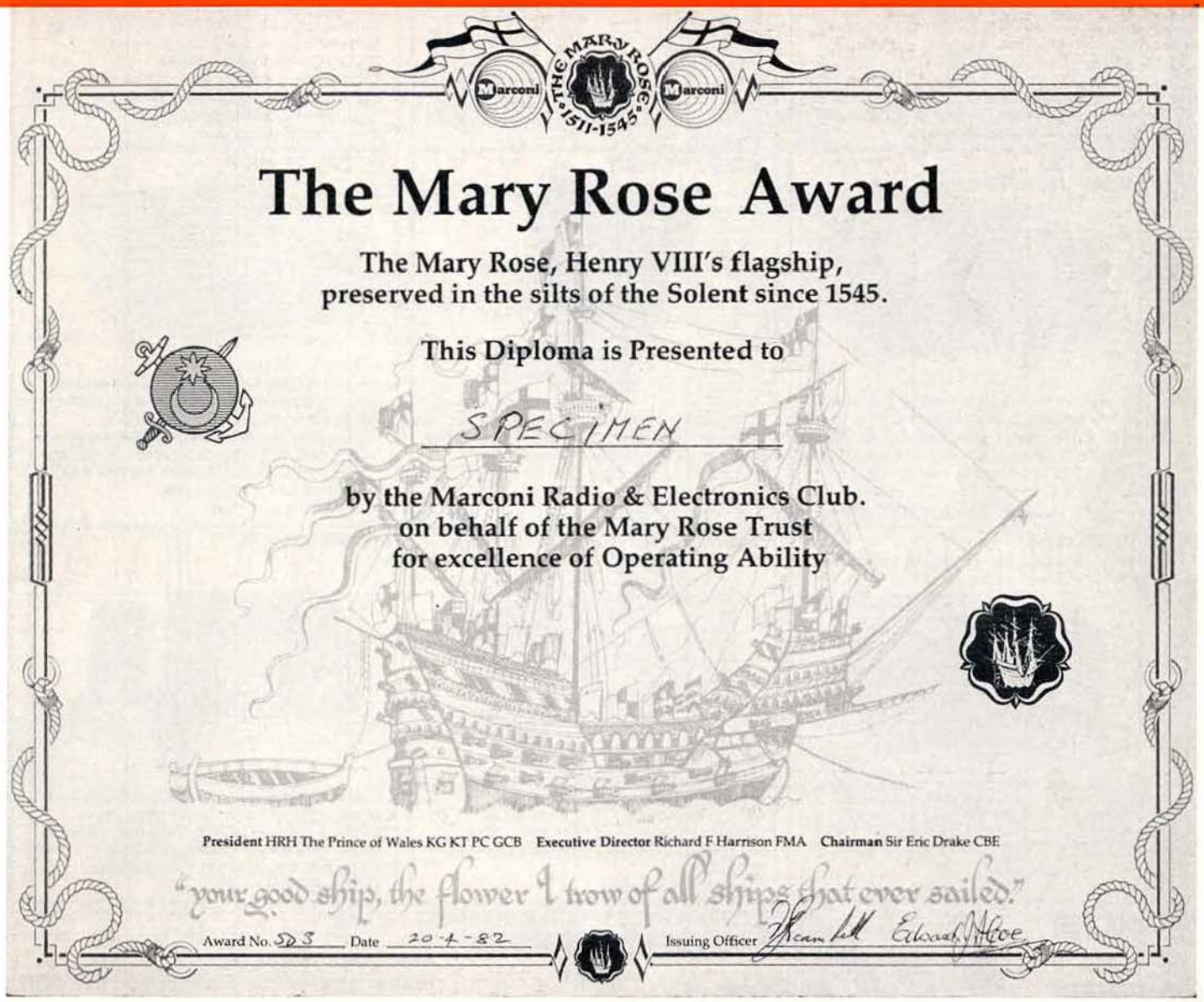
September 1982

RADio COMmunication



A black-and-white reproduction of The Mary Rose Award, details of which were published in *Rad Com* May 1982, p424

Journal of the Radio Society of Great Britain

AMCOMM are making it even easier to buy your favourite equipment. A choice of easy payments to suit you! (1) Interest free payments from ⅓ deposit. (2) 10% deposit with balance payable your choice up to 3 years and all with 2 year guarantee. Write or call for written details. Free items excluded.

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An adventure in electronics – and more! An astonishing piece of design and product engineering. Think of a feature, a facility, performance, reliability, flexibility, ergonomics, and value for money. The FT 1 has it all! We have the FT 1 complete with FM facility, AM and CW filter, keyer and microphone and two year guarantee – You have it! P.O.A.

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NEW

A new 9 Bander in traditional ICOM livery – facilities galore and every one a practical and helpful function to assist and satisfy your operating needs. All mode inc. optional FM and built in Keyer – Notch Filter, IF/Pass band tuning – variable tuning rate – memory – split operation facility – dual VFO – variable AGC and variable noise blanker – we could tell you a lot more but you'll enjoy it more by calling in to try it – it's on show now – if you can't make it forward a SAE and we'll send you a leaflet – **£659.00** inc. VAT and carriage and of course the **two year AMCOMM guarantee.**

YAESU FRG 7700
General Coverage Receiver
150Hz – 30MHz

Must be top of your list when shopping for a Receiver. You'll find it rewarding to use an antenna tuning unit and even more rewarding to get one from us! Buy an FRG 7700 or FRG 7700M and you can have the matching unit FRT 7700 completely **FREE.**
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An extremely compact 8 Band Transceiver with an output of 100 watts RF, dual VFO's with 10Hz, 100Hz and 1KHz tuning rate – plus an abundance of features including pass band tuning facility. **N.B.** Preamp and SWR Detector. **£569.00** including VAT and carriage. **Two year guarantee.**

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The world's leading portable from Yaesu, "the people who know your needs". 2.5 Watt all mode SSB/CM/FM, 10 memories – Price **£249.00** includes FREE nicads and charger, carriage and VAT.
Two year guarantee.

YAESU FT 480R

Big performance mobile station offering you all the options you expect in such a piece of equipment – all mode – full scanning, two VFO's, satellite mode etc. Price includes absolutely FREE your own choice from our stock, any VHF base or mobile antenna at **£379.00** including VAT and carriage.
Two year guarantee.

ICOM 720A
General coverage or amateur transceiver.

Silky smooth tuning and easy operation makes this a delight for the amateur or commercial operator – a host of features which make it ICOM's pride and joy. It can be yours, too, at **£883.00** VAT and carriage paid.

Two year guarantee.

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We think everybody knows the 101 story! If you don't, listen around. It means value for money – and we'll even include FREE a choice of suitable microphones. The Shure 444D or Shure 526T including carriage and VAT at **£665.00.**
Two year guarantee.

ICOM IC 290E

2 mtr. all mode with 5 memories from which priority channel can be selected – twin VFO's, scanning, reverse repeater – 25KHz tuning rate on FM 100Hz on SSB.
£369.00 including VAT and carriage.
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RC982

SEPTEMBER 1982

VOLUME 58 No 9

RADio COMmunication

CONTENTS

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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 at high competitive rates will be made for all articles published.

The editor will be pleased to send intending authors a manuscript preparation guide and to give any other advice and assistance requested.

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

One could be forgiven for thinking, that after 15 years of handling amateur radio equipment for six days a week, I would be tired of it. Why is it, I ask myself, that sitting down to use **any Trio HF transceiver** still gives me **such pleasure and satisfaction?** No doubt those of you who are wise enough to be operating Trio rigs right now will know what I mean, and those of you who haven't experienced that special satisfaction should make an effort to call on us here at Matlock and *see* what I mean.

Regardless of the particular transceiver, it's the way that Trio give the operator that "at home" feeling, with every control falling naturally to hand, with the necessary **operator information** being **instantly available** and with the quiet pleasure of having other people on the air say **"superb signal, you must be using Trio".**

Just look at the current HF transceiver line up from Trio; **the TS130S for example.** This is a most amazing rig which **packs a complete 200W pep,**


TS 130

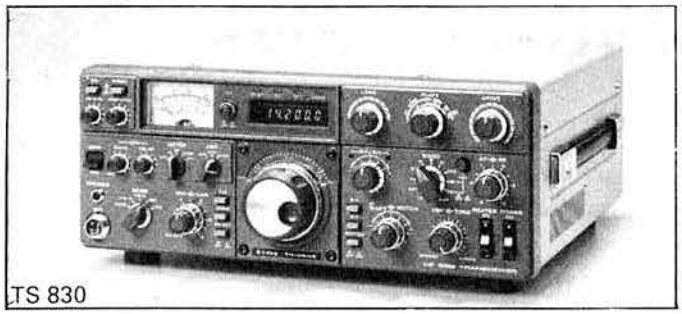
8 band top performance transceiver into a box you can sit on the palm of your hand. **Without compromises too,** since the TS130S (and its little brother, the 130V) has every feature you could ever need. **I.F. shift** for dodging QRM, **speech processing** for that extra punch when needed, **full metering, noise blanker,** full band coverage right up to 30 MHz, and an amazing PLL frequency generation system which guarantees accuracy you wouldn't believe. You can switch on the calibrator and go to each band in turn without a change in beat note which means, of course, that each band is accurate to within cycles (sorry, hertz) of all the others. Add to this the completely truthful digital readout (just ask us about *other* makers' products) and the fact that when you switch sidebands you stay on frequency (try that with a "101") and you have part of the story. I've watched amateurs sitting in our car park working PY and VK with the 130S, and that's all anyone can ask. Mobile, fixed, caravan or boat, **it's all easy with a TS130.**

For the man who doesn't need mobile operation, there is the TS530S.


TS 530

This transceiver is **winning friends** all over the world with its **unbeatable combination** of **top performance** allied to **competitive price.** Our customers normally compare the TS530 to the FT101ZD, and I suppose that makes sense. The 530S, however, has that magic Trio quality, both in design and construction, and offers a terrific range of facilities which belies the £535 price tag. With a pair of 6146B tubes in the PA, the 530S is easy to tune up, and remarkably uncritical of poor loads whilst delivering a top quality, punchy signal aided, if you need it, by built in speech processing. The TS530 again **gives you those Trio standards** of all band coverage, unambiguous *accurate* digital readout, I.F. shift, wide/narrow filter switching, noise blanker, VOX, RIT, XIT, and so on. But it's in the **using and handling** department where these Trio rigs score – **beautiful to just settle down and operate.** Sensitivity? typically 0.1 microvolt on SSB – yes – that's typical for Trio. It's no good me drivelling on, just ask us for a detailed leaflet.

As for the TS830S, words fail me. All you need to do is listen on any band, in any part of the world and locate those TS830S users. All sitting


TS 830

steadily on their net frequencies (read the drift figures in RadCom!) and producing that quality signal only Trio know how to get. Again, if you need comparisons in the market place, our customers tell us they weigh the 830 against the 902 range, but generally we find that once anyone has sat down and tried out the 830, he seldom buys anything else. I know this sounds a bit pompous, but it's all true, and we are so proud of the 830S.

If you need specific details on the why or wherefore, leaflets are available on request and our two enthusiastic Davids (Brown and Monkhouse) are just a 'phone call away, ready to answer any detailed requests.

We firmly believe that **the TS830S** is the **best amateur band transceiver** available to the amateur today. Why don't you see if that's true by coming along to try it out.

And **what about the TS930S** at the very top of the range. THERE IS *NOTHING* TO TOUCH IT. I can say no more. Read David's adverts in past issues for the details. Suffice to say that we cannot, nor can we see how we can ever, supply the demand for this transceiver, **from those discerning**


TS 930

people who simply will have the best.

I've seen the ads from dealers purporting to sell Trio equipment by calling it Kenwood/Trio or some such title. This immediately marks the gear as being imported via the back door from some other market. If you really want a discount purchase, and are prepared to put up with equipment which may not be suitable for use in the UK and will **certainly** not have any service backing – by all means go ahead. **BUT** only Trio approved dealers have the necessary long term connection with the factory and can give you piece of mind, knowing that you will always be looked after in the future.

Look in this ad for the list of **approved** Trio stockists.

And if you dislike the odd comparison in this screed, I will simply quote Thomas Fuller who, in 1732, wrote, **"Nothing is good or bad but by comparison".** If you think also that I might offend worthy traders, a further quotation (got me going tonight), this time from "Taming of the Shrew". **"Do as adversaries do in law; strive mightily, but eat and drink as friends."** Vale, John Wilson.

VHF UHF

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

The TR9130 is the new all mode VHF mobile or base station rig from Trio giving 25 watts output on 2 metres FM, USB, LSB and CW and now having a green LED display to make for easier mobile operation.

- 25 watts output on FM, SSB and CW.
- FM/USB/LSB/CW all mode operation.
- For added convenience in all modes of operation, the mode switch, in combination with the digital step (DS) switch, determines the size of the tuning step, and the number of digits displayed.
- Six memories. On FM, memories 1 through 5 for simplex or +600kHz offset, with the OFFSET switch. Memory 6 for non-standard offset. All six memories may be operated simplex, any mode.
- Memory scan. Scans memories in which data is stored. Stops on busy channels.
- Internal battery memory back-up. With Ni-Cad installed (not Trio supplied), memories will be retained approximately 24 hours, adequate for the typical move from base to mobile. A terminal is provided on the rear panel for connecting an external back-up supply.
- Automatic band scan. Scans within whole 1MHz segments (ie 144·0-144·999MHz), for improved scanning efficiency.
- Dual digital VFOs. Incorporates two built-in digital VFOs, selected through use of the A/B switch and individually tuned.
- Squelch circuit on all modes (FM/SSB/CW).
- Repeater reverse switch. For checking signals on the repeater input, on FM.
- CW semi break-in circuit with sidetone. Built-in, for convenience in CW operations.
- Digital display with green LEDs.
- Transmit offset switch for repeater shift.
- High performance noise blanker.
- RIT (Receiver Incremental Tuning) circuit. Useful during SSB/CW operations.
- HI/LOW power switch. Selects 25 or 5 watts RF output on FM or CW.
- Accessory terminal. A four-pin accessory terminal is provided for use with a linear amplifier or other accessory.
- Includes quick release mobile mounting bracket and up/down microphone.

TR9130

TR9130 ALL MODE TRANSCEIVER £395 carr: £5.00

TR9000 IS STILL AVAILABLE AT £359.00

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Wallington SM6 8RG
01-669 6700

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95 Penarth Road
Cardiff CF1 7JT
0222 24167/8

W. SUSSEX
Bredhurst Electronics
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Haywards Heath
W. Sussex 0444 400786

YORKSHIRE
Leeds Amateur Radio
27 Cookridge St
Leeds LE2 3AG
0532 452657

NORTHERN IRELAND
George Moore Electronics
7 Ravenhill Park Gardens
Belfast BT6 0DH
Belfast 647570

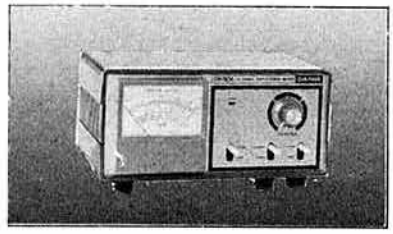
TRIO

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.

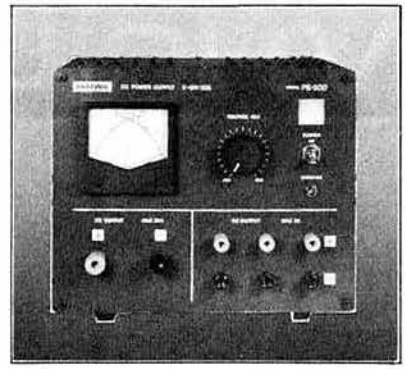
we recommend the DAIWA range.

		Price inc. VAT	Carr.
VHF AMATEUR RECEIVERS			
SR9	2m FM tunable/xtal receiver 144-146MHz	46.00	1.50
POWER & SWR METERS			
CN520	1·8-60MHz mini cross needle power/SWR meter	32.50	1.50
CN540	50-150MHz mini cross needle power/SWR meter	35.00	1.50
CN620A	1·8-150MHz cross pointer power and SWR meter. Up to 1kW	52.81	1.50
CN630	140-450MHz cross pointer power and SWR meter. Up to 200W	75.00	1.50
CN650	1·2-2·5GHz cross pointer power and SWR meter. Up to 20W	95.00	1.50
CNW518	3-30MHz 8 band hi power tuner and cross needle power meter	175.00	2.00
CNA1001A	Fully automatic all band ATU. Includes cross pointer power meter	156.00	5.00
CNA2002	As for CNA1001A but 2kW rating for tuner and power meter	228.00	5.00
SW110A	SWR/power meter 1·8-150MHz. 0-20 and 0-200W. Not cross pointer	29.90	1.25

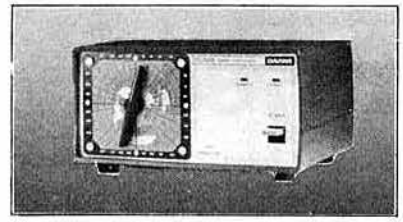
ROTATORS			
DR7500X	For HF 3 element beams. Preset controller. 6 core cable	98.04	5.00
DR7500R	As for DR7500X but using the DAIWA round controller	107.98	5.00
DR7600X	Heavy duty. Will take up to 2 element 40m beam. Preset control	141.00	5.00



DR7600R	As for DR7600X but using the DAIWA round controller	152.00	5.00
KS065	Deluxe bearing for fixing stays to rotating mast	18.50	2.00
MOBILE WHIP ANTENNAS			
DA500	Dual band whip. 2·7dB gain on 2m and 5·5dB gain on 70cm. 200W	16.50	1.00
ANTENNA ACCESSORIES			
CS201/TW2	Two way 50 ohm coax switch. 0-500MHz	11.98	1.00



POWER SUPPLIES			
PS300	Daiwa heavy duty PSU 30A max 22A continuous.	117.99	5.00
INFRA RED MICROPHONE			
RM940	New mobile mic with no connections between mic and rig	45.00	1.50
S9	Spare sensor for RM940 mic system	6.50	0.50
M9	Extra mic for RM940 system	13.00	1.50
F4	Set of four windshields for RM940 mic. Available singly at 75p	3.00	0.50



the HONOR family

ANNOUNCE THE ARRIVAL OF THE GT1000 DIGITAL MULTIMETER

The GT1000 is the newest multimeter in the established range from Honor. Different because its digital LCD display gives instant unambiguous readings over its wide range (200mV full scale up to 1000 V full scale DC, 2 V-600 V AC). The meter is auto ranging and auto polarity selecting so you can pay attention to the measurement in hand without bothering with switch twiddling. Its even auto ranging on the ohms scales, and will measure from 200 ohms full scale up to 2M ohm. Amazing.

£39.50 inc VAT carriage £1.50

the MX 4

SSB and CW from 70.150 to 70.250 MHz with 200 mW power output.
Internal telescopic aerial. CW key and Nicad charger. Operates from either an internal battery or an ext 9 volt DC supply. (Optional module for 12 volts) the rig is supplied in semi kit form for around **£75.00.**

AT LAST! A 4 METRE TRANSCEIVER

LOWE ELECTRONICS | Access | BARCLAYCARD VISA | LOWE ELECTRONICS | Access | BARCLAYCARD VISA

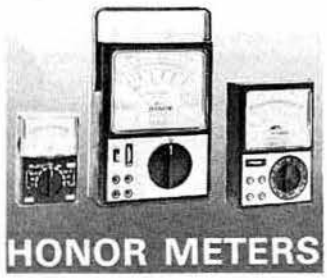
EMPORIUM NEWS

Well here we go again. **What a month** – we now have on display here at Matlock **the TS930S.** "Don't believe it", I can hear you all saying. Well I'm not surprised at that, I was beginning to think it did not exist myself. **Anyway, it has arrived** and, as you know, was well worth waiting for – well, that's what John G4ECE has told me. John was top of the list, in fact he ordered one before we had the full details. John took delivery of his TS930 the day they arrived and, as is John's way, has put it through its paces. **Delighted he is and so is his wife Diana** who is really a bit of a short-wave fanatic. The rig is already programmed with all the good short-wave stations and armed with his "World Radio & TV Handbook" John and his good lady are in **for many evenings' pleasure this winter** as they tune the band together.

I am **a bit concerned** that there will soon be **too many NRD/NSD 515** combinations on the air and the rig's **rarity value** will be gone. It is refreshing to operate a piece of equipment that the guys **States-side** have not heard of. I was talking to one guy who, when he heard what I was operating, stated that he had admired the rigs at the **Dayton Ham-Fest,** in the JRC booth, he added, but had decided that separates were not for him. A transceiver was his idea of heaven. **So might it be,** but the sheer pleasure of the NRD515 receiver covering those world-wide broadcast frequencies **is difficult to describe.** I have, in fact, received a QSL card from a guy States-side who was perturbed that a chap could spend so much money on a rig and only **have 2 dollars worth of wire and insulators as an aerial.** Daiwa products are mentioned alongside, just consider the range: there are **two things** you can be assured of with **Daiwa equipment** – its high quality of **construction** and **performance,** coupled with its **unquestionable value for money.**

I personally use **the DR7600 rotator** and that sits atop my mast turning at present a 10-element long Yagi which sits at the top of the array. Below, on a 6 foot cross boom are, at one end a 48-element multi beam for 70 cm and at the other, to balance it, an 8-element 2 metre Yagi. I have probably said it before but my location is somewhat exposed being some 800 feet above sea level and **still the rotator continues to give good service.**

The great advantage of the Daiwa rotator is that you don't have to have the end stop at north, you can move the point to any position you wish, so, if your best direction is north you can arrange the end of travel to be south, thus enabling continuous traversing **from north west to north east** – a little point but when considered, a most convenient feature. You would be amazed at the number of rotators that do not have this simple facility.



The Daiwa range of meters again is worth a second look. What about a meter that shows you both forward power, reflected power and SWR all at the same time without having to touch another control. It is not an encouragement of laziness, having a Daiwa cross needle meter in your shack, it is an aid to good operating giving a marked reduction in tune up time. For the VHF/UHF man, then it is a constant visible check that (a) the rig is working all right and (b) the aerial has not fallen down **or the coax become water logged.**

The MX4 (around £75) should, by now, be available. Sold in semi kit form the new 4 metre SSB/CW portable transceiver is simple to assemble and when finished provides its owner with **a piece of gear to be proud of.** And, as I have certainly said before, **should poverty** and the **workhouse** beckon then the MX4 is a sellable item also. Many 4 metre men have remarked to me that the MX4 with its 200m watts of RF provides **the perfect driver** for a **small home brew linear.** So, if **home brew** is your forte, then **consider the MX4.**

I have just returned from the **Derwent Valley Amateur Radio Society** DF hunt. The event was won by Cred G6CHS and his friend Ian G8ZAG. The only reason I mention the event is because I was more than impressed with their use of **advanced technology,** coupled with **the considered use of Lowe products.** On successfully finding me, they showed me the DF aerial used. I shall attempt in this short space to describe it. The aerial consisted of **a Lowe mag mount** and cable, **a small DL20 dummy load, a loudspeaker magnet** and **an aluminium saucepan.** Simple, the dummy load was screwed into the mag mount, the mag mount placed in the bottom of the saucepan and the loudspeaker magnet placed on the opposite side to provide attraction. The direction properties were amazing. **In case additional attenuation** was required a small saucepan was available to place in front of the previously described device. The latter attenuator proved not to be required and I, the hidden station, was found in just over an hour. I mentioned to Cred that I would describe his system in Emporium News **and Cred, generous and magnanimous person** that he is, agreed to waive any copyright fees that may be his due in the interests of amateur radio. The rig that Cred was using **a Trio TR9000** of course! In fact, Trio equipment came in **first, second and third:** two TR9000's followed by a TS700G. It is interesting to note that the gentleman sporting a **Yaesu FT290** was last seen proceeding in the wrong direction and eventually had to be talked back to the fold. **As befits such occasions,** the hunters and hunted adjourned to the nearby hostelry where, as befits amateur radio, **light refreshment was partaken.**

The New Daiwa active audio filter AF606K at £56.80 and the Daiwa electronic keyer, DK210 at £42.00 are proving **extremely popular** and are obviously destined to be firm favourites with amateurs up and down the country.

It seems that HF rigs are now selling in the same quantities as the smaller and less expensive VHF equipment. I am sure that with **the line up of TS930S, TS830S, TS530S and the two TS130's,** Trio have provided an extremely wide range of HF equipment. **Please** read what John has to say about the rigs on page 1 of the advert. Even if you are **a dyed-in-the-wool Yaesu** or **Icom man** turn back one page and consider his comments.

Harking back to **my good friend Cred** (short for some long Welsh name) he has had **the audacity** to suggest that I write Emporium News to get rid of our out-of-date stock. What a thing to accuse me of – **would I do that?!**

I have always found Japanese CQ magazine a very remarkable publication and over the course of the last few years **have picked up a smattering of Japanese** so, to my good friends in Japan, I send this message:

秋です, 日本のハムの皆様

こんにちは. ビル ロウ

Anyway, that's about it for now as I have just head a rumour that **someone** has given my wife **a current price list** so I must dash home to reposition the decimal places so until next time Gud DXes 73es FBYLS, XYLS, esFBOM, etc.

DAVID

Introducing the NEW IC-740

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

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

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

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

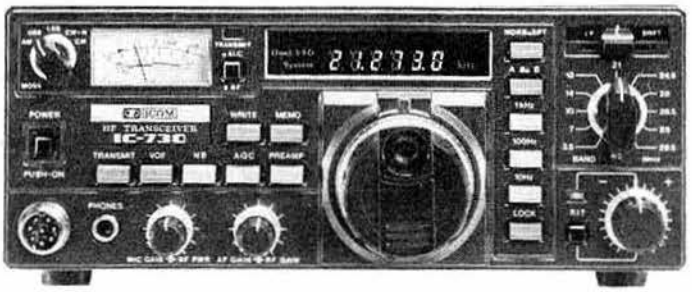
With 10 independent receiver and 6 transmitter front panel adjustments, the IC-740 operator has full control of his station's operating requirements.

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

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

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

IC-730 The best for mobile or economy base station £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, 100Hz and 1kHz steps allows effortless tuning and what's more a memory is provided for one channel per hand. Further convenience circuits are provided such as Noise Blanker, Vox, CW Monitor APC and SWR Detector to name a few. A built in Speech Processor boosts talk power on transmit and a switchable RF Pre-Amp is a boon on today's crowded bands. Full metering WWV reception and connections for transverter and linear control almost completes the IC-730's impressive facilities.

IC-25E The Tiny Tiger £239.inc.

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.

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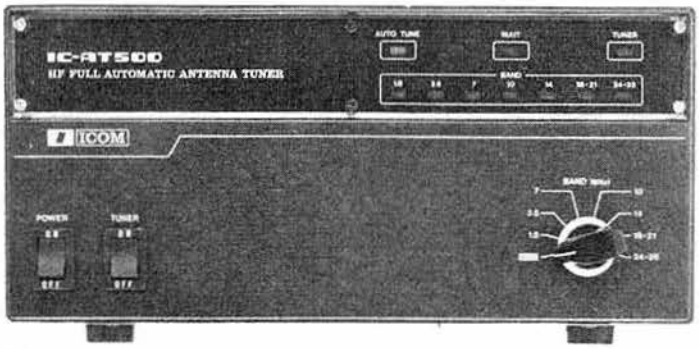
IC-AT500 Automatic antenna tuner £299.inc.
100W version AT100 £249.inc.



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

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

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

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

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

Tono RTTY and CW computers 7000E-£550./9000E-£650.inc.

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

Check the many facilities offered before you buy – especially look at the 900E which also throws in a Word Processor. Previous ads have told you quite a lot about these products – but why not call us for further information and a brochure?

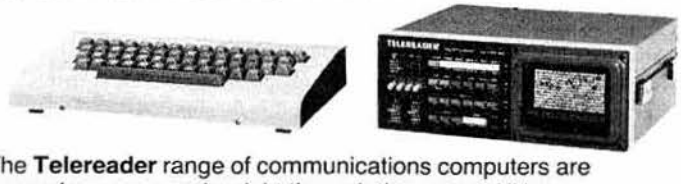
IC-2KL Super Linear £839.inc. Matching power supply IC-2KLPS £211.inc.

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, IC-730, IC-74O The IC-2KL employs a heat pipe cooling system for the heatsink of the power transistors. This is a new technology used to transfer the heat, and has a high conductance, several hundred times that of copper, plus a very quick response.

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

NEW! £699.inc. with built-in VDU.



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

CWR685E Send/receive with VDU and Keyboard	**£699**
CWR-670 Delux rx only version with CW and six selectable baud rates – 3 shifts	**£259**
CWR-600 "Morse Master" Rx only (but it does RTTY also-3 baud rates). Key socket and built in oscillator for morse practice.	**£189**

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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 returning AND BANDCHANGING of the transceiver? How many include a really excellent general coverage receiver covering all the way from 100kHz to 30MHz (with provision to transmit there also if you have the correct licence)? How many need no tuning or loading whatsoever and take great care of your PA, should you have a rotten antenna, by cutting the power back to the safe level? How many have an automatic RIT which cancels itself when the main tuning dial is moved? How many will run full power out for long periods without getting hot enough to boil an egg? How many have band data output to automatically change bands on a solid state linear AND an automatic antenna tuner unit when you are able to add these to your station?

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

CUE DEE antennas

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

4el 2m yagi VHF	4144A	8 dBd	£24.93
10el 2m yagi VHF	10144	11.4 dBd	£45.16
15el 2m yagi VHF	15144	14 dBd	£63.00
17el 70cm yagi UHF	17432	14.5 dBd	£48.00
4/5el HF Beam	DUO 2	(14/21 MHz) 9/8 dBd	£356.71

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

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

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

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

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

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

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

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

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

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

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

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

A full range of accesories in stock.		**£ 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
IC121 2 3	cases	3.60
All prices include VAT		each

Fully approved marine version now available £199.+VAT.

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

12 programmable channels which include the private ones

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Great base stations
IC-251 £499.inc./IC-451 £569.inc.

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

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

Multimode mobiles
IC-290E £366./IC-490E £445.inc.

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

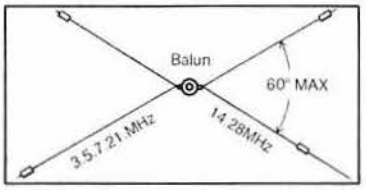
Memory scan and band scan, controlled at front panel or microphone. Two VFO's LED S-meter 25KHz and 1KHz on FM – 1KHz and 1000KHz tuning steps. Instant listen input for repeaters.

Thanet Agents Agents (phone first – all evenings and weekends only, except Scotland).
Scotland – Jack GM8 GEC (031 665 2420)
Midlands – Tony G8AVH (021 32 - 2305)
North West – Gordon G3LEQ (0565 4040 Ansafone available)

IC-24G Low-priced mobile
£169.inc.

The famous IC-240 has been improved, given a face life 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.

A new trap dipole £49.50.inc.



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

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

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

Tyrone Amateur Electronics N. Ireland (0662) 2043
Amateur Radio Exchange London (01) 992 5765
Bredhurst Electronics Sussex (0444) 400786
Photo-Acoustics Ltd. Bucks (0908) 610625
Alyntronics Tyne & Wear (0632) 761002
Fanthorpes Humberside (0482) 223096
LAM Electronics Glos (0242) 43891
Booth Holdings Avon (02217) 2402
Telecom S Yorks (0226) 5031
Gemini Lancs (0204) 652233

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143 Reculver Road, Herne Bay, Kent.
Tel: 02273 63859
Trade Enquiries Welcome.

WATERS & STANTON ELECTRONICS

18/20 MAIN ROAD, HOCKLEY, ESSEX. Tel: (0702) 206835

UNBEATABLE PRICES.....

.....UNBEATABLE VALUE

FDK THE NUMBER ONE FM RIG £169

Special price reduction for September!

M700EX 25 WATTS
144–146MHz

The Multi 700EX now a firm favourite with amateurs throughout the world—it embodies all the essential features of a completely self-contained FM station. Its punchy 25 watt signal beats all the old 10 watt transceivers hands down. The large digital display gives clear and precise frequency readout, controlled by a "click stop" frequency selector knob that provides steps of 25kHz with an additional 12½kHz selector.
Priority scanning provides for the scanning of pre-programmed channels plus the mains dial channel. Repeater operation is taken care of by means of a 600kHz down shift selector and automatic tone burst switch. For listening on the input frequency of the repeater, instant reverse repeater operation is available at the touch of a button. Local contacts are taken care of by a continuously variable power control that enables power to be reduced right down to 1 watt.

FDK 2M ALL MODES—GREAT VALUE £289

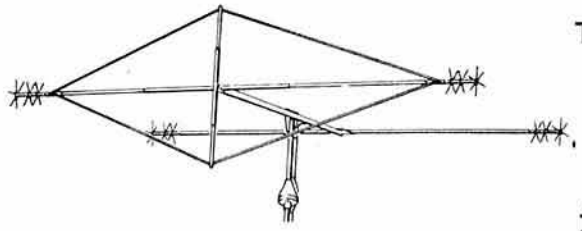
M750E 10 WATTS
FM-SSB-CW

Still going strong the M750E represents incredible value in 2m all-mode transceivers. The complete self-contained package provides 10 watts of SSB, CW and FM across the whole of the 2 metre band. The clear digital display gives frequency readout to 100Hz and dual vfo control provides the means of storing 2 separate frequencies with instant recall of either one. The highly flexible tuning provides steps of 100Hz and 5kHz on the main dial with the alternative of remote up/down tuning from the microphone. All the usual facilities are included such as noise blanker, RIT, RP gain etc. There is also the option of the matching 70cms module that provides immediate dual band operation at the press of a button. Finally consider the price. Yes nearly £100 cheaper than its competitors and with full factory back-up provided by us as exclusive distributors. So why not send off today for full details.

AZDEN—PCS300—NOW ONLY £179

144–146MHz
3 or ½ WATTS
LCD DISPLAY
12½kHz STEPS

We've really broken the price barrier with this brand new unit from Azden combining all the features you've ever wanted in a hand-held at an incredible inclusive price. Incredibly powerful, it will give over 3 watts output in the high power mode with ½ watt in the low power position. Coverage is 144 to 146MHz in 12½kHz steps, ideal for UK use. Tone burst and 600kHz repeater shifts are all included for any repeater in Europe. The clear LCD display is a mine of information, indicating frequency, memory address, repeater shift, bar "S meter" reading. RF output and low battery volts. The front panel key pad is of superior construction with a piezo bleeper indicating key entry on every function.
Comprehensive scanning facilities include band scanning and memory scanning plus programmable upper and lower band limits, with pause and auto resume. Unlike most rigs the memory back-up is permanently connected as it draws a miserly 0·01ma! Other controls include programmable repeater shift, dial illumination, key lock, PTT lock, etc.



THE AMAZING HQ-1
"MINI-BEAM"
10–15–20M 1kW
6ft TURNING RADIUS

£119 + **£3.75 carr.**

The HQ-1 is now in its 10th year of marketing in the UK. Several attempts have been made to copy it without infringing the copyright but all have failed! American built and designed we are proud to be the exclusive distributors of this famous antenna. Ideal where space is at a premium this is a first-class compact beam. Send for full details.

WATERS & STANTON ELECTRONICS

18/20 MAIN ROAD, HOCKLEY, ESSEX. Tel: (0702) 206835

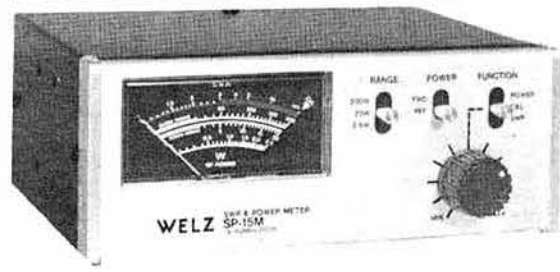
WELZ®

SIMPLY THE BEST!

PROFESSIONAL POWER METERS

SP200: Frequency range 1·8-160MHz; 20/200/1000 watts **£59**
SP300: Frequency range 1·8-500MHz; 20/200/1000 watts **£79**
SP400: Frequency range 130-500MHz; 5/20/150 watts **£59**

BUDGET LINE METERS

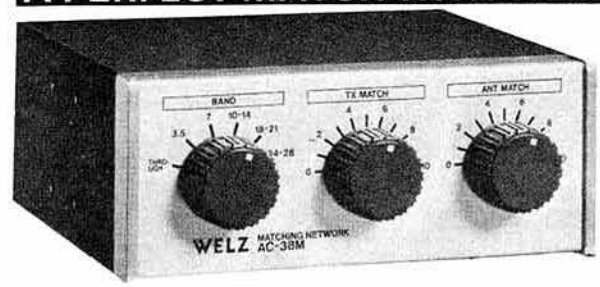


SP15M: Frequency range 1·8-150MHz; 2½/20/200 watts **£29**
SP45M: Frequency range 140-470MHz; 3/20/100 watts **£45**

SWITCH TO WELZ!

Users of *Welz* equipment will already be familiar with the fine workmanship and performance of these products. Perhaps one of the finest products they have recently produced is the 2-way coaxial switch. Beautifully machined and weighing over 1lb, this switch boasts a cross-talk better than 60dB, insertion loss of 0·1dB, and is rated to 1300MHz. With a power handling capacity of 1kW this will cater for all normal amateur radio station requirements. We know of no other switch anywhere near this price that can match its performance.

A PERFECT MATCH WITH WELZ!



