	11	27	–	–
27	Spalding & DARS	828	13	28	–	–
28	Milton Keynes & DRS	792	25	40	21	–
29	Torbay ARS	777	–	17	17	–
30	Windy Hill RF Hunters	760	24	36	35	–
31	Chiltern ARC	750	–	37	30	9
32	Salisbury RES	673	–	28	18	–
33	Basildon Marconi RS	611	–	21	31	–
34	East Antrim CG	604	–	10	39	–
35	Victory CG	591	–	30	29	–
36	Grimsby ARS	585	–	31	33	15
37	Thornton Cleveleys ARS	495	–	39	28	–
38	GM3TAL & G3SHK Group	408	26	–	34	–
39	Mid Warwick ARS	390	30	42	36	–
40	Barnsley & DARC	352	–	38	37	–
41	Watford RC	347	–	41	32	–
42	Magherafelt ARS	328	32	34	41	–
43	G8PXB & G8EBT Group	314	–	35	40	–
44	Mansfield RS	184	–	43	38	16

G4BEL

70MHz BAND RESULTS

OPEN SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	GM3WOJ	1,811	137	XO26	G3LTY/P	570
2	G4ALE	1,509	137	YK31	GM3YOR/P	633
3	G3ZYY	1,460	132	YK21	GM3YOR/P	612
4	G3MPN	1,438	148	AM06	EI9Q	540
5	GW3SNN	1,308	157	YN75	EI2CA	410
6	G3PFM	1,226	141	YK30	GM3YOR/P	615
7	G4FAW	1,215	135	AM67	EI2CA/P	562
8	G3TAA	1,165	129	AL56	EI2CA/P	654
9	G3XBY	1,158	146	YM75	GM3TAL/P	438
10	GW3UEY	1,151	145	YM54	GM3YOR/P	435
11	GM4BVE	1,120	103	XO10	G3LTY/P	550
12	G4GGD	1,100	115	ZN07	GU3HFN/P	515
13	G2ASF	1,082	126	YL75	GM4BVE/P	436
14	G3JFO	1,081	109	ZO55	G4EIK/P	525
15	G4AOL	1,080	126	AK11	GI4AHD/P	652
16	GW4HNS	1,079	142	YN75	GU3HFN/P	446
17	G3YHM	1,073	133	ZK09	GM3YOR/P	619
18	G3ZTZ	1,065	156	ZL15	GI4AHD/P	517
19	G3AMW	1,052	112	ZN18	GJ3JYH	534
20	G4ADV	1,049	81	XK54	G3JYP/P	531
21	G4EMW	1,006	118	ZN11	GU3HFN/P	485
22	G3TIR	1,004	128	ZL76	GM3YOR/P	592
23	G3PSM	995	119	ZO72	GU3HFN/P	517
24	G3ZVW	957	136	ZL42	GM3YOR/P	539
25	G3UKV	948	136	YM28	EI2CA/P	401

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
26	G4BOX	937	129	ZN71	GU3HFN/P	409
	G4LMX	937	92	ZO22	G4ALE/P	478
28	G8LM	910	135	ZM26	EI2CA/P	515
29	G4CRJ	891	134	ZL26	GM3YOR/P	515
30	G3SWC	888	121	ZK08	GI4ELQ/P	531
31	G4LND	867	96	YO78	G4EIK/P	470
32	G4MFI	864	118	ZN61	GU3HFN/P	424
33	GU3HFN	843	73	YJ48	GI4ELQ/P	596
34	G4CDQ	841	123	YM79	GM3YOR/P	463
35	G4EIK	837	66	XK64	G3JYP/P	538
36	G3PDH	823	101	AM56	GI4ELQ/P	515
37	G4BWP	750	126	ZM68	GM3ZAS/P	427
38	G3UAX	740	110	ZL53	GI4AHD/P	540
39	G4EKW	736	113	ZM04	GJ3YAU	415
40	G3RDQ	729	109	ZL73	GM3YOR/P	580
41	G4FWC	722	114	ZM73	EI2CA/P	469
42	G3PJX	712	112	ZL69	GI4ELQ/P	490
43	GM4JLD	692	53	YP25	G4AOL/P	578
44	G3WQK	681	95	AK03	GM3WOJ/P	595
45	G4IIL	638	82	ZK10	G4ADV/P	521
	G3ZKE	638	88	AL06	GI4ELQ/P	530
47	GI4AHD	596	40	WP77	G4AOL/P	651
48	G3ZKN	589	92	YL20	GM4JLD/P	431
49	G4LUP	568	90	YM47	GJ3RAX	358
50	GM3ZAS	558	49	XP76	G3YHM/P	542
51	G4KUQ	546	91	YL38	EI2CA/P	402
52	G3JKY	537	93	AL52	GM3WOJ/P	490
53	G4IYA	482	65	AL56	GI4ELQ/P	576
54	G3YWG	474	64	YK28	GM3WOJ/P	470
55	G3DSS	414	56	YK05	G3JYP/P	470
56	G4KKJ	412	66	ZN44	G4ALE/P	361
57	G3MMD	136	28	YN58	G4FAW/P	285
58	GW4LWL	18	6	YL24	G3ZVW/P	117
59	G3SGT	1	1	ZL26	G3ODR	39

RESTRICTED SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	GI4ELQ	1,454	107	XO51	GU3HFN/P	596
2	G3JYP	1,356	120	YO29	G4EIK/P	538
3	G3WGV	1,076	142	ZL54	GM3YOR/P	562
4	G3MLS	914	119	XK10	GI4ELQ/P	555
5	G3LTY	863	99	AL76	GI4ELQ/P	584
6	G4EYD	851	131	YM50	EI2CA/P	426
7	G4AQB	830	100	YN38	G4EIK/P	419
8	G3TWG	797	121	ZL17	GI4AHD/P	539
9	GM3YOR	789	66	YO56	G3PFM/P	615
10	GW4FCV	764	108	YL06	GM4JLD/P	108
11	G4EQP	754	106	YL49	GM3YOR/P	525
12	G4BFJ	724	110	ZL59	GM3YOR/P	582
13	G4HLF	718	92	AN51	GI4AHD/P	480
14	G4FUU	705	112	AL51	GI4ELQ/P	540
15	G4CW	685	101	AL51	GM4JLD/P	630
16	G2HIF	665	112	ZL33	GM3YOR/P	–
17	G3PSP	619	109	ZL29	GM4JLD/P	478
18	G4KF	574	96	AM72	GM3WOJ/P	452
19	G4GKE	547	67	AM65	GI4ELQ/P	520
20	G5RP	534	93	ZL34	GM3YOR/P	547
21	G4LDL	529	86	ZL32	GM3YOR/P	533
22	G4CAX	521	72	YN67	G4EIK/P	420
23	G3BRS	520	71	YN39	GU3HFN/P	461
24	GI4CSP	467	44	WO80	G3MPN/P	480
25	G4AFN	381	71	ZM76	GM3WOJ/P	385
26	GM3TAL	322	25	XP15	G4CRJ/P	565
27	G5AQQ	308	70	AL22	G4ADV/P	415
28	G4KEE	301	43	YK13	G3MPN/P	392
29	G4EMK	247	37	ZM29	GM3YOR/P	366
30	G4HWF	140	34	ZM63	G3JYP/P	292
31	G4HVR	62	18	YN37	G3MPN/P	266
32	GI4LVC	19	7	WO27	GM3WOJ/P	115

LISTENER SECTION

Posn	Station	Points	QSOs	QRA	Best dx	Km
1	BRS15822	35	7	ZL40	GW3SNN/P	262

Checklogs acknowledged from G3VIP, G3BPM and G3TVW/P.

144MHz BAND RESULTS

OPEN SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3SOU	8,136	672	YK30	DD3UD	816
2	GW4LIP	7,843	806	YN75	F1DV	907
3	G4BPO	7,676	755	AM67	OK1KIR/P	838
4	G4BUO	7,512	665	AL65	EA1QB/P	1,042
5	G8BHH	7,260	671	YM75	DK8SG	892
6	GW4ERP	6,852	696	YN75	DK1QHF/P	822
7	G4BAR	6,780	515	YK31	HB9PBR	943
8	G3ZIG	6,635	627	AM06	HB9BS/P	772
9	G4FEV	5,926	583	ZM68	F1FNY/P	779
10	G6HH	5,924	546	AK03	F1FVD/P	768
11	G4BWG	5,834	544	AL45	OK1KVK/P	838
12	G4HRS	5,590	587	ZK08	EA1VY	941
13	GW3OXD	5,568	603	YM54	F1BDE/P	740
14	G4APA	5,545	599	ZL15	DK3UZ	774
15	G8GBY	5,290	416	ZN18	DL6FAW/P	679
16	G4CQR	4,968	594	ZN71	DD3UD	885
17	GM3PXK	4,776	427	YP25	F1FVD/P	767
18	G3LRS	4,584	544	ZM26	F0EWD/P	732
19	G3PRC	4,569	449	YK21	DL9GS	789
20	G5BK	4,497	552	YL20	F1KLI	772
21	G4ARN	4,370	420	AM56	EI3VDE	720
22	G8TRS	4,201	522	ZM73	DD3UD	807
23	G8MWA	4,088	449	AL56	GI4LKA/P	678
24	GM3WFW	3,947	380	XO10	F1FHI	881
25	G3XEP	3,809	437	ZO72	F3TP	719
26	G4CDC	3,808	427	ZN49	DF0AP	441
27	G8HYF	3,746	433	ZO55	EI3VDE	630
28	G3SFG	3,740	443	ZL42	DL9GS	623
29	G8DDC	3,634	480	ZL18	DD5OZ	617
30	G4ETN	3,579	412	YL75	F1FNY/P	841

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
31	G3WOI	3,496	462	ZL53	ON7ZX	621
32	G3WOR	3,474	482	ZK09	GI4LKA/P	575
33	G4DZO	3,432	354	AK11	DG2SK/A	695
34	GM4IGS	3,363	308	XO26	F6BZA	967
35	G3FVA	3,360	455	ZN61	HB9PTD	850
36	G4GSK	3,318	438	ZL73	F1CTK	675
37	G2SU	3,314	473	ZN11	ON7ZX/P	721
38	GD3KMI	3,139	342	XO59	GU4IUW	551
39	G3TEU	3,111	359	ZN07	DN0NAC/P	823
40	G4EUZ	3,084	317	ZO22	DK1VC/P	800
41	G3WSC	3,042	397	ZL76	DK1VC/P	665
42	GU4IUW	3,033	275	YJ48	F6GBL	709
43	G3SDS	3,018	333	YK28	DL0CV/P	713
44	G3CMH	2,737	316	YK05	F6EKG/P	821
45	G2BRS	2,614	340	YK19	F1BDE	858
46	GW3GIZ	2,562	373	YN65	F1DME/P	625
47	G4EFY	2,531	388	ZL66	F6DZS	904
48	G8APV	2,515	343	AL52	EI2CA/P	610
49	GW4BRS	2,442	315	YL24	DL0KU	748
50	G6CW	2,292	356	ZM04	F6GCP/P	552
51	G5FZ	2,261	285	ZN78	DF0AJ/P	634
52	G4BVY	2,258	368	YM79	DK1DC	661
53	G6BSE	2,159	246	AM64	GI4DBB/P	581
54	G3ZME	2,146	333	YM28	F1FHI	618
55	G4GQR	2,124	249	ZK10	PA0TH	769
56	G3AFT	2,055	257	AL06	DK3UZ	615
57	G4CTU	1,979	286	YM47	DF0AJ/P	771
58	GI4DBB	1,869	147	WP77	F1DZP/P	731
59	G8VWA	1,846	336	ZL26	EI3VDE	582
60	G8UUP	1,825	355	ZL26	EI3VDE	587
61	G4CRC	1,800	165	XK64	ON1RN	706
62	G3TCR	1,574	254	ZL54	DL6FAW/P	645
63	G3ZMS	1,571	246	ZK10	GI4LKA/P	586
64	G4CDA	1,551	252	YN58	F1FHI	695
65	GW4MGR	1,550	280	YN65	ON7ZX/A	516
66	GM3KJF	1,542	145	XP76	G4GQK	555
67	G6GS	1,493	283	ZL69	GM3PXK/P	528
68	G3KUE	1,459	207	YO78	F1DPU/P	640
69	G4EHW	1,246	172	ZM48	DL9GS	530
70	GW4LNP	1,159	171	YL33	F6CJG/P	890
71	GW6TM	1,157	203	YN52	GM8TLG	425
72	GM8YPI	1,092	28	YP20	G3PRC/P	585
73	G4ABC	977	178	YL38	F2OH/P	573
74	G3UER	740	135	ZN44	GM8M8P	429
75	G8UDH	293	56	YK33	PE0MAR/P	560

RESTRICTED SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3PIA	3,832	487	ZL33	DF1OY/P	750
2	GW6GW	3,606	486	YL06	PA0APO/P	600
3	GI4GTY	3,186	286	XO51	F1KLI	1,112
4	G3EFX	2,821	317	ZK10	DL6FAW/P	567
5	G8JNV	2,759	297	ZM29	DK6KW/P	570
6	G3YMD	2,705	304	AL76	F6CJG	612
7	G4BJO	2,690	262	AM65	DL0AB/P	642
8	G4CCC	2,338	344	ZL54	DB4DL/P	597
9	G3SEK	2,111	353	ZL34	GI4LKA/P	500
10	GI4LKA	1,991	167	XO11	ON7ZX/A	875
11	G4LPL	1,970	314	YN37	F1FHI	719
12	G4DDY	1,938	316	AL51	DL6FAW/P	561
13	G8OHM	1,822	321	YM50	PA0APD	543
14	G8TNK	1,809	363	AL51	GI4LKA/P	560
15	G3WKX	1,653	267	ZL17	DL6FAW/P	623
16	G8SRC	1,650	249	ZL32	F6FDR	703
17	G3NJA	1,638	197	YK33	F6CJG/P	684
18	GM4GRC	1,629	176	YQ56	F6FLB	705
19	G4JHV	1,618	159	YO29	F1FVD/P	652
20	G4KKC	1,501	271	ZL59	EI6DL/P	530
21	G8VYK	1,487	239	AL32	DH0PAR	483
22	G4ARE	1,419	175	YK13	F6DKW	735
	G3PGN	1,419	195	AM72	GI4LKA/P	525
24	G3ASR	1,384	260	ZL29	DL0EE/P	680
25	G8HRC	1,363	233	AL22	DL6FAW/P	549
26	G3ZTT	1,340	215	YN67	F1FVD/P	570
27	G4AHG	1,315	205	YL49	F1FHI	475
28	G4FRS	1,280	152	AN51	DL7RQ/P	528
	G3FKF	1,280	164	ZL72	EI3VDE/P	560
30	G8NEH	1,278	216	ZL74	GI4GTY/P	485
31	G3CNX	1,251	157	ZN38	F1DPU	575
32	G8HXE	1,238	150	YN38	F1FHI	722
33	G8TMS	1,107	174	YN39	F1FHI	720
34	GI4MFT	1,027	115	WO27	F1COF	716
35	G8EBT	990	101	ZO58	F1BBD	540
36	GI8TVK	986	107	WO80	F1DPU/P	625
37	G8CAR	968	197	ZL27	GM3PXK/P	460
38	G6AJ	901	111	ZN32	DL0AN	620
39	G4ATH	892	124	YN15	F1DPU/P	574
40	G8MKC	807	172	ZM76	GM3PXK/P	410
41	G8CHW	543	121	ZL19	F1DPU/P	390
42	G8XDL	494	82	ZM63	GM3PXK/P	408
43	G3GQC	127	37	ZN74	PE0MAR/P	400

LISTENER SECTION

Posn	Station	Points	QSOs	QRA	Best dx	Km
1	BRS32525	1,217	217	AL41	GM3PXK/P	505
2	BRS26003	829	89	YO23	F1KBF	568
3	BRS15822	751	133	ZL40	DL0AN/A	460

Checklogs acknowledged from G3TVW, G8WYR/P, G4DFI, G4GCT/P, G4GBW, G3BPM, G2FSR and RS44984.

432MHz BAND RESULTS

OPEN SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km	Power
1	G4IRC	3,334	334	AM67	DK2NH	616	400
2	G8PUB	2,902	244	YK31	F6GBL	850	400
3	GW4BRA	2,576	254	YN75	DF3EE	724	350
4	G8HVY	2,558	248	YK30	DG1PU/A	700	400
5	GW4CLA	2,466	276	YN75	DJ9DL	729	400
6	G4LOJ	2,249	210	AM06	DF3XU	602	200
7	G3UBX	1,999	221	YM75	DG1PU/A	789	400
8	G4IOG	1,921	227	AL56	GM3SHK/P	640	250
9	G3YTE	1,739	229	ZL15	DC4VO/P	609	200
10	G8BQX	1,593	183	AK03	F0GJC/P	559	100
11	G4FAM	1,461	167	AL65	DC9BV/P	615	150
12	G8FMG	1,442	186	ZM68	DL0SO/P	539	400
13	G4GFX	1,418	186	YM79	F6BQX	564	50
14	G4FOX	1,396	194	ZM26	F6BQX	610	150
15	G4ADM	1,391	181	ZN71	F6BQX	667	100
16	G3VXK	1,324	180	ZN61	F6BQX	674	110
17	G4DSF	1,270	146	YL75	DG1PU/A	782	50
18	GW3YRJ	1,257	181	YM54	PA0EZ	560	100
19	GM4DIJ	1,231	112	XO26	G8YMD/P	570	400
20	G3FZL	1,169	138	AL45	DG1PU/A	508	30
21	G4DYC	1,141	128	AM56	DJ7YP	509	160
22	G4GZO	1,087	135	AK11	GM4DIJ/P	539	200
23	G4GZA	1,027	130	ZN49	F1DPU/P	560	25
24	G3WZT	1,012	153	ZK08	DJ9DL	530	200
25	G4HTD	948	104	YK11	PE0MAR/P	588	90
26	G3PWN	943	118	ZN07	F1DPU/P	602	100
27	GW8GIZ	929	121	YN65	F1BEG/P	630	48
28	G8TFI	917	155	ZL26	PE0HNE	440	400
29	GM4KOL	896	88	XO10	F1DPU/P	695	100
30	G3EKW	820	132	ZM04	F1ENS	505	200
31	G4EYV	806	100	AL06	GM4KOL/P	475	50
32	G8LVQ	804	103	ZO72	PA0WRC/P	559	100
33	G3VQN	785	115	ZK10	PA0CIS	479	250
34	G3RWL	767	122	ZL42	PA0WRC/P	530	–
35	G4IBA	743	125	ZL73	PA0EZ	473	200
36	G3TLM	726	134	ZL69	–	–	200
37	G4GBF	694	74	ZO22	PE0MAR/P	465	30
38	G4JBX	672	120	ZM73	PA0MVH	508	10
39	G4GNV	663	93	YK05	PE0MAR/P	509	100
40	G4FNL	645	116	ZK09	F6BQX	418	60
41	G3XNS	642	108	ZL76	DC4VO/P	576	60
42	G8PSE	638	87	ZN18	F1BEG/P	556	50
43	G3GHN	633	102	AL52	F1DPU/P	375	50
44	G4GNX	608	80	ZK10	G4ELM/P	525	50
45	G8JJR	544	95	ZN44	PE0MAR/P	393	35
46	G3UHF	535	91	ZN61	PE0MAR/P	428	100
47	G4IUT	507	93	YM28	GJ4JWA	385	–
48	GD4KMI	498	61	XO59	G4IRC/P	441	200
49	G4FRS	488	101	ZL66	F6BQX	454	200
50	G8SDS	484	66	YK28	PE0MAR/P	475	80
51	G8JYN	462	95	ZL54	GM4KOL/P	450	50
52	GU8NIS	455	51	YJ48	EI2CA/P	492	10
53	G4ENR	427	69	ZN11	F1BEG/P	610	10
54	G3VPC	415	69	YK19	F6BQX	427	10
55	G4GXP	402	79	ZK09	F6BQX	599	10
56	G4EFE	401	87	ZL53	F6BQX	401	10
57	G8OPS	396	68	ZN78	F1BEG/P	494	12
58	G4INL	368	69	YL20	F1BEG/P	481	50
59	G4ARD	366	–	ZL18	–	–	–
60	G8RIP	355	51	YO78	G8PUB/P	405	15
61	GW8WDC	327	54	YN65	F1DPU/P	500	50
62	G4DXW	301	54	ZM48	F1DPU/P	425	10
63	G2TO	293	47	AM64	F1DPU/P	463	50
64	GW3VKL	286	51	YL24	F1DPU/P	340	7
65	G3UUP	282	68	ZL26	F1BEG/P	405	10
66	G4HGI	270	54	YN58	GI8NBW/P	336	10
67	GW8WND	263	43	YN52	G4IRC/P	360	100
68	GM4JLD	216	28	YP25	G4IRC/P	486	150
69	G8ZAV	216	30	YK33	F6APE	420	10
70	GM3THI	196	28	XP76	G3YTE/P	430	–
71	G3TAD	181	50	YL38	F1DPU/P	320	50
72	G4BHC	143	19	XK64	GI4BDL/P	425	10
73	GI8NBW	140	20	WP77	G4ADM/P	378	100
74	GM8BDX	114	14	YP20	EI6AS/P	390	50
75	G3XC	63	15	XK54	G3YTE/P	333	8

