RADio COMmunication

March 1982

LOOKING BACK

As can be seen by the notice in the window, this photograph shows "Experimental radio station G5VS" some years before the second world war. Those were the days when everything was home-constructed and of the "breadboard" pattern. The transmitter is on the left, above the rotary converter which supplied ht, next to the 78rpm record player. The receiver on the right had valves with real "pips" on top, and the hefty 6V accumulator on the floor was used to heat the filaments—and the shack of course.

Although the Mullard valve-shaped calendar gives the day of the month, the year is not shown, but no prizes are offered for guessing "in the early 'thirties". Even the operator's chair could have come straight out of Palm Court!

G3WPO

Journal of the Radio Society of Great Britain

RSGB

SALE! SALE! SALE!

Catronics are holding another Great **'WAR ON PRICES'** Sale

Most prices reduced during Sale period 1st March–27th March 1982

BARGAINS in Components, BARGAINS in Equipment, BARGAINS in I.Cs, BARGAINS in Jaybeam, BARGAINS in LEDs, BARGAINS in Transistors, BARGAINS in Trio

We have declared war on prices, with hundreds of items reduced including 20% off CSC Breadboarding Equipment, 10% off all Jaybeam Antennas, 10% off selected Trio Equipment (5% off some), 25% off Vero Boards etc, up to 75% off some discontinued items. **Look at these examples!**

TR2200G Portable (S/H)	**£80.00**	LM380	**£4.10** for 5	Trio VFO230	**£195.00**
1296/28 Transverter	**£155.00**	710	**£1.70** for 5	SP8660	**£3.90** each
Matrix H Decoder	**£25.00**	DL304	**£4.00** for 4	TBA120	**£2.60** for 5
Philips FM321 70cm Mobile	**£199.00**	NSB3881	**£4.00** each	ZTX500	**55p** for 5
BC143	**£1.55** for 5	PCBs: G3TDZ AMRx	**£1.60**	UL914	**£6.00** for 5
BD131	**£2.20** for 5	Airband Conv.	**£2.40**	2N918	**£1.45** for 5
BD132	**£3.00** for 5	Teletext (5 × PCBs)	**£23.00**	2N5179	**£4.35** for 5
BF180	**£1.15** for 5	Telextext (Plt. Thru)	**£46.00**	2N6084	**£11.20** each
BF224	**£1.20** for 5	Alarm (Ultrasonic type)	**£45.00**	3 pole min. toggle Sw	**80p** each
6·8V Zener	**55p** for 5	12in Video Monitor	**£120.00**	D.P. Illuminated Sw	**75p** each
9·1V Zener	**55p** for 5	MLED500 Red LED	**40p** for 5	BCD coded Thumbwheels	**£2.00** each
CA3046	**£3.80** for 5	¼λ Window clip aerial	**£5.00**	40W 2M PA Kit	**£27.00**
CA3130E	**£3.90** for 5	LM3900	**£2.70** for 5	10W 2M PA Kit	**£21.00**

+20% off all CSC Breadboarding Equipment in stock +10% off all Jaybeam Antennas ordered during the sale +25% off all Vero Boards and accessories in stock Write or telephone for full list.

All items are offered subject to availability and only while stocks last

All prices include VAT but add carriage £5.50 Courier Service, min. 50p post. Some sale items are ex-demonstration equipment, some others are second-hand but all carry a full guarantee. Pay by Barclaycard, Trustcard, Visacard, Access, Eurocard, Master Charge, etc; Cash; Cheque; H.P.; or the New Catronics creditcharge card.

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video genie system

Advanced features are:

1. **Built-in TV interface, the user's TV set may be used as the display terminal, thus saving money.**
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   i) 51 key typewriter keyboard, with 10 key rollover.
   ii) High quality cassette recorder, enables recording and playback of programs, data and the use of pre-recorded tapes.
3. **Built-in audio cassette interface for connecting another cassette recorder to serve as cheap and compact storage for large amounts of data on tapes.**
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8. **Self-contained, all in one attractive case.**
9. **The system uses the powerful Z80 processor.**

New model with lower case, sound box, monitor, etc.

Now only £343.00 inc VAT

Full range of supporting programs and accessories available, including Amateur Radio packages.

We are 300 yards from Wallington Railway Station (London Bridge or Victoria). Frequent buses from Croydon and Sutton. Three large car parks within 100 yards. **Hire purchase facilities available on all equipment. Credit cards accepted.** Mail orders—normally dealt with on day of receipt. Securicor delivery arranged. All prices include VAT.

APPROVED TRIO DEALER

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Shop/showroom open Monday-Friday: 9.00-5.30, closed for lunch; 12.45-1.45. Saturdays: 9.00-1.00.

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Access

MARCH 1982

VOLUME 58 No 3

RADio COMmunication

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Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, 88 Broomfield Road, Chelmsford, Essex CM1 1SS.

All articles received are reviewed for technical merit by the RSGB Technical & Publications Committee, or an acknowledged expert on the subject, before acceptance. Payment 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.

Radio Communication **is published by The Radio Society of Great Britain as its official journal on the first Friday of each month and is sent free and post paid to all members of the Society**

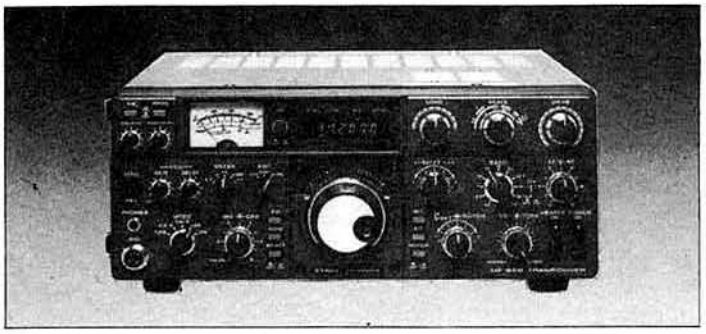
ABC MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

29,080 copies per issue average circulation in 1981

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

HF 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 details today.



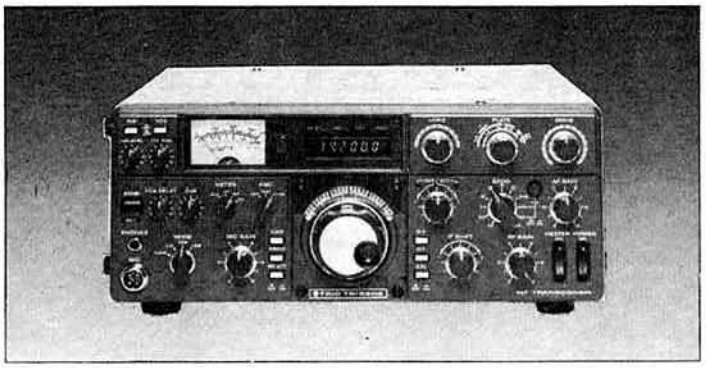
TS 830S

£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.

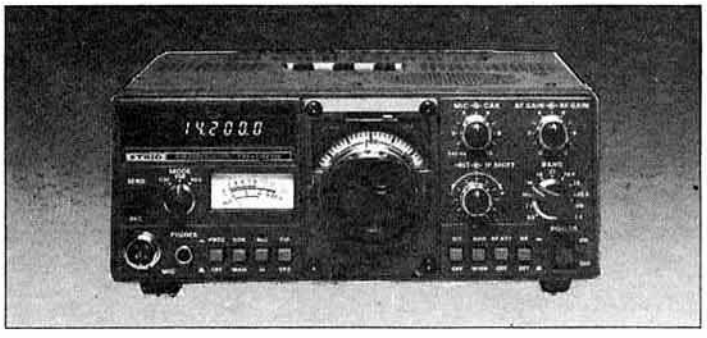


TS 530S

£534.98 inc VAT. Securicor £4.80

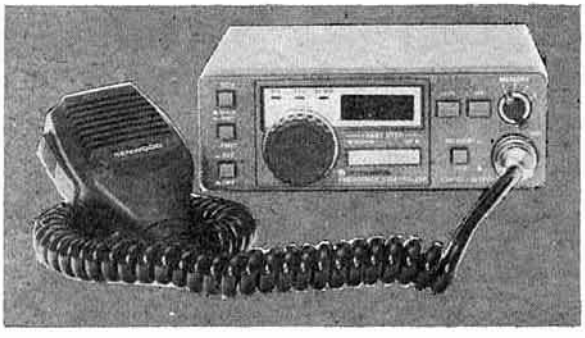
For the keen mobile/portable enthusiast, the "no-tune" solid state transceiver has proved irresistible, and the Trio TS130S is probably the best of the bunch. When the original TS120 was introduced, there were gasps of amazement at Trio's achievement in making a first class HF rig in such a small size. 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 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.V

£525.09 inc VAT. TS130V £445 inc VAT



The compact DFC230 Digital Frequency Controller provides maximum efficiency and flexibility for mobile and fixed operation by combining a 20Hz step digital VFO with 4 memories. ● 20Hz step digital VFO. ● Four memories: Frequency can be transferred from VFO to memory or from memory to VFO. ● Built-in digital display: Shows digital VFO or memory frequency. ● Perfect for mobile installation. ● UP/DOWN manual scan: Frequency can be shifted with UP/DOWN microphone (supplied with DFC-230) or with FAST STEP switch on front panel. ● Cross-operation switch: Allows split-frequency operation, with transceiver VFO on transmit and DFC-230 (VFO or memory) on receive, or vice versa. ● RIT (receiver incremental tuning). ● RIT, VFO, and MEMO indicators: LEDs show functions in operation. ● Compatibility with TS-830S, TS-120S/V and TS-130S/V.

DFC 230

£179.86 inc VAT. Securicor carriage £4.80

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NOW OPEN, OUR EMPORIUM IN THE CITY
278 PENTONVILLE ROAD, LONDON N1 9NR (LOWER SALES FLOOR, HEPWORTH'S SHOP)

NEW VHF

from Trio for 1982

The TR-2500 is a compact 2 metre FM handheld transceiver featuring an LCD readout, 10 channel memory, lithium battery memory back-up, memory scan, programmable automatic band-scan and Hi/Lo power switch.

TR-2500 FEATURES:

- Extremely compact size and light weight 66 (2·5/8) W × 168 (6·5/8) H × 40 (1·5/8) D, mm (inches), 540g, (1·2lbs) with Ni-Cd pack.
- LCD digital frequency readout, with memory channel and function indication.
- Ten channel memory, includes "M0" memory for non-standard split frequencies.
- Lithium battery memory back-up, built-in, (estimated 5 year life) saves memory when Ni-Cd pack discharged.
- Memory scan, stops on busy channels, skips channels in which no data is stored.
- UP/DOWN manual scan in 5kHz steps.
- 2·5W or 300mW RF output. (HI/LOW power switch.)
- Programmable automatic band scan allows upper and lower frequency limits and scan steps of 5kHz and larger (5, 10, 15, 20, 25, 30kHz . . . etc) to be programmed.
- Slide-lock battery pack.
- Repeater reverse operation.
- Keyboard frequency selection across full range.
- Frequency coverage, 144·000 to 145·995MHz
- Optional power source, MS-1 mobile or ST-2 AC charger/power supply allows operation while charging. (Automatic drop-in connections.)
- High impact plastic case.
- Battery status indicator.
- Two lock switches for keyboard and transmit.

STANDARD ACCESSORIES:

- Flexible rubberized antenna with BNC connector.
- 400mAH heavy-duty Ni-Cd battery pack.
- AC charger.

TR 2500 *hand held transceiver*

TR 2500 £207.00 inc VAT securicor £5.00

NEW UHF VHF

Now, with the production of the TS780, the dual bander has come of age, giving the two band multimode facilities of the original concept, plus a wealth of additional operating facilities. Trio have again produced a rig which others cannot even copy.

- Full coverage of 2 metre and 70cm band. 144·00 to 146·00 430 to 440.
- All modes. Upper sideband. Lower sideband CW and FM. Also a position with which you will not be familiar FM CH. This gives the VFO a mechanical click stop feel and increments of 12·5 or 5kHz. Ideal for 2 metre and 70cm simplex working.
- Free running VFO with 2 speeds of frequency coverage, slow in 20Hz steps, fast in 200Hz steps. Add to the VFO a friction brake and ease of fine tuning is the result.
- Band scan in either 0·5, 1, 3, 5, or 10MHz widths.
- Memory scan. The rig can be instructed to scan either the 2 metre or the 70cm frequencies in the memories or to scan the total content.
- IF shift to move the receiver pass band without changing the receive frequency and give greater operability under crowded band conditions.
- Full repeater shift facility for either 2 metres or 70cm repeaters plus tone access and reverse repeater switches.
- Up down microphone supplied as standard.
- 13·8V DC or 240V AC 50/60Hz operation

TS 780

TS 780 £748.00 inc VAT carriage £5.00

APPROVED TRIO DEALER

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Leeds LE2 3AG
0532 452657

NORTHERN IRELAND
George Moore Electronics
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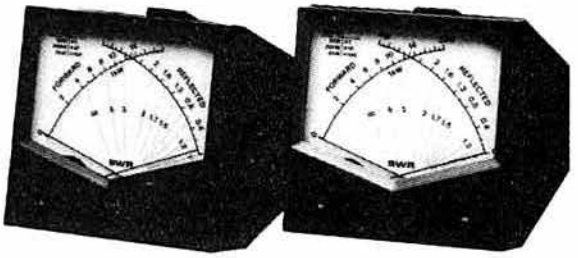
Belfast BT6 0DH
Belfast 647570

TRIO

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



CN540

50MHz-150MHz
£35.00 inc VAT carr £1.50

CN520

1·8MHz-60MHz
£32.50 inc VAT carr £1.50

The UL1000 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 UL1000 is a self-contained variable gain, tuned preamplifier suitable for use with various aerial systems. A particular feature of the UL1000 is the use of a high Q loop aerial for the 500kHz-1·6MHz band.

UL1000

£39.50 including VAT
carriage £2.00

HONOR

carriage on meters £1.00
KRT100 £5.75 KRT200 £10.50 KRT500 £19.50

For those of you who enthuse over portable SSB operation on the hills and mountains of the UK, or wish to chat to the local lads whilst seated by your fireside, then the Mizuho SB2X 2 metre SSB portable is the rig for you. One watt output on the SSB frequencies 144.000 to 144.600 and the ability to listen to the beacon frequencies from 144.800 to 145.000 (also transmit).

£165.00 inc VAT carr £4.50

MIZUHO SB2X

UHF | VHF

TR9000 The exciting TR9000 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 TR9000 is ideal for mobile installation, add on its fixed station accessories and it becomes the obvious choice for your shack.

TR9000

£394.00 inc VAT Securicor carr £4·50

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.

TR9500

£449.88 inc VAT Securicor carr £4.50

TR7800 Trio's remarkable TR7800 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 TR7800 by Trio, the only FM mobile.

TR7800

£284.97 inc VAT Securicor carr £4.50

EMPORIUM NEWS

Well Friends – another Emporium News.

Nothing new to mention this month in equipment but I am sure that you will not have got over the surprise of **three new Trio rigs last month.** I refer, of course, to the **R600 general coverage receiver,** the **TR2500 hand-held 2 metre transceiver** and last, but certainly not least, the **TS780 multimode dual bander for 70cm and 2 metres.** For those of you who think that the R600 is a replacement for the R1000, I must set that point straight. Both rigs will run concurrently in the Trio range, the R600 being an excellent general coverage rig and the R1000 being also an excellent receiver but having certain extras which assist in operating. The major advantage is not the clock but the programmable timer enabling you to record DX programs either when asleep or not in direct control of the rig. **I suppose you could even use the set to act as an alarm clock.** Imagine being woken up by Radio RSA – the voice of South Africa, on 21·535 – makes a change from a cacophony of bells.

The best best way to appreciate both receivers is to come along to Matlock and hear and see them side by side. Regarding seeing, last year I undertook visits to **Radio Clubs and Societies** taking along items from our wide range and giving members the opportunity to see the equipment on their own doorstep. Clubs visited ranged across the country from **Penrith** in the north to **Chester** in the west and **Grimsby** in the east. I enjoyed myself and, subject to time being available, am willing to do the same in 1982. Just get your Club sec. to drop me a line – better still, **why not arrange a private club visit to Matlock.** Either one evening or a Sunday afternoon. Drop me a line. Don't ring initially, a letter will help the filing system. If you come aong then a conducted tour of the facilities can be arranged. **Did you know that we now operate from London?** Our London Shop on the lower sales floor of the Hepworth's shop at the junction of Pentonville and Caledonian Road, (only a few minutes' walk from Kings Cross Station) carries the full range of Lowe products. Ring our man Andy on 01-837 6702 for full details but please remember that all mail order and repair work is undertaken here at Matlock. And my final comment on the London shop is that all products purchased there carry the full backup of the well-known facilities here at Matlock.

Talking about Matlock, let me again mention the people involved. Out front, the sales staff: **David** and his merry men – ah, so you've also noted the empty gin bottles! To handle your telephone calls, **Tracy** sits at our switchboard. The lads in the workshop, **Barry, David, Tony, Rob** and **Bob** and, of course, **John,** can all be contacted to discuss that fault or problem you have. Barry, incidentally, also looks after spare parts. (The most comprehensive set of bits you've ever seen). As time has passed by, the workshop lads have each become specialist with their own particular forte. So to aid matters, tell Tracy what piece of equipment you wish to discuss so that you get to speak to the right guy. One small word of warning, don't ring up the workshop to check that blue is neutral, brown is live and that green is the earth – they keep a book to record these questions! Club 24, Barclaycard and Access purchases are dealt with by **Anne** and **Julie** (what a superb pair) – **Marlyn** makes the tea, **Irene** types and keeps us in order, **Trevor,** aided by **Dorothea,** counts the money and **Alan** attends to the affairs of the dealer, answers your letters plus the complex job of ordering stock. Yes, it is solely his fault that we don't have it. **Pauline** and **Anne** dispatch the parcels. What do I do you ask? Well, apart from writing Emporium News, looking after the advertising, keeping the sales staff happy and generally promoting the image of the company, very little. An obvious choice for the job as I am well-known in amateur circles for my considerable tact and understanding. So there we are, as John said, a company determined to give you what you deserve, good service both before and after you buy the goods.

Talking about goods, **what about the Shimizu,** the rig to bring back the flavour of amateur radio. Available here at Matlock, this partly-built rig covering 80, 40, 20, 15 and 10 metres gives the sophistication of a "black box" plus the satisfaction of building it yourself. Of the many that we have sold, few have experienced any difficulties and, of course, **Bob down in the workshop** is always available to advise on any problems and, if required, finish the project. Of course for this latter service a small charge is made, but nobody has yet fainted so the charge must be right. **The Shimizu is available at £275** in semi-kit form, carriage £5. Optional ready-built FM boards are available: **the receive board £25, the transmit board £14.** To provide RF AGC and a noise blanker, **the SE-NB board** is available – ready-built for £11.80.

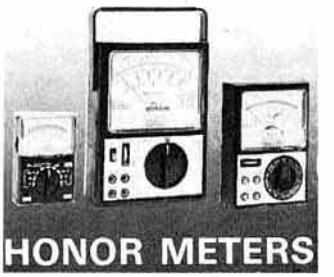
For the keen 2 metre SSB operator, **the SB2X low power transceiver** has to be an obvious choice. At the price of £165, this rig – which includes the crystals necessary for both operating on the sideband end of the band and the section containing the VHF beacons, plus an integral mains operated battery charger – **has to be good value for money.** Just the rig for those fine summer evenings.

For the HF operator, a solid state linear amplifier, the ML122,200 watts, 3-30MHz, powered from 12 volts and costs £115.00.

There seems to be a lot of people taking **the trip to the coast** these days so how about a MK704 squeeze paddle at £11.80. This item is only part of the range of keys and keyers. I will list the range: The CW3 oscillator at £6.75, the HK708 straight key £9.66, the EK180 electronic keyer £78.20 and, finally, the MK1024 electronic keyer with 1024 bit memory at £134.00.

Still available and a very good buy is the SWR427H self-powered peak power and SWR meter 1·8 to 180MHz. This meter is available at £65.00 and I am sure is worth consideration for those of **you who appreciate good test equipment.** You may say, and I would not be surprised, that the SWR427H is an expensive power and SWR bridge; however, **the equipment is special** and worth closer examination.

Mention hand-portable equipment for both 70cm and 2 metres, rigs without frills but having all the facilities that today's operator requires and one can only be talking about the AOR range of gear. Authority on Radio may sound a little presumptuous but just talk to someone who owns one. Better still, look round and see if you can buy one second-hand. The AOR range, the AR240A (£158), the 245 (£178) and the AR740A (£195).



A windy night, you are woken by a rattling window. You turn over, pull the bedclothes round your ears, the branches of the tree outside the window start tapping on the glass. The wind howls round the chimney pots. Not for you back to dreamland. Up you get, reach for the icy-cold dressing gown and slowly make your way downstairs, stopping to pull on wellingtons and then out into the garden. With the dressing gown flapping round your knees you gaze upwards to the aerial array now swaying from side to side, threatening to come crashing down, no, not in your garden, but through the neighbour's greenhouse. Visions flash through your mind: **a calm picture of the Emporium on a Saturday afternoon,** perhaps you should have bought the Daiwa KS065 (£18.50) stay bearing – the ideal piece of aerial hardware to keep those beams where they should be, high in the sky. Seriously, the KS065 is just the thing for any tower or mast system, combined with a Daiwa rotator the perfect choice.**(DR7500X rotator £98.04,** the larger model the **DR7600X £141.00).**

Without a doubt, the GPV5 must be the world's most popular 2 metre colinear – now in stock at £29.50 and the 70cm version, the GPV7 at £25.30.

Anyway, that's about it for now as I have just heard a rumour that **my friend Bill G3JYP,** is thinking about buying the full JRC system of equipment **NRD515** receiver, **NHD515** memory unit. **NVA515** speaker **CFL260** CW filter, **NSD515** transmitter, **NRD515** power supply and, finally, the **NFG515** antenna coupler, so, unfortunately, I'll have to go and help count the money, so gud DXes, 73es, FBOM, etc.

ICOM

TRIED, TESTED AND TRUSTED

IC-720A
Possibly the best choice in HF.
£883.inc.

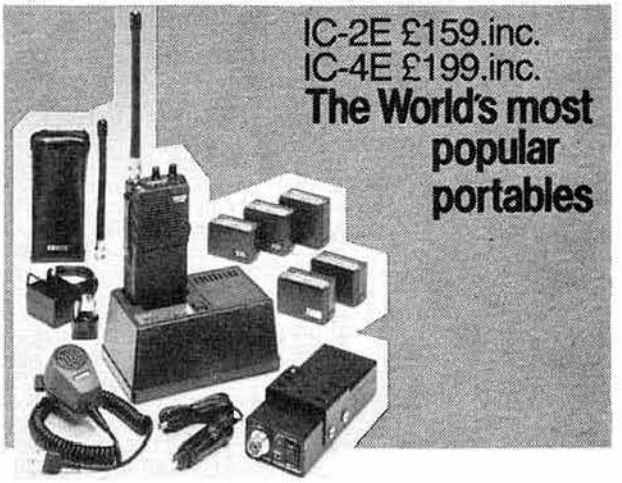
The main problem that the amateur of today has to deal with is deciding just which rig out of the many excellent products available he is going to choose. Technology is advancing at such a rapid rate and getting so sophisticated that many cannot hope to keep up. Some go too far!

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

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

IC-PS15 Mains PSU £99

IC-2E £159.inc.
IC-4E £199.inc.
The World's most popular portables



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

Fully synthesized – Covering 144 – 145.995 in 400 5KHz steps. (430-439.999 4E)
Power output – 1.5W with the 9v. rechargeable battery pack as supplied – but lower or higher output available with the optional 6v or 12v packs. Rapid slide-on changing facility.
BNC antenna output socket – 50 ohms for connecting to another antenna or use the Rubber Duck supplied (flexible ¼ λ whip – 4E)
Send/battery indicator – Lights during transmit but when battery power falls below 6v it does not light, indicating the need for a recharge.
Frequency selection – by thumbwheel switches, indicating the frequency. 5KHz switch – adds 5KHz to the indicated frequency.
Duplex simplex Switch – gives simplex or plus 600KHz or minus 600KHz transmit (1·6MHz and listen input on 4E)
Hi-Low switch – reduces power output from 1.5W to 150mW reducing battery drain.
External microphone jack – if you do not wish to use the built-in electret condenser mic an optional microphone speaker with PTT control can be used. Useful for pocket operation.
External speaker jack – for speaker or earphone. This little beauty is supplied ready to go complete with nicad battery pack, charger, rubber duck.

A full range of accessories in stock.		**£ p**
ICML1	10W mobile booster for IC2E	49.00
BP5	11 volt battery pack	30.00
BP4	Empty battery case for 6 x 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 adapter pack	8.40
HM9	Speaker microphone	12.00
CP1	Mobile charging lead	3.20
IC123	cases	each 3.60

All prices include VAT

The IC4E is going to revolutionise 70 CM!

ICOM

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

IOW RF ouput on SSB, CW and FM. Standard and non-standard repeater shifts. 5 memories and priority channel.

Memory scan and band scan, controlled at front panel or microphone. Two VFO's LED S-meter 25KHz and 1KHz on FM – 1KHz and 100Hz tuning steps on SSB. Instant listen input for repeaters.

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

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

The famous IC-240 has been improved, given a face lift and renamed the IC-24G. Many thousands of 240's 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 12½ KHz upshift, should the new channel spacing be necessary. The old IC-240 proved to be the most reliable rig we have ever sold – the IC-24G 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.

Thanet Electronics

THE AMATEUR'S PROFESSIONAL FRIEND

IC-730 The best for mobile or economy base station £586.inc.

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

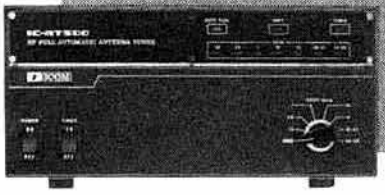
Super Linear IC-2KL £839.inc. Matching Power Supply IC-2KLPS £211.inc.

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

This automatic facility can be overriden for use on rigs other than the IC-720A, but can be added to the IC-701 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, and has a high conductance, several hundred times that of copper, plus a very quick response.

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

IC-AT500 £299.inc. Automatic antenna tuner 100W version AT100 £249. inc.



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, thus making the tune-up time very short.

Auto band switching

When the IC-720A, IC-701 (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-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 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 AC 240 volts.

NEW! Tono Theta 9000E £650.inc.

Has the features of the 7000E PLUS:

★ 80 characters per line screen format
★ Word processor facility
★ Light pen for graphics

Free carriage on direct sales – call us.

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 170 Hz 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 memory. 53 character type ahead, rub out function. LF (line feed) cancel function. Cursor control CR/LF (72,64 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 and CW practice functions. Variable CW weights. Cross pattern checking output terminal, log computer output provided. Test message function (Ry and QBF) **Receive only version £399.** Phone or write for the price list of accessories for this unit.

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 modern 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 2V.

Display outputs – RF output and composite video output 1V P.P 75 ohms. 6 memories – 32 chrs each.

Printer interface – Centronic compatable parallel interface built-in.

Output for oscilloscope – RTTY and ASCII impedance 200K ohm 1V 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 vat.
Green display monitor CRT1200G £136.00
Dot Matrix Printer HC900 £590.00
Dot Matrix Printer HC800 £499.00
Printer socket SK7 £8.50p
Linear amplifiers;
UC70 430 MHz 55W + RX pre-amp £149.00
2M-50W (2M) £65.00
2M-100W (2M) + RX pre-amp £115.00
MR-250W (2M) + RX pre-amp £259.00
MR-28LB
(26-30 MHz) + RX pre-amp £65.00
Mast-Head Pre-amp:-
RX144 £65.00 – RX430 £70.00
(both include control and psu box)

You will get a good deal from Thanet – Call us.
Why buy from Thanet?
1. Full 2 years warranty on all equipment
2. Excellent back up and after sales service using fully equipped work shop.
3. ICOM trained technical staff
4. No charge for speedy delivery service
5. Avoid disappointment – buy from the experts with years of experience.

Instant credit available in most cases.
1. Phone us during office hours
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Please note: Access/Barclaycard owners – goods must be sent to address registered with credit card company.

Thanet Electronics

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031 665-2420 (evenings)
Midlands – Tony G8AVH 021 329-2305
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All prices inclusive of VAT.

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

Bredhurst electronics

TRIO R-600 £235.00

TRIO		£	Carr.
TS830S	160-10m Transceiver 9 Bands	694.00	(—)
VFO230	Digital V.F.O. with Memories	215.00	(2.00)
AT230	All Band ATU/Power Meter	119.00	(2.00)
SP230	External Speaker Unit	34.96	(1.50)
DFC230	Dig. Frequency Remote Controller	179.00	(1.50)
YK88C	500Hz CW Filter	29.60	(0.50)
YK88CN	270Hz CW Filter	32.66	(0.50)
TS130S	8 Band 200W Pep Transceiver	525.00	(—)
TS130V	8 Band 20W Pep Transceiver	445.00	(—)
VFO120	External V.F.O.	85.00	(1.50)
TL120	200W Pep Linear for TS120V	144.00	(1.50)
MB100	Mobile Mount for TS130/120	17.00	(1.50)
SP120	Base Station External Speaker	23.00	(1.50)
AT130	100W Antenna Tuner	79.00	(1.50)
PS20	AC Power Supply - TS130V	49.45	(2.50)
PS30	AC Power Supply - TS130S	88.50	(5.00)
MA5	5 Band Mobile Aerial System	86.00	(5.00)
MC50	Dual Impedance Desk Microphone	25.76	(1.50)
MC35S	Fist Microphone 50K ohm IMP	13.80	(0.75)
MC30S	Fist Microphone 500 ohm IMP	13.80	(0.75)
LF30A	HF Low Pass Filter 1kW	17.90	(0.75)
TR9000	2M Synthesised Multimode	371.00	(—)
BO9	Base Plinth for TR9000	34.90	(1.50)
TR7800	2M Synthesised FM Mobile 25W	284.00	(—)
TR7730	2M Synthesised FM Compact Mobile 25W	247.00	(—)
TR2300	2M Synthesised FM Portable	166.00	(—)
VB2300	10W Amplifier for TR2300	58.00	(1.50)
MB2	Mobile Mount for TR2300	17.71	(1.50)
RA1	Flexible Rubber Antenna for TR2300	6.90	(0.50)
TR2500	2M FM Synthesised Handheld	207.00	(—)
ST2	Base Stand	46.00	(1.50)
SC4	Soft Case	12.19	(0.50)
SMC25	Speaker Mic	14.49	(1.00)
PB25	Spare battery pack	22.30	(0.75)
MS1	Mobile Stand	28.20	(0.75)
TR8400	70cm FM Synthesised Mobile Transceiver	334.00	(—)
PS10	Base Station Power Supply for 8400	64.00	(2.00)
TR9500	70cm Synthesised Multimode	449.00	(—)
R1000	Synthesised 200KHz-30MHz Receiver	297.00	(—)
SP100	External Speaker Unit	26.90	(1.50)
HC10	Digital Station World Time Clock	58.80	(1.50)
HS5	Deluxe Headphones	21.85	(0.75)
HS4	Economy Headphones	10.35	(0.75)
SP40	Mobile External Speaker	12.40	(1.50)

ICOM			
IC730	HF Mobile Transceiver 8 Band	586.00	(—)
IC720A	HF Transceiver & Gen. Cov. Receiver	883.00	(—)
PS15	Power Supply for 720A	99.00	(3.00)
IC251E	2M Multimode Base Station	499.00	(—)
IC25E	2M Synthesised Compact 25W Mobile	259.00	(—)
IC290E	2M Multimode Mobile	366.00	(—)
IC2E	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 × 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)

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Ferrite Rings 1⅛" 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)
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Yaesu Low Pass Filter FF501 DX 1kW		23.00	(0.75)
HP4A High Pass Filter TV Down Lead		5.95	(—)

ANTENNA BITS			
H1-Q Balun 1:1 5kW pep (PL259 Fitting)		9.95	(0.75)
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Small Egg Insulators		0.40	(0.10)
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75 ohm Twin Feeder - Light Duty - Per Meter		0.16	(0.02)
300 ohm Twin Feeder - Per meter		0.14	(0.02)
URM67 Low Loss 50 ohm Coax - Per Meter		0.60	(0.20)
UR76 50 ohm Coax - Per Meter		0.25	(0.05)

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

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MMT432/28S	70cm Transverter for HF Rig	149.00	(—)
MMT432/144R	70cm Transverter for 2M Rig	184.00	(—)
MMT70/28	4M Transverter for HF Rig	115.00	(—)
MMT70/144	4M Transverter for 2M Rig	115.00	(—)
MMT1296/144	23cm Transverter for 2M Rig	184.00	(—)
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MML144/40	2M 40W Linear Amp (10W I/P)	77.00	(—)
MML144/100S	2M 100W Linear Amp (10W I/P)	129.00	(—)
MML432/20	70cm 20W Linear Amp (3W I/P)	77.00	(—)
MML432/50	70cm/50W Linear Amp	119.00	(—)
MML432/100	70cm 10/100W Linear Amp	228.64	(—)
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MM4000	RTTY Transceiver	269.00	(—)
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MMC70/28	4M Converter to HF Rig	27.90	(—)
MMC144/28	2M Converter to HF Rig	27.90	(—)
MMC432/28S	7cm Converter to HF Rig	34.90	(—)
MMC432/144S	70cm Converter to 2M Rig	34.90	(—)
MMC435/600	70cm ATV Converter	27.90	(—)
MMK1296/144	23cm Converter to 2M Rig	59.80	(—)
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MMD600P	600MHz Prescaler	23.00	(—)
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MMA28	10M Preamp	14.95	(—)
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MMF144	2M Band Pass Filter	9.90	(—)
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MMS1	The Morse Talker	115.00	(—)

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Morse Tutor - new product			
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YAESU			
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FC902	All Band A.T.U.	135.00	(1.50)
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FT101Z	160-10m 9 Band Transceiver (FM)	590.00	(—)
FT101ZD	160-10m 9 Band Transceiver (FM) Digital R.O.	665.00	(—)
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FT707S	8 Band Transceiver 20W pep	485.00	(—)
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FV707DM	Digital V.F.O.	186.00	(—)
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FRG7700M	As above but with Memories	409.00	(—)
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FT290R	2M Portable Synthesised Multi-mode	249.00	(—)
FT708R	70cm FM Synthesised Handheld	219.00	(—)
NC7	Base Trickle Charger	26.88	(1.30)
NC8	Base Fast/Trickle Charger	44.10	(1.50)
NC9C	Compact Trickle Charger	8.00	(0.75)
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FNB2	Spare Battery Pack	17.25	(0.75)
PA3	12V DC Adaptor	13.40	(0.75)
FT480R	2M Synthesised Multimode	379.00	(—)
FT780R	70cm Synthesised Multimode (1.6MHz Shift)	459.00	(—)
FP80	Matching 230V AC Power Supply	63.00	(1.50)

FT290R	2M Portable Synthesised Multimode	249.00	(—)
MMB11	Mobile Mounting Bracket	22.25	(1.00)
CSC1	Soft Carrying Case	3.45	(0.75)
NC11C	240V AC Trickle Charger	8.05	(0.75)
FL2010	Matching 10W Linear	64.00	(1.20)
Nicads	2.2 AMP HR Nicads Each	2.50	(—)
FL2100Z	160-10m 1200 Watt Linear	425.00	(5.00)
FF501DX	H.F. Low Pass Filter 1kW	23.00	(0.75)
FSP1	Mobile External Speaker 8 ohm 6W	9.95	(0.75)
YH55	Headphones 8 ohm	10.00	(0.75)
YH77	Lightweight Headphones 8 ohm	10.00	(0.75)
QTR24D	World Clock (Quartz)	28.00	(0.75)
YM24A	Speaker/Mic 207/208/708	16.85	(0.75)
YD148	Stand Microphone Dual IMP 4 Pin Plug	21.00	(1.50)
YM34	As 148 but 8 Pin Plug	21.45	(1.50)
YM38	As 34 but up/down Scan Buttons	24.50	(1.50)

FDK VHF/UHF EQUIPMENT			
Multi 700EX	2M FM Synthesised 25W Mobile	199.00	(—)
Multi 750E	2M Multimode Mobile	289.00	(—)
Expander	70cm Transverter for M750E	219.00	(—)

STANDARD VHF/UHF			
C78	70cm FM Portable	219.00	(—)
CPB78	10W Matching Linear	67.50	(1.50)
C58	2M Multimode Portable	239.00	(—)
CPB58	25W Matching Linear	79.50	(1.50)
CM8	Mobile Bracket	19.95	(1.00)
CL8	Soft Carrying Case	6.95	(0.75)
C12/230	Charger	7.59	(0.75)

WELZ SWR/POWER METERS

SWR - POWER METERS			
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WELZ SP300	H.F/2M/70	79.00	(0.75)
WELZ SP400	2M/70	59.00	(0.75)
DAIWA SW110A	H.F/2M	35.00	(—)
DAIWA CN620A	H.F/2M Cross Pointers	52.80	(—)
DAIWA CN630	2M/70 Cross Pointers	71.00	(—)

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2m FM

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FM-USB-LSB-CW. 144-146MHz 1W or 10 watts. Blue-green digital readout. 5kHz, 1kHz and 10Hz steps. Dual VFO

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£184

PACKED WITH FEATURES

2m HANDHELD

FDK T1200

£179 Free Delivery

The T.1200 is a high powered 4 watt 2 metre transceiver featuring digital readout and covering 143-148.995MHz. It features 10 memories with both channel and memory scanning plus programmable steps in 5kHz increments. It is thus ideal for both American and European use and, of course, tone-burst and repeater shift are all included.

COMMERCIAL GRADE 5-BAND DIPOLE

1kW 80-10 metres
50ft feeder Alloy elements

£39 p&p £1.75

Here's your chance to purchase a 5 band dipole at an incredibly low price. Traps, insulators, centre piece, ultra light alloy 14 swg element wire, coax feeder with PL259, nylon halyard, etc. This 119ft dipole is of extremely high grade construction and is exclusive to us. For small gardens the ends may be folded down. Although not essential the AC38 is recommended for solid state rigs and ultra low SWR across the band.

AC38ATU 400 WATTS

£59 Post Free

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We've been doing a bit of spring cleaning and turning out the cupboards. All items below are offered at greatly reduced prices. All are guaranteed and unused. Most have either damaged packing or are new but serviced stock. If you recognise a bargain when you see one, you'll be reaching for your cheque books. First come first served!

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40	YW3 SWR meters—poor packing	£12	**£10.00**
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6	M161 2m mobile monitors—old stock	£59	**£39.00**
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1	FP107 PSU for above—new	£112	**£105.00**
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Digital readout display. RF speech processor. Audio notch filter. Variable IF filter. VOX; NB, RIT, etc.

VHF FM HANDHELD — **TR2500**

NEW

£207 Free Delivery

The new Trio TR2500 is a top line handheld. Selectable 2·5 watts or 0·3 watts output from 144-145·995MHz. Clear LCD readout and 10 programmable memories with "no drain" memory back-up. Memory and band scan, plus reverse repeater operation are all featured and the unit comes with nicad batteries and AC charger.

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.

NEW TRIO RECEIVER TS780

The all new TS780 is a dual band 2m and 70cm all mode transceiver with a host of features. For the VHF UHF man this will form a complete comprehensive station. Stocks should start to arrive about the time you read this and the price will be £748.

BUDGET RECEIVER — **TRIO R600**

£235 Free Delivery

Here's a remarkable value for money package. The R600 covers 200kHz-30MHz with full digital readout. AM/SSB/CW reception is provided with switched AM filters. Latest circuitry ensures superb sensitivity and stability. This surely must be a new classic from Trio. Look at the price and you'll be convinced.

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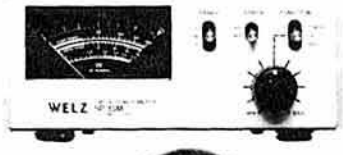

SP15M POWER METER £29.95

Here's 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.

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*Note: VHF model has 'N' sockets

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PS15	Matching psu for both above 230V AC	£99 (n/c)	IC2E	2m FM hand-held TRx 144-146MHz	t.b.a. (n/c)
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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.

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.

VHF ALL-MODE

YAESU FT290R

£249 Free Delivery

USB-LSB-CW-FM 144-146MHz. Digital display. High/low power 2·5-0·5W. 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' internal. Remote mic control etc.

DX MACHINE

YAESU FL2100Z

£425 (£5 carriage)

Here's a guaranteed way of working on DX! Completely self-contained with internal power supply, the FL2100Z will match any HF transceiver able to deliver 100 watts. Capable of being driven to 1,200 watts input on 160-10m, this guarantees good DX performance. We think this is incredible value.

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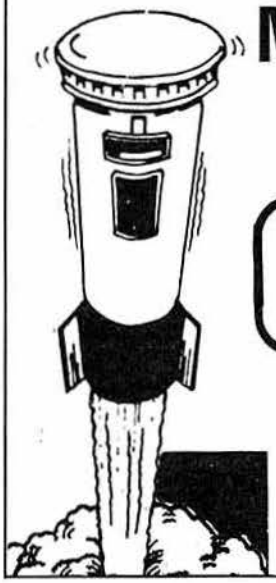

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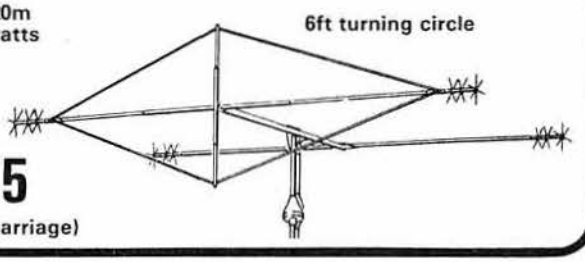

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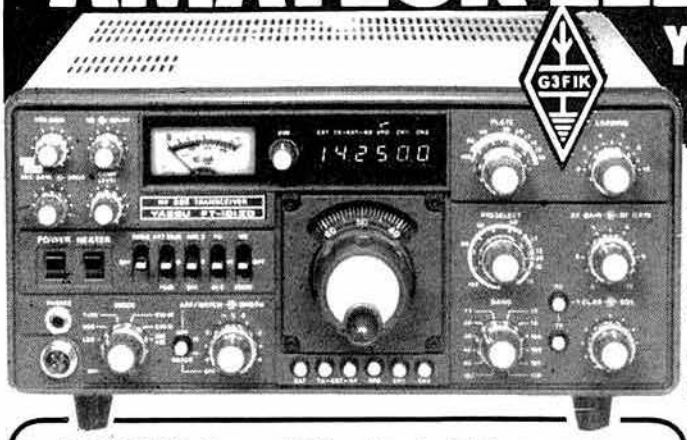
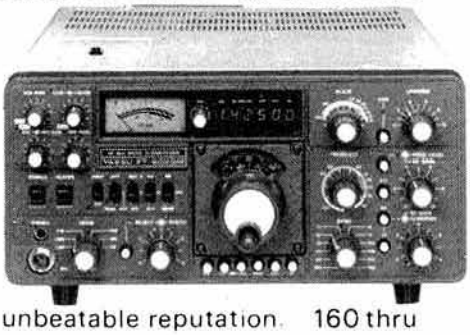


FT-101ZD Mk III

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-902DM Competition grade HF transceiver



The YAESU world famous pace-setter with the acknowledged unbeatable reputation. 160 thru 10 metres including the new WARC bands. All-mode capability, SSB, CW, AM, FSK and FM transmit and receive. Teamed with the FTV-901R transverter coverage extends to 144 & 430MHz.

FT-707 All solid-state HF mobile transceiver

The definitive HF mobile rig, digital, variable IF bandwidth, 100watts 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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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 95 dB! and **NO** band switch!!!

*Optional

NEW! **FT-230R 25W 2metre FM mobile**

Specially designed LCD viewing system provides an exceptionally wide viewing angle of the large digits, even with no external illumination; this you have to see to believe.

Tuning selector for choosing between Dial tuning or scanning.

Brightly lit meter and Liquid Crystal Display illumination give extra clear readability under every possible lighting condition, from total darkness to direct sunlight.

Memory Selector chooses between the 10 memory channels or scanning of all of the memories.

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3-position switch for ±600 kHz repeater offsets, or for simplex operation.

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Main Dial with selectable tuning steps.

Concentric Squelch and ON/OFF-Volume controls for extraordinary convenience.

Momentary contact pushbutton for choosing tuning steps of Main Dial and Scanner.

Memorize command switch to store displayed frequency into selected memory.

Tone Squelch ON/OFF (U.S. model), or Power High/Low Switch (European model).

Function activator to initiate special functions. Special function status indicated on Display along with frequency.

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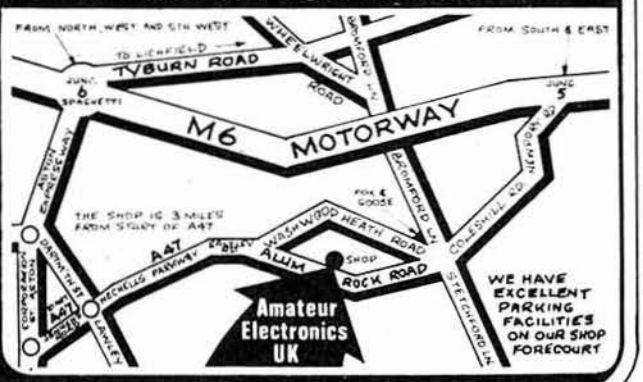

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If getting to us is difficult, however, or you already know precisely what you want, we have developed our mail-order operation so that we can virtually guarantee same-day dispatch on any orders received by 4pm.

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 . . .

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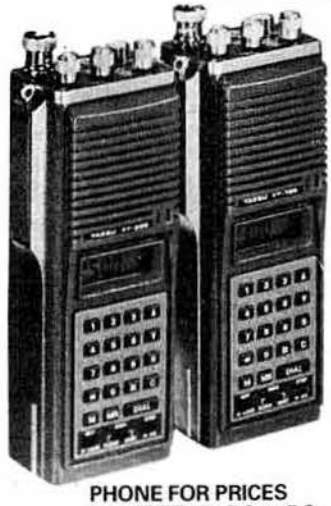
- Synthesised tuning and auto-scanning facility
- VFO or keyboard entry
- 10 VFOs
- No band switching
- IF shift and width control
- Audio Peak Filter
- Notch Filter
- Advanced variable threshold noise blanker
- 300 or 600Hz, 2,400-300Hz, 6kHz, 12kHz
- Built-in Curtis keyer
- Built-in SWR bridge
- Memory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

YAESU'S LATEST VHF/UHF MOBILES AND PORTABLES



FT-208R/FT-708R

Two sophisticated new hand-helds, for 2m and 70cm operation respectively, with such features as

• LCD display • 10 memories • Up/Down scanning in 12.5/25/50kc steps (manual or auto) • Memory scan • 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

FT-290R

All-mode portable incorporating 10 memories • Memory scan • 2 VFOs • Band scan • Clarifier • FM/LSB/USB/CW • LCD readout • Real S-meter • Priority Channel • 2.5W out

Amazing value at £249 incl. FREE ¼-wave flexi-antenna.

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

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This very popular mobile format now available for 70cm as well as 2m operation, with full 10MHz coverage, FM/SSB/CW, and unbelievable front-end sensitivity.

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• Meters by HANSEN, PACKER, and WELZ • Not to mention keyers by AEA, BENCHER and HI-MOUND • Power supplies by DRAE • Amplifiers by TONO etc, etc... and we've even found a way of offering our post and telephone customers a cup of Brenda's coffee!

FT-101ZD 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 including FREE cooling fan and mic.

IC-720A

Icom's superb new HF rig with general coverage receive from 100kc to 30MHz plus transmit facility across its entire range for commercial purposes.

Phone for our latest price.

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ATV-2 TV TRANSCEIVER

Available only from us, this has been developed from the very popular ATV-1 TV Transmitter and it represents a real triumph of miniaturised solid-state technology.

So simple to go on the air, transmitting or receiving high-definition fast-scan video ... Camera or VCR in at one end, 70cm antenna and normal domestic TV out of the other, connect to 12v, and there you are... who needs the BBC?

What's more, it's made for us in Britain by WOOD & DOUGLAS, who are building up a tremendous reputation internationally for high-quality design and construction.

Just look at all these features:

- 2-channel input from video camera or recorder in B/W or colour (switchable on front panel)
- Separate gain controls on both input channels
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- Built-in receive converter – just connect direct to UHF TV for instant ATV reception
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- Video transmitter gives full 3w PSP output • Spurious better than 50dB down
- Unit housed in steel case and constructed on high-quality fibreglass PCB
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FTONE

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DCT1	DC Power Cable	6.50
RAMT1	Non volatile memory board	10.00
FMUT1	FM Unit	TBA
XF8.9KCN	300Hz CW filter	15.35
XF8.9KC	600Hz CW filter	15.35
XF8.9KA	6kHz AM filter	15.35
XF10.7KC	CW filter	13.80

FT101

FT101Z	Transceiver 9 bands, analogue	559.00
FT101ZAM	Transceiver c/w AM option	575.00
FT101ZFM	Transceiver c/w FM option	590.00
FT101ZD	Transceiver 9 bands, digital	635.00
FT101ZDAM	Transceiver c/w AM option	650.00
FT101ZDFM	Transceiver c/w FM option	665.00
AMUT101Z	AM plug in	19.95
FMUT101Z	FM plug in	34.90
DIGT101Z	Digital readout unit	90.10
DCT101Z	Inverter for 12VDC operation	42.55
FANT101T901	Fan	13.80
FV101Z	External analogue VFO	112.00
FV101DM	External digital VFO	249.00
OMT101Z	Owners Manual FT101Z	1.00
WMT101Z	Workshop Manual FT101Z	12.00

FT107

FT107MG	Transceiver digital, solid state	725.00
FT107MGDMS	Transceiver with memory	799.00
DMST107	Digital memory option with shift	92.00
FP107	Mains power supply internal	101.95
FP107EG	Mains external speaker	113.10
FV107G	External VFO	98.50
FC107G	Antenna tuner	112.70
SP107G	External speaker	29.90
SP107PG	External speaker phone patch	57.50
FTV107RG	Transvertor main frame	119.20
FTV107RG(2)	Transvertor frame c/w 2m	216.95
OMT107M	Owners Manual FT107M	1.00
WMT107M	Workshop manual FT107M	12.00

FT707

FT707	Transceiver 100W 10-80m	569.00
FT707S	Transceiver 10W 10-80m	485.00
FP707	Mains external power supply	125.00
FV707DM	Digital VFO	203.15
FC707	Antenna Tuner	85.10
FTV707R	Transvertor main frame	90.10
FTV707(2)	Transvertor c/w 2m	198.00
FRB707	Relay switching box	23.75
MMB2	Mobile Mounting bracket	16.10
MR7	Rack unit	15.70
FL110	Linear amplifier 100W	155.25
OMT707	Owners Manual FT707	1.00
WMT707	Workshop Manual FT707	10.00

FT902

FT902DM	Transceiver	885.00
FT902DE	DM less Invert mem & FM	790.00
FT902D	DM less Invert mem & key	800.00
FMVT901	FM Module	28.00
KEYT901	Curtis Keyer	23.00
MEMT901	Memory unit	89.70
DCT901	Invertor (from 12VDC)	41.80
XF89HC	600Hz crystal filter CW	24.90
XF89HCN	300Hz crystal filter CWN	24.90
XF89GA	6kHz crystal filter AM	24.90
XF89GF	12kHz crystal filter FM	24.90
FV901DM	External VFO – scann & mem	260.00
FC902	Antenna Tuner	135.00

HF EQUIPMENT cont.

FT902 (cont)

SP901	External speaker	31.05
SP901P	External speaker phone patch	55.20
YO901P	Monitorscope with panadaptor	330.00
FTV901R	Transvertor main frame only	195.00
FTV901R(2)	Transvertor c/w 144MHz	285.00
430TV	70cms transvertor module	185.00
144TV	2m transvertor module	100.00
70TV	4m transvertor module	80.00
50TV	6m transvertor module	70.00
YR901	CW/RITTY Reader/Coder	460.00
60MAR901	60mA DC Loop Kit for YR901	19.95
MODR901	VHF TV modulator for YR901	10.75
ARF901	Low tone mod kit for YR901	27.60
YVM1	Monitor	150.00
YK901	Keyboard	125.00
MMB1	Mobile mounting bracket	24.15
FL2100Z	Linear Amplifier 1200W + (PIP)	425.00
OMT902	Owners Manual FT902	1.00
WMT902	Workshop Manual FT902	12.00

RECEIVERS

FRG7

FRG7	Receiver 0.5-30MHz AM/CW/SSB	199.00
BHRG7	Battery Holder	5.00

FRG7700

FRG7700	Rx 15-30MHz AM/CW/SSB/FM	329.00
FRG7700M	Receiver C/W 12 channel mem	409.00
MEMGR7700	Memory option	90.95
DCRG7700	DC modification kit	1.15
FRT7700	Antenna Tuner/switch	37.85
FF5	Low pass filter (Fc = 500kHz)	9.95
FRV7700A	118-130, 130-140, 140-150MHz	69.75
FRV7700B	118-130, 140-150, 50-59MHz	75.50
FRV7700C	140-150, 150-160, 160-170MHz	65.95
FRV7700D	118-130, 140-150, 70-80MHz	72.45
FRV7700E	118-130, 130-140, 150-160MHz	71.30
FRV7700F	118-130, 150-160, 170-180MHz	71.30

ACCESSORIES

YM21	Hand 600, 4 pin, noise cancel	13.80
YM22	Hand 600, 6 pin, keyboard	41.40
YM23	Hand 600, 4 pin, keyboard	41.40
YM24	Hand, 2K, 6 pin min, speaker/mic	16.85
YM24A	Hand, 2K, 6 pin min, speaker/mic	16.85
YM34	Stand, 500/50K, 8 pin	21.45
YM35	Hand, 600, 8 pin, scan	13.80
YM36	Hand, 600, 8 pin, noise cancel	13.05
YM37	Hand, 600, 8 pin	6.90
YM38	Stand 600/50K, 8 pin, scan	24.90
YM39	Hand 600, 7 pin, speaker/mic	14.95
YE7A	Hand, 600, 4 pin	6.90
YD148A	Stand, 600/50K, 4 pin	21.10
YD844A	Stand, 600/50K, 4 pin, cast type	25.30
FSP1	External Mobile speaker 8 ohms	9.95
FSP2	External Mobile speaker 4 ohms	9.95
FP4	12V power supply 4 amps	42.95
FP12	12V 12 amps c/w speaker	86.25
YH55	Headphones padded low Z	10.00
YH77	Headphones lightweight low Z	10.00
QTR24	World time clock	19.95
QTR24D	World time clock quartz	28.00
FF501DX	Low pass filter	23.00
YC1000L	Data Logger (V, F, T etc)	883.75
YP150Z	Terminated Wattmeter 5-30-150W	92.00

VHF EQUIPMENT

FT208-FT708

FT208R	Tx/Rx, Handheld 2½W 2m synth	209.00
FT708R	Tx/Rx, Handy 1W 70 cms synth	219.00
FNB2	NiCad Battery Pack	17.25
FBA2	Battery pack sleeve (fits FNB2)	3.05
FBA3	Charging sleeve (for FT207 acc)	5.00
NC9C	Slow charger	8.05
NC7	Base Master	26.85
NC8	Base Master with quick charge	44.10
PA3	Battery eliminator/charger, 12V	13.40
FTS32	Tone squelch unit	TBA
MMB10	Mobile Bracket	6.50
OMT208R	Owners Manual FT208R	1.00
OMT708R	Owners Manual FT708R	1.00

FT290-FT790

FT290R	Transceiver 2m 2½W Multimode	249.00
FT690R	Transceiver 6m	TBA
FT790R	Transceiver 70 cms	TBA
SMC2.2C	NiCad cell, 2.2 A/hr, "C" size	2.70
NC11C	Slow Charger (1.80mA)	8.05
SMC8C	Slow Charger (220mA)	TBA
MMB 11	Mobile Mount	22.25
CSC1	Soft carrying case	3.45
FLC11	Leather heavy duty case	TBA
FL2010	Linear Amplifier 2m 10W	64.40
FL7010	Linear Amplifier 70 cms	TBA
OMT290R	Owners Manual FT290R	1.00
OMT390R	Owners Manual FT390R	1.00
OMT79-R	Owners Manual FT790R	1.00

FT404

FT404R	Tx/Rx, 70cms, 6 channel, 3 watts	199.00
NBP9	NiCad Pack	17.25
FBA1	Sleeve for battery pack	3.45
NC9C	Slow charger mains	8.05
NC1A	Base Charger Mains	21.10
NC3A	Deluxe Charger/Eliminator Mains	46.00
PA2	Power adaptor – 12 volt operation	14.95
MMB10	Mobile bracket	6.50
FLC2	Heavy duty leather case	21.85
OMT404R	Owners Manual FT404R	1.00

FT480-FT680-FT780

FT480R	Transceiver 2m	379.00
FT680R	Transceiver 6m	359.00
FT780R	Transceiver 70 cms	449.00
FT780R1.6	Transceiver c/w 1.6MHz shift	459.00
MKT780	Mod for 1.6MHz shift inc. install	23.00
FP80A	Power supply unit	63.25
SC1	Station console – 2 transceivers	134.55
FL2050	Linear amplifier 50W output 145MHz	126.50
OMT480R	Owners Manual FT480R	1.00
OMT680R	Owners Manual FT680R	1.00
OMT780R	Owners Manual FT780R	1.00
WMT480R	Workshop Manual FT480R	10.00

FT720

FT720RV	Tx/Rx, 2m 10W synthesized FM	245.00
FT720RVH	Tx/Rx, 2m 25W synthesized FM	255.00
FT720RU	Tx/Rx, 70 cms 10W synthesized FM	265.00
FT720R	Control head for transceiver deck	115.00
720RV	Transceiver deck only 2m 10W	130.00
720RVH	Transceiver deck only 2m 25W	140.00
720RU	Transceiver deck only 70 cms 10W	150.00
S72	Switching box (between decks)	55.00
E72S	Extension cable, 2m long	15.00
E72L	Extension cable, 4m long	20.00
MMB3	Mobile bracket for RF deck	5.00
FMB3	Mobile bracket brace	1.00
OMT720R	Owners Manual FT720R	1.00

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

Access

BARCLAYCARD VISA

HUMBERSIDE
S.M.C. (Grimsby)
247A Freeman Street,
Grimsby, Lincolnshire.
Grimsby (0472) 99288
10-6 Tuesday-Saturday

STOKE-ON-TRENT
S.M.C. (Stoke)
76 High Street,
Talke Pits, Stoke
Kidsgrove (07816) 72644
9-5.30 Tuesday-Saturday

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
Tandragee	Mervyn	GI3WWY	(0762) 840656
Edinburgh	Jack	GM8GEC	(031665) 2420

– SMC AGENTS QTHR –

Stourbridge	Brian	G3ZUL	(03843) 5917
Redcar	Simon	G4EOS	(0642) 480808
Buckley	Howarth	GW3TMP	(0244) 549563
Neath	John	GW4FOI	(0639) 55114/2942
Jersey	Geoff	GJ4ICD	(0534) 26788

FT-ONE £1295 inc VAT @ 15%, Securicor–2 year guarantee–Free finance

★ All modes; AM, CW, FM, FSK, LSB, USB
★ Tx and Rx on opposite sidebands possible
★ Main dial; 10Hz resolution
★ Inbuilt keypad, direct digital entry to 100Hz
★ Tun/Scan Fast/Slow, Up/Down, Man/Auto
★ SSB; Variable bandwidth and IF shift
★ 300Hz, 600Hz, 2,400→300Hz, 6KHz, 12KHz
★ Receiver dynamic range up to 100dB
★ Two memory blanks (A & B) with 10 slots
★ ANY frequency storable ANY Tx/Rx split
★ RIT offset stored with memory channel
★ 100W RF, (50% duty FSK) all solid state
★ Mains and 12VDC Switch mode PSU
★ CW delay; adjustable to *full break in*
★ Electronic keyer built in‡. Drive level control
★ Digital readout to 100Hz Analogue marks
★ Dedicated digital readout of RIT to ±9·9KHz
★ Two large meters (+3 digitals and 12 leds)
‡ Option

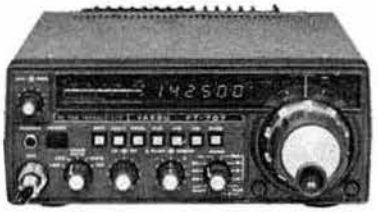
FT101Z £559 inc VAT @ 15%, Securicor–2 year guarantee–Free finance

★ 160-10 metres including new allocations
★ Variable IF bandwidth 2·4kHz to 300Hz
★ 8 pole filters for razor edge selectivity
★ Selectable CW fixed width CW-W and CW-N
★ Semi-break in with sidetone for 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 front panel control
★ 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 PSU 110-234V ac and 12V dc
★ Incredible range of matching accessories
*6 models, Digital/Analogue–AM/FM options
*Option.