AC38 Frequency range 8 bands 3·5-29MHz
Coax Feeder 400 watts 50 ohms
Matches 20-300 ohms

NEW MODELS

1·8-500MHz

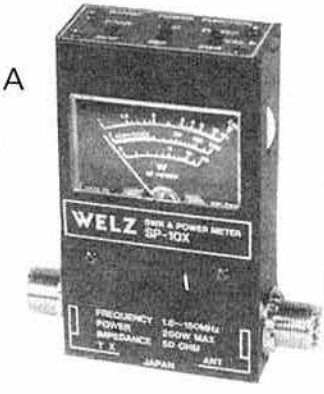
* 1·8-500MHz
* 20W and 200W power ranges
* Measures power and SWR
* Completely flat frequency response
* Dual range sensors

SP-380
£49

THE NEW HANDY METER
SP-10X £19.95

NOW EVERYBODY CAN AFFORD A WELZ POWER METER— ACKNOWLEDGED AROUND THE WORLD AS PRODUCTS OF SUPERIOR PERFORMANCE

* 1·8-150MHZ
* 20W and 200W power ranges
* Measures power and SWR
* Completely flat frequency response
* SWR sensitivity 3 watts



ALL WELZ PRODUCTS ARE FULLY GUARANTEED FOR 12 MONTHS PARTS AND LABOUR.
SOLE UK DISTRIBUTORS

WATERS & STANTON ELECTRONICS

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		Price Inc. VAT	Carr. & Ins.
FDK RANGE			
M.700EX	2m FM 25 watt.	169.00	n/c
M.750E	2m FM/SSB/CW 10w.	289.00	n/c
Expander	70cm transverter	199.00	n/c
PS750	230v AC power supply	66.00	n/c
Palm II	2m FM 6 channel	109.00	n/c
Palm IV	70cm FM 6 channel	125.00	n/c
TB1	1750Hz tone burst	10.00	0.50
TM56B	2m FM 230v/12v DC scanner	89.00	n/c
TM56B	Marine version	89.00	n/c
FDK	12v DC leads	2.75	0.65
CC2	Case for Palm II/IV	6.75	0.75
BC2	230v AC charger	4.50	0.75
BB2	"AA" size battery case	5.00	0.75
BT2	Ni-cad battery pack	12.00	0.75
Xtals	for Palm II and Palm IV	3.00	0.25
Xtals	for TM56B	3.00	0.25
T1200	2m synthesised handheld	159.00	n/c
SNAP-1	Joining plates. M750/Expander	7.95	1.00
AZDEN RANGE			
PCS3000	25w 2m FM trans.	219.00	n/c
PCS300	2m synthesised handheld	179.00	n/c
ECK	5m cable kit	25.00	n/c
AS006	Mobile extension speaker	8.95	1.00
DX-354	Deluxe base station mic.	29.00	1.50
WELZ PROFESSIONAL POWER/ SWR METERS & ACCESSORIES			
SP200	1-8-160MHz 20w-200w-1kw	59.95	n/c
SP300	1-8-500MHz 20w-200w-1kw	79.95	n/c
SP400	130-500MHz 5w-20w-150w	59.95	n/c
SP15M	1-8-160MHz 5w-20w-200w	29.95	n/c
AC38	3-5-30MHz Coax ATU	59.00	n/c
CT15A	50w dummy load	6.95	0.75
CT15N	15/50w dum load, N Plug	11.95	0.75
CT150	150/400w dummy load	31.00	n/c
CT300	300/kw dummy load	43.00	n/c
CH20A	2 way coax switch	15.95	n/c
CH20N	2 way coax switch "N"	27.95	n/c
CT-03N	3w dummy load 1-3GHz	24.95	n/c
ADONIS MICROPHONES			
MM202S	Safety mic. Lapel type	20.95	1.00
MM202HD	Safety mic. head band	29.00	1.00
MM202HM	Headphone & Mic.	39.00	1.00
NEW AM303	Base station mic.	27.00	1.00
NEW AM503	Base station mic.	35.00	1.00
AM802	Base station mic.	49.00	1.00
TRIO			
NEW TS930S	Solid state transceiver	1,098.00	n/c
TS830S	160-10m transceiver	694.00	n/c
VFO230	Digital VFO	215.00	5.00
AT230	All band ATU	119.00	5.00
SP230	External speaker unit	34.95	1.75
DS2	Optional dc pack	43.95	1.75
DFC230	Digital remote controller	179.00	1.75
YK88C	500Hz CW filter	29.60	0.75
YK88CN	270Hz CW filter	32.60	0.75
SM220	Station monitor scope	198.00	5.00
BS8	Panoramic display module	44.85	1.50
TS530S	160-10m transceiver	534.00	n/c
VFO240	External VFO	92.50	5.00
TS130S	8 band 200w pep mobile	525.00	n/c
TS130V	8 band 20w pep mobile	445.00	n/c
TL120	200w pep linear for TS120V	144.00	2.00
MB100	Mobile mount for TS130	17.00	1.50
VFO120	External VFO	85.00	2.00
SP120	Base station speaker	23.00	2.00
SP40	New mobile speaker unit	12.40	1.00
AT130	100w antenna tuner	79.12	1.50
PS20	AC power supply 4 amps	49.45	3.00
PS30	AC power supply 20 amps	88.50	5.00
MA5	Trio 5 band mobile aerial	88.75	3.25
MC50	Deluxe desk mic.	25.75	1.50
MC35S	Fist microphone 50k	13.80	0.75
MC30S	Fist microphone 500ohm	13.80	0.75
MC40S	Up/down microphone	13.80	0.75
LF30A	HF low pass filter	17.90	1.00
RD300	1kw dummy load	52.20	2.00
NEW TS780	2m/70cm transceiver	748.00	n/c
TR9000	2m multimode transceiver	359.00	n/c
TR9130	2m multimode 25w	395.00	n/c
BO9	Base plinth for TR9000	34.95	1.50
TR7730	Compact 25w 2m FM tcvr	247.00	2.00
TR7800	2m FM 25w transceiver	257.00	2.00
TR2300	2m FM portable tcvr	166.75	2.00
VB2300	10w amplifier for TR2300	58.00	1.50
MB2	Mobile mount	17.70	1.00
RA1	Rubber flexible antenna	6.90	0.75
PS1200	AC power supply unit & charger	29.50	1.50
NEW TR2500	Compact 2m FM h'held	207.00	2.50
ST2	Base stand charger	46.00	1.75
SC4	Soft case	12.00	0.75
MS1	Mobile stand/trickle chgr	28.00	1.25
SMC25	Speaker microphone	14.50	0.75
PB25	Spare battery pack	22.30	0.75
LH2	Deluxe leather case	21.30	0.75
TR8400	70cm FM mobile tcvr	299.00	2.00
PS10	Base station power supply	64.00	2.50
TR9500	70cm multimode tcvr	449.00	n/c
PL1	Charger lead for TR230U	1.30	0.75
R1000	Synthesised 200kHz-30MHz receiver	297.00	n/c
SP100	External speaker unit	26.90	2.00
HC10	Digital station clock	58.75	1.50
HS5	Deluxe headphones	21.85	1.25
HS4	Economy headphones	10.35	1.25
NEW R600	Synthesised 150kHz-30MHz receiver	235.00	n/c
DM81	Dip resonance meter	60.00	1.50
DL705	Digital multimeter	80.00	1.50
MC76	Case for DL705	4.95	1.00

SERVICE

"YES IT DOES GO WRONG SOMETIMES"

Even the best equipment goes wrong and you want to be in a position whereby you are assured that any faults can be rectified quickly and efficiently. At Hockley we have a well equipped, full-time service department to give you just that re-assurance. It's only when things go wrong that you begin to tell the "men from the boys" in the retailing world. Our policy is quite simple. We will service any equipment that we sell both in and out of warranty and do our utmost to get the work completed as fast as is humanly possible. Minor faults we will try and do whilst you wait but do please telephone before making a journey to us so that we can make sure it can be fitted into our day's schedule.

YAESU NEW YAESU	Deluxe solid st/state tcvr	1,295.00	n/c
KEYT901	Curtis keyer	23.00	0.75
DCT1	DC lead	6.50	0.75
RAMT1	Memory board	10.00	0.75
FMUT1	F.M. Unit	t.b.a.	0.75
XF8.9KCN	300Hz CW filter	15.35	0.75
XF8.9KC	600Hz CW filter	15.35	0.75
XF8.9KA	6kHz AM filter	15.35	0.75
XF10.7KC	CW filter	13.80	0.75
FT902DM	9 band AM/FM transceiver	885.00	n/c
FT902DE	9 band transceiver	790.00	n/c
FC902	9 band atu SWR/PWR etc	135.00	5.00
FTV901R(2)	Transverter fitted 2m mod	285.00	5.00
FTV901R	T'verter main frame only	195.00	5.00
430TV	70cms module for tvtr	185.00	2.00
144TV	2m module for transverter	100.00	2.00
70TV	4m module for transverter	80.00	2.00
YO91P	Monitor scope with pan. adaptor	330.00	5.00
FV901DM	Remote vfo for 901	260.00	5.00
SP901	External speaker	31.00	2.00
FL2100Z	160-10m 1200w linear	425.00	n/c
FT101ZFM	160-10m 9 band transc.	590.00	n/c
FT101ZDFM	As above with digital readout	665.00	n/c
DCT101Z	12v DC adaptor	42.50	1.50
FV101Z	Remote VFO for FT101Z/ZD	112.00	5.00
FV101DM	External Digital VFO	249.00	5.00
FANT101	Fan for 101 series	13.80	1.00
FT707	80-10m 8 band tcvr	569.00	n/c
FP707	230v AC for FT707	125.00	5.00
MR7	Metal rack for FT707	15.70	2.00
MMB2	Mobile mounting bracket	16.00	1.50
FV707DM	Digital VFO	203.00	5.00
FL110	100w linear amplifier	155.00	5.00
FRG7	General Coverage rcvr	199.00	n/c
FRG7700	Gen. co. receiver	329.00	n/c
MEMGR7700	Memory module	90.00	1.00
DCRG7700	DC modification kit	1.15	0.50
FRT7700	Antenna tuner	37.00	1.50
FF5	Low pass filter	9.95	0.75
VHF Converters for FRG7700:			
	FRV7700 'A' 118-130; 130-140; 140-150MHz	69.75	1.50
	FRV7700 'B' 118-130; 140-150; 50-59MHz	75.50	1.50
	FRV7700 'C' 140-150; 150-160; 160-170MHz	65.95	1.50
	FRV7700 'D' 118-130; 140-150; 70-80MHz	72.45	1.50
	FRV7700 'E' 118-130; 140-150; 150-160MHz	71.30	1.50
	FRV7700 'F' 118-130; 150-160; 170-180MHz	71.30	1.50
FT208R	2½watt 2m h'held tcvr	209.00	1.50
FT708R	1 watt 70cms h'held tcvr	219.00	1.50
FNB2	Nicad battery pack	17.25	0.75
NC9C	Slow charger unit	8.00	0.75
PA3	12v charger unit	13.40	0.75
MMB10	Mobile bracket	6.50	0.75
FT290R	2m all-mode portable	249.00	n/c
FT790R	70cms all-mode portable	t.b.a.	1.00
NC11C	Charger for FT290R	8.00	1.00
CSC-1	Carrying case	3.45	0.75
MMB-11	Mobile mounting bracket	22.25	1.50
FL2010	10 watt linear	64.00	2.00
NC/WSE	2amp hour ni-cad pack	20.00	1.75
FT480R	2m 10 watt SSB/CW/FM transceiver	379.00	n/c
FP80A	230v AC power supply	63.25	2.00
FL2050	50 watt linear	126.50	2.00
FT780R	70cms all-mode tcvr	449.00	2.00
YAESU ACCESSORIES			
YM21	Hand mic. 600ohm 4 pin	13.80	0.75
YM24A	Hand mic. 2K ohm 6 pin	16.85	0.75
YM34	Desk mic. 500/50K ohm 8 pin	21.45	1.50
YM35	Hand mic. 8 pin scanning. 600ohm	13.80	0.75
YM36	Hand mic. 8 pin n/c. 600ohm	13.05	0.75
YM37	Hand mic. 600ohm 8 pin	6.90	0.75
YM38	Desk mic. 600/50K ohm 8 pin	24.90	1.50
YM39	600ohm 7 pin hand speaker/mic.	14.95	0.75
YE7A	Hand mic. 600ohm 4 pin	6.90	0.75
YD148A	Desk mic. 600/50k ohm 4 pin	21.10	1.50
YD844A	Desk mic. 600/50k ohm	25.30	1.50
FP4	230v/4 amp 12v psu	42.95	2.00
FP12	230v/12 amp 12v psu	86.25	5.00
YH55	8ohm communication headphones	10.00	1.00
YH77	Lightweight headphones	10.00	1.00
QTR24D	24 hour World clock	28.00	1.50
FF501DX	Low pass filter 2kw	23.00	1.50
YP150Z	Dummy load/wattmeter	92.00	1.50
ICOM			
IC730	HF Mobile tcvr 100W	586.00	n/c
FL30	SSB Pass band tune filter	24.70	0.75
FL44	Hi Q 455kHz xtal filter	t.b.a.	0.75
FL45	CW Narrow xtal filter	34.20	0.75
EX202	LDA unit for above	t.b.a.	0.75
EX203	CW Audio filter	11.60	0.75
EX205	Transverter controller	10.50	1.00
IC720A	HF transceiver + Gen. Cov. Rcvr.	883.00	n/c
PS20	PSU for above with speaker	130.00	5.00
PS15	PSU no speaker	99.00	5.00
FL32	CW narrow filter	29.30	0.75
FL34	AM filter	23.40	0.75
BC10A/E	Mains memory backup	5.30	0.75
IC2KL	Matching HF linear 500W	839.00	n/c
IC2KLPS	PSU for above	211.00	5.00
ICAT500	1-8-30MHz auto tuner	299.00	5.00
ICAT100	3-5-30MHz auto tuner	249.00	5.00
IC45IE	70cm FM + SSB base stn	630.00	n/c
IC25IE	2m FM + SSB base stn	499.00	n/c
IC290E	2m Multimode mobile 10W	366.00	n/c
IC490E	70cm multimode mobile	445.00	n/c
IC25E	2m FM mobile 25W	259.00	n/c
IC2E	2m FM handy talky	159.00	n/c
IC4E	70cm hand portable	199.00	n/c
ICML1	10 watt mobile booster	49.00	1.00
BP5	11 volt battery pack	30.50	0.75
BP4	Battery box for 6 × AA	5.80	0.75
BP3	Standard battery pack	17.70	0.75
BP2	6 volt pack	22.00	0.75
BC30	Base charger for above	39.00	0.75
BC25	Mains charger as supplied	4.25	0.75
DC1	12 volt adaptor pack	8.40	0.75
HM9	Speaker/Microphone	12.00	0.75
CP1	Mobile charging lead	3.25	0.75
LC1/2/3	Cases each	3.50	0.75
IC202S	2m SSB portable tcvr.	169.00	n/c
IC402	70cm SSB portable tcvr.	245.00	n/c
ICSP2/3	External speaker	29.00	1.50
IC3PE	3 amp psu + speaker	64.90	1.50
ICSM2	Desk mic. 4 pin plug	29.00	1.50
ICSM5	Desk mic. 8 pin plug	29.00	1.50
ICHM3	Hand mic.	12.00	0.75
ICHM5	N/C mic. as above	20.00	0.75
ICHM7	Hand mic.	12.00	0.75
ICHM10	Scan mic.	20.00	0.75
LOWE RECEIVERS			
SRX-30	General Coverage HF receiver	158.00	n/c
SRX-30D	SRX30 with dig readout	195.00	n/c

MICROWAVE MODULES RANGE

MML28/100-3	10m 100w linear/preamp	129.95	2.00
MML70/40	4m 40 watt linear/preamp	77.00	1.25
MML70/100-S	4m 100 w linear/preamp	129.95	2.00
MML144/30L-S	1-3 w I/P 30 w O/P	65.00	1.75
MML144/40	2m 40 w linear/preamp	77.00	1.25
MML144/100-S	2m 100 w linear/preamp	129.95	2.00
MML144/100LS	2m 100 w (1 or 3w i/p)	145.00	2.00
MML432/20	70cm 20 w linear/preamp	77.00	1.25
MML432/50	70cm 50 w linear/preamp	99.00	2.00
MML432/100	70cm 100 watt linear	228.65	2.00
MML1296/10	23cm 10 watt linear	199.00	1.25
MMC435/51	70cm ATV converter	34.90	0.75
MMC435/600	70cm ATV converter	27.90	0.75
MTV435	70cm ATV 20 watt tx	149.00	1.25
MM1000	ASC11 to morse converter	59.00	1.25
MM1000KB	Morse converter with keyboard	89.00	2.00
MM2000	RTTY to TV converter	169.00	1.25
MM4000	RTTY transceiver	269.00	1.25
MM4000KB	with keyboard	299.00	2.00
MMS1	The MORSETALKER	115.00	1.25
MMS2	Advanced morse trainer	155.00	1.25
MMT28/144	10m transverter	99.00	1.25
MMT70/28	4m transverter	115.00	1.25
MMT70/144	4m transverter	115.00	1.25
MMT144/28	2m transverter	99.00	1.25
MMT432/28-S	70cm transverter	149.00	1.25
MMT432/144-R	70cm transverter	184.00	1.25
MMT1296/144	23cm transverter	184.00	2.00
MMC28/144	10m to 2m converter	27.90	0.75
MMC50/28	6m to 10m converter	27.90	0.75
MMC70/28	4m to 10m converter	27.90	0.75
MMC70/28LO	4m to 10m converter	29.90	0.75
MMC144/28	2m to 10m converter	27.90	0.75
MMC144/28LO	2m to 10m converter	29.90	0.75
MMC432/28-S	70cm to 10m converter	34.90	0.75
MMC432/144-S	70cm to 2m converter	34.90	0.75
MMC1296/28	23cm to 10m converter	32.20	0.75
MMK1296/144	23cm to 2m converter	59.80	0.75
MMK1691/137.5	1691MHz Meteosat converter	115.00	1.25
MMA28	10m low noise preamp	14.95	0.75
MMA144V	2m RF switched preamp	34.90	0.75
MMA1296	23cm low noise preamp	29.90	0.75
MMD050/500	500MHz digital meter	69.00	0.75
MMD600P	600MHz prescaler	23.00	0.75
MMDP1	Counter amplifier/probe	11.50	0.75
MMF144	2m bandpass filter	9.90	0.75
MMF432	70cm bandpass filter	9.90	0.75
MMV1296	70cm to 23cm varactor	34.50	0.75
MMR15/10	15dB, 10 watt attenuator	9.90	0.75

DATONG

PC1	General Cov. Converter	137.00	n/c
VLF	VLF converter 28-29MHz coverage	25.30	n/c
FL1	Agile audio filter	67.85	n/c
FL2	Multi-Mode audio filter	89.70	n/c
ASP/B	Automatic r.f. clipper (Trio)	79.35	n/c
ASP/A	Automatic r.f. clipper (Yaesu)	79.35	n/c
D75	Manual r.f. speech clipper	56.35	n/c
D70	Morse Tutor	49.45	n/c
MK	Keyboard morse sender	129.00	n/c
RFA	Broad band pre-amplifier	33.00	n/c
AD270	Active dipole (indoor mounting)	37.95	n/c
AD370	Active dipole (outdoor mounting)	51.75	n/c
MPU	Mains power unit	6.90	n/c
DC144/28	2 metre converter	39.00	n/c
Codecall 'A'	4000 link programmable codes	27.60	n/c
Codecall 'B'	4000 switch programmable codes	33.00	n/c

JAYBEAM ANTENNAS

10, 15 & 20 metre antennas

TB3	HF 3 el tribander 1kw	181.70	5.00
VR3	HF Vertical triband 1kw	46.00	4.00
4 metre antennas			
4Y/4M	4 element beam	22.42	4.00
PMH2/4M	2 way phasing harness	13.22	1.50
2 metre antennas			
DC1/WB	Wide band discone (100-470MHz)	41.40	3.00
LR1/2M	Colinear 4-3db	25.87	3.00
LR2/2M	Colinear 2-8db	21.85	3.00
C5/2M	5db glass fibre colinear	47.72	4.00
5Y/2M	5 element yagi	12.07	3.00
8Y/2M	8 element yagi	15.52	3.50
10Y/2M	10 element yagi	33.35	4.00
PBM10/2M	10 element parabeam	39.67	4.00
PBM14/2M	14 element parabeam	48.30	4.00
5XY/2M	Crossed 5 element yagi	24.72	3.50
8XY/2M	Crossed 8 element yagi	31.00	4.00
10XY/2M	Crossed 10 element yagi	40.82	4.00
X6/2M/X12/70cm	dual band crossed yagi	41.40	4.00
PMH/2C	Harness for circular pol.	8.00	1.50
Q4/2M	4 element quad yagi	25.87	3.00
Q6/2M	6 element quad yagi	33.90	4.00
Q8/2M	8 element quad yagi	39.10	4.00
D5/2M	Double 5 slot-fed yagi	21.85	3.00
D8/2M	Double 8 slot-fed yagi	29.32	4.00
SVMK/2M	Kit for vertical pol.	8.00	3.00
UGP/2M	Ground plane	10.90	2.00
HO/2M	Mobile 'halo' head only	5.15	2.00
HM/2M	Mobile 'halo' with 24" mast	5.75	2.00
PMH2/2M	2 way phasing harness	10.90	1.50
PMH4/2M	4 way phasing harness	25.30	1.50
70cm Antennas			
C8/70cm	8db glass fibre colinear	54.00	4.00
D8/70cm	Double 8 slot-fed yagi	22.40	3.00
PBM18/70cm	18 element parabeam yagi	27.60	3.00
PBM24/70cm	24 element parabeam yagi	36.80	4.00
MBM28/70cm	28 el multibeam yagi	18.40	3.00
MBM48/70cm	48 el multibeam yagi	31.00	3.00
MBM88/70cm	88 el multibeam yagi	42.55	4.00
8XY/70cm	Crossed 8 element yagi	36.80	3.00
12XY/70cm	Crossed 12 element yagi	46.00	4.00
PMH2/70cm	2 way phasing harness	9.20	1.50
PMH4/70cm	4 way phasing harness	19.55	1.50
23cm Antennas			
CR23cm	Corner reflector array	39.00	3.00
D15/1296	Double 15 slot-fed yagi	36.80	3.00
PMH2/23cm	2 way phasing harness	27.60	1.50
JAYBEAM Sundries			
DL	Double lashing chimney kit	10.78	3.00
W6	6" wall bracket (1½" mast)	3.00	2.00
W21	21" wall bracket (2" masts)	10.80	3.50
W24HD	24" wall bracket (2" masts)	15.45	4.00
SPM	16' × 1" portable masts	16.35	3.00
PME	4' extension	2.75	3.00
A4	4'6" × 1½" straight	4.30	3.00
A5	5' × 1" straight	2.80	3.00
A9	9' × 1½" straight	8.65	3.00

MAIL ORDER

"FASTEST IN THE BUSINESS"

Once you've made the decision to buy you'll want to get your equipment as quickly as possible. That's why we set up a completely separate mail order department to give you exactly that kind of service. Martin Pyke is our mail order manager and his number one job is to get all goods shipped out the same day as the order is received. We can take orders right up to around 5.00 p.m. for same day despatch (with the exception of the later items where 2.30 p.m. is the limit). Either send us your order by post using our clip out order form contained in this advert or telephone us your credit card details.

A10	10' × 2" straight	13.55	3.50
A12	12' × 2" straight	16.20	4.00
A14	14' × 2" straight	18.85	4.00
CP1	Cross-over plate 2" × 2"	3.60	1.75
JBL59/15	15" jointing sleeve	6.05	2.00
JBL29	Universal clamp	1.75	1.00
JBL30	Universal clamp	1.70	1.00
JBL53	Universal clamp	1.25	1.00
JBL58	Guy wire clamp	1.60	1.00
JBL63	Universal clamp	2.15	1.00
JBL64	Die-cast clamp	1.32	1.00
JBL65	Die-cast clamp	1.35	1.00
MBP	Mast base plate 2"	3.90	1.50

SPECIAL VHF ANTENNAS

Scan-X	65-520MHz discone rx only	16.00	3.00
LAB	Airband ground plane	11.50	2.50
LMD	Marine dipole aerial	4.80	2.00
GDX-2	Discone aerial 50-480mHz tx & rx	39.50	3.00

G-WHIP MOBILE ANTENNA RANGE

Tribander helical for 10/15/20 metres	25.80	3.00
Base mount single hole fixing + 3m cable	6.30	1.25
LF40m coil for above aerial	6.55	1.25
LF80m coil for above aerial	6.55	1.25
LF160m coil for above aerial	6.55	1.25
LF telescopic resonator whip	4.25	1.25

AERIAL ROTATORS (complete with control boxes)

CDE AR40 (5 core cable) up to 2 el. tribander	65.00	3.50
Channelmaster 9502B (3 core) up to 8 el. VHF	54.00	3.50
9523 Channelmaster alignment bearing	14.50	1.25
Jaybeam KR400 (6 core) up to 3 el. HF beams	99.00	3.50
250 Hirschmann (3 core) suits VHF aerials up to 8 el.	43.00	2.50
SL100 Alignment bearing for 250	13.50	1.50

HF ANTENNAS (Various manufacturers)

Mini-Products HQ-1 20/15/10m 2 el. 1kw "Mini-Beam	115.00	4.00
Mini-Products C4 20/15/10m vertical dipole 1kw	55.00	3.00
Mosley TD3JR20/15/10m wire dipole 600w	40.00	2.00
Mosley "Mini-Beam" 20/15/10m 2 el. beam 600 watts	99.00	4.00
Mosley TA33JR 3 band 3 el. beam 600 w	133.00	4.00
Hy-Gain 12AVQ 20/15/10m vertical 2kw	43.00	3.00
Hy-Gain 14AVQ 40-10m vertical 2kw	64.00	3.00
Hy-Gain 18AVT/WB 80-10m vertical 2kw	91.00	3.50
HF5 80-10m vertical 200 watts	48.50	3.50
Radial kit for HF5	30.50	3.00
Jaybeam TB3 HF 3 el tribander beam 2kw	181.70	5.00
Jaybeam VR3 HF vertical 2kw	46.00	4.00
Western DX-5V 5 band 2kw vertical	89.00	3.00
5-band commercial grade 1kw 80-10m dipole	39.00	2.00

VHF/UHF MONITOR RECEIVERS

SX200N	Scanning receiver	260.00	5.00
BEARCAT 220	Scanning receiver	229.00	5.00
TM56B	FM Scanner 12v DC/230v AC	89.00	2.00
Sound Air 008	8 channel FM monitor	39.00	2.00
Sound Air M161	16 channel FM monitor	39.00	2.00
SR9(A)	2m Amateur receiver 12v DC	46.00	2.00
SR9(M)	Marine band rcvr 12v DC	46.00	2.00

ANTIFERENCE (ANTENNA SPECIALISTS) MOBILE ANTENNAS

ASP201	2m ¼ wave aerial	3.95	3.00
ASP3462	70cm colinear 3db gain	8.95	3.00
K220A	Magnetic mount for above	8.95	2.00
ASP3009	2m 3db gain 5/8th wave	9.95	3.00
ASP3677	Deluxe 2m 3db gain 5/8th wave	15.95	3.00
ASP3667	Deluxe 70cms 5db gain	16.95	3.00
K220	Magnetic mount	8.95	2.00
ASPM161	'No-hole' boot mount	3.75	1.00
ASPM124	27/28MHz ¼ wave whip	18.95	3.00

HOKUSHIN RANGE (MOBILE ANTENNAS)

2E	2m 5/8 wave 3·4db gain	8.50	3.00
2NE	2m 7/8 wave 4·5db gain	14.50	3.00
10SE	28MHz whip	12.65	3.00
15SE	21MHz whip	12.65	3.00
20SE	14MHz whip	13.80	3.00
RG4M	Base for all above aerials	4.50	1.50
GSS	Gutter/boot mount	4.50	1.50
M85	Magnetic mount with 5m coax (not 2NE)	7.95	2.00
CBA311	2m ¼ wave gutter clip aerial	5.00	3.00

SWL AERIALS & ATU's

SW69	SWL 50ft dipole 3-30MHz	24.95	1.50
004	3-30MHz 60ft dipole with 50ft coax	29.92	2.00
Mosley RD5	All band dipole	40.00	2.00
Global AT1000	SWL antenna tuning unit 0·2MHz-30MHz	31.95	2.00

AIR BAND PORTABLE MONITORS

R517	Air band portable receiver	49.50	1.50
AIR1	Soft case for R517	3.00	1.00
Crystals for R517		3.00	0.25
ATC720	Synth Air Roc 118 136MHz	TBA	

MISCELLANEOUS ITEMS

PS134	13·8v 4 amp power supply	24.95	2.00
PS125	5 amp AC power supply	29.95	2.50
PP1310	PSU 240v/13·8v DC output at 10amp protected	49.50	3.00
Global PS15	6 amp psu with meter	32.95	2.00
EK121	Katsumi Electronic keyer	29.00	1.50
EKM12	Matching side tone monitor	10.95	1.25
COK2	Morse code oscillator	6.95	0.75
HK708	Telegraph CW key (manual)	11.50	1.00
YW3	Twin SWR/Power/Field strength meter	11.95	0.75
MF210	Self powered 2m FM monitor	9.95	0.75
FX1	Deluxe station wavemeter	33.00	1.50
DM81	Solid state dip meter	60.00	1.50
Altai	Dip oscillator	47.00	1.50

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

Name..... Goods required.....

Address..... .....

....

....

Please rush me the above. Cheque enclosed for £..... Please charge to credit card No. .....

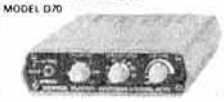
DATONG

KEYBOARD MORSE SENDER - THE ULTIMATE "MORSE KEY"


MODEL MK

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

MODEL D70: THE GO-ANYWHERE MORSE CODE TRAINER


MODEL D70

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.

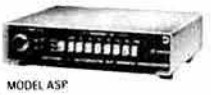
An important feature is that the unit is completely portable. This allows you to practise wherever and whenever you find it most convenient. The all-CMOS design gives about 60 hours of practice from a lowcost PP3.

MULTI-MODE AUDIO FILTER MODEL FL2

Model FL2 offers audio filtering capability which is totally in a class of its own. Although connecting in the loudspeaker line from any rig, Model FL2 simulates the effect of fully variable IF selectivity complete with pass band edges even steeper than those of multipole crystal filters. You can remove interference in SSB and winkle out weak CW to a truly remarkable extent. No less than twelve poles of tuneable filtering in Model FL2 can be used in six different ways depending on the mode switch. For example, for SSB you have independent low and high pass filters, each a 5 pole elliptic function type for knife edge cut-off, plus when needed, a separate 2 pole notch filter. All three filters tune linearly and separately from 200 to 3500 Hz. For CW all 12 poles are combined automatically to give incredible skirt selectivity and with independent calibrated controls for centre frequency and bandwidth.


MODEL FL2

MODEL ASP - THE "INTELLIGENT" RF CLIPPER


MODEL ASP

Model ASP modifies your speech signal direct from the microphone and makes it more effective at modulating your transmitter. The effect is as if the transmitter peak power were to increase by 6 to 10 dbs. "Intelligent" means that unlike other speech processors Model ASP automatically senses your voice level and reacts accordingly to always maintain the degree of true r.f. clipping selected (in decibels) by the panel push-buttons. Special circuitry does this without the undesirable side effects of simple a.g.c. devices. Adding a Datong r.f. clipper to a normal SSB transmitter has a similar effect to adding a linear amplifier but without the high cost and risk of TVI.

GENERAL COVERAGE RECEIVE CONVERTER

Reviewed Rad. Com. April '82


MODEL PC1

If you have a 2 metre all-mode receiving set up, just add Model PC1 in series with its antenna and you have a superb general coverage receiver. What better way to listen in to all the non-VHF amateur bands, not to mention everything else from 60 kHz to 30 MHz? For sheer value for money there is no better way to get high performance general coverage reception. After all what a waste it is if your expensive 2 metre all-mode rig covers one band only? Model PC1 will also extend the coverage of SX 200 type scanners to include all the long, medium and short wave bands as well. This is an excellent way to listen to your favourite short wave broadcast stations without the extra expense of a complete new receiver.

HIGH PERFORMANCE 2 METRE CONVERTER

One of the best 144MHz converters currently available. Reviewed Rad. Com. April


MODEL DC144/28

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 7 dbm 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, SO239 connectors) or as a ready built and tested PCB module.

MINIATURE RECEIVING ANTENNAS


AD 370

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 coaxial 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.

VERY LOW FREQUENCY CONVERTER MODEL VLF


MODEL VLF

Model VLF adds the missing bands below 500 kHz to your existing receiver. It also adds MW and LW coverage to amateur bands-only receivers for news, time checks etc.

Connected in series with the antenna Model VLF allows you to tune the 0 to 500 kHz range (and above at reduced sensitivity) using the ten metre band (28-30 MHz) on your normal receiver.

"CODECALL" SELECTIVE CALLING DEVICE


CODE CALL

The 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.

PRICES

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

FL1	69.00	(79.35)	AD370	56.00	(64.40)	RFA	29.50	(33.92)
FL2	78.00	(89.70)	AD270 + MPU	45.00	(51.75)	Codecall		
PC1	119.50	(137.42)	AD370 + MPU	60.00	(69.00)	(Linked)	28.00	(32.20)
ASP	72.00	(82.80)	MPU	6.00	(6.90)	Codecall		
VLF	26.00	(29.90)	DC144/28	34.50	(39.67)	(Switched)	29.50	(33.92)
D70	49.00	(56.35)	DC144/28			Basic DF System	● 149.00	(171.35)
D75	49.00	(56.35)	Module	28.00	(32.20)	DF System	● 159.00	(182.85)
RFC/M	26.00	(29.90)	Keyboard Morse			Complete Mobile DF		
AD270	41.00	(47.15)	Sender	119.50	(137.42)	System	● 214.00	(246.10)

See previous advertisement or price list for further details.

DATONG ELECTRONICS LIMITED

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

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

DATONG ELECTRONICS LIMITED

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

AMATEUR RADIO EXCHANGE

Full details and prices this month of the exciting receivers which we previewed in the August issue. Also of some other items which were on our shopping list when we were in Japan a few months ago, namely three top-quality amplifiers and a high-performance rotator.

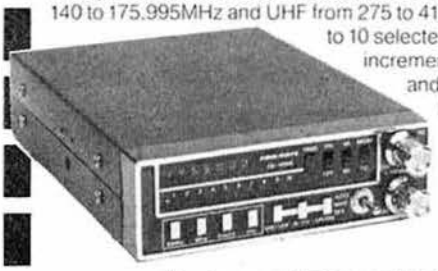
First, our scanning receivers, and to lead off, the **MAXIMAL MK-4000** (right) with FM coverage of 70-87.9875MHz and 140-175.9875MHz in 12.5kc steps on both bands. Sensitivity is 0.5µv S/N 20dB, and selectivity ± 15KHz at −50dB, and its AF output is more than 1.3W. All that, plus a built-in digital clock, for just **£99.00.**

Next, two really first-class digital-readout scanning receivers, the **CORONA CD-3000** and **CD-4000** (pictured). Their identical format presentation conceals totally different specifications as follows.

CD-3000 Professional-standard air-band receiver covering 110-139.995MHz on AM in 5kc steps. With sensitivity of 0.5µv S/N 10dB, this is tremendous value at **£89.00.**

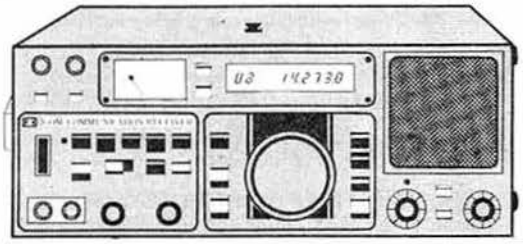
CD-4000 (left) For full coverage of public services, amateur and marine bands between 140 and 159.995MHz on FM at a price of only **£69.00.**

Finally, the **FAIRMATE AS-10960** (below), which covers VHF from 140 to 175.995MHz and UHF from 275 to 410MHz and is programmable to 10 selected frequencies in 5kc increments. Also featuring memory and priority channels, it is tremendous value at **£95.00.**



Reading specifications and looking at pictures are all very well, but the best way to appreciate the quality of these exclusive imports is to come and hear them if at all possible... and that way you'll get a cup of Brenda's coffee too while you're making up your mind which one (ones?) to buy!

Another item seen on our trip to Japan... the new ICOM general coverage receiver. Having tried it, we are convinced that this could well become the market leader in its field. With features like these, everyone who wants the best in today's receiver technology will now be asking for ICOM.



ICR-70
- Tunable from 100kc to 30MHz
- AM/SSB/FM right across the range
- Pass band tuning • Scan facility
- Notch filter • Two VFO's

Whether you want to buy outright or part-exchange your existing receiver, phone or call in without delay and be one of the first to enjoy a remarkable new experience in general coverage radio reception.