RESTRICTED SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km	Power
1	G3ULT	1,375	199	ZL54	PA0THT	569	25
2	GW4JKV	1,370	177	YL06	F6GCT	612	10
3	G8YMD	1,036	127	AL76	GM8DIJ/P	567	25
4	G3ZPB	961	151	AL51	DJ9DL	491	20
5	G3PRD	904	89	YO29	G4GZO/P	460	25
6	G4CXJ	762	142	ZL33	PA0EZ	–	25
7	G8KOS	712	124	YM50	PE1EVX	478	20
	G3SHY	712	129	ZL29	GM4DIJ/P	486	25
9	G4DMA	695	125	ZL59	GM4DIJ/P	486	25
10	G4AKC	682	106	YN37	G8BQX/P	373	10
11	G8KMY	614	94	ZM29	F1DPU/P	483	20
12	G8SFM	557	107	ZL32	GM4KOL/P	409	10
13	G4GKS	528	55	AM65	DL0SO/A	437	25
14	G4CW	512	98	AL51	PA2GBK/A	360	10
15	G4FBK	505	82	ZK10	G3PRD/P	452	25
16	G3LVW	503	103	ZL17	GM4DIJ/P	421	10
17	G8NJA	480	67	YK33	PE0MAR/P	552	10
18	G8NQP	466	82	ZL72	F1FHI	539	8
19	G4HRC	459	89	AL22	DL0SO/A	474	25
20	G8ZTT	457	76	YN67	G4FAM/P	370	10
21	G4MEJ	439	82	ZM76	F1BEG/P	415	10
22	G4AGJ	415	63	YN38	F1DPU/P	547	5
23	G4ANB	411	83	ZL34	PA0PLY	429	8
24	GI4KSO	410	44	XO51	F1DPU/P	665	25
25	G3TXC	402	71	AM72	F1DPU/P	435	7
26	G4KXR	396	52	YK13	F6APE	442	15
27	G6BRS	386	84	YN39	G8PUB/P	348	10
28	G4FWM	360	54	YN15	G4IOG/P	386	20
29	G8GNS	354	73	ZL74	F6BQX	437	10
30	G3CAR	344	79	ZL27	DJ9DL	535	12
31	G4JKG	306	56	AL32	PA0WRC/P	345	4
32	G8RCK	282	72	ZL19	F1DPU/P	390	5
33	G4BNT	264	46	ZN38	G8PUB/P	400	10
34	GM3SHK	257	17	XP15	G4IOG/P	645	20
35	GI4BDL	250	26	WO80	F1DPU/P	625	10
36	G8UIO	227	51	ZM63	F1BEG/P	460	15
37	G6AJ	161	35	ZN32	PE0MAR/P	410	10
38	G3XWZ	124	36	ZN74	–	–	10
39	GI4FUM	116	21	XO11	GW4JKV/P	366	10
40	G8PXB	76	10	ZO58	G4IOG/P	375	10
41	GI6AUB	65	11	WO27	GW4ELM/P	334	10

LISTENER SECTION

Posn	Station	Points	QSOs	QRA	Best dx	Km
1	BRS32525	228	56	—	F1DPU/P	365

1,296MHz BAND RESULTS

OPEN SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	GW4AJW	23,638	94	YN75	PA0THT	680
2	GW4CBW	23,443	109	YN75	DL3NI	725
3	G4JAR	17,429	70	YK31	PA0EZ	649
4	G3XDY	17,312	81	AM67	DF1EQ	421
5	G3OBD	13,865	75	YK30	PA0PLY/A	511
6	G3WOH	13,525	71	YM75	PA0EZ	560
7	G4CCH	12,959	70	ZN49	G4JAR/P	399
8	G4HRY	10,896	64	YL75	G4ANT/P	356
9	G4HWA	10,823	82	ZL15	PA0EZ	430
10	G3RCV	9,931	56	AL65	G3SPJ/P	455
11	G3ZUD	9,855	72	ZM26	PA0WRL	446
12	G4ANT	9,381	47	AM06	G4JAR/P	427
13	G3WTP	9,038	72	ZM68	PA0WRC/P	420
14	G5MW	7,907	46	AL56	G3SPJ/P	437
15	GW3NZS	7,748	43	YM54	PE0MAR/P	490
16	G4DBL	7,506	59	ZL73	PA2DOL	422
17	G3YKI	6,760	47	AK11	G3SPJ/P	456
18	G3GRO	6,494	52	ZL76	ON5PX	492
19	G3DCZ	5,590	43	ZN71	G3RCV/P	296
20	G4LUA	5,363	31	AM56	G4JAR/P	388
21	G3NPF	4,976	53	ZK08	GW4CBW/P	299
22	G3GHN	4,802	45	AL52	G3SPJ/P	412
23	G3RXJ	4,632	40	ZK10	GW4AJW/P	314
24	G4DDC	4,224	48	ZL18	PE0MAR/P	316
25	G3VCP	3,991	26	AL45	DJ3ZU	383
26	G3LQI	3,469	32	ZK09	GW4CBW/P	305
27	G3ZWK	3,392	42	ZL26	G4JAR/P	231
28	G4FRS	2,987	37	ZL66	GW4CBW/P	256
29	G4GTH	2,938	25	YK19	G3XDY/P	283
30	G4IRB	2,927	27	ZN61	G3XDY/P	243
31	G8REQ	2,579	25	ZN61	G3RCV/P	294
32	G4IJX	2,427	23	ZM04	G3OBD/P	260
33	GM4BYF	2,338	12	XO26	G4HWA/P	400
34	G4EUF	2,328	30	ZM73	GW4CBW/P	155
35	G5RS	2,294	36	ZL69	GW4AJW/P	270
36	G3POY	2,122	14	ZN18	F1KBF	398
37	G3SDO	1,895	16	YK28	GW4CBW/P	267
38	GW8TVX	1,813	16	YL15	G3WTP/P	184
39	GW8AAP	1,794	17	YN65	G3OSS	275
40	G4KXQ	1,599	13	YK21	G3RCV/P	349
41	G4AEZ	1,583	16	ZL42	GW4CBW/P	198
42	G2TO	1,261	14	AM64	GW4CBW/P	270
43	G4DWB	1,197	8	XK64	G4HWA/P	336
44	G4EKT	1,191	14	ZN07	GW4CBW/P	186
45	G8PRG	1,178	15	ZN44	G4ANT/P	164
46	G4LSA	1,114	16	YM28	G3NNG/P	137
47	G3THQ	1,093	22	ZL26	G3ZUD/P	107
48	G4EYV	1,059	9	AL06	PA0EZ	280
49	GW8ACG	1,051	10	YN52	GM4BYF/P	207
50	G4KKF	776	6	ZO22	G4KIY	322
51	GM3YDN	746	6	XP76	GW4AJW/P	250
52	G3PYB	693	9	ZO72	G4CCH/P	119
53	G4EIA	488	6	YL38	GW4CBW/P	170
54	G3XC	111	2	XK54	G4JAR/P	103

RESTRICTED SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3SPJ	11,798	43	YO29	F1KBF	542
2	G3NNG	7,072	57	ZL33	PA0EZ	467
3	G3AKF	6,270	68	ZL54	PA0EZ	456
4	G4ICM	5,836	35	AL76	GW4AJW/P	363
5	G3OHM	5,110	43	YM50	F1KBF	328
6	G8TB	4,958	58	AL51	GW4CBW/P	292
7	G3VCT	4,415	49	ZL17	G3SPJ/P	344
8	G4BXN	3,817	48	ZL59	GW4AJW/P	276
9	G3COJ	2,915	35	ZL27	G4JAR/P	243
10	G3TPJ	2,831	32	AL22	G4JAR/P	311
11	G3ZQU	1,683	13	AM65	G3SPJ/P	356
12	G4JNZ	1,604	21	ZK10	GW4AJW/P	309
13	G8VPC	1,511	15	ZM29	PE0MAR/P	314
14	GI4DOM	812	5	XO51	GW4AJW/P	239
15	G4EBK	784	10	ZN38	G3SPJ/P	170
16	G3XWZ	713	10	ZN74	GW4AJW/P	130

CONTEST NEWS

RSGB Cumulative Activity Periods 1982 rules

The next series of activity periods will be held in January 1982. As in previous years, there will be four sessions on 1·8MHz and another four on 3·5MHz. Club participation will be particularly welcomed and secretaries are asked to encourage their members to take part in these mini-contests.

1. **Aims.** To provide training and practice for potential contest operators.
2. **Eligible entrants.** Members of RSGB or members of any RSGB affiliated society.
3. **Sections.** CW (A1) only, single-operator only.
4. **Frequencies.** 1,810-1,860kHz and 3,540-3,590kHz only.
5. **Periods.** 1·8MHz 2000-2200gmt Monday 4, Tuesday 12, Wednesday 20, Thursday 28 January.
3·5MHz 1000-1200gmt Sunday 3, Saturday 9, Sunday 17, Saturday 23 January.
6. **Contest call and exchange.** CQ TEST. Exchange RST and serial number starting at 001.
7. **Scoring.** One point per completed contact.
8. **Additional information.** Entrants may operate in as many of the periods as desired and a station may be worked once in each period. The scores from any two periods on each band will be added together to give the final score. Checklogs for non-scoring periods and from stations that do not wish to enter will be appreciated. Club affiliation should be stated on the entry and this will be included in the results tabulation.
9. **Entries.** To R. L. Glaisher, G6LX, 279 Addiscombe Road, Croydon CR0 7HY, to arrive not later than Wednesday 10 February 1982.

Affiliated Societies Team Contest 1982 rules

1. The general rules for RSGB hf contests, published in the January 1981 issue of *Radio Communication,* will apply.
2. **When.** 1300 to 1700gmt, Sunday 10 January 1982.
3. The Affiliated Societies Team Contest is a competition between teams of stations, each team or teams representing an RSGB affiliated society. Each such society is encouraged to enter as many stations and teams as it can.
4. **(a)** A society entering one team will have its placing determined by the aggregate scores of the five highest scoring stations in its team.
(b) A society may enter more than one team. The aggregate scores of the five highest scoring stations will be placed in team "A", the next five highest scoring stations placed in team "B", etc.
5. **(a) Eligible entrants.** Each operator must be a member of the society he represents, but need not be a member of the RSGB.
(b) Each station may be single- or multi-operator, but no operator may use more than one callsign during the contest period.
(c) All stations representing a society must be operated within 50 miles of the normal society meeting place.
(d) No station may represent more than one society.
(e) In the case of a society with national coverage, eg RNARS, each team may define a different society meeting place, but this should be a place of recognizable significance, eg a naval base. For all purposes, other than the indication of affiliation, each such team entry will be considered to be entirely separate.
6. **Contacts.** CW (A1), only in the band 3,510 to 3,590kHz.
7. **Exchanges.** RST, serial number commencing with 001, and "AFS". Stations active during the contest, but not submitting an entry, are requested *not to send* "AFS".
8. **Scoring.** Five points for each contact; plus five points for each "AFS" received, subject to confirmation by corresponding log entry.
9. **Logs.** Column 5 to be headed "AFS received".
10. **Entries**
(a) Each individual entry shall conform to the general rules. All such entries from one society are to be sent in one package to RSGB HF Contests Committee, c/o D. J. Lawley, 36 Addlestead Road, East Peckham, Nr Tonbridge, Kent TN12 5DL. Packages underpaid and bearing postage-due stamps will be returned to the sender.
(b) Each package must include a declaration signed by an officer of the society that each entrant is a member of that society, and the normal meeting place address must be given.
(c) There should also be included a note stating the number of teams representing the society. If the package does not include this information it will be assumed that the society wishes to enter only one team.
(d) Packages must be postmarked not later than 25 January 1982.
11. **(a)** An individual entry will be invalid if more than 20 per cent of the points claimed are for contacts with members of the entrant's own team.
(b) If it is clear that an entrant has deliberately failed to send "AFS" to certain stations, then the entry will be disqualified and the points claimed by his team for contacts with that entrant will be disallowed.
12. **Awards**
(a) The Edgware Trophy will be awarded to the leading affiliated society.
(b) A certificate of merit will be awarded to the station having the highest individual score.
(c) A certificate of merit will be awarded to the leading affiliated society in each RSGB zone.

RSGB HF Contests Championship 1980-1 results

Posn	Callsign	Contests 1	2	3	4	5	6	7	8	9	Total
1	G3OZF	60	25	60			70	15	60		290
2	G3FXB	80	70			10	100				260
3	G3MXJ	70				35	80				185
4	G4CP	0	50		20	15	60				145
5	G3PDL		30		35	5	30			25	125
6	G3NOM						50		40		90
	G3XTJ				35	25		10		20	90
8	G2QT	0	0	40			40				80
9	G3RPB				40					35	75
	G3RRS	5	70								75
	GM3ZSP				5	40				30	75
12	G3IGW		40							15	55
13	G4BUO			0		30	0	0	20		50
	G4CNY		20						30		50
15	GM4IPS				25	20					45
16	G3UFY	20	15								35
17	G5MY		5				20				25
18	G3XTT		10		0		0			10	20
19	GM3OXC		0		0	0	10				10

Contests
1 21/28MHz Telephony
2 7MHz CW
3 7MHz Telephony
4 2nd 1·8MHz
5 1st 1·8MHz
6 Commonwealth
7 Low Power Contest
8 Region Round-up
9 Summer 1·8MHz

Awards
The G2QT trophy to D. F. Beattie, G3OZF. Runner-up certificate to A. J. Slater, G3FXB.

The Commonwealth Contest 1981 results addendum

It is regretted that a list of checklogs received in this contest was omitted from the write-up which appeared in September 1981 *Radio Communication*. The checklogs are acknowledged with thanks from: G2AJB, G3CAA, G3FXA, G3WP, G3XTJ, G2QY, G6NK, G8UQ, VE3AHZ, VE3MZ, VK6AJ and ZL2MM.

144MHz Contest September 1981 results

High pressure over central Europe together with the IARU Region 1 Contest running concurrently made this one of the busiest 144MHz contests yet for many entrants. Those stations situated closest to the Continent were best able to avail themselves of this situation, and many contacts were made at distances in excess of 1,000km. The majority agreed that weather conditions were ideal and this contributed to a good entry in Section P.

As the results tables show many stations were using high power, and it was inevitable that this would highlight inadequacy in both transmitter spectral purity and receiver dynamic range. The cover sheets documented 13 occasions when unsubstantiated complaints were registered; those concerned are advised to check out their equipment for the above parameters before the next event.

The position of overall winner was hotly contested but Martlesham Radio Society emerged with the highest score and will receive the Mitchell-Milling Trophy. The leading single-operator station, GJ4ICD, will receive the Thorogood Trophy and the leading Scottish station, Grousebeaters Contest Group, will receive the GM4HAM Trophy. In addition, certificates go to G4BWG/P, G8RZO, G8ZHP, DK3UZ, and G8HHQ/A. Congratulations to all.

G3VPK.

SECTION P

Posn	Callsign	Points	QSOs	QTH	Power	Ant	Best dx	Km
1	G4BPO/P	12,917	984	AM67	400	4×14Y	OK3KWZ/P	1,339
2	G4BWG/P	12,681	875	AL45	350	19Y	OK3KWZ/P	1,352
3	G4DEZ/A	12,099	816	AL34	400	4×16Y	OK3RMW/P	1,409
4	G3ZIG/P	11,777	874	AM08	400	10Q	SP9EWO	1,268
5	G3EFX/P	9,662	801	ZK10	350	2×16Y	OK3RMW/P	1,455
6	GW8BHH/P	9,011	846	YM44	350	80CL	DK0AM/P	1,187
7	G4APA/P	8,469	714	YO20	400	4×9Y	PA3AVL/HB/P	1,060
8	G6HH/P	8,368	709	AK03	400	14P	OK3RMW/P	1,413
9	G4JMR/P	7,994	702	ZK05	350	4×9Y	SP6GWB/P	1,255
10	GW4ERP/P	7,990	856	YN75	300	4×9Y	DD3UD	952
11	G4GKS/P	7,402	589	AM65	180	10Y	OE5XXL/2	1,016
12	G3XNO/P	7,351	637	AN21	400	4×9Y	Y53ZN/P	918
13	G3YMD/P	7,308	651	AL76	100	19Y	OK2KAV	1,226
14	G8HRC/P	7,203	541	AL17	200	16Y	OK3KWZ/P	1,330
15	GW3OXD/P	6,512	681	YM54	200	2×14Y	DL0WY	1,170
16	G4LCG/P	5,707	612	ZM26	400	3×16Y	DF9XV	924
17	G4CAN/A	5,666	494	YK38	400	13Y	OK1KHI/P	1,279
18	G3LTY/P	5,525	546	AL55	100	14Y	OK2KYJ/P	1,171
19	GM8MNG/P	5,421	459	YP58	300	16Y	DB6JB/P	733
20	G3ZWK/P	5,389	593	YL29	200	2×16Y	Y53ZN/P	1,011
21	G8SDS/P	5,361	537	YK28	400	13Y	OK1KRG/P	1,086
22	GM8JUL/P	5,322	475	XO28	150	16Y	F1DZB/P	660
23	GI4KSO/P	5,317	445	XO51	100	16Y	F1DPX	768
24	G4ANB	5,308	592	ZL34	400	16Y	DL6XZ/A	1,045
25	G3WRS/P	5,217	509	ZO46	160	2×16Y	DL0BQ/A	1,123
26	GW8BZR/P	5,173	591	YL15	400	14P	DL0EE/P	879
27	G4DGU/P	5,167	480	XK08	400	2×11Y	DK0GR	885
28	G4DZO/P	4,563	408	AK11	130	16Y	OK3KPV/P	1,376
29	G8YDW/P	4,410	564	ZN11	250	19Y	DK8SG	875
30	GM3PXK/P	4,393	387	YP25	400	21Y	ON1RN/A	750
31	G4ATH/P	4,376	493	YN38	380	16Y	DL0BQ/A	1,156
32	G3UES/P	4,324	523	ZL66	400	8/8S	OK1KRG/P	983
33	G8GBY/P	4,314	439	ZN18	400	2×9Y	DG1MT/P	1,042
34	G4BJM/P	4,117	577	ZM64	400	16Y	OK1KTL/P	1,131
35	G8POT/P	4,034	593	ZN52	150	2×12ZL	DJ4GC/P	737
36	GW6SW/P	3,824	490	YM05	90	14P	DB0KH/P	781
37	GW4CZZ/P	3,782	508	YN64	400	2×11Y	F6CVN/P	728
38	G3ULT/P	3,635	481	ZL54	200	13Y	OK1KRA/P	996
39	G8LVQ/P	3,607	434	ZO72	400	16ZL	F1KNO	802
40	G3FVA/P	2,844	438	ZN61	300	2×14Y	DL0AN/A	634
41	G4JXG/P	2,826	289	AL14	100	13Y	OK3KZA	1,280
42	EI3VGG/P	2,738	156	VL20	250	13Y	EA1CR/P	970
43	G4FOH/P	2,673	354	ZM59	400	13Y	DK8SG	755
44	G8LED/P	2,606	407	ZM45	100	8/8S	DK0GR/P	655
45	G2XV/P	2,589	412	AM72	60	6Q	F6KFN/P	589
46	GM4LAA/P	2,584	226	XO28	10	10Y	PA0PLY/P	670
47	G6BSE/P	2,531	295	AM64	100	16Y	DJ4GC/P	561
48	G4KKC/P	2,423	407	ZL59	150	10Y	OK1KRG/P	930
49	G4ARE/P	2,249	257	YK13	40	8/8S	DD1CE	1,124
50	GI4MAC/P	2,227	195	XO31	100	13Y	PE0MAR/P	718
51	G6AJ/P	2,222	284	ZN32	100	14P	DK8SG	860
52	G5LK/P	2,206	386	ZL60	70	13Y	DD3UD	689
53	G8WCE/P	2,168	314	ZM73	100	8Y	DJ4GC/P	699
54	G3GTL/P	2,069	309	YM70	100	16Y	F1FCV/P	810
55	G4JFW/P	2,000	328	ZM24	70	16Y	F1ENS/P	925
56	G4HAQ/P	1,951	300	YL20	100	16Y	DK9ZQ/P	800
57	G8OHM/P	1,924	336	YM50	15	16Y	—	—
58	G4BWE/P	1,896	267	YL49	60	16Y	DL0AN/A	619
59	G8VER/P	1,701	217	ZL28	80	2×9Y	DK8SG	712
60	G4BP/P	1,302	154	ZO58	14	14P	DL0AN/A	608
61	G4BVY/P	1,212	180	YM79	80	16Y	F6BQX	568
62	GI4DBB/P	1,196	100	WP77	400	16Y	F6CTT/P	767
63	G4JHV/P	1,164	139	YO48	35	6Q	GJ4ICD	581
64	GW6APZ/P	1,116	130	XL06	8	9Y	F6CTT/P	445
65	GI8XWV/P	505	65	XO31	5	5Y	G3ULT/P	471
66	G8ZYA/P	418	62	AL53	10	9Y	EI3VGG/P	652

SECTION M

Posn	Callsign	Points	QSOs	QTH	Power	Ant	Best dx	Km
1	G8RZO	8,309	700	AL45	350	14P	OK3KWZ/P	1,350
2	G8ZHP	6,289	544	ZM29	300	2×16Y	OE5XPL	1,134
3	GD4IOM	5,444	505	XO67	300	14P	F6KCP	783
4	G8KUC	4,000	417	AL56	160	2×14P	OK2KAU	1,230
5	G8OCN	2,037	203	ZK17	300	16Y	OK1KHI/P	1,155
6	G4GTT	1,488	251	ZL38	100	14P	DJ4GC/P	676
7	G6CHK	1,094	229	ZL27	80	9Y	DF0BY	525
8	G8ZPC	1,043	155	YN69	100	19Y	F1DPX	584
9	GW8BIP	968	139	YL44	100	10Y	F1DFE/P	685
10	G3RR	668	104	YN10	100	14Y	GJ4JWA	521
11	G8XWA	441	87	YN19	15	4Q	G8SDS/P	343