FT107M £725 inc VAT @ 15%, Securicor–2 year guarantee–Free finance

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

FT707 £569 inc VAT @ 15%, Securicor–2 year guarantee–Free finance



★ 80-10 metres (inc. 10, 18 and 24MHz)
★ USB, LSB-CWW, CWN, AM (Tx and Rx)
★ 100W PEP, 50% output at 3:1 VSWR
★ Full "broad band" no tune output stage
★ Excellent Rx dynamic range, power buffers
★ Rx Schotky diode ring mixer module
★ Local oscillator with low noise floor
★ Variable IF bandwidth–16 crystal poles
★ Bandwidths 2·4kHz*, 300Hz, 600 or, 350Hz*
★ AGC: slow-fast switchable from front panel
★ VOX built-in and adjustable from front panel
★ Semi break-in with side tone for CW
★ Digital plus analogue frequency display
★ LED level meter reads S, PO and ALC
★ Convenient concentric AF, RF gain controls
★ Indicators for calibrator, fix, and ext VFO
★ Receiver offset tuning (RIT clarifier)
★ Advanced noise blanker with local loop AGC
★ 25kHz crystal calibrator feature
★ Internal, xtal or external VFO control
* Option

FT902DM £885 inc VAT @ 15%, Securicor–2 year guarantee–Free finance

★ 160-10 metres including new allocations
★ Variable IF bandwidth 2·4kHz to 300Hz
★ Audio Peak, notch controls independent
★ AM, FSK, USB, LSB, CW, FM (Tx & 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–lambic, single or straight
★ Switchable AGC and RF attenuator
★ Optional; 350 or 600Hz CW, 6kHz AM filter
★ Clarifier switchable on Tx, Rx or both
★ Audio Peak and tunable notch filter
★ Plug-in modular, computer construction
★ Fully adjustable RF Speech processor
★ Ergonomically design with necessary LEDs
★ Incredible range of matching accessories
★ Universal PSU 110-234V ac and 12V dc
* Option

SMC SERVICE

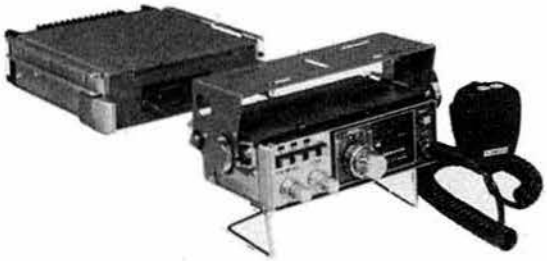
Free Finance on many items. Two year guarantee on Yaesu. Free Securicor on major Yaesu items. Access and Barclaycard over the telephone. biggest Branch, Agent and Dealer network. Ably staffed, courteous, Service Department. "B Services" Securicor contract at £3.50!! Biggest stocks of amateur equipment 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 Hi-Mound, on invoices over £100 SMC offers Free Finance! How is it done? Simple, pay 20%, split the balance equally over 6 months or pay 50% down and split the balance over a year. You pay no more than the cash price!!

GUARANTEE

Yaesu's *own* warranty does not extend outside Japan. Repairs are the responsibility of the UK 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.



FT720RV £245 inc VAT @ 15% & SECURICOR

FT720 Control Head
- ★ Four easy write-in memory channels
- ★ Rx Priority channel (auto check)
- ★ Scanning, band/memory, empty/busy
- ★ Up/down tuning/scanning from mic.
- ★ Optically coupled tuning control
- ★ Manual and automatic tone burst
- ★ String LEDs for 'S' and PO, 7 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: 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

FT790R HERE SOON!

FT230R HERE NOW

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 RIT)
- ★ 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 £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

FT480R

1·6MHz shift now available

FT780R

FREE FINANCE AVAILABLE—TWO YEAR GUARANTEE

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 available

FRA ACTIVE ANTENNA SOON!

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
- ★ 110 and 240V ac and 12V dc option
- ★ Switchable speed A.G.C. system
- ★ Signal meter calibrated in "S" and SIMPO
- ★ FRT7700: 150kHz-30MHz, Attenuator etc.
- ★ FRV7700A; 118–130, 130–140, 140–150MHz
- ★ FRV7700B; 118–130, 140–150, 50–59MHz
- ★ FRV7700C; 140–150, 150–160, 160–170MHz
- ★ FRV7700D; 118–130, 140–150, 70–80MHz
- ★ FRV7700E 118-130, 140-150, 150-160MHz
- ★ FRV7700F 118-130, 150-160, 170-180MHz
- ★ FF5; 500kHz (for improved VLF reception)
- ★ MEMGR7700; 12 Channels (internal fitting)

FT208R (2m) FT708R (70cm)

- ★ 4 bit CPU chip frequency control
- ★ Keyboard entry of frequencies/splits
- ★ LCD 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 charge 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
- ★ Range of chargers, mounts etc.

FREE FINANCE

FT208R £209 inc. VAT @ 15% & SECURICOR

- ★ 144-146MHz (144-148MHz 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 (440-450MHz possible)
- ★ 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

2 YEAR GUARANTEE

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
10-6 Tuesday-Saturday

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S.M.C. (Stoke)
76 High Street,
Talke Pits, Stoke
Kidsgrove (07816) 72644
9-5.30 Tuesday-Saturday

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

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

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S.M.C. (Jack Tweedy) LTD
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Woodhall Spa, Lincolnshire.
Woodhall Spa (0526) 52793
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— SMC AGENTS —

Bangor	John	GI3KDR	(0247) 55162	Stourbridge	Brian	G3ZUL	(03843) 5917	Buckley	Howarth	GW3TMP	(0244) 549563
Tandragee	Mervyn	GI3WWY	(0762) 840656	Redcar	Simon	G4EQS	(0642) 480808	Swansea	Peter	GW8EBB	(0792) 872525
Edinburgh	Jack	GM8GEC	(031665) 2420					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, ⅝, 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 1-1¼in 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

FOUR METRES			
4Y/4M	Yagi, 4 element	7·0dB £22.43	£1.73
PMH2/4M	Harness. 2 way	£13.23	£1.44
TWO METRES			
HO 2M	Halo, head only	3·0dB £5.17	£0.63
HM 2M	Halo, 24in mast	3·0dB £5.75	£0.75
UGP 2M	Ground Plane	0·0dB £10.92	£1.73
C5 2M	Colinear omnivert	4·8dB £47.72	£1.73
5Y 2M	Yagi 5 element	7·8dB £12.07	0.58
8Y 2M	Yagi 8 element	9·5dB £15.52	£1.73
10Y/2M	Long Yagi, 10 element	11·4dB £33.35	£1.73
14Y/2M	Long Yagi, 14 element	13·0dB £36.00	£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 element parabeam	12·4dB £39.67	£1.73
PBM14 2M	14 element parabeam	13·7dB £48.00	£1.73
Q4 2M	Quad, 4 element	10·0dB £25.87	£1.73
Q6 2M	Quad, 6 element	12·0dB £33.92	£1.73
5XY/2M	Yagi, 5 element cross	7·8dB £24.72	£1.73
8XY/2M	Yagi, 8 element cross	9·5dB £31.05	£1.73
10XY/2M	Yagi, 10 element cross	11·3dB £40.82	£1.73
PMH2 C	Harness, Cir. Polar	£8.05	0.52
PMH2 2M	Harness, 2 way	£10.92	0.86
PMH2 2ML	Harness, 2 way long	£11.92	£1.15
PMH4 2M	Harness, 4 way	£25.00	£1.73
SEVENTY CMS			
C8/70	Colinear vert.	7·8dB £54.05	£1.73
D8/70	Yagi, 8 over 8 slot	12·3dB £22.43	£1.73
PBM18/70	Parabeam 18 element	14·9dB £27.60	£1.73
PBM24/70	Parabeam 24 element	dB £36.80	£1.73
MBM28/70	Multibeam, 28 element	dB £18.40	£1.73
MBM48/70	Multibeam, 48 element	15·7dB £31.05	£1.73
MBM88/70	Multibeam, 88 element	18·5dB £42.55	£1.73
8XY/70	Yagi, 8 element cross	10·0dB £36.80	£1.73
12XY/70	Yagi, 12 element cross	13·0dB £46.00	£1.73
PMH2/70	Harness 2 way	£9.20	0.75
PMH4/70	Harness 4 way	£19.55	£1.44
TWENTY THREE CMS			
D15/23	15 over 15 slot	15·0dB £36.80	£1.73
CR/23	Corner reflector	dB £35.08	£1.73
PMH2/23	Harness 2 way	dB £27.60	£1.73

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

Kenpro

KR600RC
£132.25

360° round type meter
Max. load 200kg.
Rot. 600kg/cm, brake 4,000kg/m.
1⅛in-2⅛in masts
Lower casting optional.

KR400RC
£90.85

360° round type meter.
Max. load 200kg.
Rot. 400kg/cm, brake 1,500kg/cm
1⅛in-2⅛in masts.
Lower casting optional.

KR500
£86.25

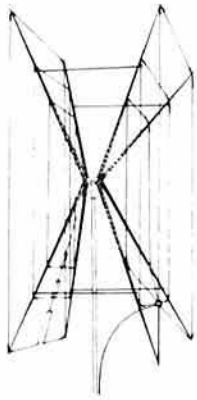
Elevation Rotator (180°).
Up to 50kg of Load.
1¼in-2¼in mast.
1¼in-1⅝in boom.

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' × 9¼'; TR 9¼'; 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

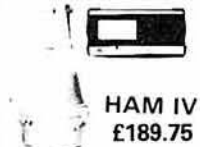
CDE

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

BRANCHES: CHESTERFIELD · HUMBERSIDE · STOKE · LEEDS · WOODHALL SPA

VERSATOWER

TELESCOPIC & TILTOVER RADIO TOWERS

BEST BUYS LOW COST TOWERS

NEW

18FT ONLY £119.00

28FT ONLY £179.00

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.

STANDARD
Post mounting

13M20P40 40′ £436.43
13M20P60 60′ £533.83

HEAVY DUTY
Post mounting

16M20P60 60′ £718.06
16M20P80 80′ £1113.20

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.

CB28 CB18

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	£388.36
10M10W30 Wall mount (LG1013W extra)	£373.18
10M10BP30 Base Plate (HD Bolts extra)	£411.13
10M10FB30 Fixed base (HD Bolts extra)	£360.53

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

HANSEN

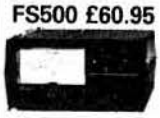
IN LINE POWER/SWR BRIDGES P.E.P., R.M.S. 1·8–440MHz

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 × 3½"
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: 6½ × 2½ × 4½"

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: 6½ × 2½ × 4½". 'N' type sockets

FS711 £32.20

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

FS5E £32.20

INDEPENDENT TWIN METER
FS5E 3·5-150MHz 20, 200 & 1kW
Power 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: 6½ × 2½ × 4½"

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 × 2½ × 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 × 2½ × 2½". 'On the Air' LED

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

SMC=HS

HF, VHF, UHF ANTENNAS MOBILE VERTICALS

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

Model	Band	Gain	Type	Power	Length	Price
20SE	20m		(½λ)	100W	1·72m	£13.80
15SE	15m		(½λ)	130W	1·72m	£12.65
10SE	10m		(½λ)	100W	1·72m	£12.65
4E	4m	0dB	¼λ	150W	1·03m	£7.48
2H/PL	2m		(½λ)	50W	0·17m	£3.45
2QW	2m	0dB	¼λ	200W	0·49m	£2.30
2VF	2m	3dB	¼λ	50W	1·06m	£10.35
2NE	2m	3dB	⅝λ	150W	1·30m	£6.33
78SF	2m		(½λ)	100W	1·42m	£11.50
78F	2m	4·5dB	⅝λ	100W	1·75m	£11.50
78B	2m	4·5dB	⅝λ	150W	1·72m	£12.65
70N2M	2/70	2·7dB 5·1dB	(½λ) 2 × ½λ	100w	0·89m	£14.38
258	70cm	5·5dB	2 × ½λ	100W	0.9m	£11.50
358	70cm	6·3dB	3 × ½λ	100W	1·36m	£14.38

Model	Description	Price
SOWM	**Wing Mount.** SO239M upper SO239 under adjustable angle	£3.35
TMCAS	**Boot Mount** c/w 6 mtrs RG58 and PL259 plug	£7.65
GCD SOCA	**Gutter Mount** deluxe cast type c/w 4 mtr cable assembly and PL259	£6.90
SOMM	**Magnetic Mount**c/w 4 mtrs RG58 and PL259 plug. *For use with smaller antennas only*	£8.45

An alternative mounting for any of the two metre antennas listed above is the BSD stainless steel bumper strap at **£7.75** plus the HS88BK extension tube at **£17.65** which raises by 80 cms and decouples the base of the antenna.

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

For operation on 2 metres and 70 cms the dual band 70N2M is an elegant solution particularly when combined with the HS770 diplexer which provides 50W power handling, 30dB isolation between transceivers with an insertion loss of only 0·5dB for **£13.80**.

Mainland delivery: accessories £0.65, antennas £1.73

NB: PRICES INCLUDE VAT (AT 15%)

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

MICROWAVE MODULES LTD

THEY'RE ALL NEW... AND FIRST CLASS!

MM2001

RTTY TO TV CONVERTER — NOW WITH EXTRA FACILITIES! SUITABLE FOR UOSAT

FEATURES:

- ★ Complete terminal unit and TV interface
- ★ Includes modulator to enable direct connection to a standard UHF TV
- ★ Latest state of the art microprocessor system
- ★ Printer output
- ★ Automatic carriage return/line feed
- ★ Automatic letter shift facility
- ★ Upper and lower case display for ASCII

This converter, MM2001, contains a terminal unit, and a microprocessor controlled TV interface, and requires only an audio input from a receiver and a 12 Volt DC supply to enable a live display of "off-air" RTTY and ASCII on a standard domestic UHF TV set. The display format is 16 lines of text, each 64 characters wide.

The following speeds of transmission can be decoded by the MM2001:

RTTY: 45·5, 50, 75, 100 baud
ASCII: 110, 300, 600, 1200 baud

The input stage of this unit is a digital frequency discriminator having two centre frequencies of 1360Hz and 1700Hz, switch selectable. This facility allows reception of all transmissions and standard frequency shifts. The inclusion of a printer output socket (Centronics compatible) allows hard copy of received signals.

The inclusion of a wide range of speeds and shifts makes the converter highly versatile, and compatible with most amateur and commercial transmissions. The unit is ideally suited for decoding the telemetry data at 1200 baud from the UOSAT satellite.

£169 inc VAT (p&p £2)

MML144/30—LS

This new 144MHz solid state linear amplifier is an updated version of our highly popular MML 144/25. When used with 1 Watt or 3 Watt transceivers this unit will provide an output power of 30 Watts. An internal attenuator controlled by a front panel mounted switch allows the input sensitivity to be selected accordingly.

Several other switches controlling the switching circuitry allow the unit to be left in circuit at all times. The linear power amplifier and low-noise receive preamp can both be independently switched in and out of circuit. In this way maximum versatility is afforded.

FEATURES:

- ★ 30 Watts RF output
- ★ Suitable for 1 Watt and 3 Watt transceivers
- ★ Equipped with RF vox
- ★ Straight through mode when turned off
- ★ Ultra low noise receive preamp—3SK88 mosfet
- ★ Supplied with all connectors

USE THIS NEW AMPLIFIER WITH YOUR FT290R, C58, TR2300 etc, AND HAVE MOBILE OR BASE STATION PERFORMANCE AT A REALISTIC COST.

£65 inc VAT (p&p £2)

MTV435

435MHz ATV TRANSMITTER

FEATURES:

- ★ 20 Watts PSP output power
- ★ Built-in waveform test generator
- ★ Two video inputs
- ★ Aerial changeover for Rx converter
- ★ Two channel using plug-in crystals

This high performance ATV transmitter consists of a two channel exciter, video modulator and a two stage 20 Watt linear amplifier. The unit will accept both colour and monochrome signals, and a sync pulse clamp is incorporated to ensure maximum output. An internal pin diode aerial changeover switch allows connection of the aerial to a suitable receive connector when in the receive mode. (The MMC435/600 converter is suitable for this application and provides an output on channel 35 of the UHF band.) Full transmit/receive switching is included together with an internal waveform test generator which will assist the user in adjusting the gain and black level controls. The unit is housed in a highly durable black diecast case and all circuitry is constructed on high quality glass-fibre printed circuit board. The two stage linear amplifier is housed in a separate internal compartment thus ensuring excellent electrical and thermal stability.

£149 inc VAT (p&p £2)

OUR ENTIRE RANGE OF PRODUCTS WILL BE EXHIBITED AND ON SALE AT MOST OF THE 1982 MOBILE RALLIES & EXHIBITIONS BY OUR SALES TEAM.

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

Access BARCLAYCARD VISA
WELCOME

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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, although no guarantee of inclusion can be given. Once broadcast, items are not usually repeated.

INTENDED RECEPTION AREA	NORMAL READER	RESERVE READER	LOCAL START TIME
Frequency: 3·640MHz. Mode: ssb			
NE Scotland	GM3HGA	GM3VEY	1130
Frequency: 3·650MHz. Mode: ssb			
SE England	G2MI	G4ARZ	0900
Midlands	G2CVV	G8QZ	0930
SW England/Wales	G8ML	G3JFH	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	GW8TTM	(Vacancy)	1100
Clwyd/Merseyside	GW4IEQ	G8NNS	1100
Exeter	G3PBV	(Vacancy)	1130
Leicester	G4JYS	G4MFU	1130
Scarborough	G8XTL	G4EEV	1130

H = horizontal polarization

RSGB PRESIDENT, 1982

Dr John Allaway, G3FKM, elected

At its meeting on 23 January 1982, the RSGB Council elected Dr John Allaway, MB, ChB, MRCS, LRCP, G3FKM, as the Society's 48th President.

Dr Allaway has had a long and distinguished career in amateur radio and in service to the RSGB. He has been contributor of "The Month on the Air" to *Radio Communication* since 1966, a Council member since 1970, President in 1976, hf manager since 1978, a member of several RSGB committees, and chairman of the Finance & Staff Committee for the past few years. He has also travelled extensively abroad in the interests of the Society and amateur radio at international levels.

QTC
Amateur radio news

Region 16 representative election

In the June 1981 issue of *Radio Communication* it was stated that Council would consider recommendations for the appointment of regional representatives in regions where vacancies still existed following the usual three-yearly elections.

In the case of Region 16, one recommendation and one nomination were received, not two nominations as was implied by the note in "QTC" in the October 1981 issue of *Radio Communication*. Both were acceptable to the Membership & Representation Committee and to Council as valid nominations.

Following the ensuing election a large number of votes which had been posted in good time for the closing date—by "recorded delivery"—did in fact arrive at RSGB HQ several days AFTER the closing date. The packet containing these had been found open and had been re-sealed by the Post Office. At that stage the process of announcing the results had commenced and therefore these could not be included in the published total of "spoilt votes". Nevertheless, the Society discussed the matter of closing dates with the Electoral Reform Society and it was decided that the original closing date as advertised must stand.

In these circumstances, Council confirms the appointment of Mr T. D. Howe, G3PLF, as representative of Region 16.

Representatives for Regions 3 and 12

Following the election to Council of Mr H. S. Pinchin, G3VPE, and Mr F. Hall, GM8BZX, the offices of representatives for Regions 3 and 12 are now vacant.

Any five corporate members resident in Region 3 (Hereford and Worcester, Shropshire, Staffordshire, Warwickshire, West Midlands), and any five corporate members resident in Region 12 (Grampian, Highland, Island Authorities, Tayside) may nominate any other qualified corporate member resident in their regions for the offices of representative for Regions 3 and 12 respectively. Each such nominator shall be debarred from nominating any other person to fill these vacancies.

All nominations must be made in writing and be delivered, together with the written consent of the nominee to accept office if elected, to: Mr D. A. Evans, G3OUF, General manager/secretary, RSGB, 35 Doughty Street, London WC1N 2AE, on or before Monday 26 April 1982.

In the event of more than one person being nominated for either of these vacancies, a ballot will be held, details of which will be published in the June 1982 issue of *Radio Communication*.

D. A. Evans, G3OUF
General manager/secretary

Executive vice-President 1982

Also at its meeting on 23 January, Council elected Mr Bob Barrett, GW8HEZ, as executive vice-President of the RSGB for 1982.

Mr Barrett was representative for Region 10 from 1975 until his election as zonal Council member from January 1980. He has been a member of the Membership & Representation Committee since 1980.

When did you join RSGB?—continued

The January 1982 *Radio Communication* "QTC" item with a similar heading to the above attracted what can only be described as a massive response. Many said that they were proud to be longstanding members of the RSGB, and wished our records to show their correct year of joining the Society. We thank all those who responded. If the month and year on your address label (just in front of your callsign or RS number) does not show your correct year of joining the Society, please send a photostat copy of your membership certificate to the general manager at RSGB HQ and our records will be amended.

When the Society transferred to computerized records five years ago many of the members at that time did not have their joining date recorded in the old manual system. Later this year the Society intends to introduce length of (continuous) service badges for members, and it is therefore essential that our records are as accurate as possible.

Morse tests

The Society has been informed that during November 1981 the cost of the morse test rose to £15. There are apparently no further plans to increase charges at the present time.

The G3PAO Memorial Lecture

The Verulam ARC has pleasure in announcing that the G3PAO memorial lecture this year will be given by Angus McKenzie, G3OSS. The subject will be the "Transmission and reception of speech". The meeting will be held on Tuesday 23 March 1982, at the Charles Morris Memorial Hall, Tyttenhanger Green, Tyttenhanger, Nr St Albans. The lecture will commence at 7.45pm. All visitors are welcome.

Further details can be obtained from Alan Gray, G4DJX; tel St Albans 54190.

Birmingham to AP82 by coach

Arrangements are being made for a coach to take visitors to the RSGB National Amateur Radio Exhibition at Alexandra Palace from Birmingham via Solihull on Saturday 17 April 1982. It will leave Birmingham University (A38) at 8am and go via Solihull to make a pick-up.

The cost will be £3 per person, and yls and xyls will be welcome. Bookings must be received by Mr J. K. Harvey, G4IVJ, 38 Bodenham Road, Birmingham B31 5DS, by 1 April. For more information send sae or telephone 021-477 7447.

Sutton & Cheam RS annual dinner/dance

The thirty-fourth annual dinner and dance of this society will take place at the Woodstock Hotel, Sutton, Surrey, on Saturday 27 March 1982. Tickets cost £8 and are available on application to Mr L. Sandell, G8XHB, 19 Mount Park, Carshalton, Surrey; tel 01-647 8399.

RTTY news bulletins

These are broadcast under the general callsign GB2ATG every Sunday according to the following schedule:

Local services on 144·600MHz

Time	Area	Transmitter
1130	Brighton	G8GEZ or G8BBI
1200	Manchester	G3LEQ
1230	Merseyside and North Wales	GW4IEQ
1230	London	G8GOJ or G8LWY
1330	Northern Ireland	GI8HXY or GI4AHP
1800	London	G4AFQ or G8LWY

Great Britain and Western Europe on 3,590kHz

Time	From	Transmitter
1200	Southern England	G3RED or G3OZF
1230	Northern England	G3VYV
1900	Southern England	G3RED or G3OZF

Overseas service on 14,090kHz

Time	Beamed to	Transmitter
0830	VK and ZL area via long path	G3RED or G3OZF
1600	Far East	G3RED or G3OZF
1800	USA	G3RED or G3OZF

NOW IN PAPERBACK

Radio Communication Handbook
(5th edn)

Volume 1 of the original 1976 hardback edition is now out of print. This paperback edition of Volumes 1 and 2 combined has been published to meet continuing demand from all over the world for this authoritative and comprehensive survey of amateur radio principles and practice.

808 pages; paperback; 248 by 184mm; 1982

(Volume 2 is still available in hardback)

Obtainable from
RSGB Publications (Sales)

Stolen equipment

From a car in Borehamwood on 17 December 1981: Trio TR7500 (144MHz fm), serial number 930031. Information to Borehamwood police or Mr D. Price, G8SZP.

From a car in NW London on 1 January 1982: Kenwood TR7500, serial number 750125, and microphone. Information to Mr P. Walker, GM8SNE, tel 0383 823906, or South Harrow police.

From a car in Birmingham: FT480R microprocessor-controlled 144MHz all-mode transceiver, serial number 1G.110911. Information to Birmingham police or Mr N. J. Thompson, tel 021-351 2632.

From a car in Chalfont St Peter on 28/29 January: Icom IC24G, serial number 01278. Information to D. W. Woodnutt, BRS47612, tel 02813 83299, or Gerrards Cross police.

UOSAT Technical Handbook and up-date

Some readers appear to have been confused by the item on this handbook in "QTC" (*Rad Com* January 1982) and did not understand that the reprint was a second printing of the original handbook, not a second edition. No circuit additions or extra pages were included, but the opportunity was taken to make minor corrections and additions arising from the on-going nature of the UOSAT project. Circuits of the video interface for the CCD camera are included in up-date No 1.

The handbook and the up-date are available from AMSAT-UK, Mr R. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ, at the following prices (revised following postage increases in February):

	UK	Europe	M East	USA	F East and Australia
Handbook	£1.35	£1.83	£2.23	£2.50	£2.60
Up-date No 1	£1.35	£1.83	£2.23	£2.50	£2.60

AMATEUR RADIO CONVENTION

9am-6pm Sunday 28 March 1982

Restaurant area of Plessey Co Ltd, Martin Road, West Leigh, Havant, Hampshire.

Talk-in on S22, (145·550) by G3WLE

This convention is being organized by Plessey West Leigh Radio Society, G3WLE, by kind permission and assistance of the Plessey Co Ltd and the site general manager.

Lectures

A series of six one-hour lectures dealing with a wide range of radio/electronics subjects, will start at 10am, with a break from 1200 to 2pm when bar and buffet facilities will be available.

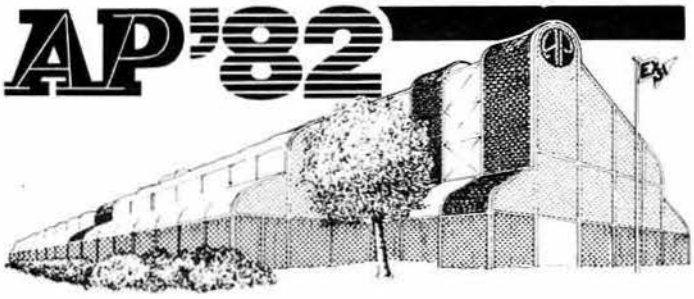
There will be an exhibition of Plessey communications equipment and a junk sale during the lunch break.

Seating for 250 **Ample car parking space**

Admission fee 30p, proceeds to RAIBC

The organizers would appreciate an indication from members wishing to attend, preferably in writing or by phone. This will assist with catering arrangements.

Further details from John Harwood, G3WLY, (ext 257), or Andy Blagg, G4JXL, (ext 232/409) both on Havant 486391.



Alexandra Palace 1982
15th-17th April
Special Offer to members only

This year's Alexandra Palace exhibition takes place on 15th-17th April 1982 at the new Alexandra Pavilion (it has been called "the largest tent in Europe," why not judge for yourself!). To make travel by train even easier, the Society has entered into a special arrangement with British Rail to bring you a package deal, which includes the rail journey from the station nearest your home to Wood Green (for Alexandra Palace), a bus connection from Wood Green to Alexandra Pavilion and admission to the exhibition–all included in the price. Since members don't have to leave to go home the same day, the opportunity exists to enjoy the exhibition and also stay overnight in London and enjoy that too.

The table given below shows the inclusive prices from your county, and all that is required is to complete the coupon and send it with your remittance to:
The Travel Manager, Kings Cross Station, London NW12RT.

Prices shown are return fares

	£		£		£
Avon	11.00	Lincolnshire	13.00	Yorkshire (West)	20.00
Bedfordshire	5.00	Manchester (Gtr)	20.00	Clwyd	21.00
Berkshire	4.00	Merseyside	20.00	Dyfed	23.00
Buckinghamshire	4.00	Norfolk	11.00	Glamorgan (Mid)	15.00
Cambridgeshire	5.00	Northamptonshire	6.00	Glamorgan (Sth)	15.00
Cheshire	18.00	Northumberland	35.00	Glamorgan (West)	19.00
Cleveland	27.00	Nottinghamshire	12.00	Gwent	13.00
Cornwall	25.00	Oxfordshire	5.00	Gwynedd	25.00
Cumbria	27.00	Shropshire	15.00	Powys	19.00
Derbyshire	12.00	Somerset	13.00	Scotland (Central)	35.00
Devon	20.00	Staffordshire	14.00	Dumfries Region	32.00
Dorset	13.00	Suffolk	6.00	Galloway Region	32.00
Durham	27.00	Surrey	4.00	Fife Region	38.00
Essex	4.00	Sussex	5.00	Highlands	45.00
Gloucestershire	11.00	Tyne & Wear	32.00	Grampian	42.00
Hampshire	7.00	Warwickshire	9.00	Tayside	38.00
Hereford/Worcester	11.00	West Midlands	12.00	Isle of Wight	9.00
Kent	5.00	Wiltshire	8.00	Hertfordshire	2.50
Lancashire	23.00	Yorkshire (Nth)	23.00	Greater London	2.50
Leicestershire	9.00	Yorkshire (Sth)	17.00	(Children half price)	

Ref: Alexandra Palace Amateur Radio Exhibition
15th-17th April 1982.

Name _____ C/S _____

Address _____

_____

Station travelling from/to _____

No. of tickets Adults ☐ Children ☐

Remittance enclosed £

The ferrite-cored balun transformer

by R. G. TITTERINGTON, G3ORY*

Introduction

The ferrite-cored balun has been around for a long time now. The definitive paper appeared in 1959 [1], and *QST* gave a useful coverage in 1964 [2]. Many UK amateurs will be familiar with the G3HZP design which appeared in 1967 and subsequently in [3]. This article presents some comparative measurements on these and more recent developments [4, 5, 6] and identifies some of the crucial factors in balun construction.

Principle of operation

The modern ferrite-cored balun uses two principles over different parts of its frequency range. At the low frequency end it behaves as an ordinary transformer using a suitable core material. At the high frequency end it behaves as a length of transmission line. This behaviour is illustrated by the results in Fig 1 which show how the performance of a conventionally-wound auto-transformer falls off at high frequencies, whereas a transmission line transformer deprived of its core magnetization behaves well at high frequencies.

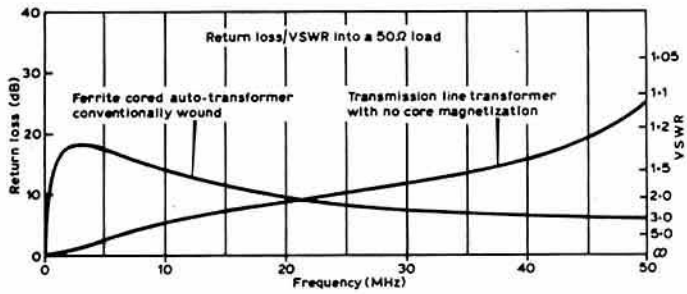


Fig 1. Illustration of the separate mechanisms in the broadband ferrite-cored balun

When these two separate mechanisms are combined in one transformer, wideband performance can be expected over a frequency ratio of as much as 200:1 or more. This makes the 20:1 required for the lowest seven amateur bands look quite modest.

Low frequency action

There are two winding configurations in frequent use; an auto-transformer and a two-winding type (Fig 2). For both types a toroidal core is normally chosen to give the highest achievable coupling between windings. This is desirable to keep the insertion loss of the finished transformer to an absolute minimum.

The choice of core material is, as ever, a compromise. High permeability cores require very few turns to produce a given inductance, and this keeps

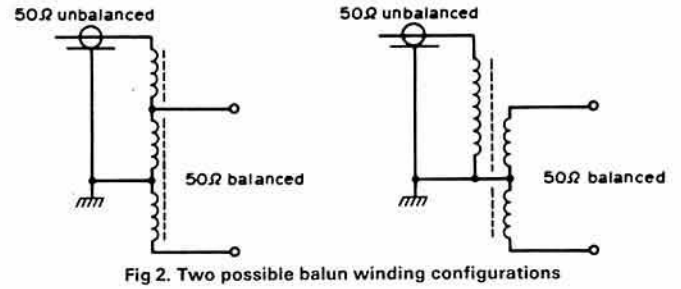


Fig 2. Two possible balun winding configurations

*"Elmwood", Church Farm Lane, Willoughby Waterleys, Leicester LE8 3UD.

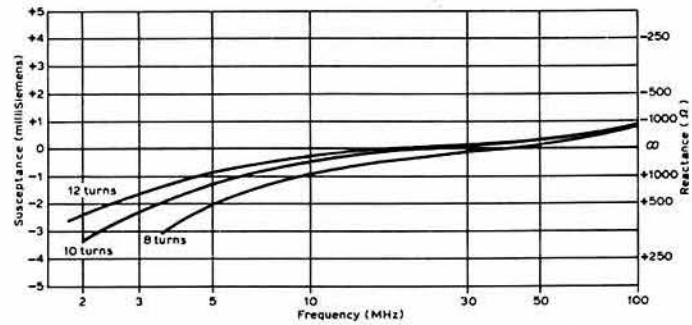


Fig 3. Curves showing the variation of susceptance/reactance of various coils wound on a pair of FX1588 toroidal cores

the electrical length of the windings down even at the hf end of the frequency range covered. This is important for effective "transmission line" action as will be seen later. Such high permeability cores have increasingly high losses associated with them as the frequency rises. Selection of a core suitable for the lower end of the frequency range only is needed (see Fig 1). The pair of stacked FX1588 cores used by G3HZP [3] is very suitable for amateur applications and has a performance very close to the Indiana General F-568-1 core of Q1 material used in many American designs.

Fig 3 gives a plot of susceptance against frequency for a pair of FX1588 cores with different windings. Parallel resonance of the winding inductance with the stray capacitance occurs when the susceptance reaches zero. The core is quite usable in this range until the net capacitive susceptance becomes high with the onset of series resonance of stray capacitance and leakage inductance.

The next question is just how many turns are actually necessary. Consider the low frequency equivalent circuit of a 1:1 transformer in Fig 4. If the design is reasonable R1 and R2 will be very much less than 50Ω, while Rc will be much greater than 50Ω. So the components of importance are the primary inductance Lp and the load resistance seen through the "ideal" transformer. This situation is illustrated in Fig 5. The current in the primary inductance serves to magnetize the core which is essential for transformer action to occur. If the primary has too few turns the magnetizing current Im will be excessive and will cause serious shunting of the load. Notice that Im and Il are in quadrature, and Figs 6 and 7 show how the shunting is not quite as serious as one might expect. Keeping the primary inductive reactance at five times the load resistance results in negligible current shunting.

However, there is one other aspect. It is not unreasonable to expect the finished balun to work over a limited range of load vswr—say up to 2:1. This can mean a load resistance as high as 100Ω, so a primary inductive reactance of the order of 400–500Ω is required. Referring to Fig 3, 12 turns on a pair of FX1588 cores will provide this order of inductance down to 1·8MHz. Fewer turns can be used if a low-end cut-off is required at a higher frequency. However, the bandwidth of the finished transformers is so large as to hardly make this worthwhile.

Tests

A word now about the tests that were carried out. Swept measurements were made using a spectrum analyser, tracking generator and reflection bridge. These enabled measurements of return loss to be made. Return loss is an alternative measurement to vswr. When a signal is reflected from a mismatched load, only a portion of the incident signal is reflected. The apparent loss of the reflected signal compared to the incident signal is called the return loss

$$\text{Return Loss} = 20 \log_{10} \frac{\text{(Incident signal voltage)}}{\text{(Reflected signal voltage)}}$$

If the load is a complete mismatch (∞:1 vswr) the reflected voltage equals the incident voltage and the return loss is 0dB. A return loss exceeding 20dB (< 1/10 of the incident voltage being reflected) represents a pretty good

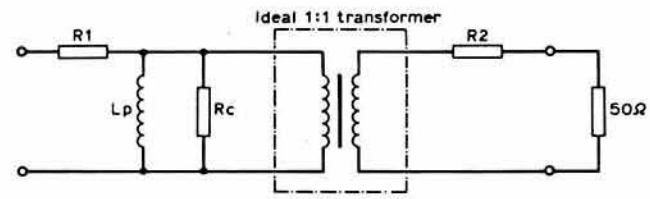


Fig 4. The low frequency equivalent circuit of a transformer. R1 is the series loss resistance of the primary; R2 is the series loss resistance of the secondary; Rc represents the core losses; and Lp is the inductance of the primary

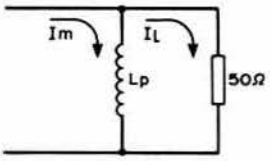


Fig 5. The shunt current path for Im produced by inadequate primary inductance

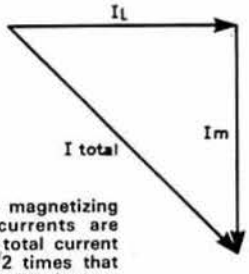


Fig 6. The magnetizing and load currents are equal. The total current drawn is √2 times that drawn by an ideal transformer

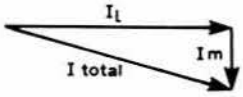


Fig 7. The magnetizing current is now one-fifth of the load current. The total current drawn is now only two per cent more than that drawn by an ideal transformer

Phasor diagrams Figs 6 and 7 illustrate the shunting effects of the magnetizing current

match by amateur standards, equivalent to a vswr of 1·22:1 or better. The graphs have their vertical axes marked in terms of both return loss and vswr for ease of reference.

The baluns tested were terminated in a balanced 50Ω load (visible in Photo 1). This was capacitively compensated at 50MHz, and represents a reasonably accurate load by amateur standards. The return loss/vswr seen from the unbalanced side of the transformer should be good over the desired frequency range.

A second test was to terminate the balun with, first, a 25Ω load, and, second, with a 100Ω load. Clearly, both of these should result in a vswr of 2:1 or a return loss of 9·6dB assuming zero transformer insertion loss.

Insertion loss was tested by connecting two identical transformers back to back to give UNBAL →BAL →UNBAL, and connecting the combination between the tracking generator and the spectrum analyser. Finally balance measurements were made by observing the variation of voltage at the centre tap on a 50Ω load.

Tests on a conventionally-wound balun

The first transformer tested was the G3HZP balun used by the author for many years on a variety of 1·8 and 3·5MHz dipoles. This is representative of the non-transmission line type of balun, using a bifilar winding technique with separate primary and secondary windings. This is apparent from Fig 8, which shows the vswr/return loss when the transformer feeds a load of 50Ω.

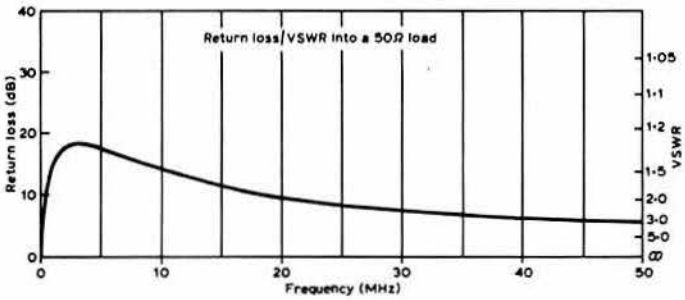


Fig 8. The G3HZP balun

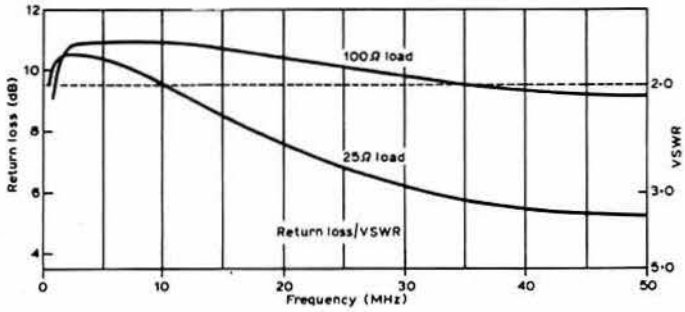


Fig 9. The G3HZP balun into a 2:1 load vswr

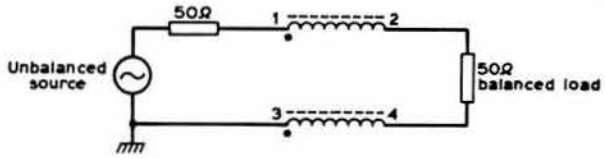


Fig 10. A simple transmission-line balun transformer

The low frequency performance is adequate up to about 10MHz, but progressively worsens at higher frequencies. Even more revealing is the result for 25Ω and 100Ω loads (Fig 9). The two results should be identical and equal to a return loss of 9·6dB plus twice the insertion loss. Below 7MHz the results are reasonable, but there is a growing disparity above this frequency. To be fair, the transformer tested had been optimized for use on the lower frequency bands by the use of 12 instead of 10 turns on each winding.

The transmission-line transformer

A simple type of balun transformer recommended by some beam antenna manufacturers consists of a dozen or so turns wound in the coaxial feeder and positioned close to the antenna feedpoint. This is a form of the transmission-line balun and is illustrated in Fig 10. Both ends of the load are isolated from earth by the reactance of the windings, and either end or the centre of the load may be earthed. Most of the stray capacitance will be absorbed into the characteristic impedance of the line, and it is this feature which greatly extends the hf performance. The equal and opposite currents flowing in the two "legs" of the transmission line cancel core flux and hence minimize core losses. This is useful because the core selected for good lf performance is likely to be very lossy at the hf end. The length of the transmission line used must be kept below λ/5 at the highest frequency [1, 7] otherwise the phase shift in the line section can cause partial cancellation of the output signal.

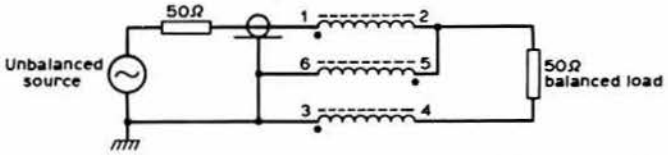


Fig 11. A transmission-line balun transformer with added "compensating" winding

The major problem with this type of balun is the provision of a core magnetizing current path to facilitate good low frequency action; [5] also shows the inferior balance performance of this simple arrangement. The solution is to provide a "compensating" winding which, at low frequencies, makes the transmission line arrangement of Fig 10 equivalent to the autotransformer arrangement of Fig 2. The circuit of a balun of this type is drawn in Fig 11, and the dot notation is used to denote the start of each winding. Great care must be taken to get the sense of the windings correct, as it is easy to get confused. Indeed, in one of the references quoted, a diagram appears of a balun with an incorrectly-connected compensating winding causing cancellation of the core flux at low frequencies.

The magnetizing current can now flow from terminals 1–2 then 5–6 in Fig 11. The balance of this circuit is also very good, and it represents the basic arrangement of the remaining baluns tested. For best results the characteristic impedance of the transmission line should be the same as the input/output impedance—in this case 50Ω; [8] shows that 22swg enamelled wire twisted to about one or two twists per centimetre has a characteristic impedance of around 50Ω.

Transmission-line balun tests

One of the first baluns tested consisted of a trifilar twisted winding of 1mm diameter wire on a pair of FX1588 cores. Six turns were wound because the series connection of two of the windings across the input allows the magnetizing current to flow through a total of 12 turns. This transformer was among the best tested, and is shown in Photo 2. Fig 12 shows the vswr/return loss into 50Ω, and Fig 13 the results with 25Ω and 100Ω loads. The vswr into a 50Ω load is at the limits of the accuracy of the load used over most of the frequency band. This represents very good performance, but the one limiting factor is the voltage rating of the tightly-twisted enamelled wire used. This raises serious doubts about the power rating of this transformer.

Before leaving the trifilar design, another experimental version was constructed using loosely-twisted 1·5mm stranded wire with thick pvc insulation. The results were most disappointing and emphasized the need

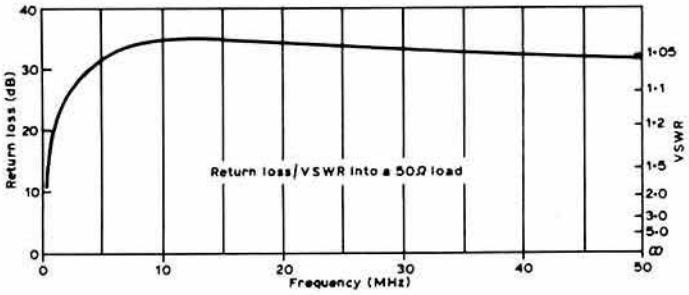


Fig 12. Balun wound with trifilar 1mm diameter wire

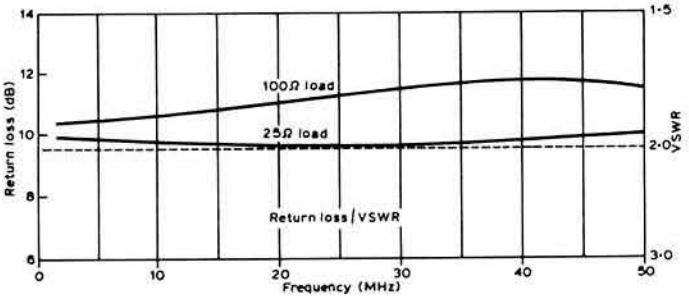


Fig 13. Trifilar wound balun into a 2:1 load vswr

for tight coupling between the trifilar windings to make them as nearly identical as possible and all subject to the same flux linkage.

Coaxial cable may be utilized for the transmission line used for windings 1–2 and 3–4 of Fig 11. This has the advantage of a much improved working voltage and a better guarantee of the characteristic impedance. The compensating winding is an additional piece of enamelled wire wound as shown in Fig 14. Results for this balun are shown in Figs 15 and 16. Balun A was wound with the compensating winding taped at intervals of about 4cm to the coaxial cable, while balun B was wound with the compensating winding and the coaxial cable fixed together with heat shrink sleeving to give the tightest possible coupling. Once again the importance of tight coupling between the windings is obvious from the results. Photo 1 shows two completed baluns of type B made with 1mm diameter compensating winding and UR76 and RG174 coaxial cables respectively. To wind the six turns required onto a pair of FX1588 cores, about 400mm of sleeved cable is needed. This assembly is shown at the top of Photo 1.

Swept measurements on the UR76 version of balun B show the insertion loss to be reasonably flat. Measurements on two baluns back to back using

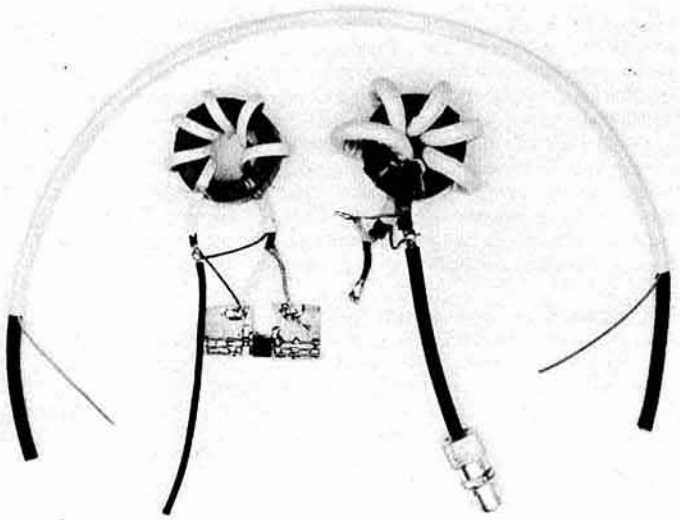


Photo 1. Completed baluns wound with a coaxial cable and compensating winding. The transformer on the left is wound with RG174 and is shown connected to the 50Ω balanced load. The right-hand transformer uses UR76, and both transformers use 1mm enamelled wire for the compensating winding. Around the edge of the photograph is a length of UR76 and 1mm enamelled wire fixed together with heat-shrink sleeving prior to winding

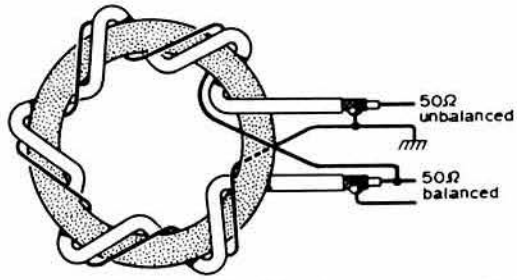


Fig 14. Balun wound with coaxial cable and a "compensating" winding

an rf millivoltmeter gave the loss as 0·15dB at 1·8MHz, rising to 0·2dB at 28MHz. With such low losses accurate measurements are not easy to make, but the low values obtained are most encouraging. Balance is also very good over the range 1·8–30MHz.

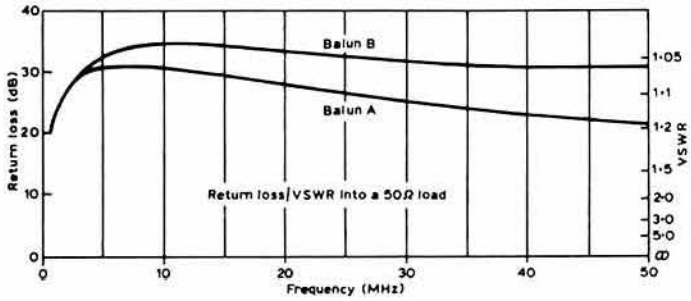


Fig 15. Performance of baluns wound with coaxial cable and a compensating winding

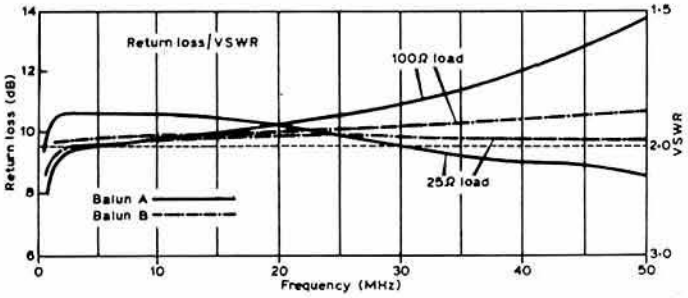


Fig 16. Baluns A and B into a 2:1 load vswr

"Super toroid" technique

T. A. O. Gross [9] first suggested an ingenious way of reducing the unwanted effects of self-capacitance in a toroidal core. This involves putting on half the winding, then crossing to the opposite side of the core adjacent to the start and continuing to wind with the same sense. Fig 17 shows this technique. It has the effect of keeping the two points with the greatest potential difference away from each other and hence reduces the current in the stray capacitance. References [5] and [6] discuss the application of this technique to balun construction.

Care must be taken not to get over-enthusiastic about this technique, since the transformers already described are capable of excellent performance over the hf band. The requirement for close coupling between windings

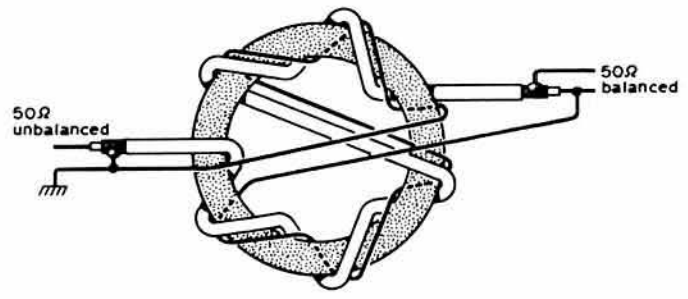


Fig 17. Balun wound using the "super toroid" technique

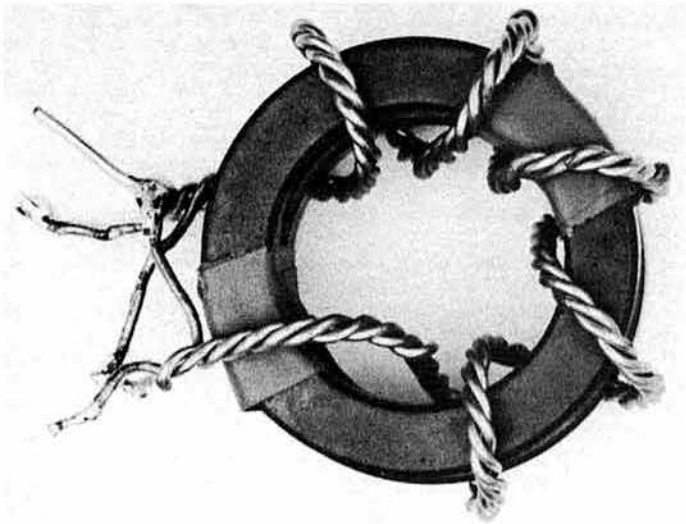


Photo 2. A trifilar-wound transformer utilizing three 1mm enamelled conductors on a pair of FX1588 cores

previously identified is paramount, and the inclusion of the compensating winding does nullify some of the advantage of Gross's technique. Tests were carried out on a balun of this type and the results appear in Figs 18 and 19. These show little difference from the conventionally wound baluns of Figs 14, 15 and 16.