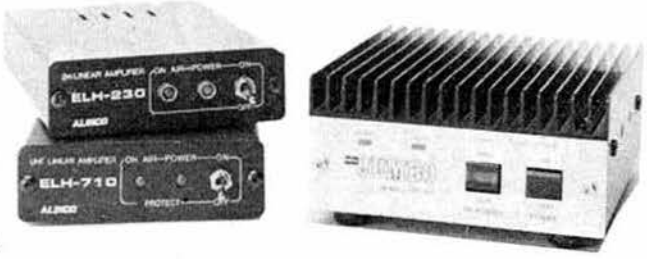
The two new RF amplifiers from ALINCO are undoubtedly the smallest units yet available in the UK measuring just 156mm x 91mm x 28mm, but there is nothing diminutive about their performance.

The **ELH-230** has an input of 3W and output of 30W over the frequency range 144-146MHz with a power consumption of 3.5 amps. **Price £49.00.**

The **ELH-710** covers 430-440MHz and has rated input of 1W/3W with output figures of 3W/10W. **Excellent value at £59.00.**

Not shown is the **EMR-400** Rotator, but performance figures like these need no picture... Rotation torque 550kg/cm (475ft/lbs) minimum. Stationary braking torque 1,500kg/cm (1,300ft/lbs) minimum. Vertical load 200kg (440lbs). Wind load area 0.5–0.8m (5.4–8.6ft) with stay bearing. Weight 5kg (11lbs). **Marvellous value at only £69.00.**

The regular-format **JUMBO HP-30** linear amplifier covers 144-148MHz with input power of 3W and output power of 30W. RF pre-amp 18dB gain. **Price £59.00.**



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

MORE OVER PAGE!

AMATEUR RADIO EXCHANGE

FT-790

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

£295

FT-102

Yaesu's latest HF transceiver...a worthy successor to the evergreen FT-101 series, with so many extra features.

- Notch filter • Three 6146B final tubes • IF shift control
- Bandwidth control from 2.7kHz to 500Hz • APF control
- RF processing • Tunable audio network for speech tailoring
- SSB/CW/AM/FM

PHONE FOR FULL DETAILS OF THE TRANSCEIVER ITSELF AND OF THE RANGE OF MATCHING ACCESSORIES. £699

IC-720A

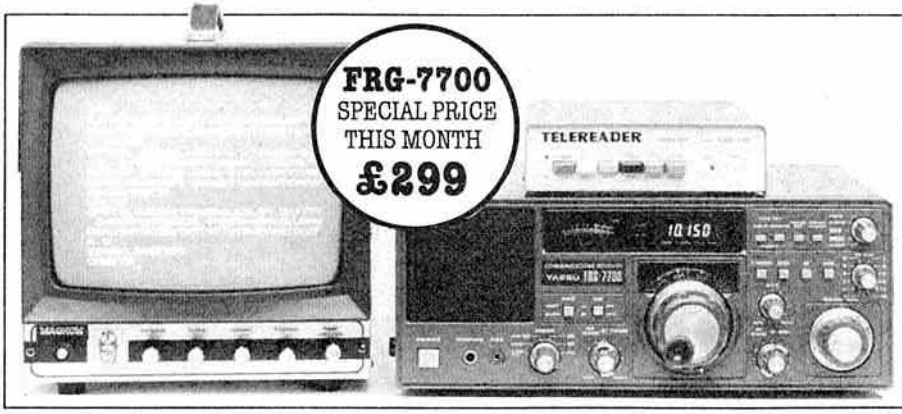
Introduced a year ago, this superb HF rig from ICOM has become a firm favourite because of its remarkable general coverage receive capability from 100kc to 30MHz, plus transmit facility across its entire range for commercial purposes.

OUR PRICE **£795**

IC-740

The latest addition to the ICOM transceiver range, this gives all-mode coverage – AM/CW/SSB/FM – right across the amateur bands from 1.8 to 30MHz. Incorporating such features as IF shift, pass-band tuning and notch-filter as standard, this is one rig that has to be seen and tried by anyone in the market for a really top-quality base station.

PHONE FOR LATEST PRICE



Ever wanted to decipher all those funny morse code (CW) and radio teletype (RTTY) noises you hear on your communications receiver? Well, now you can – with the new TASCO Morsemaster CWR-600.

Simply connect the input side of the Morsemaster to your receiver or transceiver, and the output either to a domestic TV (UHF) or to a proper VDU which we can also supply. RTTY and CW will be automatically demodulated and displayed on the screen, CW at speeds of up to 250 characters per minute, RTTY between 45.5 and 110 Bauds.

£189

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

BARCLAYCARD VISA · Access Welcome

CREDIT CARD SALES BY TELEPHONE.

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

YAESU

FT 102	160-10M 9-Band Transceiver	NEW	699.00
FT-ONE	Gen. Coverage Transceiver	NEW	1295.00
FT 790R	70cm all-mode portable	NEW	295.00
FT 101ZFM	160-10m 9-Band Transceiver		590.00
FT 101ZDFM	160-10m 9-Band Transceiver		P.O.A.
DIGT 101Z	Digital unit		90.00
DCT 101Z	DC Adaptor		42.50
FV 101Z	Remote vfo		112.00
FT902DM	9-Band AM/FM Transceiver		885.00
FC 902	9-Band atu, swr/pwr etc		135.00
FTV 901R	Transverter fitted 2m module		285.00
430TV	70cm module for above		185.00
144TV	2m module for Transverter		100.00
70TV	4m module for Transverter		80.00
FV 901DM	Remote vfo for 901		260.00
SP 901	External speaker		31.00
FL 2100Z	9-Band 1200W linear		425.00
FT 107	9-Band 100W solid state		699.00
FT 107DMS	As above with memory		779.00
DMST 107	Memory unit		92.75
FV 107G	Remote VFO for above		98.50
SP 107G	External speaker		29.90
FC 107G	Aerial tuning unit		112.70
FP 107	230V AC power module		101.95
FP 107EG	Cased PSU with speaker		113.00
FT 707	8-Band solid state 100W		545.00
FP 707	230 volts AC power supply		125.00
FC 707	Aerial tuner (unbalanced only)		85.00
MR 7	Metal rack for above		15.70
MMB 2	Mobile mounting bracket		16.00
FRG 7	0.5-30MHz receiver		199.00
FRG 7700	SSB/AM/FM recvr. dig. readout		299.00
MEM 7700	Memory unit for above		90.00

CONVERTERS FOR ABOVE

FRV 770A	118-150MHz	69.75
FRV 7700B	50-60MHz & 118-150MHz	75.50
FRV 7700C	140-170MHz	65.95
FRV 7700D	70-80MHz & 118-150MHz	72.45
FRT 7700	Receiver aerial tuner	37.85
FF 5	LF filter for above	9.95
FT 480R	2m all-mode transceiver	365.00
FP 80A	230V AC power supply	63.00
FT 780R	70cm all-mode transceiver	449.00
FT 290R	**SPECIAL** 2m all-mode portable with ARE mods	249.00
NC 11C	AC charger	8.00
CSC-1	Carrying case	3.45
MMB-11	Mobile mounting bracket	22.25
FT 208R	2m synthesized portable FM	199.00
NC 9C	AC charger	8.00
FT 708R	70cm hand-held	209.00

TRIO-KENWOOD

TS 930	Gen. coverage transceiver	NEW	999.00
TS 830S	160-10m transceiver 9 bands		650.00
AT 230	All-band ATU power meter		110.00
YK 88C	500Hz CW filter		29.60
YK 88CN	270Hz CW filter		32.60
TS 530S	160-10m trans 200w pep digital		475.00
TS 130S	8-band 200W pep		499.00
TS 130V	8-band 20W pep		445.00
AT 130	100W antenna tuner		79.00
TR 2300	2m FM synthesised portable		166.75
TR 2500	2m FM synthesised handheld		207.00
HC 10	Digital desk World Clock		58.75
DM 801	Dip meter		60.00
TR 7730	New 25W FM transceiver		247.00
R 600	Gen. Coverage Receiver		199.00

ICOM

IC 740	Multimode H.F. transceiver	NEW	P.O.A.
ICR 70	New multimode receiver		795.00
IC 730	HF mobile transceiver 8-band		586.00
IC 720A	HF transceiver and gen. cov. rec		P.O.A.
PS 15	Power supply for 720A		99.00
IC 251E	2m multimode base station		499.00
IC 25E	2m synth compact 25W mobile		259.00
IC 290E	2m multimode mobile		366.00
IC 24G	2m FM mobile 10w		169.00
IC 2E	2m FM synthesised handheld		159.00
IC 4E	70cm handheld		199.00
IC L1/2/3	Soft cases		3.50
IC HM9	Speaker/microphone		12.00
IC CP1	Car charging lead		3.20
IC BP2	6V Nicad pack for IC 2E		22.00
IC BP3	9V Nicad pack for IC 2E		17.70
IC BP4	Empty case for 6 X AA Nicads		5.80
IC BP5	11.5V Nicad pack for IC 2E		30.50
IC DC1	12V adaptor pack for IC 2E		8.40

MICROWAVE MODULES

MMT 144/28	2M Transverter for HF Rig	99.00
MMT 432/28S	70cm Transverter for HF Rig	149.00
MMT 432/144R	70cm Transverter for 2m Rig	184.00
MMT 70/28	4m Transverter for HF Rig	115.00
MMT 70/144	23cm Transverter for 2m Rig	184.00
MML 144/30LS	2m 30W linear Amp (3W1/P)	65.00
MML 144/40	2m 40W linear Amp (10W1/P)	77.00
MML 144/100S	2m 100W linear Amp (10W1/P)	129.00
MML 144/100LS	2m 100W linears (1/3W1/P)	145.00
MML 432/20	70cm 20W linear Amp (3W1/P)	77.00
MML 432/50	70cm 50W linear Amp	119.00
MML 432/100	70cm 10/100W linear Amp	228.64
MM 200/1	RTTY to TV converter	169.00
MM 400/1	RTTY transceiver	269.00
MMC 50/28	6m converter to HF Rig	27.90
MMC 70/28	4m converter to HF Rig	27.90
MMC 114/28	2m converter to HF Rig	27.90
MMC 432/28S	7cm converter to HF Rig	34.90
MMC 432/144S	70cm converter to 2m Rig	34.90
MMC 435/600	70cm ATV converter	27.90
MMK 1296/144	23cm converter to 2m Rig	59.80
MMD 050/500	500MHz dig. frequency meter	69.00
MMD 600P	600MHz prescaler	23.00
MMDP 1	Frequency counter probe	11.50
MMA 28	10 meter pre amp	14.95
MMA 144V	2m RF switched pre amp	34.90
MMF 144	2m band pass filter	9.90
MMF 432	70cm band pass filter	9.90
MMS 1	The morse talker	115.00

DATONG

PC1	Gen. Cov Converter HF on 2m	120.75
VLF	Very Low Frequency Converter	25.30
FL 1	Frequency Agile Converter	67.85
FL 2	Multi-mode Audio Filter	89.70
ASP	Auto R.F. Speech Clipper (Trio or Yaesu plug)	79.35
D 75	Manually controlled R.F. Speech clipper	56.35
RFC M	R.F. Speech Clipper Module	26.45
D 70	Morse Tutor	49.45
AD 270	Indoor Active Filter (inc. PSU)	42.55
AD 370	Outdoor Active Filter (inc. PSU)	56.35
MK	Keyboard morse sender	129.00
Codecall	Selective calling device (Link or Switch prog.)	29.32
HFA	Wideband preamplifier	27.60
MPU	Mains Power Unit	6.90

MORSE EQUIPMENT

MK 704	Squeeze paddle	10.50
HK 707	Up/Down key	10.50
EKM 1A	Practise Oscillator	8.75
EK 121	Elbug	29.95
EK 1MA	Matching side tone monitor	10.95
EK 150	Electronic Keyer	74.00

ROTATORS

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

BENCHER

BY 1	Keyer Paddle (black base)	28.75
BY 2	Keyer Paddle (chrome base)	37.95
BY 3	Keyer Paddle (gold plated)	92.00
ZA 1A	Balun 3-5-30MHz for dipoles	12.65
ZA 2A	Balun 14-30MHz for beam ant.	13.80

TONO

THETA 9000E	RTTY/CWASC11	650.00
THETA 7000E	RTTY/CW/ASC11 Receive only	550.00
THETA 350	As above, basic unit	259.00

AMPLIFIERS

UC 70	430MHz 55W + preamp	149.00
2M-50W	144MHz 30-50W	65.00
2M-100W	144MHz 100W + preamp	115.00
MR 150W	144MHz 130-150W + preamp	159.00
MR250W	144MHz 250W + preamp	259.00

TASCO

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

WELZ

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

DESK MICROPHONES

SHURE 444D	Dual Impedance	49.00
SHURE 526 T	MK II Power Microphone	57.60
ADONIS AM 502	Compression Mic 1 O/P	39.00
ADONIS AM 601	Compression Mic + Meter 1 O/P	49.00
ADONIS AM 802	Compression Mic + Meter 3 O/P	59.00

MOBILE SAFETY MICROPHONES

ADONIS AM 202S	Clip on	20.95
ADONIS AM 202F	Swan neck + up/dwn buttons	30.00
ADONIS AM 202H	Head Band + up/dwn buttons	30.95

DRAE

FULLY PROTECTED POWER SUPPLIES

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

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

136 GLADSTONE STREET, ST HELENS, MERSEYSIDE
Tel: 0744 53157 *Our North West branch run by Mike (G4NAR), just around the corner from the Rugby Ground.*

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

SMC SERVICE

Free Securicor delivery on major equipment. Access and Barclaycard over the 'phone. Biggest branch, agent and dealer network. Securicor 'B' Service contract at £4.49. Biggest stockist of amateur equipment.

NEW SHOWROOM

Our superb new showrooms are now open six days a week *9 till 5.30.*
Six demonstration benches provide *you* with full "on the air" and "side by side" facilities.

FREE FINANCE

On many regular priced items SMC offers Free Finance (on invoice over £100). 20% down and the balance over 6 months or 50% down and the balance over a year.
You pay no more than the cash price!!

SUPER SELECTION

In our catalogue you will find the widest selection anywhere: 200 stock lines of Yaesu, 600 different antennas, masts, rotators, coaxes, plus 300 items of coms. equipment.

GUARANTEE

Importer warranty on Yaesu Musen products. Ably staffed and equipped Service Department. Daily contact with the Yaesu factory. Tens of thousands of spares; test equipment. 24 years of audio experience.

SUPER SALE!

If that is not enough to tempt you into our showrooms how about: A FT107 (right), the prices overleaf, a Bearcat 220 for *£195,* a MMT432/28 for *£119* or a Hokoshin gutter mount $\frac{5}{8}\lambda$ for *£10!*

FT102

HF TRANSCEIVER

100db DYNAMIC RANGE
–40db 3rd order Tx
SSB-FM*-CW-AM*

*OPTION

FT102	Transceiver	£725.00	FV102DM	VFO	£225.00	XF82HSN	1.8kHz (1.7:1)	£11.90
AM/FM	AM/FM unit	£40.00	SP102P	Patch	TBA	XF82NC	600Hz (2.2:1)	£11.90
MD–1B8	Hand mic.	£12.65	FC102	ATU	£195.00	XF82NCN	300Hz (2.7:1)	£11.90
MD–1B8	Desk mic.	£46.00	FAS14R	Relays	TBA	XF445C	500Hz (2.2:1)	£38.90
SP102	Speaker	£45.00	XF 82GA	6KHz (2.1:1)	£11.90	XF445CN	270Hz (2.2:1)	£38.90

BETTER DYNAMIC RANGE

The extra high-level receiver front end uses 24 VDC for both RF amplifier and mixer circuits. For ultra clear copy on strong signals or noisy bands the JFET RF amplifier can be bypassed via a front panel switch, boosting dynamic range beyond 100dB. A PLL system using six narrow band VCOs provides exceptionally clean local signals on all bands for both transmit and receive.

TOTAL IF FLEXIBILITY

An extremely versatile IF Shift/Width system, using friction-linked concentric controls gives an infinite choice of bandwidths between 2·7kHz and 500Hz, which can then be tuned across the signal to the portion that provides the best copy. A wide variety of crystal filters for fixed IF bandwidths are also available as options for both parallel and cascaded configurations. The 455kHz third IF allows an extremely effective IF notch tunable across the selected passband, while an independent audio peak filter can also be activated for single-signal CW reception.

NEW STANDARD OF PURITY

Three 6146B tubes in a special configuration provide a freedom from IMD products and an overall purity of emission unattainable in two-tube and transistor designs, while a new DC fan motor gives whisper-quiet cooling as standard.

IF TRANSMIT MONITOR

An extra product detector allows audio monitoring of the transmitter IF signal, which, along with dual meters on the front panel, and a new "peak hold" system incorporated into the ALC metering circuit enables precise setting of the speech processor and transmit audio.

VERSATILE APPLICATIONS

The rear panel has jacks for an external receiver and separate receive antenna for contest and top band operation, and an optional AM/FM Unit enables operation on these modes.

NEW NOISE BLANKER

A new noise blanker design enables front panel control of the blanking pulse width, substantially improving the utility of the noise blanker for all types of operation, including woodpecker blanking.

NEW VFO DESIGN

Using a new IC module developed especially the VFO exhibits exceptional stability under all operating conditions. It is extremely simple, using only axial-lead components, that decrease the number of discrete components that can cause instability or fail in conventional designs. It is encased in a heavy, cast-aluminium housing to prevent interaction with other circuits.

FV-102DM SYNTHESIZED VFO

The FV-102DM provides advanced frequency control for optimum convenience, especially in DX and contest situations. The PLL synthesizer steps in 10Hz, while slow or fast scanning can be controlled either from the front panel or directly from an optional scanning microphone. Twelve frequencies can be memorized, entered from the FT-102 itself, the FV-102DM VFO or numerical keyboard. Front panel controls include ±5kHz and ±20kHz step buttons; VFO dial lock, last digit blanking, and transmit/receive Main/VFO/memory selector. The VFO dial can be used as a clarifier for a selected memory, while the five digit fluorescent display resolves to 10Hz.

COMMERCIAL QUALITY TRANSMITTER

The FT-102 represents a significant advance in amateur transmitter signal quality, introducing design concepts previously restricted to top-of-the-line commercial transmitters.

TRANSMITTER AUDIO TAILORING

The microphone amplifier circuit incorporates a tunable audio network which can be adjusted to tailor the transmitter response to individual voice characteristic before application to the superb internal RF speech processor.

SP-102 SPEAKER/AUDIO FILTER

The SP-102 features a large (120mm) Hi-Fi speaker with selectable low and high-cut audio filters. Headphones may be connected to take advantage of the filtering feature, which allows audio tailoring for each bandwidth and mode of operation to obtain optimum readability.

FC-102 ANTENNA COUPLER

The FC-102 will handle 1·2kW the bandswitched L-C pi-network matches a wide variety of antennas (including a single wire) with transceiver or linear amplifier on all HF amateur bands. New design features include an in-line wattmeter with three ranges (20, 200 and 1200 watts FSD) and a "peak hold" system plus a separate SWR meter. Internal relays provide low-loss pushbutton selection of two different antennas (and two transmitters). The optional FAS-1-4R Remote Antenna Selector, (four independent, low loss, excellent isolation relays housed in a diecast weatherproof housing) may be mounted either inside the FC-102 or on a tower allowing selection of four additional antennas.

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

GRIMSBY
S.M.C (Humberside)
247A Freeman Street,
Grimsby, Lincolnshire.
Grimsby (0472) 99288
9.30-5.30 Tue-Sat

STOKE
S.M.C. (Stoke)
76 High Street,
Talke Pits, Stoke.
Kidsgrove (07816) 72644
9-5.30 Tue-Sat

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

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

BUCKLEY
S.M.C. (T.M.P.),
Unit 27 Pinfold Workshops,
Pinfold Lane, Buckley.
Buckley (0244) 549583
9.30-5.30 (Lunch 1.30) Tue-Sat

SMC AGENTS

Edinburgh	Jack	GM8GEC	(31657) 2430 Day	Bangor	John	GI3KDR	(0247) 55162	Neath	John	GW4FOI	(0639) 55114 Day
Stourbridge	Brian	G3ZUL	(031665) 240 Eve (03843) 5917	Tandragee	Mervyn	GI3WWY	(0762) 840656	Jersey	Geoff	GJ4ICD	(0639) 2942 Eve (0534) 26788

FT ONE £1,295 inc. VAT @ 15% & SECURICOR

*Option

FREE FINANCE

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

FT902DM £885 inc. VAT @ 15% & SECURICOR

SPECIAL OFFER

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

SUPER BUY

*Option

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

FT101ZD £635 inc. VAT @ 15% & SECURICOR

IMPORTERS WARRANTY

*Option

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

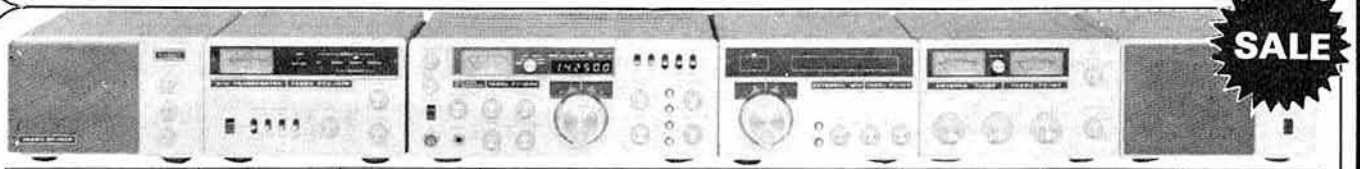
FT707 £569 inc. VAT @ 15% & SECURICOR

*Option

ACCESS & VISA ON THE PHONE

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

SALE



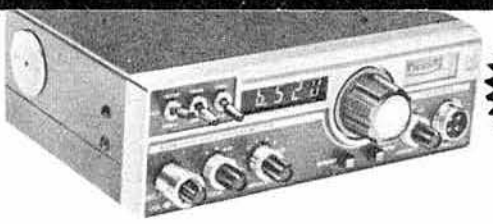
	FT107M	FP107	FP107E	DMS	FV107	FTV107	SP107P	SP107
LIST	£725	£101.95	£113.10	£92.75	£98.50	£119.20	£57.50	£29.90
SALE	£625	£90	£100	£90	£80	£110	£55	£29
LINE-UP		£80	£90	£80	£60	£100	£50	£25

FT107 'Line up' prices. (FT + FP + DMS + FV + FTV + 144TV + SP—List *£1,267.30*) is yours for *£999!!!*

SUPER PRICE

COMMUNICATIONS RX NRD515 £995 inc

NRD515, 100 KHz–30 MHz, Digital, Electronic tune, 100 Hz VFO, SSB/AM/CW/RTTY



£20 OFF

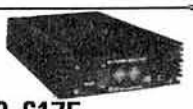
2m, 25W, FM, £179 inc. VAT @ 15% + SECURICOR

2025 MARK II Full coverage 2M Transceiver, 12½kHz (set 12½-200kHz), rapid tune, 10 "easy write" memory channels, memory or band-scan between programmable limits, auto scan stop dependent on squelch *and* centre zero.

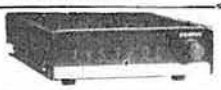
KP202 c/w KCP2 £100 INC!

6 chnl, 2 W, 144 MHz Handheld c/w charger Telescopic ant S20, S21 etc
Extra crystals – stock items only – **£1.00** each!!!

SAVE £24!



PA15/160 £175
2 m linear. 10 W ➔ 160 W. over temp. RF and hard wire switch etc.



YC221 ~~£83.38~~ ➔ £35.00
Digital readout for FT221 (R)

£50 OFF

2m, 250W(+) PEP. £449
NAG 144XL LINEAR. 4CX350F tube, 10W nom. drive, switchable pre-amp. RF and hard switching. Thermal delay.

WIDE COVERAGE ALL MODE RX; FRG7700 £329 inc. VAT @ 15% & SECURICOR

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

'7700 THE ONE WITH FM!

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

FT207R: SALE £159 inc. VAT at 15% and postage

LOW PRICE

- ★ 144-146MHz (144-148 possible)
- ★ 12.5kHz synthesizer steps
- ★ Keyboard entry of frequencies
- ★ Keyboard lockout safety features
- ★ Digital display to hundreds of Hz
- ★ Display auto shutdown timer
- ★ Four Channels of memory
- ★ Memory back up, disable switch
- ★ Up/down manual tuning

- ★ Bandscan for busy or clear channels
- ★ Memory scanning features
- ★ + 600kHz split built in
- ★ Any split + or – programmable
- ★ BNC antenna connector
- ★ "On Air" and "Channel Busy" LEDs
- ★ Built in condenser microphone
- ★ 200mW AF to internal/external speaker
- ★ 2.5/0.2W of RF output
- ★ Rx; 35mA squelch, 150mA full vol.
- ★ Tx; 250mA low, 800mA high
- ★ 0.3μV for 20dB quieting
- ★ External speaker/mic available
- ★ 1.7 (2.2)" D × 2.5 (2.7)" W × 6.7 (7.2)" H
- ★ C/W Easy change NiCad pack, case, helical

- ★ 144-146 MHz (144-148 possible)
- ★ 25 watts RF output (Low 2.5W)
- ★ 150 (W) × 50 (H) × 176 (D) mm. 1·3Kg
- ★ Selectable 12½ or 25 KHz steps
- ★ Up/down, memory/band scanning
- ★ Ten Memories with priority function
- ★ Easy write in memory channels
- ★ Large illuminated "any angle" LCD display
- ★ Display to 100's of Hz and special functions
- ★ Two independent VFO's
- ★ Operation between memory and 'other' VFO
- ★ Memory backup "5 year" lithium cell
- ★ ± 600 KHz and simplex
- ★ Manual and automatic tone burst
- ★ Large "full sound" speaker
- ★ Concentric volume/squelch controls

FREE FINANCE

FT230R £239 inc.

VAT 15% & Securicor

hy-gain

The TH7DXX is a new 7 element (10-15-20M) broadband VSWR less than 2:1 at band edges! Compact 20' (16·1M) turning radius—31' (9·4M) longest element dual driven element Yagi which by combining monoband *and* high Q, ultra high power, trapped parasitics provides an average front to back of 22dB on 20 and 15 and 17dB on 10 meters. The antenna weighs 75lbs (34kg) and its projected 9·4 sq feet (0·9 sq m) of wind area produces a load of 240lbs at 80 mph (129 kph).

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

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
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 el.	**£228.85**	£5.41
TH7DXX	"Thunderbird" 7 el.	**£419.75**	£8.75
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	**£48.20**	£0.75

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

SMC

COAXIAL 50 OHM CABLE (all prices per metre)		
URM95	Solid centre 2.2mm	**£0.23**
UR43	Solid centre 5.0mm	**£0.23**
UR76	Stranded core 5.0mm	**£0.25**
RG58U	Stranded core 5.0mm	**£0.25**
RG213	Low loss 10.2mm	**£0.55**
UR67	Low loss 10.2mm	**£0.60**
LDF450	Heliax ½" Foam	**£3.45**
COAXIAL 75 OHM CABLE (all prices per metre)		
307EP	Economy Typic 4.3mm	**£0.18**
UR70	Stranded light	**£0.28**
UR39	Medium duty 7.8mm	**£0.41**
UR57	Low loss 10.2mm	**£0.66**
BALANCED TWIN CABLE (all prices per metre)		
302	75 Ohms light duty	**£0.16**
306	300 Ohms Ribbon	**£0.17**
UHF COAXIAL PLUGS		
PL259	Standard type 11.2mm	**£0.55**
PL259P	Push on type 11.2mm	**£0.79**
UG175	Reducer 5.0mm	**£0.14**
UG176	Reducer 5.6mm	**£0.14**
PL259R	Reduced type 5.0mm	**£0.67**
PL259A	De-luxe type 11.2mm	**£1.50**
PL259B	De-luxe type 5.0mm	**£1.13**
PL259SL	'Solderless' 11.2mm	**£0.63**
PL259SS	'Solderless' 5.0mm	**£0.63**
PLZ259E	Angle type 5.0mm	**£0.95**
PL259M	Metric type standard	**£0.75**
PL259PM	Panel mount 4 hole	**£1.07**
UHF COAXIAL SOCKETS		
SO239F	Standard 4 hole fix	**£0.48**
SO239T	2 hole fixing type	**£0.48**
SO239NI	Nut fix inside type	**£0.59**
SO239NO	Nut fix outside type	**£0.59**
SO239E	Free angle type 5.0mm	**£1.01**
UHF COAXIAL COUPLERS		
PL258	Back to back female	**£0.91**
PL274	Back to back chassis	**£1.07**
PL258M	Back to back male	**£1.38**
M359	Elbow male-female	**£1.07**
M358	'T' 2 female, 1 male	**£1.38**
M358AF	'T' 3 female	**£1.70**
M458	'X' 3 female, 1 male	**£2.13**

N.B. PRICES INCLUDE VAT AT 15%
Carriage: Cable £1.80 to 7 kg, plugs £0.50 any quantity

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	15·1dB	**£36.80**	£1.73
MBM28/70	Multibeam, 28 element	12·5dB	**£18.40**	£1.73
MBM48/70	Multibeam, 48 element	15·7dB	**£31.05**	£1.73
MBM88/70	Multibeam, 88 element	18·5dB	**£42.55**	£1.73
8XY/70	Yagi, 8 element cross	10·0dB	**£36.80**	£1.73
12XY/70	Yagi, 12 element cross	13·0dB	**£46.00**	£1.73
PMH2/70	Harness 2 way		**£9.20**	£0.75
PMH4/70	Harness 4 way		**£19.55**	£1.44
TWENTY THREE CMS				
D15/23	15 over 15 slot	15·0dB	**£36.80**	£1.73
CR/23	Corner reflector	14·8dB	**£35.08**	£1.73
PMH2/23	Harness 2 way		**£27.60**	£1.73

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

Kenpro

KR600RC
£132.25

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

KR400RC
£90.85

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

KR500
£86.25

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

KR250
£44.85

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

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

Channel Master

9508
£74.75

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

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

9502
£54.63

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

Takes 1-2" mast and 1-1⅞" stub.

Upper mast support bearing.

2" mast and 1¼" stub.

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

Rotary bearing 3-way guying.

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

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

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

CDE

AR40
£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%
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VERSATOWER

TELESCOPIC & TILTOVER RADIO TOWERS 25-120 FT

Below is a photograph of the versatowers chosen for the important approach lights for Manchester Airport. Be sure of quality and reliability by using the original Versatowers achieved through twelve years of continuous development which 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.*

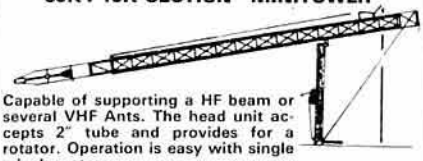
SEND NOW FOR SPECIFICATIONS/PRICES

They cost less than you would expect:

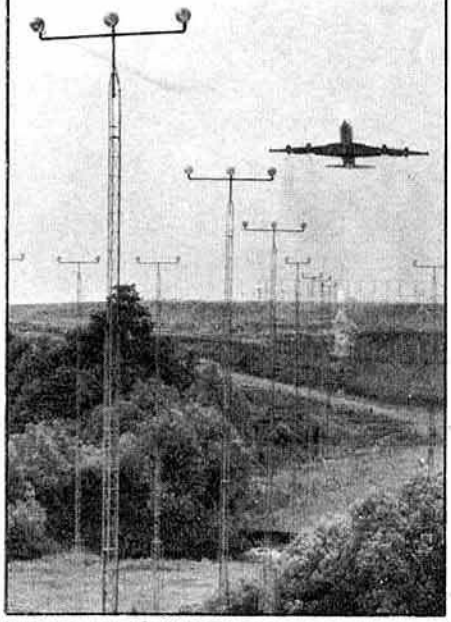
Post mounting 30ft inc. VAT **£388.35**

Post mounting 60ft inc. VAT **£533.83**

'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.



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

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

FS710; PEP AUTO-SWR RMS LEVEL

FS710 £78.20

FS710H: 1·8-60MHz. 15, 150, 1·5kW
FS710V: 50-150MHz. 15, 150W
V.S.W.R: 4:1 and to 20:1
Accuracy: ±7% of FSD
Impedance: 50-52 Ohms
Connectors: SO239
Power: 240 Volts AC 50Hz
Weight: 3·lbs (1·5Kgs)
Size overall: 8 × 4 × 5½"
Size Meter: 2 × 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 average ±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 × 1¼"

FS5E £32.20

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

FS300M £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 average ±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 average ±20% SWR 1:1-3:1
Power Max: HF 1kW 1:1. 300W 3:1,
VHF 50W
Size: 6 × 2½ × 2½". 'On the Air' LED

8 new models in stock. Sae for details

NB· PRICES INCLUDE VAT AT 15%

Carriage free (surface post) worldwide

SMC-HS

HF, VHF, UHF ANTENNAS MOBILE VERTICALS

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

Model	Band	Gain	Type	Power	Length	Price
20SE	20m		(½λ)	100W	1·72m	£15.35
17SE	17m		(½λ)	200W	1·92m	£14.20
15SE	15m		(½λ)	130W	1·72m	£13.80
12SE	12m		(½λ)	200W	1·92m	£13.40
10SE	10m		(½λ)	100W	1·72m	£12.65
4E	4m	0dB	¼λ	150W	1·03m	£7.65
2H/PL	2m		(¼λ)	50W	0·17m	£3.45
2QW	2m	0dB	¼λ	200W	0·49m	£2.30
2VF	2m	3dB	½λ	50W	1.06m	£10.35
2NE	2m	3dB	½λ	150W	1·30m	£6.90
78SF	2m		(½λ)	100W	1·42m	£12.25
78F	2m	4·5dB	½λ	100W	1·75m	£12.25
78B	2m	4·5dB	½λ	150W	1·72m	£12.65
88F	2m	5·2m	½λ	100W	2.03m	£16.50
70N2M	2/70	2·7dB 5·1dB	(½λ) 2 × ½λ	100w	0·89m	£14.20
258	70cm	5·5dB	2 × ½λ	100W	0.91m	£11.50
358	70cm	6·3dB	3 × ½λ	100W	1·36m	£14.95

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

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

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

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

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

Mainland delivery: accs. £0.80, antennas £1.80

NB: PRICES INCLUDE VAT AT 15%

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Tel: Totton (0703) 867333, Telex: 477351 SMCOMM G, Telegram: "Aerial" Southampton
See preceding pages for complete addresses and phone numbers

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

RSGB QSL BUREAU

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

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UK corporate: £14.50, incl VAT.
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Affiliated societies: £14.50 (including *Rad Com*); **£8.70** (excluding *Rad Com*).

RADIO SOCIETY OF GREAT BRITAIN

(Limited by guarantee)

Registered office: **35 Doughty Street, London WC1N 2AE**
Telephone 01-837 8688. Telex 25280 (RSGBHQ G)

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

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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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D. A. Evans, G3OUF

EDITOR
A. W. Hutchinson

RSGB HEADLINE NEWS
Tel 01-837 4118

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

RSGB SUNDAY NEWS BROADCASTS

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

The purpose of these news broadcasts is to provide an outlet for amateur radio news items which cannot wait for the next issue of *Rad Com*. Items for inclusion should reach RSGB HQ by letter (marked "GB2RS news") or telephone 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	G3BA	G4LCM	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

QTC
Amateur radio news

1983 Council election
The attention of members is drawn to the notice published on page 673 *of Rad Com* August 1982.

QSL Bureau
G4PAA-PZZ series. Mr P. A. Braham, G4BYA, 12 Shepherds Mount, Compton, Newbury, Berks RG16 0QZ, has been appointed sub-manager for this group.

G4LAA-LZZ and G8UAA-ZZZ series. Mr C. Lennox, G4LXU, sub-manager for these callsign groups, has changed his address to "Kyme Cottage", Main Street, Newton Kyme, Nr Tadcaster, N Yorks.

BRS and A series. Details of this group were accidentally lost in the printing process from the list published on page 575 of the July 1982 issue of *Rad Com*. The sub-manager continues to be Mr D. Borne, G4CYW, "Roughways", Chubb Tor, Yelverton, Devon PL20 6HY.

The QSL Bureau will be closed from 11 to 26 September inclusive. Members are asked *not* to send cards to arrive during that period.

Amateur radio in Poland
IARU Region 1 has received news that the PZK has obtained permission to restore amateur radio direction finding activity in full, as a first step to removing suspension of the amateur service in Poland.

Equipment stolen . . .
On 25/26 June 1982 from a car in Bitterne, Southampton: Trio multimode transceiver TR9000, serial No 1041201, and 5λ/8 mag mount. Information to G8XJH, QTHR, or Southampton police.

On 1 July 1982 from a car in Shettleston, Glasgow: FDK Multi 700E, serial No 01099. Information to Strathclyde police, Shettleston police office, or GM4IYZ, tel 041-778 3481.

From a car in Coventry: Kenwood/Trio 7800, serial No 1010022, has l.e.d. on lid. Information to Coventry Police, tel 555333, or G6GYN.

. . . and lost

Left on a bus in Plymouth on 24 April 1982: Standard C58 144MHz multimode portable, serial No 16E020145. Information to G4LOH, QTHR, or Charles Cross police station, Plymouth.

Calling Collins owners
Bob Ralph, G4KSG, 4 Leam Crescent, Solihull, W Midlands, is collating information for a Collins Owners Directory. Information will consist of name, callsign, address, and type of Collins equipment owned, and will be available to all subscribers. It may be possible to offer a service for buying and selling equipment and spares, and a source of technical information, advice etc.

Anyone wishing to participate is asked to send the required information on a postcard to G4KSG.