SECTION S

Posn	Callsign	Points	QSOs	QTH	Power	Ant	Best dx	Km
1	GJ4ICD	8,832	637	YJ70	375	10P	OK1KHI/P	1,260
2	DK3UZ	6,398	506	EN20	300	2×10Y	HG5KDQ	939
3	G6DDK	4,751	405	AM76	200	2×16Y	OE5XXL/2	1,010
4	GJ4JWA	4,231	354	YJ70	300	16Y	OK1KHI/P	1,264
5	GM8YJU	4,043	389	YO05	100	2×9Y	ON5FF/P	640
6	GI8TBQ	2,194	203	XO33	150	16Y	F6CTT/P	665
7	G4JCX	1,575	167	XK49	100	12ZL	EA2BK/P	828
8	G8ZRR	1,571	233	ZM25	100	16Y	DL2KAL/P	540
9	G8SVF	1,347	230	YM30	160	8Y	F1FHI	668
10	G8IEM	1,221	144	ZK05	100	6Q	DK9ZQ/P	746
11	G8RBT	1,163	195	AL13	90	5Q	OK1KHI/P	1,071
12	G4KGC	1,140	188	ZM65	25	3Q	EI3VGG/P	487
13	G8OIV	1,035	148	AL34	100	9Y	GI4GVS	546
14	G3PBV	929	75	YK32	100	9Y	DJ4GC/P	857
15	G8PJN	926	158	ZL58	100	9Y	DK0GR/P	610
16	G4HYG	924	130	YN38	200	10Y	F6HGG/P	559
17	G4HUP	874	140	YM10	70	8Y	ON5FF/P	471
18	G4FVK	744	100	ZM39	10	9Y	GI4MAC/P	431
19	G8NRJ	734	84	AM49	10	8Y	F1FCV/P	634
20	G4DFI	691	95	AL41	8	9Y	DJ4GC/P	585
21	G8VPE	660	74	AM29	12	8Y	F1FCV/P	655
22	G8OMI	630	92	ZM41	80	4Q	F1ENS	490
23	G8ZYX	621	72	AM49	10	8×Y	DK8SG	625
24	G2FNK	607	102	ZL48	70	8Y	GI4KSO/P	489
25	G4AGQ	587	99	ZL66	10	5Y	DJ0JJ/P	717
26	G8KXM	565	90	YN80	50	10×Y	F1DZB/P	500
27	G6DVJ	541	83	ZL24	10	8Y	EI3VGG/P	463
28	G2BLA	538	76	ZL20	55	10P	DF0BY	499
29	G3ORX	510	64	YL49	10	8Y	PA3BBI/P	440
30	G8ZYL	505	69	AL43	14	8/8S	DF0BY	445
31	G8GGG	473	71	ZL24	50	9Y	E3VGG/P	472
32	G8LXY	467	112	ZL09	10	5Y	PA3BPC/P	381
33	G8FAT	419	35	ZL39	200	16Y	DJ0JJ/P	689
34	G8IFF	401	75	ZM77	40	9Y	GM3PXK/P	432
35	G8XTJ	395	67	ZL27	40	4Y	GM8JUL/P	422
36	G8TZJ	294	50	YN07	10	8×Y	G4DGU/P	349
37	G5DF	214	32	ZO51	10	14Y	PA0PLY/A	500
38	G8WWV	134	23	ZL39	25	2SQ	G4DGU/P	295
39	G6CSY	81	41	AL41	10	V	F6CTT/P	182

SECTION A

Posn	Callsign	Points	QSOs	QTH	Power	Ant	Best dx	Km
1	G8HHQ/A	1,149	147	ZL42	100	8Y	DG6NAQ/P	824
2	G3WGU/P	905	111	YO56	25	9Y	PE0MAR/P	533
3	G8ABI/A	861	160	ZL39	100	9Y	YS3ZN/P	880
4	G8YGW/P	271	51	ZL56	10	3Y	GD4IOM	400

SWL SECTION

Posn	Callsign	Points	QSOs	QTH	Ant	Best dx	Km
1	BRS32525	1,971	297	AL41a	9Y	OK1KHI/P	1,093
2	BRS15822	1,021	161	ZL40j	9Y	F1FCV/P	630
3	BRS26003	1,002	110	YO23e	16Y	F1DZB	642

Checklogs received from G2DHV, G8NPC, G8NQP and G8VRW.

70MHz Trophy & SWL Contest results

This event was enlivened by the appearance on the band of ZB2BL, who operated for 70min, worked 33 stations, and won the VHF Manager's Trophy by a margin of more than 1,000 points. Disappointingly half the stations who worked him failed to send in an entry.

Temporary emigrees to Scotland led the Portable Section, with G4ANT runner-up in the Fixed Section. The conditions which brought ZB2BL on ruined the last couple of hours with 5/9 plus signals from east European fm, broadcast stations.

Certificates go to ZB2BL, G4ANT, GM3XBY and GM4LIP. *G5HD*

PORTABLE SECTION

Posn	Callsign	Points	QSOs	QRA	Km	Power
1	GM3XBY	1,255	73	WP30	679	130 p.e.p.
2	GM4LIP	1,055	77	YP42	2,139	130 p.e.p.
3	G3VXK	778	88	ZN61	1,904	100 p.e.p.
4	G3FDW	682	58	YO29	2,075	120 p.e.p.
5	GI4GTY	613	47	XO51	517	50 p.e.p.
6	GM4BVE	606	54	XO26	545	50 p.e.p.
7	G3ORA	582	68	YL68	535	100 p.e.p.
8	G3LTY	543	67	AL55	658	40 p.e.p.
9	G3JEQ	468	71	ZL67	1,692	50 in
10	G4KKC	466	68	AK11	690	60 p.e.p.
11	G3SFG	432	63	ZL76	679	60 p.e.p.
12	G4HEV	424	36	ZO65	1,890	10 p.e.p.
13	G3ZWK/A	413	63	ZL38	1,751	50 p.e.p.
14	G4ADV	274	20	XK36	274	80 p.e.p.
15	G3UUP	180	31	ZL52	377	10 p.e.p.
16	GI4DBB	150	16	WO77	591	10 p.e.p.

FIXED SECTION

Posn	Callsign	Points	QSOs	QRA	Km	Power
1	ZB2BL	2,385	33	XW64	2,139	—
2	G4ANT	728	68	AM27	1,909	125 p.e.p.
3	G3WHK	498	64	ZL49	1,739	100 p.e.p.
4	G3UUT	425	57	AM61	1,836	100 p.e.p.
5	GD2HDZ	353	37	XO68	480	60 p.e.p.
6	G3IKR	340	36	YM70	1,803	80 in
7	G3NPI	336	43	ZM76	1,794	10 p.e.p.
8	G3PSP	307	47	ZL29	1,763	80 p.e.p.
9	G4HMG	292	50	ZL38	1,748	50 in
10	G3OHC	291	33	ZM31	1,846	120 p.e.p.
11	G4EKT	288	38	ZN10	371	40 p.e.p.
12	G3BOC	246	20	YM16	1,854	40 p.e.p.
13	G4BYP	210	30	YN57	382	80 p.e.p.
14	G5UM	191	33	ZM35	480	15 in
15	G3RDQ	175	29	ZL63	589	50 p.e.p.
16	G3FIJ	170	24	AL05	627	50 in
17	G4FKI	146	32	AL51	1,768	40 in
18	GW4IOI	138	20	YL31	380	8 p.e.p.

SWL SECTION

Posn	Station	Points	QSOs	QRA	Km
1	RS15822	109	25	ZL40	480

Checklog from GW4HBK

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 January 1982 issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **February 1982** issue should reach them by **12 December** and for the **March 1982** issue by **16 January.**

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.

Ainsdale (AARC)—8, 22 December, Ainsdale Scout HQ. Details from sec Norman Horrocks, G2CUZ, tel 0704 77604.

Barnoldswick (Rolls-Royce ARC)—2 December ("Computer technology and amateur radio", by Mr A. Leaver), 8pm. Rolls-Royce Sports & Social Club, Barnoldswick. Sec Leslie Logan, G4ILG, tel Barnoldswick 812288.

Blackburn (East Lancs ARC)—1 December (AGM), 7.30pm. Shadsworth Leisure Centre, Blackburn. PRO Norman Jenkin, G4CGT, tel 0254 75037.

Blackpool (& Fylde ARS)—1 December, 5 January. Contact Jim Newland, G5ND, tel 0253 64508.

Bolton (B&DARS)—2 December (AGM), 16 December (Mystery lecture), 8pm. Horwich Leisure Centre, Horwich. Informal meeting 9 December. Sec Alan Hartley, G8PRH, tel Bolton 46023.

Bury (BRS)—8 December (AGM), 1, 15, 22 December, informal meetings. Publicity sec Peter Butterworth, tel 061-798 0970.

Leyland (LHARG)—1 December (A dinner to be held at 8pm at Hartwood Hall Hotel, Chorley), 14 December 7.30pm. Rose and Crown, Ulnes Walton, Leyland. Sec Arthur Jolly, G4JCO.

Liverpool (L&DARS)—1 December (Junk sale), 8 December ("HF mobile dx", by Bert Donn, G3XSN), 15 December ("Microwave links" by Eric Grossmith, G3WOH), 22 December ("Bring your own bottle"), 29 December (Natter night), 5 January ("Amateur radio —the knowledge"), 8pm. Conservative Rooms, Church Road, Wavertree. Sec Eric Grossmith, G3WOH, tel 051-426 3701.

Manchester (UMISTRS)—During term time, Wednesday afternoons in the shack on L floor in the main building, Thursdays, 9pm, UMIST Union bar. Stations for operation are G3CXX, 1·8-28MHz; G6CXX and G8FOT on 144-1,296MHz. Details from Duncan Wheelhouse, c/o Radio Society, UMIST Union, Box 88, Sackville St, Manchester M60 1QD.

Manchester (South Manchester RC)—4 December ("23cm fm equipment", by Trevor Hopkins, G8TYY), 11 December ("The Ekofisk story", a film with guest speaker), 18 December (Christmas party). Next meeting 8 January 1982. Informal meetings 7, 14, 21 December, 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec David Holland, G3WFT, tel 061-973 1837.

St Helens (St H&DARC)—3, 10, 17 December, 7.45pm. Conservative Club, Boundary Road, St Helens. Sec Mark Edwards, G4LHL, 2 Oliver Road, Toll Bar, St Helens, tel St Helens 31846.

Warrington (UK FM Group Western)—3 December, 7 January, 8pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4940.

Wirral (W&DARC)—2 December (Informal meeting, The Seven Stars, Thornton Hough), 9 December, ("Chairman's night" at the Concourse Sports Centre, West Kirby). Sec Ian Brooks, G8PMW, tel 051-639 5666.

Wirral (WARS)—2 December ("Interference problems on 10m"), 16 December (Christmas party night), 7.45pm. Note, the new club venue is now at Minto House School, Birkenhead Road, Hoylake. Sec Gary O'Keefe, G4MIA, 20 South Drive, Upton, tel 051-677 1531.

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel 094-786 333.

Barnsley (B&DARS)—Second and fourth Monday in each month. The Grey Horse, Kensington Road, Barnsley. G6CKP asks whether this newly re-formed club could be one of the oldest in the country. He has sent confirmation of the first club call, AXR, issued in April 1914. Any advance on that! Sec G4JKW.

Barnsley (UK FM Group Northern)—6 December, 3 January, 7.30pm. The Royal Hotel, Church Street, Barnsley. Sec G4LUE. A move is afoot to relocate the group's 432MHz repeater, GB3SY.

Halifax (Northern Heights ARS)—7.45pm. Bradshaw Tavern, Bradshaw, Nr Halifax. The newsletter indicates a busy VHF Field Day and a follow-up on 3·5MHz. A 144MHz foxhunt was also held, and won by G8NNK, and it is hoped that all members who took part will have been found by now! Sec G8NUC.

Harrogate Repeater Group (HRG)—Rumour has it that the transmitter and receiver have been tested in talkthrough mode and that the antenna has been delivered. By the time this is read some of the gear may well be on site. The group hopes that the licence may be granted early in the new year. Information from G4ATZ.

Leeds (White Rose RS)—8pm. Moortown Rugby Football Club, Moss Valley, Alwoodly, Leeds 17. 12 December (The Christmas do, details from G3KWT). Sec G8UYZ. Club net 8pm, Thursdays on 3·75 or 21·350MHz

Leeds (L&DARS)—Mondays, 8pm. Old Hall Golf Club, Woodhall Lane, Calverly, Leeds. Sec G8NVP. The Grand Christmas Rally is to be held on 13 December, at 11am, at the Pudsey Civic Centre, Pudsey, nr Leeds. Talk-in on S22 and SU8. Details from G4FIM, G4IMF, or G6CNP, tel 0532 794507.

Otley (R&ES)—Tuesdays, 15 December (Constructors' contest (members only)), 8pm. Back of Court House Street, Otley. Sec Jack Annakin, G8DFZ.

Pontefract (P&DARS)—10 December (Social), 7 January (AGM), 21 January (Junk sale). Details from G4ISU, tel Pontefract 72784. Having recently had a lecture on Raynet, a number of members have been fired with enthusiasm, and the feasibility of forming a local group is being investigated. Plans for the erection of their tribander have been prepared. An extra receiver for club use has also been acquired.

Scarborough (SARS)—Mondays, 7.30pm. Scarborough Cricket Club, North Marine Road, Scarborough. Sec G4JAQ, tel Scarborough 862638. Having recovered the G3GBH Trophy from Hornsea ARS (a close fought contest) JOTA was entered into with great gusto. Preparations are well-advanced for the Christmas dinner on 4 December.

Wakefield (W&DARS)—15 December (Christmas social), 29 December (On-the-air/natter night), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G4BLT, tel Wakefield 255515.

REGION 3—RR H. S. Pinchin, G3VPE, 61 Cole Bank Road, Hall Green, Birmingham B28 8EZ. Tel 021-777 1320.

Birmingham (Midland ARS)—15 December (Christmas social), 8pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham RS)—Thursdays (HF night on the air), Fridays (Construction and morse classes), 7.30pm. 6 January, 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G4GZI, tel 021-427 7104.

Bromsgrove (B&DARC)—11 December (Cheese and wine party), 8pm. Avoncroft Art Centre, Bromsgrove. Club net Wednesdays, 144·850MHz, 8pm. Sec G4HFP, tel Stourport (02993) 3818.

Cannock Chase (CCARS)—18 December (Christmas dance). Regular meetings Thursdays, 8pm. Bridgtown War Memorial Club, Union Street, Bridgtown, Cannock. Sec G8HZP, tel Cheslyn Hay (0922) 416419.

Hereford (HARS)—18 December (Christmas quiz), 8pm. Civil Defence HQ. Goal Street, Hereford. Sec G4CNY, tel Hereford (0432) 3237.

Kidderminster (K&DARC)—8 December (Amateur radio quiz night), 22 December (No meeting), 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Sec G4ILQ, tel Kidderminster (0562) 4930.

Malvern Hills (MHRAC)—8 December (AGM), 7.30pm. The Red Lion Inn, St Ann's Road, Great Malvern. Sec G4BVY, 9 Wyche Road, Malvern, tel Malvern (06845) 62900.

Shrewsbury (Salop ARS)—A dinner dance is to be held in January. 10, 17 December, 7 January, 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G6AKE, tel Shrewsbury (0743) 66969.

Solihull (SARS)—15 December, 7.30pm. The Manor House, High Street, Solihull. Club nets G3GEI, Fridays, 9.30pm on 1,960kHz and G8ZLJ Sundays, 9pm on S19 or next lowest vacant channel. Morse classes available. Sec G4JDL.

Stourbridge (SARS)—21 December, 7.45pm. Library, Longlands School, Brook Street, Stourbridge. Sec G8JTL, tel Lye (038482) 4019.

Stratford-upon-Avon (SA&DARC)—14 December (Surplus sale), 28 December (No meeting), 7.30pm. Bearley radio station. Talk-in on S22. Acting sec G8OVC, tel Stratford (0789) 750584.

Sutton Coldfield (SCRS)—14 December (Talk on antenna tuning units), 7.30pm. Central Library, Sutton Coldfield. Club net Mondays, except on meeting nights, 145·2MHz, 8pm. Sec G8TUR, tel 021-353 2061.

Tamworth (TARS)—14 December ("Construction methods and printed circuit boards", by Rev George Dobbs, G3RJV), 8pm. Riverside Meeting Rooms, Lichfield Street, Tamworth. 7, 21, 28 December (Informals), Club Shack, Whitacre Heath, nr Kingsbury. Club net Wednesdays, 145·375MHz, 9pm. Sec G4BKA, tel Tamworth (0827) 283952.

Telford (T&DARS)—9 December ("RTTY for amateurs", by Bob Cowling, G8ZWF), 16 December ("Beginners' morse", by Gerry Craig, G4IUT), 23 December (Social evening at The Horseshoes), 30 December, 6 January, 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G8UGL, tel Telford (0952) 584173.

Walsall (WARC)—9 December ("Power and frequency measurements", by C. G. Willoughby, G4GKC), 30 December (Night on the air), 8pm. Forest Comprehensive School, Bloxwich. Club net Fridays, 3·70MHz ssb, 9pm. Sec G4GKC, tel Walsall (0922) 39457.

Warwick (Mid-Warwickshire ARS)—21 December (Christmas party), 4 January, 8pm. 61 Emscote Road, Warwick. Club net Mondays on non-meeting days, 145·350MHz, 8pm. Sec G8RZR, tel Warwick (0926) 496453.

Willenhall (W&DARS)—The club has a new location for meetings which take place on alternate Wednesdays, commencing 9 December, 8pm. Saracens Head, Bloxwich Road South, Willenhall. Sec G4FAQ, tel Wolverhampton (0902) 730300.

Wolverhampton (WARS)—7 December ("History of WARS", by Bill Moorwood, G3CAQ), 14 December ("Canals of the West Midlands", by K. Thompson, G8ZZU), 21 December (Social evening at the Anchor, Coven), 28 December (No meeting), 4 January (No meeting), 8pm. Wolverhampton Chamber of Commerce & Industry, 93 Tettenhall Road, Wolverhampton WV3 9PE. Sec G8EDG, tel Wolverhampton (0902) 763617.

Worcester (W&DARC)—4 January ("Earth-moon-earth experiments", by Richard Marshall, G4ERP), 8pm. "Old Pheasant", New Street, Worcester. Sec G8TZE, tel Tewkesbury (0684) 293890.

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

Derby (D&DARS)—Wednesdays, 2 December (Junk sale), 9 December (Night-on-the-air), 16 December (Constructor's contest), 23 December (Christmas party in the clubroom), 30 December (The year in retrospect, members' films and slides), 6 January (Junk sale), 7.30pm. Tuesdays, morse class, 7pm. 18 December (Vintage night), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Derby (Nunsfield House ARG)—Fridays, 4 December (Group construction project), 11 December (Night-on-the-air), 18 December (Elvaston Rally 1981, tape/slide presentation), 7.45pm. Room 7, Nunsfield House, Boulton Lane, Alvaston, Derby. Sec Ian Cage, G4CTZ, tel Derby 71875 or 799452.

Mansfield (MARS)—4 December (Film—"The Aerial Circus"), 21 December (Club meeting), 7.30pm. New Inn, Westgate, Mansfield. Sec John Coates, G4GYU, tel Mansfield 27257.

Melton Mowbray (MMARS)—18 December (Grand Christmas junk sale), 7.30pm. St John's Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 63369.

Nottingham (ARCON)—3 December (Forum), 10 December (Activity night), 16 December (Notts Raynet Group AGM), 17 December (Christmas quiz), 7.30pm. The Sherwood Community Association, Woodthorpe House, Mansfield Road, Nottingham. Sec Mike Shaw, G4EKW.

REGION 5—RR J. S. Allen, G3DOT, 77 Rosslyn Crescent, Luton, Beds.

Cambridge (C&DARC)—Fridays, 5 February (G4BAO will talk on "Long distance tv"), 7.30pm. Visual Aids Room, Coleridge Community College, Radegund Road, Cambridge (turning off Coleridge Road, south part of Cambridge City). Contact G2FKS, tel Cambridge (0223) 247220 for details. It is planned to have a "curry do" on 22 January when college will be

shut. Club operates G2XV on hf and vhf from college Tower Room.
St Neots (SN& DARS)—Alternate Mondays, 7.30pm. the Ernulf Community School. Regular visits and talks. Further information from Paul Herod, G8TQI, tel Huntingdon 74642, or Ron Oakley, G8GRT, tel Huntingdon 890737.

REGION 6— RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HP13 7EA. Tel Penn (049481) 4240.

Aylesbury Vale (AVRS)—First Tuesday in each month, 8pm. Elmhurst Youth Centre, Fairfax. 29 December (Ladies' night dinner for members and members' families, bookings must be in by the beginning of December to sec. Sec G8BQH, tel 0296 64 783.
Chesham (C&DARS)—Meetings to be advised. Contact sec G8PUC, tel 0494 785625.
High Wycombe (Chiltern ARC)—30 December (Natter night), 8pm. John Hawkins Canteen, Victoria Street. Sec G4LMM, tel High Wycombe 24095.
Maidenhead (M&DARS)—15 December (Christmas social). Sec John Patrick, G3TWG, tel Bourne End (06285) 25275.
Reading (RARC)—8 December (AGM, members please attend), 22 December (Club Christmas dinner). Details sec Chris Young, G4CCC.
Vale of the White Horse (VWHARS)—1 December (Social evening at the White Hart). Sec G4FLX, tel Wallingford 37482.

REGION 7—RR Pat Walker, G8HMG, 12 Brownlow Road, Redhill, Surrey RH1 6AW. Tel Redhill 64035, evenings 01-834 9070, days.