Power handling

Tests were carried out on a pair of the type B transformers described above. The two identical transformers were connected in series between a transmitter and a dummy load, to give a 50Ω unbalanced–50Ω balanced–50Ω unbalanced sequence. Measurements were made of temperature rise and the level of the third-order intermodulation products with 400W p.e.p. applied. The temperature measurements were singularly unexciting, as a rise of less than 0·1°C was recorded for core and winding surface temperatures after 5min of continuous operation.

The effects on intermodulation were much more significant and reveal the greatest single disadvantage of the ferrite-cored balun transformer. At 28MHz the balun behaves as a true transmission line transformer, and Figs 20 and 21 show the output spectrum (10dB/div vertically and 1kHz/div horizontally) with and without the baluns in circuit. The differences are barely discernible and the third-order i.m.p. suppression is about 25dB in both cases. Figs 22 and 23 show the results of the same test carried out at

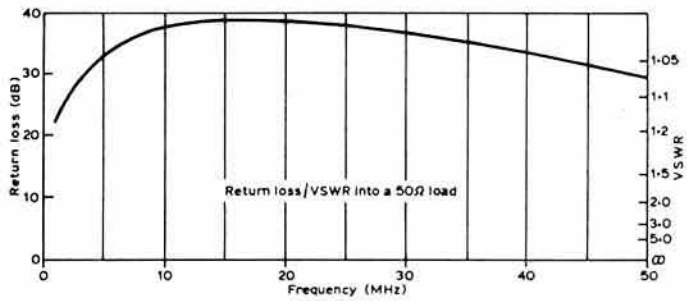


Fig 18. Performance of the balun wound using the "super toroid" technique

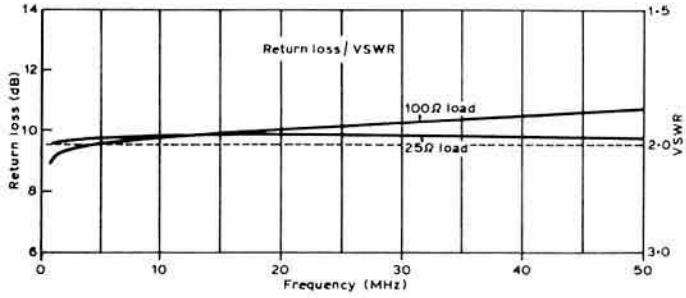


Fig 19. "Super toroid" balun into a 2:1 load vswr

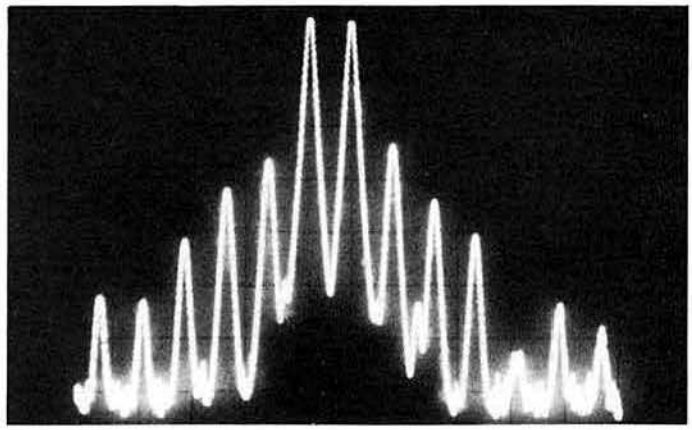


Fig 20. Intermodulation distortion produced at 28MHz 400W p.e.p. with baluns

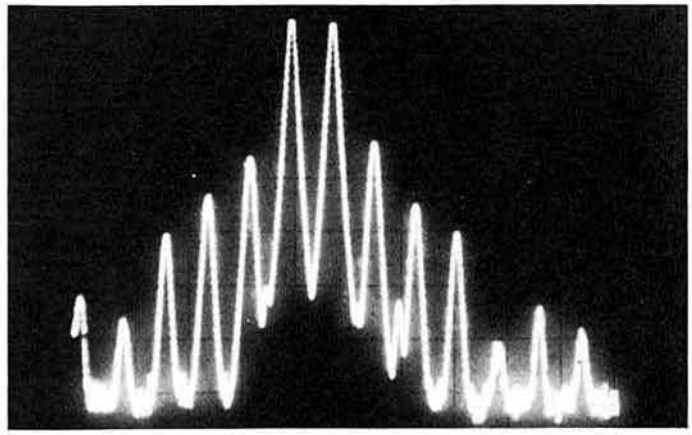


Fig 21. Intermodulation distortion produced at 28MHz 400W p.e.p. without baluns

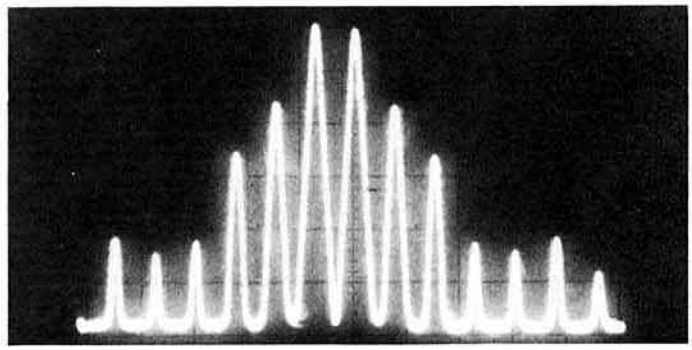


Fig 22. Intermodulation distortion produced at 3·5MHz 400W p.e.p. with baluns

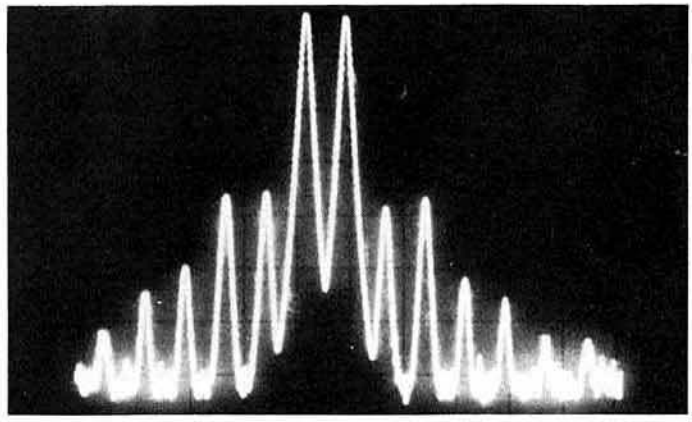


Fig 23. Intermodulation distortion produced at 3·5MHz 400W p.e.p. without baluns

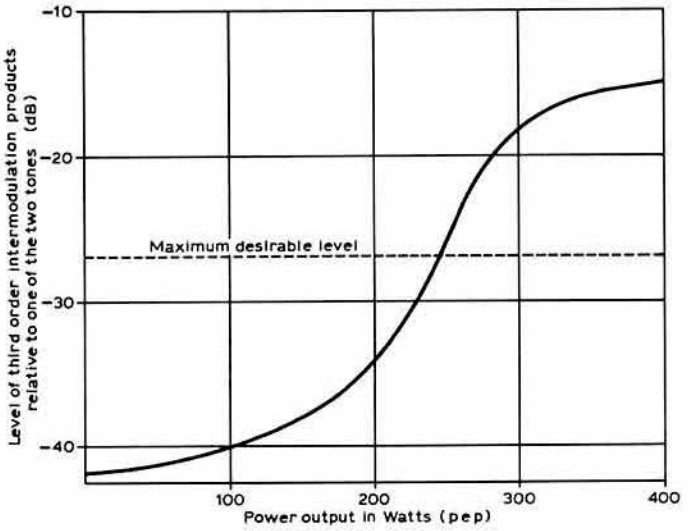


Fig 24. Graph of the level of third-order i.m.d. against p.e.p. output on 3·5MHz for two balun transformers of type B

3·5MHz and here the effect of the balun is quite dramatic. The third-order i.m.p. suppression worsens from −34dB to a mere 15dB. This behaviour is in line with the dominant action of the ferrite core at low frequencies and shows that unacceptable intermodulation distortion can occur even when the temperature rise is imperceptible.

Reducing the output level produced a more satisfactory state of affairs. The graph in Fig 24 shows how the level of third order imd varies with power transmitted through the balun. Remember that these results are for *two* transformers, and one alone could be expected to show an improvement of 3dB.

Finally, a word about encapsulation. This is necessary for weather protection, but remember that conducting surfaces close to the transformer will degrade the excellent performance obtained. Diecast boxes make good weatherproof enclosures when the lid joint is smeared with gasket goo, but choose one large enough to keep the transformer away from the walls. Photo 3 shows such an arrangement—note the use of plastic foam to keep the transformer clear of the walls. A more compact encapsulation would be possible using insulating materials. ABS boxes or plastic drainpipe seem good candidates here.

Conclusion

The tests carried out verified the excellent performance of the balun made with a length of coaxial cable and a "compensating" winding. The importance of closely-coupling all the windings, and the power handling limitations due to intermodulation were highlighted. Transformers of this type can give good performance across all the hf bands, and there is no need to optimize the design for any one group of bands.

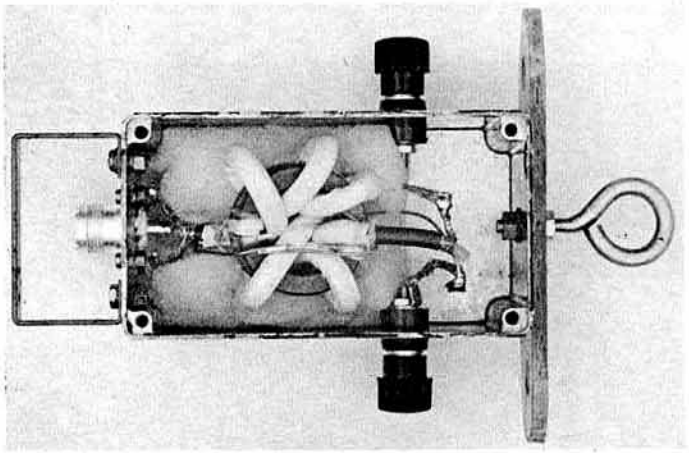


Photo 3. The completed "super toroid" balun encapsulated in a diecast box. Note the use of a suspension eye, an SRBP dipole wire terminating strip, and a support bracket to prevent the weight of the coaxial feeder being taken by the PL259 plug

References

[1] "Some broad-band transformers", C. L. Ruthroff. *Proc IRE,* Vol 47, Aug 1959, pp1337–42.
[2] "Broadband balun transformers", R. Turrin, W2IMU. *QST* Aug 1964, pp33–5.
[3] *Radio Communication Handbook*, 4th edn, page 13.30.
[4] "Simple and efficient broadband balun", J. R. Reisert, W1JR. *Ham Radio* Sep 1978, p12.
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[6] "A new class of coaxial line transformers", G. Badger, W6TC, *Ham Radio,* Feb 1980 pp12–8 (Part 1), Mar 1980 pp18–29 (Part 2).
[7] "Broadband matching transformers can handle many kilowatts", J. Sevick. *Electronics* 25 Nov 1976, pp123–8.
[8] "Designing toroidal transformers to optimize wideband performance", H. L. Krauss and C. W. Allen. *Electronics* 16 Aug 1973, pp113–6.
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A note on overvoltage protection

by LES MAY, G4HHS*

SOLIDSTATE TRANSCEIVERS designed for mobile use are commonly meant to operate from a supply of nominally 13·5V ± 10 per cent. The operating manual may specify a maximum voltage of perhaps 15V, and operating a transceiver at more than this maximum may result in damage—perhaps very expensive damage.

While building a low-voltage supply capable of giving 10 or 12A with good regulation presents its own problems, many units from which the common 10W transceiver is operated must have been built. Commercial units in this current class sell in the £20 plus price range.

Typically, low-voltage power packs operate by sampling the output voltage, comparing it with a reference voltage, and using the output to control a series transistor through which the entire current to the transceiver or other equipment must flow. The principle is shown in Fig 1. The device which compares Vref with a sample of Vo and in turn controls the pass transistor TR1, may be a purpose designed ic, an inexpensive op-amp like the 741 or, with some circuit changes, a low-power transistor like the BFY50 series may be pressed into service. The reference voltage may be derived "on chip" or from an external zener diode. For correct operation the voltage at the collector of TRL must be greater than the required output voltage.

Measurements on a widely-advertised commercial unit used by the author showed that the output voltage was 14·2V but the voltage at the collector of the series pass transistor was nearly 30V with no load. One does not need a very vivid imagination to appreciate the effects of a collector-emitter short-circuit putting the full unregulated supply across the power leads of the transceiver. The power supply in question claimed to be fully protected against overload, but when the lid came off it was clear that this meant only that it would current limit at about 4A. No attempt was made to protect against an overvoltage at the output.

When an overvoltage fault condition is detected the power supply must be instantaneously and automatically disconnected from whatever equipment it is powering if damage is to be prevented. A crude but very effective way of doing this is, in effect, to short-circuit the output to the power supply and thus blow a fuse in the supply line. For convenience the fuse should be able to carry slightly more current than that at which the supply limits, or if

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current limiting is not incorporated then it should be able to handle the maximum current normally drawn.

A simple method of doing this is shown in Fig 2(a). The diode D1 is a power zener capable of passing enough current to blow the fuse F1. It will conduct at a little above the regulated output voltage but at less than the maximum operating voltage of a transceiver or other equipment. Getting hold of a diode conducting at just the right voltage may be difficult, but the voltage may be increased by using the circuit in Fig 2(b). Diode D2 is an ordinary power diode, and when it conducts there is a voltage drop across it of about 0·6V which allows the effective firing voltage of the zener to be increased by this amount. In principle, more diodes may be added if required but note which way round each diode must be connected.

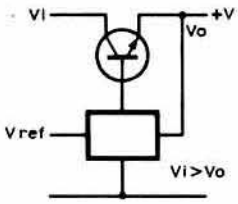

Fig 1. Illustration of the principle of overload protection

Power thyristors are easier to obtain than power zeners, and a "crowbar" overvoltage protection circuit using a thyristor is shown in Fig 3. The output voltage is sampled by the potential divider formed by R1, R2 and RV1. When the voltage at the wiper of RV1 exceeds the voltage at which D3 will conduct, current will flow through D3. The gate of SCR1 is now more positive than the cathode, and the thyristor is triggered. Excess current through F1 melts the fuse and effectively disconnects the supply from the transceiver. The wiper of RV1 is set so that at the normal operating voltage D3 does not conduct. Capacitor C2 takes a short time to charge after D3 starts to conduct, and hence helps to prevent triggering of transients. The value of C1 may need to be increased if the thyristor triggers when the supply or transceiver is switches on. A typical starting value is about 10μF. Layout is not critical and a suitable small piece of Veroboard can be used. An extra fuse in the lead between the power supply and the protection circuit is worth fitting, as some commercial power supplies do not have a fuse in the low-voltage part of the circuit but rely instead on the active protection of a current-limiting circuit.

Overvoltage protection may also be achieved using special ics such as the Motorola MC3423. The output of the power supply is sampled by this ic, and when it senses that the output voltage exceeds a preset level the output of the ic triggers a thyristor, causing the supply to short-circuit and a protective fuse to blow.

The basic circuit for using this device is shown in Fig 4. The trigger voltage is set by R1 and R2. It is of the form

$$V_{trig} \approx 2{\cdot}6\left(1+\frac{R1}{R2}\right)$$

The data sheet suggests that R2 should be less than 10kΩ, and in a practical circuit R1 would be replaced by a variable resistor.

As with the previous circuit, some protection against false triggering by transients which should not normally damage the load may be built into the circuit. The value of the capacitor C2 connected between the negative rail and pin 3 determines the minimum duration of an overvoltage condition which will trigger the protective thyristor. With the value given the delay is about 1ms.

Gate current for the thysistor is provided by the ic via pin 8. To prevent damage a gate current limiting resistor R3 is required. The minimum value is about 14Ω for a 12V supply, rising to about 80Ω for 35V supply. These

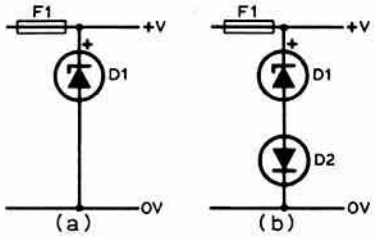

Fig 2. (a) A simple method of blowing the fuse in the supply line. (b) A modified version to achieve increased voltage. D1 is a high-power zener diode, and D2 is a silicon power rectifier (see text)

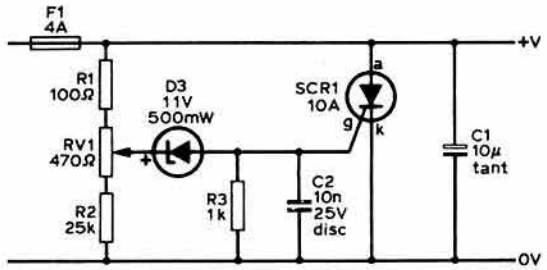

Fig 3. A "crowbar" overvoltage protection circuit. R1, 100Ω; R2, 3·5kΩ; R3, 1kΩ; RV1, 470Ω; C1, 10μF, tantalum preferred (see text); C2, 10nF disc 25V; SCR1, 10A thyristor; D3, 11V 500mW; F1, 4A. These values are suitable for a nominal 12V 3A supply

values may be increased provided that sufficient current can flow to reliably trigger the thyristor. A value of about 47Ω has been found to be satisfactory for a 12V supply. The value of R4 is determined by the trigger voltage. It may be calculated from

$$R4 \geqslant \frac{V_{trig}}{10mA}$$

Equivalents to the MC3423 may be obtained from RS Components and other suppliers, as may suitable thyristors. Surplus 5 and 10A thyristors are available from Birketts. A heatsink for the thyristor is not essential provided the circuit is properly fused, but note that the thyristor must be able to pass at least twice the current for which the fuse is rated if reliable operation is to be achieved. In practice a 10A thyristor has been found to be reliable with 4A fuses. As the fuse ruptures, a reverse voltage transient may appear across the thyristor. A suitable reverse polarity protection diode across the power leads to the transceiver may already be fitted, if not it is a useful addition in its own right.

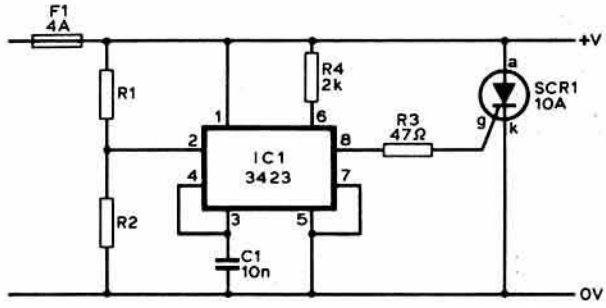

Fig 4. Overvoltage protection circuit using an ic. R1, 2 (see text); R3, 47Ω (see text); R4, 2,000Ω (see text); C1, 10nF (see text); SCR1, 10A thyristor; IC1, MC3423; F1,4A. Where a value is specified it is suitable for a nominal 12V 3A supply

When setting up the circuits in which the overvoltage level is variable it is advisable to replace the fuses with high current low voltage lamps or low current fuses. Access to a variable voltage power supply is helpful, but many homebuilt and commercial units have provision for varying the output and may be pressed into service. Note that in Fig 3 RV1 is set to minimum initially, while in Fig 4 if R1 is replaced with a variable resistor, RV1, then this should be set initially to maximum. With the transceiver disconnected and the voltage across the protection circuit adjusted to just below the maximum permissible voltage for the transceiver, RV1 is turned to the opposite end of its track while the output voltage across the crowbar thyristor is monitored with a voltmeter. At one point the voltage will fall to a low value and either the fuse will blow or the bulb will light. After switching off, the voltage should be reduced to the operating value. When it is switched on again the protection circuit should not operate. If it does it indicates that either the adjustment needs to be repeated more carefully or that the capacitors mentioned earlier need to be increased in value a little.

Either of the crowbar circuits can be added to an existing power supply in an hour or two. The economics of adding overvoltage protection are worth looking at. A typical 144MHz fm mobile transceiver costs £150 to £200 (double these figures for multimode or hf). A 12V 3A power supply can be built or bought for £15 to £20, say 10 per cent of the cost of the transceiver. Adding an overvoltage protection circuit will add about 10 per cent to the cost of the power supply or one per cent of the cost of the transceiver. It is worth it. □

Deviation displayed

by N. D. N. BELHAM, G2BKO*

THE UNIT TO BE DESCRIBED, which gives a display of negative and positive deviation from the centre frequency, was designed to operate from the i.f. of an fm receiver, but, with a suitable front-end it could equally well be used to monitor a transmitter. It consists of a discriminator working directly into a display unit, and can be battery operated. The MP5071 (or its equivalent, the MC3357) was chosen because this ic not only has a limiter and a discriminator but also contains a local oscillator and mixer—it has already been more fully described in [1]. The frequency of this local oscillator is determined by an external crystal or LC tuned circuit, so that most i.f. frequencies can be accommodated. Thus for an i.f. of 10·7MHz a crystal with a frequency of 10·245MHz is needed, as the discriminator is tuned to a centre frequency of 455kHz. The quadrature coil is an LMC4200A designed for a centre frequency of 455kHz. It is resonated to the i.f. by an internal capacitor; precise frequency setting is by an iron dust core. A 455kHz input would be applied through pin 5 directly to the limiter. Fig 1 shows the trial circuit. When a stable 455kHz oscillator was applied, the resulting voltage output at pin 9 is as shown in Fig 2.

It is clear that the "Q" of the LMC4200A is too high, giving poor linearity of the "S" curve versus deviation. The sensitivity can be reduced, and the linearity much improved, by shunting the LMC4200A with a resistor. Fig 2 also shows the result when this is done for a value of 15kΩ. If a suitable meter is coupled to pin 9, through an i.f. filter, steady state deviations are readily displayed, but of course the meter cannot respond fast enough to follow audio modulation. It is essential to preserve the dc coupling if the unmodulated carrier reading is to be retained so that frequency deviations can be distinguished. Negative and positive excursions of deviation can be obtained if a diode is included in the meter circuit, and the other meter terminal connected to an adjustable off-set voltage so that a zero reading can be obtained with the unmodulated carrier. Reversing the diode will allow the reverse deviation to be indicated.

Near peak deviations can be displayed if the meter is shunted by a capacitor in the microfarad range, provided that sufficient current is available to fully charge the capacitor while the peak deviation lasts. It was found that a fairly large output amplifier was needed. There is a further disadvantage in the meter display—the voltage delay before the diode is fully conducting. Fig 3 shows the circuit stage reached before the method was abandoned.

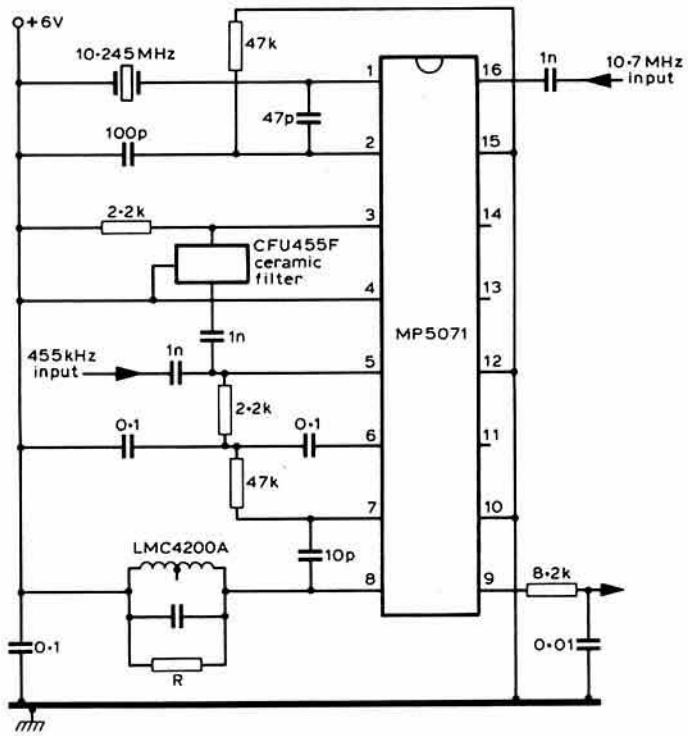

Fig 1. Trial circuit for the MP5071

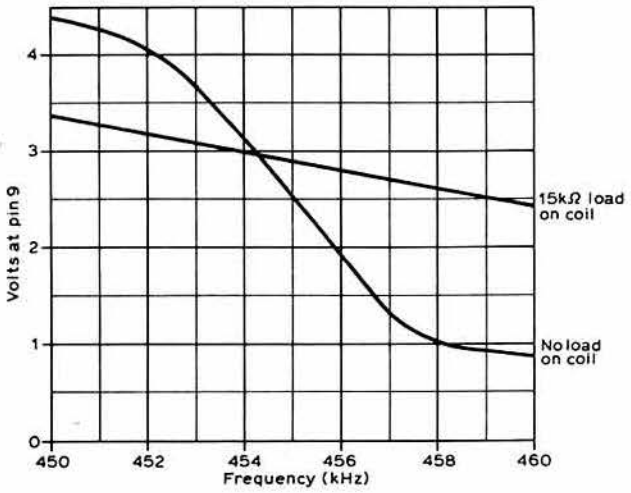

Fig 2. Discriminator response with 455kHz input

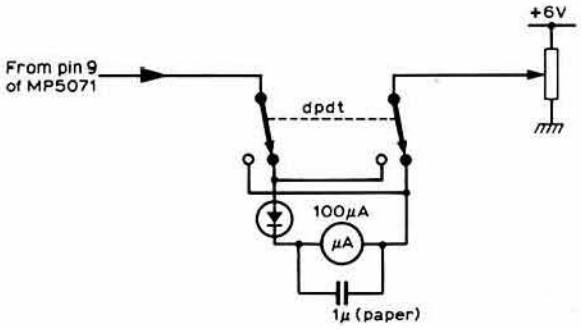

Fig 3. Peak meter circuit

A reconsideration of the practical use to which the deviation display unit might be put suggested that a line of l.e.ds might be adequate. The discrimination of such a display is limited by the fact that the driver ic (the LM3914) tends to switch from one l.e.d. to the next with little change in

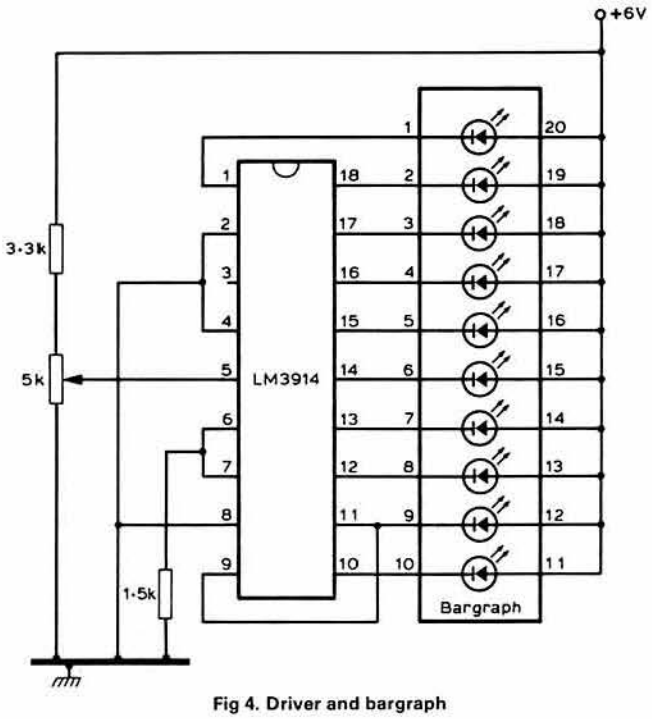

Fig 4. Driver and bargraph

*7 Binyon Close, Badsey, Evesham, Worcs WR11 5EY.

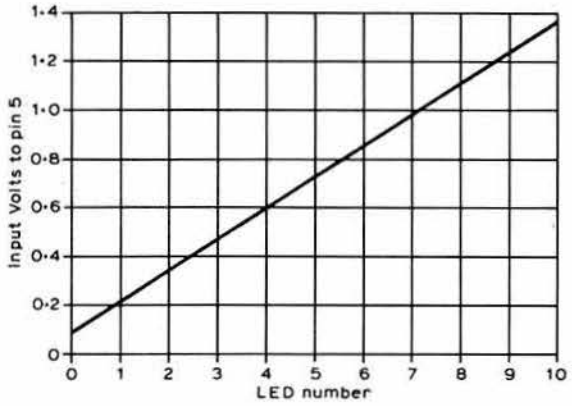

Fig 5. Driver and bargraph response

Components list

R1, 5	47kΩ	C1	100pF
R2, 3, 4	2·2kΩ	C2	47pF
R6	15kΩ	C3, 4, 6	1nF
R7	8.2kΩ	C5	220pF
R8	1kΩ	C7, 8, 10	0·1μF
RV1	470Ω sub-min preset	C9	10pF
RV2	4·7kΩ or to suit range required	C11	0·01μF
		L1	LMC4200A 455kHz quad coil (Ambit)
IC1	MP5071 or MC3357 (Ambit)	FL1	CFU455F
IC2	LM3914 (Maplin)		

20-dil 10-l.e.d. bargraph (Maplin)
Low-profile ic holder 20-pin dil (Ambit)
Low-profile ic holder 18-pin dil
Low-profile ic holder 16-pin dil

HC25U 10·245MHz crystal and holder if required

Note: All resistors are 0·33W, and all capacitors are miniature ceramic plate

brightness once an l.e.d. operates. If the unmodulated carrier is made to light the centre l.e.d. by means of an off-set voltage control, then both negative and positive deviations can be displayed apparently together, since the eye retains the impression for some twentieth of a second. While a line of standard full-size l.e.ds may be best for viewing on a shelf in the shack, the encapsulated bargraph, available in a 10-l.e.d. 20-pin dil package, is very convenient for a hand-held unit. Fig 4 shows the test circuit for an LM3914 connected to a bargraph.

The LM3914 10-l.e.d. driver contains 10 comparators, each controlling a single l.e.d.. The negative inputs of the comparators are connected in parallel, through a buffer stage, to the signal input at pin 5, but the positive inputs are connected to consecutive points on a potentiometer chain so that their bias voltages increase by equal steps. This means that as the signal voltage rises, one l.e.d. after another is switched on. Fig 5 shows the response curve. Pin 9, the mode pin, enables l.e.ds previously switched on to remain illuminated or switched off as required, thus giving a bar or dot display. For a bar display the voltage on pin 9 must be within 20mV of the supply, and for a dot display 200mV or more below that of the supply. However, if the voltage on pin 9 falls below the supply by 0·9V or more, then l.e.d. No 10 will be turned off.

The ends of the potentiometer chain are brought out to pins 6 and 4 so that the total voltage across the chain may be altered, thus altering the sensitivity. A further voltage may be introduced between the lower end of the chain and the negative of the supply, thus delaying the start of the action until a certain signal voltage has been reached. A suitable reference voltage is available from pin 7, giving a maximum of about 1·3V between pins 7 and 8. The total value of resistors between pins 7 and 8 determines the l.e.d. current and therefore the brightness. The LM3914 is therefore a very versatile ic.

Tests were then conducted to find out the conditions required for interface between the MP5071 and the LM3914. Fig 6 shows the initial test circuit. Looking back to Fig 2 it is clear that the output of the MC5071 varies by about 1V when the oscillator frequency changes from 450 to 460kHz, ie 455 ± 5kHz, and that an off-set voltage of 2·5V was required. The 470Ω preset and the 5kΩ variable easily enable this to be met. With a synthesized receiver, however, the i.f. frequency will vary more than this range because the receiver can only be tuned to the nearest 5kHz. Even repeaters working on multiples of 5kHz have been found to vary by a 1kHz or so, while stations working simplex can cause wide variations in the i.f.. Fortunately the off-set voltage control was found to be adequate to cope. In fact the unmodulated carrier could be set to illuminate the l.e.d. at one or other end of the scale, thus making full use of the linear range of the discriminator. The overall sensitivity was set at 1kHz per l.e.d., but it can be altered either by the 470Ω preset or the resistor in parallel with the discriminator tuned circuit (LMC4200A).

When the unit is supplied with a 10·7MHz signal at pin 16 and a 10·245MHz crystal inserted in the local oscillator circuit, the sum and difference frequencies, ie 20·945 and 0·455MHz, are created at pin 3 and the filter prevents the higher one from reaching the limiter at pin 5. This situation was imitated by feeding a 455kHz oscillator signal into pin 3 via a

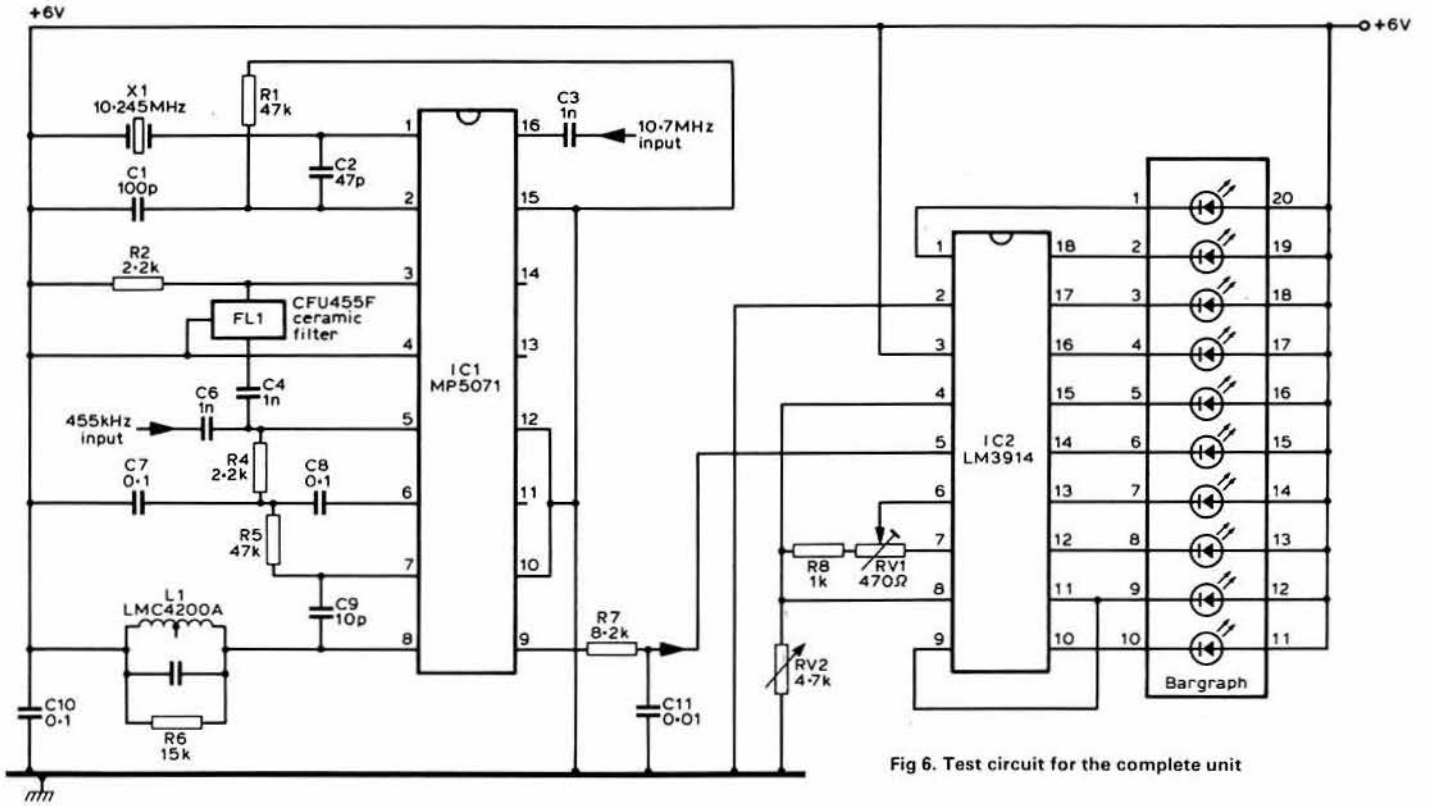

Fig 6. Test circuit for the complete unit

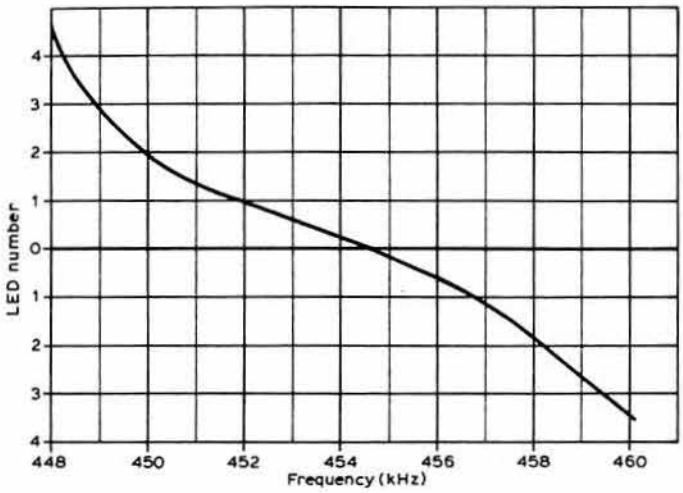

Fig 7. The effect of passing a 455kHz signal into pin 3, ie through the ceramic filter

1nF capacitor. The response is shown in Fig 7, and is far from linear. The trouble was traced to the ceramic filter, which was then removed and tested in the circuit shown in Fig 8. As the oscillator was tuned across the passband the waveform moved along the time-base over a distance equal to about $3\lambda/2$, ie a phase change of some 540° had been produced by the filter. The filter was then replaced by the simple RC filter shown in Fig 9, which also shows that the response had once more become linear. The RC filter reduces the 455kHz signal by about 6dB, but the 20·945MHz signal by much more.

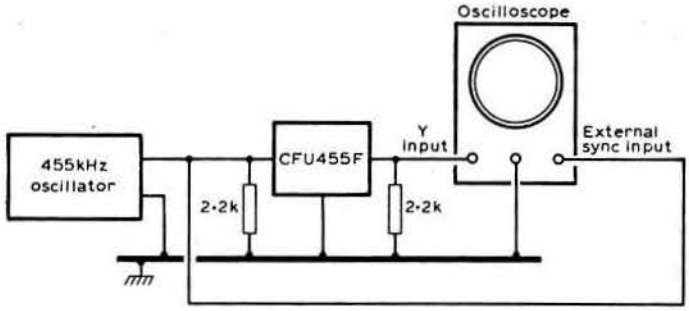

Fig. 8 Filter test circuit

Calibration is simplicity itself, as it can be carried out in steady-state conditions simply by reading the oscillator frequency on a dfm as each l.e.d. changes to the next when the oscillator is tuned across the band. When used with a 144MHz receiver the range of deviations viewed has to be seen to be

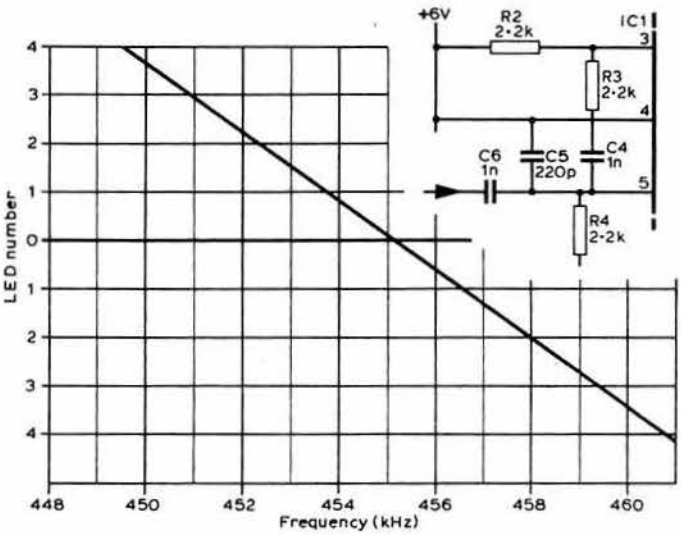

Fig. 9 Ceramic replaced by RC filter

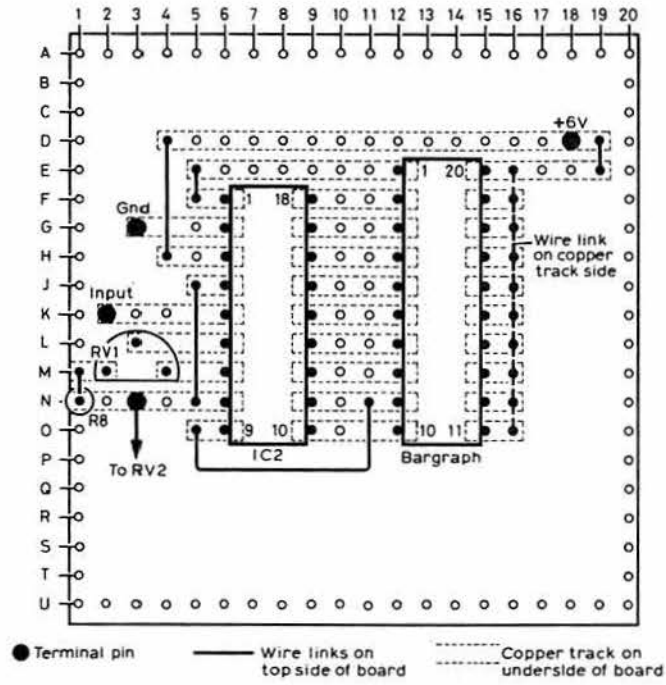

Fig 10. Display board layout

believed! The total current consumption from a 6V supply is about 24mA, and so can be supplied from a 9V battery of the PP6 type when used with a 6V zener and suitable series resistor. The peak voltage required at the 455kHz input is of the order of 100–200mV, while the data suggests that a 10·7MHz input at pin 16 need only be about 10μV.

Constructional details

The components were mounted on two pieces of Veroboard. A piece having a matrix of at least 20 × 20 holes was used to mount the bargraph display together with its LM3914 driver and associated components. The top and underside views of this board are given in Fig 10. A second piece having a matrix of at least 20 × 24 holes, with the copper strips along its length, was used to mount the discriminator, coil, crystal holder and other components. The top and underside views are shown in Fig 11.

For bench use the display panel was mounted on the underside of the lid of a metal box 6 by 4 by 2in, and the bargraph viewed through a rectangular window cut in the lid and fitted with a viewing hood. The off-set voltage control potentiometer and on-off switch were also mounted on the lid. The

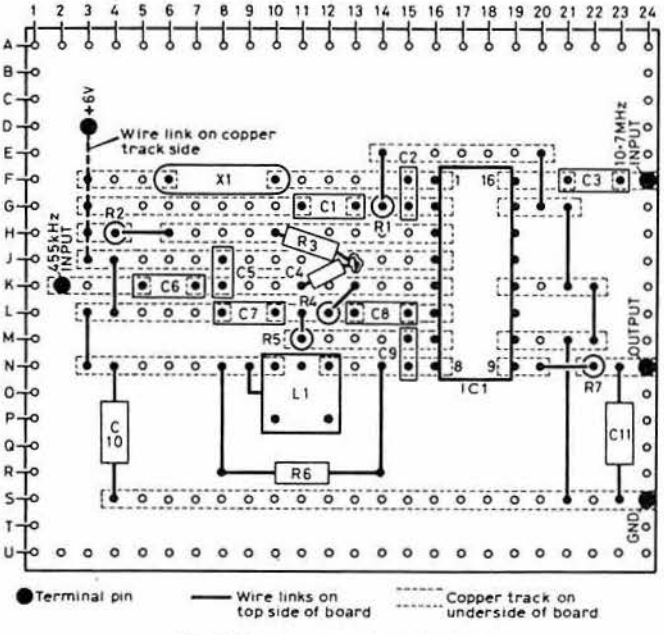

Fig 11. Discriminator board layout

second Veroboard was mounted on the bottom of the box, the two boards being connected by flying leads long enough to allow inspection. The PP6 battery was restrained by a wooden partition.

For shelf use it might be better to mount the display panel on one side of the box.

The sections of copper strip under the Veroboard not in use need, of course, to be disconnected from those that are in use. This is best done with the cutting tool designed for the purpose. Particular attention needs to be given to the mounting of the LMC4200A. No contact must be made with the pair of pins on the side remote from the three-pin side, and the centre pin of the three-pin side must also not make contact. These conditions are easily met by means of the cutting tool. The below board wire links are soldered to the copper strips they are meant to connect and isolated from all others.

Reference

[1] "A narrow-band fm receiver using a Motorola MC3357", I. J. Dilworth, G3WRT. *Rad Com* June/July 1980

Multiple hf parallel dipoles—some further thoughts

by E. SQUANCE, TD, BSc, PhD, GI4JTF*

THIS WORK came out of a requirement for multiband operation in a space where a conventional trap dipole had given poor results due to its low height (15ft/4·57m) and its proximity to buildings. A study of likely alternatives unearthed the idea of multiple parallel dipoles (1) + (2) for 7, 14 and 28MHz.

Initial tests using the formula $\frac{468}{f}$ to calculate the dipole elements' lengths gave very poor swr readings and resonances outside the amateur bands as determined by a Cambridge Kits noise bridge. A chance discussion on 7MHz with G3IYG made it clear that for a similar indoor system the elements had to be lengthened.

The Mk2 antenna had elements which were cut 2ft/61cm longer than the Mk1, and these were trimmed to resonance using a noise bridge and swr meter. From the resonant frequencies and dipole lengths the formulas shown in Table 1 were determined with the antenna at 35ft/10·7m. In passing it is interesting to note that at ground level the 7MHz dipole tuned 50kHz lower, the 14MHz dipole 100kHz lower, and the 28MHz dipole 325kHz lower.

The dimensions of the antenna appear to be the cause of the interaction, and the details are as follows. The wire used was multi-stranded 2mm copper wire spaced every 2ft/61cm by old felt-tip pen bodies cut and drilled as shown in Fig 1, which also shows the general construction.

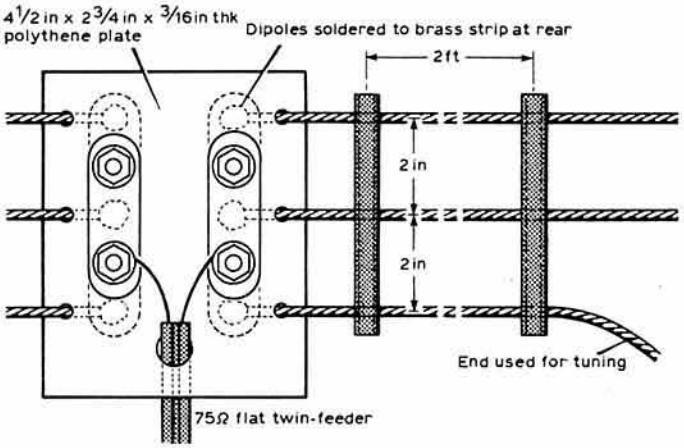

Fig 1. Arrangement of feeder and wires on base, and of spacers on wires

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Table 1

Resonant frequency (MHz)	Length of dipole (ft/m)	Revised formula
7·050	67·50/20·57	476/f
14·250	33·82/10·31	480/f
28·775	16·67/5·08	479/f mean value 478/f

For close spaced (2in/5cm) dipoles the formula was $\frac{478}{f}$ not $\frac{468}{f}$, ie an increase of two per cent in element lengths.

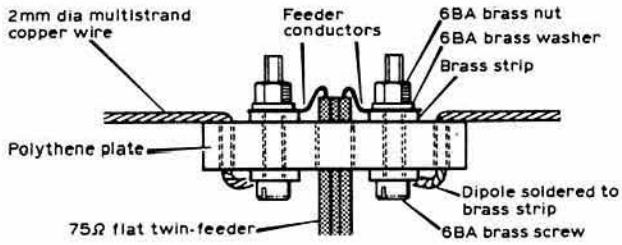

Fig 2. Exploded end-view of centre plate showing mechanical constructional details

For rigidity the wires were fed through the plate and soldered to 2·5 by 0·5in/6·3 by 1·27cm copper strips which were bolted to the plate. A second copper plate was placed on the back to prevent the nuts pulling through and against which to bolt the feeder. The feeder was passed through the plate from front to back to prevent it whipping in use. This can best be seen in Fig 2. The base plate was polyethylene 4·5 by 2·75 by 0·19in/11·4 by 6·9 by 0·5cm.

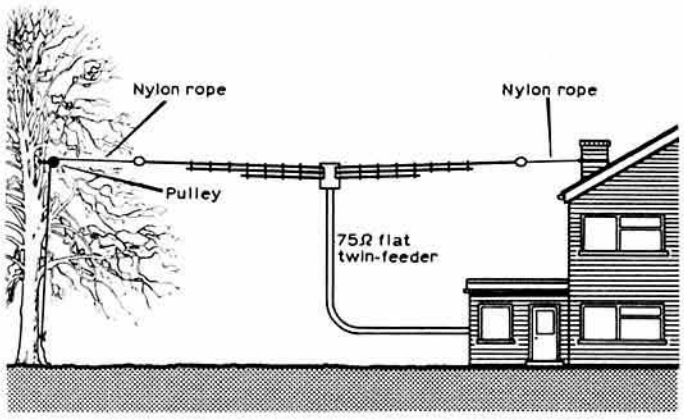

Fig 3. Position of antenna relative to house and shack

The whole assembly was liberally coated with marine varnish before being hoisted to its working height. The antenna was rigged as shown in Fig 3. Since December 1980, when the antenna was commissioned, JA, VKs, LUs, and HSs have been worked on 28MHz and 35 countries on 7MHz ssb. Although not mentioned in the data, the antenna performs well on 21MHz, with some 67 countries being worked without an atu, and an swr of 1·8:1 across the band.

Bibliography

[1] *Radio Communication Handbook* Vol 2, pp12.62, 12.63.
[2] "A multiband dipole for the hf bands", W. Farrar, G3ESP. *Radio Communication* June 1979, p527.

TECHNICAL TOPICS

Pat Hawker, G3VA

THE QUESTION to build or not to build continues to interest many amateurs and would-be amateurs. Most accept that the vast majority of non-professional constructors have virtually no hope of successfully cramming into a small enclosure the amount of electronic gubbins now provided in many of the factory-built black boxes. But some question whether all this digital circuitry—providing greater operating convenience but often adding little to basic communications performance—is really essential.

Homebrew enthusiasts all agree that home-construction should be encouraged. Some go further and claim that operating factory-built equipment is not experimental amateur radio at all. I feel this is taking the argument too far; my dividing line would be determined more by whether or not the operator understands how his equipment works and is genuinely interested in radio communication and propagation etc. After all, you can, for instance, be a genuinely keen amateur photographer without actually constructing your own camera; but one would expect such a person, unlike the chap who is interested only in taking a few holiday snaps, to come in the fullness of time to understand a good deal about the basic techniques and chemical processes of photography, be interested in its historical development and keep abreast of current trends.

Similarly amateur astronomers contribute to useful scientific studies without necessarily building their own telescopes. So it seems to me that while home-construction has a very important role to play in experimental radio—because practical projects are surely the very best way of learning to understand the technology—it is not the *only* mark of genuine amateur radio.

Straightforward ssb

Vic Goom, G4AMW, has backed his belief in the continuing attractions of home-construction to the extent of forming (with Phil Ciotti, G3XBZ) a small part-time company "Homebru Radio" to supply kits or pcbs for projects such as the *Practical Wireless* "Helford" hf ssb transceiver for which they were responsible. This is a 100W all-solidstate design which draws on Plessey (G4CLF) designs for the SL600/SL1600 devices: Fig 1. By restricting the basic design to 3·5 and 14MHz (but with the possibility of expanding this later to other bands) and using an Anzac MD108 double-balanced mixer, an XF9B or QC1246AX 9MHz ssb filter and the established TRW design for the broadband solidstate power amplifier, construction is kept reasonably simple but can result in equipment capable of good performance. My *personal* criticism would be that no account has been taken of modes other than ssb, and that there is always some risk in using rf power transistors without protection circuits.

Also thinking along similar lines, Peter Taylor, H44PT, in the Solomon Islands puts the point of view of someone in a remote developing country trying to interest local newcomers in the hobby. He writes:

"Low power cw is a great novelty and/or way of testing skills but is *not* the way to start . . . after a few days of crawling with milliwatts who could blame a newcomer for turning to real watts and a black box. But what of those who cannot afford the black boxes? As president of the Solomon Islands Radio Society I am faced with this problem when introducing the hobby to the indigenous population.

"Through Project Goodwill we have been provided with—and are very grateful for—several 14MHz direct-conversion receivers and vxo cw transmitter kits. These are relatively easy to build, and the receiver at least is a great success. But what chance has an inexperienced operator of surviving in a sought-after dx country when using 10wpm with 0·5W vxo cw on 14MHz!

"The answer is not simply a valve amplifier for such a rig. Most newcomers want to talk. English is the second or third language in very many parts of the world. To tell a newcomer here that he must first learn morse code is rather as though in the UK you were told that to communicate you must first learn Roviana (one of 97 languages spoken here!) and then convert this foreign-to-you language into a code of dits and dahs. No wonder to many it seems a black box or nothing!

"What is needed is a cheap talking box, whether the motivation is to say 'I built the rig myself' or simply because many cannot afford an imported factory-built rig of the present complexity (and incidentally many of these have a lower expectancy of 'switch on and it will work without servicing' than the simpler black boxes of 10 years ago).

"Amplitude modulation, nbfm, dsbsc, phasing-type ssb are all modes of interest but are today not really suitable for a newcomer to hf in our circumstances. Remember that so many articles on home-construction projects talk confidently of well-filled junk boxes—these simply do not exist for newcomers out here."

Peter Taylor in fact believes the most promising solution to be basically similar to that already advocated. He continues:

"My personal answer lies in high technology and mass production. The SL1600-series ssb transceiver module as available from Ambit at about £44 for a one-off or about £37 for 25 or more units can be made into a single-band hf ssb transceiver with the addition of only a stable oscillator (vxo?) and as many stages of linear amplification as we can afford or (possibly) put together from a junk box: either valve or solidstate. With a little thought, the rf section could be 'plug-in' so that additional bands could be added later without the complication of band-switching.

"A psu, microphone and headphones would also be needed. The SL1600 module is sufficiently like a block diagram to permit basic fault location to stage level without recourse to detailed circuit diagrams."

This type of approach has been reflected in several published designs, including a single-band model and the dual-band "Helford" model in *Practical Wireless*. There are some quite costly components such as the cabinet, power transistors, ferrite cores for broadband amplifiers etc, though I am told that the absence of transistor protection circuits has not led to problems.

Early days on 10·1MHz

The December 1981 *TT* suggested that the increasing complexity of hf and vhf transceivers, with their many digital techniques grafted on to essentially analogue designs, has meant that the vast majority of newcomers no longer regard home-construction as a valid way of getting on the air. It is usually only later that a relatively small number come to find that home-construction is still a rewarding approach to developing interests in, for example, low-power (QRP) operation, microwaves and the modes other than ssb and nbfm.