Abergavenny & Nevell Hall ARC
The main aim of the club is to aid the handicapped and blind, and they would like to hear from anyone (especially the disabled) who would like to join. Courses for the RAE are run from September to May, and the examination may be taken at the club—which is an officially recognized C&G examination centre. Details from the secretary, Mr D. F. Jones, Dalwyn Houses, Llanover Road, Blaenavon, Gwent NP4 9HY, tel 0495 791617.

PO Box service
Mr M. A. Reed, G4NPX, PO Box 30, Shephed, Leics LE12 9SQ, is prepared to make his PO Box available to other radio amateurs who may require such a service for direct QSLs or other amateur radio matters. Anyone interested can obtain further details by writing to G4NPX.

Congress of railway radio amateurs
FIRAC, Federation International Radio Amateur Cheminot, is the controlling body of railway radio amateurs, and has members in some 20 countries. An international congress of FIRAC will take place this year at Gunton Hall, Lowestoft, from 4 to 8 October, and over 150 delegates are expected. The British Rail ARS is organizing the event, which will also include special event station GB2ICR.

Further information from Mr G. Sims, G4GNQ, 85 Surrey Street, Glossop, Derbys SK13 9AJ.

Can you help?
F. A. Weidema, PA0FAW, Middachtensingel 67, 6825 HH Arnhem, Holland, is studying English and would like to contact a British amateur who could help him.

RSGB Region 1 ORM
3pm, Sunday 10 October 1982

Hartwood Hall Hotel, Preston Road (A6) Chorley, Lancs.

SUBJECT

To discuss amateur radio matters with Society representatives

The venue is located about a quarter-mile from junction 8 M61, and four miles from junction 28 M6, from where take B5256 to A6 and to Chorley.

A private bar will be available from 2pm. A buffet meal will be available after the meeting at £2.95, and members requiring this are asked to make reservations by sending their remittance to Frank Harrison, G3XII, 78 Lancaster Lane, Leyland, Preston, by 1 October. Tel 077 44 22121. Other enquiries to G3FNM, RR1.

Welsh Amateur Radio Convention
Oakdale Community College, Blackwood, Gwent

10am-5.30pm, 26 September 1982

Trade exhibits **Convention radio shack**
RSGB stand **Bring-and-buy stand** **Raffle**

LECTURE PROGRAMME

- Colour/sound film of the Frankford Radio Club members' activity in the 1979 ARRL DX Contest
- "Suppression of interference to tv and audio equipment"—Ross Clare, GW3NWS
- "VHF/UHF receiver front-ends"—Chris Bartram, G4DGU

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

Admission £1 at the door **Refreshments**

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

Midlands VHF Convention
The Polytechnic, Wolverhampton

from 11am, 9 October 1982

Trade stands **Bookstall** **Measurements**
Refreshments **Real ale** **Bring and buy**

LECTURES

1130 "Microprocessors in radio"—G3VYB
1400 "Synthesizers"—G3RZP
1530 "Tropospheric propagation"—G3YGF
1700 "1,296MHz equipment"—G3JVL

Talk-in S22/RB0

Admission £1.25 on the door, £1 in advance
Evening buffet £3.50 (advance bookings only)

Full information from P. Burden, G3UBX, 28 Coalway Road, Wolverhampton WV3 7LX. Tel 0902 341672

Scottish Amateur Radio Convention and Zone G Conference
Aberdeen, 11 September 1982

LECTURE PROGRAMME

"Most secret war"—Prof R. V. Jones
"Introduction to fast-scan tv"—Moray Firth ATV Group
"Noise beautiful frequency modulation"—M. Hately, GM3HAT
"High-power amplifiers using 4CX250 valves"—J. Nelson, G4FRX

All other details as published in Rad Com *July p574*

An add-on capacitance measuring module for digital frequency counters

by A. L. BAILEY, G3WPO*

A DIGITAL FREQUENCY METER is a fairly common piece of test equipment in most shacks these days, and the module to be described will extend its usefulness by enabling it to measure capacitance and give a direct readout of the result. Values of 1pF, with a true zero reading, to 1,000μF in two ranges can be catered for.

Two connections to the dfm are required—the output of the module to the dfm's input socket (the frequency of the module's output is 1MHz), and a connection to the internal circuitry to provide synchronization of the module's measurement cycle with that of the counters. This connection will often be available at the gate l.e.d. indicator if the dfm has one, but other sources for the signal will be shown. None of the modifications should affect the normal operation of the dfm.

The dfm should have a gate time of 1s for exploiting the two ranges of 1μF and 1,000μF fsd; however, 0·1s can be used for the same fsds but the resolution will drop to 10pF. To display to 1pF, the dfm must be capable of measuring to 1Hz. The module runs from + 5V to + 15V, at approximately 20mA maximum, and is contained on one single-sided pcb.

The only alignment is to the zero indication, and to a known capacitor on each range.

*20 Farnham Avenue, Hassocks, West Sussex BN6 8NS.

Circuit description

The basic mode of operation of the circuit is to provide the digital frequency meter with a frequency input which is linearly-related to capacitance. This is achieved by using a timer ic in the astable mode, a method which has been described a number of times in the past. For this circuit a 555 is used, with the unknown capacitor as part of the period determining resistor/capacitor combination.

With the resistor value known, and calibrated so that the period is exactly 1s for a 1μF capacitor, then by gating this output with an accurate oscillator running at 1·0MHz, 1,000,000 pulses are allowed to pass to the frequency counter. Any change in the capacitor value will change this output period in a linear fashion, and the counter will accurately reflect the change as the measured capacitance value. In this example the display would be directly in picofarads, but obviously by moving the decimal point the display can be in units of micro, nano or picofarads.

Referring to Fig 1, IC4 is the main timer referred to, with RV1/2 and R6/7 the calibrating resistances. Cx is the unknown capacitor under test. The 1MHz signal could obviously be derived from a crystal standard, but a far cheaper alternative is to use a ceramic resonator element at 500kHz and double it to 1MHz.

This is achieved with IC1a as the main oscillator, and IC2 as the pulse doubling circuit. The two capacitors in the actual oscillator (C1/2) are slightly lower in value than strictly required to give a final output frequency slightly in excess of 1MHz. This allows a 1μF capacitor to be measured with a fixed gate time of 1s.

In order to make sure that the start of the timer cycle agrees with the start of the dfm's cycle, a pulse is required from the dfm which goes high, and then returns low before the finish of the timing cycle. As many counters will only have outputs available which remain high for the whole of the gate time, a second 555 is used to generate the correct pulse for IC4. This is IC5, which only requires a negative-going pulse at its input (pin 2) to give the required pulse at its output to initiate IC4 correctly. Input pulses of the wrong polarity (positive-going) can be inverted by connecting the input to IC3 pins 1, 2 and 8.

A feature of the design is that if the inverted output of IC5 is gated with

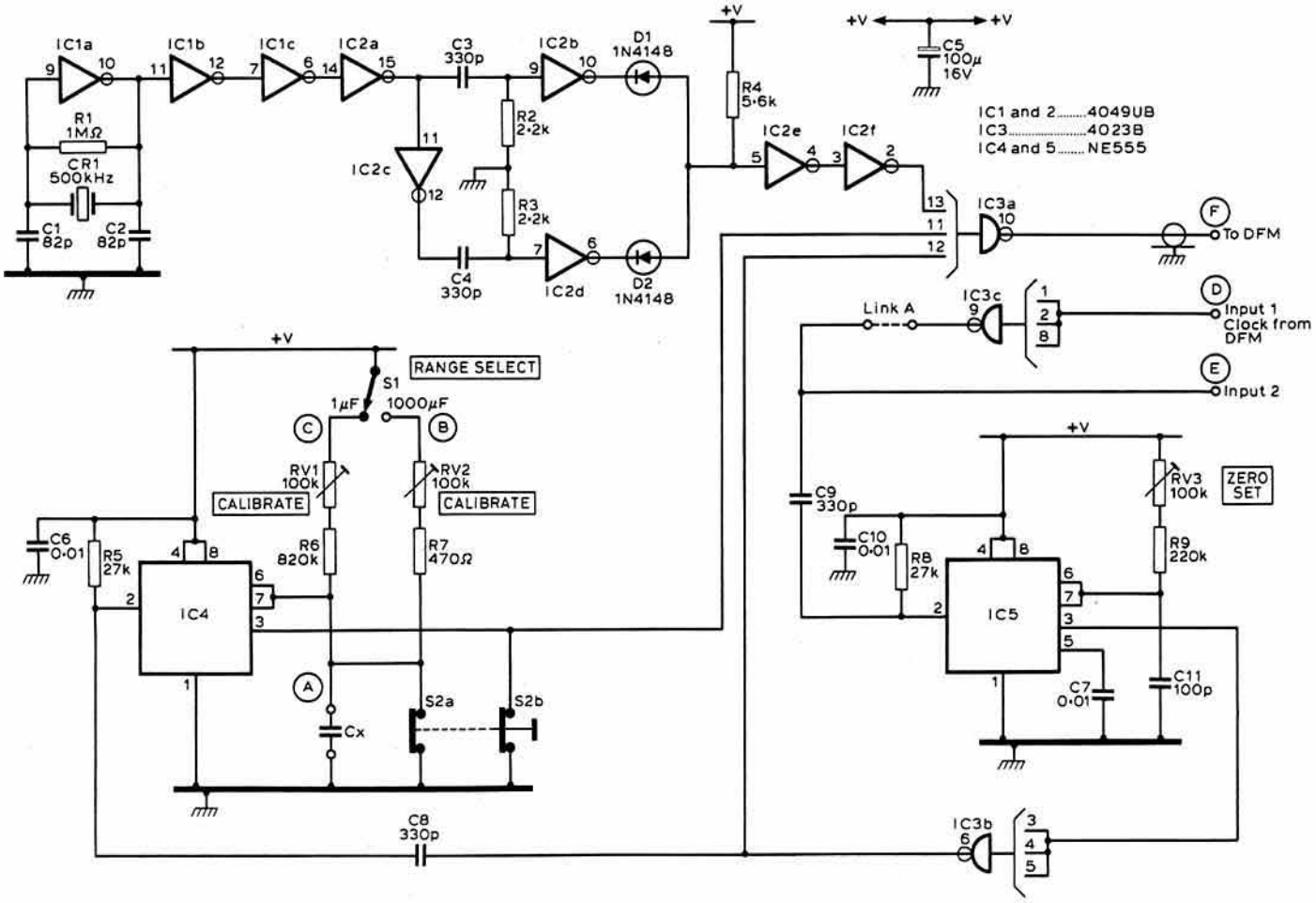


Fig 1. Circuit diagram (S2b should go to pin 13 of IC3a and not to pin 11. This connection should be marked circle H)

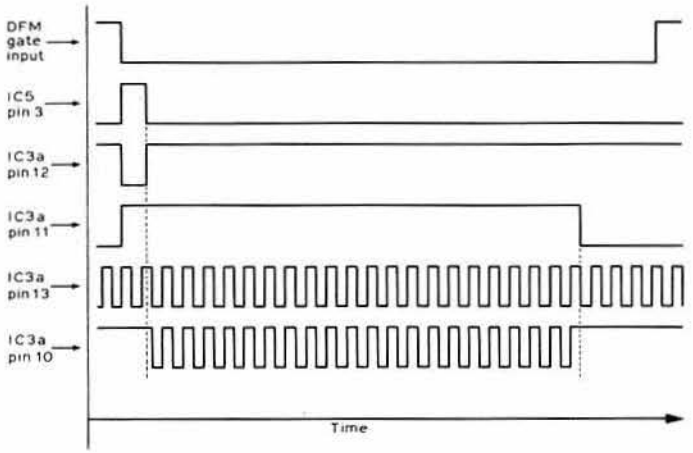


Fig 2. Waveforms

the outputs of IC4 and the 1MHz output (IC2f), then a zero-set ability is achieved by varying the pulse width of IC5 via the preset RV3. This enables the display to read a true zero rather than the 25-30pF which would show from stray capacitance in the wiring and pcb. The gating is achieved by IC3a requiring all three inputs to be at logic "1" before any output is allowed. To help in understanding the circuit, Fig 2 gives the waveforms at various points in it.

In order to measure higher values than 1μF, the calibration resistance of IC4 is lowered by a factor of 1,000, increasing the maximum measurement to 1,000μF (RV2/R7). This means that electrolytic capacitors may be measured, but due to their high leakage the result will be higher than the correct value due to lengthening of the astable time period. The effect of this is lower than might be expected due to the low value of the calibration resistance.

Usually only a comparative value is required for this type of capacitor so this is not of much consequence. The stability of the reading will give a guide to the leakage current of the device under test—polystyrene and mica types give constant readings, as will most ceramics.

As a charged capacitor could damage the input ic's circuitry when connected, a push-to-measure switch is incorporated which normally earths pins 6/7 of IC4. This ensures discharge prior to measurement. Also pin 2 of IC2f is grounded to prevent the display reading the reference oscillator frequency under these conditions.

Construction

Figs 3, 4 and 5 show the pcb on which the module is constructed. This can be made by any of the normal methods, or a ready-drilled and screened pcb is available from the author. There is nothing critical about the construction, just ensure that all semiconductors are correctly inserted, and note that one component (D1) is mounted on the track side.

The author used a small ready-built case for the prototype—anything similar will suffice but should be of metal as the unit is susceptible to mains pick-up, and should not be used near to a transformer or lead carrying ac currents.

(Continued on page 764)

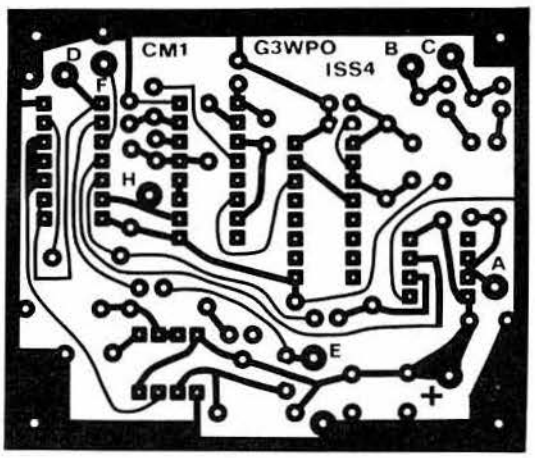


Fig 3. PCB circuit diagram

Components list

R1	1MΩ	**R6**	820kΩ metal oxide
R2, 3	2·2kΩ	**R7**	470Ω metal oxide
R4	5·6kΩ	**R9**	220kΩ metal oxide
R5, 8	27kΩ		

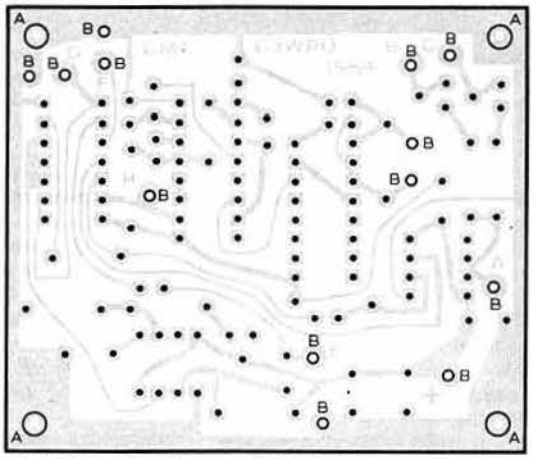
All resistors 0·25W carbon film 5 per cent tolerance, unless otherwise stated.

RV1, 3	100kΩ ALPS cermet preset	**RV2**	2·2kΩ ALPS cermet preset
C1, 2	82pF polystyrene	**C6, 7, 10**	0·01μF disc
C3, 4, 8, 9	330pF ceramic		
C5	100μF 16V electrolytic	**C11**	100pF polystyrene
IC1, 2	4049UB	**IC4, 5**	NE555 (for reduced power consumption use ICM7555)
IC3	4023B		
D1, 2	1N4148	**CR1**	TOKO 500kHz ceramic resonator type CRM500A

Also required
1mm dia pcb connection pins, 11 off
16-pin dil sockets, 2 off
14-pin dil socket
8-pin dil sockets, 2 off
SPCO miniature toggle
DPCO momentary push or biased toggle switch
Push clip sockets, 2 off
Case-size 100 by 100 by 34mm

A complete kit of parts as above, including a drilled pcb and the case are available from the author.

Material.... 1·6mm single-sided copper clad p c b
Size..... 68·5 x 58·5mm



4 holes 'A'.... 3mm dia 13 holes 'B'.... 1mm dia
Holes shown • are 0·85mm dia

Fig 4. PCB drilling plan

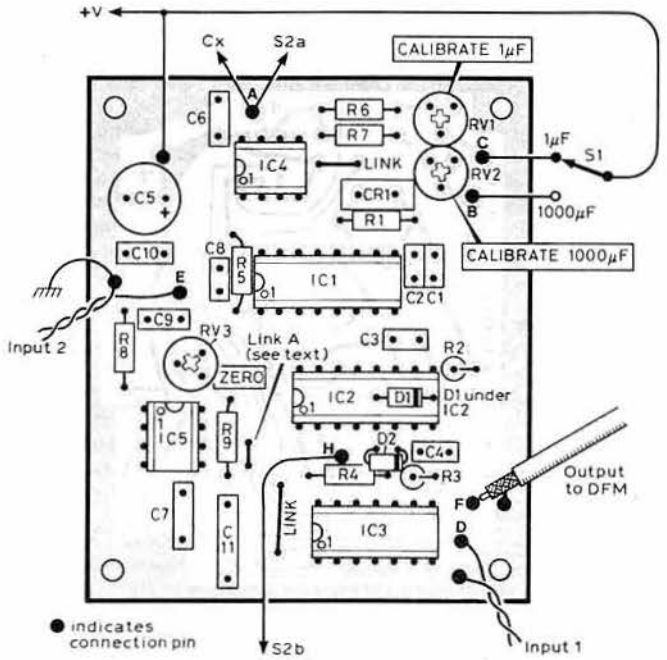
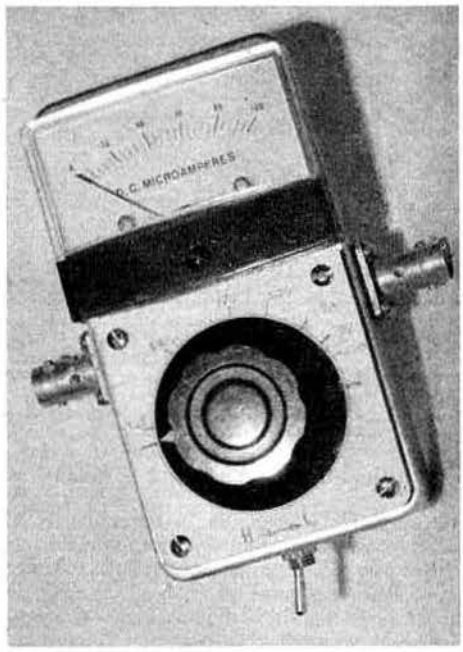


Fig 5. PCB component layout

Absorption wavemeters for 144MHz

by G. R. JESSOP, G6JP*

◄ The search type wavemeter



The throughline wavemeter ►

AN ABSORPTION WAVEMETER provides a means of unambiguous frequency measurement, and one of its most important uses is to indicate the presence of harmonics in the output of a transmitter. It is a requirement of the amateur licence that the transmitter output must be checked for harmonics.

Fortunately the 144MHz band is harmonically related to the 432MHz band, so that the third harmonic, if present, would be observed and readily reported by other amateurs if the level is high enough to cause interference on that band. The second harmonic, 288MHz, falls into a band allocated to another service, and any interference with it may cause significant trouble to that user. The generation of a second harmonic by a 144MHz transmitter is all too easy. One often hears the statement "by adjusting the trimmers I have increased the output", but quite often this may largely be due to an increase in second harmonic with little increase of the fundamental. Generally it is unwise to "twiddle with the trimmers" unless the output can be monitored by a spectrum analyser.

It is therefore essential that some form of selective filter is included in the circuit as a protection against the radiation of the harmonics, and it is important to be able to check for their presence in the output. To do this a reliable absorption wavemeter that will adequately cover the frequency range needed for 144 and 288MHz should be provided. Fortunately absorption wavemeters to cover both the fundamental and second harmonic frequencies, 144 and 288MHz, having reasonable sensitivities, can readily be constructed. Many of the commercially-made units only cover up to 250MHz.

Two designs are offered here: one a "throughline" type for connection (indirectly and directly) in the antenna feeder coaxial line; the other a "search" type suitable for checking the frequency by coupling it to the tuned circuit. Both types cover frequencies up to around 350MHz. The actual range will vary slightly depending on construction; in the prototypes the range was from 120 to over 350MHz. Circuit diagrams are given in Fig 1.

Throughline wavemeters

Although intended for connection in the coaxial feeder line to the antenna, this type may be used as a "search" type by the attachment of a coupling coil (Fig 2) to the input, and terminating the output with a 50Ω (or 75Ω) dummy load. Fig 3 shows a BNC plug with terminating resistor as a dummy load for use with the coupling coil. The main element in this type is a short section of coaxial line, to which is added some form of coupling to a tuned circuit.

Indirect method—Type A

As shown in the circuit diagram, Fig 1(a), the tuned circuit is coupled to the inner conductor by a secondary loop consisting of a fine wire inserted into the coaxial section, which for convenience should be of the semi-airspaced (cellular) type. This is connected to a larger diameter wire to complete the loop and form a suitable coupling to the tuned circuit.

Although the coaxial line within the wavemeter can be a piece of standard cable normally used by the constructor, it is difficult to make satisfactory end connections to the braid. If this cable is used it is recommended that the outer braid be replaced by a piece of copper or brass tube of the same internal diameter as the original braid.

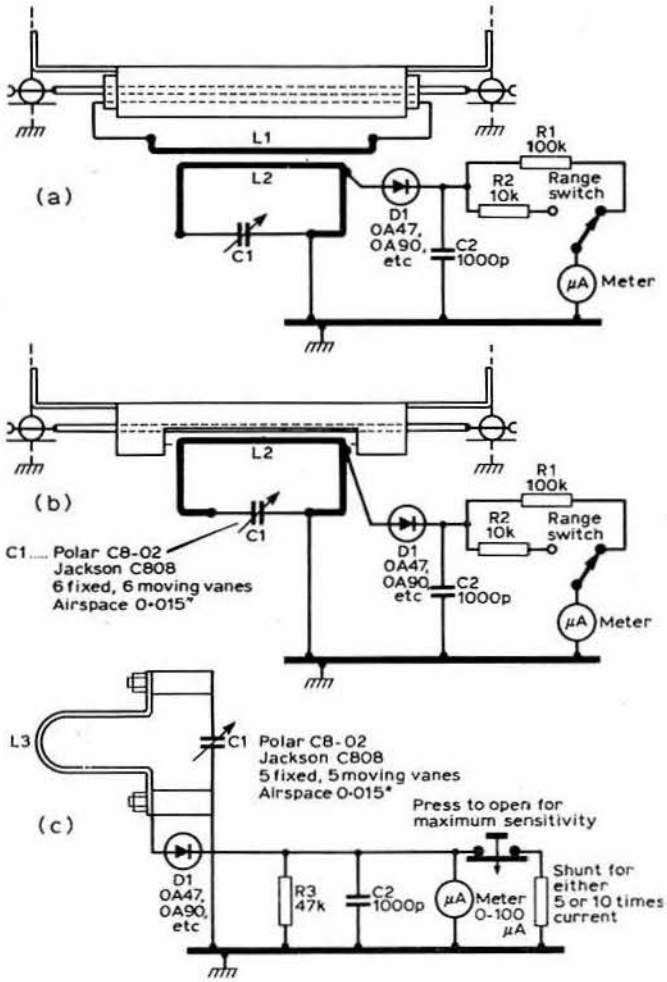


Fig 1. Wavemeter circuits. (a) Throughline indirect—Type A. (b) Throughline direct—Type B (c) Search type

*32 North View, Eastcote, Pinner, Middx.

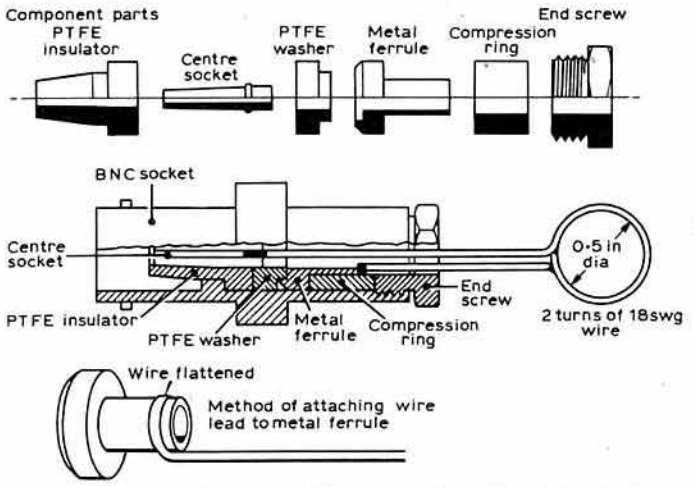


Fig 2. Coupling coil to enable throughline meter to be used as a search unit

Coaxial cable is designed for its own specific purpose, and the inside diameter of the braid will vary with different cable. If copper tube of the same size is difficult to obtain a reliable alternative can be made from a short piece of 0·25in inside diameter standard copper water pipe and an inner conductor of 12swg copper for 50Ω, or 15swg copper for 75Ω, with an insulator to position the inner conductor correctly. The copper ends of the tube can be shaped to fit into the box, Fig 4(a), and can be attached to the fixing screws of the coaxial sockets as indicated in Fig 4(c). The inner conductor should be chamfered at the end to mate with the socket connections.

The component layout is shown in Fig 5(a). The detector diode is connected to the tuned circuit at a point 20mm from the earthed end of the tuned loop L2.

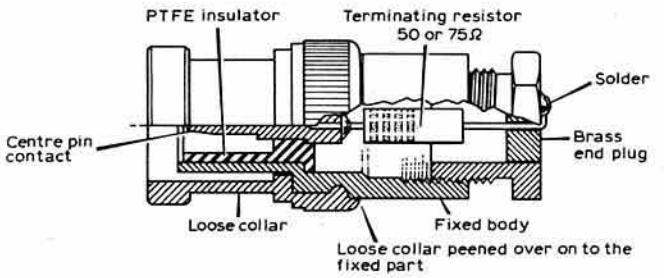
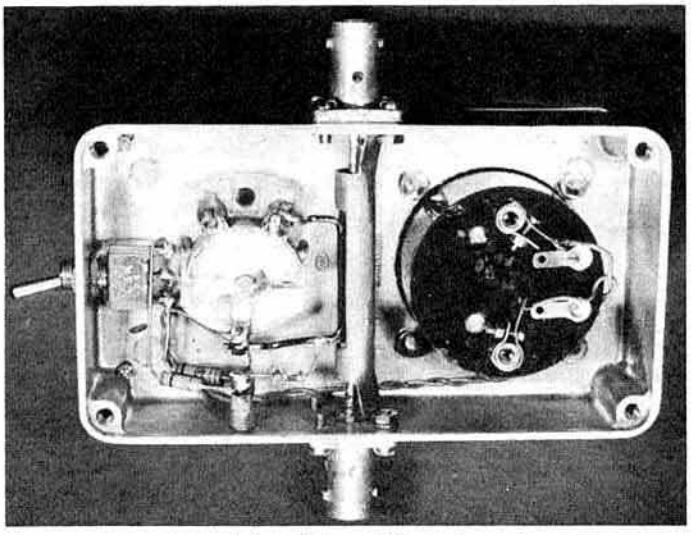
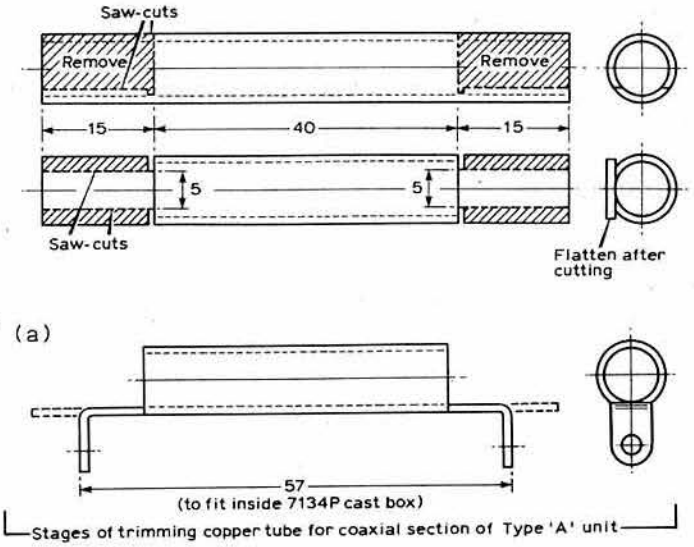
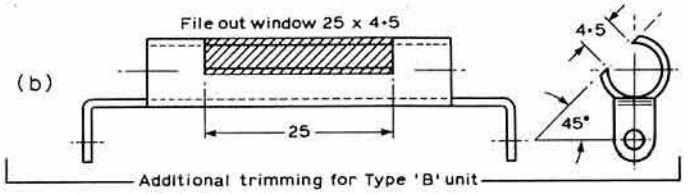


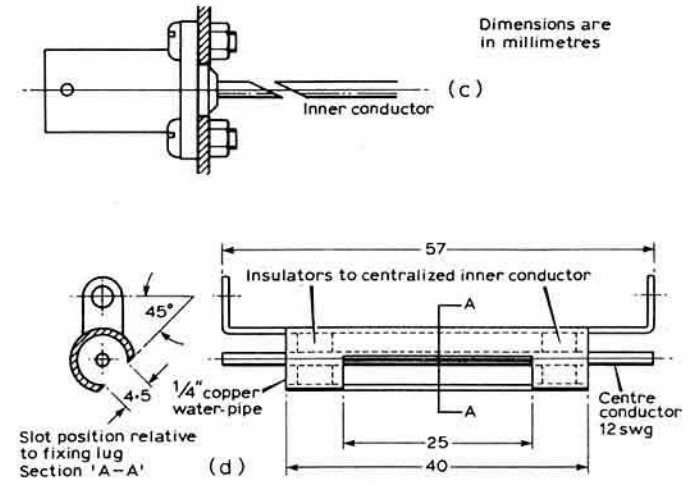
Fig 3. BNC plug with terminating resistor as a dummy load for throughline wavemeter used with coupling coil



Internal view of throughline instrument







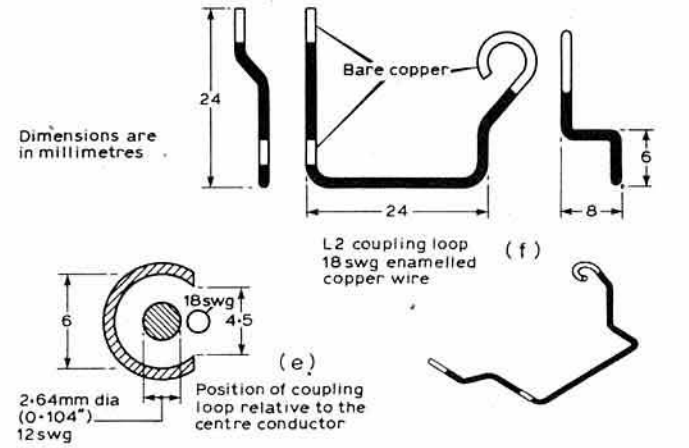


Fig 4. (a)–(d) Throughline wavemeter. Trimming and fitting arrangements for copper tube and conductor. (e), (f) Coupling loop form and position

Direct method—Type B

In this form the intermediate coupling loop is avoided. The tuned circuit is coupled to the inner conductor of the coaxial line by cutting a slot in the outer tube by simple filing, as detailed in Fig 4(b). Details of the tuned circuit inductance are given in Fig 4(e, f). This should be made of 18swg enamelled wire with the detector diode attached to the loop at a point 20mm from the earth point.

The spacing of the loop from the inner conductor is important. It must be within the field of the outer tube and aligned with the centre line of the inner conductor. To assist the alignment, the slot in the coaxial line should be cut so that it is in the vertical plane when viewed from above, so that the fixing lugs are at an angle of 45° to it.

Search type

This type has substantially greater sensitivity; the tuned circuit being coupled directly to the circuit with whose frequency it is required to identify.

The prototype was sufficiently sensitive to be able to see a small response to a fet dip oscillator having an output of the order of 3–5mW, at a distance of 4–5in. As outputs of appreciably higher levels than this are likely to be involved, the full sensitivity may not always be needed, and shunt across the meter is provided with a press-to-open switch to give full sensitivity.

The use of an edge-mounted meter may at first seem unusual (a normal surface mounted type could be used), but it will be found advantageous by avoiding the need to bend over to see the meter when using the unit.

To obtain the largest inductance for easy coupling to the circuit being checked, material of low inductance per unit length should be used—it also needs to be as rigid as possible to avoid damage or calibration changes in use. For this reason strip copper is used for both the connections to the tuning capacitor and for the external loop ("coil"). In order to keep shunt capacitances to a minimum, the end of the cast box is cut out as shown in Fig 6, and the insulation used for mounting the external loop should be of low dielectric material—ptfe 0·125in thick was used in the prototype.

The external loop is mounted with 4BA brass cheese-head screws. The internal strip connections to the tuning capacitor are soldered into the slots in the cheese heads, and the detector diode is soldered to the appropriate screw head.

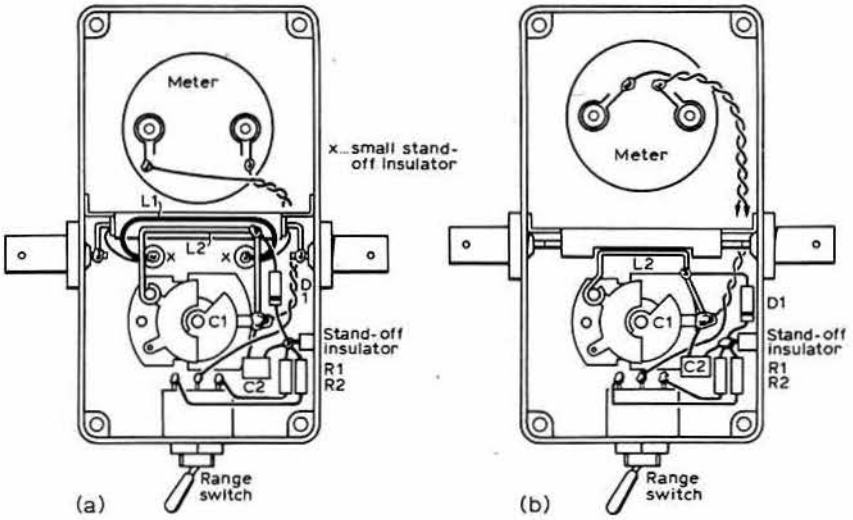


Fig 5. Component layout of throughline wavemeter: (a) indirect type; (b) direct type

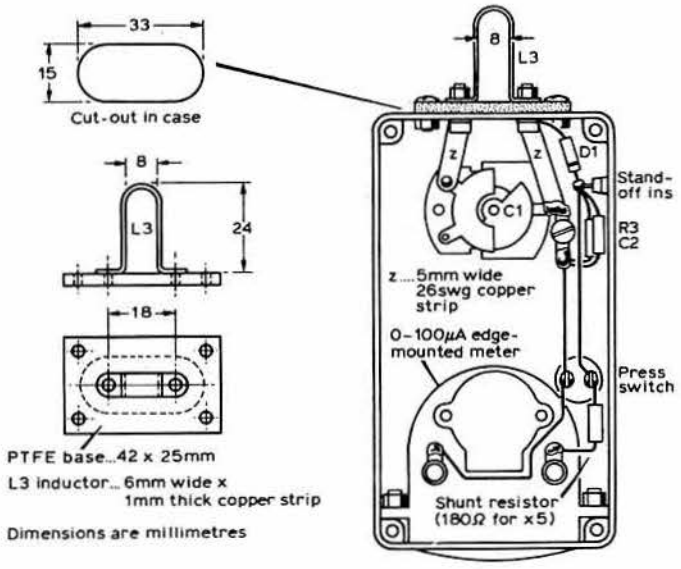
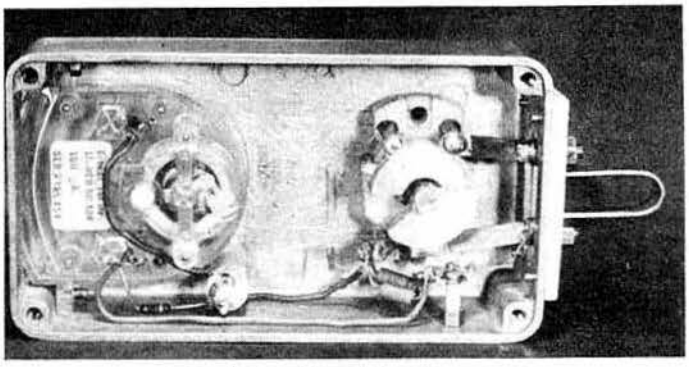


Fig 6. Component layout of search type wavemeter



Internal view of search type instrument

AN ADD-ON CAPACITANCE MEASURING MODULE FOR DIGITAL FREQUENCY COUNTERS

(Continued from page 761)

The capacitor under test is held in two spring-loaded terminals, and the connection to the dfm input socket made with miniature coaxial cable. The lead to the gate output of the dfm should be run in a twisted pair of insulated wires via a suitable socket on the dfm, and kept as short as possible.