Addiscombe (AARC)—The club, which is primarily a contest group, meets socially Tuesdays, from 9pm. The Woolpack, 154 Gloucester Road, Selhurst, Croydon. Sec Peter Hart, G3SJX, tel 01-656 9054.
Bexleyheath (North Kent RS)—First and third Tuesday in each month, 8pm. The Pop-In Parlour, Graham Road, Bexleyheath. Sec Pelham Conduit, G4KCZ, tel Crayford 524096.
Guildford (G&DRS)—Second and fourth Fridays in each month, 11 December (Natter night), 8 January (Party night), 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec Helen Davies, G8SXB, tel Aldershot 20384.
Kingston (K&DARS)—Third Wednesday in each month, 8.15pm. Alfriston, 3 Berrylands Road, Surbiton. Sec R. Pellatt, RS41392, tel 01-399 8113.
Redhill (Reigate ATS)—15 December (Constructional contest), 8pm. Constitutional Club, Warwick Road, Redhill. Sec Chris Barnes, G8FEE, 25 Hartswood Avenue, Woodhatch, Reigate RH2 8ET.
Wimbledon (W&DRS)—Second and last Friday in each month, 8pm. St Johns Ambulance Hall, 124 Kingston Road, Wimbledon SW19. Following the recent AGM the sec is now E. G. Allen, G3DRN, tel 01-947 3914.

RR7 thanks club secretaries for their kind letters and asks if they would send, or telephone if more convenient, forthcoming programmes with details of any special items of news.

REGION 8—RR K. A. Crouch, G8KEN, 14 Victoria Road, Capel-le-Ferne, Folkestone, Kent CT18 7HB. Tel 0303 55241.

Brighton (BDRS)—2 December (Film night,video of G4GNX assembling a tent), 16 December (Christmas party), 30 December (Natter night, what do you want to do in 1982?), 7.45pm. 47 Cromwell Road, Hove. Details G8VEH.
Burgess Hill (Mid-Sussex ARS)—10 December (Social evening), 7.30pm. Marle Place, Leylands Road, Burgess Hill. All other meetings not yet finalized, so please contact Jack Brooker, G3JMB, tel Hassocks 4965.
Canterbury (East Kent RS)—3 December (Cheese & wine party), 18 December (Christmas draw), 7 January (Junk sale). 3 December and 7 January meetings at Dominican Hall, 18 December at The Bun Penny PH. All start 7.30pm. New sec G8ELS.
Chichester (C&DARC)—7 December (Slides of 1981 events), 21 December (Christmas social evening), 7.30pm. Spitfire Social Club, Tangmere. Further details from G8FCX, tel Littlehampton 5082.
Crawley (CARC)—9 December (RSGB video cassettes, "Secret Listeners" and G6CJ antenna lecture). Details from D. L. Hill, G4IQM, tel 0293-8826 41.
Dover (South East Kent YMCA RC)—2 December (Natter night), 9 December (Film on lasers), 16 December ("Meteor scatter", by G8MDZ), 23 December (Christmas booze-up), 30 December ("What to do in 1982", by G8KEN), 7.30pm. YMCA, Dover. Further details from G8KEN.
Hastings (HE&RC)—16 December (Christmas party), 7.30pm. West Hill Community Centre. Computer group meets second and fourth Wednesday in each month, 7.30pm. 479 Bexhill Road, St Leonards. Further details George North, G2LL, tel Cooden 4645.
Kent Repeater Group—GB3SK will most likely be back on from its new site by now. All information about Kent's repeaters from chairman/secretary, G3MDO.
Maidstone (MYMCAARS)—11 December (Construction contest), 8pm. Y Sports Centre, Melrose Close, Cripple Street, Loose, Maidstone. For other club meetings in December please contact G4AXD, tel West Malling 841021.
Medway (MARTS)—Fridays, 4 December (Film evening, RSGB films), 18 December (Christmas social evening), 7.30pm. No 1 Hall, St Lukes Church, King Williams Road, Gillingham. Contact G4EVY, tel Medway 76463.
Sussex Repeater Group—The group maintains GB3SR and GB3BP on 144MHz, and GB3BR, GB3HO and GB3NX on 432MHz, and GB3WX, GB3CP and GB3HM on 1·3GHz. Your subscription of £3 per annum can help maintain this large group of repeaters. Treasurer G4GPX. The group's AGM will be held at the Civil Service Social Club, Holland Road, Hove, on 9 December at 8pm. Further details from sec G4EFO.
Thanet (TRC)—Alternate Fridays, 6 December (Rig night), 7.30 for 8pm. Birchington Village Centre. Further details from G8HLG, tel 0843 54154.
Tunbridge Wells (West Kent ARS)—11 December (TBA), 18 December (Home-based foxhunt). Fridays (Formal), 7.30pm. Adult Education Centre, Monson Road, Tunbridge Wells. Following Tuesdays (Informal get-together), 8pm. Old Drill Hall, Victoria Road, Tunbridge Wells. Contact G4DYF, tel Sevenoaks 56708.

RR8, xyl Sally and children wish all Region 8 members and their families a very happy Christmas and a happy, healthy and prosperous New Year. *73s*

Pat Hawker, G3VA, giving a lecture on wartime Voluntary Interceptors to Maidstone YMCARS on 9 October. One of the audience, George Jessup, G4HG, (front row, wearing glasses) was the local VI Group Leader. *Photo:* **G4GFU**

REGION 9—RR W. J. Colclough, G3XC, Highview, Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Camborne (Cornish RAC)—First Thursday in each month, 7.30pm. SWEB Clubroom, Pool, Camborne. The Cornish award manager Ted Bowden, G2AYQ, receives numerous requests for details of this unique award. When requesting details an sae would be appreciated. G2AYQ is QTHR. Pro Ron, G2ABC, tel Truro 78393.
Newquay (N&DARS)—If versatility and practicality is the hallmark of a good club the N&DARS must surely qualify for this distinction. Recently it has been involved in no fewer than five portable expeditions, four practical evening sessions with live equipment, four Raynet exercises and the odd talk. Alternate Wednesdays, 7.30pm. Treviglas School, Newquay. Contact Bob, G4LDA, tel Wadebridge 3549.
Plymouth (PRC)—Alternate Mondays. Club HQ, Tamar School, Paradise Road, Millbridge, Plymouth. This forward-looking club have already fixed the date for their 1982 rally as 30 May at the Tamar Secondary School, Plymouth. Details from Julie Butcher, G4HKZ, tel Plymouth 338417. Sec G4GWK.

Members of the English China Clay ARC who visited the Torbay rally on 30 August. *Photo:* **G4FCN**

Torbay (TARS)—A sense of great satisfaction is current in the club at gaining top spot on 1·8MHz in this year's NFD, and 10th place overall. The club repeater GB3TR is off the air at the moment for modification and site change. It is hoped that when this work is completed an improved service will be available. Fridays and the last Saturday in each month. Club HQ, Bath Lane, Torquay. Please note new sec Hugh Davies, G4DZH, tel 523063.
Treverbyn (English China Clay RC)—Alternate Mondays, 7pm. There would appear to be more than one way of travelling to a rally—the club recently hired a double-decker bus to journey to the Torbay Rally and commissioned their own driver, that versatile member Tony, G4LTY. A warm welcome is extended to Frank, G6FER, Tony, G6EKZ, and Kevin, G6CIS. Details from Jack Redfearn, G8HSZ, tel St Austell 3647.

REGION 10—RR P. A. Jones, GW4HAT, 68 Pastoral Way, Tycoch, Swansea SA2 9LY.
Haverfordwest (H&DARS)—RR10 would like to contact any member of the above club.

REGION 11—RR B. H. Green, GW2FLZ, 1 Clwyd Court,Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.
Bangor (University College of North Wales ARS)—The "Rockets Room", Room 261, School of Electronic Engineering Science, Dean Street. Sec I. Wylie, G6CCJ, Room B402, Neuadd Emrys Evans, Menai Avenue, Bangor, Gwynedd.
Colwyn Bay (Conwy Valley ARC) (GW6TM)—10 December (Questions and quiz), 7.45pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. 7 January (Annual club dinner—details to be announced later). Sec J. N. Wright, GW4KGI, tel 0745 823674.
Rhyl (R&DARC)—Social evenings and meeting detals for December from sec B. Jones, GW8OYT, 6 Rhodfa Maes Hir, Rhyl, Clwyd, tel 0745 37284.

REGION 12—RR F. Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR. Tel 0307 67565.
Dundee (Kingsway Technical College ARC)—Tuesdays, 6.30pm. Electrical Laboratory, Kingsway Technical College, Old Glamis Road, Dundee. The club AGM was held on 13 October 1981 and the following office bearers were elected: chairman, GM8PHU; vice-chairman, GM8RTI; secretary, GM4JCM; treasurer, GM3ZXE; committee, GM8TDR, GM4BAG; contest committee, GM8YIL, GM8VBT, GM8YRB, GM8YGA, D. Lunan; students reps, GM6BML, GM8RTI; publicity officer, GM4AQM; projects manager, GM8VTB; catering officer, GM2CPC. Programme details for future from sec GM4JCM.

If your club has not been mentioned in this column for some time then ask your club secretary the reason. Information not passed to the RR cannot appear.

REGION 13—RR A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife, Scotland.
Edinburgh (E&DARC)—Tuesdays, 7.30pm. City Observatory, Catton Hill, Edinburgh. Details from GM4HJQ, tel 031-554 5733.
Glenrothes (G&DARC)—Wednesdays and third Sunday in each month, 20 December ("Metal detection", by A. McGrow). Provosts Land, Leslie, Fife. Details from GM8ZTV, tel Kirkcaldy 203582.

REGION 14—RR V. Kusin, 109 Weymouth Drive, Glasgow G12 0EL.
Kilmarnock (K & Loudoun ARC)—Tuesdays fortnightly, 22 December (Guest speaker, all other Ayrshire clubs welcome). Broomhill Hotel, London Road, Kilmarnock. Details from sec W. Strachan, GM3ZRT.

REGION 15—RR J. T. Barnes, GI3USS, Whitegables, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ. Tel 0247 3948.
Belfast (BRSGBG)—Third Wednesday in each month, 8pm. 90 Belmont Road. Varied programme being arranged. Details from AR, GI4JDX.
Ballyclare (East Antrim ARC)—8 December (Christmas video show and party, Whitley's Bar), 12 January (Mobile clinic, bring your rig and see how it performs), 7.30 for 8pm. Carntall Hall, Carntall Road, Mossley. AR GI4KKA. Sec GI4JXM.
Ballymena (BRC)—Thursdays (Club night), 8pm. Mondays (Morse and RAE classes), 7.30pm. 70 Nursery Road, Gracehill. Sec GI4HCN.
Banbridge (Mid-Ulster ARS)—First Sunday in each month, 3pm. QTH of GI4BAC. Lectures are being arranged to cover all aspects of amateur radio including antennas, Raynet, advances in commercial radio communication, hi-fi, fast scan tv, etc. Details from sec GI8XQO, tel Craigavon 42620.
Bangor (B&DARS)—4 December ("Air traffic control and associated equipment", by GI3USK), 8 January (Note change of date), 8pm. Sands Hotel, Seacliff Road, Bangor. AR GI3TLT, NOT QTHR. Sec GI4JTF.
Coleraine (NWARS)—First and third Thursdays in each month, 8pm. BRCS Rooms, New Row, Coleraine, AR GI4HVI. Sec GI4LNJ.
Lisburn (Lagan Valley ARS)—Second Monday in each month, 7.30pm. Rathvarna Teachers Centre, Pond Park Road, Lisburn. AR GI8YTH. Sec GI8SXN.
Londonderry (North West of Ireland ARS)—First Monday in each month, 7.30pm. Templemore School, Londonderry. AR GI3GGY. Sec GI6DBN.
Magherafelt (MARS)—First Tuesday in each month. 12 Garden Street, Magherafelt. Sec GI8JNP.
Omagh (West Ulster ARC)—Second Monday in each month. 17 December (Annual dinner), 8pm. Top of the Town Restaurant, Omagh. Contact GI3NVW or GI8TVK for bookings). McAleers, Campsie, Omagh. Sec GI8TVK.

RR15 has compiled this listing with very little help from club secs. If you want your items to appear please send them to me well in advance of listed date. If you do not, you have no-one to blame but yourselves. The zone manager and/or RR15 have attended all AGMs to which they were invited (and some where they weren't!). Club and society secretaries: please, if not already done, send details of officers, meeting nights and times, and programme if available, to RR15 as quickly as possible.

Operators of GB2RW, a royal wedding station, which was located at Bushey Wood Farm, Great Leighs, Essex. L to r, standing: Bill, G4KIH; Paul, G4LGY; Bill, G4LJT; John, G4LJY; Len, G4KRX; Gerry, G8UWH; Peter, G8WRM; Phil, G4LCY; Malcolm, G8WSS; and Bill, G4JSC. In foreground: Sam, G4LJL; and Ivan, G4LEZ. *Photo:* **G4KIH**

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.
Braintree (B&DARS)—First Monday (Informal), 8pm, third Monday (Formal), 7.45pm, in each month. Braintree Community Centre, Victoria Street. Short lectures for swl and junior members are given by Danny Begg, G4YXJ, at 7.30pm on informal meeting evenings. Details from Alan Williams, G6CIV, tel Silver End 83516.
Chelmsford (CARS)—1 December (Junk sale, and hints & kinks, members' evening to discuss various tips concerned with getting operational on different bands), 5 January (Film show), 7.30pm. Marconi College, Arbour Lane. Club also has a morse tutor which is available for loan to members. Details from Andrew Mead, G4KQE, tel Silver End 83094.
Colchester (CRA)—10 December (Film evening, including showing of the BBC programme, "The Secret Listeners"), 7.30pm, Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 70189.
Haverhill (H&DRS)—4 December (Foxhunt), 11 December (RSGB tape/slide lecture on "Hints for mobile operation"), 18 December (Christmas dinner), 25 December (Club closed), 7.30pm. Steeple Bumpstead Road. Details from Dave Hickford, G6BPS, tel Haverhill 61207.
Ipswich (IRC)—9 December ("Oscar 9", by G3ZNU and G8ONH), 30 December (Club closed), 13 January ("An illustrated history of Suffolk", by Philip Willis) 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.
Norwich (Norfolk ARC)—9 December (Discussion evening), 23 December ("Bring your xyl/yl" evening), 7.45pm. Crome Community Centre, Telegraph Lane East. Details from Paul Gunther, G8XBT, tel Norwich 610247.
Vange (VARS)—3 December (Junk sale), 10 December ("Space computer and music synthesis", by G8LVK), 17 December (Christmas party), 24 and 31 December (Club closed), 7 January ("Construction", by G4ENW), 8pm. Barstable Tennants' Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon.

REGION 17—RR H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.
Basingstoke (BARC)—16 December (Christmas party), 7.30pm. Chineham House, Shakespeare Road, Popley, Basingstoke. Sec G8NHL.
Bournemouth (BRS)—First and third Friday in each month, 7.30pm. Room 9, Kinson Community Centre. Sec G4EKE, tel Bournemouth (0202) 877945.
Fareham (F&DARC)—Wednesdays, 2 December ("Microprocessors and how they work", by G4IJP), 9 December (Night on the air), 16 December (Slide show by G8VOI), 7.30pm. Room 12, Porchester Community Centre. Sec G4ITG, tel 0329 234904.
Farnborough (F&DRS)—Second and fourth Wednesday in each month, 23 December (Social evening with yls and xyls), 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane (near M3 bridge). Sec G4BJO, tel 0329 234904.
Horndean (H&DARC)—Second Thursday in each month, 7.30pm. Merchiston Hall, Horndean. Sec Dan Bernard, tel Horndean (0705) 593429.
Southampton (SRSGBG)—Wednesdays, 9 December ("Marine radio", by G3SHQ), 7.30pm. Toc H House, Little Oak Road, Bassett, Southampton.
Weymouth (South Dorset RS)—First Tuesday in each month TFN, 7.30pm. Army Bridging Camp, Wyke Regis. 5 December (Skittles evening at the Turks Head, Chickerell). Sec G3ZGP, tel Weymouth (0305) 812893.

RR17 would like to thank all club secretaries who have kept him informed of events during 1981. Keep up the good work. Season's greetings to all members in Region 17 and may your log be full of good dx during 1982

REGION 18—RR W. A. Ricalton, G4ADD, 4 South Road, Longhorsley, Morpeth, Northumberland. Tel Longhorsley 259.
Durham (DURES)—For details contact Mark Puddephat, Oswald 299 Grey College.
Morpeth (Northumbria RC)—Tuesdays, morse classes. Thursdays, club night. Old Telephone Exchange, Ellington. Sec G4GWB.
Sunderland (SRAS)—Mondays, Thursdays, 7pm. Sundays 9.45am, RAE and morse tuition. The Brewery Buildings, Westbourne Road. Sec Ian Batley, G8TKU, tel Sunderland 72746.

REGION 19—RR R. J. C. Broadbent, 94 Herongate Road, Wanstead Park, London E12 5EQ.
Cheshunt (CDRC)—2 December (Natter night), 9 December ("Communication satellites", by Nick, G8NDR (video)), 16 December ("South Africa", by Robin, G8IFC), 18 December (Club Christmas dinner), 23 December (Natter night, cw practice), 30 December (No meeting), 8pm. The Church Rooms, Church Lane, Wormley, Herts. Details from Jim Sleight, G3OJI, tel Ware 4316.
Chiswick (ABCARC)—15 December (Members' holiday activities—illustrated talks), 7.30pm. The Committee Rooms, Chiswick Town Hall, Chiswick W4. Sec G3GEH, tel 01-992 3448.

(Continued on page 1153)

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 Member's 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 acknowledgment 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 aditional £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.

No guarantee of inclusion in a specific issue can be given, other than the first possible issue after receipt.

Closing date for the February issue is **17 December.**

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising representative

FOR SALE

TR7800 with Hustler 5/8 antenna, boot mount, £225. Hustler hf mobile antenna, bumper mount, 80 and 20m resonators, incl quick release fitting, heavy duty spring, £50. G3DPR, QTHR. Tel 066641 470, evenings.

TS520SE, boxed, manual, cw filter, exc cond, £375. Buyer to collect. G3JMZ, QTHR. Tel 9953 792070.

Home-built 144MHz portable rig, six xtal channels, 400mW output, internal nicads, very low squelched current consumption due to sampling circuit, allows up to one week monitoring on internal batteries, £70. G4JNT NOT QTHR. Tel Camberley (0276) 25685.

Tamaphone 1510S fully synthesized fm mobile and portable tx/rx, covers 144-148MHz in 5kHz steps, five programmable channels, 1 or 10W out, internal or external 12V supply, repeater shift up/down, Flexiwhip or external ant, comp with spkr/mic, mounting bracket, £185. *Radio Communication* 1975-80, £5 the lot. Old HRO valves: 6C6, 6D6 etc, 50p each. 1959 Triang "00" gauge train set, Canadian Pacific engine and rolling stock, extra track and layout models, offers. G4CPI, QTHR Leics. Tel 0530 38377.

FT101E with cw filter, spare pa/driver valves, perfect cond, £390. Icom IC240 with mobile mount, £145. Yaesu FT202R, nicads, external spkr/mic, S20-22, R0, R6, R4 xtals, £95. Ian Greenshields, G4FSU, 13 Goodwood Court, Emsworth, Hants. Tel Emsworth 4344.

Liner 2 2m ssb, extra xtal for 144·34-144·37, rx, preamp, mic, 13V mains pu, £104. Baird tape recorder, very old, big, heavy, two-track, two-way, three-speed, £5. G3SLI, QTHR. Tel Reading 479850.

Trio twins T599S and R599D, tx 10-80m, rx 160-2m, all filters, vgc, £300. Prefer not to split. SB2M ssb handheld, vgc, £70. Would exchange SB2M for minibeam. Buyer to collect or carriage at cost. G3YEU NOT QTHR. Tel Cheltenham 511187.

Eddystone 940 rx, mint, £160. *Wanted:* Eddystone EP20 panoramic display unit and instruction book, must be in good wkg order. Tel Blackpool 64680, weekends or after 6pm.

Kenwood TR7400A 144-148 2m fm tx/rx, 25 or 5W toneburst, normal or reverse repeater, 5kHz segments, all 100 per cent, £145. Tel Wormley 3189.

Swan 350, good wkg order, new set of valves, modified for valve, 144MHz transverter, mic, £250 ono. Reynolds, G3VRI, 4 Pinewood Close, Shrewsbury, Shropshire SY1 3SF. Tel Shrewsbury 4802.

Complete 2m ssb station: IC202S, SEM35 linear, preamp, hb 12V, 6A power supply, Stolle 2050 rotator, 9-el Tonna, 9m UR67 cable, swr bridge, 20ft 2in diameter alloy mast, 21in heavy duty wall brackets, hb piptone and processor, the lot for £230 ono. 4EX250B, base and chimney, transformers for linear amp, power supply, RX80 i.f., CV80 29MHz converter, offers? Going QRT. Tel Pagham 5644, after 6pm or weekends.

Atari video computer with four cartridges in exchange for 10W/100W linear with preamp, Akai GXC40D stereo deck, LAR vhf Omni-match, KSR keyboard with manual, lots of "junk". Bill Ball, G8XCF. Tel Blackpool 404459 after 7pm and before 9.30pm daily.

FT7B, no modifications, orig packing, YC7B frequency display, £300. Daiwa CN620A, 1·8-150MHz cross point swr meter, £30. G6DPF. Tel Stafford (0785) 51616, evenings.

FDK Multi 11, S0, S20-23, R3-7, four channel auto scan, £120 ono. GI4DOR, QTHR. Tel Belfast 610007.

Lots of "junk", vgc, fan oven, exchange for cctv camera and monitor, or colour portable, or any Robot sstv gear. *Wanted:* 400 pcb and cost. Bill Ball, G8XCF. Tel for info on "junk", 0253 404459 after 7pm and before 9pm.

Eddystone EC10 gen cov rx Mk1, £45. G4BLI, QTHR. Tel 051-722 9538 (Liverpool).

T&R Bulletins: 1933-42, comp, bound, offers?; 1951-62, comp, unbound, £25. G4HUE, QTHR. Tel 01-554 0399.