The opening of 10·1MHz for cw/rtty operation at the beginning of January provided a good opportunity of finding out the extent to which amateurs are still prepared to build or modify existing equipment. It was my observation that considerable numbers of British and West German amateurs were soon active on the band. The majority appeared to be using recent "9-band" models; a substantial number were using older transceivers that can be modified for 10·1MHz without any great difficulty—for example, by using the WWV facility on such models as the FT101 series as described in *TT* and *ART7*; and the Drake series are similarly easy to put on this band. Only a very few people were heard using the older models in which rather more drastic modifications are needed (a successful conversion of the old HW101 has been made by GW3SB and it is hoped to describe this shortly); very few were noted using fully home-built equipments, and even fewer using my own (temporary) solution of dragging out a long-discarded home-made transmitter, complete with 807 pa, and rejigging this for 10·1 to 10·15MHz. As Gerald Stacey, G3MCK, pointed out some months ago,

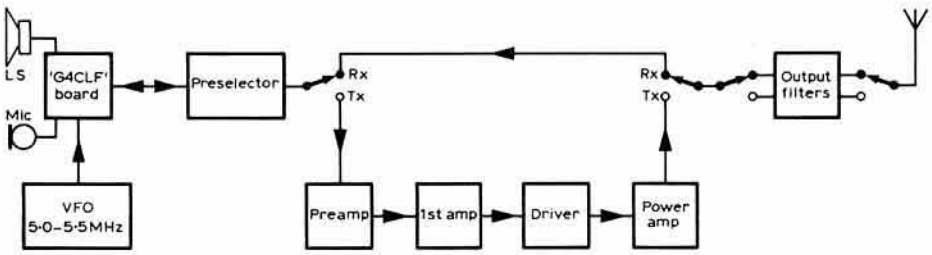

Fig 1. By using the Plessey SL1600 "G4CLF" board, the construction of a two-band 100W all-solidstate transceiver becomes relatively straightforward. This is the outline of the *Practical Wireless* "Helford" transceiver by G4AMW and G3XBZ of "Homebru Radio"

there is every reason to expect good results on this band even with the simplest transmitters, at least until it fills up with high-power stations using elaborate antenna arrays.

Some correspondents put the case for home-construction far more strongly than I would. S. M. Dyke, G3RDZ, for instance writes:

"As you noted in a recent *TT*, many modern transceivers made for the amateur bands cannot be modified, serviced or aligned in the average shack. This is true. However, it hardly matters. They are bought by those whose hobby is mainly operating radios, and this hobby is *not* amateur radio, which, by definition, is a hobby for those interested in *radio itself*. Perhaps it is time we admitted that operating is a separate hobby in its own right, and perhaps too close to cb radio for comfort!

"If amateur radio is to retain a separate identity, then the IARU should press for about 15 per cent of each band to be allocated for genuine amateur radio activities only: contacts in these sections would not qualify for awards, contests, dx nets etc, and operation of factory-made transmitters inside these sections should be banned. That would retain an *amateur radio* identity—though I suspect few will smilingly agree!" G3RDZ is another who believes that the answer to the current "kids" (keep it difficult, stupid) trend would be an ssb "kiss" rig without memories, flashing lights or frills but based on good diode ring mixers, common i.f. amplifier using linear ic devices (SL600 etc): "The most difficult section to make in the shack would be a stable hf vfo, but possibly something could be done with cheap cb synthesizer chips."

Receiver trends

In the November and December 1981 issues of *Ham Radio*, Ulrich L. Rohde, DJ2LR, looks ahead to receivers suitable for the year 2000AD, but in doing so takes readers on a journey round many of the current trends to be found in high-cost professional models, including the fabulous Rohde & Schwartz EKO70 which, with options, costs more than £10,000. He shows how, over the past decade, the dynamic range of solidstate hf receivers has been much improved by the use of better mixers and filters, noting the important point that dynamic selectivity is *not* at all the same thing as static selectivity. High-class frequency synthesizers now have greater spectral purity and in particular less phase-noise close to the carrier, and so reduce the amount of reciprocal mixing and permit better performance with up-conversion receivers having the first i.f. at vhf. But perhaps it needs to be emphasized more that the main advantage of up-conversion is that it allows general-coverage receivers to be made without gaps in coverage, although it also reduces the frequency range of the synthesizer in percentage terms and so makes it easier to design. Remember, up-conversion does have *disadvantages* for lower-cost receivers, particularly where the synthesizer may be deficient, and one still wonders whether this is an approach to be recommended for amateur-bands-only receivers.

DJ2LR is an internationally recognized advocate of the "ultimate" approach to receiver design, but he does admit that an amateur should take a cautious approach to some recent technology. He stresses, for instance, that the advances in digital technology and microprocessor design have been much faster than in rf-circuit design. He writes: "Microprocessors have become a national obsession, and a device not having a built-in microprocessor is not considered modern—a misleading notion. The microprocessor is nothing more than a device that can execute instructions sequentially at fast speed.

"Standard circuits with normal gate decoding do everything in parallel; for practical purposes there is no execution delay. As the microprocessor becomes overloaded, speed and flexibility are lost . . . the microprocessor is not always a necessity, and the trade-off between cost and speed introduces another hazard. Every microprocessor requires an internal clock. Sometimes those clocks are at frequencies that cannot be generated from the (receiver's) master standard and therefore additional frequencies occur, generating radio interference and spikes inside the receiver. It becomes a major task to shield and insulate one or more microprocessors and their switching noise from the outside."

Checking modern receivers

At the risk of appearing reactionary, it does need emphasizing that DJ2LR has touched on an inherent problem in introducing almost any form of digital techniques (even for frequency synthesizers) into hf and vhf receivers. Indeed also in *Ham Radio*, November and December 1981, George Cutsogeorge, W2VJN, of Princeton University, in presenting a design for an up-conversion receiver for the hf bands, warns that new technology does not always lead to better overall performance. It is worth quoting his introductory notes in some detail:

"After a 10-year hiatus of little amateur radio activity, my (Collins) S-line equipment started to look old when compared with the transceiver ads in the magazines. Surely, radios that looked this good must outperform my 20-year-old units. But which one to buy? With a well-equipped lab at my disposal, I decided to check-out some available units. The results, in my opinion, were disappointing. Except for third-order intermod performance, my old box full of tubes ran rings round the new solidstate units.

"One of the new units I checked-out had a strong front-end but lacked sensitivity, very poor agc characteristics, and produced a lot of hum and noise if an external audio filter wasn't used.

"Another unit had excellent sensitivity, adequate overload characteristics, and good agc; but synthesizer phase noise was excessive.

"A third unit had an excellent operating feel and sound for dxing and contesting but had a soft front-end.

"A fourth unit had a reputation for poor reliability and wasn't considered for testing . . .

"Digital reading and no-tuning (transmitter) features sold me on solidstate rigs, but I couldn't decide on which compromise to make. So I constructed this receiver as a breadboard project . . ."

Fair comment, though I still feel inclined to doubt whether digital readout is such a tremendous asset compared with bandedge and other calibration markers, at least for normal amateur operation. And broadband transmitter power amplifiers still seem to be unduly sensitive to small variations of swr; although these can be overcome with a good atu, that reintroduces the concept of tuning!

This point is underlined by Ian Davies, G3KZR, who writes:

"I deliberated for a long time when disposing of my old KW2000A, but had no option but to consider the Japanese brands that offered (at an increased price) the features I considered I needed. Eventually, I plumped for an all-solidstate model (FT107) in preference to a unit with a valve power amplifier, as I was mainly interested in having the flexibility of the all-low-voltage dc power supply.

"But one feature has proved to be little advantage in practice; that is, the so-called 'no-tune' band change. The protection circuits in the pa make the rig very sensitive to swr. Whereas, with the KW2000A, I could just tweak the pa load control as I moved across a band, I now have to have a Z-match as an *essential* addition (admittedly for all rigs it may be desirable). This negates some of the flexibility of the 12V dc facility for portable or mobile use since, with compromise antennas, I cannot travel as light as I had expected!"

A letter in *Grampian Repeater News* January 1982, from George Pople, GM4DKL, (who is in the trade) seems relevant to this discussion. He writes (in part): "I have been trying to interest manufacturers in producing a very basic transceiver with a first-class receiver but low transmitter output power and capable of being improved later with the addition of extra boards, linear amplifier etc.

"Many current rigs have lots of features which many users do not require but have to pay for and which seem invariably to be the cause of most of the faults that may develop in these units.

"Yet I find nobody agrees with me. Over the past year it is the sales of the £1,000-class hf rigs that have increased, with importers finding it increasingly difficult to sell the more-basic models. Similarly, on vhf, buyers are paying twice as much for multichannel models even if a six- or seven-channel equipment would give them all they are likely to require.

"I have found few people who do not seek the most expensive model their purse allows . . . why spend money for facilities you do not use (and which may be a source of reliability problems)?"

Vintage models?

Another comment on the December 1981 *TT* comes from Arthur Rumbelow, G3KKC, although (as noted below) his answer is not one that can readily be applied to newcomers' problems:

"Re *TT* December 1981. My reply to your (rhetorical) question, as to what equipment I am using and what was my last purchase, is 'G2DAF Mk2 transmitter and receiver and an ssb filter'.

"I agree that in recent years the hf transceiver has become increasingly complex. But there are features such as digital tuning, logic memories etc which, while they may make for operating convenience, add nothing to signal handling performance etc. I can sympathize with your remarks about complex new equipment and the increasing difficulty of interpreting makers' and retailers' promotional material in terms that relate meaningfully to operational performance. However, as far as hf reception is concerned I would advise any prospective purchaser to seize any opportunity of listening to a demonstration of the G2DAF Mk2 receiver (a home-construction all-valve project originally described in *Rad Com* many years ago). I wonder how many commercial receivers available today can equal, let alone beat its performance?

"Finally I have worked scores of Russian amateurs on 28MHz ssb, all using *home-made* transceivers. They put us to shame!"

Unfortunately the superb rf performance that was possible with the best

designs of the 1955-65 era (one must include such factory models as the Collins 75A4) is not going to solve the home-construction problem for today's newcomers. Those designs demanded high mechanical and electrical standards of construction, but perhaps more to the point is that if one were starting from scratch it would be very difficult and very expensive to locate the components for the G2DAF separate transmitter and receiver combination: high-grade metal cabinets, Eddystone 898 tuning mechanisms and dials etc. The solidstate digital revolution has ended an era of "vintage" valve designs that would no longer be economically viable to build, destined perhaps to become the Bentleys of the amateur bands!

Absorptive low-pass filters

Almost 14 years ago, two Collins Radio engineers, writing in *QST*, November 1968, introduced the concept of absorptive low-pass filters in which the unwanted high-frequency energy is separated from the wanted output and then safely dissipated in matched resistors. This technique was later endorsed by Hans Rohrbacher, DJ2NN in *CQ-DL* August 1976, and his design appears also in recent editions of *ART*. However, it has to be said that the vast majority of filters continue to be of orthodox design, in which the transmitter "sees" a high or low reactance at high frequencies and which assumes that the transmitter output impedance at these frequencies is similar to that at the operating frequency.

Recently Jan-Martin Noeding, LA8AK, in conjunction with LA1VC, has been checking whether in fact absorptive filtering does offer any substantial improvement. He has modified a Drake TV3300LP filter, using "worst case" components (ie ceramic rather than silver mica capacitors, and standard rather than non-inductive resistors), and has carefully checked the attenuation and input vswr (Figs 2-5). It can be argued that the output of a signal generator alone, unlike a transmitter, will (or should) have the same output impedance at all frequencies and therefore may tend to underestimate the advantage of the absorptive approach.

Nevertheless, he believes the results are very convincing. Insertion loss and passband vswr of the modified filter were found to be very similar to the original filter, and the minor differences may be accounted for by manufacturing tolerance; the input vswr over the stopband, however, was very different (Table 1). While the apparent fall-off attenuation of the unmodified filter may appear better, in practice this is likely to be lost due to the high input vswr. Although the filters show laboratory attenuation of over 80dB, it is probable that in practice 60dB may prove about the limit since the transmitter chassis will always contribute some radiation.

LA8AK considers it is important that the transmitter should not "see" notch filters connected in parallel with the signal, as in some earlier absorptive filter designs. While it is difficult to determine all potential "troublesome" parameters of an lp filter, since different transmitters will

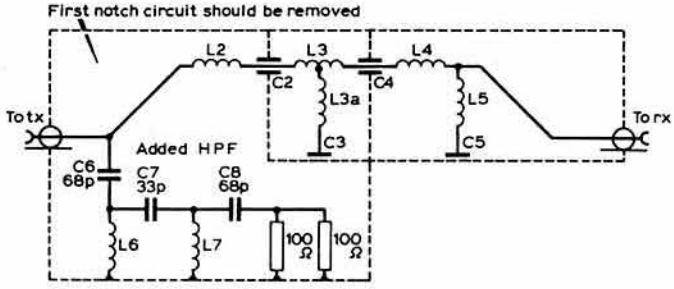

Fig 2. The Drake TV3300LP filter modified by LA8AK to form an absorptive or "hybrid" filter. The added hpf is based on calculations by LA6AK. L6 and L7 0·13μH (5t, 10mm id, 18 swg), C6 and C7 61pF calculated and 68pF used, C7 30pF calculated and 33pF used. 0·1dB ripple, 40MHz fc, 50Ω impedance Chebychev-type filter

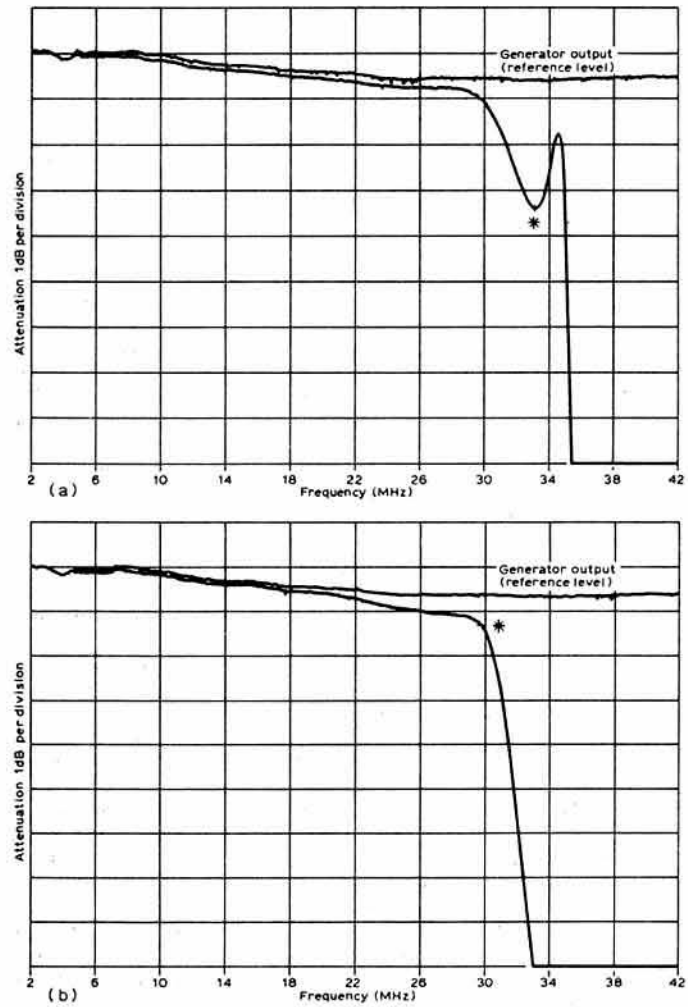

Fig 3. (a) Insertion loss of original (unmodified) filter over the passband 2-30MHz and between 30 and 42MHz *marker 33·16MHz — 14·4dBm. (b) Insertion loss of the modified filter *marker 29·72MHz — 12·32dBM

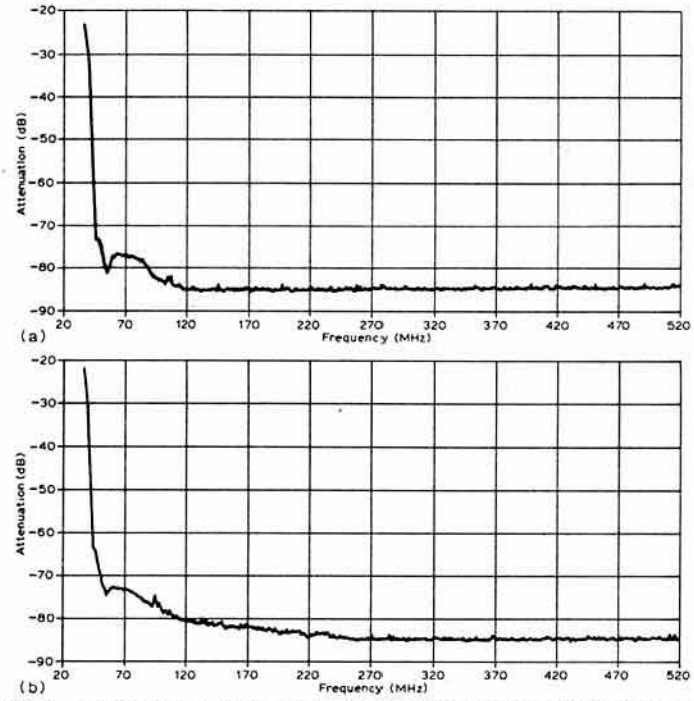

Fig 4. (a) Stop-band attenuation of the original filter. (b) Stop-band attenuation of the modified filter

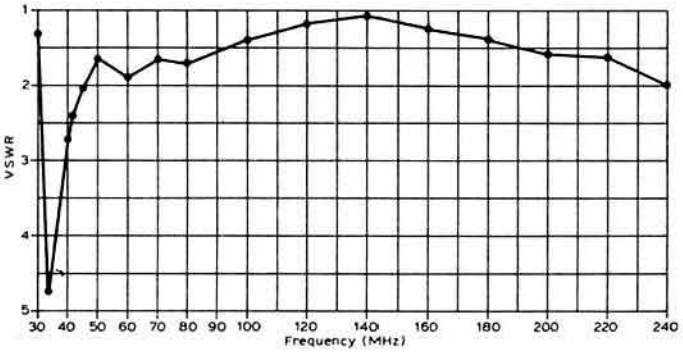

Fig 5. Input vswr of the "worst-case" modified filter over the range 30-240MHz

Table 1. Measurements on Drake TV-3300-LP low-pass filters

Freq (MHz)	Mod filter (LA8AK) Attenuation (dB)	Z (Ohms)	VSWR	Original filter Attenuation (dB)	Z (Ohms)	VSWR
1	0·02	52·4 −j2·7	1·07	0·02	52·7 −j2·3	1·07
2	0·02	51·4 −j4	1·09	0·02	51·8 −j3·3	1·07
3·5	0·09	46·4 −j5·8	1·13	0·04	46·9 −j4·5	1·09
7	0·08	42·4 −j2·7	1·19	0·02	43·5 −j0·4	1·14
10	0·00	42·5 +j2·9	1·19	0·00	44·7 +j6·5	1·19
14	0·08	50·2 +j6·0	1·12	0·05	55·6 +j9·6	1·23
21	0·14	46·8 −j6·0	1·13	0·06	50·9 −j6·5	1·14
28	0·6	35·2 −j4·8	1·45	0·2	49 +j3·3	1·07
30	0·9	40·2 −j6·5	1·3	0·4	76·2 +j0·5	1·52
34		10·6 +j9·1	4·7			
41	60	40·1 +j44	2·67	75	0·51 +j15	105
42	74	46·7 +j44	2·42	105	0·64 +j19	91
45	64	59 +j39	2·06	74	0·7 +j31	96
50	75	67·8 +j32	1·66	75	0·62 +j54	>100
60	74	86·8 +j20	1·9	76	1·5 +j117	>100
70		90 −j11	1·65			
80	80	70·4 −j24	1·7	79	0·7 −j790	>100
100	86	46·7 −j17	1·4	86	2·1 −j120	>100
120		47·2 −j7	1·2		0·3 −j62	>100
140		52·5 −j4	1·1		<0·1 −j36	>100
160		56 −j10	1·25		<0·1 −j19	>100
180		49·7 −j17	1·4		0·3 −j6	>100
200		36·5 −j17	1·6		0·6 +j5	82
220		29·4 −j12	1.65		0·7 +j16	75
240		24·5 −j3·5	2		0·7 +j30	94
260		22·6 +j6	2·25		1·0 +j46	90
280		23·3 +j17	2·4		2·7 +j71	57
300		27 +j29	2·64		7·0 +j114	36

Measured by LA1VC (TTR-Teledirektoratet/Oslo). Attenuation measured by spectrum analyser, impedance by vector analyser (Rohde & Schwartz).

be affected differently, LA8AK is convinced that the most important is the vswr on the cable between filter and transmitter. It is also critical that this cable should be short, as cable resonances (which may short-circuit the output) will introduce problems—and indeed such techniques are often used to *increase* harmonic output of doublers, triplers etc. In other words, the absorptive (or "hybrid") filter is a very desirable beast.

Permeability of toroids

G. Sims, G4GNQ, has been experimenting with the use of iron-powder toroids in filters, and has come to the conclusion that constructors cannot always depend solely upon manufacturers' data in respect of the permeability of the cores. He believes that the manufacturing tolerances for each mix are wide enough to need to be taken into account. He advises making a test winding before launching into constructional projects. He writes:

"I built an m-derived filter for use on 3·5MHz with poles of attenuation located at the second and third harmonic frequencies. The core used was the T68·2 and I calculated I would need 21 or 20 turns. However, test results showed the second harmonic pole of attenuation was 6·3MHz and the third harmonic at 12·5MHz. I corrected the second harmonic pole by reducing the number of turns to 19, and the third harmonic by adding capacitance to the notch. A second similar filter was then constructed for 7MHz with even more disconcerting results: the half-power point appeared at 6·5MHz, and the second harmonic pole at 12·5MHz—I am still trying to correct this filter.

"Data supplied for the T68·2 cores gives a K of 5·7. With L equal to K times the number of turns squared this should give 2·280μH with 20 turns; actual inductance is 2·4μH with 19 turns (for which the calculated value is 2·05μH). While the end result has been a 3·5MHz filter with a 55dB stopband having poles of attenuation of 80dB, the time spent correcting and reworking the values, believing my calculations must be wrong, has almost succeeded in putting me off filter construction for good! I have now adopted the practice of making up a 10-turn winding; putting it across a known capacitance; measuring the resonant frequency, and hence inductance; and then calculating the true K of my toroid."

Vmos nicad charger

For many years, *ART* has included some notes on what are called "constant-current diodes" formed, in effect, by using a field-effect transistor with the gate and source tied together and chosen for low pinch-off and high breakdown voltage characteristics. Practical use of a fet as a constant-current diode or current regulator can include the arrangements shown in Fig 6 to improve a zener-diode voltage regulator where one wants to run a voltage-sensitive device that offers a fairly constant load. W9IZN (*QST* February 1972) showed that this technique is well suited for running stable oscillators from battery sources.

The same basic idea has been used by A. C. Dickens (*Wireless World* February 1982, p42) but with a vmos power fet as the basis of a simple constant current battery charger for nicad batteries: Fig 7. By varying the

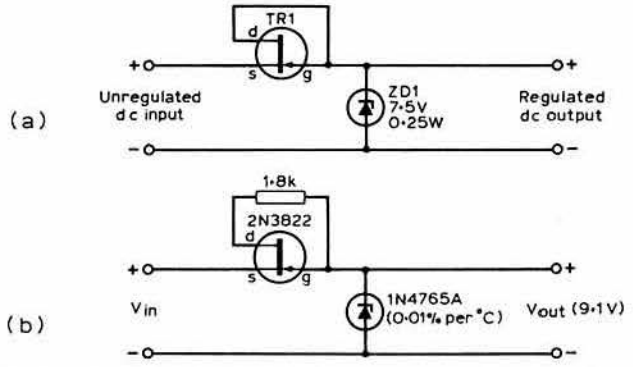

Fig 6. Use of constant-current fet to improve voltage stabilization of a zener diode where a fairly consistent load is drawn as described in *Amateur Radio Techniques*. In (a) TR1 can be MPF102 or similar

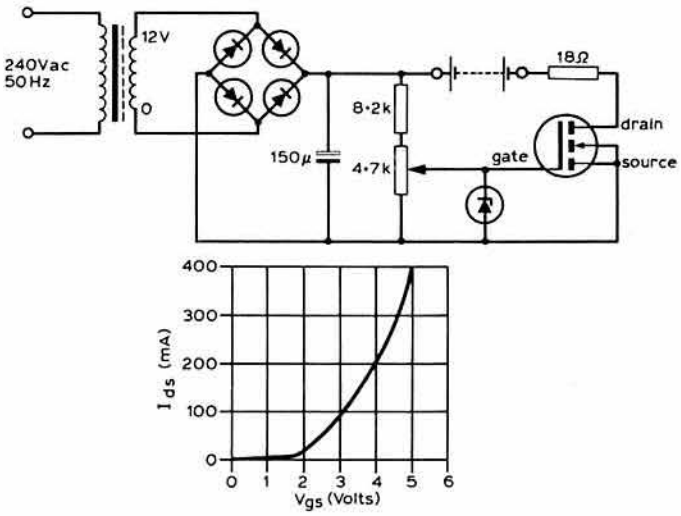

Fig 7. Adjustable constant-current nicad battery charger using vmos device as described in *Wireless World*

gate-to-source voltage by means of a 4·7kΩ potentiometer, the source-to-drain current can be set anywhere from 0 to 100mA. The diode shown in the diagram between drain and source is the integral protective zener diode in the VK10KM device. Circuit parameters are not critical, but the supply potential needs to be several volts higher than the maximum voltage of the battery to be charged.

Battery charging

Another survey article on nicads ("Those nicad batteries and how to charge them" by David W. Potter, W2GZD, in *QST*, October, pp34–5) again brings out the essential difference between the standard charging rate (0·1C where C is the milliampere hour capacity of the cell) and rapid charging (eg 0·5C). For standard charging you need little more than a simple constant-current battery charger, such as the arrangement shown in Fig 8. Rapid charging needs some form of sensing and automatic shut-down or current reduction technique—or alternatively a timer that takes into account the total charge delivered to the cell (cells should be fully discharged first if using a timing technique). W2GZD describes a relatively simple constant current charger with automatic shut-down using an LM339 voltage comparator, but unless absolutely essential it is probably safer to use 0·1C charging.

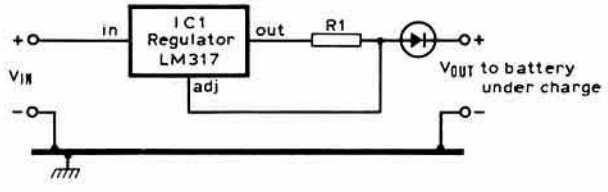

Fig 8. Simple constant-current battery charger suitable for charging nicad cells at the 0·1C rate. Series diode (to prevent discharge) can be 1A 50prv silicon type. Input dc potential should be at least 5 to 6V higher than desired maximum output voltage, and may be considerably greater. Charging current is approximately 1,200/R1 where for, say, 250mAh battery the current is set for 25mA charging rate)

An odd, but useful, tip stems from ZL2KU in *Break-in* and reminds me of the time when, as a young boy, I tried to make a "crystal" set using just a potato, knife and fork and coil of wire (as described in some magazine or other; mine did not work but I suspect that if I had used a proper antenna the potato would in fact have demodulated the signal!). ZL2KU writes:

"If you've removed the battery from your car and are not sure which terminal is which, connect wires and push the ends into half a potato. A blue or purplish colour will appear on the potato in the vicinity of the wire from the positive lead." ZL2KU tried it out and found that a current of about 4mA passed through the potato; after about 5min a definite pale blue colouring appeared around the positive lead.

24A power supply

Although it may seem that there has been a plethora of designs in *TT* for 12V power supplies, there is a valid reason why this subject still attracts attention: a high-current psu can be built from scratch for a third to a half of the cost of a factory-made unit without the problems of rf circuitry (though "sensible" construction is still necessary).

M. J. Grierson, G3TSO, has studied many of the ideas put forward previously and has adapted a number of them, but feels his final circuit will be of interest to others: Fig 9. He also provides a number of useful constructional hints, as follows:

"The transformer T1 was obtained from Davtrend and is as used in the DRAE 24A psu at a price of £25. An alternative smaller transformer that has since appeared is the ILP torroidal 7X013 with two 15V, 10A windings. C1, 2 and 3 were computer type 20,000μF at 40V. Only two are needed with the DRAE transformer, but three may be more suitable with the 15V ILP transformer.

"All pass transistors are earthed for ease of construction and heatsinking, and it is the *TT* circuit of May 1980 upside down. The 741 has proved itself over many years as a reliable comparator. Stabilization of this unit is five per cent from 0 to 20A.

"The 12V relay is used as a slow-down and anti-surge precaution during switch-on. Also Rx connected between pin 3 on the 741 and earth slows down the appearance of the output voltage. If this delay (1s) is not desired, connect between pin 3 and the 20V negative rail.

"Two 2N3771 pass transistors are adequate for ssb work but four 2N3055s would give better heat dissipation for continuous output. Large finned heatsinks are used on the pass transistors, and the rectifier blocks should be bolted to the chassis. The decoupling capacitors have been found essential to cure instability and prevent rfi.

"My unit powers an FT707 and cost one-third of the price of the commercial psu for this rig. Using the ILP toroidal transformer, a psu could be made of similar size to many of the commercial models. An overvoltage "crowbar" would be advantageous but would require a large scr."

Keys and keying

I suppose it is possible to develop a special regard for a particular microphone; indeed I seem to recall that in the heyday of a.m. the crystal-diaphragm D104 was held in high esteem by many amateurs. But certainly this cannot approach the way in which a favourite morse key becomes a treasured possession.

Recently there has been a revival of interest in the old brass, large-knob keys used by the British Post Office in the days before the development of the teleprinter. I notice that an Australian firm is claiming to have sold over 600 replicas of the BPO type 610 key, claiming "there has never been a better designed morse code key—solid, robust and beautifully balanced".

Personally I would place my money on the even older "double-current" keys: I would hate to be without my "Griffin, London No 423, Mk 3, 1914" key, with gleaming brasswork and large black knob, that is both aesthetically pleasing and a pleasure to use. And though I have had some nasty shocks due to the bad practice of keying at rather high voltage, at least such keys never play up due to rfi!

For those interested in the apparatus of early telegraphy and telephony there is some good news. In the 'sixties the Post Office had a very good display of such equipment in a building off Farringdon Street, but this "museum" closed its doors more than 10 years ago. The collection, however, was not broken up, and British Telecom is busy setting it up anew in Baynard House in the City of London where it will be opened to the public early this year. There are already BT displays of old apparatus at Norwich, Oxford and Taunton.

The old "pump-handle" straight key possesses the desirable characteristic of being, to use the modern jargon, "fully adaptive" in the sense that an operator can adapt his speed of sending to circuit conditions and even to a particularly significant word. For almost all other keys (except the side-swiper) a large change of speed involves some adjustment.

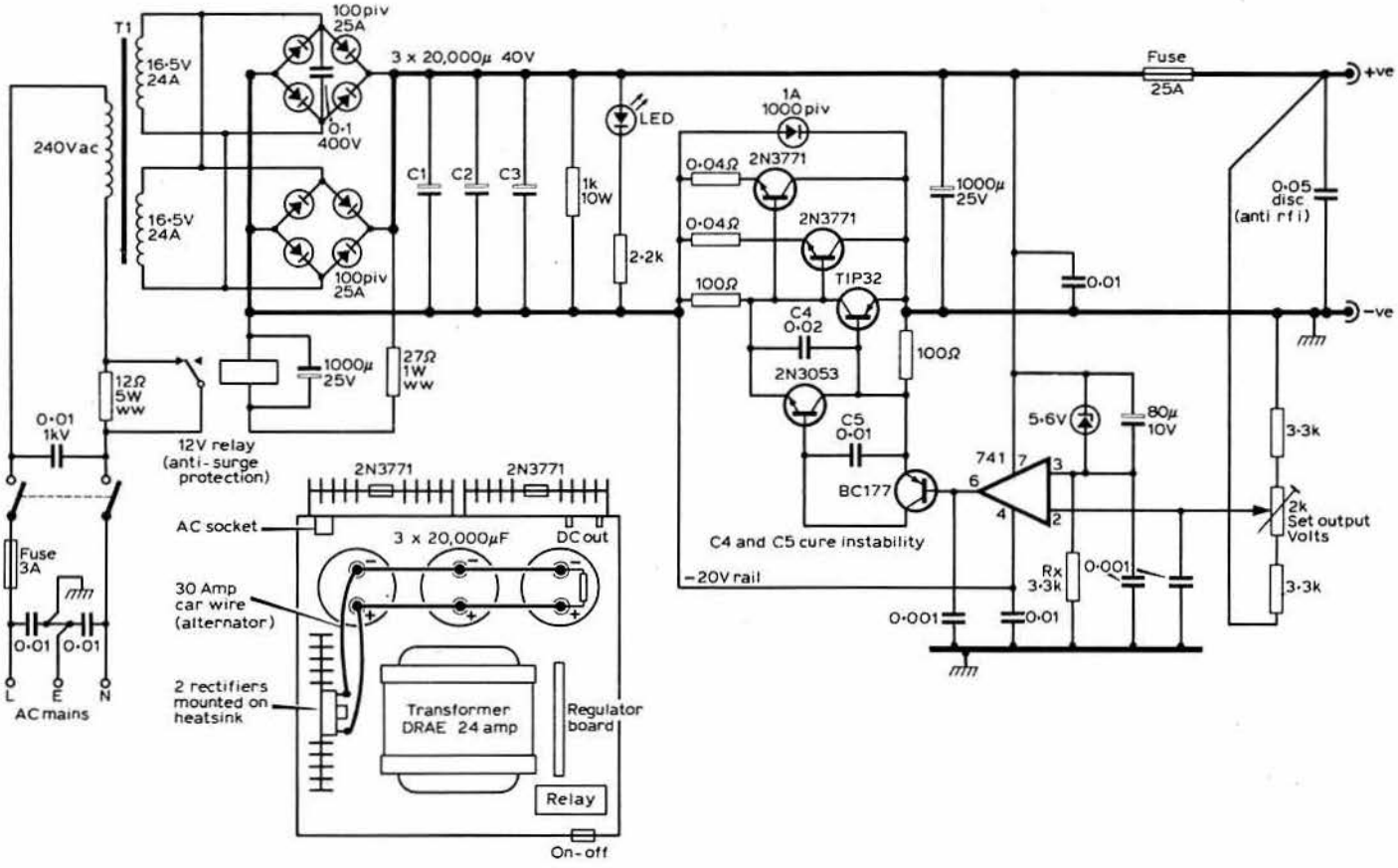

Fig 9. High-current 13·8V, 24A power supply as built by G3TSO

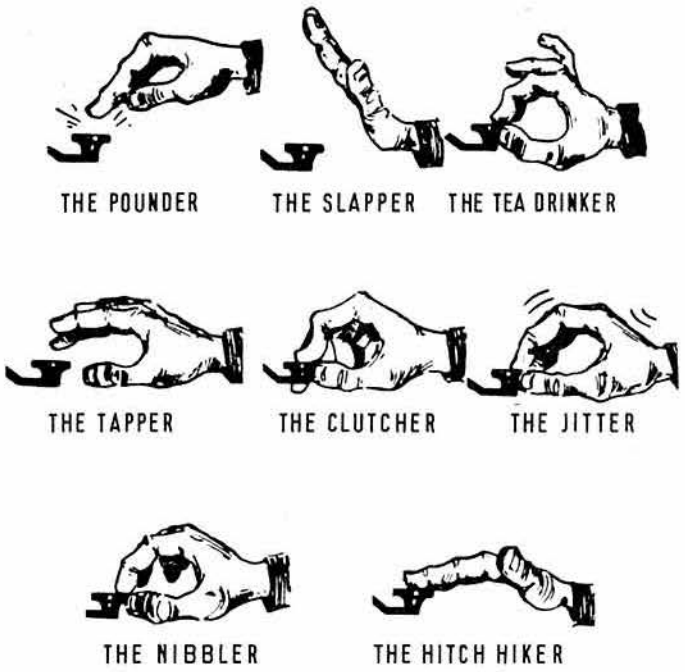

Fig 10. The multitudinous ways of using a straight key having a typical German-style, flat knob as depicted on DK1BP's QSL card. But do any of these, or more orthodox styles, result in a "glass arm"?

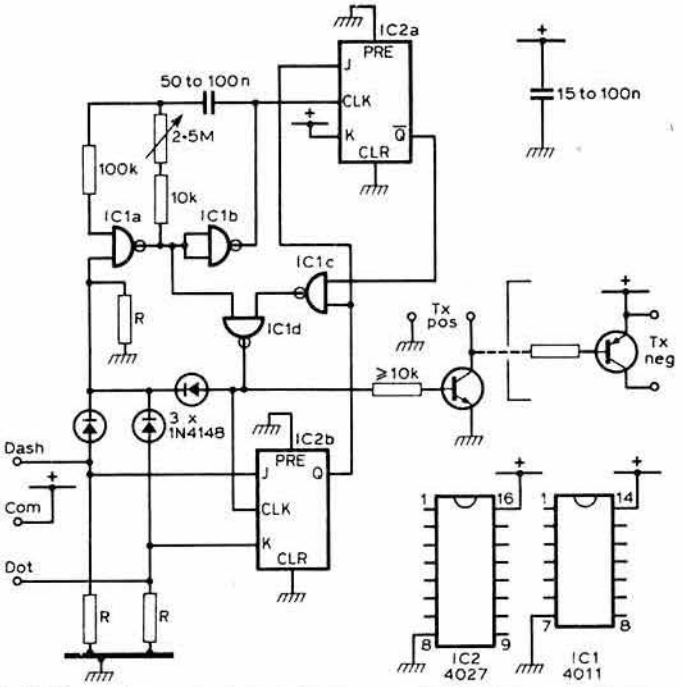

Fig 11. Electronic squeeze-keyer using two cmos devices as suggested in a *cq-DL* "tip" by DF1KY. Can be used with dual mechanical paddle (with R greater than or equal to 10kΩ) or a double "touch-type" paddle with R greater than about 5MΩ

Nevertheless Vibroplex are urging us not to forget Horace Martin. And who, you may ask, was Horace Martin?

In 1890, say Vibroplex, Horace Martin was searching for some way to relieve the plight of wireless operators who were developing "glass arm" from pounding straight keys. He innovated by placing the key on its side, and the semi-automatic key was born. Because the Vibroplex trade mark, then as now, took the form of an insect, such keys soon became known as bug keys. Even 90 years later the same basic Horace Martin design is used.

I have no doubt this is basically a true story, although the copy-writer may have a credibility problem if he insists on referring to "wireless operators" rather than telegraphists in 1890! And as the years go by I am more and more reluctant to accept the once popular concept that operators develop "glass arm" from pounding straight keys; just as I question the American belief that the keying arm should always rest on the operating desk (though this is good practice with semi-automatic keys and electronic keyers).

Before electronic keyers became popular in the late 'forties and 'fifties, there was a long search for keys that could provide automatic dashes as well as dots. A valve keyer was described in *QST* as early as 1933, but it was about 1945 before really effective designs began to appear, one of which was further developed by the late OZ7BO who spread the technique widely in Europe.

In the earlier period some ingenious mechanical keys were introduced, and several reached the market (see *QST* March 1942, pp34–8). Several had two vibrating arms, the usual one for dits, the other for dahs; there was even a motor-driven "Equable Key" with friction-mounted keying wheels and dual-paddle keying that took advantage of the belief that you can move a finger faster than your thumb. But most of these imposed severe requirements on the operator to get his timing very precise, and have long been superseded by various electronic keyers and the currently quite popular keyboard systems that produce very accurate characters but (to my mind) do tend to take half the fun and skill out of cw operating—though I recognize that not everyone would agree with that view!

A simple squeeze-key type design by DF1KY (*cq-DL* 7/81, p327) is shown in Fig 11 and is based on two cmos ic devices. It is intended for use either with mechanical paddles or with some modified resistor values for touch keys. Few precautions, however, seem to have been taken to minimize the common problem of cmos keyers being upset by rfi.

An "ultra-simple" design for an electronic keyer using discrete devices has been described by F0FZE in *Radio-REF* No 7, July 1981, using a single multivibrator for all timing operations: Fig 12. With the component values shown, F0FZE states that the basic dot/space element time can be varied from 4 to 8Hz, and from 2 to 4Hz for the dashes; it is possible to increase the keying speed by reducing the value of the four capacitors C1, C2, C3 and C4 from the suggested 0·8μF. The value of Rc3 depends on the characteristics of the keying relay, for which F0FZE uses a reed-type with a field winding of about 170Ω. Similarly the value of Rb3 may need adjustment to suit the transistor and the relay. The keyer, in this case, is built into the transmitter and connected to the key via screened cable.

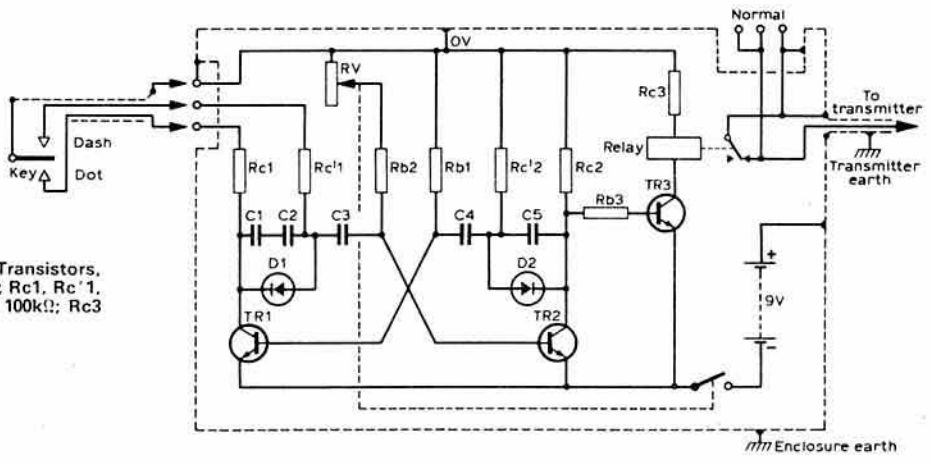

Fig 12. "Ultra-simple" electronic keyer by F0FZE. Transistors, BC238 or equivalent; C1-4, 0·8μF; C5, 15nF; RV, 500kΩ; Rc1, Rc'1, 510Ω; Rc2, 47kΩ; Rb1, Rc'2, 220kΩ; Rb2, 330kΩ; Rb3, 100kΩ; Rc3 depends on relay, typically 220Ω

MICROWAVES

Charles Suckling, G3WDG*

Beacon news

There is now a second beacon running at Martlesham Heath in addition to the very successful 1·3GHz beacon. Also licensed as GB3BPO, the new beacon is on 10,368·830MHz, and is currently running 1mW output into a 4ft dish.

Initially the dish was beamed NE, and the beacon was heard soon after becoming operational over the remarkable distance of 592km by DK2ZF on holiday in EP31j, using wideband equipment. A check of the professional 11GHz link from the Dutch Coast to Martlesham showed that signals were being received over this path at the same time.

The antenna is now beaming east towards Holland, and it is hoped to increase power and change to an omnidirectional antenna in the near future.

Northamptonshire on 2·3GHz

G4LRT (ex G8ART) reports that he is now operational on 2·3GHz with 12W from a 2C39BA pa, and is looking for contacts. So far he has worked G3LQR and G4BYV (at the same time GB3BPO was very strong at 1·3GHz), and one-way contacts have been made with G3WDG and G4DDK/P. During the spell of excellent conditions in January he also worked PA0EZ, PA0FRE, PA2DOL and PA0WWM.

G4LRT notes that the licence has now been received for the GB3LES 2·3GHz beacon at Leicester (ZM24j) and that the equipment is undergoing soak tests until the better weather arrives, when the beacon will be installed.

Activity report from Suffolk/Belgium

During the 1981 1·3GHz Cumulative Contest, G4FRE operated from the shack of G8HPU and worked a total of 42 different callsigns (69 QSOs total) from 10 QTH squares. Best dx was HB9AMH/P (DH66c) on 2 December at 691km. The equipment was all homebuilt, apart from the IC202 driver, and consisted of a high level mixer and WB6IOM pa delivering 90W on transmit, and an NE64535 preamplifier, filter and diode ring mixer on receive. The antenna was a 1·2m dish at 16m asl. For the last cumulative an all-solidstate transverter delivering 7·5W was used in conjunction with the above pa/preamp configuration. This was built from a number of different modules: transmit mixer by WA6UAM (*Ham Radio* 7/77 p33), receiver preamplifier by WA6UAM (*Ham Radio* 10/75 p42), local oscillator by DC0DA (*VHF Communications* 1/78 p18) and power amplifier by PA2DOL (*Electron*).

While on holiday in Belgium last summer, G4FRE, operating as ON8QK/P, worked the following stations on 2·3GHz: G3LQR (first 2·3GHz G-ON ?) PA2DOL (second ever PA-ON on 2·3GHz), PA0FRE, PA0EZ and G4BYV. Beacons heard were PA0QHN (CM) and GB3LDN (AL). The transmitter consisted of a Microwave Modules source at 384MHz, 10W pa, Microwave Modules tripler and DF7QF doubler giving 2·3W output at 2·3GHz. On receive a two-stage NE64535 preamplifier was used to feed a DJ1EE mixer, and the antenna was a 23-element loop-Yagi at 16ft agl.

On 10GHz, a wideband signal was heard from G8HPU (AM78f, 196km).

Belgium VHF Convention

The 1982 Belgium Convention will be held in Gent on 29 May. In the past this meeting has been most interesting from a microwave point of view, and anyone interested in going should contact Dave Robinson, G4FRE, 19 Bostock Road, Ipswich, for further information.

24GHz tests

G3BNL and G3JHM have been busy during the last few months carrying out a series of very interesting one-way tests on 24GHz. Three paths have been tried over 15km, 40km and 60km, with excellent results. Signal levels over the 60km path, from Old Reading to Hindhead, were measured as 18dB above noise, implying a maximum possible range of 480km for the equipment. Attenuation due to rain was observed, with the signals disappearing at times. It was also noticed that elevating the antenna a few degrees at both ends improved the signals; the reason for this is not yet clear.

The equipment in use was rather advanced by current standards on 24GHz. A phase-locked Gunn oscillator was used by G3BNL for transmitting (50mW output), and a crystal-controlled narrowband receiver was used by G3JHM. The use of narrowband almost certainly contributed to the success of these tests, and would seem the best way to improve the performance of 24GHz equipment so that paths can be covered as easily as, say, on 10GHz wideband.

Winchester round table

The round table held on 17 January at the IBA Engineering Headquarters, Crawley Court, was very well attended despite poor weather, with visitors from as far away as Yorkshire.

During the discussion session, a number of topics were discussed, including the 10GHz and Microwave Cumulative Contests, talkback frequencies and the *Microwave Newsletter*. It was reported that a regular net is held in the south coast area on 144·33MHz on Wednesdays at 8pm.

Four talks had been organized for the afternoon, and G3JHM began by discussing equipment for 24GHz and the millimetre bands (hopefully to become available soon). The harmonic relationship between 24GHz and the higher bands meant that existing 24GHz equipment could be used, as a driver for the higher bands (with a slight change in frequency). For example, the harmonic output from a 24GHz oscillator could be used to produce a relatively low level, but still useful, signal at 47GHz. For higher power it could be necessary to use a proper frequency multiplier, unless an oscillator for the band was available (unlikely!). For receiving, one technique which looked particularly promising was the sub-harmonically pumped anti-parallel injection at half the final frequency, which would be ideal for use with existing 24GHz equipment. Waveguide for 47GHz was also discussed, and it was proposed that WG23 would be a good choice, as flanges for this waveguide were thought to be available. Anyone interested in purchasing waveguide and flanges for 47GHz use was invited to contact G3JHM so that a bulk order could be put together.

G3BNL continued the lecture session by describing in some detail the 24GHz narrowband equipment which he and G3JHM had been using during their recent tests. Gunn oscillators were a particularly cost-effective way of generating a reasonable amount of power, but suffered from stability problems—implying the use of wideband equipment and consequently reduced signal to noise. He had investigated ways of phase locking Gunn oscillators to obtain the advantage of narrowband operation. His system consisted of a 384MHz "Microwave Committee" local oscillator board, amplified to 2·5W with a BGY22 module driving a varactor multiplier to 1,152MHz (0·8–1W output) feeding a ×21 multiplier to 24GHz, using a BXY41 diode. About 2mW output was available, after filtering, at 24,192MHz. This was mixed with a sample of the 24GHz Gunn oscillator output using a crosscoupler and 1N26 mixer. The i.f. was divided down from 250kHz and compared to a 250kHz signal, originating from a 1MHz crystal oscillator, in an MC14568 ic. The error signal was then fed back to the Gunn oscillator power supply to achieve phase locking. The system had a locking range of 50MHz, and the resulting signal had a good cw note!

The remaining talks of the afternoon were on the subject of microwave beacon building and operation. G8ATK described the construction of the Farnborough GB3FRS 1·3GHz beacon which is only awaiting licensing before becoming operational. Much of the equipment for this beacon had been donated by various sources, and G8ATK thanked Microwave Modules and Wood & Douglas in particular for their help. The GB3FRS beacon consists of a Storno exciter retuned to 432MHz delivering 15W and driving a varactor multiplier to 1·3GHz. The antenna is an Antec "Modified Alford loop" with 2·15dBi gain. Careful screening was used to reduce 432MHz radiation to a very low level. Particular features of interest in the design of this beacon were the use of battery back-up (giving up to 5h of operation in the event of mains failure) and the provision of a unique facility whereby it is possible to telephone the beacon to find out its current status. Various prerecorded speech messages are available, which were selected by the equipment to inform the caller of whether the beacon is operational, or the nature of any fault conditions.

G8ADM concluded the lecture session by describing the Andover 1·3GHz and 2·3GHz beacons. Reliability had been the major criterion in the construction of these beacons and had paid off—so far the 1·3GHz beacon has completed 45,000 hours of operation with only two failures (a blown fuse and a faulty edge connector), and the 2·3GHz beacon has completed 6,500 hours operation with only one failure (a blown fuse). G8ADM reported that many stations regularly use the GB3AND 1·3GHz beacon for propagation monitoring, but that so far there had been only three reception reports of the 2·3GHz beacon. He is always very interested to receive reception reports. □

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SWL NEWS

Bob Treacher, BRS32525*

Newcomers

The new year has prompted a large number of members to contribute to this page for the first time. It is extremely comforting that so many listening members are making themselves known, and we will try to give everyone a brief mention in this piece—so if you think you have something worthwhile to offer, let your scribe know. Among the first-time correspondents we welcome Ken Cheetham, BRS38296, who has been a member since 1976. He runs an FRG7 with 100ft wire fed through an atu, and a vertical for 28MHz.

Brian Warnaby, BRS48602, also introduces himself. An FRG7700M graces his shack and he is hoping to add an FRV7700 for 70 and 144MHz, in readiness for the summer dx season. We look forward to some dx reports on those bands in due course.

David Tanswell, BRS30493, had returned to swling after a 10-year absence. He also uses an FRG7700 and a 200ft long wire.

W. D. Evers-Swindell, RS47143, is a recent newcomer to the Society. He uses an FRG7700, an atu, and a long, long wire. Norman Jennings, BRS48675, has also recently joined the listening ranks and, like RS47143, appears to need much basic information to set him off down the right road. Norman asks in particular how to log the stations heard. The Society has log books for the swl so that stations heard can be logged in a tidy and efficient manner, which can be obtained from Society headquarters—see publications page for details. RS47143 wants more advice and tips for the swl. Again, the Society has just the right publication. *A guide to Amateur Radio*, by Pat Hawker, G3VA, provides the newcomer to amateur radio with basic information on receivers, transmitters and antennas. It also contains technical information and operating data of interest both to listeners and radio amateurs. The paperback version costs £2.76 and is available from Society headquarters. To answer another question posed by several readers, a countries list can also be obtained from the Society, priced 31p.

Set listening periods

Paul Crankshaw, BRS48909, was quick to take up the challenge on slps. He has suggested an slp for each band as follows:

27 March	0600-0800	7MHz ssb	**28 March**	2100-2300	7MHz cw
17 April	0900-1100	28MHz ssb	**18 April**	1700-1900	28MHz cw
19 June	0900-1100	21MHz ssb	**20 June**	1700-1900	21MHz cw
28 August	0700-0900	14MHz ssb	**29 August**	1700-1900	14MHz cw
23 October	0600-0800	3·5MHz ssb	**24 October**	2100-2300	3·5MHz cw
18 December	2200-0000	1·8MHz ssb	**19 December**	2000-2200	1·8MHz cw

Logs should show station heard, station being worked, time, report given and report at listener's QTH. To add a contest element to the slps, all European stations will count 5pt each, USA/VE 10pt each, all other stations 15pt each, and the final score will be points multiplied by the number of countries heard. Logs should reach Paul within 14 days of the slp. His address is 20 Reedloch Drive, Barassie, Troon, Ayrshire KA10 6UU.

VHF happenings

Dave Whitaker reported the 14 January "lift" on 144MHz. He commented that from his QTH it seemed that the entire OZ amateur population was active, but it appears to have been a rather selective opening which those in the north had mainly to themselves. Dave copied hordes of OZs, several SMs, DLs, PA0s and one ON. New squares for Dave were CN, FP, FQ, GP, GQ, GR and HQ, but he missed the locators for SM6CMU, SM7MRJ, and SM7MK. Can any reader oblige? Otherwise Dave will have to await the QSLs for the details.

10MHz

Although your scribe has had reports from G3GIQ, G3KMA and G4FAM, reports on happenings on this "new" band begin with Paul Tittensor, A8808. With his R4B and dipole at 26ft he heard 38 countries up to 18 January. His initial reaction was that the band had plenty to offer. The Caribbean, VK and ZL were audible from 0700 to 1000, and Europeans were audible until sunset, when the band opened to the Middle East and Africa. His best dx at the time of writing was C6ABA, W6QL/8R1, VK2, 3, 5, 6, and 7, and ZLs (from 0800 to 1000, and at 1800 and 0100), JY9RA, 9K2DR, 4X4VE/5N8, 5N0WRA, ZD8TC, OX3CS, ZS1JT, ZS6ANW, and VP8ANT, as well as the less exotic OY, FC, LX, GU, GJ and EA6. Paul had "heard all continents" by 1649 on 4 January—can anyone beat that? He also heard hundreds of Gs and DLs, with between 25 and 50 stations heard from HB9, LA and OZ. Only two USSR stations found their way into Paul's log—a UA3 and a UP2. As well as these countries, your scribe has been advised that VK9NS and VK9YC had been worked on the band by mid-January.

Paul hopes that the 10MHz band will be included in the tables, not only because it seems to be capable of much good dx, but because it will also encourage others to dabble in cw reception. Therefore, if 10 listeners enter figures for the band, it *will* be included in the 1982 list. As for the all-time list, if your scribe receives six entries it will be included there too.

DX report

With 14MHz closing early during December, some dx has filtered down to 7 and 3·5MHz, but the concensus of opinion is that in general the lower frequency bands have been in poor shape. More of that later.

On 28MHz, Howard Banks, RS45033, mentioned KH6JVL, VK9NYG, and VS6CT. Robert Small, BRS8841, caught up with YI1AS for a new country. Also entered in the log were C53AP (C5AAP), VQ9AB, VS6DX, 9K2BE and 9N1BMK. Brian Wainwright, BRS44703, added CR9AN, P29FV, XT2BG and 3D6AO. Ken Cheetham, BRS38296, listed a host of good dx on the band, the best being A71AU, YC1BSA, 3B8DB, 3V8AA, 5N0MOA and 5T5ZZ.

Very little mention of 21 or 14MHz this time. Dave Tanswell, BRS30493, lists AL7BL, OJ0AM, VP8AEI and 4U1ITU, all on 14MHz, while VR6TC was added by John Sutton, BRS35509. Robert Small was pleased with two new additions on 21MHz, ZL1AAS/C and JD1AMA (Ogasawara Is).