Clock output from the dfm

Virtually all dfms will have a suitable output available to drive the unit—this takes the form of a positive- or negative-going pulse corresponding with the start of the counter measurement cycle. If there is an indicator for the gate, then a connection to this, or the logic element it is derived from, should be suitable; check with a 'scope (or by trial and error) whether the pulse needs inverting or not. Otherwise consult the dfm circuit diagram, and find the control logic for the counter gate.

For outputs with a positive leading edge, the connection should be taken to input 1 on the module, and the link marked "link A" connected. Otherwise this link is left open and the input taken to input 2.

If the dfm uses an ICM7216C, then pin 2 will provide the correct pulse with no inversion required (input 2).

Setting up

Connect the module to the dfm, with the supply voltage to the module the same as that used by the logic circuits of the dfm (this should ensure that the clock pulse amplitude is compatible with IC3c input—possibly a 1kΩ pull-up resistor may be needed). Switch on and adjust RV3, with S1 set to the 1μF range so that a reading of zero is obtained. Using a close-tolerance capacitor of known value (mica, 1 or 2 per cent), adjust RV1 to give the correct reading. Repeat these adjustments as they interact.

The calibration of the 1,000μF range is a little more problematical as close tolerance capacitors of any value are somewhat difficult to come by! If one can be found then use it, but the best solution is to measure a capacitor on the 1μF range which is as close to 1μF as possible, record the value, then switch to 1,000μF and adjust RV2 for the equivalent reading. Do not readjust RV3.

It will now be possible to sort out all those unmarked surplus capacitors lurking in the junk box and find out what the capacitance swing of those variables really is! □

Fast cw with the Sinclair ZX81

by TONY WALLBANK, G4CIZ*, and JOHN MORRIS, G4ANB

VARIOUS cw sending programs written in Basic have been described for the Sinclair microcomputers. A fundamental limitation of most such programs is that they cannot operate beyond about 50-60wpm, making them unsuitable for meteor scatter (ms) use.

This article describes a machine code routine capable of sending cw at speeds up to at least 180wpm, together with an example Basic calling program designed to repeat any desired message many times. A circuit is given for connecting the ZX81 to a transmitter. Alternatively a commercially available output port can be used.

The program fits easily into an unexpanded ZX81 with 1kbyte of ram, and allows messages up to 100 characters long to be sent.

Machine code

The machine code routine and corresponding assembly language are shown in Listing 1. All of the values in the listing are in decimal. The first two bytes are Z80 HALT instructions, used to stop the ZX81 trying to display the machine code. The next 49 bytes, at addresses 16516-16564, form a look-up table for conversion from ZX81 character codes to morse. The cw coding technique is similar to that described by G4INP [1], with some additional characters. A binary "1" indicates a dash and a "0" a dot. The appropriate bits for a given cw character are packed into a single byte in reverse order, with an extra leading binary "1" to mark the end of the character.

The bytes at addresses 16565-16613 make up the actual machine code program. DELAY1, starting at address 16604, is a one-dot-length delay subroutine. It uses two nested loops to effectively do nothing for the required period. The length of the delay is set by poking a suitable value into address 16605, which gives the number of times the outer loop is traversed. The inner loop is executed 147 times for each cycle round the outer loop. A bit of work with the Z80 instruction timing table shows that with the 3·25MHz system clock of the ZX81, the total time in milliseconds taken by DELAY1 is just about 0·6N, where N is the value in 16605 [2]. The length of a morse dot in milliseconds should be 1,200/S, where S is the speed in words/min (wpm). Combining these two gives 1,200/S = 0·6N, which simplifies to N = 2,000/S. The value of N must be in the range 1-255, which means that the delay routine can give dot lengths corresponding to speeds from about 8 to 2,000wpm.

DELAY2, as its name implies, is designed to give a two-dot-long delay. The simple way to do this would be to call DELAY1 twice and then return. A rather less obvious but slightly shorter method is used here. DELAY1 is called once to give the first half of the delay and then execution is allowed to "fall into" DELAY1 directly, giving the second half of the delay. The RET instruction at the end of DELAY1 thus also acts as the return from DELAY2.

The main program starts at address 16565. On entry it is assumed that the output is already low, corresponding to key-up. The first action is to set up the HL register pair ready for later use as a table pointer. Then the ZX81 code for the character to be sent is loaded into register A. The character code must have been poked into address 16569 before the routine is called.

The OR instruction at 16570 performs a logical "or" of A with itself. This may not seem very useful, as it leaves A unchanged, but it also sets a few flags, including the Z flag if A is zero. This gives a very quick check for a space, which is zero in ZX81 code. The JR Z instruction causes a jump to DELAY2 if the character is a space, and after a two-dot-length delay to give the inter-character gap control automatically returns to Basic.

If the character is not a space then some actual cw must be sent. First of all the cw code must be found. This is done by the instructions at addresses 16573-16577 which set up the HL register pair to point to the correct table entry and then fetch the corresponding code into the D register.

Address 16578 marks the start of the main loop, traversed once per dash or dot in the character. Register A is loaded with the value two, which will be used later to turn the output on. Next the D register is shifted right, which puts the old bottom bit of the register into the carry flag. If the content of D after the shift is zero then the complete character has been sent and the Z flag will be set. The JR Z instruction at 16582 checks for this, and if so causes a jump to DELAY2 for a two-dot-long key-up delay and automatic return to Basic.

If D is not zero after the shift then a dot or a dash must be sent and so the output is turned on (key down) by the instruction at 16584. At this stage the carry flag still holds the bit shifted out earlier from D. If the bit is a "1" a dash is required and DELAY2 is called to give the first two-thirds of the key-down time. Then DELAY1 is called unconditionally to give either the last third of the dash or the whole dot. This completes the key-down time, and the output is turned off by the instruction at 16593. Note that A must contain zero at this stage as the delay routine only finishes when this is true.

Finally DELAY1 is called to give the inter-dot/dash gap and the program loops back to take another look at D for the next part of the character, so repeating the whole process until the complete character has been sent.

Listing 1. Machine code routine

Address	Data									
16514	118,	118,	76,	128,	128,	42,	42,	49,	42,	53,
16524	104,	41,	45,	115,	106,	63,	62,	60,	56,	48,
16534	32,	33,	35,	39,	47,	6,	17,	21,	9,	2,
16544	20,	11,	16,	4,	30,	13,	18,	7,	5,	15,
16554	22,	27,	10,	8,	3,	12,	24,	14,	25,	29,
16564	19									

Address	Byte(s)		Assembler equivalent	
16565	33, 117, 64	START	LD	HL, 16501
16568	62, 0		LD	A, 0
16570	183		OR	A
16571	40, 28		JR	Z, DELAY2
16573	79		LD	C, A
16574	6, 0		LD	B, 0
16576	9		ADD	HL, BC
16577	86		LD	D, (HL)
16578	62, 2	LOOP	LD	A, 2
16580	203, 58		SRL	D
16582	40, 17		JR	Z, DELAY2
16584	50, 40, 35		LD	(9000), A
16587	220, 217, 64		CALL	C, DELAY2
16590	205, 220, 64		CALL	DELAY1
16593	50, 40, 35		LD	(9000), A
16596	205, 220, 64		CALL	DELAY1
16599	24, 233		JR	LOOP
16601	205, 220, 64	DELAY2	CALL	DELAY1
16604	62, 0	DELAY1	LD	A, 0
16606	6, 150	DLOOP1	LD	B, 147
16608	16, 254	DLOOP2	DJNZ	DLOOP2
16610	61		DEC	A
16611	32, 249		JR	NZ, DLOOP1
16613	201		RET	

Loading the machine code

The machine code routine is held in a large REM statement at line number 1, as suggested by Sinclair [3]. Listing 2 shows a simple loading program. If machine code is to be used and modified frequently, a more sophisticated loading/editing program is recommended [4], but the program in Listing 2 is quite adequate for the "one-off" loading of the cw sending routine.

The REM in line 1 should be followed by exactly 100 characters. A good way to count the characters is to type nine "dots", or full stops, followed by a "1" to mark the 10th character, nine more dots, a "2" for the 20th character, and so on up to "0" for the 100th and last character.

When the loading program is run the prompt "16514 = " will appear. Type the first value from Listing 1 (118) in response. The next prompt will be "16515 = ", to which the next value (again 118) should be given. Continue in this way until the final value (201) has been typed in for address 16613, after which the program will stop. If any mistakes are made while typing in the values it is best not to break into the program and correct them at once, but to make a note and poke in the right values "by hand" at the end. At this stage it is a good idea to save the program on tape a few times using the normal SAVE command.

If the program is now listed it will be found that only line 1, consisting of an apparently blank REM statement, can be seen. This is because the two "118" bytes at the start of the machine code fool the ZX81's listing routine into thinking the end of the program has been reached. The command LIST2 will reveal the rest of the Basic program. Alternatively, poking zeroes into

Listing 2. Machine code loading program

```
 1 REM (followed by exactly 100 characters)
10 FOR J=16514 TO 16613
20 SCROLL
30 PRINT J;"=";
40 INPUT S
50 PRINT S
60 POKE J, S
70 NEXT J
```

*27 Parkside Road, Pinhoe, Exeter, Devon EX1 3TN.

Listing 3. Basic calling program, tailored for meteor scatter use

```
10 PRINT "ENTER WPM"
20 INPUT S
30 PRINT S
40 POKE 16605, 2E3/S
50 INPUT A$
60 FAST
70 FOR J = 1 TO LEN A$
80 POKE 16569, CODE A$(J)
90 LET S = USR 16565
100 NEXT J
110 GOTO 70
```

addresses 16514 and 16515 will allow the machine code hidden in the REM to be listed as several lines of apparently meaningless rubbish. Doing this does not affect program operation, and the choice is essentially aesthetic.

To check that the machine code has been entered correctly delete lines 30-60 and change line 20 to:

20 PRINT J; " = "; PEEK (J),

The output from this program, which will fill the screen several times, should be *very* carefully checked against Listing 1, and any errors corrected by using the POKE command. The loading and checking process is admittedly a little tedious, but it only needs to be done once, and as even the slightest error will stop the routine working correctly—and could even make the ZX81 go into "let's make pretty patterns on the tv screen" mode—it is worth taking care to get it right.

When everything is correct, save the program on tape a few more times. The remaining lines of Basic, apart of course from the line 1 REM, may then be deleted, and the cw sending routine is ready for use.

Calling the machine code

Using the machine code routine to send cw from a Basic program is quite simple. First of all the speed should be set by poking 2,000 divided by the required words/min (or, equivalently, 10,000 divided by the required letters/min) into address 16605. Then the ZX81 code (obtained using the CODE function) for the character to be sent should be poked into address 16569. Finally the machine code should be invoked by a call to USR 16565. If the machine code has been entered correctly and suitable hardware is attached, then the letter should appear in morse code.

When the character has been completed, control will return to Basic. The USR function does not in this case return any useful value.

Note that the ZX81 *must* be in FAST mode when the machine code routine is used; although it may appear to work in SLOW mode, the speed and timing will be incorrect, especially at high speeds.

If morse code does not appear, or the tv screen goes blank for a long time and the ZX81 will not respond to the BREAK key, then there is probably a mistake in the machine code. Switch the computer off and on again, reload the program from tape, and check it very carefully against Listing 1.

An example calling program is given in Listing 3. It would of course be preceded by the line 1 REM containing the machine code routine. The example given is tailored for ms use. It repeatedly sends the same string of characters until the BREAK key is pressed. The program is fairly self-evident and a detailed explanation of its operation is not given. The ZX81 manual should be consulted for any features which are not clear. It does, however, serve to illustrate how the machine code routine is called.

The example program performs well up to about 180wpm. Beyond this the inter-character spacing tends to be too long because of the time taken up in the Basic calling program between each character. The characters themselves are sent correctly at up to 2,000wpm!

Other Basic calling programs can of course be used, as long as the calling conventions described above are followed. For example, if the output port were used to key an audio oscillator, a morse practice program—perhaps sending random five-character groups—could be written. The lowest speed possible would be a shade under 8wpm. This may seem rather fast for learning, but long inter-character pauses could be added by executing a Basic delay loop between each USR call. Listening to characters with a moderately-fast cadence but separated by long gaps in just this way is widely recognized as an effective way of learning morse.

With a little thought it should be possible to use the machine code routine to produce a "morse keyboard", or even a cw contest sender with gaps to allow variable information to be inserted. The possibilities are limited only by the ingenuity used in writing the Basic calling program.

As well as all of the letters and digits, the machine code routine will handle the following punctuation and control characters (the corresponding ZX81 keyboard characters are given in parentheses): question mark (?), oblique stroke(/), full stop(.), comma (,), $\overline{AR}$ (< , > or +), $\overline{KA}$ (−), $\overline{VA}$ (*), $\overline{KN}$ (;) and break or $\overline{BT}$ (=). In addition the parentheses, "(" and ")" will each produce a sequence of seven dots.

Keying the transmitter

To key the transmitter it is necessary to provide an output from the ZX81 which can be controlled by the program. By suitably decoding the microprocessor address lines, and using the result to latch the data present on the data bus at the correct time, an eight-bit output port can be built.

The address and data busses and other necessary control signals are available on the edge connector at the back of the ZX81, making it easy to fit an output port. A suitable circuit is shown in Fig 1.

Circuit description

The high order address lines and $\overline{MREQ}$ and $\overline{WR}$ controls are input to IC1, a ttl 1-of-8 decoder. Memory request and write lines both go low when writing to the port, and at the appropriate address (9000 is used here) the output at pin 14 is also taken low. This is used to clock IC2, an 8-bit D-type flip-flop, here being used as a latch. When clocked, the signals present on the eight data lines are transferred to the eight output lines, where they are held until IC2 is clocked again; ie until new data is written to the port.

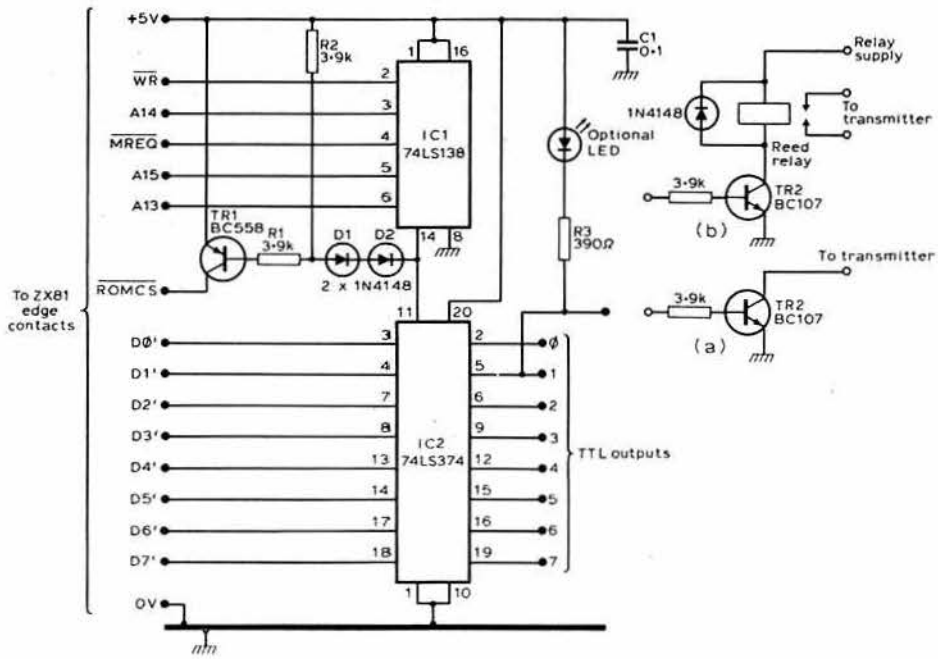


Fig 1. Output port circuit diagram

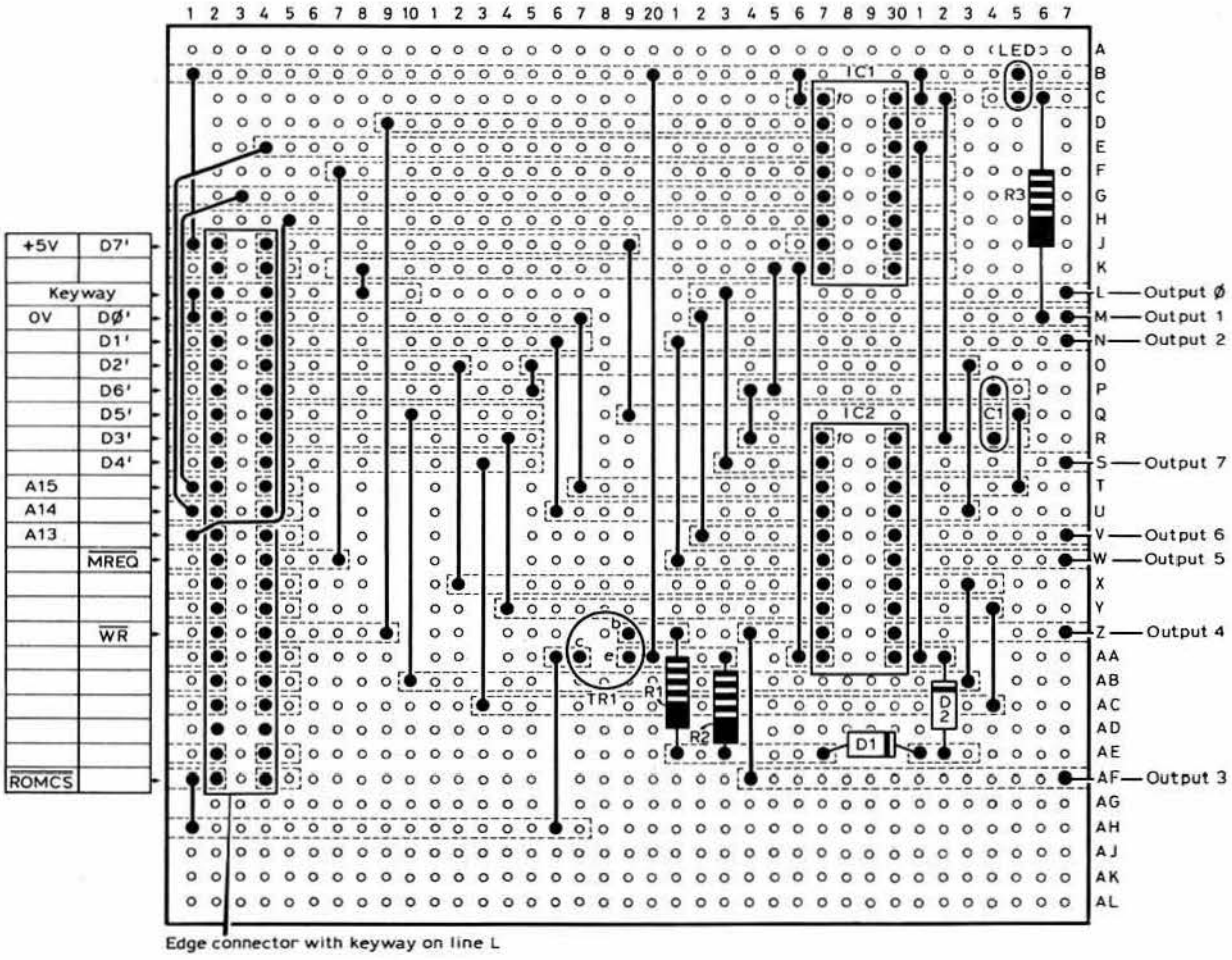


Fig 2. Output port Veroboard layout, shown from component side

TR1 is used to disable the ZX81's internal rom-select line when accessing the output port, as otherwise the Basic rom inside the computer would be activated and some byte from it latched by the port instead of the desired data.

Two transmitter interfaces are shown. Circuit (a) is a simple transistor which can be used for keying transmitters having a positive keying voltage less than 30V and a current requirement of less than about 25mA. One of the authors uses this method to key a homebrew 144MHz transceiver, and some of the more modern Japanese rigs can be keyed with this circuit.

If the keying requirements exceed those given above, or if they are unknown, then circuit (b) should be used, as it provides complete electrical isolation between the transmitter and computer. A 5 or 12V reed relay can be used, although it is unwise to take too much extra current from the 5V line in the ZX81 as this will increase the dissipation in the internal regulator which has only a small heatsink.

Construction

A suitable Veroboard layout is given in Fig 2, although this is not critical and others may wish to alter it to suit their own requirements. The three links shown crossing the edge connector are made on the track side using short lengths of insulated wire. The keying transistor is not included on the layout as this area will vary depending on the transmitter to be keyed.

A standard 0·1in pitch edge connector will fit, but 23-ways is not a standard length and so a longer one may have to be cut down. A small hacksaw should be used for this. Be careful to use a double-sided connector as a single-sided one will short the upper and lower board contacts.

Output port notes

The output port may be used in other programs; it just appears as a memory location as far as the ZX81 is concerned. It provides eight ttl outputs, each of which may be used to drive an l.e.d. or other circuitry. The cw sending routine uses line 1, as shown in Fig 1. The port may be accessed from any Basic program by the statement "POKE 9000,N" where N is any number from 0 to 255 and is the data that will be latched by the output port (in binary form of course) when the statement is executed. In fact the port will respond to any address from 8192 to 16383; 9000 is used simply because it is easy to remember. The port (and the cw routine) will work equally well with the 1k ZX81 or an expanded 16k version.

To use other output ports some changes to the cw routine may be needed. The bytes at addresses 16585–6 should be changed to the low and high parts respectively of the port address; and similarly those at 16594–5. For example, to use the port available from Technomatics, the low part of the port address should be 248 and the high part 42. The appropriate output line is then interfaced to the transmitter in the same way as for the design described here.

QRM from the ZX81

In common with other microprocessors the ZX81 does generate some interference, which in the authors' experience tends to be at its worst on 70MHz. Its magnitude depends on the proximity of the receiver antenna to the computer, the amount of receiver screening, and the number of wires coming from the ZX81.

The keying lead to the transmitter should be filtered and the power supply lead wound a few times round a ferrite toroid placed as close as possible to the ZX81 case. If these measures are insufficient then additionally the ZX81 can be placed inside a metal box (biscuit tin) whose lid is removed to operate the keys. Those wishing to go the whole hog can use an aluminium case to house the ZX81 and its power supply, a proper keyboard, and the output circuitry, with all leads filtered.

References

[1] "The Sinclair ZX80 microcomputer as a morse tutor", P. L. Newman, G4INP, *Rad Com* January 1982.

[2] See, for example, *Z-80 Microprocessor Programming and Interfacing*, J. C. Nichols, E. A. Nichols and P. R. Rony (Sams, 1979) or any similar volume.

[3] *ZX81 BASIC Programming*, S. Vickers (supplied with ZX81).

[4] *Mastering Machine Code on your ZX81*, T. Baker (Interface, 1981). □

TECHNICAL TOPICS

Pat Hawker, G3VA

UNTIL A FEW YEARS AGO the annual report of the Home Office Directorate of Radio Technology on radio and television interference provided a rough but ready guide to how the battle of tvi was going. However, around 1976 the basis on which the report was compiled was changed, with the result that the number of interference cases ascribed to amateur transmitters dropped dramatically. While this was gratifying to amateurs—who had long expressed the view that most cases of interference in recent years have been due to the poor electromagnetic compatibility (emc) of domestic equipment—it did mean that the annual Home Office statistics, far from illuminating the situation, tend to conceal the very real problem still posed to all who operate transmitters in residential areas.

RFI and emc

The 1981 report ascribes only 116 cases of rfi to fundamental radiation from amateur stations and 19 to harmonic radiation—a tiny percentage of the 51,358 cases (55 per cent up on 1980) closed during the year. The number of complaints received, 70,452, showed a remarkable 96·85 per cent rise on 1980, and it is clear that much (but not all) of the tremendous increase in 1981 was due to the illegal use of 27MHz amplitude-modulated cb equipment. I note that although there is now a good deal of legal fm cb in my locality I still hear many a.m. transmissions. The Home Office dithering on cb has had the effect of creating a *wider* cb band than in almost any other country, divided roughly into a.m. (plus some high power ssb) and fm sections! Regrettably, some of the less-responsible cb magazines appear to offer positive "show how" encouragement to their readers to engage in pirate operation in the amateur bands with amateur-type equipment. The Home Office report makes it clear that the main problem with cb transmissions is not the much-publicized "harmonic radiation". To quote the report: "The majority of the complaints affecting television and radio are due to direct audio break-in arising from the close proximity of the cb transmitters". This is further borne out by an analysis of 14,359 complaints which the completed investigations have shown to be due to 27MHz cb: 1,498 caused to long-wave radio; 1,567 to medium-wave radio; 1,788 to vhf/fm (Band 2) radio; 35 to Band 1 vhf tv; 33 to Band 3 vhf tv; 9,222 to uhf tv; and 266 to land-mobile radio. It is shown, in fact, that 13,626 of the 14,359 were due to *fundamental* radiation; only 733 due to harmonics, even including the 19 instances where 27MHz "harmonics" interfered with long-wave (lf) radio (possibly due to frequency synthesizer spurii?)!

These extracts from the official report are not intended to excuse or justify illegal cb operation, but to show that they indicate once again that much of the problem this causes is directly related to the poor emc characteristics of current domestic equipment. It should surely be possible to operate, say, a low-power transmitter, whether fm, a.m. or ssb, within 50–100ft of domestic equipment without this immediately curling up under the strain. The Home Office tests during 1979–81 showed that this often happens even with about 5W of a.m. on 27MHz—let alone the 400W p.e.p. output (plus 5–6dB antenna gain) of a legal 28MHz amateur station!

Yet work in Sweden, Germany and by Texas Instruments in the USA over the past decade has shown that dramatic improvements in emc characteristics of tv sets can be obtained without undue cost to the consumer. The latest trend in consumer goods is "unit video" in which complete home-entertainment centres are put together using separate but interconnected units. One suspects that, as for audio, this system (unless more care is taken by manufacturers) will result in a further lowering of emc characteristics, and make tv and video even more susceptible to strong local signals.

High-performance mixers

One reason why domestic equipment is nowadays so vulnerable to strong signals, even when these are far removed from the tv or radio frequencies, is the use of broadband and/or low-Q front-end stages. There are even broadband vhf/uhf masthead preamplifiers that cover vhf and uhf continuously to about 1GHz, making it virtually certain that any strong 144MHz or 430MHz signals will vastly overload the receiver.

TT has frequently drawn attention to the continued importance of pre-mixer rf selectivity for any high-performance hf, vhf or uhf receiver. Yet we all seem to be falling victim to the dangerous attractions of the "broadband" approach of current amateur radio receivers, transceivers etc, lulled into complacency by the increased dynamic range made possible by doubly-balanced Schottky-diode ring mixers. What is not always appreciated is that the dynamic range of 95–100dB now being achieved in the best designs is necessary *mainly* because these (often) general coverage receivers present to the mixer a whole spectrum of strong signals, *including* those in the main hf broadcast bands, where even a simple dipole antenna may deliver a number of 100mV signals. These can generate vast numbers of intermodulation products in the absence of a really high class mixer.

It is important to realize that "dynamic range" as normally defined does *not* provide an overall receiver "goodness" factor. Intercept points etc are measured using two signals spaced 20–50kHz away from the required channel; this measurement approach does not take into account the fact that in practice many intermodulation products arise from broadcast stations perhaps 1–2MHz off-tune. A receiver with a *poorer* dynamic range but with *more* pre-mixer selectivity may in practice suffer far less from imd!

Recently Peter Chadwick, G3RZP, kindly let me have a set of the papers on "Mixers for high performance radio" which were delivered at the September 1981 "Wescon" professional meeting at San Francisco, and for which James Bryant, G4CLF, was session chairman. Apart from G3RZP's paper dealing with the SL6440 high-performance ic mixer (*TT* June/July 1980), the session also included papers by Dr Ulrich Rohde, DJ2LR, ("Performance capability of active mixers"); William E. Sabine, W0IYH, of Collins, on "Use of mixers in hf up-conversion receivers"; and Peter Will, of Anzac (Adams-Russell), on a new class of termination insensitive doubly-balanced diode mixers. Much of DJ2LR's paper has since appeared in *Ham Radio*.

The paper by William Sabine is of particular interest in its frank discussion of the philosophy behind the current use of broadband circuitry, vhf up/down conversion, and the various performance and cost trade-offs involved in this type of approach. Admittedly his conclusion is that "high-level mixers, low-noise synthesizers and the minimum amount of wideband circuitry can offset the limitations of the broadband concept to an extent which is quite acceptable for most applications". The revealing point is that he fully accepts that broadband circuitry and frequency synthesizers do impose *limitations*, something which may not always be clear from current sales literature!

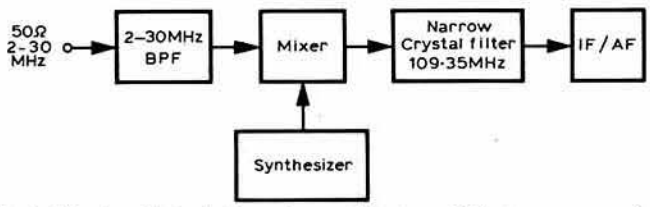


Fig 1. A basic wideband hf receiver architecture of the type now coming increasingly into use in higher-grade "top of the line" amateur hf transceivers

He writes (my italics): "The era of the sharply-tuned receiver front-end, which mechanically tracks the local oscillator tuning, has ended for general coverage hf receivers in the medium price range. Reasons for this include the high labour and material costs for the electrical and mechanical assemblies and recent trends in fast frequency hopping under computer control. Instead, a 2–30MHz bandpass filter allows all desired and undesired signals to get into the mixers and active circuits. Having accepted this approach *and its limitations*, the problem is to determine the wideband vulnerability to

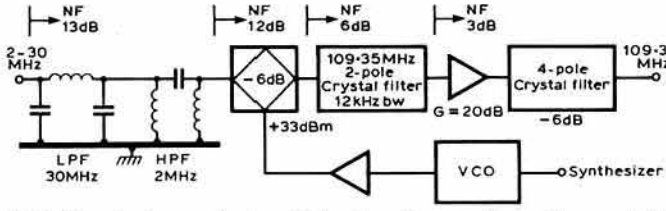


Fig 2. How the front-end of a wideband receiver may be implemented. The mixer is likely to be a diode-quad ring mixer or similar arrangement that will handle a wide dynamic range without introducing excessive intermodulation distortion. The overall noise figure of 13dB in this experimental front-end is considerably higher than often found in current amateur hf receivers, but it could be argued that there are substantial advantages in not striving for a 5 or 6dB noise figure, and many professional designers consider 10dB more than adequate for hf

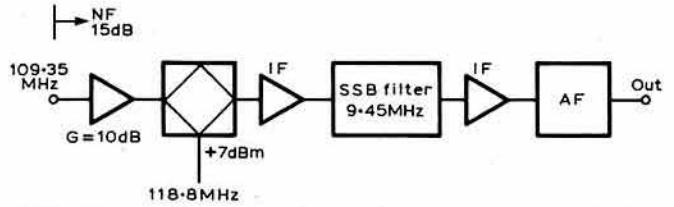


Fig 3. The "downstream" block of the receiver outlined in Fig 2 as described in the paper by W0IYH. The main selective filter at about 9·45MHz is placed a little way along the i.f. strip rather than immediately following the mixer, since the two earlier vhf crystal filters act as "roofing" filters

interference and to reduce it *as much as possible*, consistent with economic goals. Any receiver can be interfered with. The question is: How much interference can you tolerate, and how much will you pay to make it better?

"The design approach now in use is to minimize the amount of broadband circuitry and make it as immune as possible. Also the local oscillator purity becomes a matter of special concern . . . "

This seems to me a fair statement of the existing situation. It underlines the reasons why hf receiver designs have evolved something along the lines shown in Figs 1–3 rather than either the classic single-conversion superhet with four gang-tuned circuits or the double-conversion receiver with crystal controlled front-end, both of which were best and most economically realized as amateur-bands-only receivers. It also indicates why, for example, the G2DAF Mark 2 or Collins 75A4 receivers can still outperform *for amateur applications* most current receivers: it is not just a question of valves versus semiconductors but rather of the whole design concept which has been forced to change partly because of manufacturing economics and partly because of the changed requirements for professional use. Amateurs do *not* require to operate banks of remote unattended frequency-hopping receivers under computer control or require the same high order of long-term frequency stability. Nobody has yet made a low-cost digital frequency synthesizer with anything like the purity (ie low noise sidebands) of a good crystal oscillator or free-running vfo: see Fig 4.

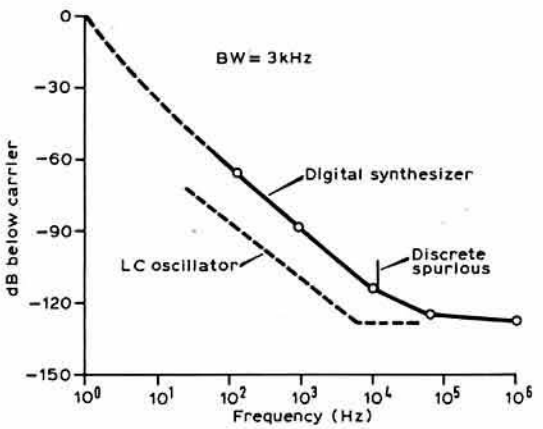


Fig 4. Noise spectra of a relatively good digital synthesizer compared with that from an LC oscillator. The increased noise output degrades mixer performance and can result in reciprocal mixing etc. The advantage of good long-term stability and the ability to control the synthesizer by means of a microcomputer may not be required in amateur applications

Clearly amateurs are being swept along a path that offers few advantages. But there *is* one way in which we might reap some benefits. The broadband up-conversion concept *has* led to improved mixers and improved filters. Today, for example, the SL range of linear ics plus a couple of low-cost crystal ladder filters could form the basis of a high-performance modern receiver using traditional overall design concepts. If we do not want to tune the rf stages mechanically, let us use good fixed bandpass filters that extend as little beyond the actual amateur bands as possible. Above all, let us not be misled into thinking that up-conversion, frequency synthesis and broadband general coverage are design concepts that actually improve the overall performance of hf receivers on the amateur bands. Inherently they do not. If very well designed, they can give performances that range from acceptable to excellent, but most unlikely for *amateur* operation to exceed those of the best designs of 20 years ago. It is not necessarily that valves were better than currently available semiconductors, but more a question of the overall design philosophy, with particular reference to pre-mixer selectivity.

Power supply topics

Comments continue to come in on many different aspects of 12V power supply units, including some further notes from Jan Martin Noeding, LA8AK. He points out, for example, that many protective "crowbar" arrangements seem to be designed to work only once when preventing high voltages reaching the equipment they feed. The usual arrangement causes a thyristor (scr) to be switched on by any voltage over a preset level and then to short-circuit the output of the psu regardless of the damage that may be done to the psu components before the fuse blows. He points out that for most applications it would be equally effective to provide a crowbar designed simply to pull down the output voltage of the psu to a safe value. This can be done very simply, as shown in Fig 5, by an arrangement which differs from the conventional only in having a low-value resistor (R) in series with the thyristor.

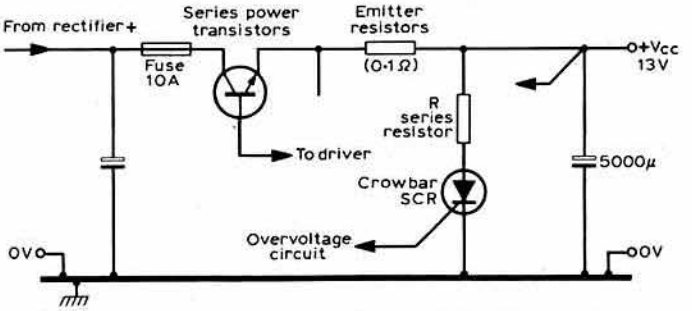


Fig 5. A "crowbar" over-voltage protection circuit that does not depend so much on "brute force" is suggested by LA8AK. A low-value resistor in series with the thyristor pulls down the voltage without damaging the components in the power supply unit. The limiting value of R is given by 13V/10A or 1·3Ω, and in this example a suitable value to use would be from 0·47 to 0·68Ω with 10W rating

Another tip from LA8AK (which applies not only to power supplies but also to any other equipment) is to note that the life of a transistor is significantly reduced when it is expected to run hot, even if the case temperature remains within the manufacturer's specified limit. This point is seldom mentioned, either by device manufacturers or in the literature, but LA8AK reports that it has certainly been the experience of the maintenance people in Norwegian telecommunications that transistors running above 50°C last only for a very limited period of time. For this reason it makes good sense, from both economic and reliability viewpoints, to use double the number of pass transistors in a high-current psu than might appear strictly necessary from the data books. By running extra devices in parallel, not only will their life be lengthened but it will make for simplified cooling arrangements, drive-circuits etc. Low-value ballast resistors should of course be used to ensure equal sharing of the total current between the transistors.

The question of transformer ratings was raised by G3FPK (*TT* June 1982 "Tips and topics"). LA8AK considers that this is primarily a question of temperature and that with a low duty-cycle rig it is often quite safe to take appreciably more current from a transformer than a strict interpretation of its specification might suggest. Even fm rigs with continuous carrier output on transmit can often be run quite satisfactorily from "underdimensioned" transformers provided you are not in the habit of talking for more than 5min at a time without first checking the transformer temperature under such conditions. In most circumstances an amateur "listens" for considerably longer periods of time than he "transmits"—and should it be the other way round then other people may not shed many tears when that transformer does burn out!

On many other occasions we have pointed out in *TT* that with modern electronic and radio equipment, reliability problems are very often linked directly with temperature; others are often basically mechanical in nature or related to the materials used for switch and plug contacts etc.