Shack clearance: UR67, 20m, £10; 18m, £9; double lashing kit, £8; three lengths 1·5in aluminium tube, total 23ft, £8; VCR97, VCR517B crts, dual beam crt unit, octal type valves, free. All buyers collect. G8RCG, QTHR. Tel 061-494 0434 (Manchester).

Yaesu FT301 solid-state hf tx/rx, 160-10m, two auxiliary 200W rf speech processor, matching spkr/power supply (25A) with digital clock, GW identifier facility, mint cond, cost £710, selling for £500 ono. Carriage via Securicor. GI8XOI, QTHR. Tel 0247 62629.

Heathkit RA1 rx, good cond, good wkg order, comp with handbook, xtal calibrator. £40 ono. Buyer must collect. Ferrograph r-r recorder, exc cond, Series 7, £15 ono. 4m converter, 3·1MHz i.f., homebrew, works ok, £9 ono. Buyers must collect or pay carriage. ARS40935. Tel Woburn 545, evenings.

Pye Cambridge base station and four mobiles, easily converted to 2m fm tx/rxs, £40 each. 20ft mobile mast with sliding platform powered by diesel engine, can carry mast extension etc, £200. G6DMS. Tel Great Easton (Essex) 250.

DX302 communications rx, as new, £150. Partridge Joystick vfa, Joymaster Supermatch atu, £50. Gartley, 4 Hurst Road, Southam, Warwickshire. Tel 092-681 4253.

Icom 245E and RM3, £325. Icom 201 mains/battery, £250. Icom 2AT 144/148, comp batteries/charger, tel ant, touchpad extension mic etc, £170. SEM antenna Z-unit, £45. G3AOS, QTHR. Tel 061-980 2415.

Realistic DX300 digital synthesized professional rx, 10kHz-30MHz, all usual features, was £230, hardly used, as new, in makers box, operating manual, service manual (was extra £3), accept £185. G4IBG. Tel Hove (0273) 731391.

All valve a.m./cw tx, switched power, 10/30/70W, 160-10m, all valve, cw only tx, switched power 10/50/100/150W, 160-10m, 210V at, auto transformers, 240/210V ac available, professionally built, buyers collect, offers. G4MU, QTHR. Tel Northampton 582951.

Yaesu FRG7700 rx, comp with memory, FRT7700 atu, YH55 headphones, £290. Bearcat 220FB with Norcone, £190. MR110 fm scanning rx, S20, R5 fitted, psu, £30. MMC 28/144, £15. G6CHB, QTHR. Tel 0632 462606.

Pye Bantam 2m fm, nicads, helical, diagrams, £40. Murphy MR121 Navy rx, 60kHz-30MHz, psu, diagrams, spare valves, £100. Jaybeam PMH/2C harness, £3. 6/6 slot antenna, £6. Alloy masts, 9 and 14ft, various valves, transformers, etc. W.H.Y? G8SSI NOT QTHR. Tel Martin, 01-686 9646.

FT221R 2m multimode, mic, external YC221 digital readout, £315 ono. Liner 2, mic, Belcom matching psu, Belcom matching external vfo, vgc, £115 ono. Carriage negotiable. G6AUW. Tel Weymouth 786930.

Cambridge antenna noise bridge, virtually new, £6.50. Philips 4-track reel-to-reel tape recorder, £15 p&p. Bolex 500XL sound cine camera, Eumig 822 sound projector, both in mint cond, the pair, £125. Would consider separate camera sale. G3HNP. Tel Tavistock 840751.

Trio JR599CS rx, ham bands 1·8 to 28 incl 10MHz, 144 to 147MHz, exc cond, £140 ovno. RA17, works ok, needs peaking, offers please. SEI xtal filter, 5·2MHz, 2kHz, bw, £5. Plus carriage by arrangement. G3ICH, QTHR. Tel 0823 680234.

Racal universal drive unit, MA79G, mint, £285. Racal preselector MA197B, good cond, £45. Creed 7B with silence cover, part-built BARTG tu, £25. G4JQN, QTHR. Tel Westbury (0373) 864478.

IC202S, nicads, built-in 12V charger, five xtals in orig packing, MM144/25 linear power amp for IC202, £190. G4JCC, QTHR. Tel 07016 3504.

AR88D comp with spare valves, manual, £45. Search 9 2m rx vfo, xtals R6-7, S18-23, boxed, £35. Codar PR40 preselector, £15. Microwave Modules 2m converter 144/28, brand new, £19. G6ERH. Tel Blackburn 28969, evenings.

FT75 80-10m ssb/cw mobile/base tx/rx, vfo, extra vxo xtals, ac and dc psus, mic, spare pa valves (new), mobile mount, handbook, orig packing, exc cond, £135. Carriage extra. G3YUQ, QTHR. Tel Bedford (0234) 768120, evenings/weekends.

Yaesu FRG7000, gen cov rx, exc cond, unmarked, incl orig packing, manual, antenna wire, plugs, Hamgear PM2 atu, £225 ono. *Radio Communication*, 1973-80 incl, what offers? G8TTP. Tel Bob, 0273 558724.

TS520 cw filter, VFO520, vgc, £350. IC202S, all xtals, nicads, charger, case, vgc, £150. HC2 ham clock, £8. Eddystone bug key, offers. Geloso xtal mic, £5. G3BII, QTHR. Tel 049-46 5528, after 6pm.

Ex-Army 52RX, 52TX, 19 sets, power supplies, manuals, offers please. G4BJQ, QTHR. Tel Farnborough 43036, evenings.

Sony bw video equipment, camera (zoom f1·9), portable recorder, nicads, mains operated rec player, cw many 0·5in tapes, good order, £170. 10W fm tx/rx, vfo and synth, Arac 102, Atal 228, hb synth, works well, £95. Tel Melton Mowbray (Leics) 822152, after 6pm.

Trio TS900 hf tx/rx, 300W cw filter, used very little, one owner, orig packing, one Trio ac power supply for same, unused dc supply for mobile, unused, rare chance to buy one of Trio's best rigs. GM4AGS, QTHR. Tel 0382 543113.

Marconi tx/rx, output test set TF1065. G4EZM NOT QTHR. Tel 0253-64836, after 6pm.

FT200 handheld, 1W, as new, R3-5, S20-22, £85. Panda Cub, hf tx, slight face damage, £10. Large quantity surplus equipment, all to go, one lot, to good cause or highest bidder. G8UDJ, QTHR. Tel for list, Abingdon 20005.

TS820S, matching mic, digital, immac cond, £475. G3JNY, QTHR. Tel Leeds 863058.

Icom IC202S, nicads, charger, case, as new, used less than 3h since September 1980, for quick sale, hence £135. G8PPM, QTHR. Tel Chris, Worthing (0903) 38309, evenings/weekends, or 01-760 7182 during office hours.

Standard C8800 2m mobile, memories etc, mounting bracket etc, not used mobile, boxed as new, Jaybeam 2m 6-el quad, as new, SWR25 meter, seven meters, new UR67, all for £185. G6AMX. Tel Chris, 01-898 5417, evenings.

FT202, ok for rx and transverter, ht supply needs attention, G3LLL clipper, mic, manual, etc. £180 ono. Liner 2, good cond, Pye mic, preamp, £60 ono for quick sale. G4LJW. Tel Jon, Bedford (0234) 781 323.

Amtor unit Mk1, homemade, pcb, int mains psu, ttl interface, cased, full documentation, any demo/test, inspect, collect, £65. Replaced by another unit. Tel 01-640 6020.

Trio 7500 fm tx/rx, mobile mount, handbook, £150. 2m 50W amp, £50. 2m 30W SEM amp, £50. IC202S 2m ssb tx/rx, £138. FT480R, offers. Two IC202R fm

handhelds, £160. G8KOM, QTHR. Tel Littlewick Green 2453.

Eitex MRS100 cw/rtty tx/rx, mint cond, used very little, £125 ono. Tel 0463 41211.

IC2E 2m fm, 10MHz coverage, mic, λ/4 whip, spare battery case, £150 ono, plus carriage. Tel Johnson, Chelmsford (0245) 353221, ext 748.

FR101D, FL101, mic, spkr, extras, spares, all in good cond, £465, or will sell FL101 separately for £190 or exchange for linear, FL2100B or similar. G3PEK, QTHR. Tel 0244 300897.

Jaybeam C8/70cm 432MHz glass fibre colinear antenna, 8dBd omni-gain, £25. Hallicrafters SX28 gen cov mf/hf/vhf rx, 0·55-43MHz, fully operational cond, handbook, spkr, £25. G8GZZ, QTHR. Tel Woking 23506.

FDK Multi 750E, almost new, all accessories, operating manual, under warranty, £220. William Young, G4KUU, QTHR. Tel Guisborough 35278.

Drake T4XC, AC4 ps, R4C, as new, £495. Buyer collects. Drake TV3300 low pass filter, £15.50. G2UZ, QTHR. Tel Leeds 784074.

If you want a multimode rig, but cannot afford a digital flashing light job, why not buy my TS700G a.m., fm, usb, lsb, cw, sidetone, vgc, incl vox, £269. Liner 2, modified, works ok, £60. Tel 01-360 0210, after 6pm.

Trio 2300, mint cond, with λ/4, 5λ/8 and 7λ/8 mobile whip antennas, homebrew Slim Jim and 8yd coaxial, £155. G3WPP, QTHR. Tel Worcester 354942, after 4pm.

CR100 comms rx, 60kHz-30MHz, S-meter, some spare valves, £30. Tel 0272 843321.

Yaesu FT200/FP200 tx/rx, good cond, orig packing, instruction book, only £175. Buyer collects or pays carriage. GB4IU, QTHR. Tel 0326 40703 after 7pm.

AR240A, one year old, in good cond, requires new owner with £110 dowry, ono. G4CEN, 16 Ashdown Way, Saxon Meadows, Romsey SO5 8QR. Tel Romsey (0794) 515912, after 6pm.

LG300 rf, £20. LG ps, £20. LG160 twin, new, power supply, £15. HRO rx No1, £20. HRO No2, £10. 10, 40, 80 bs coils, lots of coils. Due to weight buyer must collect hence price. 4 Abbotsway, Neston, Wirral, Cheshire. Tel 051-336 2033.

IC240 fm tx/rx, modified for 23 channels, c/w mobile mount, all accessories, in orig packing, good cond, £100. MM 144MHz transverter, cw manual, circuit, diagram, £60. Owner going multimode. Tel Tom, 0224 876747, evenings.

AR240 2m fm tx/rx, charger, case, £100. Apply by post only please, A. Currie, G6CSU, Merchant Navy College, Greenhithe, Kent DA9 9NY.

Yaesu FT301D, mains psu, £350 ono. Yaesu FT221R, fitted with Mutek front end, £320. Microwave Modules 28/432 transverter, used little, offers. Ian Cage, G4CTZ, QTHR. Tel Derby (0332) 71875 or 799452.

IC240, all accessories, as new, orig packing, £130. Trio 2400, used little, mint cond, £160. Both items less than 1yr old. G8XHH, QTHR. Tel Paul, Doncaster (0302) 50109.

Trio 9R59DS, £45. National HRO5T, seven coils, separate psu, £40. Marconi Electra separate psu, £40. Sony CRF5090 nine-band rx, £100. All good cond, wkg order. Buyer collects. BRS46751. Tel 01-804 1869 (North London).

Yaesu FT200/FP200, all of 10, exc cond, £180. Yaesu FTV250 2m transverter, exc cond, £85. AR88D spkr, spare valves, £35. Prefer buyer inspects and collects. G4BHO, QTHR. Tel Letchworth (04626) 74600.

TS520, VFO520, vgc, handbooks, orig pack, £350. KW202, £125. Valve vhf a.m. base tx, for spares, £5. All ono. Buyer collects. Tel 0734 482559.

Datong D70 morse tutor, four months old, comp, boxed, as new, reason for sale—passed test first time. £40. Tel Hoghton (025485) 2182.

QTH in near perfect location over two acres paddocks, suitable n/s/e/w antenna farm, very private location, four beds, two baths, other exc accommodation, sw facing, hillside, three detached brick workshops, double garage, brick barn, £120,000 ono. Gillespie. Tel 0734-732626 (Berks).

Comp rtty set-up: Creed 7BRP, £38. ST5TU tx, £35. 6ST autosender, £18. Tapemaker, £10. SWR200, £32. KW E-Zee Match, £32. BC221, £28. KW dummy load, £18. Geloso allband cw tx, £15. All in vgc. G4AEI. Tel Reading (0734) 883508.

TR2400 fm synthesized handheld, ST1, SC3, LH1, £200. IC202S ssb handheld, four xtals, nicads, N900C, BC15E, ICFAI, £150. ML144/25 25W linear, £40. PX402 psu, 13·8V, 3A, £12. G4FTQ. Tel Peter, Crawley (0293) 516465.

TC240 with 80 channel switch, £140 ono. Eddystone EC10 Mk1, £80 ono. Sentinel 2m converter (4-6MHz i.f.), £15. Pye Ranger, £5. Buyers collect. G6ANP. Nr Bristol. Tel 0275-83 2768, weekends only.

Trio JR599, Trio T599S, Kenwood S599 spkr, all items in orig packing, operating manuals, all in good cond, £300. G4EPV, QTHR. Tel Wickford (0734) 63564, after 7pm.

2200GX, good cond, internal light fitted, power lead, mic, two cases. charger, nicads, orig packing, handbook, xtals S0, S20-22, S24, 145·8, R3, R5, R5 input, R6-8, £100 ono. Carriage at cost. G2BCY, QTHR. Tel 0632 654780.

TR2300 nicads, rev rep, £135. IC225 2m fm 10W mobile synthesized 25kHz channels, £140. IC30A 70cm 10W mobile, 22ch eight fitted, £150. FRG7, fine tune, fm, vgc, £130. All orig packing. G8AYN, QTHR. Tel 047485 2577.

HW17A 2m tx/rx, mains psu, assembly manual, rx tuning capacitor needs attention, offers? Small dc motors, 3-9V, ideal for model makers, 50p each. Many 6V valves. Contact for requirements. G4IOY, QTHR. Tel 01-455 0540, evenings.

TR2200GX, auto toneburst, charger, R0-7, S18, S20-22, £100. FT7 hf ssb, dc ac psus, mobile mount, £130. TV waveform monitor Pye 2802, £30. ITT Starphone AM7, £20. Storno Viscount, £20. Pye Ranger for spares, £3. G3RXG, QTHR. Tel Winscombe 3237.

Labgear LG50 a.m. tx, instruction book, circuit diagrams, for amateur bands 3·5-30MHz, 40W telephony, 60W cw, been stored several years, good cond, appearance, wkg order, owner going QRP. Buyer can test into dummy load and collect. No reasonable offer refused. G3FRM, QTHR. Tel 0207 506280.

1980 Viking Fibreline 2B, deluxe 12ft 10in two berth touring caravan, end kitchen, oven, fridge, carver heater, hc water, double-glazed, extra under-floor insulation, exc cond, £3,500 ono. Kokusai filter MF455·15K, £7. *Wanted:* FT480R, IC260E. G3KSP, QTHR. Tel 0524 52275.

Pye Bantam fm hi-band relay, u.s. otherwise fb, £20. A.M. mid-band, £8. Spares or refurbish. Several good reel tape recorders, £10 each, or exchange tx. W.H.Y? Redifon GR415 ssb tx/rx, 12V dc, £45. Valve tester, Mullard, £5. G3DVF, QTHR. Tel Alnwick 602487.

Hellschreiber rx, needs slight mechanical modifying for amateur signals, £10. BM3 xtal mic, £2.50. Transformer, mains, 1,300V, about 350mA, no centre tap, bulky, £7. Ferranti intervalve, output, audio, late 'twenties. All carriage extra. Details on request, G5XB, QTHR. Tel 0734 722195.

Heathkit tx DX100U, phone, cw, output 140W, 160, 80, 40, 20, 15, 10m, manual, £35. CR100 rx, perfect, £20 ono. GM4MCP, 7 Doulalston Avenue, Milngavie, Glasgow G62 6AU. Tel 041-956 2662.

Liner 2 ssb 2m tx/rx, 10W, exc, £80. AR88D gen cov rx, S-meter fitted, 2m converter, £75. Sinclair ZX81 computer with games cassette, £55. Carriage arranged at cost. G8DOI, QTHR. Tel Rugby (0788) 70584.

Trio 7500, mobile mount, boxed, £155. Icom IC22A, four simplex, all repeaters, £90. Microwave Modules frequency counter, new, £60. PSU, 13·8V, genuine 20A, fully regulated, £40. Trio 9R59DS rx, good cond, £50. All ono. G6BGW. Tel 061-665 1722.

FR101S rx, 160-10m, 2m, bc all modes, YC601B external digital readout for above, doubles as 30MHz counter, SP101B spkr, manuals, £320. IC22A fully xtalled, R0-7, S8-9, S11, S13-23, manual, £110. AR22 pocket monitor, 141-149MHz, charger, helical antenna, £55. G6AQC. Tel Oxford 43634.

Icom IC202E ssb tx/rx, 144·0-144·8MHz, as new, handbook, carry strap, orig packing, £120. Pair Pye Pocketphones, xtals for RB6 required tuning up, £20. G8GZB, QTHR. Tel Langley Mill (07737) 69135.

FDK Multi Palmsizer, 2m fm handheld, external mic/spkr, £100. HF5V, 10-80m vertical, comp with radial kit, £45. Commercial cctv camera, 9in monitor, DL2RZ converter, built but unaligned, £100. G3ZJU, QTHR. Tel 01-527 4492.

Eddystone 840C gen cov rx, immac cond, £65 ono. Mech bug key, £10 ono. G6BVL, 1 Hilltop, New Longton, Preston. Tel 0772 617809.

KW500 linear amp, mint cond, £130. Telefunken colour tv, 26in, good cond, £60. 28 Covert Road, Northchurch, Berkhamsted, Herts. Tel Ray, 04427 4240.

Power supply/nicad charger, PS1200, £25. Mizuho 2m ssb, handbook, case, £75. VB2300, TR2300, 10W amp, £35. Creed 7E Mk1 teleprinter, fitted silent cover, £20. All items ono. Buyer collects teleprinter, remaining items collect, carriage extra. G8SBU, QTHR. Tel Fareham 0329-232799, anytime.

Strumech P60 tower, incl central tube, £290. Yaesu FT301, all options, 160m speech processor, vox board, etc. £275. Andrews FXJ5 coaxial, 55ft, £40. 2m Jaybeam, C5/2M co-linear, mast, chimney lashing, coaxial, £30. G4AHH, QTHR. Tel Silverstone (0327) 857350.

Vega Spidola rx, lw, mw, vhf, six sw bands, vgc, orig packing, £25. Tel Dan, 0322-524938, 6-9pm.

FT101E, 350Hz filter, front panel processor control, revalved, dynamic range optimized, over 300 countries worked. G2DMR, QTHR. Tel Burgh Heath 58729.

Trio JR310 rx, £85. Pocketfone PF2UB, SU16, £35. Racal RA217 rx, £325. G8MPG, QTHR. Tel 025-481 3182.

Microwave Modules MMT144/28 2m transverter, exc cond, recent, £65. Gone multimode. G4GOR, QTHR. Tel Macclesfield 24697.

Sommerkamp FL200B tx, 80-10m, unscratched, suit beginner, manual, mic, spare valves, £95. G2AGY, QTHR. Tel Chelmsford (0245) 59883.

SX200 uhf vhf scanning monitor, as new, minus antenna, hardly used, offers around £150. Mark Jarvis, 204 Lewis Trust Buildings, Warner Road, London SE5 9LY. Tel 01-737 4681.

MMT144/28 transverter, £65. Datong morse tutor, £28.50. Both incl postage. Ex-GM8UQM, QTHR. Tel 0847 5460.

Eddystone 750 rx, external spkr, vgc, £70. AEC swr power meter, £10. YD148 desk mic, £15. G4BXR, QTHR. Tel 0908 566266.

Sentinel 2-10m converter, £12. Heller 1W 2m tx, cased, internal psu, £25. 2m λ/4 gp, unused, £6. Transformers: 500-0-500 150mA, £2: 350-0-350 250mA, £3. Dobbs, G4LZH. Tel Staines 51942, after 6pm.

Icom IC701, matching psu, mic, manual, mint, £550. Trap dipole, £10. Field strength/mod meter, £4. CMOS touch paddles, £4. Squeeze paddles, £4. G3HSC morse record, £2. Free junk box. G4BJM, QTHR. Tel Fraser, 029672 340, home, 0908 653961, work.

FDK Multi 750, £235. Yaesu YO100 scope, £85. Microwave Modules 144-1,296 transverter, £130. Pair W0EYE 15-el 70cm beams, never used, £20. Microwave Modules 28-432 transverter, £65. All above as new. Orig packing. G4FEV, QTHR. Tel Rushden 56768.

Icom IC240, as new, in orig packing, handbook, accessories, etc, used little, Jaybeam unipole groundplane, £130. G8OSF. Tel 01-393 9275.

Trio TX599, RX599, superb hf rig, twin vfos, all filters, matching spkr, handbooks, spare 6146Bs, one very satisfied owner from new, £425. G4GAH, QTHR. Tel Wallingford (0491) 37188.

TS520, SP520, vgc, 80-10m. £300 or swap for 2m multimode. 144/28 transverter. Microwave Modules, £70. HQ170 160-6m, superb rx, £90 ono. Liner 2 with Pye mic, £85. HB communication rx, EC10 style, £20. Various disco light effects. G8PVH. Tel Alton (Hants) 82693.

FT227R 2m fitted autoscan, rev rptr, etc, £165. MM hf preamp, £6. Numerous valves, YL1080, QQVO320, 807s, etc. *Wanted:* Pye Europa lowband (4m) fm. G3NPZ, QTHR. Tel Fareham (0329) 283736.

Clark air-operated telescopic mast, up to 35ft extended, 7ft 3in closed, 12V dc compressor, automatic pressure switch, new seals, clamping rings, £120 ono. G4LRX. Tel 01-992 5344, days, 0252 515581, evenings.