(Continued on page 236)

ALL TIME COUNTRIES TABLE
(Starting score 750)

Station	28	21	14	7	3·5	1·8	Total	Mode
G3KMA	309	325	326	267	198	56	1,481	ssb/cw
BRS17567	285	320	351	214	227	34	1,431	ssb/cw
BRS25429	270	305	329	233	223	59	1,419	ssb
BRS32525	265	296	317	236	244	49	1,407	ssb
RS42604	277	286	273	234	178	50	1,298	ssb
G3GIQ	301	322	322	179	139	31	1,294	ssb/cw
G3MCS	298	310	313	178	166	21	1,286	ssb/cw
A8841	237	270	309	174	173	23	1,186	ssb/cw
A8808	238	274	293	161	163	53	1,182	ssb/cw
G3ALI	206	234	301	168	189	0	1,098	ssb/cw
G4FAM	219	234	239	181	119	35	1,027	ssb/cw
G3IGW	170	189	213	218	127	84	991	ssb/cw
G3XTT	221	220	186	171	127	56	981	ssb/cw
BRS1066	170	191	255	133	88	52	889	ssb/cw
OE2VEL	172	219	260	116	105	9	881	ssb/cw
BRS48909	192	221	228	129	83	25	878	ssb
A9191	177	219	251	95	106	18	866	ssb/cw
BRS44703	171	177	191	126	107	31	803	ssb

1981 COUNTRIES TABLE
Final scores

Station	28	21	14	7	3·5	1·8	Total	Mode
RS42604	221	232	223	188	137	44	1,045	ssb
BRS14585	226	239	242	166	141	29	1,043	ssb/cw
BRS25429	209	222	231	149	128	42	981	ssb
BRS8841	204	219	241	145	111	17	937	ssb/cw
BRS48909	192	221	228	129	83	25	878	ssb
BRS44703	164	167	188	122	105	31	777	ssb
A8808	181	173	170	116	96	34	768	ssb/cw
BRS1066	150	174	172	88	69	46	699	ssb/cw
RS46228	111	135	177	155	75	23	676	ssb/cw
BRS44266	149	122	155	62	51	17	556	ssb
BRS35509	106	136	156	69	72	3	542	ssb
ORS45992/7Q	147	185	173	8	14	0	527	ssb
BRS18529	85	107	131	92	78	27	520	ssb
BRS31440	126	126	104	75	49	9	489	ssb
BRS40705	134	106	120	42	30	13	445	ssb
ARS42503	92	125	146	28	32	0	422	ssb
A9191	88	100	117	49	40	8	402	ssb/cw
BRS41992	56	74	131	65	50	16	392	ssb
RS45033	124	72	123	5	9	0	333	ssb
RS44218	81	85	111	26	21	5	329	ssb/cw
ARS41349	76	89	79	36	40	3	323	ssb
BRS46708	71	40	85	40	57	0	293	ssb
BRS47945	60	60	70	46	46	10	292	ssb
BRS30493	45	66	106	37	27	2	283	ssb
BRS32601	135	55	46	16	14	0	266	ssb
BRS48675	37	78	72	18	9	1	215	ssb

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4-2-70

John Morris, G4ANB*

50MHz

The dying weeks of 1981 produced yet more 50MHz dx, although in the early days of 1982 the conditions finally appeared to have faded. Certainly the 28-50MHz crossband fraternity can have little cause for complaint about the 1981 "autumn" season, which lasted far longer than even the most optimistic operator would have forecasted.

The RSGB general manager, G3OUF, took a break from his time consuming duties on 8 December, and between 1330 and 1410gmt completed crossband contacts with VE1ASJ, WA1EKV, VE1YX, VE3ESS, VE3EVW and W4CKD. After 1600gmt many of the USA call areas were heard, and K5VAV was worked at 1640gmt.

On the same day the exclusive 70MHz transatlantic club gained a few new members when VE1ASJ on 50MHz worked EI6AS, EI6DT, G3APY, G2AOK and GW3MHW on 70MHz. GW3MHW has claimed his contact with VE1ASJ, which was made at 1353gmt, as a GW-VE 70-50MHz crossband "first".

G4IDE found the conditions excellent on 13 December, and worked three new countries in the shape of DL3ZM/YV5, HC2FG and HI8DAF. Between 1400 and 1500gmt G4IDE also received 55·25MHz video from the USA. The reception of transatlantic tv raised a point which has been puzzling G4IDE for some time. On two occasions he was listening when 70MHz signals from the UK were received by VE1ASJ, but on neither occasion was there any sign of tv transmissions coming in the other directions. Perhaps this just goes to show that for all of the work which has been done we are still a long way from fully understanding propagation, particularly when it is pushed to its limits.

G4BPY heard many of the Caribbean 50MHz beacons, and completed crossband contacts with stations there and in North America on many days up to 21 December. WB4TAT in Kentucky was worked at 1633gmt on 12 December to give G4BPY his first new state since 1979, bringing his total up to 44. Contacts with TF3T by backscatter at 1407gmt on 4 December, and with DL3ZM/YV5 at 1226gmt on 12 December, brought the G4BPY crossband country total up to 31. Bad weather conditions towards the end of December forced G4BPY to abandon his outside shack, which considering his enthusiasm for the subject shows just how cold it must have been!

On 13 December, his last day of operation from the Isles of Scilly, G5KW worked W5VLJ/7 in Utah for his 48th state. Other new states during the preceding few weeks were provided by K5FF (New Mexico), K7ZOK (Nevada), K0AYK (Colorado), W7LFL (Wyoming) and W7JF (Montana). Three new countries were also collected in the form of HK0BKX, DL3ZM/YV5 and TF3T to bring G5KW's 28-50MHz crossband total to 34.

Although the peak of the sunspot cycle may have passed, I would not like to take any bets on there being no more dx on 50MHz before the next peak. Sporadic-E, for example, works much better and is more common on 50MHz than on higher frequencies, and with more people than ever before on this side of the Atlantic listening on the band there is a good chance of any exceptional conditions being detected. The regular and predictable meteor showers each year could also offer food for thought for anyone looking for a challenging series of experiments during the low of the sunspot cycle.

Aurora

In the far north of Scotland, GM4FZH (YS33d) is in an excellent position to take advantage of any auroral activity. Openings on 144MHz were noted on 11, 12, 29 and 30 December and 2 January, bringing cw contacts with several stations in Norway, Denmark, Sweden and West Germany. Nothing was heard on 70MHz. GM4FZH has noted that some of the auroral openings are very restricted in area, activity extending only as far south as the north of Scotland. He also monitors an auroral propagation radar system, and noted reflections on many days during late December and early January, but with nothing heard on 144MHz.

Harking back to the good auroral opening on 20 October, one particularly fine contact has come to light. At 1917gmt on 20 October EA1QJ (VD59h) completed a cw contact with GW3NYY (XL40b) by aurora on 144MHz. This contact is thought to be a "first" by aurora between Spain and Wales. It is certainly very unusual for any aurora to extend far enough south for EA stations to be worked from the UK.

Repeater news

GB3FC (RB2, Fylde Coast) came back on the air on 1 January after an absence of nearly a year caused by the loss of its original site. From its new site, the Norbreck Castle Hotel on the Blackpool seafront, the repeater is reported to be providing excellent coverage of the Fylde area and to be workable in a 30km arc encompassing Preston, Lancaster and Barrow.

The Orkney-Caithness Repeater Group has recently been formed with the aim of bringing a new 144MHz repeater on the air. GB3OC, which is currently at the proposal stage, will be located on Wideford Hill, near Kirkwall, on mainland Orkney, and will be designed to bring mobile and portable coverage to Orkney and the north coast of Scotland. As there are few people in the area and certain running costs will have to be met, any donations to help with the project would be most welcome. Further information can be obtained from A. W. Wright, GM3IBU, 18 Dundas Crescent, Kirkwall, Orkney KW15 1JQ.

One of the repeaters in uhf Phase 6, which is with the Home Office at the time of writing, is also suffering financial difficulties. GB3HB (RB15, St Austell, Cornwall) is to be co-sited with the existing vhf repeater GB3NC (R5). Construction is at an advanced stage, but the project is very short of money. Trade help from Mutek, Westlake and Jewell & Powys has been most generous, but more help will be needed to bring GB3HB on the air and maintain a reliable service. The secretary of the Mid-Cornwall Repeater Group is G8ARH, QTHR. Remember the old saying: "Repeaters don't just come on"—not even those you only use when on holiday!

On the subject of repeater funding, a recent issue of *Central Scotland FM News* recounts an incident during the negotiations for the use of the site for the planned repeater GB3PA (R1, Paisley): "Expecting the site clearance to be a formality we were horrified to discover that the site owners were hoping to charge us the commercial rate of some £800/year for use of the mast! This was whittled down to £500, but when we explained to their management that we were a non-profit-making group involved in amateur radio we were offered all facilities for a price a Scotsman would call 'reasonable'."

There are currently 18 repeater proposals in uhf Phase 7, which is due to go to the Home Office during 1982. Because of this unusually large number the Repeater Working Group has decided to bring the closing date forward. For a proposal to go in uhf Phase 7 the *complete* paperwork must be with RSGB HQ by 26 March at the latest.

Repeater Working Group elections

Five of the eight members of the Repeater Working Group are elected annually by individual repeater groups on a basis of one vote per repeater. For this purpose the country is divided into five "areas", with one group from each area being chosen to send a representative. The following groups have been elected to send representatives to the RWG for 1982: GB3BK, GB3CF, GB3CS, GB3MP and GB3SR.

Working on the RWG is not the easiest of tasks, and its members put in a lot of hard work. Nevertheless it is impossible to please all of the people all of the time. One RWG member was recently overheard to comment: "There was one repeater proposal which we turned down because of probable co-channel interference problems. Eventually, because of the high level of support and pressure in favour of the project, we gave it the go-ahead. Now that it is operational we are getting letters complaining about co-channel interference . . ."

Contests

AGCW-DL VHF/UHF CW Contests

1900-2300 20 March (432·00-432·15MHz)
1900-2300 26 June (144·01-144·15MHz)
1900-2300 25 September (144·01-144·15MHz)

Single-operator, cw only. There are three output classes: A—less than 3·5W output, B—less than 25W, and C—more than 25W. Exchanges consist of RST plus serial number (from 001)/class/QTH locator. The strokes must be keyed, as in "579001/B/EL25a". Class A to class A contacts score 9 points, A-B 7, A-C 5, B-B 4, B-C 3 and C-C 2. Contacts with stations who do not send a full contest report score one point each. Each big QTH locator square (eg EL) worked counts one multiplier point, and each DXCC country five. The final score is the sum of contact points times the sum of multiplier points. Each contest will be evaluated separately, as will the three classes within each contest. Logs, postmarked no later than the last day of the month following the contest, should be sent to Edmund Ramm, DK3UZ, PO Box 38, D-2358 Kaltenkirchen, Federal Republic of Germany

*c/o RSGB HQ, 35 Doughty St, London WC1N 2AE.

The following extracts from the results of the **AGCW-DL 144MHz CW Contest** held on 26 September 1981 are arranged in the order position, callsign, QTH locator, points.

Class A:	1	DF5JJ	DL44g	7,844
	2	DJ9IE/P	EL73c	7,616
Class B:	1	DL5AP/P	FL33b	10,422
	2	DK2BJ/A	DK11e	9,792
	17	G4GGV	ZL37g	1,334
	28	G5HD	XK09d	36
Class C:	1	DF7DJ	DL39a	14,190
	2	DL2OM	DK48d	9,828
	8	G4KWQ	YM30b	1,334

The **Irish Radio Transmitters Society 144MHz Cumulative Contest** will take place on 11, 18 and 25 March from 8 to 9.30pm local time each evening. These contests are run twice a year, in the spring and autumn, and are open only to EI and GI stations. The hour after the contest each evening has been designated as an "activity period", and there should be approximately 100 EI/GI stations beaming east and looking for dx between 9.30 and 10.30pm. In the autumn 1981 event 30 of the 32 EI and GI counties were active, so square and county hunters may be able to pick up some new ones after the contest proper.

Raynet frequencies and the 144MHz band plan

Alert readers may have noticed that the 144MHz band plan published in January's *Rad Com* shows 144·650 and 144·775MHz as being newly allocated to Raynet. In fact 144·650MHz is *not* a Raynet frequency, although at the time the band plan was prepared for publication it was being proposed that it should be. The story behind this—or at least the latest episode of the story—starts at the IARU Region 1 Conference held in Brighton in April 1981.

Before the conference the 144MHz beacon sub-band had been specified only vaguely as "centred on 144·9MHz". This unsatisfactory definition was clarified at Brighton to give the present beacon allocation, 144·845–144·990MHz. (Parenthetically, these limits were agreed after a long discussion as the least unsatisfactory to all concerned—proposals from various countries for the lower limit ranged from 144·8 to 144·9MHz.)

Before the Brighton meeting Raynet had been allocated, on a purely *national* basis within the UK, frequencies of 144·800, 144·825, 144·850 and 144·875MHz. Unfortunately, the *international* conference then decreed that the top two of these frequencies should only be used by beacon stations.

Following this decision the VHF Committee of the RSGB looked long and hard at the 144MHz band plan to find two new frequencies to replace those lost by Raynet. The first choice was 144·775MHz, being adjacent to the other frequencies and not allocated to any other use. The second choice was more difficult, as 144·750MHz is the atv calling and talkback frequency. Working down the band plan, the next best choice seemed to be 144·650MHz, and so this was proposed. It was at this stage that the band plan in January's *Rad Com* was prepared for publication.

Since that time, however, the Raynet Committee has indicated that although 144·775MHz is acceptable as a replacement frequency, 144·650MHz is not, as it is not adjacent to the other frequencies. At a meeting between members of the Raynet and VHF committees it was therefore agreed that as a *temporary* measure Raynet should continue using 144·850MHz. This is a strictly interim expedient, until frequencies for emergency organizations can be agreed by the member countries of IARU Region 1.

The problem of finding 144MHz frequencies for Raynet is not a new one, and its source is not difficult to find. Raynet is a purely UK organization, whereas the band plans are agreed internationally. It is difficult to convince all of the other countries in Europe and Africa, most of which do not have amateur emergency networks, that part of a crowded and popular band should be left unused for the sake of a group in a country towards one edge of the region.

A final solution to this problem may be in sight. At the Brighton conference national societies were encouraged to give thought to the formation of emergency networks, with Raynet suggested as an example. If enough countries follow this suggestion it may be possible, at the 1984 conference in Italy, to agree suitable frequencies in the 144MHz and other bands. It would be appropriate for a lead in this direction to come from the UK. Although 1984 may seem a long time off, planning for this must start as soon as possible.

As it is not required by Raynet, the future of 144·650MHz may be of interest. A few years ago it was nominated, again on a UK basis, as the a.m. calling frequency. This was done at the request of a few members, but it has never been heavily used. Indeed, I cannot recall hearing any a.m. at all on 144·650MHz for the past couple of years. The VHF Committee feels that the need for a 144MHz a.m. calling frequency has largely passed, and there is little point in keeping it in an already complex band plan.

Awards

The callsign of GM8MBP in Aberdeen has appeared in many people's 144MHz award claims, and his meticulous QSLing has been of no little help to card collectors. Now GM8MBP has himself taken FMD Senior No 175 and 4-2-70 Squares 15/60 sticker No 24 on 144MHz. GM8JYU in Gretna also submitted a double 144MHz claim, to take FMD Senior No 176 and 4-2-70 10/40 No 71.

The claim from G4GFX of Malvern was a triple one, bringing him 432MHz FMD Standard No 168, 4-2-70 6/30 No 13 on the same band, and 10/40 No 70 for 144MHz. Some of the cards submitted were common to both of the 432MHz claims. This was made very plain in the accompanying documentation, thus lightening the awards manager's checking task. Also on 432MHz G3VYF of south Essex has become the first operator to take the 15/80 sticker.

In the upper echelons of the 4-2-70 144MHz Squares series the dedicated ms work of G3BW in Cumbria has brought him 20/150 sticker No 2, while G4JZF of Cannock has reached the 20/100 mark. A rare 70MHz claim came from David Thorpe of Ilford, who has taken the basic 4/20 certificate No 3.

After taking the FMD Supreme in 1981 G8FMK in Thame now seems to be mounting a serious attack on the 4-2-70 squares series. In the early weeks of 1982 he claimed 144MHz 10/40 No 73, 432MHz 6/30 No 14, and also a microwave award.

Yet another double claim came from G8LFB of London, for the 144MHz Senior and 15/60 Squares award on the same band. These were achieved with no more than 25W, and a modicum of dedication. On 432MHz G8GMC has taken Standard No 169, and finally G6ADC of Coventry has become the second holder of a G6+3 callsign to take an FMD award; the 144MHz Standard.

UK Six Metre Group

The "UK Six Metre Group" has been formed by a group of 50MHz enthusiasts to draw together everyone interested in amateur operation at this frequency. Its aims include the publication and exchange of information relating to all aspects of the 50–54MHz band via a newsletter sent to members about five times a year. As might be expected, another of the group's aims is to work for a 50MHz allocation in the UK, although it must be said that there seems to be no immediate prospect of this hope being fulfilled. Affiliation with the RSGB is also to be sought.

At present the group is being formed by an *ad-hoc* committee, with G4JLH as acting chairman and G4JCC as acting treasurer/secretary. This committee will resign at the first annual general meeting, which is expected to take place after the main lectures at the RSGB VHF Convention on 20 March, so that a properly constituted committee can be elected.

The initial subscription to the UK Six Metre Group has been set at £5. Anyone wishing to join the group should send a cheque or postal order for this amount with their name, address and callsign to G4JCC, QTHR.

Are you a vhf/uhf record holder?

The IARU Region 1 co-ordinator of vhf/uhf records is SM5AGM, who collates this information for publication by national societies. Records information is supplied to SM5AGM by the awards managers of the countries within the region, which so far as the UK is concerned means G5UM.

Anyone who thinks he may hold a distance record on any of the vhf/uhf bands is asked to send the details to G5UM, QTHR, or to G4ANB, who will forward any information. As well as the callsigns of the stations involved, please include the date, time, QTH and QTH locator at each end of the contact, transmission mode (ssb, cw, fm etc) and if possible the propagation mode (tropo, aurora, Es, ms etc).

It has been emphasized several times by SM5AGM that believed "firsts" are not required (although *4-2-70* is always interested in these). His objective is to publish an authoritative list at least once a year of substantiated distance record contacts.

Repeater licensing policy

Those contemplating bringing a new repeater on the air, or curious about the policies used to decide which projects should be supported, may be interested in the following extracts from the *Guide to Repeater Licensing* issued by RSGB HQ.

"**144MHz.** There is now a comprehensive network of 144MHz repeaters in the UK, and new vhf units are only considered if it can be shown that there is no coverage from existing repeaters. The only exception to this is in highly populated areas such as London and other major cities where overlapping coverage *may* be considered, subject to suitable frequencies being available. VHF repeaters are considered to be area units with coverage roughly

equivalent to a county. With only R0 to R7 available for the foreseeable future, very careful frequency co-ordination is needed.

"**432MHz.** The uhf repeater network comes under a plan agreed between the Society and the Home Office based on one repeater per 33·3km square (*Rad Com* April 1976). A group contemplating a new repeater close to an existing one should first contact the existing group to see whether coverage of the operational unit could be improved by the two groups joining forces. It is the basic concept of uhf repeaters that they provide good (but not necessarily total) coverage to mobiles within a 15-20km range. It is on this basis only that the uhf plan has been accepted. UHF repeaters are local, not area, devices.

"**Special projects.** Any proposal for a repeater of a special type will be considered on its merits if presented in the form described in the guide. A one-off proposal can take a considerable amount of time to discuss and—perhaps—ultimately license. Hypothetical questions as to whether a new type of repeater is licensable cannot be answered; it is far better to submit a technical proposal for discussion. It is highly unlikely that such a proposal would be accepted for the crowded 144MHz band. There is a little more room on 432MHz, but consideration of a microwave unit is strongly advised.

"**Applying for a licence.** Because of the complex but necessary vetting procedures of the Society and the Home Office, up to a year could elapse between a proposal being submitted and the licence being issued. The first step, which should be taken as soon as possible, is to send a 'letter of intent' to the general manager at RSGB HQ stating the nature of the proposal, the reasons for wanting the repeater, the desired coverage area, the band (and preferably the actual channel number) desired, and a choice of three callsigns."

The *Guide to Repeater Licensing* goes on to describe the machinery this will set in motion, and the plethora of paperwork to be provided before the proposal can be submitted to the Home Office. Including the time taken by the Home Office for vetting, it could take up to a year from a proposal being submitted to the licence being issued. The moral for budding repeater groups is: approach the Society as soon as possible, and certainly before any time or money have been spent on hardware construction.

Scatter

Anyone planning an expedition to the Republic of Ireland is asked to contact EI2CA, QTHR, the IRTS vhf manager. He will be able to provide information and advice on suitable locations, with local knowledge of those which cannot be used, however enticing they may appear on the map.

Roger Barker, G4IDE, has written a machine code program for the ZX81 computer which produces perfect cw at speeds from 20 to 4,000 characters/min, with obvious potential for ms working, and has generously offered to make it generally available. Anyone who would like a copy should send an sae for a listing or a cassette plus an sae for a recording of the program to G4IDE, QTHR.

G4MHB has written to *4-2-70* to express his appreciation of the sterling work done by G3RLO in sending slow morse transmissions for aspiring G4s in the Nottinghamshire area. Slow morse transmissions are of course undertaken by many members, but the fact that G3RLO's transmissions go out *every* night at 7-7.30pm, seven days a week, surely merits a special mention and praise.

The mention of cw prompts a reminder that Monday night is cw night on 144MHz. From 8pm onwards there are usually several contacts going on at the bottom end of the band. There is no need to be shy about joining in, as most operators are very patient with those who are inexperienced—or perhaps a little rusty—on the key. CW on vhf is also becoming more popular at other times. G4KGC in Northampton recently called "CQ" on 144·05MHz in the small hours of a midweek morning and promptly received a reply from G4DGU in Devon.

Moving on to a different mode, BARTG has suggested that 144MHz rtty activity evenings should also take place each Monday.

EI2W in Dublin is looking for 144 and 432MHz contacts most evenings. From 2000 and 2200gmt he is on 432·210MHz ssb, and from 2030 and 2230gmt on 144·2MHz, beaming from north to southeast during each 30min.

Derek Brown, G8ECI (AN41h), spends much of his time in Saudi Arabia, but during the contest on 6 and 7 March, and for the following few weeks until 20 March, he will be operational on 144 and 432MHz ssb from his comparatively rare home locator square. He also hopes to be active during the Perseids meteor shower in August. Anyone who would like to arrange a sked with G8ECI can contact him on 050786203 after 5 March.

The Imperial College ARS is hoping to mount an expedition to Andorra for 10 days from 26 March. The operating frequencies are expected to be 144·2 and 432·2MHz, as well as hf. Further information can be obtained from G5YC, QTHR.

G8ESB, G6ANF, G6EIE, G4NFB and G6HIC will be operating from the northwest coast of Scotland from 28 March to 10 April. During this period they hope to visit XQ, XR, XS, WR, WQ and possibly WS locator squares. They will have 144 and 432MHz equipment for all modes, including computer generated rtty. Further information from G8ESB, QTHR.

G5KW, one of the 50MHz fraternity, has managed to put himself into hospital (and we wish him a speedy recovery), but nevertheless has plans for a demonstration 28-50MHz crossband station at the RSGB VHF Convention.

The new band plan for the reduced 70MHz band seems to be generally acceptable. Several favourable comments have been received, with only one dissenting letter.

My change of QTH proceeds with alarming lethargy, aided neither by the weather nor by some parts of British Rail. If ever again I contemplate moving over Christmas I earnestly hope that some kind soul will beat me about the head until I come to my senses. At the time of writing, the new address is *still* not settled, and so all news and views for *4-2-70* should continue to be sent to RSGB HQ, with items for May to arrive by 19 March (late news by 29 March) and for June by 16 April (late news by 26 April) please.

FINAL REMINDER

RSGB NATIONAL VHF CONVENTION

Saturday 20 March 1982

SWL NEWS

(Continued from page 233)

Lower frequency

With a few listeners taking an interest in your scribe's lower frequency challenge, we have a number of detailed reports on activity on 7, 3·5 and 1·8MHz. Let us start with 7MHz—which seemed to lose a little of its sparkle in late December/early January. The band was open to the USA as late as 1030 in early January, but the selection of other dx available during our sunrise time was limited. Several caught up with ZL1AZV/C, ZL4OY/A and FK8CR. Also mentioned were CM2JJ, FG0BKZ/FS7, 6Y5AG, TG9AL and HC1NEA. Little had been reported at around 1730—a good time for dx normally during winter months. The best loggings at around this time were EA8, EA9, JA, UI8, XT2BG, ZL1, 4, 3B8CF, 9U5JM, and 9X5SL. Around 2300 the Caribbean had been audible with stations reported with good signals from FM7, VP2KBS (via W2GHK) VP5, plus activity from CN8, CT3 and VS6.

On 3·5MHz, conditions were decidedly better, although the dx around at sunrise was less than normal in January. However, "grey-line" and "twilight" dx conditions were better than previous years, although nothing exotic came from the Pacific. Between 1500 and 1600 the following stations were reported: JA1JWP, MCU; JA5RH; JA8BQW; JA9BMP, TWN; W6RR; W7FU (who confirmed to your scribe that the only G worked by him on long path this season was G3FPQ), YB0WR and ZL1LK. 1600-1700 provided A9XF (quick direct QSL—Box 25320, Awali, Bahrain, Arabian Gulf), FK8CR, JA3LIU, JA0RR, ZL1AXU, and BJC. 1800-1900 produced EL8H, FK8CR, assorted JAs, VK2AVA, assorted 4X4s and 9N1BMK. After 1900, and until 2240, the band had been very good for JA on most evenings, especially 12 and 13 January. VS6DO had been at good strength around 2320, while W and VE were in abundant supply around midnight.

It was hoped that the International DX Contest would provide some much needed Caribbean dx on 1·8MHz to boost all-time scores for the band, but most listeners' hopes were dashed. Dave Whitaker, BRS25429, provided a comprehensive report of the contest. He managed nine USA stations (W1, 2, 3, 4 and 8), plus NP4A, but was even more pleased to catch RD6DNE for No 59 on the band. Several Europeans were mentioned—HB9LN, EA3SF, PA0HIP and RQ2GFQ being the strongest. Dave's "gotaways" included 8P6KX and KV4FZ. Reports from other quarters mention F5GQ, K5NA, EA6CE, EA6ET and SP5IXI/OE6. Peter Norris, BRS47513, reported much ssb activity around midnight between 1·820 and 1·850MHz, and had QSLs from DL, SP, PA0, C31, EI and OZ in December.

Finale

Congratulations to the leading receiving stations in the 1981 table. Hopefully the 1982 table will provide some healthy competition in the ensuing months. Listeners will find the Cray Valley SWL Contest results in "Contest News". Copy date for the **May** issue is Saturday **20 March**, with late copy by Monday **29 March**.

THE MONTH ON THE AIR

John Allaway, G3FKM*

THE ARGUMENTS for and against the ethics of contacts made during "list" conditions continue to grow. They are now appearing in many USA columns, and it is believed that ARRL is looking into the problem. *MOTA* cannot take over the functions of "Your Opinion" and publish answers to the G3YDX and G3GIQ "guest editorials"—however, it is fair to say that more anti- than pro-list letters were received. The writer is in principle against list operations but can see that there are circumstances when the operator of a dx station may be unwilling to face the rough-and-tumble which he would stir up should he appear on his own. This is particularly likely when there is a language problem or where equipment leaves something to be desired at the dx end of the contact.

G4ICC reports receipt of QSL cards for "ZC4KC" who was working in the African Safari Net between 16 and 22 December and giving his name as Monty. Mike does not act as QSL manager for any station using this call.

The request for news of the present whereabouts of Ray Vasper, ex-VS9HRV, has produced the information that he is now G3VIY.

Top band "firsts"

A request was made in June 1981 *MOTA* for claims for first-ever contacts with other countries on this band. A list has now been compiled thanks to a number of correspondents, and claimed QSOs so far are as follows (in all cases with England):

CT1CO-G3IGW (26.1.62)
CX3BH-G3SSO (Nov 68)
EK1AO-G3CCZ (14.1.51)
EL1C-G3PU (16.12.56)
FP8BX-G3IGW (26.2.62)
HC1DC-G3PU (20.1.63)
HK4EB-G3SED (5.12.65)
HR2HH-G2PL (2.1.70)
5Z4LE/HZ-G3RFS (Dec 69)
JY9FOC-G3IGW (24.2.73)
KP4KD-G3PU (9.1.54)
KZ5DE-G3PU (16.1.54)
MP4BJI-G3SVK (30.8.71)
MP4TAF-G3XAQ (26.7.69)
OD5LX-G3PU (14.1.61)
OJ0MA-G3IGW (3.8.78)
PA0LR-G2KK (13.7.55)
PJ0CC-G3VUM (Nov 68)
PZ1AH-G3SED (8.12.67)
VE3BQL/SU-G3IGW (11.2.62)
TG0AA-G3RPB (26.11.67)
VE7UZ-G3SVK (26.10.75)
VK5NO-G3PU (30.9.63) (First VK-Eu)
VP3CZ-G8NF (30.1.65)
VP5XG-G3IGW (26.1.62)
VP7NM-G3PU (2.1.54)
VP8GQ-G3PU (16.12.62)
VS6DO-G3WRF (18.11.71)
VS9OC-G3SVK (21.12.69)
W6ML-G3PU (2.2.64) (First W6-Eu)
YV5DE-G3PU (1.2.55)
ZB2A-G3RPB (22.2.65)
ZD8J-G3RPB (3.12.66)
ZL1AH-G6GM (16.6.51)
ZP9AY-G3RPB (11.6.70)
ZS4PB-G3MYI (26.2.78)
5H3KK-G3SED (12.2.67)
6W8CW-G3SED (5.11.67)
6YACZ-G3CCZ (26.1.64)
W0GTA/8F4-G3RPB (20.10.66)
9A1VU-G3IGW (27.12.63)
9X5SP-G3IGW (Dec 69)

There seems to be some doubt as to whether certain UK-New Zealand tests which took place before 1939 were successful. Note that this list is of *claimed* firsts and may not be entirely accurate.

Overseas news

Aris Kaponides, 5B4JE, asks that QSLs be sent to the address in "QTH Corner". His former QSL manager, DF4FX, became a silent key last June.

Ex-VS5RP is now in Saudi Arabia. He has made enquiries about the "7Z1BDF" mentioned in a previous *MOTA*. The QSL address being given proved to be that of HZ1HZ who confirmed that the station must be a pirate. Ahmed confirmed that foreigners are not issued with amateur licences at the present time and that HZ1AB has a special dispensation. Bob is still receiving many QSL requests for Brunei contacts and was hoping to clear them after his Christmas home leave.

W9SWM has notified your scribe via G3XTT that he is now QSL manager for V2ADX, KJ8R/V2A, WB8QXN/V2A, W9SWM/V2A, W8RKL/V2A and K8NOQ/V2A.

The Association des Radio-Amateurs Principaute de Monaco now has a new QSL bureau address. This is also the correct QTH for ARM's awards manager and will be found in "QTH Corner".

Ezzat Ramadan, SU1ER, wishes to emphasize that there is no office or QSL manager for any Egyptian amateur, and that this has always been so. All SU amateurs are listed in the *Callbook* or they may be QSLd via Box 33, Air Post, Cairo, Egypt.

GI3OLJ (who was /W7 at the time of writing) reports that his son Denis, GI3TAC, has been operating /MM from the *M/V Cable Venture* with an FT107 and vertical antenna.

WA4JQS has ceased to act as QSL manager for TA2TAT since he discovered that he was asking for USA dollars and several ircs for cards. Tony will QSL to those sending sae and two ircs to him as he has a supply of cards paid for by himself.

Expeditions

Gus Browning, W4BPD, who will be remembered for his many worldwide expeditions in the past, is rumoured to have commenced another five-year journey. He has been reported as W4BPD/C6A, and was then expected to go to the Cayman Is as VP5GMB.

Notice of an expedition by members of the Argentine RC on board the Argentine Navy's newest ship *Bahia Paraiso* was received too late for inclusion in the February issue. However, it is possible that the last part of its progress through the South Atlantic islands may still be under way. Visits were planned to Antarctica, South Shetland Is, and South Orkney Is. An illegal operation from South Shetland Is by LU5ZY was also possible. Located north of 60°S, this area is not defined by the Antarctic Treaty of 1961 as being international, and it is unfortunate that ARRL refuses to accept this fact when deciding on the acceptibility of such operation for DXCC credit.

The Third Annual Mad River RC contest expedition to Anguilla was planned to run from 15 February until 10 March. It was hoped to take part in major contests during this period with the callsign VP2E. Outside contests operation will be on all bands 1·8 to 28MHz on cw, ssb and rtty —believed to be perhaps the first activity on the last-mentioned mode from Anguilla. At these times the group will concentrate on working non-W/VE countries. Operators will include K8ND (as VP2EV), AD8J (as VP2ED, AA4NC (as VP2EE), WA8CZS (as VP2EJ), WB8VPA (as VP2EX), and WB6SHD (as VP2ESE). In addition K8CV, WB8DQP and W0RLX will be with the party but their individual callsigns were not known at the time of writing. QSLs for individual callsigns go to their home QTHs.

K9BJ will be VP2VHV from British Virgin Is from 18 to 25 March and will be on all bands 3·5 to 28MHz with the emphasis on 28MHz. Immediately following this he will move to the US Virgin Is and operate as KP2AF until 29 March.

VK3OT was expected to be on the air from Cocos Keeling Is for two weeks from 27 February as VK9YT. On 14 March he should become VK9XT for a further two weeks from Christmas Is.

W8UVZ and WB8LDH will be in Grenada with J3 calls between 1 and 10 March.

Forecasts are that K4YT should be in Congo (9Q) on 3 March, Kenya (5Z4) on 18 March, Seychelles (S7) on 2 April, and Ethopia (ET) on 9 April. He will be on the air if at all possible from each location.

Iris and Lloyd Colvin concluded 20 days on the air from Guyana on 11 January after making 9,000 contacts with a total of 144 countries. They were specially active on 7MHz. Operating permission and customs clearance of their equipment took three weeks to obtain, and they were told that they were the first visitors to the country who came solely to operate amateur radio. Following Guyana the Colvins moved on to Surinam where they operated as W6KG/PZ1.

The Imperial College ARS hopes to be operating from Andorra for about two weeks commencing 26 March. All bands 3·5 to 28MHz will be covered

Les Sampson, 7Q7LW, currently the only amateur on the air from Malawi, at the operating position at G3GIQ's home

* 10 Knightlow Road, Birmingham B17 8QB

on both cw and ssb. Equipment will be an FT902DM and probably simple dipole antennas. Anyone needing further information or wishing to make schedules should contact the club via G5YC, QTHR.

DX News Sheet

Congratulations are due to Geoff Watts on the issue of his weekly bulletin No 1000 on 27 January. This represents a quite extraordinary achievement—unique in the writer's experience—where one individual has continued to produce such a news-sheet for over 20 years. Subscribers will appreciate the enormous amount of work which has been put into the venture by Geoff. Long may it continue!

DX news

Those of us who often hear KV4AA on the hf bands will not be surprised to learn that Dick made 25,720 contacts during 1981. This brings his total for the six-year period from 1976 to 195,000.

WB0MKR/KH3 is on Johnston Is, and is likely to be there for the rest of 1982. *DX News Sheet* reports that he is sometimes active on 14,310kHz at 0400 on Tuesdays. Other sources say that he meets QSL manager KB2RV at that time on 14,280kHz. ZK1BM left the North Cook Is in mid-January, but ZK1CG should start a three- to six-week visit there sometime during March. He will operate on all bands 3·5 to 28MHz on cw and ssb.

Activity from Chatham Is can be found between 14,210 and 14,230kHz most days after 0700, in the shape of ZL4PO/C or ZL3PA/C. ZL3AFH/A is frequently near 14,005kHz after 0730. VK0AN on Macquarie Is to be found on Saturdays at 1000 on or near 14,165kHz—a list of those wishing to contact him is sometimes prepared by VK6AJW or VK6IH. VK9ZH meets his QSL manager on Tuesdays and Thursdays at 0930 on 14,331kHz, he is also often to be found in the Open House Net on the same frequency after 1030. FB8YI has been noted at 1800 in the "French" area of 14MHz between 14,100 and 14,110kHz.

Long Skip reports that OK3TAB was due back in Angola in January for a three-month stay, during which time he hoped to be OK3TAB/D2A once more. F6BJY is also supposed to be visiting the same area and hoping for a licence. 3C1AB, from Equatorial Guinea, operates on Sunday mornings at 0900 on 21,300kHz—QSLs go to EA1QF. Lucien, FH8CO, has left Mayotte and returned to France. His successor is also a licensed amateur but at the time of writing had not yet received his FH call. 3V8AA still has two years of his five-year contract in Tunisia to complete, and is often to be found on 28,605kHz at 1400 on Fridays. On other days at the same time look for him near 28,535kHz.

Amateurs in the Gambia are now using two numbers in their prefixes—Andrew, formerly C5AAP, now being C53AP. Gambia and Senegal united to become one country, Senegambia, on 1 January 1982. Possible DXCC changes might logically result in deletion of the two former countries from and the addition of the new one to the DXCC list.

Changes in the US Trust Territories in the Pacific will occur during 1982. According to *Long Skip*, some, like the Mariana Is, have elected to become a commonwealth within the USA (like Puerto Rico) and will be known as the Commonwealth of the North Marianas. One new nation will be the Federated States of Micronesia, which will probably include the Marshall Is and all the Caroline Is, except Palau Is which became the Republic of Palau last year. It remains to be seen if the new area will be separated into Western, Central and Eastern Micronesia, thereby following the precedent set in Kiribati.

GM3ITN has supplied up-to-date news on VP8 activities. He confirms that VP8AEN will be staying on South Georgia for another year and should be working the dx—Les has a schedule with him on 14,127kHz at 2000. VP8AJL left South Orkney on 28 January. QSLs for both stations and VP8AEI are being dealt with by Les himself or by GM4KHE, and will be answered as soon as the logs arrive—passing logs over the air became very difficult when winter conditions set in, and Les asks for patience from those waiting for confirmations.

DP0LEX began operation in mid-January and will remain at Atka Bay (70°37′S, 8°22′W) until May 1983. The operator is DK6RK who looks specially for German stations at 1700 and 2000 on Mondays; 2000 Thursdays; 1600, 1800 and 2100 Saturdays; and 1800, 2000 and 2100 Sundays. Frequencies used are 3,515, 3,650, 7,015, 7,060, 14,015, 14,205, 21,015 and 21,210kHz, and DP0LEX calls first for 10min on 21,015kHz. If no contact results he QSYs to 14,015kHz, and if conditions are good then moves to the ssb frequency. Normally he calls DL6NI—and possible callers are asked to please wait until this contact is finished before calling. QSL to DL6NI (see "QTH Corner").

Stations using the 6D5 prefix were celebrating the fiftieth anniversary of the Mexican national society LMRE. Another special prefix in use recently was CG5, which was used by VE5s in Moose Jaw—this marked the town's centenary celebrations.

At a recent meeting of ARAB, Allan Papworth, ex-A9XDB (now G3WUW), took this picture of the QSL Bureau operation—under a tree! QSL manager Ian Cable, A9XBW (left), is handing cards to Bob McCredie, A9XCX

G3KPO reports that KH6IJ is particularly anxious to contact UK stations, and can often be found between 0900 and 1000 on 14,015, 21,015 or 28,015kHz depending on propagation. UK contacts are also being sought by VS6BS, who is on 21,155kHz daily at 1300.

The new hf bands

At the time of writing (late January) the Society was still awaiting a decision from the Home Office on permission to use the 18 and 24MHz bands. At the same time it was known that amateurs in certain European countries had been given consent. Denmark, the Faeroe Is, Greenland, the Federal Republic of Germany, and Switzerland have this (for operation of course on a non-interference basis), all except Switzerland being limited to A1A operation at reduced power input. However, OE and F stations have also been heard.

On 10MHz the position is much clearer, and many countries are being logged. Very few breaches of the agreement to restrict use to narrowband modes have been noted, and regrettably most of these seem to have involved UK stations who were determined to exert their "rights" rather than consider the narrow width of the band and how to make room for the maximum number of potential users. Unfortunately the USA administration has not yet released the band and no date for this event has been given. In the meantime USA stations have been working crossband by transmitting on 14MHz and listening on 10MHz. The *DX Bulletin* suggests that USA stations looking for such contacts call near 14,070kHz.

SSTV

G3WW writes "New sstv stations continue to appear on the permitted bands worldwide. During 1981 G3WW had two-way sstv contacts with 94 newcomers in 24 countries, compared with 189 in 27 countries during the previous year. All W call areas were worked but seven states are still needed for SSTV WAS (already held by G3IAD). Three-colour sstv now appears to be the "in" thing. Methods include using three Robot 400s (G3NOX), a 400 with WA7WOD's three-memory substitute (G3MES and ZS6BTD), 400 or SC77s with two W9NTP designed memories (produced by G3GGJ from negatives sent by W9NTP) (G3WW, G4CZT, G3JRL etc), VE3EGO's 300 memory unit with a 400, DL2RZ's commercial scan-converter SC-422a with two or three memories (ZS6BTD, GM3KJF, SM5EEP etc), and G3OQD's home-designed-and-built three-memory scan converter with computer control. A steady stream of colour pictures flows between the USA, UK, South Africa and Italy, as well as within the UK. Black and white pictures still far exceed colour in number.

Hong Kong activity days

During the period 0001 3 April until 1700 4 April a special effort will be made by VS6 stations to be on the air and to give out as many contacts as possible. Although not a contest, VS6s will give signal reports plus serial QSO numbers, and others are asked to give reports plus *CQ* zone in return (UK is in zone 14). Suggested areas of activity are: 3,502, 3,770, 7,002, 7,070, 14,025, 14,170, 14,220, 21,025, 21,270, 21,320, 28,025, 28,470 and 28,520kHz. HARTS asks those sending QSLs to VS6 stations to check whether they have QSL managers before sending them to the VS6 bureau. The bureau itself is financed from the proceeds of the two very attractive awards described in the "Awards" section.

QTH CORNER

CR9BH	M. Laine, Pyorrekuja 4 C 43, SF-01600 Vantaa 60, Finland.
DP0LEX	J. Andresen, DL6NI, Moninger Berg, D-8437 Freystadt, FR of Germany.
EP2SV	(1977-78) D. Wolkow, NB60, 5615 Marengo Av, La Mesa, Cal, 92041, USA.
J6LOV	K2QIE, E. J. Mason, 129 Cherry Hill Rd, Maine, NY, 13802, USA.
SP2BHZ/JW	now via SM5DQC, O. B. Magnusson, PO Box 110, 59900 Odeshog, Sweden.
LU5Z-expedition	LU2A, C. Correo 100, Suc 28, 1428 CF, Buenos Aires, Argentina.
M1J	Ca Raggio Borgo, 47031 Domagnano, San Marino.
K3SA/PJ3	R. Haase, 674 Valley View Lane, Strafford, Wayne, Pa, 19087, USA.
W6KG/PZ1	YASME Foundation, PO Box 2025, Castro Valley, Calif, 94546, USA.
V3ME	via G3OGO, J. Nisbet, "Rushmere", Marley Lane, Haslemere, Surrey, GU27 3RF.
VK9NYG	via VK6NE, N. Penfold, 388 Huntriss Rd, Woodlands 6018, W Australia.
VK9ZD, VK9ZG, VK9ZH	now via VK6YL, Mrs. G. Weaver, 23 Corbel St, Shelley 6155, W Australia.
VP2VIC	J. Weber, KA2IXW, Rd 1 Box 89c, E. Chatham, NY, 12060, USA.
YI1AS	via DK2OC (new QTH) U. Adelung, Klokstopstr 2, D-1000 Berlin 21, FR of Germany.
ZD8MW	via G3GIQ, H. Lewis, 271 Popes Lane, Ealing, London W5 4NH.
3A2 QSL Bureau	24 Av Prince Purre, MC Monaco.
3D6AE	PO Box 1334, M'babane, Swaziland.
3V8DX	via G3SVK, F. Curtis, 32 Elgin Av, Harold Park, Romford, Essex.
4X4NJ	via WA4WTG, R. Kaplan, 445 NW 202 Terrace, Miami, Fla, 33169, USA.
5B4JE	Aris Kaponides, PO Box 1723, Limassol, Cyprus.
4X4VE/5N8	Box 439, Kano, Nigeria.

Welcome

The Society is happy to have recruited the following overseas members during November 1981: EI3B, EI3DV, EI5EM, EI9P, F6CTT, G4AMJ/W0, N6FFG, ST1KR, TF3US, VK5ZAA, VS6EM, ZB2J and ZS6AOG, and also J. Fowtenla (EA), D. J. Finegan (EI) and A. Amit (4X).

Contests

4th His Majesty the King of Spain Trophy

2000 24 April to 2000 25 April

All modes, 1·8 to 30MHz. Work Spanish stations, each of which counts as one point, "only one QSO per station in each frequency and type will be accepted". A 4h rest period must be taken, and operation on each band must continue for at least 15min at a time. Send RS/T plus serial QSO number (from 001)—EA, EB, EC and ED stations will send report and province indicator. Final score is total QSO points multiplied by the total provinces worked on each band added together. EA3RCC counts as a separate multiplier. Logs should be posted before 30 June to Agrupacio Radioaficionats Calella, Apartado 181, Calella (Barcelona), Spain, enclosing four ircs or US $2. Those making a minimum of 75 QSOs will receive the commemorative award, as will listeners logging 150 contacts. World winners will receive their prizes in Calella during October.

Don Atkinson, J3AH, and the equipment which he kindly allowed GM4CHX/J3 to operate during his recent visit

CQ WW WPX Contest (SSB)

0000 27 March to 2400 28 March

1·8 to 28MHz. Contacts with stations in one's own continent count two points on 14, 21 and 28MHz, and four on the other bands. Contacts with stations in other continents count three and six points respectively. Stations in one's own country may be worked for multiplier credit only. The multiplier is the total number of different prefixes worked—each counts once only irrespective of band. Exchange RS/T plus serial QSO number (from 001). There are single-operator single- and multi-band, and multi-operator single-transmitter all-band categories. The latter must use only one transmitter and one band during the same 10min period (QSYing to another band to work a multiplier during this period is forbidden). There is also a multi-operator multi-transmitter category in which all equipment must be "within a 500m diameter". The final score is total QSO points multiplied by the total number of prefixes worked. There is a QRP section for stations with no more than 5W output, and "QRP" must be indicated clearly on the summary sheet. Note that single-operator entries may only operate for 30h with the 18h rest period taken in up to five sections. They must operate for a minimum of 12h to qualify for an award, and multi-operator stations for 24h. Logs should indicate date, time, station worked, numbers sent and received, if new prefix, and points claimed. A prefix check list must be included. Entries must be posted before 9 May to: "CQ Magazine", WPX Contest, 76 N Broadway, Hicksville, NY, 11801, USA. Please mark entries clearly as "SSB". (There is a cw section in May.)

The Bermuda Contest

0001 20 March to 2400 21 March

A reminder that full details of this contest appeared in February *MOTA*. Descriptive brochures and log and summary sheets are still available from G3FKM.

CARF Commonwealth Phone Contest

1200 10 April to 1200 11 April

Amateurs licensed to operate within the Commonwealth or British Mandated Territories may take part. J3E only on the 3·5 to 28MHz bands —suggested that activity is centred on 3,600, 3,780, 7,080, 14,180, 21,200 and 28,480kHz. UK stations may not work each other. Exchange RS and serial QSO number (from 001). Each QSO counts five points, and there is a bonus of 20 points for each of the first three QSOs with each Commonwealth call area on each band. Separate logs must be submitted for each band, and they should include a checklist of call areas worked on that band. Entries may be multi- or single-band single-operator. Entries must reach CARF Contests & Awards Committee, PO Box 2172, Station D, Ottawa, Ont, K1P 5W4, Canada, no later than 1 June. Official summary sheets are available from this address (sae and irc please).

In the 1981 contest **G3FXB** had the highest UK score in the multi-band category with 6,360 points. G4APL scored 2,465, and G3ZRL 815. **GW3MPB** scored 390 points on 14MHz.

Awards

Nine Dragons Award

For confirmed contacts with one VS6 plus one country in each of *CQ* zones 18, 19, 25, 26, 27, 28, 29 and 30 since 1 January 1979. Send certified log extracts plus USA $3 or 25 ircs (or equivalent) to HARTS, PO Box 541, Hong Kong.

Firecracker Award

For six confirmed contacts with different VS6s since 1 January 1964. This award costs USA $2 or 15 ircs and application is as above.

Around the bands

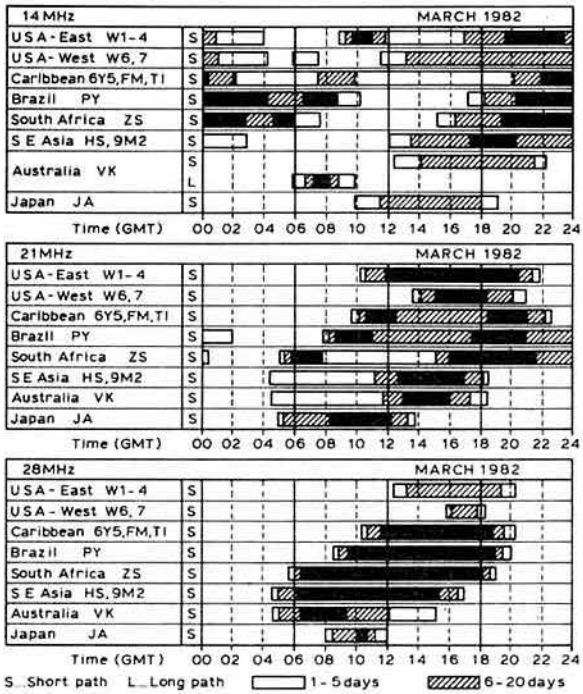
A rather short report from G8KG this month, which reads as follows: "January saw a distinct drop in mean solar activity which marked the end of the recent outstanding spell. Early in the month the 27-day average solar flux dropped below 200sfu for the first time for 150 days, and continued to fall steeply to level-off at around 150sfu.

"The low for the month was on 13 January when the daily value was 132sfu, while on 27 January the daily value again topped the 200 mark. These values are more typical of this stage in the cycle than were those of recent months, and they are still high enough to give good conditions on the higher hf bands."

The 10MHz band clearly has great potential with long-path openings into VK and ZL in the morning, and SE Asia in the afternoon. VK and ZL signals seem to be present during most of the day. On 3·5MHz JA signals have been heard coming via the long path in the morning, and similar openings into the Pacific have been noted around noon on 28MHz—a time when it can be interesting to point the beam southwards.

Many thanks to the following for sending information this month:

Propagation predictions



At the time of the March equinox the distribution of F2 mufs is almost equal in the northern and southern hemispheres, and the seasonal decline in F2 mufs will also continue during March. This will be most noticeable on **28MHz**, and most probably North America will not be heard on this frequency with as much certainty as during the previous month. Traffic with all other continents will be possible, even if only for brief periods.

At present the conditions on **21MHz** will not be affected by the changes in daytime frequencies. Lengthening days in March mean that both **21** and **28MHz** will remain open longer in the evening. Seasonal changes mean that dx will be possible on **14MHz** during the latter half of the night, but only in April will this band become an expressly night-time dx band.

During the time of the equinox, dx via the indirect path is hardly possible on **21** or **14MHz**; an exception is traffic with Australia via the indirect path which will often be more favourable than the direct path. Traffic with Hawaii and Alaska will be possible on **14MHz** under favourable conditions between 0700 and 0930gmt and from 1700 to 1900gmt. As the great circle in this case leads through the polar light zone, traffic will be frequently interrupted by static.

The **7MHz** band will still offer usable dx chances during March when the longest part of the path lies in darkness. Eastern North America will be heard on this band from about 2200gmt until shortly after sunrise. It may be possible to work western North America on **7MHz** from about 0330 to 0630gmt, and, under very favourable conditions, Hawaii and Alaska from about 0430 to 0600gmt.

On **3·5MHz** traffic with the east coast of the USA will be possible from about midnight to 0530gmt. During the latter half of the night local traffic on this band will be interrupted by the dead zone.

The provisional mean sunspot number for January 1982 was 110·7. The maximum daily number was 237 on 31 January, and the minimum was 46 on 11 January. The predicted smoothed numbers for February, March, April, May, June and July are 124, 122, 120, 118, 115 and 113 respectively.

HF propagation study

Band predictions for March 1982

	28MHz	21MHz	14MHz	10MHz	7MHz	3·5MHz
UTC	000001111122	000001111122	000001111122	000001111122	000001111122	000001111122
	024680246802	024680246802	024680246802	024680246802	024680246802	024680246802
EUROPE						
Moscow	....256651..	...1788996..	1..776677962	633544445798	875311112588	+42.....25+
Malta	....466652..	...18999981.	31.777778985	874754446899	998521123689	++52....3++
Gibraltar	.....44332..	....5888871.	11.187778983	762665555899	998642223589	+++3....2++
Iceland	......111....	.....36664..	37778861	32.165556786	884542223568	+++3....24+
ASIA						
Osaka	....461.....	...387521...	1..153225653	....2...3674	361	.....3.
Hong Kong	...278862...	...36767751.	2...23225875	2.....3687	365	32
Bangkok	...3788872..	...35777871.	3....2225886	4.....3688	2.....367	34
Singapore	...4788882..	...35767871.	3....2125886	3.....3688	1.....366	33
New Delhi	...488883...	...45667821.	521..1125787	83.....3689	61.....378	3.....45
Teheran	...5889982...	...755678821	7352..126888	973.....3689	851.....367	52.....45
Colombo	...5889983...	...445678831	62....126898	83.....3689	5.....367	2.....45
Bahrain	...68+9984...	1..655678842	8552..125899	973.....2689	851.....367	52.....45
Cyprus	...3899984...	...788889931	743654557898	986421224799	8841....1578	++2.....25+
Aden	...6++++961.	311644578975	9752...25899	984.....2689	861.....377	53.....44
OCEANIA						
Suva (S)	.....1332....	....2666751.	...45322572.	....43...25..	....2....3..	.....
Suva (L)	42..532..275	442486533785	..275211573.	....42...251.	....2....2..	.....
Wellington (S)	.....14543...	...16776751.	..165322584.	....43...362.	....1....3..	.....
Wellington (L)	32..41....55	552285311286	113652114752	.143...252.	....1....2..	.....
Sydney (S)	...2787741...	...68767871.	...353225862	....2...3651	.....33....	.....
Sydney (L)	....21....22	221.7531..76	1.1363113673	....13...1551	.....22....	.....
Perth	...5898631...	...567678621	4...22126897	2.....3686	.....364...	.....4.
Honolulu	.....2.....	.....21.462.	.1124322551.	...3531..22...	...13.....	.....
AFRICA						
Seychelles	...56788552.	311533678975	974...125899	961.....2689	84.....367	5.....35
Mauritius	...58++++9731	411544678986	973...125899	961.....2689	83.....377	5.....45
Nairobi	1..587888842	631643478998	9962..25899	985.....2688	872.....377	54.....44
Salisbury	2..4788+9964	851744468999	9973...25899	995.....2688	873.....367	54.....34
Capetown	2..288+++976	84.665568999	99661..15899	9973....2589	885.....367	5+2.....45
Lagos	42.19+++++986	972574447999	99872...3899	8985.....589	7872.....367	454.....35
Ascension Is	32..8+778755	883385435899	99975....599	88862....279	7773.....58	444.....25
Dakar	22..8++++++74	873186445899	999751...599	98863....379	7773.....58	544.....25
Las Palmas	....5998883.	11..89888984	886676556799	999753223589	888521....268	++52.....4+
S AMERICA						
South Shetland	21...48++974	763236667888	899752113357	78863....125	5673.....2	234.....
Falkland Is	11...16++++74	763167666688	999762111158	89863.....25	7873.....3	4+4.....
Rio de Janeiro	11...8866773	663147544588	999753....69	98863.....37	8773.....5	544.....2
Buenos Aires	.1..26+88873	553177654588	9997631...37	89863.....15	7873.....2	4+4.....
Lima	988862	221.42654356	8985631....5	79863.....2	58731.....	254.....
Bogota	888861	221..3654356	8884431....6	89863.....3	68741.....1	354.....
N AMERICA						
Barbados	.....6+88872	221.17644477	9985531...38	99863.....5	88731.....3	554.....
Jamaica	888861	11...2664456	88745321....6	79863.....3	58741.....	254.....
Bermuda	2888861	11...6665576	88734321...37	89863....15	68741.....2	454.....
New York	577751	1....3675675	77523322.136	798531....4	57731.....1	254.....
Mexico	.....7774.	1....365444	67524222...2	488531.....	16731.....	.34.....
Montreal	.....57774.	1....3666675	775233221147	798531....14	57731.....1	244.....
Denver	.....1453.	1.....47553	56413.1231.3	37853.....	15731.....	.24.....
Los Angeles	.....452.	1.....27542	453131.241.1	258531.1...	3731.....	.4.....
Vancouver	.....11.	3541	44213..15322	25753...2...	2531.....	.2.....
Fairbanks	.....	.....1122.	331242225654	245531..2322	.133.....1..	.....

G2HKU, G5JL, G3s AGZ, BDQ, GIQ, GVV, IMW, KDB, KSH, LPS, MWG, SFT, UDA, XBY, GM4CHX, G4s DJX, EHQ, GW4KGR, G4s LDS, LRS, NKM, and RS25429 and 1066.