Humidity can also still be a problem for those seeking the highest possible standards of performance. Hal Price, KR4R, in *QST* May 1982 notes that the highly regarded Drake TR7 equipment can drift by about 1kHz in the first hour from switch on, and around 1·8kHz over several hours. He reports that some users have cut these figures to about one-half by running continuously a small dial light or similar heat-producing element in the cabinet fairly close to the vfo enclosure. This trick used to be common with the much greater frequency drifts encountered with older receivers having coil formers that tended to absorb moisture. KR4R's solution for the TR7 was to use some self-adhesive heat strips dissipating a total of about 12W in the cabinet; these reduced drift to about 200Hz in the first hour, about one-fifth of the original figure.

Chordal hop reaches America

Much though I admire such American journals as *QST* I have to admit to being sufficiently chauvinistic (or at least Europeanized) to be irritated by their frequent indifference to developments taking place outside of North America. An almost classic example of this can be found in the technical correspondence columns of *QST* May 1982 where S. B. Mackenzie, K8IRY, comes up with "a theory for long-range radio-wave propagation that is different from all others I have seen". In essence K8IRY expounds the belief that many hf signals are propagated around the world without intermediate ground reflections. I am sure that K8IRY is right—but then so for some 25 years have been many others, including of course Hans Albrecht DL3EC/VK3AHH, who originally put forward the theory of chordal hop propagation based on his reception in Australia of amateur signals from Europe during 1947. All credit to K8IRY for coming to the same conclusions —but perhaps rather less credit to the editors of *QST* for not appending an explanatory note. But this is not altogether surprising, since I cannot remember *QST* ever explaining the chordal hop propagation theory in all the years since Albrecht first expounded it in both professional and amateur radio journals. Yet, as Les Moxon, G6XN, has pointed out, for amateur dx operation it is multihop propagation that should be considered "abnormal" with most low-power signals exploiting the absence of ground-reflection attenuation!

Crystal ladder filter design

To be fair, *QST* does better elsewhere in the same issue. Wes Hayward, W7ZOI, in "A unified approach to the design of crystal ladder filters" acknowledges the work done by Jack Hardcastle, G3JIR, some of whose *Rad Com* articles were reprinted in *QST*. Nevertheless it took several years for the American journals to catch on to this subject, despite the fact that the first crystal ladder filter to go into amateur radio equipment was in an Atlas transceiver. W7ZOI provides useful design information on low-cost filters based on tv-set crystals (4·433MHz for PAL, 3·57MHz for NTSC), an approach first suggested in West Germany. W7ZOI also includes the "normalized" design approach which was advocated eight years ago by J. Pochet, F6BQP (*Radio-REF* May 1976, *TT* September 1976, *Wireless World* July 1977). To my mind the simplified F6BQP technique remains an entirely valid way of building reasonably effective crystal filters by those who might otherwise hesitate to plunge into the whole gamut of filter design procedures and mathematics. It is in fact very doubtful whether an expertly designed filter, with minimum ripple across the passband, is an ideal filter for an hf receiver used for ssb reception. Many years ago it was pointed out in *QST* that the central dip in response that is often a feature of do-it-yourself half-lattice filters is actually an advantage rather than a disadvantage.

W7ZOI stresses what has always seemed to me a most important feature of the ladder approach to crystal filters: the ability it gives to amateurs to put together reasonably effective filters from almost any handful of nominally similar frequency crystals with a minimum of design or constructional hassle. He writes: "Home construction of crystal (ladder) filters is very practical, especially for the experimentally inclined amateur with the usual amount of instrumentation; laboratory-grade equipment is definitely not needed." I would go even further and suggest that with the simple "normalized" capacitor values suggested by F6BQP back in 1976, almost anyone can be reasonably confident of achieving a usable, if possibly sub-optimum, filter without even the "usual amount of instrumentation".

With crystal filters for factory-made receivers costing up to £60 or more, the ladder filter has a very practical appeal indeed. D. A. Bundey, G3JQQ, (*Rad Com* July 1982, pp582-3) has shown how additional *variable* selectivity can be added to the receiver sections of very many current hf transceivers (in his case the FT7) by adding conversion into and out of a 4·43MHz ladder filter, in such a way that the overlap with the response to the existing 9MHz filter can readily be varied. There is also still scope for further development of the G3UUR design for a switched variable bandpass ladder filter (*TT* December 1980, Fig 8, p1295).

Designs for absorptive filters

TT (March 1982, pp228-9) included results of a most useful investigation by LA8AK and LA6AK of absorptive ("hybrid") low-pass tvi filters based on adding a high-pass filter and load to a standard Drake TV3300LP filter. (Note the output socket in Fig 2 was incorrectly marked "to rx" but should of course have read "to ant".) This has encouraged Ed Wetherhold, W3NQN, (who acts as ARRL technical adviser on passive LC filters) to pass along some valuable information on computer designs for high-pass and low-pass filters using only preferred-value capacitors. He writes:

"In Fig 2, page 228, a five-element highpass filter designed by LA6AK is shown in which C6, C7 and C8 are calculated to be non-standard values, but to simplify construction the nearest preferred values (68 and 33pF) were used. I would like to recommend a five-element Chebyshev high-pass design precisely based on the standard-value capacitors. This design has the advantage of being mathematically correct when the standard values are used. Parameters are shown in the caption to Fig 6.

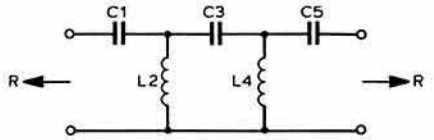


Fig 6. A fifth-degree highpass Chebyshev filter design by E. E. Wetherhold, W3NQN, for standard-value capacitors. Fifty ohms capacitive input impedance: RC 5·20%; C1, C5 68pF; L2, L4 0·1003μH; C3 33pF. Attenuation characteristics: AP 60·33MHz; 3dB 47·2MHz; 20dB 33·61MHz; 50dB 17·97MHz

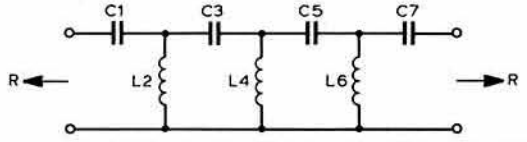


Fig 7. Improved seventh-degree high-pass Chebyshev filter design for standard value capacitors. Fifty ohms capacitive input impedance. RC 6·14%; C1, C7 82pF; L2, L6 0·1244μH; C3, C5 39pF; L4 0·1075μH. Attenuation characteristics: AP 45·21MHz; 3dB 40·15MHz; 20dB 33·22MHz; 50dB 22·55MHz

"Should any readers wish to use a more selective hpf, I have calculated a seven-element Chebyshev design that requires 39pF and 82pF standard values (see Fig 7). The 45MHz cut-off frequency (Ap) of such a filter is lower than the 60MHz fco of the five-element filter. This means that the seven-element filter permits harmonics to be directed to the 50Ω load sink 15MHz below the higher cut-off frequency of the five-element design, which is advantageous. The stop-band attenuation of the two filters is similar at the 20dB level (both have 20dB loss at 33MHz) but the seven-element design has more attenuation at frequencies below 33MHz.

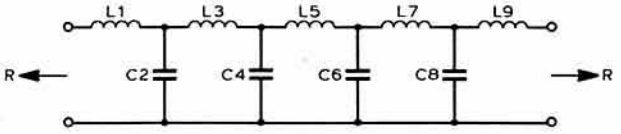


Fig 8. Ninth-degree low-pass Chebyshev filter design for standard value capacitors. Fifty ohms inductive input impedance. RC 4·8%; L1, L9 0·2141μH; C, C8 150pF; L3, L7 0·4742μH; C4, C6 180pF; L5 0·5008μH. Attenuation characteristics: AP 30·28MHz; 3dB 32·92MHz; 20dB 37·33MHz; 50dB 48·72MHz

"To facilitate construction of absorptive filters at minimal cost, it is feasible to replace the basic TV3300LP filter with a nine-element home-constructed Chebyshev low-pass filter with inductive input/output and again using only standard value capacitors: Fig 8. The calculated attenuation at the second harmonic of the 30MHz cut-off frequency is greater than 60dB although as noted by LA8AK it is probable that in practice 60dB may prove about the limit achieved (or needed). This nine-element filter is easily constructed since not only are standard value capacitors used but no tuning is required with the inductor values shown. If standard mica capacitors with 500V nominal rating are used, the filter would be suitable only for power levels up to about 400W with a maximum vswr of 1:3. Such a vswr may be encountered during tune-up, and should the vswr be higher than this the voltage rating of the capacitors would be exceeded."

Meteor scatter af up-converter

TT (October 1981, p928) included a block diagram of an audio-frequency up-converter used by LA8AK in order to tape-record high-speed meteor scatter signals (about 1,500Hz tone) in a form suitable for playback at much lower tape speeds while still providing an easy-to-read tone at about 850Hz.

Since then LA8AK has sent along full circuit details of this unit which has already been taken up by a number of Norwegian and Swedish ms enthusiasts. A pcb is available from LA8AK for about £3 including post and packing (Jan-Martin Noeding, LA8AK, Voielia 39/B, N-4620 Vaagsbygd, Norway) although other forms of construction could probably be used; the components have been chosen from those readily available in most European countries.

IC2 forms a stable and trouble-free 7kHz oscillator, converting the incoming audio signals to about 7 ± (0·4–2·7)kHz. The upper sideband is then selected, with TR1, TR2 forming a second-order bandpass filter removing most of the unwanted products (some interference between usb/

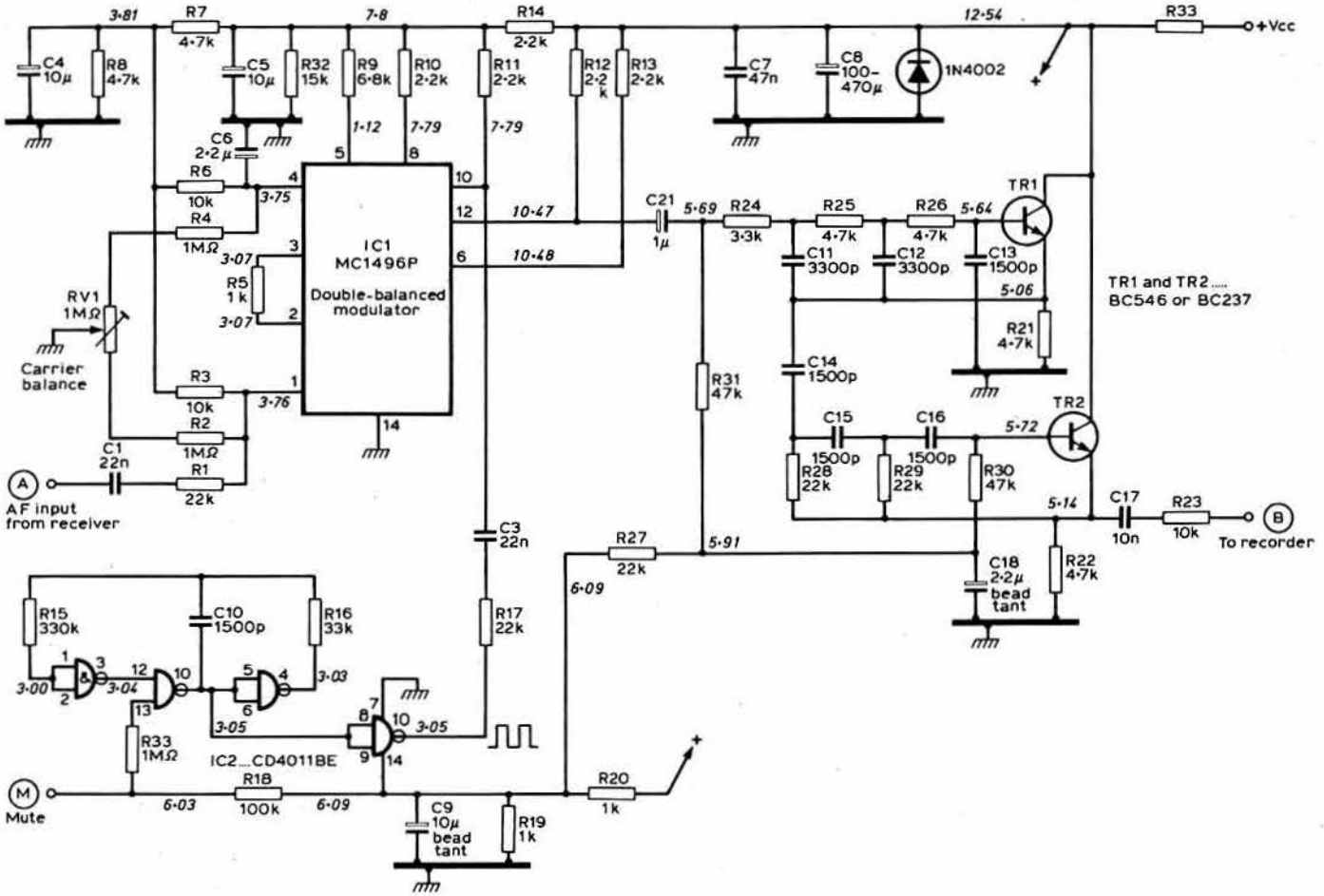


Fig 9. LA8AK's audio-frequency up-converter for high-speed meteor scatter. By recording at about 8,500Hz the tape recorder can be slowed down by a factor of 10 for transcription of the morse. Test voltages measured on Fluke 8020A. Supply current 19·3mA. Suggested values for R33: Vcc 12V 22Ω, 13V 47Ω, 14V or 15V 100Ω

lsb products will remain, but this results only in slightly lower-sounding output tone).

The converter requires an af input level of 0·1 to 1V p-p. It is best to bypass the audio-gain control in the receiver so that this does not affect the signal fed to the up-converter; this overcomes the problem that the af may contain increased hum at low levels and helps to maintain optimum snr. The balance adjustment to remove or minimize the carrier tone can be done using an af amplifier or the monitor amplifier of the tape recorder. While some carrier will usually remain audible after adjustment, this will usually be smothered by band noise when the receiver is connected.

Moonbounce pioneers

Of all the projects open to the amateur, probably the most demanding, in terms of equipment performance, is the earth-moon-earth path. From a practical communications viewpoint eme offers little that could not be achieved more easily by other means. Its greatest attraction is its challenge. Like Everest, it is there.

It is also predictable in a way that few other experimental communications systems are. The path loss can be calculated to within a couple of decibels. Build equipment that can meet this requirement, wait for the moon to be in a suitable position and there is no reason to fail. You will not grow old waiting for "good conditions" or an "opening".

When I visited Dallas last April I had the opportunity of a brief meeting with John De Witt, N4CBC (formerly W4ER1 and W4FU), who holds the distinction of having been in charge of the very first successful moonbounce project. This was at the US Army Evans Signal Laboratory. On 10 January, 1946 a 0·25s pulse on 111·5MHz produced a clearly-identifiable echo 2·5s later (first heard by Herbert Kauffman, W2OQU, one of the team). The equipment was a modified radar unit with a 64-dipole array and narrowband quadruple-conversion superhet tuned to take account of the doppler shift.

In 1951, using slow morse, a link was established between Cedar Rapids, Iowa and Virginia. In 1958 speech echoes were obtained by the US Navy and at Jodrell Bank. The first amateur eme echoes were heard by W4AO and W3GKP in 1953 on 144MHz. But a series of experiments between Jodrell Bank and Australia produced "disappointing" results. It was accepted that the moon's periodic disappearance, fast fading and propagation delay make it far from an ideal communications system for professional communications. First amateur eme contact was between W1BU and W6HB on 17 July 1960.

However, in the early 'sixties, with interest in "passive" artificial satellites (remember the large Echo balloon project?) and the unattractive Project West Ford that threatened to create an artificial reflecting band of metallic needles encircling the globe, renewed interest in the moon was shown by the professionals. The Royal Aircraft Establishment at Farnborough, working in collaboration with Lincoln Laboratories of the American MIT, developed experimental eme links, including in 1963 good reception of rtty traffic from California. Lincoln Laboratories had by then shown that the moon has an equivalent radar-echoing area equal to seven per cent of its actual area, and acts as a partially polished sphere with an efficient central reflecting area rather like the bright point on a matt ball bearing.

An eme signal has to travel about half-a-million miles. The path loss varies with frequency: about 258dB at 300MHz; 270dB at 1,300MHz; 279dB at 2,600MHz; and 287dB at 9·3GHz. A path loss of 280dB is indeed an extremely formidable figure (over 70dB more than from a geostationary satellite at 12GHz which has a path loss of about 206dB). It has been pointed out that to receive back one *micro-microwatt* of power, it would be necessary to radiate 10,000,000,000,000 *kilowatts* along the beam! Furthermore the moon acts as a black-body radiator of about 200K and contributes substantially to the system noise. RAE favoured frequencies between 7 and 9GHz but few amateurs can generate a kilowatt at these frequencies (it needs a high-cost multi-cavity klystron).

432MHz moonbounce

Clearly, anyone attempting moonbounce has to be prepared to spend a lot of time and a good deal of money (or have access to specialized equipment) if he is to overcome successfully the challenge of a path loss that on 432MHz amounts to a formidable 262 ± 1dB. It needs, say, a minimum of 25dBi antenna gain, some 500W rf at the antenna feedpoint (requiring in the UK

a special experimental permit), a receiver noise figure less than 2dB, and sufficient stability to permit the use of 500Hz bandwidth. These are of course interrelated, and a larger dish could be used with a less sensitive receiver and vice versa, although antenna gain is particularly useful as it applies to both transmit and receive modes.

For those willing to face up to such a challenge, Joe Reisert, W1JR, has an excellent "overview" article "Requirements and recommendations for 70cm eme" in the June 1982 issue of *Ham Radio*. For low-noise preamplifiers he notes the NEC V645 bipolar transistor can yield a 1dB noise figure, while the NEC V244, Mitsubishi MGF1400 and Dextel D-432 gallium arsenide fets can yield 0·5 to 1dB noise figures with 18–25dB gain. He firmly recommends, however, that before spending time and money on a state-of-the-art preamplifier, an inexpensive unit with about 1·75dB noise figure should be put together using such devices as the Motorola MRF301 (under $3) at least until the relay switching systems (to bypass the preamplifier on transmit) have been thoroughly debugged, and the transmitting system thoroughly checked out. He suggests that on 432MHz the diameter for a parabolic reflector dish should be between 18 and 40ft (5·5 and 12m) though it is noteworthy that G3WDG and G4KGC have recently successfully used a 4m dish on this band.

To adapt an old nursery rhyme:

The moon shines bright
The stars give light,
And little fading signals,
Will come tomorrow night.

Cut-away 300Ω ribbon

Several years ago, an item was included in *TT* from K8ANV pointing out that the wet weather problems and basic losses of 300Ω "ribbon" transmission line can be significantly reduced by punching out "windows", about 1in long and separated by about 0·125in of dielectric, all along the cable, preferably flame polished to improve the water-repellent properties. It was subsequently noted that low-loss ribbon feeder with such windows was (and presumably still is) manufactured by Borens Fabriks AB (Bofa) of Kungsbacka, Sweden; for example, type GMP-6.

From Dr Costantino Feruglio, IV3VS, comes a further note on air-spaced balanced feeder cable, and how it can be used to form a useful centre-fed multiband dipole. The ribbon he uses comes from Datwykr AG, Altdorf, Uri, Switzerland, as type FS1018. With a power rating of 1kW at 10MHz, the attenuation per 100m is 0·55dB at 3·5MHz, 0·84dB at 7MHz, 1·26dB at 14MHz, 2·1dB at 30MHz and 4·20dB at 100MHz. In other words, a *metre* of this feeder has roughly the same loss as a *foot* of RG58.

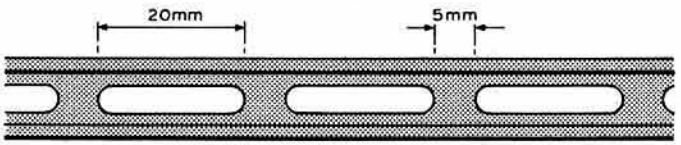


Fig 10. Cutaway Swiss 300Ω ribbon feeder

He feeds a dipole of 2×15·5m with about 25m of the 300Ω feeder. Although the winds are often very strong in his location at Udine in northern Italy, the ribbon remains in good condition after two years of use, and presents no greater problems than RG58 coaxial cable. The dipole feeder connections are arranged carefully to avoid transforming his rf pipe into a waterpipe. He mentions that several types of very light cables are available. But remember that balanced ribbon cable should be kept away from metallic guttering etc.

I was a very satisfied user of conventional ribbon feeder for a number of years; my main problem used to be due (I think) to the effect of uv-light on the ribbon, making it brittle and tending to cause splits to appear after a time, but the sample of the brown FS1018 sent by IV3VS looks pretty tough, with windows approximately 20mm long separated by 5mm struts: Fig 10.

Stable microwaves

It is now approaching 20 years since J. B. Gunn, a British scientist working for IBM, discovered that a gallium arsenide diode can convert dc into ac with a frequency in the microwave region: and so was born the Gunn-diode oscillator. The first devices were extremely inefficient and needed some 1·5W of electrical energy to provide 17μW of microwave power, but by 1965 Gunn diodes could provide about 15mW cw at 4GHz.

Although the Gunn diode possesses the important property of microwave oscillation without the requirement for any external resonant circuits, such oscillation is far from stable. It can, however, be stabilized by a high-Q resonant cavity, although there remains considerable temperature drift.

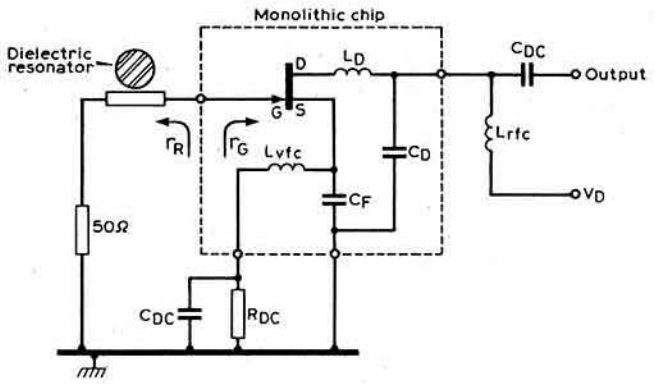


Fig 11. Experimental monolithic microwave oscillator with $Ba_2Ti_9O_{20}$ resonator

During recent years a new form of temperature/frequency stabilization (which may or may not be used in conjunction with a conventional cavity) has been arousing a good deal of interest in research laboratories. This is the ceramic dielectric resonator which can be used to form a microwave integrated circuit oscillator; it can be used also with microstrip Impatt diodes at frequencies up to 100GHz. Such techniques are already beginning to reach the market place, although still at "professional" prices. Mullard have recently announced a dielectric resonator stabilized oscillator for frequencies between 9 and 12GHz (frequencies of interest for space communications, direct-broadcast satellites, radar etc). This oscillator has a mechanical tuning range over about five per cent of its operating frequency and a frequency stability better than 4ppm/°C. A number of experimental oscillators have also been reported recently in *Electronics Letters*, including Impatt diodes oscillators between 75 and 120GHz.

In France, for example, monolithic gasfet oscillators at 10·8GHz have been developed which are stabilized by barium titanate dielectric ($Ba_2Ti_9O_{20}$) resonators and described in *Electronics Letters* (15 April, 1982, pp345–347). The basic circuit arrangement is shown in Fig 11. These tiny chips (1·2 by 1·4mm²) deliver more than 30mW into 50Ω with a frequency stability better than 1ppm/K, with a chip efficiency of around 20 per cent. It must be stressed that these monolithic ("on a chip") microwave oscillators are still at an experimental and high-cost stage, but clearly such techniques offer very important possibilities for greatly increasing amateur use of the 10GHz band—and for satellite receivers etc. The "transmitter on a chip" is not very far away for10GHz.

Mobile safety

Ralph Taylor, GW2HCJ, considers that for mobile operation the safety and convenience aspects are of paramount importance. His ranking of the requirements is:

(1) Boom microphone to keep the hands free, preferably behind the line of sight and of very light construction from a crash safety point of view.

(2) Very easy transmit/receive switching. Foot switch (preferred), gear lever or dip-switch located.

(3) Easy channel change, preferably without having to take eyes off the road when changing to frequently-used channels.

(4) A frequency/channel display which is visible by day but not obtrusive by night.

For higher power installations GW2HCJ suggests that a centre-roof-mounted antenna is to be preferred to either gutter or wing mounting, if only to reduce any possible radiation hazards. Since his own car is of glass-fibre construction he has lined the roof with thin aluminium.

In the early days of 144MHz mobile operation GW2HCJ had a rotatable three-element array, and once succeeded in working Yugoslavia while mobile with the 40-year-old SCR522 American-built aircraft equipment. The antenna attracted much interest when rotated on the move, and even when the vehicle was stationary. His explanation to those who came to examine it was that it was an undercover tv detector vehicle, at which point some of the assembled crowd would often depart hurriedly in the direction of the nearest Post Office.

His present home set-up includes full polarization switching of a Jaybeam 10-element crossed Yagi array. This provides either left-hand or right-hand circular polarization or linear vertical or horizontal polarization. At his location most incoming signals are reflected rather than direct, and he finds that the GB3MP transmissions are only fair with vertical or horizontal polarization, hardly readable with right-hand circular, but solid copy with left-hand circular. Polarization changes are achieved by switching in or out a series of phasing sections in one of the two feeder lines. □

MICROWAVES

Charles Suckling, G3WDG*

Forthcoming round table

A round table meeting will be held at Martlesham Heath on 17 October. It is envisaged that there will be a junk sale and that test equipment will be available as in previous years. One lecture has been arranged so far, and will be on the subject of small business satellite operations. The event will be ticket entry as before, and anyone intending to go or requiring more information, should contact Graham Murchie, tel 03942-2394 (work), 03943-4199 (home).

Beacon news

The Martlesham Heath 10GHz beacon has recently changed callsign to GB3MHX.

There has been good progress with the Leicester 2·3GHz beacon GB3LES. The transmitter has been recrystalled to 2,320·955MHz in line with the new band plan. The feeder has been installed on site, and the group is now only awaiting the completion of the Alford slot antenna before putting the beacon on the air. The installation of the feeder was done on 20 June—the co-sited 10GHz beacon GB3LEX had to be switched off for the day, and the group apologises for the beacon's absence during the cumulative contest period that day. G8CAC, QTHR, would welcome any reception reports of GB3LEX, as he is trying to produce a coverage map for the beacon.

July openings

Following the rather poor conditions reported by a number of stations during VHF NFD, two excellent openings during early July came as a welcome change. On 7 July, HB9AMH/P (DH66c) was worked by many stations all over the UK on 1·3GHz. Among those who worked him was G4BRT (ZM76j), who was operating for the first time properly from home. In addition to working HB9AMH/P (at 749km), he also worked DK8VR (DJ-632km). The next evening conditions were again excellent, as the G4BRT log shows: DK6AS (FM-794km), PE1DPX (DM-478km), F1SA (CI-550km), ON1JE (BL-347km), DB9IU (DL-503km) and PE0AGO (DM-500km).

The contact with DB9IU was particularly remarkable as DB9IU broke into G4BRT's contact with G8TXG (Malvern) off the back of his beam! A solid three-way QSO resulted.

G3LQR was also active during the evening of 8 July and had the unusual experience of being able to hear *five* 10GHz beacons: GB3MHX, PA0DBQ, PA0MS/A, ON4RUG (Gent, 10,368·27MHz) and GB3SWH. This was the first time that he had copied GB3SWH, after numerous previous attempts; the signal exhibited considerable fading and was not audible all the time. On 1·3GHz, G3LQR worked LX1DB (CJ) for a new country, as well as HB9AMH/P and several DL stations in DL square.

A second opening occurred on 12 July. This coincided with the beginning of a cold spell, and provided extremely good propagation to Scandinavia. G3LQR was again very successful on 1·3GHz, working LA8AK (DS), LA3FV (FT), LA8AE (FT), OZ8WK (ER), OZ9NI (GP), OZ7LX (FP).

The 2·3GHz band was also open to Scandinavia. One of the most remarkable contacts made was between G3LTF (AL) and SM6HYG (FS) over a distance of 1,016km! This was G3LTF's first-ever contact from home on 2·3GHz. He was running only 200mW output and was very surprised to make the contact; SM6HYG was overheard on 432MHz remarking that this was about the same power as a torch bulb and yet was covering over 1,000km on 2·3GHz! SM6HYG also worked G3LQR on 2·3GHz.

SM6HYG was also active on 1·3GHz, and gave many stations their first SM QSO on 1·3GHz that evening, including G4BRT, G4KGC and G3WDG.

One opening of a different sort which did not quite occur was on 14 July during an aurora. During a contact with G3WDG on 432MHz aurora, DJ5BV (DK) requested a test on 1·3GHz. Unfortunately no contact resulted —does anyone know of any successful 1·3GHz auroral tests?

A high-efficiency dish feed for 1·3GHz

The dish feed to be described is capable of feeding dish antennas with f/d ratios in the range 0·5–0·6, with high efficiency. Anyone planning to build a dish for 1·3GHz (with a diameter greater than about 2m) is recommended to use a 0·6f/d ratio, as such a dish is much easier to feed than one with a smaller f/d ratio, and will thus perform better.

The construction of the feed is shown in Fig 1. The design is based on the EIA "Standard gain antenna" and uses two folded dipoles λ/2 apart, driven in phase. The dipoles are positioned λ/4 above a 1λ square reflector. The dipoles, and the λ/4 open-wire transmission lines which join them to the feedpoint, are made from one length of 1·5mm diameter tinned copper wire. The dimensions are fairly critical, and should be adhered to as closely as possible.

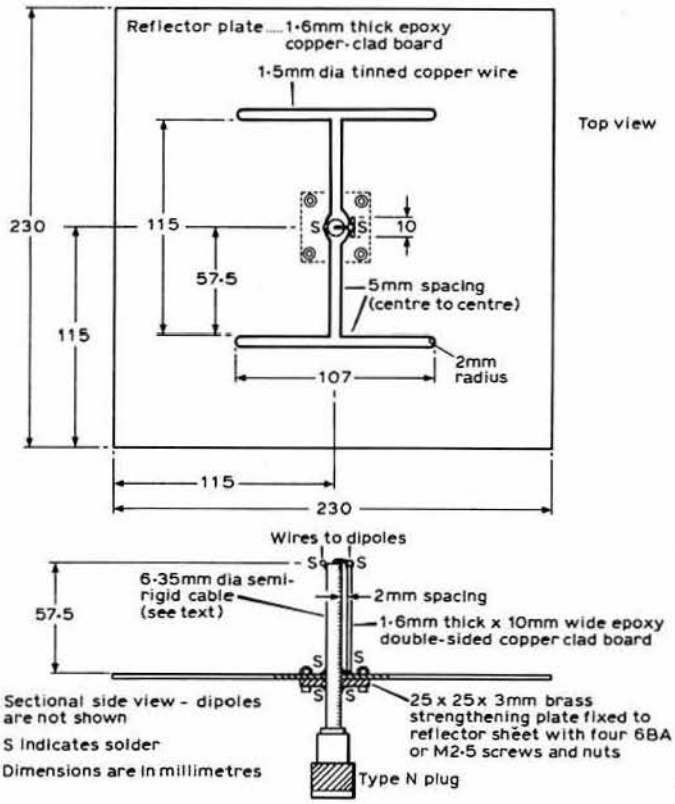


Fig 1. Details of dish feed construction

The method of feeding the dipoles is also shown in Fig 1. The prototype used a length of 50Ω 6·35mm semi-rigid cable. This could be replaced by a homemade 50Ω rigid cable, using a 6·35mm copper or brass rod, drilled just large enough to take the inner from a piece of standard cable, eg UR43. The cable and a strip of copper-clad epoxy board form a 1:1 balun. One side of the open-wire feeder is connected to the outer of the cable, the other to the junction of the inner conductor of the cable and the top of the epoxy board.

Provided that the feed has been carefully made, it should exhibit a low vswr. The vswr can be minimised by squeezing together or pulling apart the open-wire feeder sections and the dipole elements. Try to aim for a symmetrical antenna after doing this, or the two dipoles may not share the power equally; this would distort the pattern and hence reduce the illumination efficiency. If significant power levels, ie greater than about 1W, have to be used to measure the vswr, do not make any adjustments with the power on!

In use, the feed should be located in the dish so that the focal point of the dish is midway between the plane of the dipoles and the reflector. The feed may then be moved inwards and outwards by a small amount to maximize the gain of the dish. The best way to mount the feed is to use a tripod or quadrupod support with the feed fixed between the support members just in front of the apex of the support. Horizontal polarization is obtained when the dipole elements are horizontal. □

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4-2-70

Ken Willis, G8VR*

IT HAS BEEN quite an eventful month, with excellent tropo, one of the biggest auroras ever recorded, some Es, and exotic squares being activated on ms by expedition stations. Anyone who failed to work some new ones between 1 and 15 July must be regarded as having been very unfortunate, since much was there for the taking. There were occasions when long-haul tropo and auroral openings occurred simultaneously, and during an aurora G3BDQ worked a Russian on Es.

Aurora

Auroras occurred on four successive days between 11 and 14 July. The one on 13 July may go into the records as one of the most intense and widespread ever experienced. The GB2RS newscast did not anticipate auroras, but drew attention to coronal holes, so G2FKZ's advice last month to watch out for them proved well worth taking.

On 11 July a "weak Scottish type" aurora developed which lasted a very short time in the south, but in Shetland GM3XOQ/A worked eight SMs, nine OZs, and four D stations, all on cw, coping with massive QRM in pile-ups. He also worked G3POI, G3NSM and GW3LDH. GM4DJS, using only 10W to a 10-element antenna, had 15 contacts with G, PA, OZ and D stations.

For several hours on 12 July there was one of the largest radio blackouts ever recorded, wiping out the hf bands completely, with sunspots visible to the naked eye. That afternoon an intense aurora developed. G3NSM and G3BDQ worked RQ2GAG, and G4IYA had a QSO with UR2RQT. During this aurora a tropo opening to Scandinavia confused the situation, several stations abandoning the Au mode to take advantage of it.

Around 1700 gmt on 13 July a very good aurora started up which greatly favoured southern latitudes. French stations right down to CE square were audible at 59A, and the band was full of GM, GI, GW, ON, PA and D signals, mostly at S9. G4ASR (YM) worked two SMs and was then called by UP2BJB and UP2BKH, both more than 1,600km distant. He went on to work 12 OKs, six East Germans, 13 West Germans, HG1YA, LX, OE and PA. Very little of this was being heard in the south at this time. By 2000gmt the event had largely disappeared, but this was only the first phase and the best was yet to come.

The second phase started up at about 2315gmt and was still going at 0400 the following day. GM3WCS and G4IJE were engaged in a 70MHz ms test when their signals went auroral, so they continued using ssb and had a 30min chat by this mode with exceptionally strong signals. By this time the aurora had strengthened and had already embraced almost the whole of Europe down to the Mediterranean. G3NSM in Oxford using an 80-element colinear array had a busy night on 144MHz and worked 10 Russians (in UQ2, UP2, UR2, UC2), 12 OKs, eight Y22s, three YUs, four Is, OE, and the prize, F6KAW/EA6 (CZ), the expedition station in the Balearic Islands. He also worked SM, LA, OZ etc and says that every part of Europe could have been accessed in this aurora. Bob found that a beam heading of about 30° was best for the Russian contacts, but for the rest of Europe he aimed more like 90°. He noted a distinct null in signal levels on a beam heading of approximately 60°. All his contacts were on cw.

Also on 144MHz, GW3NYY (XL) operated for nearly four hours on cw and worked 14 different countries and 48 squares, many of them new ones, without contacting G, GM, GI, GW or EI. His "bag" included I4XCC (GD), I4BXN (FE), I3LGP (GF), UQ2GLO (KQ), OE6WIG (HG), YU3ES (GF), YU2SFU (IG), YU3ZV (HG) and the coveted F6KAW/EA6 (CZ). Walt thinks that this may be a "first" GW-EA6 via aurora, and it seems unlikely that his claim will be challenged. GW3NYY also worked OK2SDL, OL7BDQ, two HGs, numerous D, Y22, F and PA stations. For this second phase his antenna bearing was 75–80°. The action was still going on when he retired to bed around 0330gmt.

At about third hand it is reported that EI6AS also worked F6KAW/EA6, and if this is confirmed it is very likely to be another one for the record books.

The action was not all confined to 144MHz however. G4DGU (XK) has long advocated the use of 432MHz in its own right rather than as "a band to QSY to". He practised what he preaches in this aurora, as this extract from his 432MHz log will show:

GMT	Callsign	Square	QRB (km)
1802	G3SHK	ZK	173
1806	G3LQR	AM	423
1811	DL7ZL	GM	1,231
1822	G3WDG	ZM	270
1823	G4KGC	ZM	270
1828	G2CIW	AL	343
1847	DL7QY	FJ	1,050
1852	DJ5BV	DK	800

It puts this aurora in perspective to know that G4DGU has operated on 432MHz for more than 10 years, and in all that time had only one auroral contact on the band until this event came along. He thinks that the QSO with DL7ZL over the 1,231km path represents a G-to-Europe dx record for an auroral contact on the band. All of his contacts were in cw mode.