Dentron linear amplifier, GLA1000B, 1,200W p.e.p., 800W cw input, ideal solid-state rigs, 12 months old, as new, manual, demonstration arranged, bargain, £200. G3ZUM. Tel 025-681 298 until 9 December, then 021-747 5077.

2m KDK 144-10SX, 15W mobile or base tx/rx, fully synthesized digital readout, auto toneburst, exc cond. G4KTK, QTHR. Tel Canvey Island (Essex) 684978, after 5pm.

Eddystone communication rx model 730/4, comp with spkr, manual, mint cond, buyer collects, see working, £120. F. G. Bunting, 22 Northgate, Oakham, Leics LE15 6QS.

Eddystone 888 rx, £90. 2m Marconi fm portable, 12ch, £100. Unmodified, circuits, £80. Westminster W15AM, unmodified, £60. HRO RX, seven coils, £50. Oskerblock power meter, 3-200MHz, £35. All ono. G8XHL. Tel Colchester 48102.

Drake R4C cw filter, extra xtals, latest model, £325. Hammond Aurora Century organ, £1,825 or part exchange for smaller instrument or good current hf gear. W.H.Y? *Wanted:* Drake T4XC or TR4. G3MPN, QTHR. Tel Wymondham 603382.

Rotator SU2000 for light vhf beams, as new, £18. G3MEW, QTHR.

Eddystone 840C gen cov rx, manual, orig packing, £65. External bfo for Grundig rx, £10. Yaesu spkr SP101B, virtually new, £15. Tatty Codar CR70A Mk2, PR30 preselector, wkg but requires attention, offers. BRS25941. Tel Cheltenham 515112, anytime.

IC202S, Oscar xtal, exc cond, orig packing, £130. IC255E, vgc, orig packing, no mods, £200. KW Vespa Mk2 hf tx, psu, £80. Codar 14 160+80m tx, psu, £30. G8UDH, QTHR. Tel Bovey Tracey (0626) 833337.

FT290R, two months old, comp with handbook, packing, mic, etc, list price ono. Buyer pays carriage. Tel 05432 23608, evenings.

Complete QRP cw station, HW8, mains psu, phones, handbook, £70 or exchange for handheld 2m tx/rx. Heathkit metal detector type GD1190, new, tested, unused owing illness, with handbook, £40. G3KFZ, QTHR. Tel Norwich 57725.

TR2400, 2m fm handheld, 400ch synth, 10 memories, scan, etc, all accessories, ST1 base stand for above, himound HK707 key, all vgc, £195, G8RYT NOT QTHR. Tel 01-856 3746.

S100 4MHz cpu board, Ithaca audio, comp, built, needs rom, 2708 incl, possible repeater use, may need attention but believed fully operation, some data, £70 or offers. M. J. Ganley, 4 Walnut Grove, Trowbridge, Wilts BA14 0HR.

Rank Murphy base station, high quality standard rack mounting cabinet, 24in high, ideal projects, 144MHz tx, 3-10 driving 6-40A 90W, modulator two KT77s, 600V power supply, no rx unit, spare 6-40A, £40. G8EJG, QTHR. Tel Earls Colne (Essex) 3356.

CQ R700 gen cov six-band communication rx, 500 and 50kHz calibrators, a.m., ssb, noise blanker, ant tuner, adjustable bandwidth, tape record, playback, exc swl rx, used little, instruction manual, £110 ono. Moss, Garden Cottage, School Lane, West Kingsdown. Tel 2400.

EC10, £25. 2m MM converter, £12. 70cm JXK converter, £12. 70cm multibeam, £7. 2m 60W pa, £10. 70cm 50W pa, £15. 2m 10W tx, £10. 6ft 19in cabinet, £10. HF tx, homebrew, Heathkit vfo, £15. 3cm Klystron tx, £15. GM3VBB, QTHR. Tel 031-449 3842.

FT225RD, Mutek fe fitted, orig board available, two fixed channels, S22-23, used very little, going hf mobile, consider exchange and cash adjustment for good FT7. G4HZF, QTHR. Tel Grimsby 71215.

KW202 hf rx, calibrator, Q-multiplier, notch filter, no mods, exc cond, KW manual, £130 ono. LS and atu (Diawar), available. Moss, Garden Cottage, School Lane, West Kingsdown, Sevenoaks. Tel 0474 852400, anytime.

Trio JR310 rx, fitted narrow filter, £80. MM144/28 converter, £10. Codar PR40 preselector, £7. Lowe 1420C 2m monitor with psu, £20. Hallicrafters S120GL rx, £20. Garex 2m converter, £5. Tel Winslow (Bucks) 3744.

Guts of a.m./cw tx available due to shack clearance: Geloso N4/104S vfo, 160-10m, Woden UM3 modulation transformer, Pi-tank cct, pa valves, metering, switches, psu, etc, offers please. Tel Cardiff 593077.

Venus SS2 slow scan tv monitor rx with handbook, buyer gets well-built DL2RZ fast/slow converter with pattern generator and power pack free, £125. B. Sykes, G2HCG, 52 Marine Drive East, New Milton, Hants. Tel 617090.

AR40 rotator, £35. 2m 8-el beam, £6. PR30 preselector, £3. 9MHz ssb exiter, £5. Box of valves: 2-6s,, 3-10s, 3-20s, 6-40s, £10. Tel 0474 874102.

Uniden 2030 12ch, extra xtals, £85. HF5 vertical antenna, £25. Nytech CTA252 tuner-amp, top class stereo, £125. G3RKH NOT QTHR. Tel Retford (0777) 702515.

Heath SB303 rx, good performer, appearance, handbook, £175. Would consider exchange for Icom IC240 with Superscan, in mint cond. G3KGW, QTHR. Tel Codsall 2214 (West Midlands).

Cossor double beam oscilloscope, 339A, £30. Solartron single beam oscilloscope, CD523 DC10MZ, £40. AVO47A, £7. Valve voltmeter CT54, mains pp, £12. Ink chart recorder, slow paper feed, £17. All wkg. Carriage extra, prefer collect. G3IVI, QTHR. Tel Cheltenham 41666.

Lowe analogue rx SRX30, £110. Cuna SR9 vhf fm rx, £30, Bell Sonic 3/5A psu, £10. Daiwa CL22 swl atu, £12. All less than two years old, in exc cond. *Wanted:* Samson ETM2/3 keyer. Tel Scarborough (0723) 85379.

Wireless World: 1942-9, 63 copies; 1950-64, 166 copies; orig manuals for BC640 tx, SCR300, offers. Tel Abson 2843, evenings.

SB104A digital readout, 10-80m tx/rx, solid-state, good wkg order, hb psu built into SB604, offers around £295. G3RZC. Tel 0424 892504.

FT227RA 2m tx/rx, fitted 25/5kHz steps, scan, automatic toneburst, reverse repeater, four memories, 10W out, very sensitive rx, vgc, orig box, £175. G8ZNC. Tel David, Garston (Herts) 79567.

G3ZVC SL600 series ssb tx/rx, as published *Radio Communication* September 1974. G3TDZ 2m tx/rx kit, as published *Radio Communication* January 1973. Datong automatic transistor tester Datest 1. Exchange for heavy duty mast rotator. Offers or cash. G3HDT, QTHR.

Tektronix oscilloscope model S54, as new, manual, comp with Hewlett Packard divide by ten probe, £120 ono. Data Tech digital voltmeter, 500mV-1,400V dc, ac to 1,000V, continuity to 50MHz, comp with mains adaptor/charger, £25. G3CRH. Tel 05436 6364.

FT101E, immac cono, unmodified, mic, fan, rf processor, a.m./cw/ssb, 10-160m, wwv, aux positions, suitable new band?, spare tubes, ac/dc leads, handbook, orig packing, realistic price of £350. G4GXM, QTHR. Tel Hitchin 53001, home, Letchworth 6500, ext 250, office.

IC22A, 23 available channels fitted, eight repeaters, auto toneburst, four simplex, best offer near £110. TS700 vfo, fully rocked, £265. G3MTX, QTHR. Tel Bexhill (0424) 210177.

IC240, all attachments: ZL super Slim-Jim 2m ant; PX402 mains psu, 13·8V dc 3-4A output; all mint, comp station, £175. 14MHz λ/4 vertical ant, base insulator, ground section, telescopic aluminium tubing, makes fb ground plane, £9.50. Tel 0373 64694 (Bath area).

TR2200GX, exc cond, S18, S20-23, R2, R5-7, orig packing, case, λ/4 whip, helical, nicads, charger, etc, £90. Linear amp 144MHz, homebrew modular electronics design, nice job, £25. G4JCX, QTHR. Tel 07555 3503, evenings, weekends.

Yaesu FT280 (same as FT480R), 2m multimode, 1yr old, exc cond, fitted auto toneburst, listen-on-input, comp with manual, orig packing, £290. Carriage extra or buyer collects. G4LVP, QTHR. Tel Hitchin (0462) 58728.

SR600 hf amateur rx, 80-10m triple conv xtal front end, ssb, a.m., cw, 0·5-4kHz bandpass, notch filter, calibrator, fb rx for swl or with tx, heard the world, £60. Buyer collects. G4MAD. Tel Sittingbourne (Kent) (0795) 74308.

Over 200 *QST*s: 1938-75, £10. Sundry *CQ* and *73* mags. G3VW, QTHR. Tel 01-205 1443.

Drake TR4 tx/rx, RV4 remote vfo, AC4 psu noise blanker, all vgc, £280. R216 vhf rx, 19-157MHz a.m./ssb/fm, £110. G4AXD, QTHR. Tel 0732 841021.

Swan 350, new pa valves (6LQ6s), some other spare valves, manual, orig packing, fb cond, £130. G3KGN, QTHR. Tel Southend 77779.

TS520, SP520, VFO520, mint cond, orig packing, £390. KW1000, £180. 18AVT, £30. Following new and unused 40ft Telomast, cw rigging, £40. TH3JNR, £110. AR40, 50yd 5-core, £40. G4ETK NOT QTHR. Tel Potters Bar (0707) 45968.

FT207R, no mods, nicad case, strap, helical, manual, NC2 quick charger/ac adaptor giving portable and base station operation, cost £237, only £170 ono. Spare nicad available, rarely used, £16 new, £10. G8MRQ NOT QTHR. Tel Nottingham (0602) 280252.

FT101E, immac cond, £400 or offers. Eddystone 888A, £80 or offers. G4HTX, QTHR. Tel Bedford 43348.

Yaesu FT202R 6ch handie, nicads, NC1charger, new, unused, £90. Yaesu desk mic, modified to 500Ω, £10. Nagasawa TWS120N uhf two-way coaxial switch, gold-plated N connectors, new, unused, £10. Postage extra. Tel 0747 840138.

FT207R, charger, mint, used little, orig packing, £140. G8SAJ, QTHR. Tel Malvern (06845) 63552.

Manuals: CT212, CT436, TS505B/U, SP600, 880/2, 51J4, 75S3A/B, C core transformer, tapped mains input, sec 16V 14A constant duty, very high quality, new, £16 plus postage. *Wanted:* Panoramic adaptor, 455-465kHz i.f., BC1031A or similar instrument. Tel 0995 40387.

Datong morse tutor, as new, £35. Junkers precision straight hand key, weighted base, cover, built-in key click filter, lovely smooth action, £23 ono. Realistic DX160 gen cov rx, bandspread, ant trim, etc, cw/ssb/a.m., £69 ono. G4GIG, QTHR.

Icom IC215, fm tx/rx, orig packing, handbook, £75. G3ZJF, QTHR. Tel Windsor 68364.

14-el 2m Parabeam, work some dx for £20. Palm 4 70cm handheld, 11 xtals, £110. Modular Electronics 15W 144MHz linear, £35. FT101E hf tx/rx, £315. G8KMV, QTHR. Tel 0438 54689.

2m preamp, Microwave Modules MMA144V, rf switched, as new, in orig packing, cost £35, will accept £22. Jaybeam 4-el quad, Q4/2M, £10. G8TLV, QTHR. Tel Southend (0702) 333330.

Trio VB2300 10W pa for use with TR2300, as new, used approx 1h, £35 ono. Mobile mount for above and TR2300, as new, £10 ono. Both for £40 ono. G8TBI, QTHR. Tel 01-500 4183.

Sinclair ZX80, both old and new roms, tape recorder, old and new manuals, lots of prog listings, £60 the lot, or will swap for old comm rx. H. Jones, BRS40066, 6 Raynesfield, Grand Drive, London SW20. Tel 01-540 1057.

FT200, FP200, fully xtalled on 10m, £190. QM70 transverter, 50W wired for FT200, £60. Could deliver some areas. G4GBE, QTHR. Tel 021-453 8242.

Palm 2 2m fm handheld, fitted S20-23, R5-6, xtal toneburst, helical whip, leather case, nicads, charger, orig packing, £85 ono. G8LRS. Tel 0487 840368, after 6pm.

FT101B, mint, accessories, £250. FRG7000, as new, £220. TA33JR, 40m hd coaxial, £60. Buyer collects. G4FQP, QTHR. Tel 0724 720794.

FT101 Mk2 160-10m, fan, mic, orig packing, spare valves, mint cond, £295. Datong rf clipper, £35. Various *RSGB Bulletins* 1948-59, 20p each or lot (100 issues), £15. G3VOW, QTHR. Tel 0635 43048.

TR9000, exc cond, used only as base station, 10 months old, mobile mounting bracket, power leads etc, orig box, £315. Tel 061-427 5931 (Manchester area).

Kenwood AT180 atu in new cond, £70 ono. Ward, GI3ZCK, QTHR. Tel Belfast 56221, ext 36, business hours.

Property of the late Bill Levett, G8JLL, all vgc Yaesu FT280 (like FT480), 2m all mode, £290. Icom IC255E, £200. KDK FM2016E 2m fm, synthesized tx/rx, £160. Icom IC215 2m fm portable, £100. Mirage B108, 80W, 2m linear amp, £80. Bearcat 220FB, £200. Daiwa CN630 swr and power meter, £50. MM 2m converter, £10. 2m 4-el quad ant, £10. Joymatch atu, £5. Tel Maidenhead 31822.

Business computer system: TRS80 model one 48k with one disk drive, lower case, green screen, about 1yr old, disk drive is 26-1141B (40 tracks), supplied with Newdos 80, loads of software, £900 ono. G4IAC, QTHR. Tel Bracknell 24277.

KW2000E ac psu, Datong clipper, £230. KW77 rx triple conversion, £70. Emsac Nuvistor 2m converter, 28-30m i.f., £12. Goodman spkrs, 8-10in, large enclosure, £15. Vols *Radio Communication* 1969-75, £2 per vol. Class D wavemeter, ac psu, £12. All vgc. Tel 01-311 2346.

FT707, £490. FP707 power supply, £85. All above items as new, genuine reason for sale. Tel 458 9035, after 6.15pm.

Trio 2200GX, fitted R0, R7, S20-22, helical rubber whip, new nicads, good cond, in orig packing, £50. G4LDF. Tel 01-428 3266 (NW London).

Clearance: W30AMLB, £70; W15AMLB, mains power supply, £80; Vanguards 25BL/B, £15 each; 25TL/B, £20 each; Cambridges AM10BH/B, £15 each; AM101DH/B £20; RTC2B controllers, £10 each; GEC 625H/B, £180 each; C800 scanner, £60 each. GM8LON. Tel 0382 642943.

HF5 trapped vertical with radials, £50 or exchange for rotator or 2m portable, with cash adjustment. G3RYY, QTHR. Tel Chorley 62250.

Drake SSR1 communications rx, £100 ono. Buyer collects. J. Coggins. Tel 01-727 2141, evenings, 01-499 1279, daytime.

FRG7, as new, no mods, orig packing, manual, comp with Joystick antenna, atu, fittings, £170 ono. GW6DXI, QTHR. Tel Swansea (0792) 204206, after 6pm.

HW101, psu, 160m transverter, £170. IC24G, psu, £140. LM14, £18. JR500S, £70. GPV5, £18. TA32JR, £30. Junkers key, £20. Buyer collects. GM30BC, QTHR. Tel Glenrothes (0592) 758647.

SB102, recently realigned by Heathkit, revalved, SB600/psu, £175. HM102 power/swr meter, £25. KW E-Zee Match, £20. All with manuals, in good cond. Vibroplex el-bug, £20. Carriage extra. All reasonable offers considered. G3FPB. Tel 0480 810073, evenings.

TR2300, nicads, charger, reverse repeater handbook, boxed, as new, 5λ/8 mobile mag mount, £150 ono. Codar AT5 tx, £12. Pye desk mic, new, £10 ono. Consider px for FT7B. *Wanted:* FT7, FT7B hf mobile rig, or similar. Tel Durham 45750.

Antenna dummy load resistor, 50Ω tubular carbon 9 × 1·75in for coaxial const, £10. Collectors items: Admiralty hf wavemeter, G61 and oscillator, G35 handbooks, calibration charts circa 1940, total weight 50kg approx, £65 ono. Carriage extra. GM3LGU, QTHR. Tel 036 987341, evenings.

Standard C146A with nicads, charger, helical whip, leather wallet, £70. G4FAZ NOT QTHR. Tel Yeovil (0935) 29003.

Swan 700CX, 230XC psu, 510 c/osc, vox unit, Datong rf clipper, Shure 444 mic, handbook, spare valves, exc cond, £450. G3LAT, QTHR. Tel Northbourne 79115.

Kenwood 520SE, as new, £380. Buyer collects. Various valves. G2UZ, QTHR. Tel Leeds 784074.

TB3 Jaybeam tribander, 10, 15, 20m 3-el beam antenna. Cowl gill motor. Mullard FX1588 toroidal ferrite cores. G. Ripley, G3KFW, 16 Curtis Road, Hornchurch, Essex RM11 3NP. Tel Hornchurch 53912.

Pair of PF1 Pocketfones, comp, working on SU8, £25. U10B Cambridge, comp, working on SU8, £30. The lot, £50. *Wanted:* F27 cabinet, Bantam top panel, dash, Cambridge manual (AM10D), fm Bantam manual. G8GOJ, QTHR. Tel 01-688 2564.

Moving QTH: HW101 hb psu, £190. Linear amp comps, radar/scope tubes, £1 each. VVM, £5. HB sig gen, £5. SCR522 chassis, £5. Pye Cambridge boards, many rare valves, comps etc. SAE with enquiries. G4BPW, QTHR. Tel 0283 813395.

Yaesu FT101Z, fan, desk mic YD184, dual-Z, £405. Heathkit or KW103 power, swr bridge, £15 or free with above. Would swap for Robot 800. 11 Tregonwell Road, Bournemouth. Tel Kevin, 0202 24848.

Standard C8800, immac, £200. Pye Bantam, S20, S22, nicads, helical, £40. ZVC board, xtal filter, £30. 10·7MHz ssb xtal filter, unused, £15. 100W Tuac audio pa, 775mV sensitivity, £35. *Wanted:* faulty 2m rigs. G8OQN, QTHR. Tel John, Portsmouth (0705) 750600.

Heath ssb/cw SB303 rx, SB401 tx, SB600, cw with tx/rx cables, vgc, £265. SB200 1·2kW linear, vgc, £300. KW107 up-rated to 109 power level by KW, vgc, £110. G4FHQ, QTHR. Tel 021-748 2841.

Realistic DX302 communications rx, 150kHz-30MHz in 30 bands, as new, boxed, £150. FRG7700M Yaesu communications rx, as new, boxed, £260. BRS47111. Port. Tel 01-309 1615.

Datong FL1 with mpu mains unit, as new, £50.

Lafayette lab tester, 100,000Ω/V model 99-5065, 24 ranges, boxed, £15. Two 625 tvs for parts, £2 each, collected. Books, valves, parts, must sell. SAE lists G2HKU, QTHR. Tel 0795 873100.

Radio Communication 1966-80, free to good home, please collect. G3MQU, QTHR. Tel Diss 2875.

Expansion interface for Video Genie or TRS80. incl 32k ram, floppy disk controller, printer port, RS232C serial link, £320 ono. G8GHO NOT QTHR. Tel 061-440 8811, after 7pm.

PRO2002 realistic 50ch programmable scanner, 20, 480 frequencies, vhf 30-50/108-136/138-174MHz, uhf 410-512MHz, four months old, cost new £299, absolutely mint, £200 ono. Send sae to BRS47678, 16 Lymm Avenue, Lancaster LA1 5DA. Tel Bob, Lancaster 34351.

2m pocket-sized scanning monitor rx MR3000, xtalled for 10 popular channels, £50. 2m Slim-Jim ant, £8. Programmable scientific calculator Casio FX502P, comp with cassette interface, case, demo tape, instructions etc, £40 ono. Tel 031-332 9742, evenings only.

Sommerkamp FRDX500 rx 160-10m, 6-2m converters, instruction manual, £160 ono. Buyer collects or carriage at cost. Tel John, Newport (Pembrokeshire) (0239) 820521.

Mizuho SB2M 2m ssb tx/rx, Mizuho 10W linear amp, boxed, as new, works fb, gone multimode, £75. Tel 01-455 5039 (NW London).

FDK Multi 750E, 2m fm/ssb/cw synth, 1-10W, good cond, nine months old, orig box, handbook, mobile mount, mic, power cable, £260 ono. Will exchange for IC202S(E) and IC2E or FT207R with usual accessories. G8XFW. Tel Flitwick (0525) 715377.

FT75 ac and dc psus, exc cond, used little, £150. GM4HNK, QTHR. Tel Dunadd 253.

R1000 Trio gen cov rx, good cond, handbook, orig packing, £220 ono. Datong AD270 active antenna and mains unit, new, £30. QM70 144MHz receive converter, 28MHz i.f., £12. G8PPR, QTHR. Tel Bancroft, Bradford (0274) 674396, weekends only.