Stations listed in italics were using A1A.

1·8MHz. 0000 SP5IXI/OE6, **0100** 9H1BB. **0500** EA6CE, NP4A, VE1YX. **0600** NF4C. **2100** *KP4KK/DU2, VK6HD.* **2200** *UA9CM, UL7OO.*

3·5MHz. 0200 *OJ0AM.* **0400** VP5GT. **0500** HK0FBF, W6KG/PZ1. **0600** *EA9EU, KX6QC,* FM0GA. **0700** J6LOV, TG9AL, 6W8AR. **0800** FK8CR, FK8DR, FM7CD, H44SH, JA (LP), N7RK, W4, ZL1s AZV, 2BT. **0900** KR2N. **1500** ZLs. **1600** JA6BJT, VE7FG, W7FU. **1700** ZL1AXU. **1800** EL8H, JA6XMM, **1900** JA3LIU, *JA* (until 2300), UH8EAA, VK2AVA, OE5JTL/YK. **2000** SV (near 3,695kHz), VK5WO. **2100** 9H1EU. **2200** JA3EMU, KE1Y, N1ZZ, DF3NZ/ST2, UK9ABA, 5B4JE. **2300** CT2DP, KR2N, UG6GDS.

7MHz. 0000 W6. *PA0VDV/3A.* **0100** *FM0GA, SP2BHZ/JW, UA1PGO.* **0200** VP2MGP. **0400** VP5WJR. **0700** CE6COR, EL, FK8CR, HC6XE, HH2GB, HI, LU5ZI, VR6TC, *W6-W7.* **0800** *JA1JAN, VK0RT,* ZF2DX, ZL4OY/C, 6D5ZAA. **0900** *JA.* **1500** *W6.* **1600** *N6RA, UA0BBN.* **1700** D68AM, *UH8GAA,* VU2RAK, I2QEN/5N2. **1800** *JA,* TR8DX, YB0WR, Z21EV. **1900** A71AD, T5TI. **2000** *CN8CY, VK3MR.* **2200** DU6JF, HL4YJ, 4U1UN.

10MHz. 0000 *C6ABA.* **0700** *ZL4LZ.* **0800** *VK2, VK3AUQ, VK7BC, VK9NS, ZL4LZ.* **0900** *C6ABA, FC9VN, I5SMX, VK, ZL.* **1000** *C6, VK, ZL.* **1100** *OX3CS, ZL.* **1200** *ZL3GO.* **1400** *OY7ML, VK9YC.* **1500** *VK6CW, ZL1, 9K2DR.* **1600** *EA6EU, UA3DJK.* **1700** *OX, OY, VK2, ZL2, 5N0WRA.* **1800** *EA8AK, JW5OD, P29DH, VK, ZL.* **1900** *FK0VU, HV3SJ, OX3CS, P29DH, VK, ZL, ZS1JT.* **2000** *VK, ZB2BL, 4X4VE/5N8.* **2200** *4U1ITU.* **2300** *DL2GG/YV, W6QL/8R1.*

14MHz. 0000 *VE7, VP8ANT, 4K1A.* **0600** *SU1AA.* **0700** LU5ZI. **0800** JT60UB, VK9NS, ZLs, ZL1AZV/C. **0900** KL7, *VK0AN,* YI1BGD. **1200** *C31XO.* **1300** KH0AC. **1500** *VS6DF.* **1600** DX1F, *VS5SS,* W6-W7, *PA0WRS/3A,* 3V8BZ, **1700** *FR7AI/J, KH6AA. KH6JWK, ZL, UA1GZ/4K1.* **1800** ZL, *K6BJC/3B8.* **1900** *KH6IJ, K1BT/3B8* , 3C0BC, 4K1A. **2000** *FP8HL.* VP8ANT, W7. **2100** 9U5WR. **2300** *SU1IM,* VP2VJ.

21MHz. 0800 JA (until 1100), VK (until 1400), ZL (until 1400). **0900** JD1BAE, LU5ZR, VP8ANT, *4S7EA.* **1000** CR9AN, 3C0AC, 9G1OC, 9N1MM. **1100** FG7BV. **1200** *HC7CM,* E. coast W (until 1900), 5N6AKD/1. **1300** EA9XD, VK9XW, *VP2MIX,* VS5DD, *"3Y6CD".* **1500** W. coast W (until 1900). **1600** XT2AT, VE3FXT/Z2, 3C0AC, 3D6AE. **1700** DJ0GF/FG7, HK0FBF, JY9AA, M1C, VE8XO, VQ9JB. **1800** LU5ZI, 5H3BH. **1900** A9XDO, W6KG/PZ1.

28MHz. 0900 JA, VK (until 1300), VS6CT. **1000** CN8CY, KA6CMD/KH2, LU5ZI, VK9NYG, YI1AS, Z21EW, W6YB/3D6, 9J2BO. **1100** AP2B, KH0AC, VK9YC, VS6, (E. coast W (until 1800), 3V8AA, 9N1BMK. **1200** A9XP, C53DY, C6ANU, FY7KRU, J6LOV, J28DL, JX5VAA, JY9AF, LU5ZR, VK9NYG, YJ8NPS (LP), 5T5RR, 5N8ASS, 8P6. **1300** CE0AE, KP4KK/DU2, V3ME, VK9XW, W6QL/8R1, 4S7MX. **1400** J73PP. **1500** HK0COP, SP2BHZ/JW, DL2VK/ST3, DF4SU/ST2. **1600** C53AP, HR1AVS, J3AJ, PY, TI2PZ, VP2s KBS, VIC, W7XJ (W. coast W until 1900), 3C0DC, 9G1JZ. **1700** CO, FS0YDP, K3SA/PJ3. **1800** ZD8TC, ZP5XAA, 7Q7LW.

Once again thanks to all who contributed to this month's column, and also to the authors of the following: 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* **(PA0GAM)**, *CQ Magazine* **(W1WY)**, *DXNL* **(DL3RK)**, and the *Lynx DX Bulletin* **(EA1QF/EA2JG)**.

All contributions for **May** issue by **23 March** please **(NB—this is very early)**, and for **June** by **27 April**.

COUNCIL PROCEEDINGS

A brief report on the Council meeting held on 21 November 1981

Present: Mr B. O'Brien (President, in the chair), Dr E. J. Allaway, Messrs J. Anthony, R. G. Barrett, J. Bazley, R. Bellerby, Dr D. S. Evans, Messrs K. A. M. Fisher, L. N. G. Hawkyard, Mrs J. Heathershaw, Messrs G. R. Jessop, G. I. Knight, I. J. Kyle, W. J. McClintock, D. M. Pratt, G. M. C. Stone (members of Council), D. A. Evans (general manager/secretary), A. W. Hutchinson (editor), and Mrs H. M. Allin (minutes secretary).

The President said it was his sad duty to inform Council of the death of Mr C. H. Parsons, GW8NP, a past-President of the Society. A minute's silence was observed.

Mr O'Brien thanked Council for its support during his Presidential year. The President added that in the past year he had attended many radio functions around the UK and overseas. He was convinced that RSGB representation at foreign events was a great investment for the Society, and he had been impressed by the high esteem with which RSGB was held. Mr O'Brien expressed his gratitude to his wife for her assistance during the year and also to HQ staff.

Apologies for absence were received from Mr P. F. D. Cornish, G3COR.

Financial report
In the absence of the hon treasurer, the President commented on the accounts for the three months to 30 September 1981.

General manager's report
Mr Evans referred to the sustained growth of the Society's activities, particularly in relation to the 12 per cent increase in membership in the last financial year, and the effect this had on headquarters administration. He went into some detail on the increased work load on staff, and possible ways of coping with this, and reported that the Finance & Staff Committee had approved the appointment of a third membership services officer and the purchase of an additional computer work station to improve services to members.

The general manager reported on the position regarding nominations received for the Council election.

Honoraria
Council approved payments of honoraria to QSL Bureau sub-managers, Intruder Watch organizer and observers, awards managers, slow morse transmission organizer, trophies manager, tape lecture organizer and the Raynet registration secretary and supplies officer.

Telecommunications liaison officer
The position of telecommunications liaison officer, left vacant by the death of Roy Stevens, was discussed at length. It was agreed not to appoint a new telecommunications liaison officer, and that day-to-day liaison should continue via the general manager. He would be responsible for correspondence and other communications and for keeping proper records where matters of policy were involved, and would maintain close liaison with the spectrum managers and the chairman of the Telecommunications Liaison Committee.

Membership and representation
Council approved reduced subscriptions in respect of five members.

The results of the recent ballots for representatives for regions 5, 14 and 16 were announced.

The appointment of the following new and re-registered area representatives was approved: G. Adams, G3LEQ, N Cheshire; P. G. Brooker, G3WXC, Isle of Wight; J. Chapman, GI4LVC, Magherafelt and district, Co Londonderry; I. F. M. Duthie, G8TCJ, N Cumbria; G. D. Edy, G4AXD, Maidstone and district; J. C. Greenhow, G3PEY, Tunbridge Wells; F. Harrison, G3XII, Leyland, Chorley area; J. Heywood, G4IAL, Stockport and district; F. R. Howe, G3FIJ, Colchester; B. Jones, G8ASO, Worcester; E. C. Jones, GW4JPP, Tywyn, Gwynedd; A. B. Langfield, G3IOA, Greater Manchester (NE); L. D. E. Light, G3KDL, Harrow; L. V. Mayhead, G3AQC, Farnborough; A. C. A. Newman, G2FIX, Salisbury; G. W. A. Pople, GM4DKL, Highland area; T. Riggott, G4MFU, Leicester; A. Thorne, G3ART, W & S Cumbria.

RSGB and CCIR
Dr Evans felt that links should be increased, and he drew Council's attention to a paper on this subject written by Mr Phillips, G4IQQ, and appended to the minutes of the Technical & Publications Committee.

The need for Society input to CCIR to be of good professional standards, and the importance of increased links at a professional level was agreed.

Awards
It was agreed to award the Founders Trophy to Mrs F. E. Woolley, G3LWY, (for her work on behalf of RAIBC). It was decided not to award the Calcutta Key this year.

Raynet
Mr Fisher outlined the problems regarding the loss of two Raynet frequencies, 144·850 and 144·875MHz, following decisions taken by the IARU Region 1 at its Brighton Conference. Following discussion, he undertook to meet members of the Raynet and VHF Committees to discuss the band plans.

Repeater callsigns
Mr Fisher spoke of correspondence on the subject of allocation of callsigns for repeaters. Mr Fisher had replied that the letters forming a callsign were not to be considered unique and indeed, with the present number of licences and complexity of the licensing system, the present method of allocation was, in his opinion, satisfactory. His reply was endorsed by Council.

Observation Service
Following a brief report of a transmission from Dulwich, Mr Pratt confirmed that standard letters were despatched to amateurs heard contacting suspect operators.

Mr G. M. C. Stone
Mr Stone had to leave the meeting at this juncture and, it being the last meeting of his present term of office, the President wished him well for the coming year, thanking him for his past attendance and contributions to Council.

Review of committee business
Education
Mr Bellerby enquired about the paper produced by Mr Benbow on the future of the RAE, and Mr Anthony agreed to circulate this paper to Council.

Finance & Staff
Dr Allaway reported that the committee, having considered the general manager's report on the present difficult working conditions at HQ, recommended to Council that a new headquarters be found as a matter of urgency and that the committee be asked to formulate proposals as soon as possible.

It was unanimously agreed that such steps were essential.

HF
The minutes of a meeting of the committee were accepted without comment.

HF Contests
The minutes of a meeting of the committee were accepted.

IARU
Dr Allaway reported that Mr C. E. Godsmark, G5CO, had been appointed secretary of IARU Region 1 until the next Region 1 conference, and added that he would be attending future Region 1 Executive Committee meetings as chairman of the IARU HF Working Group.

Interference
The minutes of a meeting of the committee were accepted with one minor comment.

Membership & Representation
It was confirmed that the subject of zonal boundaries was being continually discussed within this committee.

Microwave
Dr Evans requested Council's agreement to a short resumé of the committee's work being given in the *Microwave Newsletter*; this was agreed.

Propagation Studies
The minutes of a meeting of the committee were accepted without comment.

Rally & Exhibition
Mr Hutchinson drew attention to a statement in the minutes which implied that the *RSGB Callbook* was not usually available at the annual East Midlands exhibition. This statement was misleading as the publication had normally been available and had always sold extremely well at this event.

The recommended date of 1 August 1982 was approved for the Woburn RSGB National Rally.

Raynet
The GM was asked to write to ARI requesting details of the recent international meeting on emergency communications.

Much discussion took place on the Home Office ban on emergency communications for use during charity walks/marathons. (It was intended to approach the Home Office on this matter as soon as possible.)

Technical & Publications
Dr Evans reported that the recent IEE lecture, given by G8KG, was first-class, although attendance had been disappointing. Mr Hawkyard spoke of the possibility of his recording the lecture.

In reply to a query from Mr Anthony regarding the committee's comments on the recommendations of the Citizen's Band Working Group, Dr Evans stated that the subject would be fully considered at the next meeting of the committee.

Mr Hawkyard asked what progress was being made on the next edition of the *VHF/UHF Manual*. Dr Evans replied that it was hoped to have this available in 1982.

VHF
The minutes of a meeting of the committee were accepted without comment.

VHF Contests
Council approved the award of the following trophies:

Mitchell-Milling trophy	—Martlesham R.S.
Thorogood trophy	—Mr G. Brown, GJ4ICD
GM4HAM trophy	—Grouse Beaters Contest Group

Finale
Mr Knight said as this may be his final meeting, he wished to thank Council and HQ staff for their co-operation during his period of office.

Mr Bellerby, who had also come to the end of a three-year term of office, echoed these remarks.

Mr Anthony thanked Mr O'Brien for his leadership during the year, and this was warmly endorsed by all present.

YOUR OPINION

THE 144MHz SSB G6BHP
The Editor
Radio Communication
Sir—I am not a selfish person, in fact sometimes I am rather generous. However, there are some things a person likes to keep to himself—his callsign in particular. So if the station using my callsign on 144MHz ssb in Stoke-on-Trent would mind obtaining his own callsign, and refrain from using mine, I would be very grateful.

J. D. Wrighthouse, G6BHP
Altrincham, South Manchester

EQUIPMENT COSTS
The Editor
Radio Communication
Sir—Re the previous letters concerning the excessive prices charged for items of amateur radio equipment in this country, I would like to point out that this "overcharge" condition also exists on the smaller items such as plugs, sockets and valves. To those who spend

(Continued on page 245)

CONTEST NEWS

21/28MHz Telephony Contest 1981 results

The HF Contests Committee makes no apology for the conditions that prevailed during the contest, but it certainly made checking somewhat easier than for a number of years. Entries in all sections were well down on previous years.

The winner of the Whitworth Trophy for the first place in the UK Transmitting section was G3OZF. The Powditch Trophy for 28MHz operation went to G3UKS. The Receiving section was once again won by BRS32525, who also won the Powditch Receiving Trophy for the highest score on 28MHz.

In the overseas section the winner was PP2ZDD by a substantial margin over last year's winner C5AAP. It should be pointed out however that all of C5AAP's points were amassed on 21MHz as he had no opening to the UK on 28MHz.

The committee would like to draw entrants' attention to the rule which asks for summary sheets showing multipliers worked to be submitted with their logs, and points out that of 32 entrants in the UK Transmitting section no less than 11 sent no summary sheet. Five entrants used both sides of the log sheet and the committee *still* gets logs written in pencil. All contest rules are set to make the adjudicators' job as easy as possible and failure to observe these rules could mean disqualification.

The committee would like to thank all entrants for their logs, and the people who took the trouble to send in check logs. Finally to my fellow committee member who finished last year's write-up with the sentence "Dare we say again that perhaps next year conditions could be as good" — no comment!

G3KDB

UK TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	G3OZF	108,780	17	GI4KCE	11,550*
2	G3VPW	92,150	18	G3VAO	9,936
3	G3LDI	72,802	19	G4FOH	9,430
4	G4ICM	45,441†	20	G4FJT	9,120
5	G2QT	44,700	21	G3WBM	9,044
6	G4AFJ	36,991	22	G4MMQ	7,848
7	G3UKS	29,484*	23	GM3ZRT	7,828
8	G4HVR	26,215	24	G4AZN	5,994
9	G3XBY	25,872*	25	G4GNK	4,620
10	G3UDR	25,530*	26	G3XLL	3,813
11	G3TBK	24,832	27	GM4HAM	3,584†
12	GW4BLE	21,402*	28	G3ZGA	2,704
13	GW4BKG	20,757*	29	G2VJ	1,836*
14	G4IUF	14,994	30	G3SWX	1,782
15	G3VJP	13,728	31	G3OLU	1,071
16	G3PJK	12,150	32	G4KAL	461

*28MHz only
† Multi-operator

Check logs received from G3XMV and G4EZA.

UK RECEIVING

Posn	Station	Points	Posn	Station	Points
1	BRS32525	13,572	4	BRS28198	6,765
2	BRS26407	9,804	5	A9191	5,994
3	BRS48909	7,749	6	BRS20249	2,496

OVERSEAS TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	PP2ZDD	17,974	24	I4CSP	729
2	C5AAP	8,106	25	SM0JOQ	702
3	VE1CEG	7,155	26	SP5DRH	576
4	AE4Y	6,300	27	ZD8RH	528
5	UA9CJA	5,385	28	UK6FAA	516
6	KN2N	4,485	29	K3ZO/HK3	432
7	N2LT	4,420	30	VK4LX	375
8	OH1TD/4U	3,780	31	PY4ZO	288
9	UJ8XCW	3,333	32	UB5PBA	240
10	VK5MS	3,234	33	EA4JO	236
11	YU7MAT	2,790	34	Y54TA	132
12	EA8TE	2,691	35	UY5XE	128
13	UA6LBC	2,664	36	JR2QUZ	114
14	UA9CIQ	2,652	37	WA4VEK	96
15	UA9AKO	2,484	38	UA9XWR	88
16	UA6HCS	1,728	39	JA7KM	72
17	UA4ACP	1,631		W4KO	72
18	UA9FCI	1,338	41	OZ5DSB	54
19	KA1UE	1,296	42	JH1GZV	42
20	ZS6KU	1,080	43	UB5FDF	24
21	6W8JU	1,053	44	YU75F/M	18
22	UA6LHB	945		UB5QAV	18
23	SM7AIL	792			

Check logs received from N3BO, SM6FGP, UA3PAV, Y38ZM.

OVERSEAS RECEIVING

Posn	Station	Points	Posn	Station	Points
1	DL-F58-1901024	4,140	6	UF6-012-319	252
2	UP2-038-938	1,023	7	UA3-142-1182	165
3	UB5-066-286	735	8	UB5-073-1610	117
4	UA4-094-762	414	9	Y2-EA-16841/G	36
5	Y2-7215/1	378	10	JA1-22456	24

10GHz Cumulative Contest results

Despite poor weather for many of the activity periods of this contest, activity was good, with a record 72 different stations appearing in the entrants' logs. The contest has now become an important focus for 10GHz operation and it is gratifying to see activity growing. As can be seen from the table of results, over half the entrants had narrowband capability, but this does not mean that good results cannot be achieved with simple low-power wideband equipment (congratulations to the G3ZME group!).

Certificates of merit go to G3YGF/P as the overall winner (he also wins the Alpha Award); G3ZME/P as runner-up, and also as the leading low power wideband station; G3JVL as the leading fixed station; F8WN/P as the leading foreign station; and G8AGN/P as the highest placed station who has not won an award before.

G3WDG

Posn	Callsign	Points	QSOs	Best dx	Km	wb/nb
1	G3YGF/P	4,564	48	G8FWA/P	179	wb + nb
2	G3ZME/P	2,376	37	G8AGN/P	128	wb
3	G3YJH/P	2,108	35	G8EUQ/P	152	wb + nb
4	G8AGN/P	2,036	24	G3ZME/P	128	wb
5	G3WDG/P	1,954	30	G3MTG/P	132	wb + nb
5	G4KNZ/P	1,826	24	G3JVL	178	wb + nb
6	G4KGC/P	1,793	28	G3MTG/P	132	nb
7	G3FYX/P	1,746	28	G3PFR/P	91	wb + nb
8	G8HMV/P	1,684	30	G8GUH/P	104	wb + nb
9	G3IZD/P	1,565	22	F0AKD/P	118	wb + nb
	G8SHF/P	1,565	22	F0AKD/P	119	wb + nb
11	G4EBF/P	1,493	22	GW3YGF/P	123	wb + nb
12	G3PHO/P	1,461	16	G3ZME/P	128	wb
13	G3JVL	1,318	19	GW3YGF/P	178	wb + nb
14	G3PFR/P	1,195	20	GW3PPF/P	137	wb
15	G8EXL/P	1,158	17	G8AGN/P	122	wb
16	G4MBS	1,071	18	GW3YGF/P	149	nb
17	G3AYJ/P	837	17	G8FWA/P	95	wb + nb
18	F8WN/P	583	11	G3KSU/P	140	wb
19	G8GUH/P	454	6	G8HMV/P	104	wb
20	G4CNV/P	446	12	GW3PPF/P	116	wb + nb
21	G2DSP/P	396	12	G3KSU/P	70	wb
22	G4AUC/P	334	6	G3WDG/P	77	wb

§ = Adjudicator
Check logs received with thanks from G3LQC/P, G3MTG/P, G8CXK/P, and G3KPT/P.

Microwave Cumulative Contest 1981 results

Despite a rather low number of entries to this contest, there is an increasing interest in the bands covered by it, and it is hoped that next year will produce more entries! No entries were received for 3·4GHz, although G4MBS was active (he could find no-one else on this band to work!).

Certificates of merit go to the band leaders G4MBS (2·3GHz), G3FYX/P (5·7GHz), and G4CNV/P (24GHz).

G3WDG

2·3GHz

Posn	Callsign	Points	QSOs	Best dx	Km
1	G4MBS	7	1	G8NDJ	7
2	G3FYX/P	0	0	—	—

5·7GHz

Posn	Callsign	Points	QSOs	Best dx	Km
1	G3FYX/P	127	2	G4KGC/P	74
2	G4KGC/P	92	2	G3FYX/P	74
3	G4MBS	71	2	G4KGC/P	35

24GHz

Posn	Callsign	Points	QSOs	Best dx	Km
1	G4CNV/P	30	1	G8SHF/P	30
2	G4KNZ/P	4	1	G3YGF/P	4
	G3YGF/P	4	1	G4KNZ/P	4
4	G3FYX/P	0	0	—	—

October 70MHz Fixed Contest results

Conditions for this event were described as "rock bottom", "terrible", "rotten", etc, and as such it resulted in being a very disappointing contest as far as propagation goes. Heavy rain storms in many parts of the country gave rain-static to make the going even harder for some contestants.

Congratulations to the winner, runner-up and to all contestants for having to endure such appalling conditions.

G4BEL

Posn	Callsign	Points	QSOs	QTH	Pwr	Best dx	Km
1	G3UVR	271	38	YN55	60	G3FIJ	316
2	GM3WOJ	266	26	YP72	130	G8VR	475
3	G3WHK	226	40	ZL49	100	GM3WOJ	467
4	G3UUT	195	33	AM61	100	GM3WOJ	408
5	G3PWK	176	31	AM42	130	GM3WOJ	398
6	G3UAX	158	30	ZL45	40	GM3WOJ	438
7	G3LVP	151	35	AL33	25	G3UVR	320
8	G3VNQ	127	23	YN39	25	G3SHK	296
9	G3NPI	124	24	ZM76	10	EI9Q	387
10	G3BPM	117	29	ZL48	50	G6WR	390
11	G3JEQ	100	22	ZL59	100	EI9Q	—
12	G3OIC	94	22	ZM41	10	GM3WOJ	316
13	G3VIP	86	17	ZN40	80	GM3WOJ	283
14	G4FKI	79	23	AL31	10	G3UVR	260
15	GW4IOI	75	15	YL31	14	G3LVP	325
16	G3IOI	64	18	AL33	3	G3UVR	305
17	G3PWN	59	11	ZO80	30	G3WHK	304
18	G4EYD	56	14	ZM41	30	GM3WOJ	330
19	G8VN	50	12	ZM03	10	GM3WOJ	270
20	G5UM	45	11	ZM35	18	GM3WOJ	306
21	G4APL	44	12	ZL60	20	G3VIP	253
22	GM3TAL	22	4	YQ73	50	G3UKV	375

December 144MHz Fixed Contest results

The last contest of the year continues to be popular and entries have increased by one third. Unfortunately conditions were rather poor, but those stations which managed to penetrate into the Continent were able to establish good scoring rates.

There was little comment on contest rules but several stations failed to notice that Rule 4 required that a fixed station be located at the main address as shown on the licence. It was also apparent that some computer-generated logs were not in the correct format as specified in Rule 13.

Yorkshire station G8LEF headed former winners G4BWG and GJ4ICD in the single-operator section. In the multi-operator section the Norfolk VHF/UHF Contest Group, operating from the main address of G3ZIG, demonstrated mastery of the contest by winning for the fifth year in succession. By scoring at an average rate in excess of 10 points/min they generated a convincing lead over former winner G4BPO. Congratulations to all award winners.

G3VPK

SECTION S

Posn	Callsign	Points	QSOs	QTH	Antenna	Best dx	Km
1	G8LEF	2,875	327	ZN21	4 × 19Y	DK8SG	898
2	G4BWG	2,813	410	ZL60	19Y	DF9QT	660
3	GJ4ICD	2,687	232	YJ70	10P	DJ8PB	699
4	G8GGP	2,470	329	AL52	16Y	DK8SG	643
5	G4CLA	1,827	258	ZM05	16Y	DB6KI	668
6	GJ4JWA	1,728	162	YJ70	16Y	EI9DC	524
7	GM8YJU	1,657	164	YO05	2 × 9Y	G8IQO	512
8	G4DCV	1,394	164	AL67	9Y	DL4YAM	545
9	GW3NYY	1,187	151	XL40	14Y	PA0FHG/A	598
10	G8ULU	1,184	137	AL56	16Y	DF9CY	506
11	GM4CXM	1,088	96	XP09	16Y	G8GGP	595
12	G6FPU	1,012	208	ZM51	19Y	DD3KF	565
13	G4JZF	926	205	YM30	16Y	F1BBD	542
14	GI8TBQ	774	83	XO33	16Y	G4MDZ	575
15	G3ZVW	760	199	ZL40	10P	DF9QT	585
16	G8PJZ	759	181	ZL57	2 × 8Y	GM8NCM	555
17	G4HLX	716	175	ZL34	9XY	GM4CXM	522
18	G4HGU	714	128	YN46	9Y	GU2FZC	440
19	G4MVR	684	183	AL41	11Y	GM6ALC	595
20	G3ZLQ	673	113	ZK17	14P	PE1DTU	458
21	G6ECM	610	115	AL56	8Y	G6DFE	—
22	G8ZPC	609	123	YN69	19ZL	GJ4ICD	444
23	G8TIC	606	128	YM69	16L	GM8MBP	565
24	G8NNJ	566	171	AL31	9Y	GI8TBQ	—
25	G8WPD	565	137	ZN51	8Y	GM4CXM	340
26	G4MID	512	68	AM64	16ZL	DK8SG	667
27	G4JYS	511	121	ZM35	6Q	GI4KIG	465
28	G3PBV	492	68	YK32	9Y	G4BPO	379
29	G4KLN	483	101	ZN32	14Y	G4MDZ	344
30	G4HYG	466	82	YN38	10Y	G4MDZ	360
31	GI4KIG	446	40	WP77	16Y	G4MDZ	681
32	G8KKJ	413	77	AL63	8Y	G6DFE	420
33	G8VPE	408	54	AM29	8Y	DF9QT	477
34	G4KBX	403	43	ZP73	10XY	G8CKZ	464
35	G8MGY	377	75	YN55	10Y	—	—
36	G8JXV	360	116	ZL60	10XY	G8YDW	307
37	G4FVK	353	71	ZM39	9Y	GI8TBQ	405
38	G6AYY	348	56	XK38	9Y	G6ECM	390
39	GI4LKA	347	47	XO21	12ZL	G4BWG	530
40	G8XOS	345	109	ZM63	9Y	GI4JYJ	401
41	G8ZOB	344	82	ZM35	10Y	GJ4JWA	360
42	G4JLG	343	78	YN39	10Y	GJ4ICD	460
43	G4HAY	340	102	ZL30	6Y	GD4IOM	392
44	G8LFB	324	110	ZL30	16Y	PA3ANV	475
45	G8ZVF	303	57	ZN40	8Y	F1KBF	505
46	G8OPS	296	60	ZN68	8XY	GJ4JWA	459
47	G6DVJ	261	79	ZL24	9Y	GD4IOM	340
48	G3XWZ	259	101	ZN64	P	G8CKZ	240
49	G4GTH	258	58	ZK21	6Q	G8YDW	329
50	G6ABT	250	64	ZL24	10XY	GJ4JWA	275
51	G4CIZ	238	44	YK23	6Y	G8LEF	341
52	G6BTB	230	60	ZL24	9Y	G8PNN	410
53	G6CNP	215	77	ZN12	—	—	—
54	G6FFL	208	60	YL38	8Y	GM8YJU	370
55	G4KAL	194	42	ZN40	6Q	GJ4JWA	490
56	G8AKB	188	50	ZM27	10Y	GJ4ICD	385
57	G3ORX	179	39	YL49	8Y	GJ4JWA	245
58	G8XTJ	171	67	ZL27	4Y	G8YDW	244
59	G6DER	168	56	ZN33	10XY	G8DPV	367
60	G8SRL	166	76	ZL67	9Y	GJ4ICD	237
61	G8CKC	158	28	YK23	10XY	G4BPO	365
62	G6AFH	143	59	YN49	8ZL	GM4CXM	263
63	G4ASL	128	47	ZL60	9Y	GJ4JWA	271
64	G6DSA	107	50	YN68	8Y	G8CKZ	310
65	G8WXW	97	37	YN68	8Y	G3NNG	—
66	G3TUX	86	36	ZL77	4Q	G3KQG	247
67	G6AMN	85	59	ZL38	5Y	G4DEZ	97
68	G8TZJ	84	20	YN07	8XY	G8YLH	318
69	G8LXY	79	44	ZL09	5Y	G8DEE	124
70	G8NIP	64	22	ZN18	8Y	PE1AAP	420
71	G6CSY	62	38	AL41	HALO	G8ZMP	151
72	G6FUZ	61	30	YN79	8ZL	GM8YJU	225
73	G8UYD	39	21	ZN64	4Q	G3OUL	125
74	G8UDV	27	27	ZL39	XD	—	—

SECTION M

Posn	Callsign	Points	QSOs	QTH	Antenna	Best dx	Km
1	G3ZIG	5,011	373	AM27	4 × 9Y	DB2RR	799
2	G4BPO	4,465	374	AM77	19Y	DD1SA	692
3	G8ZHP	3,389	260	ZM29	2 × 16Y	DD3UD	770
4	G3NNG	2,583	341	ZL23	16Y	DD0EM	658
5	G4DEZ	2,575	264	AL35	2 × 16Y	DK2JB	648
6	G4MDZ	2,501	257	AL76	2 × 14P	GI4KIG	675
7	G8CKZ	2,294	270	ZK04	4 × 13Y	DK8SG	743
8	G3OUL	2,222	301	YN46	2 × 16Y	DJ1DJ	738
9	G8KUC	2,001	220	AL56	2 × 14P	DJ9BV	649
10	G8YLH	1,789	259	ZL56	16Y	GI4KIG	597
11	G4BRT	1,756	244	ZM76	10Y	DF5PS	627
12	G8RXK	1,381	233	ZL28	10Y	DF9CY	605
13	G8WAQ	1,277	276	ZL38	20L	DF9CY	590
14	G4MHC	1,143	217	YM79	9Y	DF7KF	639
15	G3JRM	1,136	111	AM49	16Y	DK8SG	629
16	GD4IOM	1,096	124	XO67	32L	GU6EFB	541
17	G8IQO	1,076	114	AK12	9Y	DD3UD	641
18	G6AXA	765	148	ZL55	9Y	GM4CXM	564
19	G6CHK	715	194	ZL27	16Y	GM8YJU	450
20	G8DPQ	697	200	ZL68	5/5S	GI8TBQ	495
21	G4GSU	650	130	YN49	16Y	GJ4ICD	475
22	G8WYR	628	135	ZN12	—	—	—
23	G8RAF	544	104	YL56	—	—	—
24	G3GDU	512	123	ZL80	11Y	GM8YJU	467
25	G6CNQ	497	142	AL31	10Y	PA3BRS	497
26	G4MJQ	476	62	AK12	9Y	F1DV	564
27	G8GJZ	475	107	ZL65	9Y	GI4LKA	501
28	G4MWD	455	138	ZL69	10P	DF7KF	495
29	G3IUB	410	130	ZM41	10Y	G4KBX	292
30	G4AYM	400	105	YL19	9Y	G4KBX	364
31	G8AHK	358	130	ZL68	10Y	PE1DAB	461
32	G3KQG	352	70	YK33	8Y	G8RYK	314
33	G8GBY	340	74	ZN19	10Y	GM4JLY	373
34	G3YVR	296	90	ZL80	9Y	G8YDW	320
35	G3CMH	279	64	YK07	8XY	G8VJS	321
36	G6ATW	272	105	ZL18	4Q	G3OUL	245
37	G6CRF	254	113	ZL10	9XY	—	—
38	G4GCT	228	73	YL38	9Y	GJ4JWA	418
39	G3MAR	180	83	ZM41	8Y	GM8YJU	180
40	G8XHA	179	47	YN19	8Y	G8GGP	324
41	G8ZKE	148	65	ZM41	8Y	G4MDZ	253
42	G6UW	133	38	AM61	14Y	PA0FHG	319
43	G3SDC	123	46	ZM25	8Y	G8MFE	205

Disqualified under Rule 4: G3GJL/A; G3JKF/A; G4EUR/A; G4MPN/A; GW6GW/A; G8NPH/A; and G8VYK/A. Check logs received from G4EMT, G4LLR/A, G4MDR/A

1,296MHz Trophy Contest rules

1600-2400gmt, 3 April 1982

The following general rules, published in the January 1982 issue of *Radio Communication*, will apply: 1, 2, 3, 4d, 5a, 6a, 7b, 9, 10a, 11a, 12a, 13-26.

All entries and checklogs to: VHF Contests Committee, c/o Mr L. Hawkyard, G5HD, "The Eyry", Newton St Petrock, Nr Torrington, N Devon.

432MHz Trophy Contest rules

0900-1700gmt, 4 April 1982

The following general rules, published in the January 1982 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 9, 10a, 11a, 12a, 13-26.

All entries and checklogs to: VHF Contests Committee, c/o Mr L. Hawkyard, G5HD, "The Eyry", Newton St Petrock, Nr Torrington, N Devon.

144MHz CW Contest rules

0900-1500gmt, 18 April 1982

The following general rules, published in the January 1982 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6b, 7a, 9, 10a, 11a, 12a, 13-26.

All entries and checklogs to: VHF Contests Committee, c/o Mr R. Taylor, G4BEL, 12 The Rampart, Haddenham, Cambs.

70MHz Cumulative Contest rules

1000-1200gmt, 31 January, 14 February, 14 March 1982
0900-1100gmt, 28 March, 11 and 25 April 1982

The following general rules, published in the January 1982 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 9, 10a, 11b, 12a, 13-26.

All entries and checklogs to: VHF Contests Committee, c/o Mr J. Quarmby, G3XDY, 12 Chesnut Close, Rushmere, St Andrew, Ipswich IP5 7ED.

Mid-Thames Treble Night DF results

The final df event of the 1981 season for Mid-Thames DF Club was held on 17 October on a very wet and blustery evening. This did not deter the 21 teams who turned out that evening, some from as far away as Manchester and Colchester.

All three transmitters were in varied locations, from station "A" in the west on a hill overlooking the Oxfordshire countryside, to station "B" down among pit lakes near Twyford, and station "C" in the east in an overgrown wood near Beaconsfield. All three locations were some way from the public highway and many competitors found the going tough. But eventually, at 0012, Mike Hawkins was the first to find his third and final transmitter, closely followed by Eric Mollart and Chris Plummer. In all only five teams found all three transmitters, 14 found two, and two teams only one.

Mrs Jean Mollart and co supplied a splendid supper and the evening turned out a success despite the adverse weather conditions.

			Time of arrival		
Posn	Name	Club	Station "A"	Station "B"	Station "C"
1	M. Hawkins	Chelmsford	0012	2119	2245
2	E. Mollart	Mid-Thames	0016	2114	2250
3	C. Plummer	Mid-Thames	0017	2130	2250
4	C. Wells	Mid-Thames	0019	2122	2318
5	R. Shepherd	Mid-Thames	0029	2121	2250
6	I. Butson	Colchester	—	2115	2236
7	R. Parsons	Burton-on-Trent	—	2122	2254
8	W. Pechey	Mid-Thames	—	2128	2316
9	W. North	Mid-Thames	—	2121	2331
10	B. Bristow	Mid-Thames	2334	2115	—
11	P. Tyler	Mid-Thames	2335	2126	—
12	G. Whenham	Coventry	—	2152	2339
13	P. Lisle	Mid-Thames	—	2135	2350
14	J. Drakely	Slade	—	2130	2356
15	D. Holland	South Manchester	—	2228	0007
16	D. Newman	Slade	—	2127	0012
17	R. Vickers	Slade	—	0021	2131
18	T. Gage	Mid-Thames	0024	2141	—
19	A. Sapsed	Mid-Thames	—	0030	2255
20	R. Goodearl	Mid-Thames	—	2124	—
21	T. Gleeson	South Manchester	—	2336	—

RSGB DF National Final results

The 1981 event, organized by the Mid-Thames Radio DF Club, was held on 20 September. Seventeen teams assembled for the 1250 start at Caesar's Camp, near Bracknell. Most competitors heard signals from all three transmitters but for a few a half quadrant bearing was given for station "C".

Station "A", operated by G4CKW, was located near the River Thames at Windsor, approximately nine miles from the start. Station "B", situated *in* the Thames, also nine miles from the start, was operated by G3UJO complete with wet suit. A number of teams had some difficulty in deciding on which side of the Thames he was situated as the antenna was clearly visible crossing the river. One competitor—G6AGE (Aged Geriatric Eric)—spent an hour beating up a swamp half-a-mile away from this transmitter! Station "C", situated in an unmarked copse, 16 miles from the start, was

manned by G3ORI. With a simple end-fed λ/2 antenna this station presented considerable difficulties for most competitors due to the rather odd radiation pattern.

Seven teams successfully located all three transmitters, the winner being Roger Parsons, Burton-on-Trent, at 1555. The tea rendezvous was held at Piddington village hall where the RSGB National Final Trophy and the Mid-Thames Cup were presented to Roger Parsons by Mrs P. Peck, widow of the late G. T. Peck, who was for so many years the RSGB df organizer.

An attempt was made to end the continuous run of success enjoyed by Roger Parsons by shooting him, but regrettably the organizer, Brian Bristow, G4KBB, missed!

Posn	Name	Club	Time of arrival Station "A"	Station "B"	Station "C"
1	R. Parsons	Burton-on-Trent	1555·5	1405·5	1457
2	T. Gage	Mid-Thames	1357	1451·5	1608
3	E. Mollart	Mid-Thames	1358	1619	1458
4	I. Butson	Colchester	1357·5	1514·5	1623
5	C. Oliver	Dartford Heath	1625	1415·5	1532
6	C. Wells	Mid-Thames	1629	1406·5	1537
7	M. Hawkins	Chelmsford	1630	1415	1524
8	A. Simmons	Mid-Thames	1523·5	1416	–
9	D. Yorke	South Manchester	1535	1405	–
10	D. Holland	South Manchester	–	1431	1554
11	G. Whenham	Coventry	–	1406	1555
12	R. Shepherd	Mid-Thames	1556	–	1435
13	P. Lisle	Mid-Thames	1400	1612	–
14	C. Plummer	Mid-Thames	1617	1451	–
15	R. Brocks	Chelmsford	1420	1620	–
16	B. Mahony	Hereford	–	1430·25	–
17	D. Newman	Slade	1441	–	–

Cray Valley RS Activity Weekend Contest results 1981

144MHz

Posn	Callsign	Section	County	QSOs	QSO points	Multipliers	Points
1	G8KPZ/P	P	SRY	175	217	41	8,897†
2	G8RZP	M	KNT	125	152	43	6,536†
3	G8VVG/P (opG8KAX)	P	ESX	111	137	40	5,480
4	G6ELH/P	NP	BFD	99	114	40	4,560†
5	G3SXE/A	F	LDN	121	147	31	4,557†
6	G8NNJ	F	LDN	98	124	36	4,464
7	G8YLH	F	HPH	100	114	37	4,218
8	G6GGU/P	MNP	GLR	86	105	37	3,886
9	G8MJD/P	MP	YSN	98	100	38	3,800†
10	G8WAQ	F	BKS	81	107	35	3,745
11	G8RXK	F	HFD	76	97	36	3,492
12	G8NQP	F	WLT	82	86	39	3,354
13	G8ETB	F	BKS	72	97	29	2,813
14	G6ECM	N	KNT	71	85	31	2,635†
15	G8VFO/P	P	GLR	75	79	30	2,370
16	G8GHU	F	DOR	53	66	31	2,046
17	G8YCA	F	DOR	56	64	30	1,920
18	GJ3ZAY	F	JER	53	56	33	1,848
19	G8RXA	F	LDN	56	96	18	1,728
20	G6CSJ	N	SRY	50	52	28	1,456
21	G6FPU	N	WMD	45	45	25	1,125
22	G6GGE	N	LDN	40	66	17	1,122
23	G4EFE	F	BRK	37	43	23	989
24	G8TNU	F	BRK	34	56	17	952
25	G6CSY	N	LDN	34	70	12	840
26	G3WVP	F	LDN	36	65	10	650
27	G8ZPC	F	CHS	27	29	22	638
28	G8LXK	F	KNT	26	53	11	583
29	G6CSZ	N	ESX	17	42	8	336
30	G8CKC	H	DVN	11	15	10	150†

Check logs received from: G3RCV, G4DCV, G4DFI/M, G8FCV
Sections F: Fixed; H: Homebrew; M: Multi-op; N: Novice; P: Portable.
†Certificate winners

144MHz SWL

Posn	Station	County	QSOs	QSO points	Multiplier	Points
1	BRS32525	LDN	58	90	26	2,340†
2	BRS28198	SXE	43	62	22	1,364†
3	BRS32525/XYL	LDN	39	67	20	1,340

1·8MHz

Posn	Callsign	Section	County	QSOs	QSO points	Multiplier	Points
1	G4HPE	F	HFD	44	65	28	1,820†
2	G4LTH	N	ESX	20	45	10	450†
3	G4EFE	F	BRK	17	28	16	448
4	G4BWS	F	LDN	19	40	7	280†
5	G2WI	H	LDN	14	33	6	198†
6	G4BUO	F	KNT	7	20	5	100
7	G4DEY	H	LDN	9	25	3	75
8	G3WVP	F	LDN	9	12	5	60
9	G2DHV	H	LDN	8	16	2	32

Check log received from G3RCV

1·8MHz SWL

Posn	Station	County	QSOs	QSO points	Multiplier	Points
1	BRS28198	SXE	29	56	17	952†
2	BRS32525/XYL	LDN	22	39	13	507†

14MHz

Posn	Callsign	Section	QSOs	QSO points	Multiplier	Points
1	GJ3ZAY	F	94	110	33	3,630†
2	G3SXE/A	F	30	42	16	672
3	G3WVP	F	27	42	15	630
4	G4DIB	F	25	40	15	600
5	G4DEY	H	10	26	4	104†
6	G2DHV	H(CW)	8	8	6	48†

Check log received from G3RCV

14MHz SWL

Posn	Station	County	QSOs	QSO points	Multiplier	Points
1	BRS32525	LDN	30	49	15	735†
2	BRS32525/XYL	LDN	25	43	10	430
3	BRS28198	SXE	18	32	11	352†

Sections F: Fixed; H: Homebrew; N: Novice
† Certificate winners

Contests calendar

31 January, 14, 28 March, 11, 25 April	70MHz Cumulative *(Rules in March issue)*
6-7 March	144, 432MHz & SWL *(Rules in February issue)*
13-14 March	Commonwealth *(Rules in November issue)*
20 March	AGCW—DL UHF/VHF CW (432MHz) *(Rules in June 4-2-70)*
20-21 March	Bermuda *(Rules in March MOTA)*
20-22 March	BARTG Spring RTTY 1982
27-28 March	CQ WW WPX (SSB) *(Rules in March MOTA)*
28 March	Barking R&ES 144MHz *(Rules in March issue)*
3 April	1,296MHz Trophy *(Rules in March issue)*
3-4 April	BARTC Spring VHF/UHF *(Rules in March issue)*
4 April	432MHz Trophy & SWL*(Rules in March issue)*
4 April	ROPOCO 1 *(Rules in March issue)*
11 April	Stevenage & DARS 144MHz FM *(Rules in March issue)*
10-11 April	CARF Commonwealth Phone *(Rules in March MOTA)*
18 April	144MHz CW *(Rules in March issue)*
18 April	Low Power
24-25 April	4th HM King of Spain Trophy *(Rules in March MOTA)*
25 April	10GHz Cumulative 1982
1-2 May	432/1,296/2,304MHz
2 May	144MHz Low Power
16 May	10GHz Cumulative 1982
16 May	Region Round-up
16 May	LF Phone (WAB) *(Rules for all WAB contests obtainable from D. Roberts, G4FQO, 12 Chestnut Ave, Cranwell, Nr Sleaford, Lincs NG34 8HT)*
22-23 May	144MHz
5-6 June	NFD *(Rules in February issue)*
13 June	70MHz & SWL
20 June	10GHz Cumulative 1982
26-27 June	1·8MHz (Summer)
27 June	VHF 2m/70cm Phone (WAB) *(See note after 16 May LF Phone)*
3-4 July	VHF NFD
11 July	10GHz Cumulative 1982
18 July	3·5MHz Field Day
8 August	10GHz Cumulative 1982
15 August	70MHz Trophy & SWL
29 August	ROPOCO 2
4-5 September	144MHz & SWL
4-5 September	IARU 144MHz
4-5 September	SSB FD
19 September	10GHz Cumulative 1982
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
7 November	LF CW (WAB) *(See note after 16 May LF Phone)*
13-14 November	1·8MHz (2nd)
5 December	144MHz Fixed

Cray Valley Radio Society 11th SWL Contest 1981 results

CW SINGLE-OPERATOR

Posn	Station	QSOs	Multiplier	Total
1	BRS44395*	401	127	50,927
2	BRS15822*	266	180	47,880

PHONE SINGLE-OPERATOR

Posn	Station	QSOs	Multiplier	Total
1	ONL383*	753	296	222,888
2	BRS43716*	543	216	117,288
3	BRS40293	639	177	113,103
4	OE1109976*	404	164	66,256
5	BRS35509*	374	140	52,360
6	ZS6212*	345	145	50,025
7	BRS25209	264	140	36,960
8	BRS48181	323	107	34,561
9	ONL6945	210	114	23,940
10	BRS34986	281	77	21,637
11	BRS46999	182	79	14,378
12	ARS46702	170	71	12,070
13	ORS48081*	144	80	11,520
14	Lewis Ayres (G)	106	58	6,148
15	J Le Roux (ZS)	99	61	6,039
16	BRS42501*	107	55	5,885
17	BRS45466	113	48	5,424
18	BRS40705	88	54	4,752
19	BRS44715*	53	42	2,226

MULTI-OPERATOR

Posn	Station	QSOs	Multiplier	Total
1	Peter Destoop Pascal & Donna (ON)*	861	290	249,960
2	Tina & Martin Parry (G)*	604	207	125,028

* Certificate winners.

BARTG Spring VHF/UHF Contest rules

1800 3 April to 1200 4 April

A 4h rest period must be taken and declared.

RTTY only in the 144, 432 and 1,296MHz bands. Eligible stations are those in zones 14 and 15 (basically Europe west of the USSR) who are permitted to use rtty. There are three sections: single-operator; multi-operator; and swl. Exchanges consist of the time of the start of the contact in gmt, expressed as a full four-figure group (this information must be passed in both

directions—expressions such as "same" or "same as yours" are not allowed); RST and serial number (starting from 001 and continuing irrespective of band changes); and QTH, preferably as QTH locator, or alternatively as a town or bearing and distance up to 25km from a town identifiable on a 1:500,000 tourist or route planning map. Scoring is by the RSGB 50km radial ring system on 144 and 432MHz, and 1 point/km on 1,296MHz. Each band is regarded as a separate contest, and single-band entries will be accepted. Logs should be on A4 size sheets, preferably of BARTG type, with the QTH locator marked at the top of each sheet, and accompanied by a cover sheet similar to RSGB form 427.

Entries, postmarked no later than 1 May, should be sent to: BARTG vhf/uhf contest manager, Chris Plummer, G8APB, 27A Thorn Lane, Four Marks, Nr Alton, Hants GU34 5XB.

Stevenage & DARS 144MHz FM Contest rules

1300-1700gmt, 11 April 1982

Contestants may operate on 144·5-144·85MHz, and 145·2-145·575MHz.
The contest is open to anyone, and there will be three classes.
1. Stations running up to 25W output
2. Stations running more than 25W output
3. Short-wave listeners.

Further details from the club's sec Stephen Clarke, G8LXY, 126 Putteridge Road, Luton, Beds.

ROPOCO 1 1982 rules

1. The general rules for RSGB hf contests, published in the January 1982 issue of *Radio Communication,* will apply.
2. Eligible entrants. All paid-up members of the RSGB resident in the British Isles holding a Class A licence. Single-operator entries only.
3. When. 0800 to 1000gmt, Sunday 4 April 1982.
4. Contacts. CW in the 3·5MHz band only. Entrants are requested to confine their operations to 3,510 to 3,580kHz. Send RST plus—for the first contact, entrant's own postal code; for the second and subsequent contacts, the postal code received in the previous contact.
5. Scoring. 10 points per contact.
6. Entries. Logs must be sent to E. C. Hodson, G3XTJ, 20 Spencer Avenue, London N13, postmarked not later than Monday 19 April 1982.
7. Awards. Certificates will be awarded to the first, second and third placed entrants.

BARTG Spring RTTY Contest rules

0200 20 March to 0200 22 March

3·5 to 28MHz. Operation limited to 30h—the 18th rest period may be taken at any time but not in less than 3h periods. Exchange RST plus serial QSO number and time (full four figures). QSOs with own country count two points, with others 10 points. A bonus of 200 points for each country worked on each band, own included, and the same station may be worked on more than one band for credit. The final score is the total of QSO points multiplied by the number of countries worked, and then added to the total country points times 200 times the number of continents worked (maximum six).

Use separate log sheet for each band and indicate all times on the air. Listeners may enter and should log station heard, reports being sent and station being worked. Logs and summary sheets are available from Ted Double, G8CDW, 89 Linden Gardens, Enfield, Middlesex EN1 4DX—please send a large stamped self-addressed envelope at least 9 by 6in in size. Logs must reach G8CDW no later than 31 May.

Barking R&ES 144MHz Contest rules

1300-1700gmt 28 March 1982

The rules for this contest are the same as those for last year's event, with the following exceptions:
The following RSGB rules will apply: 4a, 5a, 6a, 10a, 11a, 14-16, 19, 21.
Copies of the rules can be obtained from A. L. Sammons, G8IZN, 80 Lyndhurst Gardens, Barking, Essex IG11 9XZ, tel 01-594 2471, to whom all logs should also be sent.

Special event station

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

GB2BC, 26 March-1 April
The station, operated by Surrey ARC, in conjunction with Sutton & Cheam RS, will celebrate the 110th anniversary of the establishment of British Columbia House. It will operate as closely as possible to a 24h schedule over all the hf band. On 27-8 March it will participate in a dx contest. All stations worked by GB2BC will receive a special QSL card from QSL manager VE7SAR, PO Box 542, Surrey, BC Canada, V3T 5B7. Details from R. H. Webb, VE7BVG, Surrey Amateur Radio Club, 15613-18 Avenue, Surrey, British Columbia, tel (604) 531-2662, or Jim Johnson, VE7CSJ, tel (604) 531-5486.

Looking ahead

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

20 March—RSGB VHF Convention, Sandown Park.
4 April—Northern Amateur Radio Societies Association Exhibition, Lancaster Suite, Belle Vue Leisure Park, Manchester.
15-17 April—RSGB National Amateur Radio Exhibition, Alexandra Pavilion, London.
28 May—RSGB Region 1 lecture, Manchester.
19 June—RSGB HF Convention, Belfry Hotel, Oxford.
4 December—RSGB AGM, IEE, Savoy Place, London.

YOUR OPINION

(Continued from page 241)

twice as long reading the advertisements as anything else, have you noticed how the most popular rigs, in terms of what the new G6 will buy, seem to increase in price just as the RAE results are published! I would have expected the price to drop as the companies try to scoop the influx of amateurs wanting rigs.

The moral seems to be *wait,* shop around and if possible buy at a rally where the postage is free. Do not buy the latest rig on the market, buy the superseded model that will be "knocked out" cheaper as shops clear their shelves for the pricier model, ask for a cash discount, and hint that the dealer stands to lose the £300 sale if he is not generous.

Remember the power of prices is in your hands!

G. Caselton, RS44984 (soon to be G6)

QSL RETURNS
The Editor
Radio Communication
Sir—A long and bitter experience of the behaviour of amateurs and their QSLing habits, prompts me to write this letter.

After waiting anything up to 18 months for a card from Canada, via the QSL Bureau, I resorted to the quicker but more expensive method of direct airmail, which works out at approximately 90p/card or, in other words, at least £90 for a DXCC Award. That is bad enough, but a high proportion of amateurs seems to ignore the direct method, even when accompanied by ircs.

On present indications I reckon one is lucky to achieve a return rate of 75 per cent, so it follows that my pension book and DXCC certificate will be applied for at about the same time.

In general one can expect a reply from North America, Australia, Japan, North Africa, West Indies; while among the worst are South Africa, India, Pakistan, Singapore, Hong Kong, Phillipines and Indonesia.

Can I ask any overseas amateurs reading this to please take a look in their logbook, and see if you owe old GI4DOR a card—it would be much more appreciated than passing your regards to my family, or telling me to "have a good day".

George Alford, GI4DOR

OBITUARIES

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

Mr H. Baker, G4FTR
Herbert Baker died on 16 December, 1981. Although only licensed for a few years, he had been interested in amateur radio for many more. He was keen on 28MHz antenna construction, and worked on all bands, including 144MHz. He was well known on the Thames Valley 144MHz and 3·5MHz nets.

Mr W. H. J. Brunning, G3FFD
Bill Brunning died on 8 November, 1981. He was active in the local Stafford and North Staffordshire net, and maintained his interest in amateur radio until his death.

Mr E. Dobson, ZL3UY
Ted Dobson, who died on 7 January, operated daily from Clandeboye, mainly on 14MHz, with English amateurs for many years. He was in his late eighties.

Mr J. N. P. Douglas, G2CAS
John Douglas died on 4 July, 1981, aged 73. He was a well-known portable cw operator, and did not confine his activities in this field just to the summer months. He was a stalwart member of Harrogate Radio Club and had held a number of calls, including ON4ZD.

Mr R. L. Edwards, G3TEF
Mr Edwards died on 12 December, 1981. He was a regular on his local 3·5MHz net.

Mr D. E. Herbert, G6RF
Derek Herbert died on 13 November, 1981. Latterly he had only been active on 144MHz due to ill-health.

Mr A. Keiller, G3KXR
Archie Keiller, who died at Christmas 1981, was a keen member of the Wirral ARS, although he had been inactive for some years due to ill-health. He had been their hon treasurer from 1958 to 1968, and was known for his contest logging.

Dr T. H. Parkman, G3MGQ
Dr Parkman, who died in July 1981, was first licensed in 1958. He had been chairman of the Hastings & DARC for several years.

Mr J. A. Rainbow, G4INY
Jimmie Rainbow died on Christmas Eve, 1981. He had been a member of York ARS for many years, and served on the committee of the club and as its secretary during that time. He often helped with the running of G3HWW, the club station.

Mr D. Sargeant, G3YBL
Mr Sargeant died on 28 October, 1981, aged 59. He was a keen and accomplished cw operator, and was especially interested in radio astronomy, both theory and practice. He was always willing to help aspiring amateurs.