A few auroral signals from GM were heard in the south on the evening of 14 July. Everyone waited expectantly for another big one, but it did not materialize, at least it had not done so by 0100gmt on 15 July. Since these notes are being written just hours after the events, it is probable that many more reports will come in. If so, they will be included next month unless further momentous happenings make prior claim to the space available.

Tropo

The period 7 to 15 July was marked by really excellent tropo conditions, resulting in thousands of good dx contacts throughout Europe. The good conditions started on the afternoon of 7 July when the Swiss beacon, HB9HB, on 144·865MHz could be heard at S5-6. Reception of it was to persist for more than 36h, and at times the signal reached the S8-9 level. On both 144 and 432MHz British stations started to work into HB9 from about 1500gmt, and from that time until the early afternoon of 9 July conditions to the south and east were outstanding. To put a layer of cream on the cake, a good N-S path between GM and the south of England opened up later in the evening.

The excitement was increased by the presence on the band of some exotic calls. Two expeditions, C31YR and F6KAW/EA6 (CZ), were audible at times on 144MHz tropo, and on the same band 4U1ITU popped up to make 144MHz sound more like 14MHz in short skip conditions. On 144MHz on the afternoon and evening of 7 July, G3JXN worked some HB9s, and then 4U1ITU called in to say that John was being called by some Italian stations. G3JXN then worked I1KTC and I2FAK in EF square. G3POI also worked I2FAK.

G4ISM (Whitstable) worked HB9, OE, C31YR and 4U1ITU, and heard F6KAW/EA6 via tropo. G4DEZ worked much the same from Great Wakering. Only a few miles further west, G4IYA in Gravesend could hear the HB9s, but much of the dx deeper into the southeast of Europe was inaudible to him. The opening was in fact quite well-defined, and G4BPY in YM commented on the fact that AL and ZL were doing much better than stations in his area. Going further north the tapering off was much sharper, and although many Ds were worked by northern stations, not many heard the HB9s. GM4CXM commented wryly on the "layers of Gs" between him and the Continent, and related this to G4KGC's comments in *4-2-70* July. Certainly some enormous pile-ups developed during the opening but operating behaviour was generally good.

The 432MHz band had its share of the dx, and many stations worked their first HB9 on the band because some of the Swiss portables were running very high erp from mountain-top sites. The 1·3GHz band was equally well served, and this will no doubt be reported elsewhere in *Rad Com*. On 432MHz G4BPY worked F1DMG/HB9 for a new country, having received his Supreme award a few days earlier. All of his work on 432MHz, leading to the Senior award on that band, was accomplished using only 10W, and the HB9 was his thirteenth country on the band.

At about 1900gmt on 7 July, G3BDQ near Hastings was busy working into HB9, DL and OE on 144MHz when he was called by UB5EDT (R145c) in Dnieperpetrovsk. This was on ssb and apparently by Es. After a rapid exchange of reports, G3BDQ moved to the cw end of the band and heard a UA3, but conditions died on him before the station could be positively identified. Conditions were still good next morning at breakfast time, many Gs having stayed up most of the night, and good conditions continued right through the evening of 8 July, with 4U1ITU still in evidence, plus many of the more remote German stations being worked from Britain. Around lunchtime on 8 July G3VYF worked an IW3 on 144MHz, and signals were good enough to QSY to 432MHz, where contact was retained. Just to top off the opening, for some hours on the morning of 9 July, LA1EKO on the Ekofisk oil rig (BQ27g) was on 144MHz giving many Gs their first contact with this square.

There was another tropo opening on 12 July, this time into Scandinavia. During the afternoon an aurora developed, and before it died down the 144MHz band had opened up to LA, OZ and SM. A strange situation arose

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whereby signals could be heard by tropo and aurora simultaneously, as the beam headings were much the same for both modes for stations in the south. During the evening of 12 July the 144MHz band was full of LA, OZ and SM signals, on both cw and ssb, and 432MHz was lively towards the same region. It was unusual to hear so many LAs; in the past they seldom come in with the OZs and SMs, but this opening embraced all three countries. Many newly-licensed amateurs had "firsts" on 144 or 432MHz, and in some cases on both. Even 10W stations were getting S9+ reports.

While all this was going on, a very stable tropo path developed between the Shetlands and the south, and GM4LBE in ZU65f was steady at S9+ for some hours, giving station after station a new square and a new country. His patience and calm in the face of incredible pile-ups must be given full credit. The Lerwick beacon on 144·865MHz was quite strong in the south at this time and, although the OY6VHF beacon could not be copied, G4DEZ believes that he heard OY9JD but he could not be raised despite several calls.

Further tropo between the Shetlands and the south occurred on 13 July, and this time GM3XOQ/A (ZT04d) joined GM4BLE on 144MHz to provide yet another rare square for the hordes of stations lucky enough to work him. Pete adopted the technique of calling for replies square by square, thus reducing the QRM very considerably. Other dx stations please copy!

Sporadic-E

Information continues to come in referring to the three major Es openings on 25 May, 5 June and 8 June, all reported last month. Reports as widely separated as those from G3PBV (Exeter), G4FIX (Runcorn), G8YVR (Hereford), G8TIC (Worcester), G8PNM (Sheffield) and GI6FIW (Belfast), all of whom worked down to the Mediterranean, indicate how widespread the openings were. G8TIC worked one Corsican station and heard another. He also heard an EA8, and very few others have reported these particular call areas.

Since those openings only one Es event of any significance has been reported, and that was of short duration. On 9 July at 1915gmt, G8XIR (Gravesend) was tuning up his amplifier on 144MHz and was surprised by a call from CT1AWO in VZ38j. Reports of 59 were quickly exchanged, and a second QSO followed, this time with CT4PI, also in VZ. G4DEZ (Great Wakering) and G3JXN (London W5) both worked CT1AWO and CT4PI, and G3JXN went on to work CT1HH. He was then called by EA9GH, but the signals faded out before the QSO could be completed.

The entire event seems to have lasted only about 20min, but since this information was all taken over the air from the stations mentioned, later reports will no doubt give a better picture of the size and duration of the event.

70MHz

Two readers, G3EIW (Havant) and G8VN (Mickleover), make a plea for more operation on 70MHz. They point out that during VHF NFD on 3–4 July, the band was full of signals from all over the country, showing the potentialities of the band even when conditions are unexceptional. G8VN worked 36 stations, including one in GM, using only 10W to a three-element beam.

Via the vhf net comes news from DK1PZ (EL) who also receives the UK 70MHz beacons quite well on ms. DK1PZ recently worked G4IJE crossband (144/70) using ms cw. During this QSO he was audible much of the time on tropo, so a tropo crossband contact between DK1PZ on 144MHz and a UK station on 70MHz is distinctly possible when conditions are favourable. On 12 June GM3WCS also worked DK1PZ crossband (144/70) using ms cw. He received a 28 report and the QSO was completed quite quickly. DK1PZ can regularly be heard on the vhf net arranging schedules.

Finally, from G4BPY, a report of reception of the Cyprus beacon on 70·113MHz. He heard it on 9 June at 0625gmt, and again on 8 July between 1511 and 1600gmt, the signal being 529 on both occasions.

50MHz

G4BPY has been monitoring the FY7THF beacon on 50·039MHz, and wonders whether the propagation can really be Es as this would entail five or six hops to cover the long path. He reports reception of the beacon on 7 July between 1954 and 2030gmt, and again on 9 July between 1930 and 2145gmt, the beacon peaking S3 on both occasions.

G4BPY notes that other stations sometimes copy the beacon at greater signal levels than he reports, and attributes this to a poor take-off towards the WSW. He believes this to be especially significant for low-angle radiation, as the optimum angle would then lie below his horizon. In support of this theory he quotes the case of G4GLT in Leicester who copied FY7THF at S9 when Gordon could hear it at only S3. G4GLT's QTH is only 150ft asl compared with the 400ft asl location of G4BPY, but the terrain around G4GLT is generally flatter. In addition, G4BPY has an obstruction rising to 600ft to the WSW of his location.

On 50·5MHz G4BPY has again copied the Cyprus beacon. On 9 June between 0625 and 0627gmt it peaked S4, while on 8 July between 1511 and 1810gmt it was again audible at this level.

On a quite different aspect of 50MHz "happenings", G6GGE (Chiswick) reports having received some good short-duration tv pictures on Russian Channel 1 (49·75MHz), believed to be from Moscow. Anyone who has an old Band 1 tv might consider putting up a dipole or a Band 1 antenna, because during the Es season there is a good chance of some pictures being received. The channel uses horizontal polarization, unlike the early BBC transmissions. Frequently the tv will lock-on to a picture during a meteor burst, as the signal strengths can be very high in this propagation mode. The Perseids shower around 12–13 August was a good time to try this.

Recent awards

In June the vhf awards manager, G5UM, was pleased to confirm the issue of a 144MHz Squares Award to Jesus Suarez of La Coruna, Spain, who operates EA1QJ. This was only the second time that a station outside the British Isles has qualified for such an award, the first being DK1KR in 1980. EA1QJ submitted cards from 102 squares in 24 countries, thereby leap-frogging the lower categories to gain certificate No 15 at the 20+100 level.

Nearer home, Shaun Clive, G4MDZ, also received a 144MHz 20+100 award (No 14) and like so many before him commented on the problems encountered in amassing sufficient confirmations to support his claim. G6ADC appears to have been more fortunate in this respect, as in a relatively short time he has collected enough cards to obtain certificate No 85 in the 144MHz 10+40 category. Certificate No 86 in the same category went to G8ULU of Whitstable, and he is now hot on the trail of a 432MHz award.

G6ADH, who earlier qualified for a 144MHz 10+40 award, has submitted cards to upgrade his certificate to the 15+60 category, being No 27 in this particular group. G6CGY of Hartlepool preferred to take the "Four Metres and Down" route and has received certificate No 610 in the 144MHz Standard Transmitting category (nine countries and 40 counties), thus becoming the first G6C - - - to qualify for this award. His claim was quickly followed by one from G6ECM of Herne Bay who now receives certificate No 614 in the 144MHz Standard category, becoming the first G6 - - to qualify!

Last, but in no sense least, comes news that Gordon Pheasant, G4BPY, of Walsall, has qualified for certificate No 79 in the 432MHz Senior Transmitting category, a surprise to some since he is always associated with 70MHz operation. As this was his third senior award, he now joins the illustrious group of Supreme holders, bringing their number to 41. Many congratulations to all those who have qualified for awards.

Repeater information

Repeater users are not always aware of the considerable amount of administrative, planning and fund-raising work which must be carried out before any repeater becomes operational. There is always a dedicated group of individuals who make it all work. Typical among these is the Sudbury Repeater Group in Suffolk. Having established the need for and interest in a 432MHz repeater in their area, they set about raising the necessary funds, finding a site, building the hardware and obtaining the licence. Their application for GB3SU on RB15 is one of the uhf Phase 7 proposals now with the licensing authority. When operational, GB3SU will be accessed by a 1,750Hz tone, identify itself every 5min on mcw using a 1Hz tone with high deviation when the repeater is free, and with low deviation when the system has been accessed. A double pip-tone will indicate that the input is clear. The Sudbury group puts out a very interesting newsletter obtainable from the secretary, G4IZA, QTHR. The project engineer is G8AAR.

Another well-organized group is that in Leicestershire (GB3LE RB4) whose chairman is G3STG. They also publish a newsletter under the editorship of G5UM, and it is an interesting combination of user, technical and administrative information. The repeater has recently undergone a change of antenna system, including the feeder, and the group was able to muster a working party of 25 members to carry out this work. Reports on reception of the repeater with its new antenna would be welcomed by G3STG as the new installation may have changed the radiation pattern somewhat.

Recently a reader asked why the Society did not produce a booklet providing repeater information. Julian Baldwin, G3UHK, has written to remind readers of *The International VHF-FM Guide* which he publishes in collaboration with Kris Partridge, G8AUU. The current edition came out in 1981 and is carried by RSGB Publications (Sales), though very few copies are at present available. The booklet is packed with information of all types, and deals with the operational aspects of the repeaters as well as their technical features. Maps are also included to give an indication of the

probable coverage which might be expected from the repeater. Other useful information relates to reciprocal licensing requirements in the countries for which repeater information is provided. For anyone travelling by car with mobile equipment on board, a copy of this booklet should prove to be a most valuable source of information. G3UHK hopes that an updated new edition will be produced in spring 1983.

Beacon news

Home Office approval has now been received for the proposed site change and the addition of 432MHz equipment to the GB3CTC beacon complex mentioned in *4-2-70* July. The new site is at Hensbarrow (XK46d) and G3UUT hopes to have the 70MHz and 144MHz beacons in operation some time in September. Help is still required, however, to complete the 432MHz beacon.

The installation of a new mast for the BBC tv transmitter at Wrotham, Kent, has caused the GB3VHF beacon located there to be closed down. This has provided the opportunity to install a new antenna system for the beacon and to carry out some much-needed maintenance and modifications. The beacon will be off for two or three months. The old antenna, a five-element Yagi, gave excellent service for over 20 years.

UK beacons below 1GHz which are currently operational are listed below. Off the air at present but still licensed are GB3VHF, GB3GI, GB3NEE and GB3CTC.

Callsign	Freq (MHz)	QTH	ERP W	Ant	Beam heading	Keying
GB3SIX	50·020	XN49f	100	3-el Y	270	F1A
GB3WHA	70·040	AL71d	16	2-el Y	315	F1A
GB3BUX	70·050	ZN61A	20	2 × t/s	Omni	A1A, F1A
GB3ANG	70·060	YQ35c	100/14	4-el Y	160	A1A
GB3LER	144·965	ZU65f	50	4-el Y	22	F1A
GB3ANG	144·975	YQ35c	20	4-el Y	160	F1A
GB3WHA	432·81	AL71d	25	2 × 8/8	330, 90	F1A
GB3SUT	432·89	ZM31b	60	2 × 8/8	0, 135	F1A
GB3EM	432·91	ZN32b	50	8/8	150	F1A
GB3ANG	432·99	YQ35c	100	9-el Y	170	F1A

Meteor scatter

Meteor scatter enthusiasts in steadily increasing numbers continue to make excellent use of sporadic meteors and minor showers. G8ECI (AN), home on leave from Saudi Arabia, found his square much in demand on the vhf net where skeds for him were set up by G4IJE. In the period 16 to 29 June, G8ECI had complete QSOs on ssb ms with SM7DLZ (IQ), DK1PZ (EL), I1ANP (EE), YU3ZV (HG), OK2KZR (IJ), IV3HWT (GF), I6DQE (GD), OZ1IDK (ER), LA9BM (EU), YU2CCB (IF), F1JG (CD), OE6WIG (HG), HG1YA (IH), DL0SP/HB0 (EH), EA3LL (AB), HG1KYY (IH) and LA5IH (CU). All of this left Derek in no doubt as to the effectiveness of this mode of operation.

In much the same period, G4IJE, who must surely qualify for the title "Mister ms", worked OK1AFN (IK), OK1OA (HK), DJ5MS (GI), OK2PEW (IJ), LA8KV (FW), DL0SP/HB0 (EH), DK1PZ (crossband 144/70), F6KAW/EA6 (CZ), SM1BSA (JR), YU2ZN (IE) and LA6HL/TF. These provided several new squares and three new countries. The TF QSO was particularly pleasing as Paul tail-ended a QSO between the TF and a PA station with no sked arranged. The EA6 contact represented another exotic and infrequently heard call area and provided one more new country and square.

Between 23 June and 2 July, GM4CXM used cw ms to work YU3ZV (HG), HG1YA (IH), OE6WIG (HG) and DL0SP/HB0 (EH). Ray believes that he may have been the first GM to contact Lichtenstein, and almost certainly this is true for ms working. G8VR also worked the HB0, together with UP2BJB (LP), HG1KYY (IH), SM5MIX (HS) and SK4KVM (HT), but was unfortunate in that he failed to complete with F6KAW/EA6 (CZ) after receiving a 3/7 report following a response to a CQ call.

G4DGU has arranged some ms skeds on 432MHz for the Perseids. Some years ago he tested with SM3AKW on this band and almost completed an ms contact. It will be interesting to see how things go with the more sophisticated equipment available today. Brief details of ms contacts, both direct and crossband, are given under "70MHz", and the GM3WOJ/P skeds on this band in the Perseids should provide useful data.

I will try to summarize the response to G4KLN's letter published in the June *4-2-70*. Serious ms operators have no reason to doubt the validity of their contacts, and the general reaction has been "come and hear my tapes". Most operators can provide recordings of bursts containing considerable amounts of data, far more than is often exchanged in a tropo QSO under difficult conditions. At 600 to 800 lpm a lot of information is received in only a 2s burst, and the tendency is to use higher speeds, even in excess of 1,000 lpm.

No self-respecting ms operator will send "rogers" until he has received both calls and a report. Some European operators have tended to send a roger report after receiving only their own report, but this has usually turned out to be due to ignorance of procedures rather than an intent to cheat. Compare this with a tropo QSO. If the operator at the other end says he has received everything, you do not normally query it, but must accept his word.

When two stations discuss what they received on the vhf net following a QSO or sked, this is not to fill gaps in the log but to compare, period by period, what was sent and received, since ms is an intensely scientific mode. In any case, by the time this occurs the QSO has either been completed or not.

There is one valid exception to this. If, for example, a station receives an R26 report, having already received both calls, he will respond with full "rogers" (eg G9ZZZ RRRRRRRRRRR). If he hears no more from the other station for any reason, he is entitled to find out whether his "rogers" were copied by that station since he has conformed with procedures by receiving both calls, and receiving *and* sending "rogers". He can then discuss it on the net or simply wait to see if a QSL arrives.

G3WZT makes some observations which are much to the point. While not subscribing to special awards for ms, he says that if the random frequency is used during a major shower, so many reflections are often received that it is possible to receive "rogers" intended for someone else, so any final confirmation should contain at least one call as identification. John goes on to say that cheating no doubt exists in ms just as it does on any other mode, but in the final resort you cheat only yourself if you do not follow the accepted rules. How many of us have heard *Es* contacts claimed without any callsigns being exchanged in pile-ups where several stations answer together and believe the response was to them? And, with any schedule, one starts off with the advantage of knowing the calls anyway, be it on ms, tropo, eme or other mode.

Auroral-E propagation

On 27 June at 0238gmt UA1ZCL in RC square worked DK1KO in Kiel on 144MHz cw, and shortly afterwards had a further QSO with DK3UZ in EN. Reports exchanged were in the region of 119–219. The distances involved were in excess of 2,000km, and it is significant that earlier in the day a fairly intense aurora had been observed at both ends of the path.

It is believed that the aurora produced an ionized layer capable of returning 144MHz signals to earth, in effect a weakly-ionized E-layer. Those investigating this form of propagation have chosen to call it an "E" layer since its height above ground must be of the same order as that for layers formed when *Es* is present, as the path-length between stations able to work one another is similar to that experienced in sporadic-E openings. The signal strengths experienced are vastly lower, indicating a much smaller degree of ionization than is the case with *Es*.

UA1ZCL, who uses an 8 × 7-element antenna and 1·5kW output on 144MHz, reports having worked a number of SMs by this so-called auroral-E mode following auroras, but no information is to hand on the path lengths and signal strengths in such QSOs.

G3POI, who supplied most of this information, will carry out tests with UA1ZCL following major auroras in an attempt to throw more light on these matters. Information has just come to hand that G3NSM heard signals from SM5MIX and SM5DCX go fully T9 towards the end of the big aurora on 13 July

Amateur colour tv

GM3VTB wrote from Glasgow to describe some very interesting atv activity from Strathclyde. On 30 May GM3VTB and GM4HCO successfully transmitted amateur tv colour pictures from the summit of Ben Lomond (974m) on 432MHz. Good pictures were received by GM8CUS (Linlithgow), GM3SAN (Baillieston), GM8BKE (Bearsden) and GM3GUO (Glasgow). The equipment used consisted of a Sony HCV 200P colour camera, a Microwave Modules 28/432 transverter suitably modified for colour, and a 19-element Tonna atv antenna. Power was provided by two 7·5Ah nicads.

Scatter

G8RBY is seeking rtty schedules on 144MHz with stations in GI, EI, GM and the Shetlands. He lists the squares he is interested in as WJ, XJ, XK, XM, XN, XQ, XR, XS, YJ, YO, YP, YQ, YR, ZR and AK. Anyone interested in setting up such skeds can contact him QTHR or by telephone on 0664 67118... David Edwards, G8NEO, plans to be active on 144MHz operating /A,P and /M from XK square (and possibly the Scillies WJ) between 4 and 18 September.

Deadlines

Please send all news intended for the November issue to arrive by 23 September (late items by 2 October) and for the December issue to arrive by 21 October (late items by 30 October). □

SWL NEWS

Bob Treacher, BRS32525*

144MHz dx report

Last month there were reports of good tropospheric conditions, sporadic-E and auroral activity, and this month continues the trend. Mid-June to mid-July provided much in the way of good European dx, as well as good inter-G propagation. Dave Whitaker, BRS25429 (ZN03h), caught up with the good tropo conditions on 7 and 8 July. HB9MY (EH63j) provided his first-ever Swiss station, and DF1CF (FH23j) was also good copy, while F1FIM/P (DI65c), GI4LKA (XO21j), GM4DMA/P(ZR), GM8OEG (YQ36c), GM4JLY (YR80c), GI8TBQ (XO33j), EI9EH (WN59j), and F1FHI (ZH63f) were all at good strength at Dave's QTH. On 8 July LX1JA (CJ10d), LA1EKO (BQ37g), GM8GIX (YO05h), and F1CYB (BH20b) were logged. Stations on the east coast worked Y22UJ, Y22GQ, 1W1AHH, I2FAK and OK1GW.

In London the lift seemed to favour stations to the west, with low power stations in GW working into HB9. However, some good dx was audible, including F1DMG/HB9 (DG13b), HB9AMH/P (DH66c), F1GJA/P (CG67g), F1DTC/P (CE37b), DC4QF (DM67a) and F1FJM (AH64a). C31YQ was worked and F6KAW/EA6 in CZ square was heard by several operators.

The best tropo occurred on 12 July when stations in LA, OZ and SM were audible in London. LA5XAA (CS39j) was heard at 1620; OZ1DPR/P (ER) was 59 at 1900, and by 2200 the band was crowded. Lift conditions persisted until around 0030, and the following notable stations were heard: LA1ZE (CS29f), LA9FB (CU), OZ1BEF (EQ67h), OZ1CFO (ER79j), OZ1FDA (EP04c), OZ1FTW (EQ04h), OZ9BE (EO07j), SM6GUS (GR), and SM6HDY (FS80f). Several GMs were also very strong, in particular GM4LBE, (ZU65f), GM4NHI (YR38d) and GM8MBP (YR60e).

A very brief Es opening to VZ square in Portugal occurred on 9 July between 1925 and 1940: CT1AGH, CT1AWO and CT4PI were heard, and at 1951 weak signals were detected from EA9HG (XV), in Ceuta, North Africa. During the afternoon of 12 July several GMs were audible in the London area due to aurora.

Dave Whitaker mentioned a 144MHz reception report sent via the QSL Bureau which was apparently sent in error to the wrong G8. The station had the decency to return his card direct, explaining what had occurred. This good deed deserves a mention as it was a welcome change from some overseas stations who take one's ircs and send nothing. Thank you, G8TXG.

QSL returns from various sources include GM4LBE (ZU), F1TW/P (BJ), IT9IKG (GY), IT9VHS (GY), GI8YDZ (WP), IS0PDQ (EZ) and G8VWG (ZP).

21MHz slp results

SSB. The All-Asian Contest and a reasonable opening to that part of the world provided considerable activity. Little was heard of western Europe, but central Europe, Asiatic USSR and Japan were audible, as were Africa (ZS, 5H3, 5N6, 5Z4), Brazil, and the Middle East (4X4, A4, YK). The best dx logged during the 2h were A4XIU, OH1TD/4U (YK), OH2BJK/OH0, P29GC, UD6BR, UL7CAL, VU2YOU, 5H3DM, 5N6ATT, and 5Z4CI.

Scores were as follows:

	QSOs logged				
Station	15pt	10pt	5pt	Countries	Total
BRS28198	25	0	25	27	13,500
BRS48909	36	0	25	20	13,300
BRS42501	16	0	18	14	4,620
RS49802	18	0	22	11	4,100
RS50625	3	0	8	9	765
BRS25429*	55	0	40	21	21,525

* It is important to note that stations submitting logs for the slps *must* log the station being worked (even though it is no longer required to log the signal report given by the station heard). This entry did not record any stations being worked.

In all, 35 countries were logged during the competition.

CW. Only two entries for this slp: both commented on the poor conditions, with severe QSB on signals. By and large, EU stations predominated in the logs, but a few stations from Africa (ZS and 5H3) crept through, along with some PY stations. In all, 20 countries were recorded, the best dx being PP7IVP, UH8EAD, UL7XE, ZS4GL, ZS6AEI, and 5H3FN.

Scores were:

	QSOs logged				
Station	15pt	10pt	5pt	Countries	Total
BRS44395	15	0	17	17	5,270
BRS30694	9	0	27	18	4,860

1982 HF COUNTRIES TABLE

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS8841	181	180	201	148	95	14	819	ssb/cw
BRS47745	165	191	193	117	110	29	805	ssb/cw
BRS25429	163	176	173	140	107	35	794	ssb
BRS46228	115	108	170	134	107	32	666	ssb
BRS44703	126	142	156	105	100	26	655	ssb
BRS25901	102	142	165	91	97	29	626	ssb/cw
ORS46084/7Q7	147	185	170	41	13	0	556	ssb
ORS45992/7Q7	145	174	176	46	14	0	555	ssb
BRS1066	96	131	125	87	62	41	542	ssb/cw
BRS35509	111	104	142	79	71	5	512	ssb
BRS31440	118	85	106	74	67	27	477	ssb
BRS30694	113	125	105	50	49	28	470	ssb/cw
BRS18529	36	71	63	103	107	27	407	ssb
BRS45033	161	96	141	3	6	0	407	ssb
BRS48675	68	91	100	49	36	18	362	ssb
BRS30493	47	89	112	40	31	6	325	ssb
ARS50886	63	101	88	30	28	2	312	ssb
RS45466	44	81	64	44	55	16	304	ssb

ALL-TIME COUNTRIES LIST

(Starting score 750)

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	272	305	329	236	224	62	1428	ssb
BRS32525	267	301	317	239	246	53	1423	ssb
BRS8841	240	274	309	181	173	25	1202	ssb/cw
A8808	238	274	293	161	163	53	1182	ssb/cw
BRS28198	203	198	257	166	165	36	1025	am/ssb
BRS48909	203	234	241	145	99	32	954	ssb
BRS1066	182	198	259	146	94	58	937	ssb/cw
BRS44703	184	199	207	144	128	36	898	ssb
BRS30694	179	238	244	111	73	32	877	ssb/cw
RS46228	141	153	213	180	119	36	842	ssb/cw
BRS47745	167	195	195	125	111	32	825	ssb/cw
BRS18529	121	181	228	134	102	35	821	ssb
BRS31440	166	166	207	99	91	31	760	ssb
ARS50886	183	183	211	86	69	22	754	ssb

QSL matters

Card returns. Following mention in the July column of those stations who seem not to QSL, your scribe has had an interesting response. Brian Russell, BRS33915, has had QSLs from FM7WS, 6T1YP, HZ1HZ, KH6WF/KH8, ZE6JL, 6O0DX and FR7AI/T. Robert Small, BRS8841, also reported successes from those stations plus ZL1AMO/C and LU3ZY. This seems to have reduced the July list to A71AD, 3C1AC, M1Y, 3D2BH and VK0KC. Can any listener boast a QSL from these stations?

DX addresses. Several more listeners have asked to be included in the list of those prepared to give dx addresses. The following should be added to those listed in the July column: Brian Russell, BRS33915, 163 Halton Road, Runcorn, Cheshire WA7 5RJ, who can provide dx QSL information back to 1972; Harold Moss, BRS18529, Sevenoaks, Kent, tel 0474-85 2400; and Jim Dunnett, BRS30694, Prestatyn, Clwyd, tel 07456 88480.

CARF news service

Several months ago mention was made of the Canadian Amateur Radio Federation News Service. As the transmissions recommence this month the operating schedule is given below. The service operates every second Sunday using VE3TCA, and on alternate Sundays using VE2TCA, which does not include the teletype broadcast.

GMT	Frequency	Mode
1745	14,140kHz	Single sideband phone
1830	14,070kHz	CW 15wpm
2000	21,076kHz	Teletype 60wpm followed by ASCII teletype 100wpm
2130	14,078kHz	Repeat of teletype
2300	3,775kHz	Single sideband phone
2330	3,660kHz	Teletype as above

DX swl

Your scribe received a letter from Marc Domen, ONL6945, via G4DFI. Marc is the UBA contest manager, and UBA has decided that there is a need for a magazine for the swl; he is looking for swls to provide articles for inclusion in such a magazine. Those interested in finding out more about this venture are invited to write to him at Gebr. Blommestraat 14, 2200 Borgerhout, Belgium. It seems that the UBA (swl section) is to promote an all-the-year-round swl contest in 1983. Your scribe awaits the rules with great interest!

Finale

News, views and comments for November should be received by Monday, 20 September. Late copy by 28 September.

* 79 Granby Road, Eltham, London SE9 1EH

First RSGB National HF Convention

by J. D. KAY, G3AAE*

THE HF COMMITTEE had been planning this major RSGB event for well over a year, and looking forward to 19 June 1982 with a mixture of anticipation and apprehension. It would be the first RSGB hf convention, so everything had to be planned from scratch.

It was a calculated risk holding the convention outside London, but near Oxford was considered more accessible from many parts of the country and London was only an hour away on the motorway. The facilities of the venue chosen also seemed ideal, catering as they did for dealers, the RSGB bookshop, the QRP demonstration station, and films and lectures, and having comprehensive catering facilities and a very large car park.

The big unknown, which made planning so difficult, was trying to guess how many people would attend an event with no track record. It could be 100, 250 or 350 plus. How many chairs for the lectures? How many lunches should be guaranteed to the hotel? Would the car park, large though it was, be big enough? The answers would be known only on 19 June.

The convention day was not fine and sunny, but despite this over 350 people arrived, including amateurs from Germany, Switzerland, Scotland and Wales. Judging from the completed questionnaires, all but two intend to come to the 1983 RSGB National HF Convention: so they must have enjoyed it despite the weather and the overcrowding at the two highlight lectures.

The G5RV antenna lecture

There was a full house for this lecture, with an attendance of approximately 175, of whom unfortunately about 50 had to stand. (Next year everyone will get seats for the lectures!) The writer introduced G5RV, more from protocol than necessity: G5RV being one of the best known callsigns anywhere in the world.

Louis Varney commenced with a brief resumé of antennas relative to available space, and their primary operating purpose: local ragchewing or dx. He went on to deal with simple antennas, including dipoles, zepps and long-wires, together with the elements of matching antennas and transmitters. G5RV is a firm believer in antenna tuning units, and dealt at some length with the construction of variable inductances and atu circuits.

The G5RV antenna was discussed (the original article on this antenna was published in the *RSGB Bulletin* November 1966) and its method of operation explained: the need for a good atu for proper operation again being emphasized. Of course the question at the forefront of the minds of many in the audience was whether the G5RV would work on the three new bands. The good news is that it can and does, without any need for modification. G5RV has recently been operating as CX5RV and, as the Uruguayan authorities already permit operation on 10, 18 and 24MHz, he had been able to use the antenna on all three bands with excellent results. All we need now are the other two bands in the UK!

G5RV then outlined means by which antennas can be modified for the new bands, but considered that commercial trapped multi-band Yagis cannot easily be modified, and that the best solution would be to install separate 18 and 24MHz trapped Yagis above or below the existing 14, 21 and 28MHz beam.

Louis Varney concluded his lecture by showing examples of home-made open-wire feeders, variable inductors and feed-connecting arrangements.

On completion of a question and answer period, the writer thanked G5RV and requested the usual indication of appreciation: the applause was deafening and prolonged!

The G3VA receiver lecture

The afternoon lecture by Pat Hawker, which was also to an audience which packed the hall to overflowing, was entitled "HF receivers—simple or complex?". He traced lightheartedly the way in which the hf communications receiver, originally developed to meet the requirements of radio amateurs, had over the years become increasingly complex and costly, with design trends influenced by stringent professional requirements that do not necessarily add to their effectiveness when used on the amateur bands. Increased complexity poses reliability problems, while the inclusion of digital circuitry and microprocessors means that there are high-speed pulses that must be kept out of the signal path. The main problem today, as always, is to reject unwanted signals and minimize spurious responses and internally-generated interference, with the superhet a very powerful method of receiving most signals more than once!

G3VA wants to see more emphasis on the ability of the operator to read cw under interference, and to follow frequency shifted speech etc, rather than added complexity in making receivers more automated. The key to a good receiver is still selectivity, provided there is also good intermodulation-free dynamic range and sufficient stability. Good mechanical design and convenient tuning are among the prime requirements. He suggested that amateurs have been rather slow to take advantage of easy-to-make, low-cost ladder filters based, for example, on tv-receiver type crystals.

The second part of Pat Hawker's lecture included a slide survey of circuits for direct-conversion receivers which, with care, can provide entirely acceptable performance even from low-cost, kitchen-table models; though he emphasized that in more complex forms the d-c receiver is capable of almost the highest performance associated with the best superhet models, and takes full advantage of good audio filters. In short, his talk showed that filters and tuned circuits are still the key to good reception.

In conclusion G3VA showed an example of a miniature spy set of post-second world war vintage. The writer proposed the vote of thanks, and from the applause it was obvious that the audience had appreciated every moment of this fascinating lecture.

The RSGB President presenting the ROTAB Trophy to GM3ITN

HF forum

This was the final event on the convention programme, and was attended by approximately 150 people. G3AAE opened the forum by introducing the panel members: John Allaway, G3FKM, RSGB President and chairman of the IARU Region 1 HF Committee; Dennis Andrews, G3MXJ, chairman of the HF Contests Committee; Peter Miles, G3KDB, HF awards and trophies manager, and himself as chairman of the HF Committee.

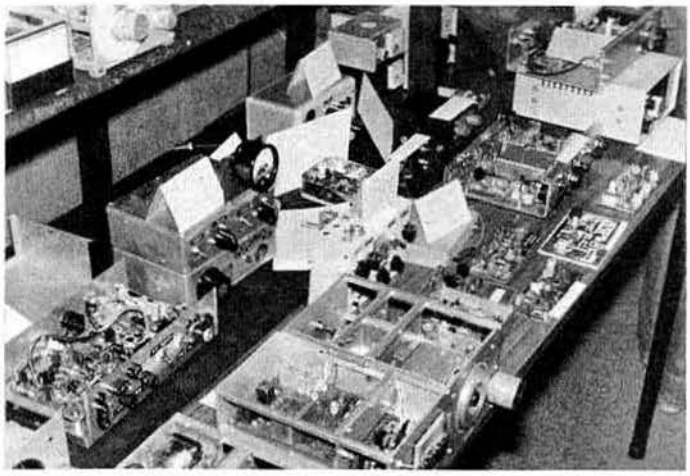
Immediately after the opening remarks, G3FKM presented the ROTAB Trophy to Les Hamilton, GM3ITN. This award, one of the oldest RSGB trophies, is for outstanding and consistent dx working. Some idea of its antiquity can be gained from its initials, which stand for Royal Order of Trans Atlantic Brasspounders!

Then came the questions, which the forum members hope were answered to the total satisfaction of those raising them. Subjects covered included novice licences, USA phone band extensions, the use of 10MHz, 28MHz beacons, the issuing of new licences, contest dates, contest results, contest coverage in *Radio Communication*, and many more.

QRP Club

A QRP station, GB2HF, was on the air throughout the convention and invoked considerable interest. Most favourable comments were made on the excellent and wide-ranging display of home-constructed QRP equipment, which ably demonstrated the high degree of skill being put into the construction of low powered equipments by members of the club.

*75 Roundmead Avenue, Loughton, Essex.



Part of the comprehensive QRP Club display

Thanks are due to Strumech who supplied the telescopic tower complete with rotator, and to the Gravesend Radio Society who supplied the DX33 three-element Yagi antenna. Operation on the lower hf bands employed inverted-V dipoles.

DX films

Throughout the day, films of the Clipperton, Mayotte and Juan de Nova dxpeditions were shown and generated moderate interest. Next year the committee will endeavour to get a dxpeditioner to attend the convention and give an illustrated talk on some of his operations.

G3MXJ, G3KDB and G3FKM listening to a questioner during the forum

Summary

Bearing in mind that this was the first RSGB National HF Convention, and that it was planned completely from scratch, the vast majority attending considered it to be a success, and the HF Committee believes that it now knows what improvements should be made in future years.

Of course one of the major attractions of attending this sort of function is the opportunity to renew old friendships, to put a face to the call, and to discuss subjects of mutual interest, and in this respect the convention was most successful: the management of the hotel spoke in glowing terms of the bar receipts! The HF Committee is already planning a bigger and better convention for 1983, and expects to be rewarded by an even bigger attendance than this year.

Finally, thanks are due to many people who helped in the organization both before and on the day: particularly to the general manager and other headquarters staff; G2AMV and his xyl and G3VPE who manned the bookshop; the lecturers and forum panel members; the dealers who supported an event without a track record; the staff of the Belfry Hotel, the yl/xyls of G4BUO, G4CNY and G3AAE who helped with the lecture visuals and manned reception; and to the members of the HF Committee. □

RAE courses 1982-3

(See also July issue, page 603, and August issue, page 693)

Barking. Westbury Recreational Centre, Westbury School, Ripple Road, Barking. Enrolment 27 September, 7.30-9.30pm, at the school. Courses commence 4 October, 7.30-10pm. Details from G8IZN, tel 01-594 2471.