FT707 100W, as new, for quick sale, £460. FP707 matching power supply, £80. FC707 atu with swr, dummy load, £60. All in exc cond. Prefer not to split. Can be viewed operating. G4MCK. Tel Stevenage 68564, evenings.

QTH Sutton Coldfield: good-sized pre-war semi, garage, nice gardens, recently decorated throughout, three beds, all carpets, curtains, fitted kitchen/family room, good for buses/shops, tribander/rotator in situ. Details G3XYT. Tel 021-354 1566.

Collins 75S3B rx serial No 17383, 115/240V mains, 3·4-30MHz a.m., lsb, usb, cw1, cw2, 3·1kHz mechanical filter, Q-multiplier, notch filter, service and instruction manual, cond and performance exc, £250. G8KS, QTHR. Tel 0323 21919.

TR7500 2m fm, as new, mobile slide mount, £150. *Wanted:*QRO hf linear amp, components, valves, bases, etc, w.h.y?. G3SKN. Tel Denis Naylor, 0642 829723.

Trio TR9000, under 1yr old, mobile whip, 4-el quad, as new, £355. BC348 rx, in wkg cond, £45. G4LFT. Tel Billericay 52581.

Trio 9R59DS xtal cal, volt stab options, exc cond, manual, box, internal spkr, £55. Delivery possible London, Kent, Essex areas. Tel Brian, 01-854 3390.

KW2000A professionally realigned, in good wkg order, comp psu, mic, etc, £150 ono. Cambridge dash mount, modified fm fitted, 6ch, comp toneburst, mic, good wkg order, £50 ono. Offers for BC348, LG300, both comp. G3KLQ, QTHR. Tel 0522 33149.

Eddystone 888A rx with S-meter, £80. Creed 7B with silence cover on trolley, FSY11, CRT3, phase-shift scope, psus etc, £40. Emsac Nuvistor 2-10m converter, Joystick, atu, etc, £10. Buyer collects. Will demonstrate. Tel Deasington, 041-552 4400, ext 2118, daytime.

Brenel STB2 stereo tape recorder, requires new record/playback heads, £100. Eddystone 770R rx, 19-165MHz, £100 ono. Refractor telescope, 3in, with carrying case, equatorial mount made by Fullerscopes, £175. Solartron CD523S oscilloscope, blue trace, £50. Sig gen type 62, 95-161MHz in one range, incl xtal marker, £40. Amateur band rx, double conversion, homebuilt, may need some improvement to front end, all valve, £30. Buyer to inspect and collect. G8ZDH. Tel Windsor (Berks) 69015, after 6pm.

C4 vertical dipole, 10, 15, 20 triband, mini-product, as new, full maker's instructions, £30. G4EJH, QTHR. Tel Portishead (0272) 843897, evenings.

Yaesu FRG7 tx/rx, mint cond, now surplus to what I require, at half the new price, genuine bargain, £100. Panda Cub tx and matching atu, any offers. G3PKR, QTHR.

FDK 700EX, £135. Buyer collects. G8YGL. Tel Stoke-on-Trent (0782) 612442.

Compukit UK101 personal computer, 8k microsoft basic, 16k ram, Cegmon monitor, extra interface and expansion board, toolkit rom, assembler, full documentation, £225 ono. Pye U450 tx/rx, £15 ono. *Wanted:* 9MHz cw filter. G8BIS, QTHR. Tel Shorne (Kent) 2894.

TS510/PS510 five-band ssb/cw hf tx/rx, faulty VFO5D, matching external vfo, spare valves, very good performer, £200. G4GZC, QTHR. Tel Paul, Epworth (0427) 872724.

Sony TC377 reel-to-reel tape deck, three heads, four tracks, recently overhauled by makers, exc cond, £110 ovno. G6DLR. Tel 0732 823483, evenings.

Morse code key, ex-Air Ministry type F, adjustable, brown-moulded insulated case, £4 post paid. Transformer 6V, 18A, 230V input, £7. Gardners transformer input, 240V tapped, 260V, twice 55mA, 310V, 210mA, 6·3V, 2·2A, three tappings. G3MBL, QTHR. Tel 01-445 4321.

KW Atlanta, comp with external vfo, manual, spare valves, etc, £250. G4JCY, QTHR. Tel Haywards Heath (Sussex) (0444) 51522.

Yaesu FT202R 2m fm handie tx, as brand new, boxed, fitted S20-22, R0, R4-5, spare xtals, new nicads, charger, helical whip, case, £90. G6FFO. Tel 021-360 9307.

FT901DM, mint cond, still under guarantee, comp, £600. Buyer collects or pays carriage. Tel 061-761 2952.

FB FT2 auto 10/1W, eight xtal channels, 12V dc/mains, S20-23, 144·8, PO, DA, KN and PI, ideal new G6, £60 ono. 1957 A35, suit collector, offers. G3XJL, QTHR.

FT221RD with YC221, in perfect wkg order, £290 for quick sale. MMC432/144·5 70cm converter, £20. 2 × 16-el Tonna, only a few months old, £50. Buccaneer 2m transverter from 28MHz 15W output, £35. M. E. Wright, 27 Bulbridge Road, Wilton, Salisbury.

Trio R1000, mint, boxed, used little, £240. *Wanted:* straight morse keys, old type, for my collection, will not be resold. Steve Vincent, G4MQX. Tel Axbridge (Somerset) 732655.

Codar AT5, psu, mobile control and psu, comp, £20. Ex-Army B44 mod for 4m, reasonable offer. Buyer collects. G3LIU, QTHR. Tel 051-449 2546.

Wood & Douglas 2m rx, assembled and aligned for synthesizer, plus data, £30. G8ZAG. Tel 062-982 3072.

VFO, FV400S for FTDX400 or 401, ideal for the dx man, vgc, £35. Datong clipper-speech processor, this unit gives the equivalent lift to a linear, £20. G3JMH, QTHR. Tel High Wycombe 34984.

FT101ZD, 15 months old, mint cond, comp with mic, fan, all leads, manual, AEC twin meter swr bridge, £460. Prefer buyer collects. G4FXG, QTHR. Tel Poulton-le-Fylde 883461.

Trio JR310 rx, 10-160m wwv, handbook, £85. G6AXP. Tel Richard, Leeds (0532) 689880.

Trio/Kenwood SS deluxe tx/rx, dfc, optional ssb filter, as new, £525. Swan PSU3, ideal partner for TS180, £75. MC50 dual impedance desk mic, £15. G3MIN, QTHR. Tel Shoreham (Sussex) 3552.

Standard C8800 2m fm mobile, fully synthesized, 5kHz or 25kHz shift selector, full repeater facilities, four memories, full microprocessor type programming, 1 and 10W output, local or dx selector switch, autocalling channel, £195. Tel 0272 614497.

HW101, HP23B, SB600, £195. SB620, £65. SB200, £200. FT227R, £175. All absolutely mint. G4BKI NOT QTHR. Tel Paul, 0203 24011 ext 2414, work, 0926 314994, home.

WANTED

B2 suitcase radio or any other wartime suitcase/spy type radio. Any cond or incomplete welcome. G8VDZ, QTHR. Tel 01-949 2317.

DC200 dc power supply unit for Yaesu FT200 to provide all necessary voltages from 12V battery for mobile use, and fitting instructions please. G4HHH, QTHR. Tel Whitby (0947) 880 245, evenings.

Icom IC30A 70cm mobile tx/rx, any cond, must have owner's manual. G8CCD, QTHR. Tel 051-523 0460.

Urgently wanted by an ex-Merchant Navy radio officer for Christmas, a Marconi Atalanta rx, must be in mint cond, ready for action, service manual would also help. Details to G4LFG, QTHR. Tel South Shields 566658, after 6pm.

Manual of Seamanship Vol 2, 1926. *Handbook for Spies,* Alexander Foote. *Savrola,* Winston Churchill. *Receivers,* RSGB booklet, 1949. *Stand-by nautical telegraph and radio code,* Noel. *The Long Voyage,* De Mierre. Signal Training (all arms) pamphlets. G3OQF, QTHR.

For the Wireless Museum: old radio books, magazines, catalogues, QSL cards, service sheets, etc. Specially required: pre-war Gamages catalogue. Collection arranged. Details please to hon curator G3KPO, QTHR. Tel Ryde (0983) 62513.

RME DB20 preselector. S-meter and output transformer for RME70. Handbook for Hammarlund Super Pro (ux valve version), SP100 circa 1937. Pre-1950 ARRL, editors' and engineers handbooks. G4HHZ, QTHR. Tel Chandlers Ford (04215) 68705 evenings, Winchester (0962) 822401, daytime.

External vfo CV110 for Standard C828M and/or handbook/circuit. Details GI3XLK, QTHR.

KW1000 linear. G3DWS, 173 Black Haynes Road, Birmingham B29 4RE. Tel 021-475 6269.

Valve tester, preferably not card type, but anything considered. 68 Warwick Road, Broughton Astley, Leics. Tel Sutton Elms 283518.

KW a.m./cw tx, need not be wkg, or Geloso signal shifter plus pa tank coil. Must be cheap. G4IZM, QTHR. Tel Rugby 811295, evenings.

AR88 components: headphones, MI58036; i.f. transformer, adj tool, M86/83501; air trimmer adj tool, M81059501. G4CCW, QTHR. Tel 01-651 1410.

AT5 or other top band tx with mains psu. Will collect or pay carriage. G4GIE, QTHR, Norfolk. Tel 037977 669.

RX: Star SR700, must be orig cond, clean, unmodified. Pyramid linear, cond immaterial. G2WI. Tel Orpington 29716, 9-10pm, except Thursdays and Fridays.

Buy or borrow for copying, handbook for Cossor Commando 20 low band a.m. G4LUQ (ex-G8IEL), QTHR. Tel 051-355 3871, after 6pm.

AR88LF rx, in good cond, please state price. Jim Price, 16 Melbourne Road, Leyton E10. Tel 01-556 4050, after 6pm.

4-400A valve for homebrew linear. 120ft lattice tower, crank-up, tilt-over, G3KVT, QTHR. Tel 0603 860452.

Codar FR40 or PR30. Brooke, Ricklands, Hollow Lane, West Raynham, Fakenham, Norfolk NR21 7ET. Tel Weasenham St Peter 280.

GDO, valve voltmeter, rf probe, audio generator, Heathkit or similar. G3FLW keyer, all items must be fb cond. Full details and price to G3WXT, QTHR.

Cossor 1324 fm rx alignment generator, copy of instruction manual for Taylor model 92A tv sweep oscillator. G3FFY, QTHR. Tel Upminster 25008.

WS18 Mk3 workshop manual, loan or purchase. Expenses refunded. Rowlands, G3NKR, 3 Prior's Way, Oliver's Battery, Winchester, Hants.

Old, decrepit and unloved National HRO rxs for spares/rebuild, especially early types with 2·5V valves. Military versions RAS, RAW, RCE, etc and second world war German/Japanese copies. G8LIU, QTHR. Tel Uxbridge (0895) 30006.

Pye Europas fm high-band, preferably with ME1 or ME1A encoder/decoders. Pyecall handheld fm pocketphones, high-band. Pyecall 5 paging units, high-band fm. J. W. Ker, Ciddy Hall, Liss, Hants.

FT780R, must be in mint cond. *For sale:* OFS1, fb, £60. WWV AIM capacitance tester, mint cond, power supply unit, £90 ono. Manuals for above items. G4IZW, QTHR. Tel 0632-678828.

Valves type 811A or 572B, new or good used. GW3GAH, QTHR. Tel 024-874 2761.

Versatower P40 or equivalent. G3VQL NOT QTHR. Tel Shrewsbury (Shrops) 55179.

Datong D70 morse tutor, must be in good cond. A. J. Wixon. Tel Bedworth (0203) 318301, after 6pm please.

TS120VS, DFC230, TS130VS, Collins S-line, KWM2A, rtty video gear, monitorscope or scanalyser. GM3DAR, QTHR. Tel 0896 56027.

Heathkit gdo. 572B. G3FTA. Tel Hastings 423828.

Circuit diagram of Ultra 4B7 2ch handheld, can copy and return. N. Flatman. Tel Felixstowe 74269.

Oscilloscope, dual beam, 20/50MHz, X delay preferred. Solid-state circuitry, handbook, but could be faulty. Offers please to Doug, G3ONP, QTHR. Tel Wolverhampton (0902) 788459.

Trio AT200 and SP520, prefer in good cond. Cliff Toomer. Tel Axminster 32091, after 6pm.

Valves type 813, good order, oscilloscope, double beam with external trigger. Tel Newcastle (0632) 810400.

MML144/100S 100W linear amplifier. PSU 12V or 13·8V, must be 12A or over. Details to R. Hartnell, G8YNO, 3 Town Mills, Wiveliscombe, Taunton, Somerset 2LY 4TA. Tel 0984 23762.

Solenoid (2·5kΩ) for Creed automatic tx model 2F, GPO marking, CTP67/4. G3ZOR, QTHR. Tel Deal (03045) 62528.

Mint Yaesu atu FC901/2. Other Yaesu equipment: FV101Z; FV901DM; FV902DM; S901P; FT708R. Microwave Modules MML144/25. *For sale:* Datong FL1 audio filter, £32. PF2 on RB6, SU8, extras, £85. G4INX. Tel Chester (0244) 374584.

Valve type L21, L2, or HL2. Tunnel diode IN3719. Robert Coleman, 31 Kingfisher Road, Upminster, Essex RM14 1ER. Tel Upminster 21523, evenings.

Suitcase or miniature tx/rxs (British, American or Polish), wartime and post-war, any spares, incomplete or damaged sets, orig manuals or associated literature welcomed. RA117E, WS62 (with transistorized psu), ex-Army tx No 53 Mk2. Taylor, G3UCT, QTHR. Tel Fleet (02514) 6998.

Handbook/diagram photocopy or loan for Pye Pocketfone 70 type PF2 fmh 2m. For Pye Europa mobile set 2m for service information. Details to G2DHV, QTHR. Tel 01-300 1649.

Yaesu FR101 rx, any model considered. G3RCE, 23 Bristol Road, Southsea, Hants. Tel 0705 839107.
FT7 or FT7B in good cond, no mods. G3OIC, QTHR. Tel 0564 826124.
Any TW (Withers) equipment, ie two mobile, top mobile, communicator, etc, especially units for 70MHz, top band. *For sale:* 2m linear CQS, 2/18W fm, £20. P. Turner, G4IIL, QTHR. Tel Brighton 607737, evenings.
HQ1 mini-beam, in good cond, G4DTA, QTHR. Tel 0843 21511, anytime.
ITT Starphone AM7 mid or high band a.m. High band a.m. handheld with data. G8AWH, 5 Croftlands, Idle, Bradford, W Yorks. Tel 0274 617699.
Trio VFO30G, any cond. Vespa Mk2, in good cond. Tony Callum. G3ZMO. Tel Chester-le-Street 882313, shop hours.
New valves: 6GM6; 6EW6; 6BL8. Admiralty handbook for B28 rx. G3MBL, QTHR. Tel 01-445 4321.
Datong AD370 with or without mpu. All replies answered. State price incl carriage. BRS44395, 50 Steyne Street, Bognor Regis, West Sussex PO21 1TJ.
KVG XF9B and XF9C xtal filters. G8KLV, QTHR. Tel Chippenham 50880, after 6pm.

CLUB NEWS

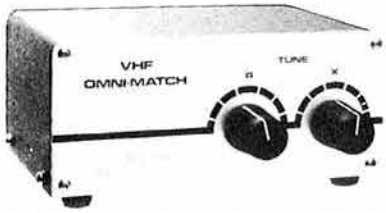
(Continued from page 1148)

Edgware (EDRS)—10 December (Junk sale), 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec G3HMD, tel 01-952 6462.
Grafton (GARS)—11 December (Annual Christmas party and constructors' contest), 8pm. The Five Bells, East End Road, East Finchley. Sec John, G8SYD, tel 01-957 8785.
Southgate (SARC)—10 December (AGM, all are welcome), 7.30 for 8pm. St Thomas's Church Hall, Prince George Avenue, Oakwood, London N14. Sec V. Austin, G4MCD, tel 01-360 5832.
Stevenage (S&DARS)—10 December (Social evening at the Broadway Hotel, Letchworth), 17 December (Natter night), 8pm. The Staff Canteen, Site B, British Aerospace Ltd, Gunnels Wood, Stevenage, Herts. Sec G8LXY, publicity G8KCV, tel 0438-64624. This club also runs RAE and morse classes. *(RR19 wishes to apologize for non-attendance on 16 October owing to illness.)*
Wanstead (ELRSGBG)—20 December (Junk sale—the annual event plus very useful meeting—the AGM where everybody puts everybody else up to do a job of work), 3pm. Wanstead House, The Green, London E11. Sec R. Holmes, G3AMF, tel 01-989 9224.
Watford (WRC)—No information but would like AR to visit sometime. Details from sec C. Tredwell, G8CHW.

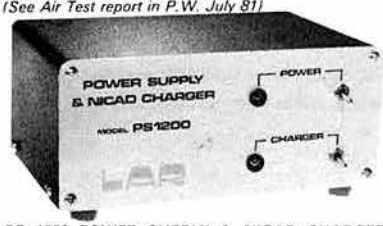
REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ.
Bristol (BRSGBG)—14 December (Christmas party), 7.30pm. Queens Building, Bristol University. Details from Chris Short, G8GLQ, tel 0272 621253.
Bristol (North Bristol ARC)—Fridays, 7.30pm. C/o Self Help Enterprise, Braemar Crescent, Northville, Bristol. Sec reports that membership is still restricted for the time being due to shortage of accommodation. We all wish Ernie, G2DWI, chairman, a quick and speedy recovery after his recent illness and two spells in hospital. Further info on the club's activities from Ted Bidmead, G4EUV, tel 0272 691685.
Cheltenham (CARA)—3 December (AGM), 18 December (Natter night), 7.30pm. The Old Bakery, Chester Walk, Clarence Street, Cheltenham. The newsletter suggests Cheltenham is a direction to look for sstv. CARA distance records are currently held by G4CRN (144MHz), with LZ1AB, 2,175km, G4INL (432MHz), with PA0FRE, 447km, and G4IRK (10GHz), a one-way contact over a distance of 40 miles. Details from Grant Cratchley, G4ILI, tel 0242 43891.
Easton-in-Gordano (First Crockern Scouts Short Wave Group)—Welcome to the recently RSGB affiliated group whose HQ is at Easton-in-Gordano. As yet there are no licensed amateurs in the group but it is hoped to rectify this soon. They have an HRO working and hope to build and erect a transmitting antenna in the near future. A shack is also being planned and it is hoped that local licensed amateurs will be able to operate occasionally /A from the HQ. Further details from P. Knowles, tel Pill 4248.
Gloucester (GARS)—Thursdays, 7.30pm. Chequers Bridge Centre, Painswick Road, Gloucester. 3 December (Slide show of society activities), 10, 17 December (Natter nights and morse practice). Members please note that the Centre will be closed for the Christmas holidays from 21 December to 4 January 1982. At the AGM, Pat Perkins, G3MA, was presented with a silver tankard in appreciation of 34 years as secretary for the club. RR20 is sure his many friends, besides himself, add their good wishes for his "retirement". G3MA will still be active with GARS. The new sec is Tony Martin, G4HBV.
Mendip Repeater Group—GB3WR repeater has had a new single run of Andrew heliax type LDF4-50 fitted with an overall improvement of some 3dB, and is somewhat longer than the original feeder of 450ft. The main transmitter has also been superseded by the standby unit, providing a constant 25W rf output power. The original transmitter is being modified to the same standard. Further details of the Mendip Group's repeaters GB3WR, GB3UB and GB3VS from Steve Gardner, G8GMZ, tel Midsomer Norton 413902.
Locking (RAFARS)—RAFARS HQ at Locking wish to remind members that the RAFARS Christmas Party Contest will be held on 13 December. Time 1300–1700. Bands will be 3·5, 7, 144 and 432MHz. Scoring, per contact, will be 2 points for 3·5 and 7MHz, 3 points for 144MHz and 4 points for 432MHz. Mode multipliers are ×1 for ssb/fm, ×2 for a.m./cw and ×3 for rtty. Contest scores to commence with 001 followed by report etc. HQ also reports that it now has the capability of working Oscar 7 and 8 on both modes, and that it also has a Siemens T150 teleprinter hooked into the Collins S-Line for rtty. Further details from the admin sec, RAF Amateur Radio Society, Royal Air Force, Locking, Weston-super-Mare, Avon BS24 7AA.
Yeovil (Y&DARC)—Thursdays, 3 December ("A quiz", by G3KSK), 10 December ("Some simple but useful formulas", by G3KSK), 17 December ("Electrical bandspreading", by G3MYM), 7.30pm. Building 101, Houndstone Camp, Yeovil. Please note that the next two meetings will be held on 23 December (Natter night) and 31 December when it is hoped to stay on, see the New Year in and possibly christen the new bands with G3CMH. Further details from Don McLean, tel 0935 24956.

RR20 thanks the above clubs' secs for the reports and newletters and wishes all a very happy Christmas and a prosperous New Year.