Mr H. N. Storey, G3UPB
Harold Storey died on 13 November 1981. He was well known in both commercial and amateur radio and electronics in the north east, and was active on most frequencies both fixed and mobile.

Also:

Mr A. J. Cotty, RS46952, on 31 December 1981;
Mr J. Greaves, G3HCB, on 12 November 1981;
Mr V. E. Green, G3XXW, on 22 August 1981;
Mr A. Hargreaves, G6NV, on 13 November, 1981, aged 72;
Dr D. A. Howes, G8DFT, on 5 November 1981;
Mr G. Kennedy, RS34796, in August 1981;
Mr R. S. Marriott, RS8405, on 1 October 1981;
Mr W. H. Parrington, RS4463;
Mr E. L. Stephens, G4IEE, in November 1981;
Mr W. J. Thomas, G3YDW, on 8 January;
Mr G. H. Thornton, G4LDM, on 7 November 1981; and
Mr F. T. Watson, G4LOC, on 9 October 1981.

CLUB NEWS

The Leeds & D ARS held its first Christmas Rally at Pudsey on 13 December, and despite inclement weather over 1,000 visitors and 40 exhibitors were present. The photograph shows (l to r) Dave Foster, G8WTT; Linda Stocks, swl; "Santa" Geoff Rowland, G8PKJ, and Chris Rose, G8XFI. *Photo:* G6CLM

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organizations will be published in the July 1982 issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **May** issue should reach them by **18 March**, and for the **June** issue by **16 April**.

Club programmes are given in order of date, subject, time and place of the meeting. All callsigns of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book*) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

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

Accrington (North Western Repeater Group)—18 March, 8pm. The Globe Bowling Club, Willows Lane, Accrington. Further details from H. A. Aspinall, G3RXH.

Ainsdale (AARC)—2, 16, 30 March. Ainsdale Scout HQ. Sec Norman Horrocks, G2CUZ, tel 0704 77604.

Barnoldswick (Rolls-Royce ARC)—3 March ("Kits and amateur television", by F. Starkie), 19 March (Social evening, 50-50 Dance and members construction contest, refreshments and bar available, dancing from 8.30pm), 8pm. Rolls-Royce Sports & Social Club, Barnoldswick. Further details and tickets at £1.50 from sec Leslie Logan, G4ILG, tel Barnoldswick 812288.

Blackburn (East Lancs ARC)—2 March (Surplus equipment sale), 6 April (Talk and slide show on Antarctica by Ron Smith, G3SVW, ex-VP8LK), 7.30pm. The Shadsworth Leisure Centre, Blackburn. PRO Norman Jenkin, G4CGT, tel 0254 75037.

Blackpool (B & Fylde ARS)—2 March, 6 April. Details from Jim Newland, G5ND, tel 0253 64508.

Bolton (B & DARS)—3, 17 March (Technical lecture evenings), 10, 24 March (Activity nights), 8pm. Horwich Leisure Centre, Horwich. The new officers elected at the December AGM were chairman, Ted Dunne, G6CTH; treasurer, Geoff Mollison, G8VCW; sec, Dave Molyneux, G6AEK, tel Atherton 877921.

Bury (BRS)—9 March (Amateur radio insurance), 2, 16, 23, 30 March (Informal meetings for operation of G3BRS, G6BRS, construction, morse or just a natter and a pint), 7.30pm. Mosses Community Centre, Cecil Street, Bury. Officers elected at the AGM were chairman, Chris Marcroft, G4JAG; treasurer, Eric Fielding, G4IHF; sec, Mike Bainbridge, G4GSY. Further information from pro David Hensby, G8TKD, tel Whitworth 2213, daytime.

Leyland (LHARG)—8 March. The Rose & Crown, Ulnes Walton, Leyland at 7.30pm. Details from sec Arthur Jolly, G4JCO.

Liverpool (L & DARS)—2, 9, 16, 23, 30 March, 8pm. Conservative Rooms, Church Road, Wavertree. For programme contact sec Eric Grossmith, G3WOH, tel 051-426 3701.

Manchester (UMIST RS)—Term-time activity on Wednesday afternoons. The G3CXX shack is now equipped with GPO land-line facilities and is available during normal office hours, tel 061-236 3311, ext 2945. Further details from Duncan Wheelhouse, G8TRP, c/o Radio Society, UMIST Union, PO Box 88, Sackville Street, Manchester M60 1QD.

Manchester (MUARS)—The club is now active again from a new shack on the first floor on N side of the Students Union building. G3VUM is operational on 3·5-28MHz, and G8FUM on 144 and 432MHz with recently acquired all-mode transceivers. Informal meetings most lunchtimes and Wednesday afternoons in the shack, and on Thursday evenings in UMIST Union Bar. Contact chairman John Hampson, G4LPO, for further details, c/o Amateur Radio Society, University Union, Oxford Road, Manchester M13 9PR.

Manchester (South Manchester RC)—5 March (Night df contest), 12 March ("Amateur satellites", by Joe Lenartowicz, G8RQZ), 19 March (Club quiz), 26 March (A mystery lecture by Dave Bolton, G8UQC), 2 April (Lecture, to be arranged), Informal meetings Mondays in the club shack, 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec David Holland, G3WFT, tel 061-973 1837.

Preston (PARS)—4 March (Video film—"Aerial circus"), 18 March ("Amateur television", by Mark Walmesley), 1 April ("Air traffic control systems", by Derek Ashworth). St Mary Magdelene Church Hall, Faringdon Lane, Ribbleton, Preston. Sec George Earnshaw, G3ZXC.

St Helens (St H & DARC)—4 March (Sale of surplus equipment), 11 March (Quiz and social evening entertaining members of Liverpool & DARS), 18 March (Talk on hf mobile dx by Bert Donn, G3XSN), 25 March ("Amateur Radio Exchange comes to St Helens", talk and demonstration by Mike Rogers, G4NAR, and Bill Marsden, G8TIW), 7.45pm. Conservative Club, Boundary Road, St Helens. Morse practice at 7.15pm, prior to each meeting. The new sec is Paul Gaskell, G4MWO, ex-G8PQD, tel St Helens 25472.

Stockport (SRS)—10 March (Junk sale), 24 March (To be announced), 8pm. Blossoms Hotel, Buxton Road, Stockport. Sec Stan Aspinall, G3VSA, tel 061-437 1437.

Thornton Cleveleys (TCARS)—1 March (Sale of surplus equipment), 8 March (Question and answer night), 15 March ("Microprocessors-Part 1, for beginners", by C. Webb, G4FWM), 22 March ("Microprocessors-Part 2, more advanced", by C. Webb, G4FWM), 29 March ("Amateur df and foxhunting", a talk by F. Starkey, G8TJG), 7.30pm. Thornton Cleveleys Sports Centre, Victoria Road, Cleveleys. Sec Mrs Jen Ward, G8YOK.

Warrington (UK FM Group Western)—4 March, 1 April, 8pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Wirral (WARS)—3 March (Film night), 17 March (Demonstration by Norman Kendrick, G3CSG, of a new home-brew transmitter), 7 April ("My year as RSGB President", a talk by Basil O'Brien, G2AMV), 7.45pm. Minto House School, Birkenhead Road, Hoylake. Sec Gordon Lee, G3UJX, tel 051-677 1518.

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel 094-786 333.

Barnsley (UK FM Group Northern)—7 March, 4 April, 7.30pm. The Royal Hotel, Church Street, Barnsley. Sec G8PLJ.

Halifax (H&DARS)—First and third Tuesdays in each month, 6 April (Equipment demo by G4MH), 7.30pm. Claremount Liberal Club, Claremount Road, Halifax. Details from sec G4LEC, tel 0422 33080.

Harrogate (HRG)—at the time of writing the bad weather had prevented antenna erection, to be accomplished as soon as possible. Details from G4ATZ.

Leeds (White Rose RS)—Wednesdays, 8pm. Moortown Rugby Football Club, Moss Valley, Alwoodly, Leeds 17. Sec G8UYZ. Club net 8pm, Thursdays, on 3·7750MHz or 21·350MHz, depending on conditions.

Pontefract (P&DARS)—4 March (RSGB tape/slide lectures "Aerials", by G6CJ, and "Radio aurora", by C. Newton), 18 March (Visit to Radio Aire). Details from G4ISU, tel Pontefract 72784. At the AGM a new chairman, G4FPO was elected, but sec remained G4ISU. Preparations are complete for the components fair to be held at the Carlton Community Centre, Pontefract, on 14 March. See you there.

Wakefield (W&DARS)—6 April ("Raynet", by G3KWT), 20 April (AGM), 4 May (On the air/natter night), 18 May (Junk sale), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G4BLT, tel Wakefield 255515.

York (YARS)—Fridays except the third in each month, 7.30pm. United Services Club, Micklegate, York. Sec Keith Cass, G3WVO. Members were saddened by the death of Jimmy Rainbow, G4INY, on Christmas Eve. He was a stalwart of the society, and will be sorely missed.

Following a lively Christmas party, at which baseball type hats from York, Pennsylvania, were presented to chairman and sec, preparations have begun on activities for 1982. Among these is a planned presence at the Great Yorkshire Show.

REGION 3—Acting RR H. S. Pinchin, G3VPE, 61 Cole Bank Road, Hall Green, Birmingham B28 8EZ. Tel 021-777 1320.

Birmingham (Midland ARS)—16 March ("Antennascope and associated instruments", by Naylor Strong, G2RQ), 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. 7 April ("Radio astronomy"), 7.45pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G8RGQ, tel 021-459 8312.

Bromsgrove (B&DARC)—12 March (AGM), 26 March (QRP meeting), 8pm. Avoncroft Arts Centre, Bromsgrove. Club net Wednesdays, 144·850MHz, 8pm. Morse classes Mondays. Sec G4HFP, tel Stourport (02993) 3818.

Coventry (CARS)—5 March (Night on the air), 12 March (Wine & cheese party), 19 March (Night on the air), 26 March (Talk by the Muzzle Loaders Association), 2 April (Night on the air), 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Sec G4HRY, tel Coventry (0203) 618648.

Hereford (HARS)—5 March, 6 March (Annual dinner), 19 March (Informal meeting), 2 April, 8pm. Civil Defence HQ, Gaol Street, Hereford. Sec G4CNY, tel Hereford (0432) 3237.

Malvern Hills (MHRAC)—9 March (Morse class followed by talk), 7.30pm. The Red Lion Inn, St Ann's Road, Great Malvern. Sec G4GFX, 9 Wyche Road, Malvern, tel Malvern (06845) 62900.

Redditch (RRC)—11 March ("How the radio amateur can help the community", by Brian Jones, G8ASO), 25 March ("Aerials and feeders", by Dave Yates, G3PGQ), 8pm. WRVS Centre, Ludlow Road, Redditch. Sec G3EVT, tel Alcester (0789) 762041.

Shrewsbury (Salop ARS)—11 March ("DBs", by Richard Millington, G4AZV), 18 March (Natter night), 25 March ("RTTY", by Ken Walker, G8DIR), 1 April, 8 April, 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G6AKE, tel Shrewsbury (0743) 66969.

Solihull (SARS)—16 March ("CW operating", by Ray Dobdinson, G3RGD), 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 (StARS)—15 March (AGM), 7.45pm. Library, Longlands School, Brook Street, Stourbridge. Sec G8JTL, tel Lye (038482) 4019.

Telford T&DARS)—10 March (Planning for vhf contests and other events), 17 March (Film and video evening), 24 March ("Direction finding", talk), 31 March (Natter night), 7 April (AGM), 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G8UGL, tel Telford (0952) 584173.

Wolverhampton (WARS)—8 March (Night on the air), 15 March (Club project), 29 March (Natter night), 5 April, 8pm. Wolverhampton Chamber of Commerce and Industry, 93 Tettenhall Road, Wolverhampton WV3 9PE. Sec G8EDG, tel Wolverhampton (0902) 763617).

Worcester (W&DARC)—29 March (Construction contest), 8pm. Old Pheasant, New Street, Worcester. Sec G8TZE, tel Tewkesbury (0684) 293890.

REGION 5—RR J. S. Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT. Tel 0582 508515.

Bedford (B&DARC)—("Antennas", by Chris Meadows, G4KWH), 8pm. Club Shack, Ravensden, Bedford. Details of dates from sec G4JTJ.

Leighton Buzzard (LLRC)—8 March ("What do you expect from petrol in your car?", a talk by D. Williams), 22 March ("Landlines", by visiting lecturer Roger Pye, G4IUH), 7pm. Vandyke Community College, Room A64. Sec G8GIK. Morse classes at 7.15pm, lectures at 8pm. Talk-in at club QTH on 145·275MHz.

Luton (Kent Process Controls Ltd ARC)—3 March (Visit to Luton International Airport), 8pm. KPC Ltd Sports Club, Tenby Drive, Luton. Sec G3DOT, chairman, G3TLE.

Peterborough (PR&ES)—Meetings on the the third Friday of the month. Sec G4KSW.

Would club secretaries please let RR5 have details of programmes and activities by the date shown at the beginning of the "Club News" section.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HP13 7EA. Tel Penn (049481) 4240.

High Wycombe (Chiltern ARS)—31 March (Illustrated talk on members' shacks, by Ivan, G3KLT). John Hawkins Ltd Canteen, Victoria Street. Sec G4LMM. Tel High Wycombe 24095.

Maidenhead (M&DARS)—16 March (AGM, members please attend) 7.30 for 8pm. The Red Cross Hall, The Crescent, Maidenhead. Sec J. Patrick, G3TWG, tel Bourne End (06285) 25275.

Newbury (N&DARS)—9 March (Slide show, hf holiday in Iceland, by G4JAL/G8LTD). Details from sec Merton Vaslet, G4JAL, tel Newbury (0135) 46078.

Reading (RARC)—Please note new sec is R. A. Brown, G3SCZ, tel 0734 414393, or 861567.

REGION 7—RR Pat Walker, G8HMG, 12 Brownlow Road, Redhill, Surrey RH1 6AW. Tel Redhill 64035, evenings, 01-834 9070, daytime.

Bexleyheath (North Kent RS)—2 March (Phil Jobson, G3HLF, chairman of the RSGB Interference Committee, will talk on "Interference"), 16 March (Surplus equipment sale), 8pm. The Pop-in Parlour, Graham Road, Bexleyheath. Sec Pelham Conduit, G4KCZ, tel Crayford 524096.

Cray Valley (CVRS)—First and third Thursdays in each month, 4 March (Spring surplus sale), 1 April (AGM), 8pm. Christchurch Centre Hall, Eltham High Street, Eltham SE9. Sec G4FUG.

Croydon (Surrey Radio Contact Club)—1 March (Surplus equipment sale), 15 March (Surplus book sale), 5 April (AGM), 8pm. TS Terra Nova, 34 The Waldrons, Croydon. Sec G4FFY, tel 01-642 9871.

Guildford (G&DRS)—Second and fourth Fridays in each month, 12 March (Discussion with RR7), 23 April (AGM), 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec Helen Davies, G8SXB, tel Aldershot 20384.

Guildford (Guildford Repeater Group)—The group maintains the uhf repeater GB3GF and meets on the first Thursday in each month at the Anchor & Horseshoes at Burpham, Guildford. Sec Dave Surey, G8GIA, tel Woking 22679.

Kingston (K&DARS)—Third Wednesday in each month, 8pm "Alfriston", 3 Berrylands Road, Surbiton. Sec Robin Pellatt, G4LJI, tel 01-399 8113.

New Cross (Clifton ARS)—Fridays, 19 March (Video evening), 8pm. Upstairs room, New Cross Inn, Clifton Rise, London SE14. Details from Reg Hinton, 42 Sutcliffe Road, Welling, Kent. Club net Mondays, on 144·41MHz.

Redhill (Reigate ATS)—16 March (Pat Hawker, G3VA, will talk on "Technical topics"), 20 April (AGM), 8pm. Constitutional & Conservative Centre, Warwick Road, Redhill. Sec Chris Barnes, G8FEE, 25 Hartswood Avenue, Woodhatch, Reigate RH2 8ET.

REGION 8—RR K. A. Crouch, G8KEN, 14 Victoria Road, Capel-le-Ferne, Folkestone, Kent CT18 7LR. Tel 0303 55241.

Burgess Hill (Mid-Sussex ARS)—Alternate Thursdays, 11 March ("UOSAT", by Colin Edwards, G8FQT), 7.30pm. Marle Place, Leylands Road, Burgess Hill. Further details from Jack Brooker, G3JMB, tel Hassocks 4965. Jack is also the RSGB AR.

Canterbury (East Kent RS)—4 March ("Contest working", by Paul, G4DCV), 1 April ("A visit to USA", a slide show by G4KNP), 7.30pm. Dominican Hall, Canterbury. Further details from Derek, G8ELS, tel Herne Bay 5629. The club would like to thank all those who came and helped make the junk sale such a success.

Chichester (C&DARC)—1 and 15 March (Club nights), 7.30pm. Spitfire Social Club, Tangmere. Contact S. Talbot, G8FCX, tel Littlehampton 5082 for details.

Crawley (CARC)—10 March (Informal meeting at G4GHO's QTH) 24 March (Annual construction contest). Informal meetings at members QTH's are in the form of a beer, sandwich and ragchew. The formal meetings are held at 8pm at the Trinity United Reform Church Hall, Ifield Drive, Crawley. All meetings start at 8pm unless otherwise stated. There is a cw class in progress and if prospective pupils could ring sec David, G4IQM, on 0293 882641, he will supply the details.

Dover (South-East Kent YMCA ARC)—3 March (Natter night), 10 March (G4JOV on his computer knowledge), 17 March (Junk sale), 24 March (10min talks by four club volunteers), 31 March (Construction contest), 7 April (AGM—your chance to send out who or what you want). Morse classes Wednesdays, 7pm, given by Ted, G2FLT, and on Tuesdays, 8pm, given by G3VSU. RAE classes are run on Mondays, 7.30pm, by G4EGQ and various helpers. Details from G3VSU, G4EGQ, or G8KEN.

Eastbourne (Southdown ARS)—First Monday in each month, 7.30 for 8pm. The Chasley Home for Disabled Servicemen, Southcliffe, Eastbourne. Local RSGB AR is Mr K. J. Homewood, G8NPC. Updated information from sec R. Jefferies, G8KQN, tel 0323 643463.

Hastings (HERC)—Wednesdays, 17 March (AGM—your turn to send out your representatives to do what you want to do or see. Please attend and show your support by your vote), 7.30pm. First Wednesday in each month (Committee meets); second, fourth and fifth Wednesday in each month (Micro night); third Wednesday (Main meeting). West Hill Community Centre. Details from G8VEA, tel Hastings 216516.

Maidstone (MYMCAARC)—Fridays, 8pm. First and third Fridays (For beginners) 12 March (Kent Repeater Group open evening), 26 March (Junk sale, 8.30pm start of sale), 9 April (There will be no meeting as it is Good Friday). All details can be obtained from Graham Edy, G4AXD, who is also the RSGB AR.

Medway (MARTS)—No 1 Hall, St Luke Church, King Williams Road, Gillingham. From 21 February until 20 March the club will be busy with GB2MDJ, a special event station to celebrate its 60th anniversary. Listen on all bands hf to vhf and give a call, special QSL cards available. Details of club programme from Pete, G4EVY, tel Medway 76463.

Worthing (W&DARC)—RR8 must apologize to sec Joyce Lillywhite for getting her name printed wrongly recently—sorry. 2 March ("UOSAT", by G8DHE), 9 March (TBA), 16 March (Annual dinner at the Thomas A' Beckett), 23 March ("Simple aerials", by G5CO), 30 March ("Surgery time", by G3YHM), 7.30 for 8pm. Pond Lane Amenity Centre. Details from sec Joyce Lillywhite, 41 Brendon Road, Worthing, tel Worthing 63062.

Thanet (RCT)—12 March (Construction evening), 24 March (Natter night), 9 April (Talk on repeaters). Birchington Village Centre. The club has now purchased an FT101ZD and has recently erected an hf antenna. It has also just had G2IC re-issued (G2 Island Club) as a memorial to a local amateur who is deceased. It has an hf net on 28·4MHz on Sunday mornings at 9.30am. Details from Ian Gone, G4NEF, tel Thanet 54154. RR8 congratulates Ian on his new call.

RR8 would like to thank all those who took the trouble to write with details of their clubs' activities. Please keep writing.

REGION 9—RR W. J. Colcough, G3XC, Highview, Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Camborne (CRAC)—4 March ("Slide, sound, sink", by Steve, G4MSV). Computer section: 15 March ("Machine code programming", by Clive, G3OCB). SWEB Pool, Camborne. Club call G4CRC. Arrangements are now well in hand for the annual Cornish Rally which will be held at the Cornwall Technical College, Camborne, on Sunday 18 July. Sec Andy French, G8TUJ, tel Camborne 717343.

Exeter (ERC)—Thursdays, 8pm. "Loughrigg", East Street, South Moulton. The club call is G8SSS. Contrary to the information in January it is understood the rtty section is still in the course of construction. It is hoped it will be completed in the near future. Sec Dave Jones, G6CHZ, 6 Priory Close, Pilton, Barnstaple, Devon, tel 0271 2724.

Newquay (N&DARC)—Alternate Wednesdays, 7.30pm. Treviglas School, Newquay. Club call, G4ADV. At the AGM the following officers were elected: chairman, Bob Lawrence, G4LDA; sec Pat King, G4GFY; treasurer, Brian Pearce, G8GOR. Details from G4GFY.

Torbay (TARS)—Fridays, 7.30pm. Last Saturday in each month, special meeting, 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay, Torbay. Club call, G3JNA. 24 April (AGM at club HQ). It must be recorded that Torbay were victors in the Christmas quiz against Plymouth Radio Club. A good time was had by all. Yet another yl has passed the RAE—suggest you start an all girls club—RR. Les, G2CWR, is once again the official AR for South Devon. Details from sec Hugh Davies, G4DZH, tel Paignton 523063.

Treverbyn (English China Clay RC)—1 March ("Wartime radar", by ex-aircrew operator), 15 March (Jumble sale and homebrew), 29 March (Visit to Bodmin hf radio station), 7pm. Pentewan Labs, Pentewan Road, St Austell, Cornwall. Club call, G6ECC. At the AGM the following officers were elected: chairman, Bevan Babey, G8NYR; sec Mike Porter, G8NXM; treasurer, T. Watts, G8NYA; RSGB rep, Chris Golley, G4JYF; pro Jack Redfern, G8HSZ, tel 0726 3647.

REGION 10—RR P. A. Jones, GW4HAT, 68 Pastoral Way, Tycoch, Swansea SA2 9LY.

It is regretted that for the second month running it has not been possible to collate Region 10's club news as RR10 has been working very long hours due to adverse weather in west Wales. It is hoped that normal service will be resumed as soon as possible. *RR10.*

REGION 11—RR B. H. Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Colwyn Bay (Conwy Valley ARC) (GW6TM)—11 March (The yearly technical lecture by Dr David Last of the University College of North Wales), 7.30pm, 24 March (Technical talk), 7.30pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec J. N. Wright, GW4KGI, tel 0745 823674.

Dolgellau (Meirion ARS)—4 March (Talk by Derek Whitehead), 7.30pm. Royal Ship Hotel, Dolgellau. Sec Mrs Jean Jones, GW4KYK, tel Tywyn (710) 402.

Rhyl (R&DARC)—11 March, 25 March (Quiz), 7.30pm. Ambulance Station, Rhyl. Sec B. Jones, GW8OYT, 6 Rhodfa Maes Hir, Rhyl, Clwyd, tel 0745 37284.

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Braintree (B&DARS)—1 March (Informal), 15 March ("DF equipment and techniques", by G4HKC), 8pm. Braintree Community Centre, Victoria Street. Details from Alan Williams, G6CIV, tel Silver End 83516.

Chelmsford (CARS)—2 March (Demonstration of latest equipment by a local retailer), Marconi College, Arbour Lane. Details from Andrew Mead, G4KQE, tel Silver End 83094.

Colchester (CRA)—4 March (Slow-scan television), 18 March ("Down at the council something stirs", by G6GCC). Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 70189.

Ipswich (IRC)—10 March (Spring clearance sale), 31 March ("The amateur beacon service", by G4FSG), 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

Norwich (Norfolk ARC)—3 March ("Television", by G4LUA), 10 March (Informal/cw tuition), 17 March ("Radio navigation", by Decca Staff), 24 March (Informal/cw tuition), 31 March (Surplus equipment auction), 7.45pm. Crome Community Centre, Telegraph Lane East. Details from Paul Gunther, G8XBT, tel Norwich 610247.

Vange (VARS)—Every Thursday, 8pm. Main Hall Barstable Tennants Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

REGION 17—RR H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.

Andover (ARAC)—Second and fourth Tuesday in each month, 26 March (Visit to Goch, Andover's twin town), 8pm. Wolversdene Club, Love Lane, Andover. Sec G3KVX.

Basingstoke (BARC)—17 March (Junk sale), 21 April (Construction practice for the amateur), 7.30pm. Chineham House, Popley, Basingstoke. Sec G6CPA, tel Tadley (07356) 4964.

Bournemouth (BRS)—5 March ("Repeaters", by G8MCP), 19 March (Coast guard communications), 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel Ferndown (0202) 877945.

Horndean (H&DARC)—11 March ("Understanding vhf aerials", by G3GVC), 7.30pm. Merchiston Hall, Horndean. Sec G6GBM, tel Horndean (0705) 593429.

Portsmouth (Marconi E&ARS)—30 March (Junk sale), 27 April (Talk by IBA Engineering), 8pm. Broad Oaks Works Canteen, Portsmouth Airport. Details from G8NEH, tel 0705 664966, ext 153, during office hours.

Southampton (SARS)—Wednesdays, 10 March

(Continued on page 252)

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 additional £1 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

Closing dates in 1982 for issues in brackets, are **23 March** (May), **21 April** (June), **19 May** (July), **17 June** (August), **15 July** (September), **25 August** (October), **23 September** (November), **21 October** (December), **18 November** (January 1983), **16 December** (February 1983).

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising representative

FOR SALE

Yaesu FT200, FP200, fully xtalled on 10m, in absolutely immac cond, hence £225. Europa B transverter, £60. 6 el quad, Hirschmann rotator, 21ft steel pole and brackets (rotator new), £65. All items ono. Tel Wolverhampton (0902) 764214.

Datong morse tutor, £37. Straight precision key, incl key click filter, £15. Zycomm Z5800, incl base charger, spkr/mic, £175. Micro-cassette recorder, £20. Micro-lightweight headphones, £10. UHF/vhf scanner, £120. 2BCX 16-el beam, £20. Offers? G6CGM. Tel Derby 832816.

Zycomm 5800, 144-148MHz fm handheld, plus charger, 5W output, £140. TR2200G, S20-22, R0, R3, R7, RR0, charger, £60. Both with nicads. G6ASC, QTHR Tel 021-705 1253.

KW Atlanta ext vfo, vox, spare valves, exc cond, £240 ono. Trio 7010, not used mobile, as new, £130 ono. Cambridge dash mount, exc cond, xtals S20, 145·8, R3, R5, £35. G3OLZ, QTHR. Tel Guisborough 40681.

Hi-fi equipment, quad FM3 tuner, 33 preamp, 303 power amp, £275. Dual 721 auto record deck, £200. JVC KD720 cassette deck, £75. Amphon spkr, £50. All immac. Teak sleeve for tuner and preamp. Tel Stan, Wolverhampton (0902) 764214.

Three-bedroom bungalow, 0·33 acre plot, 40ft tower, planning to 50ft, 3-el beam, radio shack, will split. FDK Multi 16, £60. G4BGM, QTHR. Tel 0908 583278, evenings, weekends.

Video cassette recorder, Philips N1700, with three tapes, perfect wkg order, can be seen operating, owner wishes to change to vhs, hence giveaway at £250. Buyer collects/pays carriage. G6FKG. Tel Herne Bay 64054, evenings (answer machine daytime).

Transam Triton home computer, 4k level 4 Basic plus machine code, comp with Motorola M5000 monitor, manuals etc, £200 ono. Tandy ASCII 60 keyboard, £10, or exchange for 2m gear or w.h.y? G3WDW. Tel Bradford (0274) 633387.

FDK Multi Palmsizer 2m fm handheld, external mic/spkr, £95. HF5V 10-80m vertical, comp with radial kit, £45. Commercial cctv camera, 9in monitor, DL2RZ, converter, unaligned, £100. Would consider selling separate. G3ZJU, QTHR. Tel 01-527 4492.

SEM dual gate mosfet 2m converter, i.f. 28-30MHz, internal mains supply, in exc cond, £15. Tel Hastings 440541, evenings.

Pye Westminster 2m tx/rx, channels R3-4, R0, S20, £50. Tavasu whip, all coils, top band to 10, £25. G4DKR, QTHR. Tel Derby 810101.

KW Viceroy Mk4 tx, 80-10, ssb/cw, £60. KW204 tx, 160-10, ssb/cw, mint cond, £115. G4JOW NOT QTHR. Tel Westonzoyland 740.

Icom 245E multimode, in orig packing, £198. GM3DJT, QTHR. Tel 031-449 6323.

TS830S Trio tx/rx, AT230 matching atu, power/swr meter, used only once to check operation on all bands, pair, £700 ono. Would split if necessary. G3SEL, QTHR. Tel West Coker (093586) 2712.

2m linear amp, 10W in, 40W out, 2W in, 18W out, modified A200 for fm only, easy mod for ssb, £28. G3NCP, QTHR. Tel 0706 229257.

2400 Trio 2m handheld, cw helical, nicads, mains charger, £135. Tel 01-363 8060.

Sommerkamp TS802 2W 80ch scanning hand portable, incl case, nicads, in orig packing, only one year old, £95. G8HQX, QTHR. Tel Dartford 28833.

Yaesu FT227RXS, SMC scanner, mobile bracket, psu, mobile antenna, £160 ono. Mirage B108, 10W in, 80W out, 2m linear, preamp, 12V 15A psu, pair, £80. G4KFK, QTHR, or Michael Gathergood, Leith Nautical College, 24 Milton Road East, Edinburgh EH15 2PP.

CRO 1089B Edison-Swan, very old, no calb, fixed input gain/amplitude, 1MHz time base/ext trigger, exchange for s'het rx, (communications) at least 1·8-30MHz, must have bfo rf gain, any age/cond considered. Tel Great Milton (Oxfordshire) 337.

TR2300, nicads, charger, case, helical antenna, handbook, matching Modular Electronics 25W amp, built-in preamp, 5/8 wavelength mobile antenna, £150. Tel Dave, 01-578 6044, anytime.

FT101E, exc cond, spare valves etc, £410. SSM Europa with relay unit and spare QQVO 64A, 100W, £50. MC22 mic compressor, £10. 18AVT 80/10 trap vertical, £40. G2HOP, QTHR. Tel 0780 3125.

Drake R4B rx, spare valves, £200. Will send Securicor, or would exchange for Strumech P60 tower, also consider P40. G4LYJ, QTHR. Tel 0743 64273, after 6pm.

Z-Match antenna coupler, in cabinet with built-in commercial switchable swr meter, dummy load, straight through facility, £20. G3KAJ, QTHR. Tel Chorley 71343.

Icom 720A, PS15, mic, three months use, immac cond, £820 ono. Tel 0492 58030, after 6pm.

Switched G8HBR rtty station with keyboard and G3PLX memory unit, only requiring monitor or machine, £200 ono. Catronics CT100 rtty terminal unit, £60 ono. W0LMB sstv keyboard, £100. Thurlow, G3WW, QTHR. Tel March (0354) 740255.

Europa B model 2m 60W transverter for FT101, £60. G3LLL speech processor, £10. G3HHZ, QTHR Devon.

Realistic DX160 general comm rx, good cond, £68 ono. Buyer collects. Tel Kingswinford (West Midlands) 295964, after 6pm.

W1191A sig gen, £6. *Wanted:* good valve tx/rx, gdo rf probe, valve voltmeter, fcw keyer, all items must be fb cond, full details please. All letters answered. G3WXT, QTHR.

Brand new high-speed brass morse keys, £3.10 each. BC221, mains psu, fb, £18. *Wanted:* sig gen, like Advance E, in good order, manual for Marconi 887A vvtm. G4ILA. Tel John, Lymm 2388.

Trio TX599, RX599, twin vfos, full set of filters, spare 6146Bs, handbooks, £350 ovno. Tel 01-828 1588.

IC202 2m ssb/cw tx/rx, vgc, perfect wkg order, £100. Alan Gray, G4DJX, QTHR. Tel St Albans 54190.

IC251E 2m multimode, £375. FT7/FL110 200W p.e.p. hf tx/rx, immac cond, £325. Heathkit hf station SB300, SB400 HM15 swr bridge, vgc, £300. All plus carriage. GW3XJQ, Sunray, Pendine, Dyfed SA33 4PD. Tel Pendine (09945) 267, after 6pm.

Full sets of *Radio Communication* magazines dated from January 1965 to December 1970, January 1978 to December 1981, some odd part sets, £5 per set ono. Perfect cond. Tel 01-330 2046.

Trio 7200G 2m tx/rx, fitted 17 xtals, £110. Triangular Duralumin lattice mast, approx 80ft in 8ft 4in sections, will split, £33 per section. *Wanted:* IC2E or Trio 2300, Yaesu 290R. Tel East Kirkby (Lincolnshire) 079 03 295.

Yaesu FT707, cw filter, three months old, £470..MMB2 mobile mount, unused, £10. Katsumi MK1024, three months old, £90. Daiwa CNW418 500W p.e.p. atu, £65. Genuine reason for sale. G4MHM ex-G8WJA, QTHR. Tel 0789 296645.

TS180S with second ssb filter, cw filter, PS30, SP180, MIC35S, all first class cond, £600. G3GGK, QTHR Cambs. Tel 0954 210374.

Yaesu FRG7 rx, orig packing, manual, £150 ono. G4KZZ, QTHR. Tel 0203 444160.

Drake TR4 tx/rx, RV4 remote vfo, AC4 psu, £300. Heathkit SB634 console, £75. Datong rfc/m, boxed, £20. 88mH toroids, £1.20 each, post paid. *Wanted: QST* 1981 and *CQ* 1975-80. Chris Pedder, G3VBL, 5 Royalty Lane, New Longton, Preston PR4 4JD. Tel 0772 612289.

Linear builders: 813s, bases, heater transformers, roller coasters, turn counters, wide-spaced V-caps, fixed ceramic caps, hi-power ceramic rotary switches, ceramic coil formers, electrolytics for stacking, Collins ssb generator, 455kHz, gem quad, 2-el, new, TS500, PS500 tx/rx. G4DNV. Tel 01-732 5661.

Telomast, extends to any height from 10 to 50ft, comp with rigging kit, but less guy stakes, £40. Buyer to arrange carriage. G3VOO, QTHR. Tel 0258-87 648, evenings or weekends.

CT600 rtty terminal unit and software for Video Genie/TRS80. Sale forced by change of micro currently £122, will accept £80. G3ZYY, QTHR. Tel Saltash (07555) 5913, after 6pm.

FT480R 2m tx/rx, FP80A psu, new cond, £300. MR110 scanning rx, psu, R5, S20 fitted, £25. Tel G6CHB, QTHR. Tel 0632 462606.

Standard C8800 2m fm mobile, fully synthesized, 5kHz, 25kHz shift selector, full repeater facilities, four memories, full microprocessor type programming, 1 and 10W output, local or dx selector switch, auto calling channel, £190. Tel 0272 614497.

TR2300, mobile mounting bracket MB2, RA1 helical ant, good cond, £150. G4KUC, QTHR. Tel 061-427 5931. Manchester area.

Bank manager forces sale! FT708R uhf handheld, mint cond, cw YM24A spkr/mic, orig packaging etc, £210 ono. A. Cox, 1 St Barnabas Terrace, Stoke, Plymouth, Devon.

Mutek FT221/225GT front end board, incl wire, instructions for fitting, three months old, £46. R. Hartnell, G8YNQ. Tel 0984 23762.

FT101 Mk2, FV101, SP101, G3LLL clipper, double balanced mixer, cw filter, fan, mic, spare valves, audio filter, £295. Trio 7200G, R0-7, S8-10, S14-23, £105. Bauer paddle, £5. G4DJC, QTHR. Tel Witham (0376) 514845.

Muirhead decade oscillator, 1Hz-111kHz, built-in xtal oscillator, variable op into 600Ω or 10kΩ, £60. PSU 13·8V at 6A, vgc, used little, £10. G3VWE, QTHR. Tel 0272 656783.

Icom IC202, 144-144·4, carrying strap, handbook, £95 ono. G3RWL, QTHR. Tel 01-366 4297.

TET (USA) 4-el 10m beam, £55. Atari 800 computer (USA model) 32K, program recorder, programs, £600. G3WUW, QTHR. Tel 073-529 3694.

Heathkit GR78 rx, £50. Amstrad 6010 rx, £25. 8Ω headphones, £5. 500Ω headphones, £10. 13ft 6in Vortex Seaspeed fishing rod, £25. Prefer cash. Buyer inspects, collects. Bill Lawrence, Leggatts Park, Potters Bar, Herts EN6 1NZ.

Digital voltmeter, Advance DVM1, 0-2000V dc, 0-1000V ac, handbook, £50. G4AYG, QTHR. Tel 025-55 7175.

AR240, cw charger, helical, packaging, £120. Pair each new unused Eimac 4CX250B SK606 chimneys, SK610 vhf bases, lot, £45. Unmod ITT Star uhf M5 six channel, 12·5 spacing, £25. Mullard BLW60, £6. Full spec 40W 175MHz. G3ZON, QTHR. Tel 01-546 3447.

Eddystone 940 rx, £105. Heathkit HW32, 20m ssb tx/rx, cw ps, £90. Trio 2200GX, all accessories, £110. Tel Hackwood 4578, after 6.30pm.

Mosley TA33SNR (USA), TA40KR (40m attachment), Bencher iambic keying paddle, unused, MFJ cw filter CWF2, valves, components, sae for list. GM3OXC, QTHR. Tel 0224 26984, evenings.

AR8516L, spare valves, new in cartons, total of 14, £20. CRTs 3KP1, 3EG1, new, boxed, orig RA17 cabinet,

chrome fittings, new in sealed container, collect. Manuals: RA17L, TF867, S36A, 880/2, £6.50 each. Postage extra. *Wanted:* Marconi vtvm, HT32A or similar. Tel 0995 40387.

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.

Telequipment DM53A dB storage scope, £85. TR2300, cw nicads, charger, rubber duck, handbook, £135. Cabinet for 19in rack, 10in high, £2. *Wanted:* cw filter FT101E. Datong morse tutor. G3OXV, QTHR. Tel Daventry 2265.

2m fm station: Multi 700EX (FDK), 6A Drake psu, Long John 5/8 gp antenna, 12m UR43, plugs, all mint cond, £199 the lot. Buyer collects. G4HJU, QTHR. Tel 051-653 6369.

SX200 scanning rx, 26-514MHz, used very little, in as new cond, £195. DX200 gen cov rx, 150kHz-30MHz, less than one year old, £90. Tel Horsham (0403) 67908.

Icom IC260E 2m multimode, good clean cond, £270 ono. MMT 432/144 Microwave Modules transverter, used very little, £140. G8XHB, QTHR. Tel 01-641 8399.

Trio 7500 2m fm tx/rx, 1-15W output, as new cond, car mounting bracket, power supply, genuine reason for reluctant sale, £135. G8XFQ, QTHR.

FTDX401 560W p.e.p., 80-10m, 160m receive only, TW Phase 2, 2m transverter, hf rig comp with set spare valves, four pairs pa valves, £275. G3WWT, QTHR. Tel 01-898 2417.

12ft sports boat, m/ply, 18hp Perkins petrol engine, remotes, road trailer, spare five gallon tank, exchange for hf/vhf station, rtty gear, or w.h.y? to value approx £300. BRS49100. Tel 0952 583784, after 4pm.

Yaesu FTV250 Mk2, 18 months old, cond as new, comp with connecting leads, surplus to requirements, £85. G4GXF, QTHR. Tel 03752 2089.

Three Friden ASCII printers, comp with punch, reader, technical manuals, need attention, some spares, prefer not to split, buyer collects, xyl clearance forces sale, £50 ono. Valve tester, (AVO), £20. G8PLC, QTHR.

Jaybeam C5 2m colinear, UR67 coaxial brackets, etc, £30. Kenwood LF30A low pass filter, as new, boxed, info, £12. Transistorized electric fence unit, £10. Amtech 300 hf atu, £29. Tel Richard, 0376 21869, after 6pm.

Hygain 103BA 10m beam, brand new, assembled but never erected, £30. Buyer collects. G3AMF, QTHR. Tel 01-989 9224.

FT7, boxed, vgc, £240. Storno Viscount incl control, manual, £30. BC453 Q5ER, £5. G3JIB, QTHR. Tel 061-681 5117.

Liner 2, good wkg order, £85. TW phase 2 28/144MHz transverter, converter OK but only few watts output, hence £25. Radio-controlled beach buggy, proportional control, in orig packaging, £30. All carriage extra. G4EFE, QTHR. Tel Newbury (0635) 45747.

QTH: Solihull, W Midlands, attractive traditional three-bedroom semi, semi-rural location, freehold, full gas central heating, large attractive gardens, space for garage and caravan storage, planning permission for 80ft tower and 160m dipole, around £28,750. G3ZLS, QTHR. Tel 021-454 5275, office.

IC202, vgc, offers or will exchange for 144MHz fm handheld. G3EJF, QTHR.

FT902DM, brand new, FTV901R(2) and FV901DM, £1,070. MMC/144/28 converter, £15. MMA/144V preamp, £20. G8ZTH, QTHR. Tel 01-242 5795, day, 02934 6371, night.

KW Viceroy 80-10m ssb/a.m./cw 2X6146 pa, 700/250V psu, needs slight attention, hence £25 ono. Magazines 1948-51, tel for details. *Wanted:* Z or EZee-Match, 1:1 balun and FT101B or similar. G4KXW, QTHR. Tel Don, 0742 394515.

TA33JR 3-el triband hf beam, £50. Buyer collects. G2FYT, QTHR. Tel 0272 623670.

TS520SE 160-10m tx/rx, only 18 months old, £385. Matching AT200 tuner/power meter, £80. The pair, £460. Both items mint, unmodified cond, mic, handbooks, orig cartons. Tel Bath area (0373) 64694.

Trio TR9000, 2m multimode, £290 ono. G3KHZ keyer, £7.50. *PW* G4CLF 9MHz ssb board, YE90H2·4B xtal filter, £35. G3ILO, QTHR.

FLDX400, £160. FRDX400, £160. FL2000B, £170. Heath monitorscope, £65. Spectrum analyser, £70. Shure 444, £14. TW communicator, 4m, £20. G4AYA, QTHR. Tel 051-924 3020.

C78 uhf synthesized portables, matching 10W linears mounting bracket (never used mobile), soft case, charger, all vgc, orig packing, handbooks, £265 or may split. IC24E 2m 10W multimode mobile, packing, handbooks, £230. G8PRR. Tel 01-340 4139.

FT101ZD, 12 months old, mint cond, comp with mic, fan, dc-dc converter, FC902 antenna tuner, DX5V five-band vertical antenna, all manuals, all leads, coaxial, £700 ono. Prefer buyer collects. Tel Southampton (0703) 733626.

Yaesu FT480R multimode, £300. FT207R handheld, spkr, mic, £130. JIL SX200 scanning rx, £160. Pye pmr transistor mobile rig, 60W minimum op, helical, front end, eight channels, OK for 2m, £70. All ono. G8UQE, QTHR. Tel 061-736 1734.

Pocketphones, new nicads, on RB14 xtals for RB0, incl one set xtals (xtals, £2.50 set), £25 ono. Storno CQM33, 12 working on 2m, £7 ono. All with circuits etc. G4LXI NOT QTHR. Tel Bromsgrove 72215.

Phasing harness for Tonna 2m 9-el crossed Yagi, brand new, cost £32, accept £20 ono. G8JEI. Tel 0302 867364, between 9am and 5pm.

RSGB Bulletin, 1963-7, *Radio Communication* 1972-80, perfect cond, £12. Free delivery 15 miles. G3CVX, Sherbrook, Primrose Lane, Wolverhampton. Tel 733284.

Late model BRT402 GEC comm rx, miniature valves, as new cond, £95. VHF marine channel Bantam, comp, £60. HF six-channel marine ssb, tx/rx, £65. *Wanted:* hf amateur tx, cw/ssb or cw/a.m.. Non-wkg OK. G3DVF, QTHR. Tel Alnwick 602487.

Scanning rx, Realistic PRO2008, 30-50MHz, 166-172MHz, 410-512MHz, £150 ono. Tel Ross-on-Wye (0989) 63722, after 6pm or weekends.

Heathkit HW100, psu, manuals, £135. Various Eddystone manuals, tel for details. Amtron a.m. radio kit, £4. 74001A telegraph relay test set, offers. Pye uhf tx, £15. Travelling wave amplifier, 5·7GHz, £10. G4VYA, QTHR. Tel Tamworth (0827) 55670.

Philips Cardioid mic, desk mounting, chrome flexible stem, h and l impedance, Cambridge speech compressor, £15 pair, plus carriage. Ronette desk mic, high impedance, £3 plus carriage. G3JNY, QTHR. Tel Leeds 863058.

Allam 1·5kVA generator, £140 ono. BC221 with charts, psu, £18 ono. Airmec 853 wave analyser, 30kHz-30MHz, £15 ono. Friden electric typewriter, papertape reader, punch, £110 ono. P/X 144MHz linear, 70cm rig, rotator, test gear, etc. Tel 048084 396 (nr Huntingdon).

Grundig Satellit 1400 professional all-wave receiver, 1·6-28MHz fm, med, long wave, bat/mains, £125. Sony ICF2001 fm/a.m. pll, synthesized rx, a.m. 150-29,999kHz, direct key input, £125. Sony AC14A power adaptor, £10. All exc cond. Tel 061-432 8943.

FT480R, exc cond, £300. IC202, £90. Microwave Modules MMT432/144R transverter, new June 1981, £145. Ampere APB82A 144MHz 80W amplifier (linear), comp mobile bracket, £75. All prices ovno. Stephen Prior, G8KQB. Tel 040924 548, during office hours or early evening.

TR2300 nicads, charger, case strap λ/4, helical, handbook, rev rpt, £140. Catronics 1/10W pa, £10, £145 the pair (compatible). G6AJN, QTHR. Tel Stevenage (0438) 50862.

Standard C8800 2m/fm mobile fully synthesized tx/rx, five memories, two years old, perfect cond, £170. Mirage B108 80W linear, fm/ssb to match, £80. Postage/insurance paid. G. France, G8VTU, 2 Leopold Drive, Bishops Waltham, Hampshire. Tel 4876.

Trio R1000 rx, six months old, as new, £240. Jim Henderson, GM4HKW, 1 Rossiebank Crescent, Westmuir, Kirriemuir, Angus. Tel Kirriemuir 3455.

Pye Communications Dolphin radio telephone, 500-3,600kHz, exc cond, £100 ono. Philips 709 stereo amp cum radio, pre-set vhf stations, £70 ono. G4KUW, QTHR. Tel Doncaster 831612.

Creed workshop manuals for teleprinters model 2, 3, 47; Auto tx 65 series; reperfs 7TR3, 25, £5; Keyboard perf tx 7PN, 67; Tape reader 92; Above books £1 each, except Nos 47 and 85, £6 each. G8AVJ, QTHR.

Drake 2C rx, 2CQ spkr/mult, xtal cal, extra xtal, 28·0-28·5, manual, 250/110V auto transformer, £120 ono. Minimitter top 2-7 tx, a.m./cw, 160/80/40, 10W, £15. PCB for SL1600 multimode tx/rx, £10. G3WAO NOT QTHR. Tel Stubbington (Hants) 5757.

FT707, FP707, mic, bought October 1981, £600 ono. Roy Howard, RS49751, Hiraethog, Eglwysbach, Clwyd. Tel 049267355, anytime.

KW204 tx, KW202 rx, vgc, £300. Will only sell as a pair. No offers. Tel Medway (Kent) (0634) 30822 (Answerphone).

FT227R 28/5kHz step and scan, £170. IC202S, 144·0-144·6MHz and satellite band, £140. Coutant psus: 5V 2A, 6V 5A, ± 12V 0·5A, all £15 each. Bishop, G4LQE, 88 Lanercost Way, Ipswich. Tel 218067 or 642110.

4CX250B vhf beam tetrode, £20. Base and chimney for above, £25. VHF Pye PF70 portable, £65. Two Selsyn power synchros, 250V, £30. RF sig gen, 3-300MHz, vgc, £150. Old but wkg Solartron 10MHz cro, offers. Tuscan mpu and vid monitor S100 bus, £500. Triton mpu and uhf mon, £250. Creed 75 two-speed ttu, £40. Variable eht dc supply, 2kV, £25. Marconi industrial surv cameras, £10. Bridge/megga, vgc, £30. S. D. Shergold, 56 Gallwey Road, Wyke, Weymouth, Dorset.

IC255E, 25W fm tx/rx scan mic, mobile mount, orig packing, mint, £185. ASR33 teletype, in good wkg order, offers. Organ keyboard, 49 key, C-to-C, gold plated contacts, exc cond, £15. G4JXU. Tel Basingstoke 28241, after 6pm.

Tektronix RM525 tv waveform monitor, £120. Burndept BE201 military vhf tx/rx psu, leads, £85. BC221, charts, psu, £22. Exchange for rtty gear (non-mechanical) or computer equipment like Video Genie, Atom, Tangerine. All plus carriage. G8MHL, QTHR. Tel 0934 823432.

Stamp collection in stock album, mainly modern mint British, some foreign mint, plus fdcs, value over £75, exchange gen cov rx, 144MHz equip or w.h.y? G3OAZ, QTHR. Tel 0256 65126.

Trio 7200G, fitted R0-7, S0, S18-23, R5R, vgc, 10W output, comp with mobile mounting bracket, very easy to use when mobile, therefore safe, ideal for new G6, £100. G6ATI, QTHR. Tel Harrington (Cumbria) 831854, after 5pm or weekends.

Yamaha B55 electronic organ, exc cond, suit beginner or expert, £700 ono. Could deliver. *Wanted:* circuit Marconi HR100 rx. G4MJF, QTHR. Tel 0604 405646.

Tonna 432MHz 21-el, used but clean, £10. Liner 430, cheap 70cm ssb/cw, £110. SK620A base, £10. Trio DM81 dip meter, £30. Ham 4 rotator, six months old, £80. 40ft wind-up, tiltover, Westower, £99. Buyer collects. Mint 4CX250B, £5. Tel 0484 659428.

TS802 2m 80ch handheld, £110. Frequency counter, 200MHz, eight digit, £70. 2m 1W handheld (R3), £50. 40ch 2m tx/rx, £75. Variable voltage 5A psu, £25. 13·8V 12A psu, £30. New coaxial relays, £5. Magslips, £5. G4LYD. Tel Kirton (Suffolk) 513.

Heathkit HR10B five-band rx, HRA 10-1 xtal calibrator, DX60B five-band tx, HG10B vfo, five hf bands, 6 and 2m, manuals, all used little, in exc cond, four-band trap vertical antenna, £170 the lot. G4FOF, QTHR. Tel Hunstanton 2836.

Nascom 1, 32k expansion Nas Sys 3, 8k Basic, Gemini eprom board, Cottis Blandford tape interface, £230. Trio TR2300, as new, nicads, reverse repeater, charger, case, etc, £140. G3XKT, QTHR. Tel 0602 392554.

QTH' East Barnet, Hertfordshire (north London boundary), 229ft asl, close to main line station, modern semi-detached house, three bedrooms (one fitted as shack), bathroom, separate wc, two reception communicating, kitchen, attached brick garage, own drive, garden 62ft with tower at bottom and use of railway land, shed, £39,000 freehold, reasonable offers considered. Details from G3MBL, QTHR. Tel 01-445 4321.

Rotator Stolle 3001 50ft cable, £26. 26ft glass fibre pole suit, all-band hf vertical, £25. Advanced morse tutor CBM/PET, computer sending, 5-30wpm, morse keyboard, various intercharacter delays, simulated GPO test, cassette, £5. Post extra. G3XGK, QTHR. Tel Lowestoft 64160.

IC251E, fitted Mutek board, £325. IC451E, mint, under guarantee, £400. MMT1296/144 transverter, unused, £105. 144MHz QRO linear, psu, pair 4CX300A, £150. Four 19-el boomers, stacking frame, power combiner, spare antenna, £125. Tonna 23cm 23-el, brand new, £15. Tel 0484 659428.

Datong D70 morse tutor, £36 incl p & p. 12AVQ vertical 10, 15, 20 antenna, £20. Buyer collects if possible. G4LSB, QTHR. Tel Dean 43329.

IC202, extra xtal fitted for 145·8-146, in orig box, instructions, etc, £120 ono. Andy Malbon, G8MIA NOT QTHR. Tel Wokingham 781649, after 7pm.

TR2300, nicads, charger, case, reverse repeater, handbook, orig packing, exc cond, £120. G8IIQ. Tel Rainford (Merseyside) (074488) 2118, after 6pm.

IC240, good cond, power lead, mic, manual, £125. Buyer collects. G8UUK NOT QTHR. Tel Croydon (654) 4905, after 6pm.

FDK 2m multi-mode 2700 Mk2, AC240, DC13·8, fully synth, vfo, a.m., fm, ssb, cw, Oscar, vgc, delivered 50 miles, £299. G6AEA, QTHR. Tel Melton Mowbray 63369, evenings.

KDK FM144, 10W 2m mobile rig, vgc, mic, power lead, handbook, orig packing, £145. HF5 vertical antenna, £20. *Wanted:* TR2300, must be in good cond. G4LEX. Tel Gloucester 421013.

FT101B, cw filter, fan, spare driver and pa valves, dc leads, manual, KW E-Zee Match, both vgc, £350. FDK Multi 750, mobile bracket, etc, 12 months old, as new, £230. *Wanted:* MMT432/28S. MMT144/28. RTTY tu. G6ANS, QTHR. Tel Brentwood 810831.

40ft Heathkit tower, three sections, climbing rungs, platform, £60. Gem quad, few months old, £65. Substantial mains rotator, £25. Buyer collects all items. G3MWV, QTHR. Tel Cromer (0263) 512872.

Bearcat 220FB, fm/a.m. across entire coverage, workshop and user manuals, orig packing, all accessories, £175. G8PRR. Tel 01-340 4137.

Kenwood (Trio) QR666 rx, immac but needs slight realignment, hence £35. Jaybeam 4-el 4m ant, £7. G6ETA. Tel Chestfield (Kent) (022779) 3262.

FR101, matching spkr, good cond, buyer inspects and collects, £230. Genuine reason for sale! Tel 0702 338741, evenings.

TR2400 2m synthesized handheld, £160. Mamiya

M645 camera, accessories, film, £300. Will consider exchange for radio gear. GW4JOQ, QTHR. Tel 0558 823301, evenings.

KW Viceroy, in wo, manual, all reasonable offers considered. G3WVC, QTHR. Tel 09297 534.

Trio TS520SE, fitted cw filter, mint cond, HS4 headphones, £360. G3SYL NOT QTHR. Tel Broadstone (0202) 693548.

Cossor marine vhf fm CC400M6 24V rt simplex/dual freq, fitted ch6, 8, 9, 12, 14, 16, all transistor, mint cond, comp with all circuits, technical handbook, prefer to exchange for similar cond 12V rig. GI4MFM, QTHR. Tel Garvagh (026652) 230, 9am-5.30pm.

Yaesu FL50B, FR50B, vgc, rx fitted fm discriminator, £130 ono. Instruction manuals. G4JGQ, QTHR. Tel 01-855 1481.

FRG7 rx, fitted digital readout, Toko 2·1 MFL455 filter, exc cond, £120. Will deliver within reasonable distance. Tel 05086 2923.

FRDX400 multimode rx, 160-10m, 6m, 2m converters, spkr, spare valves, manual, £125. FT202R handiportable, 6ch, fully xtalled S19-22, R5-6, nicads, NC1 charger, YM24 spkr mic, earphone, rubber duck, telescopic antenna case, manual, £80. G8VXQ, QTHR. Tel 021-705 3583.

4CX250B, brand new, boxed ITT, six available, £15 each ono. Amperex 4CX250F, one only, brand new, £12 ono. G4MAW, ex-G8ABP, QTHR. Tel 0803 555488, evenings.

Heath continuing education: dc electronics; ac electronics; semiconductor devices; electronic circuits; the above four courses plus multimeter and oscilloscope, any reasonable offer considered. Jim Coggins. Tel 01-727 2141, evenings.

FT7S 10-80m tx/rx vxo, mobile mains psu, vox unit, £100 ono. G4ISI, QTHR. Tel 051-644 6332.

Trio 8400 uhf tx/rx, mint, £265. CV89 rtty converter, £20. Solartron digital voltmeter, bench model LM1440, £20. Solartron bench oscilloscope trolley, manual, £15. Muirhead "Mufax" D658D 18in fax tx, a.m./fm, three-speed, mint, £75. G4LZX, QTHR. Tel 0384-292337, evenings.

R216 army vhf rx, 19-157MHz, five bands, a.m./fm/cw, 30 or 120kHz bandwidth, ac psu, vgc, £90. Racal RA17 hf rx, exc cond, £160 ono. Collins TCS tx and rx, good cond, £40. G4NCE (ex-G8XRY), QTHR. Tel 021-588 4801.

TA33JR 3-el triband hf beam, £80. AR22R rotator, £30. The pair, £100. G4EOG. Tel Chelmsford 465468.

Solartron CD1212 scope, 25MHz db, 40MHz sb plug-ins, manual, £60 ono. Calibrator No 2, sig gen, 20-80MHz a.m., fm, cw, £15 ono. Marconi lcr bridge, £10 ono. TF867 Standard sig gen, 15kHz-30MHz, £40 ono. Buyer collects. All in good cond. G8MDD. Tel Sheffield (0742) 882922.

Akai 4000DS three-head stereo reel-to-reel tape deck, as new, orig packing, £70. Goodmans 3000 fm stereo tuner amp, Goldring-Lenco single-play deck, Wharfdale Unit-3 spkrs, Radiomobile 108SR lw/mw radio, stereo cartridge player, offers. G8WOZ. Tel 0376 83947.

MMT70/144 4m transverter, fb, £95. Jaybeam 4Y/4m ant, fb, £16. Yaesu desk mic, dual imp, YD844A, fb, £20. Yaesu YO100 monitorscope, vgc, 80-2m, £40. Hygain 14AVQ, tr, vert, 40-10m, £30. G4HEB, QTHR. Tel 02873 34312.

Standard C7800 uhf mobile, boxed, vgc, £195. Lunar 80W pa, preamp, boxed, vgc, £85. G8WVV. Tel 0223 314855, during office hours.

FT707, atu, power supply, FP707, FC707, brand new, unused, list price, £720, all three, £600. Keith Rodgerson, 10 Leigh Road, Clifton, Bristol. Tel 0272 733848.

TR7100 mobile, 2m fm, tx/rx 10W, 12ch, R0, R3-4, S13, S20-23, RR0, auto toneburst fitted, manual, £75. Shira 24F1 eight waveband gen cov (incl 2m band), £15. Codar RQ10 Q-multiplier, peak and null etc, £5. G8VPV, QTHR. Tel Ray, Sheffield (0742) 848310.

KW2000A, psu, mobile psu, Yaesu mic, recently serviced by KW, antenna plug PL259, £140 ovno. Prefer buyer collects but will deliver any reasonable distance from QTH (Gt Missenden, Bucks). John Hughes, G4KGT. Tel 01-920 8142, or 02406 4380.

IC202, nicads, 144·000-144·600, 145·800-146, £95 ono. G8XDA, QTHR. Tel Stroud 77172.

G6MN: selling owing to illness: 12 nife batteries, 1·5V, 75A Bang & Olsen turntable pick-up; small 4W amplifier, 0-10, 0-100, 0-200m ac voltmeter, coaxial antenna, switchover low pass filter, Wharfedale 12in spkr, pressure column, HRO/power pack/10 coils, incl 5BS, 500V megga e & v, transverter 28/144MHz, power pack converter, 28/144 valve voltmeter, Heathkit universal avo meter, Ferrograph tape recorder, reel-to-reel, G8KW trapped dipole, 80-10m, six boxes assorted 2, 4, 6BA nuts, bolts, two boxes Belling LEA sockets, two boxes American BNL sockets etc, two boxes resistors, condensers, If choke, 6V soldering iron, transformer, 6/12/18V. All must be sold in one lot, offers. G6MN, QTHR. Tel 0909 473415.

12AVQ vertical antenna, £25. 8XY/2M crossed Yagi, 8-el, £20. New cond 5Y/2M 5-el Yagi, £10. Oskerblock SWR200B, £30. G8AQF/G4NAS, QTHR. Tel 0772 633778.

Trio TR9000, boxed, exc mobile or base station, £290. G4JLU, QTHR. Tel David, 01-954 6728, evenings, 01-349 1122, days.

KW Viceroy tx, 3·5-28MHz, 180W p.e.p., ssb, £45. Trio JR599 rx, 1·8-29·7MHz incl 144 and 10MHz, £135. SEM Z-Match, 1·8-30MHz, £30. G4AQT, QTHR. Tel Nottingham (0602) 250601.

FT200, FP200, xtals 28·0-29·0, spare tx/rx, valves, £200. G8LZ, QTHR. Tel Maidstone 54461.

Practical Wireless February 1942 to August 1952; October 1952 to December 1954; February-November 1955, 80 copies, £10. Valve books and *73 Magazine,* free. Lowe SRX30, and 2m converter, £150. Lafeyette HA600 amateur band rx, £35. Liner 2, and preamp, £80. 19 set antenna variometer, £5. Computer keyboard (surplus), £10. Will accept an hf or vhf (multimode) in part exchange, or with my ZX81 (£55) and 5k ram, would accept a larger computer (eg a PET). All ono. Will deliver 50 miles from Cumbria. G8KJI, QTHR. Tel Harrington (0946) 832127.

FT100B, 10-80 tx/rx, cw, ssb, xtal filters, mains, 12V, £160. IC202, nicads, Oscar xtal, vgc, £120. Uniden a.m. ssb mobile, 8W p.e.p., 28-29MHz, £100. Pye Europa uhf mobile, SU8, RB6-10, £100. Burndept BE357 uhf portable, £12. G4BLJ, QTHR. Tel Brighton 503980.

Yaesu FT707, brand new, in unopened box, £450, no offers. Securicor delivery £10 if desired. Standard C58 2m multimode, CPB58 matching linear, case, mobile mount, all immac, hardly used, offers. G4LDT, QTHR. Tel 0632 551045.

Collins KWM1, exc cond, extra xtals, new valves, homebrew psu, offers. 4CX250B, as new, ptfe base and chimney, 1185-0-1185V at 500mA transformer, heavy duty coaxial relay, £25. G4KSG, 4 Leam Crescent, Solihull, West Midlands.

QTH: Mabelthorpe, 100yds from sea, small bungalow, newly modernized, two small bedrooms, lounge, rebuilt new kitchen, garden at rear approx 350 sq yd, orchard, various outbuildings, planning permission for 30ft mast, suit disabled or retired couple, bungalow in block of five. £12,000. Tel Mabelthorpe 3201.

Yaesu FT480R 2m multimode, base station use only, £280. Icom IC2E 2m portable, case, charger, £130. MML144/100S 100W linear, preamp, £100. All less than year old. G6ARY. Tel Brighton 603964, after 6pm.

Icom IC255E 2m fm, £185. Revco 2m mag mount antenna, £20. Both vgc. Tel Neil, Congleton (02602) 3323.

Morse. Learn cw from slow to fast on PET computer; five character groups letters, figures and random words; program prints out characters sent for performance checking; interface instructions; program on tape cassette, £5 post included. G3AZI, QTHR. Tel 0772 37815.

Heathkit continuing education course: ac, dc, semiconductors, all books, records, components etc, model ET3100 designer/trainer, all pristine, £100. Telequipment S51 oscilloscope, £40. Altogether, £120. G4HBU, QTHR. Tel Les, Bristol 551055, day, 611093, evenings.

Cossor 1035 Mk3 dB scope, Dartronic 510 scope, Heathkit scope switch, R1475, R4187, hb psu, APN9 Loran rx, Geloso converter less i.f. trans, PW Texan amp, NJ vhf tuner, WW Dolby noise reducer, 9m 100Ω coaxial, offers. G8MGZ, QTHR. Tel Crawley 25110.

Microwave Modules 144/28LO converter, as new, £14. Joystick vfa, Joymatch atu, £20. Muirhead D239A stepped attenuator, £10. AT&E 5ABV4 telegraph distortion measuring set, £5. Pye Ranger (4m) comp, £5. All ono. G4ERX, QTHR. Tel 0277 225736.

FT101B, mint cond, still with clear plastic on front, used very little, manual, orig packing, prefer buyer inspects, £340. G4FXS, QTHR. Tel 021-458 3537.

Trio R1000 rx, exc cond, manual, orig packing, carriage by arrangement, £215 ono. Joystick system A antenna system, £20 ono. Tel Loveden (0400) 72704.

TR9000 2m multimode, mint cond, boxed, incl all accessories, £305. Jaybeam 10XY 2m antenna, £26. Sentinel 2m auto fet preamp, £14. FT101 Mk2, spare new valves, good cond, fan, £285. Carriage incl all items. GW4AEC. Tel Llanelli (05542) 53186.

FDK Multi 2000, fm/ssb/cw 2m tx/rx, 12V dc, mains, workshop manual, Jaybeam LR1/2M colinear, 10m RG8U cable, comp 2m station, £175. No offers. G4HBU, QTHR. Tel Les, Bristol 551055, day, 611093, evenings and weekends.

VCR97 tube, offers. No cash send until proved OK. 1964 Heathkit manual for model DX100U, offers. Frank White, G4KFW, 87 Dyas Avenue, Birmingham B42 1HQ. Tel 021-357 2009.

TS520, 80-10m, £295. GLA1000 hf amp, never used, £199. Trio gdo, £35. Above items late G3DIH. C146A 5ch 2m handheld, £52. MM432/50 amp, £80. 432/88-el multibeam, £27. 14 AVQ/WB, £45. 20ch programmable scanning rx, £70. KF430 70cm, 9ch, fitted, £105. TR2300 mobile bracket, £9. Tektronix type 435 dual trace oscilloscope, £58. ZX81 with 16k ram, £95. CCTV and control box, £38. *Wanted:* studio monitor and reel-to-reel video recorder. W.H.Y? Tel Maldon (0621) 773528 after 6pm.

Sentinel preamplifier fet, 145MHz, £12. Audio filter type BP2, eight-position, by Technical Associates, £12. Trio 911 2kW linear, boxed, immac, £250 or offers. Variable dc power unit, 0-30V, 5A Farnell, £90. 13·8V dc power unit, new, £59. Heathkit oscilloscope, £12. Yaesu FRG7000, £220. Trio 2300 rubber duck antenna, £95. G4IJS, QTHR. Tel 0925 64075.

Icom 202, 2m ssb, fully xtalled, MML 25W linear, £100 or exchange for 2m fm rig or oscilloscope. G4HIY NOT QTHR. Tel Crowmarsh 788, any evening.

Trio TR7010 2m tx/rx, all accessories, orig packaging, vgc, £130. KW77 rx, 160-10m, a.m./ssb/cw, £50. Marconi CR100/2 rx, 160kHz-30MHz, a.m./ssb/cw, £20. Buyer collects or postage extra. Going hf. GW4MTE, ex-GW8XJC, QTHR. Tel Porthcawl 4832.

Racal universal drive unit, MA79G, mint, handbook, £285. Racal preselector MA197B, good cond, handbook, £45. G4JQN, QTHR. Tel Westbury (0373) 864478.

Radio Communication September 1974-December 1981 in exc cond, comp, £35. Buyer collects. Tel Thanet (0843) 581849.

Trio TS700 2m multimode, exc wkg cond, 3N204 preamp, xtals R3, S20-23, mic, all accessories, £280 ono. G8MJG, QTHR. Tel Leeds 676084.

Welz SP15M swr/pwr meter, new, £20. KW swr meter, £6. Drake R4B spare manual, £2. Wide-spaced variable cap, approx 450 + 450 ped, £6.50. G3CPM, QTHR. Tel 0386 852753.

Heathkit SW717 rx, aligned by Heath December 1981 three months old, ideal for beginner, £60. Heath rcl bridge IB5281, four months old, £40. Heath rf oscillator IG5280, £40. All with manuals and in perfect cond. Tel Horley (Surrey) 73046.

Trio JR310 160-10m amateur bands only rx, SP5 spkr, immac cond, orig box, £90. Heathkit HW101 tx/rx, HP23A psu, SB600 spkr, Shure 444T mic, all manuals, £175. KW topband tx, offers. G4DXW, QTHR. Tel 0773 232211.

FT200/FP200 hf rig, used mainly to transvert to 2m, all 10m, orig packing, manual, spare pas, good cond, no mods, £195. CCTV camera Ikegami 5000, 1in Vidicon "C" mount, no lens, £55. Both carriage at cost or deliver Manchester area. G8NXW, QTHR. Tel Ashton-in-Makerfield (0942) 718295.

Eddystone 770U Mk2 rx, 144-500MHz, £155. Trio 2400 2m hh, orig packing, £165. Datong PCI hf converter, new, £105. Sommerkamp TS788DX 10m mobile tx/rx, £270. Hallicrafters SX122 rx, 550-34MHz, £100. IC201 multimode, tx fault, £170. Part exch? G4AFY, QTHR. Tel Kidderminster (0562) 753358.

Trio TS700G multimode, manual, vgc, £290. Channel Master rotator, £30. With cable, SWR25 power meter, £5. 2m phasing harness, £4. G8VKE NOT QTHR. Tel John, 01-553 4459.

Sanyo RP8880 rx, broadcast plus amateur marine 5 sw, double conversion, fb for swl, hardly used, £110. G4HBU, QTHR. Tel Les, Bristol 551055, day, 611093, evenings.

FT101ZD hf tx/rx, new bands, 160-10m, fan mic, one year old, exc cond, £525 ono. GM6XW, QTHR. Tel Larbert (0324) 56204.

The last of the 520 line: TS520SE with 250Hz cw filter, comp with American dust cover, SP520 external spkr, MC35S mic, Hansen SWR50B illuminated twin meter swr bridge, £380. GM4DHJ, QTHR Paisley. Tel 041-889 9010.

Yaesu FT207R 2m handheld, boxed, comp with 12V dc mobile psu, remote spkr/mic, mains charger, all as new, £140 ono. Steve Woods, G8ZUO, 325 Revidge Road, Blackburn, Lancs. Tel 0254 887670, work, 62811, home.

KW1000 linear, serial No W583, two 572Bs final, forward and reflected power bridge meter, instruction manual, mint cond, £220. G8KS, QTHR. Tel 0323 21919.

TR7500 with mobile mount, 80ch 2m fm, £155, or exchange your unmodified FRG7. G3IGY, QTHR. Tel Leeds 862508.

Yaesu FT202R 6ch handie, leather case, rubber duckie, nicads, NC1 charger, list price £136, new, unused, £85. Yaesu desk mic, 50Ω, four pin, £12. Lambda computer quality psu, 5V, 10A, £16. Postage extra. Tel 0747 840138.

Icom IC201 144MHz multimode, cw, ssb, fm, 10W output, rf attenuator, very nice rig, £250, or exchange for hf rig or separates (KW2000 etc). Eagle RX80 gen cov rx, 0·5-30MHz, in four bands, offers? G4KZY, NOT QTHR. Tel Rugby (0788) 85506.

Kenwood/Trio model TV502S, 2m transverter, suitable for use with 520 or 820 models, £80 or offer. Apple 48k computer with disc drive, Eurocolour card, integer card, interface for cw, rtty, software, £1,000 or offer. G8TLU, QTHR. Tel Toddington 2760.

Daiwa SR9 2m tunable rx, R6 xtal, new December 1981, £35. Yaesu FT75B hf tx/rx, two FP75B ac power/spkr units, mic, eight xtals installed, £100. GM4DHJ, QTHR Paisley. Tel 041-889 9010.

LG300 tx, 80-10m cw, a.m., 150W, £50. Eddystone 730 rx, 500kHz-30MHz, £70. Pye vhf a.m. low band rx, £10. Two-off Murphy a.m. vhf txs, QQVO640A pa, comp with psus, heavy, £15 the pair. G3XVL. Tel Chesham 784883.

SSTV camera comprising Crofton cctv camera lens, inbuilt DL2RZ f to ss converter, two outputs 625FS and 128SS video, plug-in pcbs, all data, DL2RZ could be used separately, £65. G3LTZ, QTHR. Tel 0793 762559, anytime.

SSTV pcb for Robot 400 issue B, dspth, gold edge connector by VK5PV, all info as supplied, up date mod, info issue D, £40. G3LTZ. Tel 0793 762559, anytime.

Heathkit IO12U laboratory oscilloscope, £35. Heathkit RG1 gen cov rx, £35. Cossor Commando CC302 6ch, S20, S22, R0, R5, R7, spares, £35. Storno Viscount 4ch, S20, S22, R5, toneburst, £35. Pye PF1 SU8, nicads, £25. Pye AM25B 2m, £15. Marconi TF1152 10/25W 0-470MHz, £30. Marconi TF762 a.m. sig gen, 250-600MHz, £15. BCC CT53 a.m. sig gen, 9-300MHz, £15. Marconi TF897 valve voltmeter, £10. BC221T with charts, £17. Cavity filter, silver plated, ok 2m, £15. Class D wavemeter with phones, £10. Bird TS118/2 1kW rf load, £15. Solartron CD523S scope for spares, £7. QQVO640A ex equip, £2 each. QQVO320A ex equip, £1·50 each. QQVO320A, new, £5 each. Papst blowers, ex equip, £1.50 each. *Radio Communication* 2m valve converter, £5. Creed 7E with silence cover, £15. Many components etc. G8CUG, QTHR. Tel Byfleet 45859.

Icom IC251 multimode fm/ssb/cw 2m tx/rx, couple months old only, as new, ac/dc psus built-in, Icom mic, Isopole colinear, £415. Buyer must collect. Genuine reason for sale. G8VKM. 4 Ripley Drive, St Annes, Lancs. Tel 0253 729998.

Icom 202S, extra xtals fitted for 144·800-145·000, 145·800-146·000, comp with box, instructions, high power nicads, helical etc, £110 ono. G4FKR, QTHR. Tel 0962-72557, evenings.

FT280, similar to FT480R, seldom used, exc cond, 6A, 13V stab mains psu, £280. G3XVR, QTHR. Tel Bracknell 84028, 6-7pm.

Trio 2200G, S16, S20, S22, R7, R9, £45. G4JOW, QTHR. Tel Westonzoyland 740.

Heathkit RA1 rx, comp with handbook, xtal calibrator, exc spkr, good cond, buyer collect, £30. *Wanted:* DL2RZ sstv boards. G3JZW, QTHR. Tel 0525 221161.

AR88D, needs slight attention, hence only £20. G2DAF tx, non-standard construction, needs attention, could be used for parts (incl 898 drive), £15. Will deliver within 30 miles Cardiff, or buyer collects or pays carriage. GW4BSB, QTHR. Tel 0222 374329, evenings.

Exchange FT101Z with fan, mic, handbook, showroom cond, comp with orig packing, hardly used, for Trio hf solid-state rig TS120S, TS180S, Yaesu or well-known make, or sell best offer. G3LWJ, QTHR. Tel Huntingdon 213361.

Yaesu FRDX400S rx, all extras incl 2 and 4m, good cond, £100. Buyer collects. Tel Cardiff (0222) 487417, after 6pm or weekends.

Eddystone 840C, £60. Trio 9R59DS, £45. Lowe SRX30, £115. Realistic DX200, £75. Last two as new. *Wanted:* Several Eddystone and Hammarlund spkrs, scanner, 200N Bearcat, etc. Andrews, 12 Malton Way, York. Tel 0904 59035.

IC22 2m tx/rx, mobile antenna, 4-el Jaybeam quad, £85 or swap for hf atu, dmm hf beam, rtty tu, hf tx/rx, 2m ssb rig, gen cov rx. G4IXQ, QTHR. Tel Bury St Edmunds (0284) 66661.

FT101, orig model, fan added, recently serviced with mic, Asahi swr and power meter, £220. G3WGS. Tel Morpeth (Northumberland) 512905.

Yaesu FR50B rx, 80-10m, manual, orig packing, mint cond, ideal swl, £75. Belcom Liner 2, fitted piptone, 28MHz tx/rx board, 10W to 144MHz, and 10W to 28MHz, good clean cond, £130. G4GFD, QTHR. Tel 061-799 0519.

Yaesu FT280 (480R) 2m multimode, as new, fitted auto toneburst, listen on input, £260. ZL8 8-el compact Yagi for 2m, £10. Carriage extra or collect. G4LVP, QTHR. Tel Hitchin (0462) 58728.

Minimitter 160, 80m mobile control unit, metered, vfo tune, standby, send, £5. 69Y mains power unit for HRO rx, £10. Rack mount supply, £9. Choke lf, oil filled Gresham, 20H, 250mA, 190Ω, £5. G3MBL, QTHR. Tel 01-445 4321.

Panasonic RF2900 rx, £70. Heathkit HM2140 wattmeter, £32. MFJ 949B 300W deluxe atu, £55. HW8 psu, TenTec AC5 atu, swr bridge, £80. Hallicrafter SX101A rx, pickup only, £65. Consider Datong filters or 2m ssb/fm trade. Tim Cook, G5DEH. Tel Newmarket 4757.

Yaesu FT707, FC707 atu, FP707 power supply, FV707DM digital vfo, YM38 mic, all as new, boxed, cost over £1,000 12 weeks ago, reluctant sale, £725 ono. Friend's equipment, despondent, failed RAE. G3BRD NOT QTHR. Tel Peacehaven 2345.

Creed 75, £30. ASCII keyboard in case, £10. Telequipment servicescope, needs attention, £20. New 4CX250BS, £5 each. Bases and chimneys, £5 each. 1·4MHz filters, usb, dsb, 1·6kHz, £4 each. Filters 250kHz usb, lsb, xtal, £5. Tel 0273 552824.

Pocketfones PF1, nicads, xtalled SU8, £20. 16X4027 450ns, dynamic rams, £16. Sharp MZ80K editor/assembler/debugger package, £30. Digital research cpm manuals, incl CP/M handbook by Zaks, £20. C. McMahon, G6FCI, Flat 6C, Kirkley Close, Gosforth, Newcastle-upon-Tyne.

FT200B, as new, G3LLL clipper, spare pa valves, others, packing, prefer buyer collect, £200 ono. G4DLW, QTHR. Tel Helsby 5221.

Icom IC2E 2m fm handheld, comp, as new, HM9 spkr/mic, BP4 battery pack, A4 size nicads, £140. G3ZFZ, 20 Earnse Bay, Walney Island, Barrow, Cumbria LA14 3XZ.

Racal RA98 sideband adaptor, £25. Racal vlf converter, £25. Hewlett Packard oscilloscope model 120B, £100. All with manuals. 10W 70cm atv tx, (PC Electronics), sound board etc, £50. G3WDI, QTHR. Tel Lowestoft 63216.

Panda Cub a.m./cw tx, matching Panda atu, any offers? Heathkit HD1410 twin paddle electronic keyer, £30. G3PKR, QTHR.

Icom IC2E, hand mic, mobile psu, mains charger, 12V charger, spare nicads, orig packing, under 10h use, still guaranteed, £135. Icom IC202, good cond, £100. G4GBS, QTHR. Tel Doncaster 743130.

Yaesu FR50B rx, xtal cal, manual, vgc, orig packing, £65. Heathkit DX40U tx, cw, a.m., 80-10m, VFU1, sep vfo, manual, £28. G3KBR. Tel 0223 247930.

10GHz tx/rx, dishes, tripod, wavemeters, narrow-band bits, £85 lot. G3THW. Tel Peter, Wolverhampton (0902) 759122, home, 773831, office.

IC22A, eight repeater, seven simplex channels fitted, auto toneburst, mobile mount, £100 ono. Heathkit IO 18V 5MHz oscilloscope, £35. G4GMY NOT QTHR. Tel Wantage 4943.

HW101, overhauled, new pas, Shure 201 mic, spare valves, parts, nice cond, £190. G4AGZ, QTHR. Tel Leedstown 419.

Storno CQM611 mobile radio, used but internally like new, regret no rx or tx oscillator units but wkg, volume, squelch, etc, comp with handbook, £14. Redifon R408 rx handbook, £3.50. All carriage extra. G3LTU, QTHR. Tel 0472 696412.

Teletype BRPE110 high speed paper tape punch sets, 110 chps, eight-level code, three units offered, not guaranteed but wkg when removed from service, technical manual, offers in region of £60 each. Two ttl compatible current drive units for same, eight-bit parallel ip, strobe, ready op, £20 each. Buyer collects. G8XYG, QTHR.

Trio TS515 80-10m tx/rx, PS515 spkr, psu, vgc, £220. Matching Europa B 2m transverter, all cables, £50. Hammarlund HQ145 gen cov rx, amateur bandspread, matching spkr, £50. Eddystone 770R rx, 19-165MHz fm, a.m., cw/ssb, £70. GW3ECH. Tel Brecon 5871.

Candler touch typewriting course, £5.50. *Wanted:* Thruline elements; Termaline 50Ω; hf lo-pass filter; two-speed gearbox for Creed 75; 70-200mm zoom lens, Pentax screw; any microscope slides; Eurosonic 24h clock; Amtor 2; FT901 accessories. G3AZI, QTHR. Tel 0772 37815.

FT250, homebrew ac/dc psus, ht psu, needs work, G3LLL clipper, all 10m, spare valves, £180. Palm 2, S20-23, R5-6, R0 xtal, nicads, charger, dc lead, carrying case, £60. *Wanted:* IC202S. G4LJW, QTHR. Tel Jon, Bedford (0234) 781323.

QQVO640 valves, new, surplus, tested, £6 each. P&P, 50p. G8NXI, QTHR. Tel Cromer 511978, evenings.

Trio TR7010 2m ssb tx/rx, orig box, mobile bracket, £100. Microwave Modules 144/40 2m linear amp, rx preamp, £50. Yaesu FRG7000M, memory fitted, £300. G4NMR. Tel Worcester (0905) 423723.

TR9000, mobile mount unused, £290 ono. Buyer collects. G4KEW, QTHR. Tel 01-868 8368.

FT901DM, comp with mobile leads, mint cond, boxed, used little, £575. Datong FL2 filter, as new, bargain, £45. Farnell stabilized power supply E, 350-0-350V, 200mA, £20. D.M. Gair, G3YEY. Tel 021-353 9341.

2m Liner 2 with mains pu, extra range to 144·36, £90 ono. 4X150A, £10. *Wanted:* IC2E for white stick operator. G3SLI, QTHR. Tel Reading 479850.

Triband 3-el beam, 1kW rated, £75. 30ft wall bracket winch up mast, used for above, £50. Buyer collects both items. North London area. G3MBM, QTHR. Tel 0223 860178.

FT101 80-10, cw filter, fan, matching SP101 spkr, spare valves, manual. Hear it most mornings around 3·745, 0830gmt, £250. Hustler mobile antenna, all resonators, ball and bumper mounts, as new, £50. G3UXU, QTHR. Tel Sheringham (Norfolk) 824078.

FT101ZD, comp with fan, mic, manual, perfect cond, £425. Geoff Bennett, G3CYL, QTHR. Tel 02514 7521.

WANTED

HRO coil packs, gen cov and bandspread. WS18, any cond. SSB adaptor for Heathkit DX100V. A. Watkins. Tel Warley (West Midlands) (021) 552 1838.

US Army type BC348J, N or Q, any cond, preferably with outer case. Details and price to G8LIU, QTHR. Tel Uxbridge 30006.

Small supply black-crackle paint or address of suppliers. Brian Henniker, GM3FUU, 44 Ashley Terrace, Edinburgh. Tel 031-337 3441.

FT220, any cond, so long as comp and undamaged. G4LRT, QTHR. Tel Northampton 740633.

FT101B or similar, Z or E-Zee Match, 1:1 hf balun, must be good wkg order, tx preferably with top band. G4KXW, QTHR. Tel Don, 0742 394515.

Xtals B7G, base valve type, similar Brooks "G" range, for 12MHz, any frequency for 2m band tx. Due to vhf band changes. Otherwise any two-pin type tx. Write with cost to George, G2DHV, QTHR Sidcup DA15 7LT.

Radio Communication for February 1973, and January and April 1980. Ray Lowes, G4NJW, ex-G8ZRR, QTHR. Tel (reverse charge) Leicester 362733.

HF comm rx, by schoolboy swl, limited funds available, can collect if seller in central Scotland. David Dodds. Tel 0383 23056, after 6pm.

KW2000 or KW2000A, in good cond, good wkg order. Tel Wylam (06614) 2648.

813 valves, in perfect cond. G3AMF, QTHR. Tel 01-989 9224.

FRG7700. KW E-Zee Match atu. Trap dipole. Yagi 3-el beam, or quad antenna. Heavy duty rotator. Must be in good cond. Will collect. Tel 05086 2923.

KW109 high power atu. G3HEE, QTHR. Tel 0780 55001.

Valves type BW1121J, ESA1500 recs D94 or equiv, as used in rf industrial induction heating machines. G3SMK, QTHR. Tel Earlswood (Warks) 3423, after 7.30pm.

Output tester type 57 (Air Ministry), or chassis and cabinet in any cond. Any ventilated metal case, approx 10in cube. Indicator unit type 247 or chassis/case therefrom. Robert Coleman, 31 Kingfisher Road, Upminster, Essex RM14 1ER. Tel Upminster 21523, evenings.

Spkr SP101B/277B for Yaesu FR101 at sensible price, in clean and good cond, offers. GW4JKR, QTHR.

Pye PTC145 vhf base station rx handbook or circuit diagram, urgently required to buy, borrow or copy. Any expenses incurred will be reimbursed. Tel Birmingham (021) 382 8563.

Heath HW7 cw rx. Tel Kingswinford (West Midlands) 295964, after 6pm.

Transformer, 1,000-0-1,000V, 1A, 240V primary, design for QRO (400W) 2C39 23cm linear, 4CX250 series bases, screen ring, chimneys. G4MHM, QTHR. Tel Mike, 0789 296645.

CW filter for FT101ZD, 600Hz or 300Hz. Aerial rotator, lightweight. G4LJO. Tel 0934 732345.

Manual for Heathkit Mohican. Photostat acceptable. M. Knott, G8WLH, QTHR. Tel 089282 3462.

KW107 atv, 100W, 150MHz, 50/75Ω load. Sinclair ZX81. AC psu 6211A, atu 623A for Redifon GR410 (C14). June 1978 *Elektor* magazine and prescaler. PCBs for 0·25GHz counter. *For sale:* various *PWs* 1973-7, sae list Ex-G8XRY, QTHR. Tel 021-588 4801.

Rx type PCR3, 2·5-70-7MHz, 23MHz. G8BWI. Tel Cambridge 314532.

For the Wireless Museum: pre-war radio books, magazines, catalogues, QSL cards, Gamages catalogue, 1916 White valve, Mk3 aircraft tuner, morse keys, info on Minimitter Mercury 200. Collection arranged. Details please to hon sec G3KPO, QTHR. Tel Ryde 62513.

Trap assy for TA33JNR beam, a.m./fm sig gen, 1-30MHz, audio oscillator. Remote vfo for Heathkit, SB101 0-100 wattmeter. G3GDC, 10 Thornyville Drive, Oreston, Plymouth, Devon PL9 7LF. Tel 0752 43551.

School radio club desperately needs amateur bands rx, must be cheap! Anything considered, 640, AR88, etc. Master I/C Radio Club, G3PHO, c/o Birkdale School, Endcliffe Crescent, Sheffield S10. Tel 0742 681216, after 6pm.

For boys' club: *RSGB Bulletins* for years 1950-68 inclusive, in good cond, will collect anywhere UK or Northern Ireland. State price. EI2W, QTHR. Tel Dublin 804645.

Suitcase or miniature tx/rxs; any spares, incomplete or damaged sets. WS62 with transistorized psu. WS (Canadian) 29 connecting leads, etc. Army tx No 53. Any commercial/military mains a.m. fone tx or tx/rx. Taylor, G3UCT, QTHR. Tel Fleet (02514) 6998.

P60 or similar fold-over tower. G3UGL, QTHR. Tel 0234 750050.

Copies of *Ham Radio* 1980-81. *QST* 1975-81. *73 Magazine* 1975 to date. Send list and price required. G3WPO, 20 Farnham Avenue, Hassocks, W Sussex BN6 8NS.

Radio Communication back issues, any comp years

1960-80. Xtal for class D wavemeter. G4KUN, QTHR. Tel 0424 420359.

Datong audio filter, vfo or Q-multiplier for KW2000 series. Info on mods for KW2000B. GI4GNZ, QTHR. Tel 0266 880740.

Post mount for 40ft Versatower. Have base plate mount for exchange. G4LVH, QTHR.

Brass Navy or RAF bench key needed for budding high speed cw operator! Good price paid for quality instrument. G4LJF. Tel Wokingham (0734) 789610.

Handbook or copy of and any info on Dymar 880 hand portables. G3XVL. Tel Chesham (0494) 784883.

Gen cov valved hf rx, any wkg reasonably priced popular make considered. Can call 30 miles radius Cardiff. GW4NHH, ex-GW8ZCU, QTHR. Tel Mike, Cardiff 394007.

HF tx/rx, Yaesu 101, Trio, Icom, etc, wkg or non-wkg. Cond and price. G8KXD, QTHR. Tel 0952 810037.

Don't give your Collins away to opportunists—willing to offer going rate for Collins and E. F. Johnson equipment, old *QST* and *T&R Bulletins*, *CQs* of mid-'70s and D104 mic. Baker, Field 405, Glanyrafon, Bontnewydd, Aberystwyth. Tel 097-421 608.

For spares or rebuild: Telefunken KWEA and Lorenz LO6K39 rxs. Details to G8LIU, QTHR. Tel Uxbridge (0895) 30006.

Circuit details of Taylor oscilloscope model 31A, will pay for purchase or loan to copy. Coolgardie Road, Ashford, Middx. Tel Ashford (Middx) 53990.

Wiring diagram, pin-to-pin of JR599 TX599 transceive multi-way cable. G4EOD, QTHR.

KW2000E, with psu, handbook, in good cond, KW202 and KW204 in good cond. GW4JPC, QTHR. Tel Gareth, Gorseinon (0792) 896815.

25-30A psu, cont, 13·8V regulated, similar Yaesu, must be 100 per cent, cash waiting. *For sale:* OFS1 off-air standard WWV, £50. 27RB scanner, Lunar, 80W linear, preamp, will separate, good cond, £250. G4IZW Tel Ken, 0632 678828.

CLUB NEWS

(Continued from p247)

("Aerials, facts and theory", by G4BDQ), 7.30pm. Toc H House, Little Oak Road, Bassett, Southampton. Sec G4MYS.

Swindon (S&DARC)—Every Thursday, 7.30pm. Park School, Harlowe Avenue, Swindon. 16 May (Mobile rally at Park School). Sec Ian Browne, tel Swindon (0793) 485584.

Weymouth (South Dorset RS)—9 March (Annual constructors contest) 13 April (AGM), 7.30pm. Civilian Canteen, Army Bridging Camp, Wyke Regis, Weymouth. Sec G3ZGP, tel Weymouth (0305) 812893.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Barking (BR&ES)—5 March (DF hunts), 28 March (BR&ES 2m contest). Details of club nights and venue can be obtained from sec Alan Sammons, G8IZN, tel 01-594 2471, any evening.

Cheshunt (C&DRC)—3 March (Natter night), 10 March ("Antennas", by Dave Woollard), 17 March (Natter night), 24 March ("Sierra Leone", by G8DJU), 8pm. The Church Room, Church Lane, Wormsley, Herts. Enquiries to Jim Sleight, tel Ware 4316.

Central London (UCLARS)—Please contact chairman Andrew Scott-Green, G4GWR, c/o Students Union, Gower Street, London, WC1.

Chiswick (ABCARC)—16 March (Slow-scan tv demo by G3WCY), 7.30pm. The Committee Room, Chiswick Town Hall. Sec G3GEH, tel 01-992 3778.

Harrow (RSH)—5 March (Informal), 12 March (AGM), 19 March (Informal), 25 March (Talk), 27 March (The public demo of amateur radio—should be a good opportunity for all club members to meet their public and help our image—*RR19*). Harrow Arts Centre, High Road, Harrow, Middx. Details of all activities of this lively club from Peter Marcham, G3YXZ, or G4AUF, tel 01-868 5002.

St Albans (Verulam ARC)—23 March (The G3PAO Memorial Lecture—"Transmission and reception of speech", by Angus McKenzie, G3OSS). The Charles Morris Hall, Tytenhanger Green, Nr St Albans. Details of club activities from Peter, G3VJO.

Stevenage (S&DARC)—4 March (Talk/demo by the St John Ambulance Brigade), 18 March (AGM). The Staff Canteen, B.A. Dynamics Ltd, Site B, Gunnels Wood Road, Stevenage. Details from Stephen, G8LXY, or Peter, G8MLV, tel 0438 64624, evenings.

Wanstead (ELGRSGB)—21 March (Talk), 3pm. Wanstead House, London E11, (off The Green at Wanstead underground station). This group has recently had a change of officers and the first lady chairperson in its history. Welcome to Sheila Gabriel, G3HCQ. Meetings are held on the third Sundays of the months of September to May only. Tel RR19 for details. Tel number of new sec not yet known.

Watford (WRC)—First and third Wednesday in each month: first Wednesday (Construction and morse); third Wednesday (lectures). Small Hall, Christ Church, St Albans Road, Watford. New sec R. J. Woollard, G8RCK, tel 09273 72832.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ.

Bristol (BARC)—2 March (Computer club night), other Tuesdays (RAE classes etc), 7.30pm, c/o YMCA, Park Road, Kingswood. Further details from Trevor Cockram, G8GFZ.

Bristol (North Bristol ARC)—Fridays, 7.30pm. c/o Self Help Enterprise, Braemar Crescent, Northville, Bristol. It is now hoped the new club projects will commence during March. Details from Ted Bidmead, G4EUV, tel 0272 691685.

Mike Hearsey, G8ATK; John Pink, G3OQB, and John Hardy, G3KND, looking over the Farnborough & D Radio Society's 23cm beacon project which is awaiting the issue of the GB3FRS licence. *Photo:* **G4MBZ**

Bristol (BRSGBG)—29 March (Meeting not yet finalized at time of going to press but details will be announced on GB2RS). Queens Building, Bristol University. Sec Chris Short, G8GLQ, tel 0272 621153.

Bristol (Shirehampton ARC)—Fridays, 7pm. Twyford House, Shirehampton. The QRP group is progressing well, a 144MHz receiver project is being planned, and the morse class can accommodate new members. Sec Ron Ford, G4GTD.

Cheltenham (CARA)—4 March (Annual constructors' contest), 19 March (Natter night), 1 April ("QRP operation," by Rev G. Dobbs, G3RJV), The Old Bakery, Chester Walk, Clarence Street, Cheltenham. Details of the contest and other club activities from Grant Cratchley, G4ILI, tel 0242 43891.

Gloucester (GARS)—Thursdays, 4 March (Talk on "Oscar"), 1 April (Construction contest including spoof section), 7.30pm. Chequers Bridge Centre, Painswick Road, Gloucester. Details from Tony Martin, G4HBV.

Portishead (Gordano ARG)—24 March (Meeting has not been finalized at the time of going to press but details will be announced on GB2RS), 7.30pm. Ship Hotel, Down Road, Portishead. Details from John Davies, G3LJD.

Sedgemoor (SARS)—Welcome to this new group in Somerset. Meeting nights are third Monday in each month, 8pm. ATC Hut, New Road, Bridgwater. Sec Jonathon Butler, G4JOW, tel Westonzoyland 740.

Yeovil (Y&DARC)—4 March ("Receiver middles," by G3DSS), 11 March ("A club propagation research project," by G3MYM), 18 March ("An 80m direct conversion receiver," by G3MYM), 25 March (Natter night), 7.30pm. Building 101, Houndstone Camp, Yeovil. Details from Don McLean, G3NOF, tel 0935 24956.

Mobile rallies calendar

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

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.

25 April—Swansea ARS Rally, The Patti Pavilion, adjacent to St Helens County Cricket Ground, Swansea, on A4067. Open 10.30am to 5pm. Talk-in on S22. Bring and buy, bookstall, licensed bar, refreshments, good car parking. Details from GW4HSH, tel 0792 404422.

25 April—Drayton Manor Mobile Rally, nr Tamworth, Staffs.

9 May—Lincoln Hamfest, organized by the Lincoln Short Wave Club, on the Lincolnshire Showground. Details to be announced. Contact J. R. Hunt, G3PVU c/o the club at the City Engineers Club, Central Depot, Waterside South, Lincoln.

16 May—Swindon & DARC Rally, Park School, Marlowe Avenue, Swindon, Wilts. Open 10am. Talk-in on 144MHz (S22) and 432MHz (SU8 or on GB3TD if possible). Ample car parking, refreshments, attractions for the whole family. Details from K. A. Saunders, G8SFH, QTHR, tel 06668 307.

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.**

23 May—Barry College of Further Education RS Mobile Rally. Barry Memorial Hall. Further details to be announced. Contact R. V. Belcher, GW8TCF, QTHR.

30 May—Hull & DARS Mobile Rally, Hull University, Cottingham Road, Hull. Open 12am to 4pm. Details from H. Cunliffe, G6DUL, 142 Hall Road, Hull HU8 8SB, tel 0482 447355.

30 May—Plymouth RC Mobile Rally, School Hall, Tamar Secondary School, Paradise Road, Millbridge, Plymouth, Devon. Details from Julie Butcher, G4HKZ, QTHR, tel 0752 338417.

30 May—East Suffolk Wireless Revival, Sports Ground, Ipswich Area Civil Service Sports Association, Straight Road, Ipswich (adjacent Suffolk Show Ground). Attractions include transceiver clinic, antenna testing range, flea market etc. Further details later. Requests for stand space to George Spencer, G6CRN, 83 Tuddenham Avenue, Ipswich, Suffolk, tel Ipswich (0473) 218285. Other enquiries to Jack Toothill, G4IFF, QTHR, tel Ipswich (0473) 44047.

13 June—Elvaston Castle Mobile Rally, Elvaston Castle Country Park, 5 miles south-east of Derby on the B5010. Organized by the Nunsfield House ARC. Opens 10am. Talk-in on 144 and 432MHz. All the usual facilities including full on-site catering facilities. Further details from Ian Cage, G4CTZ, QTHR, tel Derby 71875 or 799452. Trade enquiries to Mr R. Woolley, G4HIJ, QTHR, tel Ashbourne 43241.

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.

20 June—Denby Dale & DARS Mobile Rally, Shelley High School, Skelmansthorpe, Nr Huddersfield. Open 11am. Talk-in on S22 and SU8. Details from J. Clegg, G3FQH, QTHR.

27 June—Longleat Mobile Rally. This will be the City of Bristol RSGB group's 25th event. Entertainment by The Bristol Unicorns Youth Band. There will be a mast erection contest, involving teams of four entrants, the winners of which will be awarded the "Longleat Trophy" presented by Lord Christopher Thynne. It is hoped that the President of the RSGB will attend. Preliminary enquiries for trade stands to, and further information from, B. L. Goddard, G4FRG, tel 0272 848140.

27 June—Rolls Royce ARC Mobile Rally, Rolls Royce Sports & Social Club, Barnoldswick (six miles south of Skipton, 12 miles north of Burnley, access from A59 and A56). Open 11am-6pm. All usual facilities—trade stands, refreshments, talk in etc. Details and applications for booking forms etc from L. Logan, G4ILG, c/o 19 Fenton Avenue, Barnoldswick, Colne, Lancs BB8 6HB, tel Barnoldswick 812288.

11 July—Worcester & DARC Mobile Rally.

18 July—Cornish Rally, Technical College, Camborne, Cornwall. Details from Andy French, G8TUJ, 12 Pentalk Road, Camborne, tel 0209 717343.

25 July—Scarborough ARS Mobile Rally, The Spa Ocean Room, on the sea front. Open 10.45am. Talk-in on S22 and GB3NY (RB0). Usual attractions including bring-and-buy, plus 50th anniversary events. Help given to RAIBC members by prior arrangement. Further information from G4JAQ, QTHR, tel 0723 862638.

1 August—RSGB National Mobile Rally, Woburn.

15 August—Preston Mobile Rally. Details to follow.

29 August—BARTG Rally, Sandown Racecourse, nr London. Details from sec Edward Batts, G8LWY, 27 Cranmer Court, Richmond Road, Kingston-upon-Thames, Surrey.

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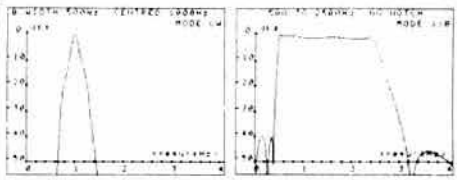
Model DC144/28

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.



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.

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 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

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

FL1	59.00 (67.85)	MPU	6.00 (6.90)
FL2	78.00 (89.70)	DC144/28	31.00 (35.65)
PC1	105.00 (120.75)	DC144/28 Module	25.00 (28.75)
ASP	69.00 (79.35)	Keyboard Morse Sender	112.20 (129.00)
VLF	22.00 (25.30)	RFA	25.50 (29.32)
D70	43.00 (49.45)	Codecall (Linked)	24.00 (27.60)
D75	49.00 (56.35)	Codecall (Switched)	25.50 (29.32)
RFC/M	23.00 (26.45)		
AD270	33.00 (37.95)		
AD370	45.00 (51.75)		
AD270+MPU	37.00 (42.55)		
AD370+MPU	49.00 (56.35)		

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

NEW PRODUCTS PREVIEW

Available Shortly

MODEL DF1
Direction finder attachment for FM, VHF receivers/transceivers, gives directional readout on circle of LED's. Connects to loudspeaker and antenna jacks.

BROADBAND PREAMPLIFIER – MODEL RFA

- Wide bandwidth, 5 to 200 MHz, lets Model RFA replace a whole collection of single band amplifiers.
- Low noise figure, high intercept point (+ 25dbm), and moderate gain (9dbs) make Model RFA ideal for improving the sensitivity of HF and VHF transceivers, scanner receivers, PMR, marine VHF, without difficulties with overload.
- RF switched for convenient use with transceivers.
- Solid construction (same die cast case as Models VLF and DC144/28) with S0239 connectors.

Price: £25.50 plus VAT (£29.32 total)
Expected Availability: early January.

"CODECALL" SELECTIVE CALLING DEVICE

The new Datong Codecall adds "selective call" to any radio voice channel. A single self-contained unit at each end of the link sends or receives a coded audio signal. When the correct code is received, the receiver bleeps loudly.
The only connection needed to a transceiver is to the external loudspeaker jack. Sending is via direct audio into the microphone.
"Codecall" allows totally silent stand-by operation yet with confidence that when that specific call comes, you won't miss it.
Over 4000 different codes can be selected by internal link or by three 16-way panel switches, depending on the model. This practically eliminates false alarms.
NOTE: All transmissions must be identified as required by the licence conditions.
Price per unit: Link programmable £24.00 + VAT (£27.60)
Switch programmable £25.50 + VAT (£29.32)

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

DATONG ELECTRONICS LIMITED
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HK 707	Straight Up/Down keyer	£12.27
BK 100	Semi-automatic mechanical bug	£22.12
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MK 702	Manipulator	£24.50
MK 705	Squeeze paddle on marble base	£21.72
EKM 1A	Morse code practice oscillator	£8.63
MK 1024	Automatic memory keyer	£135.13
EK 150	Semi/Automatic keyer	£74.75

LINEAR AMPLIFIERS

2M10-80P	144MHz 10W input/80W output with 9dB preamp	£138.00
2M25-150P	144MHz 25W input/150W output with 9dB preamp	£184.00
2M10-150P	144MHz 10W input/150W output with 9dB preamp	£209.88
2M3-150P	144MHz 3W input 150W output with 9dB preamp	£209.88

ICOM

IC 720 Allband Tcvr	£799.00
IC 730 10-80Mts inc WARC	£529.00
IC 290 2m mult mobile all mode	£329.00
IC 251E 2m Tcvr	£449.00
IC 451 70cms Tcvr	£539.00

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526T	Desk controlled response transistor preamp	£51.30

DAIWA

CNA	1001 Auto ATU 200W RMS	£139.00
CNA	2002 Auto ATU 1kW RMS	£192.00
CN	620A RF Power Meter 1·8 to 150MHz 1kW	£49.99
CN	630 RF Power Meter 140-450 MHz 200W	£69.00
SR11	Scanning Receiver	£49.00

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Yaesu FRG 7700/S	£329	£139	£15.89
Yaesu FRG 7700/M	£409	£180	£19.01
Yaesu FT 101ZD/FM	£665	£300	£30.41
Yaesu FT 101ZD/AM	£650	£275	£31.29
Yaesu FT 101Z/FM	£590	£250	£28.27
Yaesu FT 101Z/AM	£575	£225	£29.15
Yaesu FL 2100Z	£425	£185	£20.08
Yaesu FT 480R	£379	£185	£16.18
Yaesu FT 707	£569	£230	£28.27
Yaesu FT 290	£249	£120	£10.82
Standard C78	£219	£ 99	£10.04
Standard C58	£247	£107	£11.69

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MMT 28/144	£199.00
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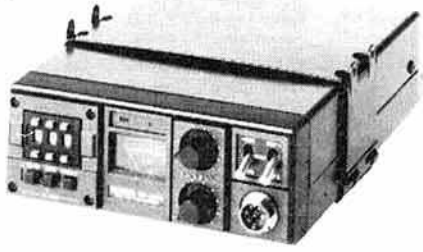

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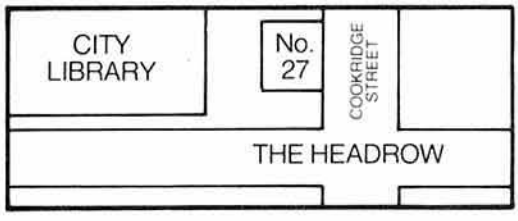

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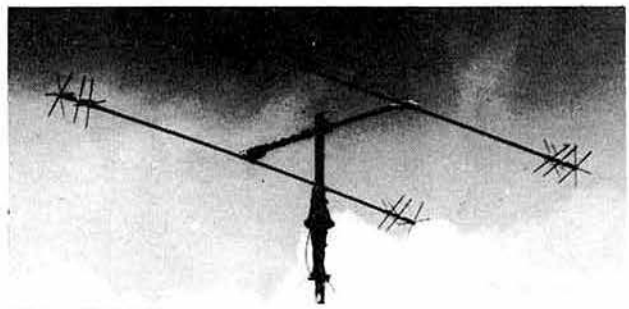

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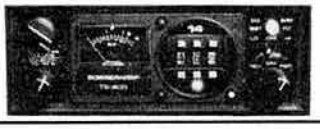

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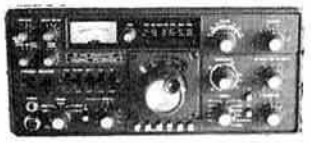

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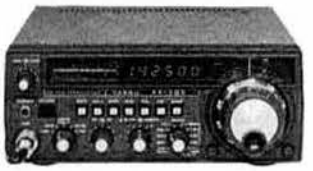

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TR-9000

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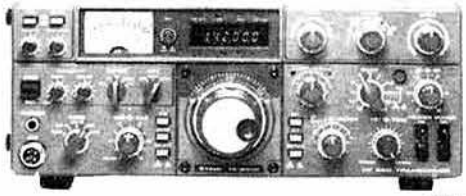

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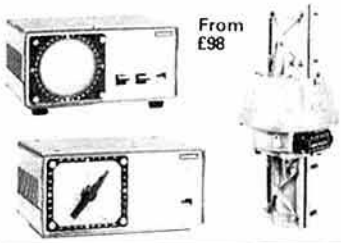

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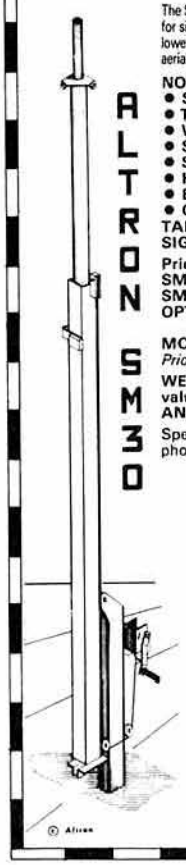

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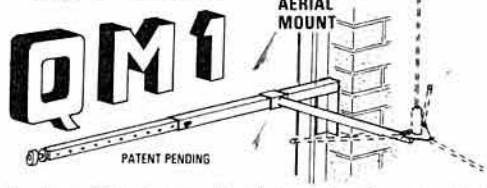

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FT-290R

MULTIMODE MULTI-ROLE 145MHz TRANSCEIVER

MULTIMODE OPERATION
Never before possible from such a compact package, true multimode —USB, LSB, CW & FM—operation is yours to enjoy. With CW and SSB activity at an all-time high, you will not be left out of the satellite or DX action and you can still ragchew on FM simplex or even via a repeater (inbuilt ±600kHz shift and 1750Hz tone burst).

ADVANCED MICRO CONTROL
Advances in microprocessor circuitry allows selectable synthesizer steps, up/down scanning from the microphone, priority channel operation, and ten memories (with memory scan), called up with fingertip ease.

LCD DISPLAY
A large, easy-to-read Liquid Crystal Display provides readout of the operating frequency, and an indication of a number of the control functions. The display, highly readable under conditions of bright sunlight, is backed up by an illuminating lamp for night-time operation while portable or mobile.

PROGRAMMABLE SYNTHESIZER
The optimum synthesizer steps for SSB/CW or FM operation are very different. That's why Yaesu gives you the flexibility of two synthesizer steps per mode: 100Hz or 1kHz per step on SSB and CW, and 12½kHz or 25kHz per step on FM. When changing modes from SSB/CW to FM, your FT290R is automatically set to the nearest standard channel when you start scanning or tuning.

TEN MEMORY CHANNELS
As many as ten frequencies may be stored into memory, for instant recall. The priority feature allows you to check a favourite frequency every few seconds, with automatic halting (FM mode) when the channel is clear or busy, as desired. Memory backup is provided by a built-in lithium cell, with an estimated lifetime of five years.

DUAL VFO SYSTEM
The FT290R features a digitally synthesized dual VFO system which provides tremendous flexibility in day to day operation. For example, one VFO may be set up in the SSB portion of the band, and the other in the FM sub-band, for immediate QSY when changing modes.

CONVENIENT FEATURES
Among the many features adding to the convenience of the transceiver is a built-in telescoping antenna, a high-performance noise blanker, a high/low power switch, and a battery condition meter. A clarifier (offset tuning) allows you to follow unstable or Doppler-shifted signals.

FULL LINE OF ACCESSORIES
See your authorised Yaesu dealer for details of the quality line of accessories. These include the YM49 remote speaker microphone with scanning controls; MMB11 Mobile Mounting Bracket; FL2010 2 meter 10 watt amplifier, FLC11 Leather Carrying Case; and the CSC1 Vinyl Carrying Case, Nicad C-Cells and the NC11C Battery Charger. Stop by and try the FT290R today!!

GENERAL

Frequency coverage:
144-146MHz

Modes of operation:
SSB (USB, LSB), CW and FM

Synthesizer steps:
SSB/CW: 100Hz, 1kHz
FM: 12·5kHz, 25kHz

Power requirements:
8 × C size dry batteries
8 × C size Nicad cells
External: 8·5-15·2V DC
Memory backup: lithium cell

Current consumption:
70m A on receive;
800m A on transmit (2·5W RF, FM)

Dimensions:
58(H) × 150(W) × 195(D) mm, 1·3 kg

TRANSMITTER

Power output:
2·5 watts at 12 volts

Carrier Suppression:
Better than −40dB

Spurious radiation:
Better than −60dB

Unwanted sideband suppression:
Better than −40dB

Tone burst frequency:
1750Hz (other models)

Frequency response:
300-2700Hz (−6dB)

FM Deviation:
± 5kHz (max)

Microphone impedance:
600 Ohms

RECEIVER

Intermediate frequencies:
1st IF 10·81MHz (SSB & FM)
2nd IF 455kHz (FM ONLY)

Sensitivity:
SSB/CW: 0·5 μV for 20dB S/N
FM: 0·25 μV for 12dB SINAD

Selectivity:
SSB/CW: 2·4kHz at 6dB down
4·1kHz at 60dB down
FM: 14kHz at 6dB down
25kHz at 60dB down

Image rejection:
Better than −60dB

Audio output impedance:
8 Ohms

Audio output:
1 watt @ 10% THD

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Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, 35 Doughty Street, London, WC1N 2AE
by E T Heron & Co Ltd, Essex and London