GET OMNI-MATCH-ABILITY



VHF OMNI-MATCH 144–174MHz. The ATU for the 2-metre man. Enables one antenna to cover the whole band. Ends laborious antenna pruning. Tunes out SWR at the operating position. Handles 750W **£34.90**
(See Air Test report in P.W. July 81)



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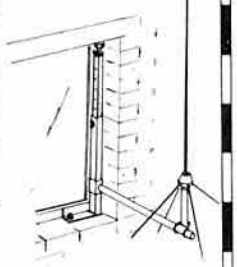

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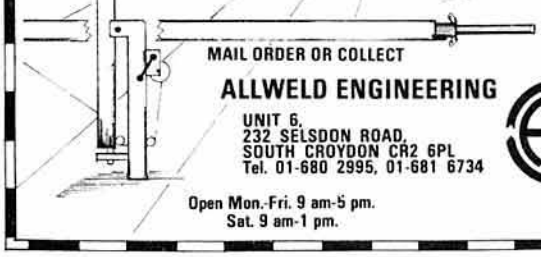

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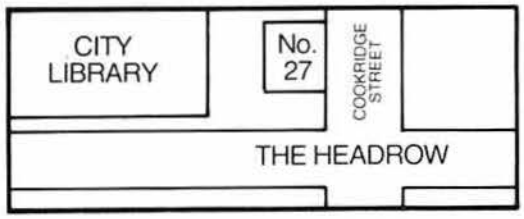

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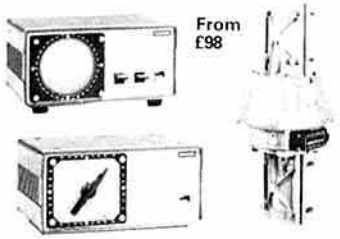

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FM Package 2 (Synthesised)	70PAC2	163.00	128.00
TV Modulator (for 70FM05T4)	TVM1	8.10	5.30
Power Amplifiers (FM/CW use)			
50mW to 500mW	70FM1	12.05	6.85
500mW to 3W	70FM3	19.65	13.25
500mW to 10W	70FM10	30.70	22.10
3W to 10W	70FM3/10	19.75	14.20
Combined Power Amp/Pre-Amp (10W)	70PA/FM10	48.70	34.65
Pre-Amplifiers			
Bipolar Miniature (13dB gain)	70PA2	7.90	5.95
MOSFET Miniature (14dB gain)	70PA3	8.25	6.80
RF Switched (25W max)	70PA2/S	21.10	14.75
2M EQUIPMENT			
Transceiver Kits and Accessories			
FM Transmitter (1·5W)	144FM2T	36.40	22.25
FM Receiver	144FM2R	64.35	45.76
Synthesiser (2pcbs)	144SY25B	78.25	59.95
Synthesiser Transmit Amplifier	SY2T	26.85	19.40
Bandpass Filter	BPF 144	6.10	3.25
PIN RF Switch	PS1 144	9.10	7.75
Synthesised FM Package (1·5W)	144PAC	138.00	105.00
Power Amplifiers			
1·5W to 10W (FM) (No Changeover)	144FM10A	18.95	13.95
1·5W to 10W (FM) (Auto-Changeover)	144FM10B	33.35	25.95
1·5W to 10W (SSB/FM) (O/P Changeover)	144LIN10A	26.80	19.87
1·5W to 10W (SSB/FM) (Auto Changeover)	144LIN10B	35.60	26.95
Pre-Amplifiers			
Low Noise, Miniature	144PA3	8.10	6.95
Low Noise, Improved Performance	144PA4	10.95	7.95
Low Noise, RF Switched	144PA4/S	18.95	14.40
SYNTHESISER ACCESSORIES			
10-channel Scanner	PROSCAN 1	23.70	15.56
Display Decoder/Driver	DISP1/2	22.60	16.10
GENERAL ACCESSORIES			
Toneburst	TB2	6.20	3.85
Piptone	PT2	6.90	3.95
Kaytone	PTK1	8.20	5.95
Economiser	BE1	4.80	3.50
Regulator	REG1	6.80	4.25
Solid State Supply Switch	SSR1	5.80	3.60
Microphone Pre-Amplifier	MPA1	5.40	2.95
Noise Filter	SLF1	5.95	4.40
Reflectometer	SWR1	6.35	5.35
CW Filter	CWF1	6.40	4.75
TVI Filter	70FI6P	4.20	3.40
MICROWAVE PROJECTS			
Microwave Drive Source	MD05T	29.50	20.40
Bandpass Filter	BPF 384	5.10	3.25

All prices include VAT at the current rate. Please add 70p to your total order for post and handling. Kits contain all pcb components but no external hardware. Crystals are not supplied for transceivers but are for converters, synthesisers etc. Kits when stock are 2-3 days, otherwise up to 28 days depending on component availability. Assembled modules 20-40 days depending on stock. Non-amateur frequencies can be supplied for assembled modules but we reserve the right to charge up to 20% excess to cover handling costs. All postal enquiries require an SAE please; a large one if full lists are required! *Non-technical enquiries only* can be taken 10am-4pm on 07356 5324. For technical information please call 07356 5324 or 0256 24611 between 7pm-9pm, as we are part-time.

Kits are available from the following agents:-

Amateur Radio Exchange, Northfield Road, EALING. 01·579 5311.
J. Birkett, 25 The Strait, LINCOLN. 0522 20767.
Darwen Electronics, 13 Thorncliffe Drive, DARWEN, Lancs. 0254 771 497.
United Trading AB, Box 16024, 200 25 MALMO, SWEDEN. 040 94 89 55.

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	FP-707	PSU/speaker		£119
	FC-707	Antenna tuner		£82
	FL-2100Z	Linear amplifier		£399
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	FT-290R	2m all-mode Portable		£235
	FT-480R	2m all-mode Mobile		£360
	FT-720RV	2m FM Mobile		£239
	FT-720RU	70cm FM Mobile		£264
RECEIVERS	FRG-7	General Coverage Receiver		£189
	FRG-7700	General Coverage, Digital		£315

HF EQUIPMENT	TS-130S	Solid state transceiver	£525
	TS-530S	HF base transceiver	£539
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Mast size	28–44mm
Wind load area (max)	0·25sq.m.
Cable required	5-way
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Direction indicator	Meter (NESW)
Rotation torque	550kg.cm.
Braking torque (stationary)	1,500kg.cm.
Rotation time	50 seconds
Antenna weight (max)	200kg
Mast size	38–50mm
Wind load area (max)	0·5sq.m. (basic 0·8sq.m. (with stay bearing)
Cable required	6-way
Lower mast clamp included	
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Rotation torque	450kg.cm.
Braking torque (stationary)	1,500kg.cm.
Rotation time	55 seconds
Antenna weight (max)	150kg
Wind load area (max)	0·5sq.m.
Cable required	6-way
PRICE	**£86.25**

EMOTO 502SAX — HEAVY DUTY

Direction indicator	360° circular dial
Rotation torque	600kg.cm.
Braking torque	4,000kg.cm.
Rotation time	66 seconds
Antenna weight (max)	400kg
Wind load area (max)	1·5sq.m.
Cable required	6-way
PRICE	**£125.35**

EMOTO 1102MXX/1103MXX — EXTRA-HEAVY DUTY

Direction indicator	Meter (NESW)
Rotation torque	800kg.cm. (1102); 1,000kg.cm. (1103)
Braking torque	1,000kg.cm.
Rotation time	80sec (1102); 110sec (1100)
Antenna weight (max)	400kg
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Cable required	7-way
PRICES	**1102MXX £189.75** **1103MXX £194.35**

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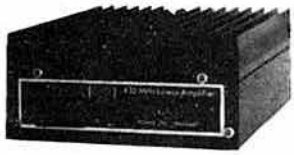

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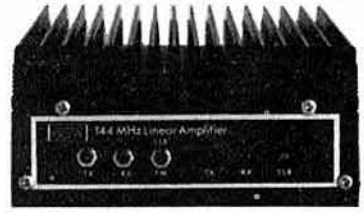

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May I take this opportunity of wishing all my customers and friends a very happy Christmas; also a happy, healthy and peaceful New Year, and I will look forward to seeing you at the new address below.

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6 to 19·999kHz	£28.12	100 to 159·99kHz	£9.25
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* 21 to 24·99MHz (fund) ,,	£6.73
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***Delivery** Normally 5/6 weeks (express available)—all other frequencies 7/8 weeks.
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Unless otherwise specified, fundamentals will be supplied to 30pf circuit conditions and overtones to series resonance.

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We can supply crystals to most commercial and MIL specifications, with an express service for that urgent order. Also for commercial use, eg TV or computer crystals, etc, we can supply at very competitive prices. Please send S.A.E. for details or telephone between 4.30–7pm and ask for Mr Norcliffe.

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144·4 (433·2)	b	e	b	e	e	b	e	e	e	e	e
144·480	e	e	e	e	e	e	e	e	e	e	e
144·800	c	e	e	e	e	c	c	c	c	c	e
144·850	e	e	e	e	e	e	e	e	e	e	e
145·000/ROT	a	c	a	c	c	b	b	b	a	a	c
145·025/R1T	a	c	a	e	e	b	e	b	e	e	e
145·055/R2T	a	c	a	e	e	b	e	b	e	e	e
145·975 R3T	a	c	a	e	e	b	e	b	e	e	e
145·100/R4T	a	c	a	e	e	b	e	b	e	e	e
145·125R5T	a	c	a	e	e	b	e	b	e	e	e
145·150/R6T	a	c	a	e	e	b	e	b	e	e	e
145·175/R7T	a	c	a	e	e	b	e	b	e	e	e
145·200/R8T	e	c	a	e	e	b	b	b	a	a	c
145·300/S12	e	e	e	e	e	e	e	e	e	e	e
145·350/S14	e	e	e	e	e	e	e	e	e	e	e
145·400/S16	e	e	e	e	e	e	e	e	e	e	e
145·425/S17	e	e	e	e	e	e	e	e	e	e	e
145·450/S18	a	e	a	e	e	b	b	b	a	a	e
145·475/S19	a	e	a	e	e	b	b	b	a	a	e
145·500/S20	a	c	a	c	c	b	b	b	a	a	c
145·525/S21	a	c	a	c	c	b	b	b	a	a	c
145·550/S22	a	c	a	c	c	b	b	b	a	a	c
145·575/S23	a	c	a	c	c	b	b	b	a	a	c
145·600/R0R	a	c	a	c	c	b	b	b	a	a	c
145·625/R1R	e	e	e	e	e	e	b	e	a	a	c
145·650/R2R	e	e	e	c	e	e	b	e	a	a	c
145·675/R3R	e	e	e	c	c	e	b	e	a	a	c
145·700/R4R	e	e	e	c	c	e	b	e	a	a	c
145·725/R5R	e	e	e	c	c	e	b	e	a	a	c
145·750/R6R	e	e	e	c	c	e	b	e	a	a	c
145·775/R7R	e	e	e	e	c	e	b	e	a	a	c
145·800/R8R	a	c	a	c	c	b	e	e	a	e	e
145·950/S38	a	e	e	c	e	e	e	e	a	e	e

PRICES: (a) **£1.95**, (b) **£2.32**, (c) **£2.50**, and (e) **£4.48**.

AVAILABILITY: (a), (b) and (c) stock items normally available by return (we have over 5000 items in stock). (e) 4/6 weeks normally but it is quite possible we could supply from stock. **N.B.** Frequencies as listed above but in alternative holders and/or non stock loadings are available as per code (e).

ORDERING: When ordering please quote (1) Channel, (2) Crystal frequency, (3) Holder, (4) Circuit conditions (load in pf). If you cannot give these, please give make and model of equipment and channel or output frequency required and we will advise if we have details.

70cm CRYSTALS

Due to the much higher multiplication involved (three times that on 2m) all our stock 70cm crystals are to much higher tolerances than our standard range.

We are stocking the following channels: RB0 (434·60/433·00), RB2 (434·65/433·05), RB4 (434·70/433·10), RB6 (434·75/433·15) SU8 (433·20), RB10 (434·85/433·25), RB11 (434·875/433·275), RB13 (434·925/433·325), RB14 (434·95/433·35), SU18 (433·45), SU20 (433·50)—TX & RX for use with: PYE UHF Westminster (W15U), UHF Cambridge (U10B), Pocketfone (PF1) AND UHF PF70 Range, and STORNO COL/CQM 662 all at **£2.32**. For the U450L Base Stn we have the TX crystals for the above channels. The RX crystals for the U450L Base Stn together with TX and RX crystals for any other 70cm channel (eg RB/SU12 (434·90/433·30) RTTY, SU16 (433·40) SU22 (433·55) etc) for most UHF equipments are available at **£4.48** for crystals up to 63MHz, and **£5.16** for 63 to 105MHz to amateur spec or **£5.26** for up to 63MHz and **£6.05** for 63 to 105MHz to the same closer spec as our stock items. Delivery approx 5/6 weeks.

4m CRYSTALS FOR 70·26MHz—HC6/U
TX8·7825MHz and RX6·7466MHz or 29·7800MHz **£2.32**

10·245MHz "ALTERNATIVE" I.F. CRYSTALS—£2.32 For use in Pye and other equipment with 10·7MHz and 455kHz I.F.s to get rid of the "birdy" just above 145·0MHz. In HC6/U, HC18/U and HC25/U.

CRYSTAL SOCKETS—HC6/U. HC13/U and HC25/U (Low loss) 16p each. **10p P. & P. per order (P & P free if ordered with crystals).**

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All at **£3.00**, 38·6666MHz (144/28), 42MHz (70/28), 58MHz (144/28), 70MHz (144/4), 71MHz. (144/2), 96MHz (1,296/432/144), 101MHz (432/28), 101·50MHz (434/28), 105·6666MHz (1,296/28) and 116MHz (144/28).

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100kHz in HC13/U and 1MHz in HC6/U **£2.95**
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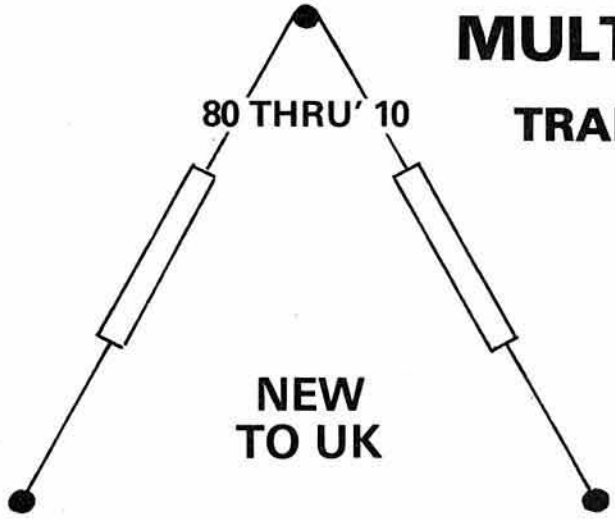
CRYSTALS FOR MICROPROCESSORS

Please let us know your requirements e.g. 4MHz HC18/U. 1 off, **£2.00**; 100 off, **£1.10**; 1000 off, **99p**; 25,000 off, **50p**.

ANZAC MD-108 DOUBLE BALANCED MIXER

5·500MHz supplied with full details for only **£6.95**.



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ONLY 26m LONG

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fact: Shure brings intelligibility & reliability to professional communications microphones

Experienced operators recognize that the audio quality of the transmitter is limited by the quality of the input from the microphone. On the air, there's no mistaking the crisp, intelligible messages from Shure microphones.

Shure microphones have been the overwhelming choice of professional communications users all over the world for over 30 years. Many milestone improvements developed for demanding professionals are found on Shure microphones:

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	Mobile Application	Fixed Station Application
SSB	414A* 407A* 577A**	444D 526T Series II
FM	414B* 507B* 577B**	450 526T Series II

*General recommendation: Consult equipment instruction manual for correct microphone inpedance.
**Noise-cancelling.

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Controlled Magnetic® Fixed Station Microphone (Models 444D, 450)
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New Transistorized Fixed-Station Microphone (Model 526T Series II)
A new design for maximum versatility in fixed-station operation. Modulation level (volume) control for high undistorted output with high- or low-impedance inputs.

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Small, easy-to-handle design, with rugged Dynamic or CONTROLLED MAGNETIC® transducers for excellent voice intelligibility. Hum-shielded and insulated against shock. Model 507B Dynamic version features extended low and high frequency response, especially suitable for mobile FM transmitters. Modular construction simplifies field service.

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Ideal for miniaturized or portable communications systems, or where dashboard space is limited. The 414 Series CONTROLLED MAGNETIC® microphones are about half the size and weight of conventional microphones—yet they are rugged units, recommended for critical outdoor or indoor applications.

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muTek limited's SLNA144s is the better alternative to the previous generation of in-line, rf-switched 2m preamplifiers

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  Noise measure of 1·2dB typical
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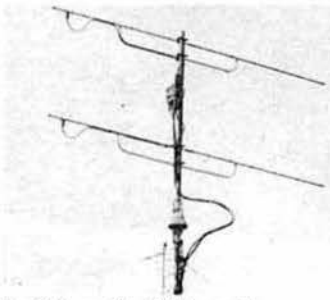
- **RF connectors:**
  50Ω BNC
- **Case:**
  Diecast, size 50 × 100 × 25mm (excluding connectors)
- **Plus internationally acclaimed muTek quality!**

Price: £33.90 (p&p 60p) inc VAT
Delivery: ex stock

GET MORE UP WITH DL6WU YAGIS



2 × 16 elements for 432MHz providing: approximately 19dBi gain (genuine!) for *only* 210N (22kg) windloading at 160km h ⁻¹!!

With DL6WU yagis from Hamburger-Antennen-GroBhandel you can obtain more real antenna gain per unit windload than with any other 'competitive' vhf/uhf yagi range. By the use of advanced mechanical engineering concepts and materials the strength isn't compromised however, and with HAG's unique 3-year guarantee against structural damage due to corrosion you won't see your antenna investment fade away.

The range

MHz	Length (m)	Eles	3dB beam-width° horiz.	3dB beam-width° vert.	Windload N at km hr 120	Windload N at km hr 160	Gain dB	Weight kg	Price £
144	1·04	4	55	70	15	26	9·7	0·45	**18.00**
144	2·75	7	44	51	35	63	12·3	0·98	**22.00**
144	4·91	11	35	38	83	147	14·5	2·20	**36.50**
144*	6·72	13	31	33	160	285	15·6	3·70	**55.00**
432	1·55	10	36	40	22	39	14·3	0·68	**30.00**
432	3·10	16	28	30	59	105	16·5	1·69	**33.50**
432	5·06	23	24	25	91	160	17·9	2·10	**38.00**
1296	2·00	26	20	21	42	—	18·1	0·82	**POA**
1296	4·00	48!	15·5	16	135	—	20·6	1·41	**POA**

Prices include precision teflon balun where appropriate, but not VAT or carriage.
* This antenna has 8mm dia elements and a 20mm square boom.

Carriage: 2m 4-element £1.50. All others £4.50. This price reflects the cost of shipping the long packages necessitated by HAG's insistence on not compromising structural integrity for ease of shipping.

We now have a new application note on antennas and their gains: an SAE with a request for ANO9-81 will bring a copy.

Access

All of our usual products are of course still available, but space is tight this month!

Another year past already! A year of continued growth for muTek limited. Once again thank you for reading our advertisements (and even buying our products!). To our friends, customers, agents and even our competitors (what competitors?) Jane, Daphne, Patsy, Stephen (G8KQB), Graham (G8MXE), Ted (G6ABE), Robert (G????) and I send our greetings for a very happy Christmas and a peaceful New Year. Chris (G4DGU).

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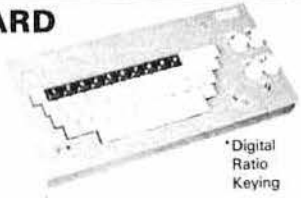

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FREQUENCY COUNTERS. 9-digit 600MHz counter resolution 0·1Hz. 10MHz, 10Hz, £106. Soar FC841 £45 post, leads etc. extra S.A.E. details.

VALVES FOR FT101 Mk1-ZD. Don't stock up with the wrong make of bottles, they won't work!! Many 6146B's noisy on *receive!* in FT101Z. S.A.E. for list.

Barclaycard, Access, Cheque (we take your photo!) Cash!!

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PACKAGE: beam, rotator, 15m coax UR43, 15m 5 core—**£150.00**
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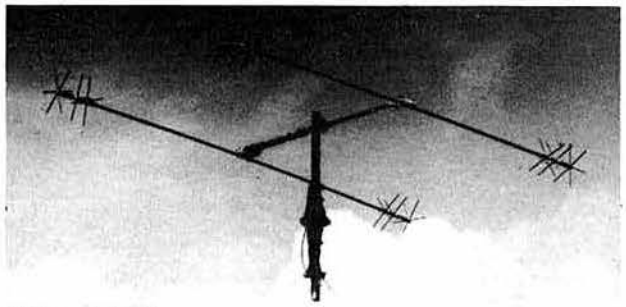

SPECIFICATION

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

SAE for details, Coax UR43, UR67 and 5 core available

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Complete set of PCB's for the P W Helford TX/RX up to and including the 25 Watts out stage. **£18.00** + 50p p&p.

Now available: "P W Helford" super economy case. A completely accessible custom designed box, matt black, with screen printed front panel. **£23.50** + £2.50 p&p.

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VALVES

6AJ8	£1.60;	6BM8	£2.70;	6E88	£2.75;	6HF8	£3.00;	12AV6	£1.35;
6AQ5	£1.65;	6BN8	£2.25;	6EH5	£1.80;	6HS6	£4.20;	12AX7A	£1.70;
6AT6	£1.50;	6BQ5	£2.45;	6EJ7	£1.68;	6JB6A	£3.30;	12BA6	£1.59;
6AU6A	£1.55;	6BV8	£3.60;	6ES8	£2.95;	6JH8	£3.10;	12BE6	£1.75;
6AV6	£1.50;	6BZ6	£1.75;	6EV7	£1.80;	6JS6C	£4.10;	12BY7A	£1.93;
6AV11	£1.75;	6C4	£1.90;	6EW6	£1.90;	6KD6	£4.90;	12BZ6	£3.50;
6AW8A	£2.40;	6C10	£2.90;	6GE5	£3.40;	6KE8	£2.80;	12GN7	£2.50;
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6BJ7	£1.40;	6DO5	£3.55;	6GX6	£1.90;	12AT7	£1.80;	6146B	£6.00;
6BL8	£1.60;	6EA8	£2.20;	6HF5	£4.40;	12AU7	£1.70;	7360	£9.20;
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Members' Ads must be sent to the editor at Chelmsford.

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