Bassingbourn. Bassingbourn Village College, Herts. Courses start mid-September. Details from the community education sec, tel Cambridge 811372.

Borehamwood. De Havilland College, Elstree Way, Borehamwood, Herts. Enrolment 13-14 September, 2-8pm. Course Mondays, 7-9pm, commencing 27 September. Details from course lecturer G. L. Benbow, G3HB, QTHR.

Bottisham. Bottisham Village College. Courses start mid-September. Details from community education sec, tel Cambridge 811372.

Brentwood. Brentwood Adult Education Centre, Bishops Hill, Rayleigh Road, Hutton, Brentwood, Essex. Enrolment 13 September 7pm. RAE and morse classes. Details from centre, tel Brentwood 218593.

Brighton. Brighton Technical College, Pelham Street, Brighton BN1 4FA. Details from J. C. Pierce, Head of Faculty of Engineering, at the college, tel 0273 685971.

Bury St Edmunds. West Suffolk College of Further Education, Bury St Edmunds. Courses start mid-September. Details from community education sec, tel Cambridge 811372.

Cambridge. Chesterton Adult Centre, Cambridge. Courses start mid-September. Details from community education sec, tel Cambridge 811372.

Canterbury. Canterbury College of Technology, New Dover Road, Canterbury. Enrolment 8.30am-7pm. Course commences 20 September, 6.30pm. Course lecturer Derek Bradford, G3LCK. Details from the college, tel Canterbury 66081.

Chingford. Friday Hill House, Simmons Lane, Chingford, London E4. Course commences 14 September, 7.15pm. Enrolment will be on first night. Course tutor Alan Foss, G8EAY. Details from head of centre at above address, or tel 01-529 3380.

Crawley. Sarah Robinson School, Ifield, Crawley, West Sussex. Enrolment, 6-8 September, 7-9pm. Course will be held Mondays or Thursdays, 7-9pm, commencing either 20 or 23 September, for 27 lessons. Details from R. Scrivens, G3LNM, tel Crawley 22540.

Dudley. Dudley College of Technology, The Broadway, Dudley, West Midlands DY1 4AS. Enrolment commences 7 September. Class Tuesdays, 6.30-8.30pm. Details from J. Raby, G8RF, course tutor, c/o the college, tel Dudley 53585.

Durham. Classes Fridays, October-May. Details of venue etc from G3ZJY, QTHR, tel 0385 66773.

Glenrothes. Balwearie Community School, Kirkcaldy. Enrolment 20 September, 7-9pm. Morse class, Tuesday evenings; theory class, Thursday evenings. Details from GM4AQO, tel 0592 266287.

Guernsey. The Lodge, La Corbinerie, St Martins. Enrolment 6 September, 7.30pm. Guernsey ARS will run two parallel courses, for December RAE, course instructor John Morris, GU6BGI, and basic course for May 1983 RAE, course instructor Richard Stockwell, GU8FBO. Details from S. Gibbs, GU3MBS, president GARS, 50 Pre de l'Aumone, Castel, Guernsey.

Kettering. Latimer School Adult Education Centre, Castle Way, Barton Seagrave, Kettering NN15 6SW. Enrolment 6-7 September, 7-8.30pm; postal enrolment from 8 September. Course commences 23 September. Course tutor Alan Course. Course fee—£18.40 covers three terms. Details from the college, tel Burton Latimer (0536 72) 4219.

Leeds. Heckmondwike Grammar School. Course commences 13 September, 7pm. Details from F. Stork, G3TEE, QTHR.

Leeds. South Leeds Evening Centre, Cockburn High School, Leeds 11. Courses commence 18 September, 7pm. Details from F. Stork, G3TEE, QTHR.

Maidstone. Adult Education Centre, Cornwallis School, Hubbards Lane, Linton, Maidstone. Enrolment 13-15 September, 7-9pm. Course Monday evenings, 7-9pm, commencing 27 September. Details from Mr D. H. Janney, tel Maidstone 43152.

Melton Mowbray. Melton Mowbray College of Further Education, Asfordby Road, Melton Mowbray, Leics. Enrolment 1-2 September at the college. Course commences 7 September, 7-9pm. Details from the college, or the course tutor Ken Melton, G3WKM, tel Melton Mowbray 68810.

Morley. Morley Technical Institute, Fountain Street, Morley. Courses Mondays, 7-9pm. Details from Mrs Stewart, at the college, tel 538252.

Newcastle upon Tyne. Gosforth Secondary School, Newcastle upon Tyne. Course Wednesdays, 7-9pm. Candidates may sit the examination at the school. Details from the Principal, Gosforth Adult Association, Gosforth Secondary School, tel Newcastle upon Tyne 668439.

Portsmouth. Further Education Centre, Drayton Road, Portsmouth. Courses Tuesdays and Thursdays. Details from the centre, Cosham Park House, Cosham Park Avenue, Portsmouth PO6 3BG, or from G6NZ.

Rugeley. Aelfear Comprehensive School, Taylors Lane, Rugeley. Enrolment 6-8 September, 7-8.30pm, at the school. Course commences 16 September, 7pm, run by the Rugeley Evening Institute, Staffordshire Education Committee. Fees are £9 per term, with substantial reductions for students under 18, senior citizens, and registered unemployed people. Details from course tutor G4DBR, QTHR.

Seaton. St Clare's Centre, Fore Street, Seaton, East Devon. Enrolment 21 September. Course begins 7 October, 7.30pm. Course tutor G. R. Smith, BSc, CEng, MIEE, G8AOJ. Details from the warden at the centre.

Southall. Southall College of Technology, Middx. Details from Stuart Dodson, G3PPD, tel 01-574 3448 ext 67, or 01-422 4153.

Stamford. Great Casterton Community Centre, Ryhall Road, Great Casterton, nr Stamford. Enrolment 6 September, 7pm, or by post to the principal, at the college. Course commences 23 September, 7pm. Details from the college.

Wakefield. Wakefield College of Technology & Arts, Margaret Street, Wakefield. Course Thursdays, 7-9pm. Details from C. Hinkley, Electrical Engineering Dept of the college, tel Wakefield 370501.

Welwyn Garden City. De Havilland College, Applecroft Centre, Applecroft Road, Welwyn Garden City, Herts. Enrolment 13-14 September, 2-8pm, at the college. Classes Thursdays, 7-9pm, commencing 30 September. Details from G. L. Benbow, G3HB, QTHR.

NOTE: Beckenham, Kent

Arising from the apparent lack of, and demand for, morse classes in the London area, coupled with shortage of accommodation at the centre, the RAE course planned to commence at the Adult Education Centre, 28 Beckenham Road, Beckenham, on 21 September has been cancelled and replaced by another morse class commencing at 7.30pm on the same date.

THE MONTH ON THE AIR

John Allaway, G3FKM*

THE DIFFERENCES existing between countries with respect to their amateur radio licensing policy can be very considerable. Many amateurs in Britain may be unaware that there is no code-free licence in the USA—even for frequencies above 30MHz. The FCC is drafting a Notice of Proposed Rulemaking proposing the removal of the morse code test from the present Technician Class licence for operation above 50MHz. It is understood that ARRL would strongly oppose such a move. What would have been the reaction here had RSGB opposed the Class B licence? Perhaps the presence of cb in the USA for so many years took away most of the pressure from those who merely wanted short distance phone communication and who therefore did not need an amateur licence.

G4GLM says that his callsign is being used by a pirate again. He has no hf equipment and does not use cw. QSLs have been arriving for alleged contacts on 7, 21 and 28MHz.

VE3EUP (whose QTH appears after VE1SPI in "QTH Corner") is seeking news of the present whereabouts of the operators of XW8CS and FB8WW (in 1968), ZD3M (February 1973), and HR6SWA (March 1975).

Chris Baker, G4LDS, QTHR, offers his services as QSL manager for a dx station. Please contact Chris direct.

DX news

Those looking for a contact with Oman should seek the Sinbad Net which takes place between 1700 and 2000 each Sunday and Monday on 21,315kHz. According to *DXpress* many A4X stations take part and two stations contacted during each net meeting may be counted towards the new Oman Award.

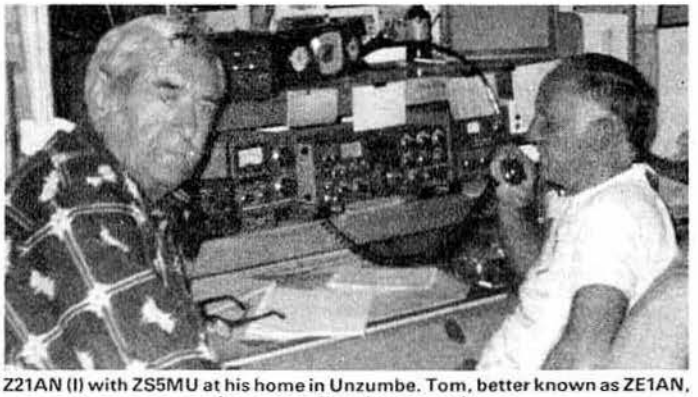
JA1EMT/YI and JH2NDK/YI are radio engineers and have been trying to obtain proper YI calls. The first-named has probably left by now, but JA1DNG/YI is also quite active between 21,270 and 21,290kHz after 1800.

Tim Chen, BV2A/BV2B, has his beams down at the present time because it is the typhoon season in Taiwan. However, he is still on the air using dipoles. Look for him on Wednesdays at 1200 on 14,030 or 21,030kHz, and at other times on 14,217 or 14,225kHz.

EP2TY continues to be the sole signal coming from Iran. He keeps regular schedules on Wednesdays and Fridays at 1400 on 21,250kHz and at 1600 on 14,250kHz.

DF8MP/XZ is still active, but no written authorization satisfying the legality of any Burmese station has yet been submitted to ARRL for consideration for DXCC credit. However, it seems that QSLs from XZ5A and XZ9A will be accepted by *CQ* for its awards.

Latest information on the habits of 9U5WR suggests that he has now left Burundi and returned to Poland, but that he may be assigned to another rare location later in the year. He made over 30,000 QSOs and his QSL manager was SP6FER. Another familiar African signal, TYA11, was also due to close down in mid-July. A new callsign noted from Zaire is 9Q5HK who has been worked on 7 and 21MHz ssb.



Z21AN (l) with ZS5MU at his home in Unzumbe. Tom, better known as ZE1AN, became a silent key recently

*10 Knightlow Road, Birmingham B17 8QB

A group of Brunei amateurs and xyls who met recently. L to r: xyl of VS5GF, VS5DD (G4EXY), VS5GA, VE7CKJ, xyl of VS5LH, VS5LH, VS5DX (ZL3UC), xyl of VS5DX, VS5TX and VS5GF (G2GC). *Photo:* Alan Kan, VS5TX

4K1D is said to be on 3,503kHz daily at 0100, 7,005kHz at 0330, and 14,011kHz from 1400. 4K1A operates on Saturdays on 7,060kHz around 2130 and on 3,640kHz from 2200. 4K0A asks for QSLs via UA1ADQ, and shares the 4K0 prefix with other former UPOL stations from Oblast 171.

DXpress reports that because of rumours of forthcoming activity from Mt Athos, SV1DC, SV1IW, and SV1JG (from the last expedition) have submitted a copy of their 1980 licence to ARRL. They expect that similar documentation will be required from any future expeditions.

LA1EKO/P is unusual in that he is located on North Sea gas platform H-7. He asks for QSLs via LA4CM. According to *DX Bulletin*, LA5VAA arrived at Bear Is in June and is now JW5VAA. He is said to be operating on cw between 1,820 and 1,850kHz. JW5IJ and JW7FD are also on the island. LA5NM and his wife are on Svalbard and using the calls JW5NM and JW8KT respectively. They will be there for up to three years. JW0P was due to close down on 15 August.

AH6DY/KH9 is fairly active from Wake Is, and is usually on until 0700. He keeps a schedule with his new QSL manager, KW6HF, at 0510 on 14,314kHz daily. Note that in order to complete the confusion (particularly in the minds of old-timers to whom KW6 meant Wake Is), KW6HF lives in Las Vegas and not even in California!

VK9ZH made over 10,000 QSOs from Willis Is before leaving. His place has been taken by VK9ZA, Andy, who is expected to be there until 16 December.

WD8QGQ/KH7, located on Kure Is, is regularly active from 0300 on 14,295kHz.

Juan Carlos, CE0ZAD, located on Juan Fernandez Is, is reported to be a regular occupant of 21,230kHz at 1930 on Mondays, with CE3RC helping out.

Long Island DX Bulletin says that 7Q7LW appears regularly on 28,505kHz between 1800 and 1930. In addition he may sometimes be found on 28,038kHz. He also joins the African Safari Net on 21,292kHz at 1800, and makes 7MHz schedules on request—a pirate 7Q7LW has been on 3·5 and 7MHz.

G3GIQ says that G8MPP, who was ZD8MW, has now taken all the QSLs that 'GIQ collected both for ZD8MW and ZD8MJH and will be replying to them himself.

Overseas news

Brian, G5DSD (WA3NGL), apologises for delays in QSLs for his early spring stint at GU5DSD. He was expecting the cards from the printers in late June, and QSL manager WA4WPO has promised speedy service. Brian will be GU5DSD again before and after the CQ WW DX Contest in late October, and GJ5DSD actually during the contest. QSLs should be sent to Linda, WA4WPO, who may possibly join Brian in GU and GJ.

Fernando, EA8AK, when sending along some excellent pictures of the recent dxpedition to Mellish Reef and Willis Is, mentioned that VK9ZR QSLs will be going out by October or November and that they will be a nice four-colour card. He also commented that (at the end of June) there was "nothing sure about Albania yet".

Reg Field, VS5GF (also G2GC), reported that a meeting of 18 Brunei licence holders was held recently at the international airport. It was decided to try to form the Brunei Amateur Radio Transmitting Society and perhaps issue an award next year when Brunei becomes independent. Reg says that all the VS5s would like to hear more signals from the UK, but realize that there are problems after 1600; however, there is activity on 21 and 14MHz every day from Brunei.

Phil Weaver, VS6CT, president of HARTS, has provided a full list of all Hong Kong "full" licence holders as at the end of June 1982. They are as follows: VS6s AA, AL, AO, AP, AQ, AS, AZ, BA, BB, BD, BN, BO, BQ, BR, BS, BT, BU, CB, CC, CG, CK, CN, CT, CW, CX, CY, DA, DF, DH, DI, DJ, DM, DO, DP, DR, DS, DT, DU, DW, DX, DY, EA, EE, EI, EK, EL, EM, EO, EP, ER, EW, EZ, FF, FK, FL, FM, FP, FU, FX, FY, GK, GP, GS, GT, GW, HB9AQZ/VS6, HC, HF, HH, HJ, HN, HO, HP, HQ, HR,

HS, HW, HY, IC, ID, II, IQ, JA, JD, JF, JK, JPC, JS, KC, KT and KV.

In a letter from HMS *Antrim* Stewart Cooper, G4AFF, tries to clarify the present position regarding amateur radio in the area. He has been in both South Georgia and Falkland and says that all the British Antarctic Survey people from South Georgia have now left. He found one Collins 30S1 still there in rather poor condition, but feels that none of the present garrison is a licensed amateur, and that further activity from there will not take place until the Antarctic winter is over. He was able to listen on an R1000 with a long-wire antenna and found that only 7MHz was really useful—he heard many UK signals, particularly during NFD. As far as Falkland is concerned he says that UK signals have been quite good around 2000 with Marshall, VP8PU, having no difficulty in getting out without a linear. He believes that those with their own power supply should now be back to normal.

Expeditions

Karl Renz, K4YT, is now on a business trip through Africa which is likely to last four months and cause him to visit about a dozen countries. He began in Nigeria in July and was then expecting to go to TJ, TL, TN, TR, 9Q5, 5Z4, 5X5, ET3, S79 and 7P8. A good way of locating him would be to listen to his regular schedules with KG3R (his wife) near 21,300kHz after 1800. All QSLs go to W2TK.

Eric, SM0AGD, temporarily left the *Marathon AQ* when it arrived in Fiji. He was active there as 3D2WR and hoped to pick up a generator and beam in Samoa en route to Tonga. ZM7AG is hoping to charter a boat for T31AE and KH1 operation, and will be in the Pacific area until the end of the year.

DXCC listings

It seems clear that your scribe's brain was not functioning very well on the cold day last February when the item which appeared in April *MOTA* under this heading was written! G3UML has already pointed out an omission, and a suggestion from others that "we are obviously not part of the right crowd" caused a full check to be made which revealed a number of errors. A fuller (and hopefully more accurate) list of those with 300 or more countries reads as follows: (Mixed modes) GW3AHN (359), G3AAE (358), G3FKM, G3FXB, G4CP, G5VT (357), G2BVN (356), G2BOZ (351), G3HCT (350), G2FYT (348), GM3ITN (346), G2FSP (343), G3IOR (342), GI3OQR (339), G5RP (335), G3JEC, G6RC (334), G3JAG (331), G3GIQ (325), G3KDB (322), G3HTA (318), G3KAA (311), G3SJH (310), G3ZAY (302). (Phone only) G5VT (357), G3FKM (353), GI3IVJ (349), G3NLY (335), G3JEC (334), G3UML (332), G3TJW (327), G5AFA (326), G3LQP (325), G3ZBA (323), G3MCS (319), G3WW (317), G3SJH (310), G3ZAY (300).

In the two-way cw section G3EZZ was omitted but had a score of 108. All totals are of "all-time" countries, many of which are no longer in existence.

All-time countries table

The first table has been received from G3GIQ. The second will appear in the December issue, and scores should be sent to G3GIQ, QTHR, by 15 October.

Callsign	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3KMA	63	201	277	326	326	311	1,504
G3GIQ	41	154	194	323	323	304	1,339
G3MCS	25	172	193	313	312	300	1,315
G3HTA	39	152	182	291	265	232	1,182
G4FAM	38	135	196	246	244	233	1,092
G3XTT	64	141	179	214	238	234	1,070
G3TXF	28	147	150	238	239	195	1,009
G3XJS	26	33	32	255	267	268	881
VK9NS	5	114	169	218	187	160	856
G3VKW	20	71	74	237	236	213	851
G3RUR	1	28	117	250	159	157	712
G3YMC	57	44	85	128	156	124	594

Welcome

Greetings to the following foreign amateurs who joined the Society during June: AC1Y, CT1WW, EA2TQ, EI6ER, EI7AAB, EI8ANB, HB9AGS, VK1CC, ZC4MR, ZS5AV, 5N8HEM, and Messrs G. Cregg (EI), M. Chelliah (A4), and A. Carnes-Martin (EA).

Ex-G Radio Club

This is for "radio amateurs born in the UK and domiciled abroad". Associate membership is available to those who have a parent or spouse born in Britain, and all applicants must have lived outside the UK for at least six months. Applications for membership should be directed to the secretary: R. Cherrill, W3HQO, 101 Lockart Plaza, Apt A, Philadelphia, Pa, 19116, USA.

The club was founded in 1959 by W3HQO, and has an extensive membership—many of whom keep contact with each other and their homeland by joining the various club nets which take place regularly. The worldwide net takes place at 1900 every Sunday on 14,346kHz, and the Canadian net on the same days at 1630 on 14,155kHz. Other nets function on Saturdays: the "Pacific", which is held on 14,346kHz at 0500, and the "CW" which takes place on 14,065kHz at 1830. A daily "informal family net" meets at 1230 on 21,410kHz. Potential members are always welcome and can obtain details of membership by joining in.

SCHEDULE OF IBP (28MHz) BEACONS

Frequency	Callsign	Location	Notes
28,175kHz	VE3TEN	Ottawa	Non-operational. New frequency allotted, see below.
28,200kHz	—	—	Common frequency.
28,2025kHz	ZS5VHF	Durban	
28,205kHz	DL0IGI	Mt Predigtstuhl	Transmits on 28·2MHz H – H + 5 and H + 30 – H + 35.
28,2075kHz	WD4HES	Englewood Fla	Intermittent.
28,210kHz	3B8MS	Mauritius	Non-operational. Location difficulties.
28,215kHz	ZD9GI	Gough Is	
28,215kHz	GB3SX	Crowborough	
28,2175kHz	VE2TEN	Chicoutimi	
28,220kHz	5B4CY	Zyyi	
28,2225kHz	HG2BHA	Tapolca	
28,225kHz	VE8AA		Non-operational. Location being changed.
28,230kHz	ZL2MHF	Mt Climie	
28,235kHz	VP9BA	Southampton	
28,2375kHz	LA5TEN	Oslo	
28,240kHz	OA4CK	Lima	Intermittent.
28,245kHz	A9XC	Hamala	Temporarily non-operational.
28,2475kHz	ZS1CTB	Capetown	
28,250kHz	Z21AN	Bulawayo	Under construction.
28,2525kHz	VE7TEN	Vancouver	Reserved frequency.
28,2575kHz	DK0TE	Konstanz	
28,260kHz	VK5WI	Adelaide	
28,262kHz	VK2WI	Sydney	
28,264kHz	VK6	Perth	Status unknown.
28,266kHz	VK6	Albany	Status unknown.
28,270kHz	VK4	Townsville	Status unknown.
28,270kHz	ZS6PW	Pretoria	
28,2725kHz	TU2ABJ	Abidjan	Intermittent.
28,275kHz	VE3TEN	Ottawa	Reserved frequency.
28,2775kHz	DF0AAB	Luetjenberg i H (30km E of Kiel)	
28,280kHz	YV5AYV	Caracas	Eu, W and VK in 24h sequence.
28,285kHz	VP8ADE	Adelaide Is	Status unknown.
28,2875kHz	W	Tuckasegee NC	Reserved frequency.
28,290kHz	VS6TEN	Cape D'Aguilar	
28,295kHz	VU2BCN	New Delhi	
28,3025kHz	ZS1STB	Still Bay	TEP
28,315kHz	ZS6DN	Johannesburg	TEP

Awards

Worked All Pacific

Issued by NZART for confirmed contacts with, or reception of, stations in at least 30 Oceania countries since November 1945. A certified list of cards should be sent, with NZ $1 or five ircs, to NZART, Postbox 1459, Christchurch, New Zealand.

Worked All ZL Award

Available to licensed amateurs or listeners who have confirmed contacts or reports with at least 35 different branches of NZART since November 1945. A special endorsement is available to those making the contacts in a period of 12 months. The fee is NZ $0·50 or three ircs, and applications should be sent to the address given above.

The WAVKCA Award

Issued to licensed amateurs who have confirmed contacts as follows since 1 January 1946: one each with VK1, VK8, VK9 and VK0, and three each with VK2, VK3, VK4, VK5, VK6 and VK7. Applicants must be members of an IARU society, and should send a list of QSLs certified by their national society awards manager to Federal Awards Manager, M. E. Bazley, VK6HD, 8 James Road, Kalamunda, W Australia 6076, Australia. There is no fee for the award, but postage for the certificate would be appreciated (two ircs surface, three ircs airmail is suggested by VK6HD).

WALA Award

For confirmed contacts or reception reports with at least 20 LA, JW or JX stations, at least six of which must have been located north of the Arctic Circle. The QTH must be indicated on the QSL card. Contacts after 1 January 1950 are valid. Send list of QSLs certified by national society awards manager, plus NKr5 or 10 ircs to; NRRL Awards Manager, Erik Jahnsen, LA7AJ, Kaupangruta 21, N-3250 Larvik, Norway.

RNARS Anniversary Award

Please note that in future applicants should send claims to D. F. J. Walmsley, 3 Meon Court, 609 London Road, Isleworth, Middlesex TW7 4EW.

Royal Omani ARS Award

This is designed in such a way that it can be awarded for any number of events, contests or conditions as determined by ROARS. It is currently available to those who have worked either eight stations using the A4X

QTH CORNER

ex-A22ZM	via ZS5CU, R. J. Williams, 29 Fir Tree Av, Cleland, Pietermaritzburg, 3210 Natal, Rep of South Africa.
A35WH	via DJ9KH (see ZK2KH).
A4XYB	via G4KII, K. Harris, 101 Camplea Croft, Chelmsley Wood, Birmingham B37 5DX.
C31HD	via F6BII, M. Imbaud, Pl de la Republique, 63230 Pontgibaud, France.
C31JX	via DK9FE, C. Gerlach, Am-Muchlrain 12, D-6440 Bebra, FR of Germany.
CR9T	via WA4IKZ, D. Tanio, 3941 Tonbridge Lane, Winston Salem, NC, 27106, USA.
WD8QGQ/KH7	via KH6JEB, R. Senenes, 95-161 Kauepae Pl, Mililani Town, Hi, 96789, USA.
AH6DY/KH9	via KW6HF, H. Wright, 3910 Parker Lane, Las Vegas, Nev, 89030, USA.
TL8CK, TL8DC	via F6EVM, L. Chaumeny, 6 demaine de Gaillat, 64100 Bayenne, France.
VE1CER	via AK4L, G. Hull, 1625 Cutty Sark Rd, Virginia Beach, Fla, 23454, USA.
VE1SPI	via VE3EUP, G. Hamilton, PO Box 1156, Fonthill, Ont, L05 1E0, Canada.
VP8QG	Deidre Barnes, Dunbar, Falkland Is.
JA1DNG/YI	via JA1CJF, Y. Iteyama, 6-41-7 Honcho, Nakano, Tokyo, Japan.
ZD8MW, ZD8MJH	G8MPP, M. R. Whitley, 888 Greenford Rd, Greenford, Middx UB6 8QW.
ZK2KH	via DJ9KH, W. Hasemann, K1.Moorweide 141, D-2819 Riede, FR of Germany.
ZS3BWK	Box 53, Swakopmund 9000, SW Africa.
3B8FK	Box 1080, Port Louis, Mauritius.
3B9CD	via 3B8CD, A. Teeluck, Berthaud Av, Quatre Bornes, Mauritius.
9L1MS	PO Box 1292, Freetown, Sierra Leone.
9Q5HK	Dieter Knobe, Box 9732, Kinshasa, Zaire.

prefix on ssb or five on cw. The award will be endorsed accordingly. Claimants should submit a log extract of the contacts made, certified and countersigned by an official of an affiliated radio club, together with five ircs (or equivalent) to: Awards manager, ROARS, PO Box 981, Muscat, Sultanate of Oman. Incorrect claims will not be entertained or replied to.

Contests

VK/ZL/Oceania Contest

1000 2 October to 1000 3 October (Phone).
1000 9 October to 1000 10 October (CW)

3·5 to 28MHz. Two points for each QSO with VK/ZL, and one for each contact with a station in Oceania other than VK or ZL. The multiplier is the total sum of VK/ZL call areas worked on each band added together. Exchange RS/T plus serial number (from 001). Logs must show date, time, callsign, band, number sent, number received, and each new VK/ZL call area should be underlined. Use separate log sheet for each band used. Include summary sheet giving callsign, name and address (both in block capitals), details of equipment used, and for each band claimed QSO points and multipliers. Final score is total QSO points multiplied by the sum of call areas worked on all bands. Listeners may enter and should log VK and ZL stations only, noting date, time, station heard, station being worked, RS/T of station heard and serial number being sent. Scoring and logs are similar to the transmitting section. The usual declaration that all regulations and rules have been observed should be included. Please post logs to reach NZART Contest Manager ZL2GX, 152 Lytton Road, Gisborne, New Zealand, no later than 31 January 1983 for either section of the contest. Results will be sent to all who include an irc.

Scandinavian Activity Contest

1500 18 September to 1800 19 September (CW).
1500 25 September to 1800 26 September (Phone).

3·5 to 28MHz confined to the following segments: (CW) 3,505-3,575kHz, 7,005-7,040kHz, 14,010-14,075kHz, 21,010-21,120kHz and 28,010-28,125kHz; (Phone) 3,600-3,650kHz, 3,700-3,790kHz, 7,050-7,100kHz, 14,150-14,300kHz, 21,200-21,350kHz and 28,400-28,700kHz. There are single- and multi-operator multi-band, and multi-operator multi-transmitter sections. Non-Scandinavians work Scandinavians and European stations score one point per QSO. Exchanges consist of RS/T plus serial number (from 001). The same station may be worked on each band for credit, cross-mode QSOs are invalid. For the purpose of this contest Scandinavia is considered to consist of the following prefixes; LA, LB, LG, LJ, JW, JX, OF, OG, OH, OI, OH0, OJ0, OX, OY, OZ, SJ, SK, SL, SM and TF. The multiplier is the number of different Scandinavian call areas worked on each band; eg LA1, LB1 and LJ1 are all one call area. Portable stations without district number count as the tenth district (G3FKM/LA would equal LA0). OH0 and OJ0 count separately. Final score is total QSO points times sum of multipliers from all bands. Logs should show date, time, station worked, sent and received numbers, band, if multiplier, points. A summary sheet must be enclosed giving name and address, callsign, category. Show number of QSOs on each band (less duplicates), number of duplicates on each band, QSO points per band, and final score. All entrants who work more than 200 stations on a band must submit a multiplier sheet for that band, and also a "dupe" sheet listed by call areas. Logs must be mailed by 30 October to: EDR Contest Manager, OZ1LO, Leif Ottosen, Bankevejen 12, Kong, DK-4750 Lundby, Denmark.

The VK9ZR expedition to Mellish Reef earlier this year. L to r: EA8AK, DJ9ZB, VK2BJL, VK3DHT, and Jack Binder, skipper of the *Banyandah*. From Mellish Reef the group went on to Willis Island

ON Contest

0700-1100 3 October (3·5MHz)
0700-1100 10 October (144MHz)

Only QSOs with Belgium are allowed. CW, ssb and fm. Exchange RS/T and serial number (from 001). ON stations will also give their club code (eg MCL). Each QSO counts three points, and the multiplier is the number of different clubs worked. Top station in each country will receive an award. Post logs for 3·5MHz before 24 October and for 144MHz by 31 October to: Welters Leon, ON5WL, Contest Manager MCL, Borgstraat 80, B 2880 Putte Beerzel, Belgium.

Around the bands

G8KG has now returned, and his brief solar up-date reads as follows: "As previously intimated, May was a relatively quiet month as far as solar activity was concerned, the value of 81·4 for the SIDC provisional monthly sunspot number and 148 for the mean solar flux being lower than in any month since August 1978.

Mean activity levels recovered somewhat in June and July, but the outstanding feature of these two months was the very wide range of variation in activity levels. During a trough centred on the first days of July the daily solar flux fell to 103 sfu, a value not seen since August 1978, while the highest daily value in both months was above 250 sfu-256 on 12 June and 271 on 16 July.

During both these peaks there were many flares and considerable geomagnetic activity with an A-index of 150 recorded in Europe on 13 July."

This would seem to explain the extremely poor patches of dx conditions mentioned by the following who kindly submitted logs: G5JL, G3s GIQ, GVV, KSH, NWG, XBY, YRM, G4EHQ, GW4KGR, G4s LDS, LRS, NKM, OBK, G5CFJ, and RSs 30694 and 45205.

Stations listed in italics were on A1A.

1·8MHz. 1900 *4U1ITU.* **2300** *C31JX,* EA3VY, EA8QL, *LA6VK, PY1MAG, UA3PFN, UB5FFJ, 4N4NF.*

3·5MHz. 0000 *LU4FC, PY1DMQ.* **0400** *TU2JB.* **2300** *CN2AO. PY.*

7MHz. 0000 *DK3GI/HK1,* **0100** VO1AB. **0400** *W* (east), *4M3AGT.* **0500** *DA1WA/HB0, LU, PY, VK7LZ, F6IPA/3A.* **0600** *N5RM/C6A, VK2, VK7, W6-W7, XE1AO, ZL.* **2200** *JW8MJ, 4K1D.* **2300** FM7AZ, UA3TDX/U6F, UH8EAA, VK6HD, *ZB2EO.*

10MHz. 0400 *ZL3AAM.* **0500** *FC8TT, DF5TY/HB0, VK2VX.* **0600** *C31HD, VK2* and *VK3* (until 0800). **1800** *DL, LA, OE, OK.* **2000** *ZL3GQ.* **2100** *SM5FUG/OY, VE1ASJ, VK3MR.* **2200** *DL2GG/YV5.* **2300** *FG7BG, XT2AW.*

14MHz. 0500 J88AJ, ON6BC/ST4, YI1BGD, OZ7GI/5N9. **0600** FY7YD, 9Y50FS. **0700** AH8A, VK, VK0AN, W6-W7, ZK2KH, *4K0A.* **0800** DL0SP/HB0, T32AF, VK, W6-W7, ZL, 9M8PW. **1500** CR9T, *VQ9XX.* **1700** JW7FD, 9V1VI. **2000** 5N6DJA. **2100** *CE0DX,* HS1AMM, VK, VQ9IB. **2200** CE, LU, PY, SU1ER, V2AO, VE1SPI, *4S7WP.* **2300** C6ANU, HC8GI, HT3JQ, ZL3MA.

21MHz. 0000 VK3VRL (LP). **0400** *VE5-VE7, W6-W7.* **0500** W7, ZL1JM. **0600** A4XIU, J28DM, KB8RO/KP4. **0800** *BY1PK,* JA (until 1800), *KH6IJ,* TYA11, 3B8FG. **0900** HL1SX, VQ9IB. **1000** FR0FLO. **1100** A71AD, P29CH, P29MF, W (east coast until 2000), *4W1GM,* 5Z5CI. **1200** *A51PN.* **1300** TL8CK, 5H3DM. **1400** *HC1CN, K5YY/J6,* ON6BC/ST4, VE1SPI, VS6CT, W (west coast until 1900), YB8AEG, *3B9CD,* 4K1A. **1500** C53CC, OD5PZ, VQ9CI, VS5GA. **1600** BY1PK, FH8CB, HC8GI, J5HTL. **1700** J88AQ, S79LB, VS5PP, 7Q7LW, 9J2NO, *9V1TL.* **1800** WB8ZJW/CP6, *JD1BAT,* 5N8SMF, 9U5WR. **1900** AP2SQ, D44BC, *SV0CJ/SV5,* V2AZE, VP8s AOE, ADX, QE, ZD7HH, *ZL1AH,* 9L1MS, 9M2LC. **2000** A4XYB, F6BJY/ST2. **2100** *C31HD,* J33PP, YC4GX. **2300** N4FKZ/HR5, VK (LP), ZL4AW (LP).

28MHz. 0900 (much sporadic-E), ZSs (until 1800). **1100** C31WG, TYA11. **1200** AM9JV. **1500** *PY.* **1600** S83H, DJ9FH/5N4, 9J2NO. **1700** *CX,* 7Q7LW. **1800** *HB, LA, OH, OK,* 5N3RFT. **2300** HC1E, HI8IGT, VE1BPZ.

Finally, thanks to all who contributed to this month's column and also to the following for news items: *CQ Magazine* **(W1WY)**, *DXNL* **(DL3RK)**, the *DX Bulletin* **(K1IN)**, the *Long Island DX Bulletin* **(W2IYX)**, *DX News Sheet* **(Geoff Watts)**, the *Ex-G Radio Club Bulletin* **(W3HQO)**, *Long Skip* **(VE3EUP)**, and *DX'press* **(PA0GAM)**.

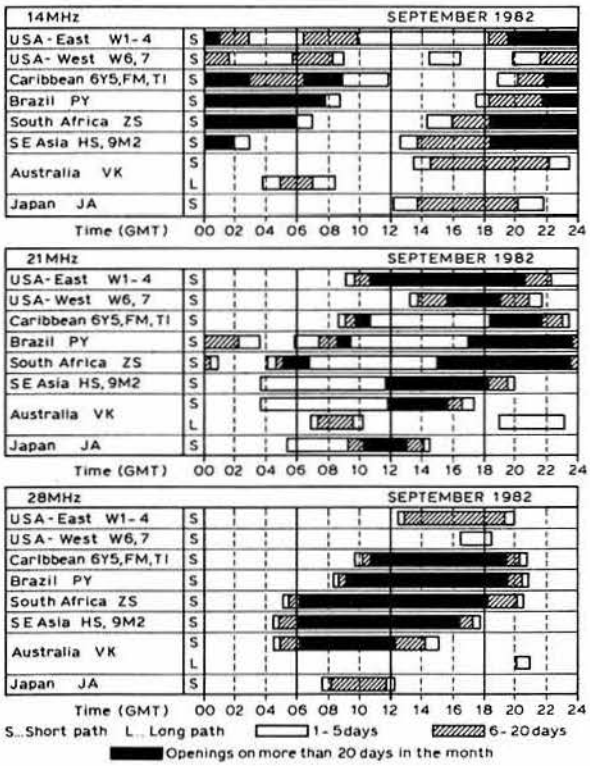
All material for the **November** issue **to reach G3FKM** please by **30 September** and for the **December** issue by **27 October.** □

Propagation predictions

The current relatively low F2 mufs will steadily increase in September so that conditions on the hf bands will continuously improve to reach their maximum towards the end of October-beginning of November. After a long break, traffic with eastern North America and Japan will again be possible on **28MHz**. Traffic with western North America will only occasionally be possible—the chances being better during the second half of the month. The best opportunities for hf contacts with North America will be from stations in the southern half of Britain. This difference will be much more marked throughout the winter months than during the summer. Contact with Central and South America, as well as with SE Asia and Australia, will be certain and improve still more towards the end of the month.

The improvement in conditions is not quite as marked on **21MHz** compared with last month, and is mostly confined to traffic with North America and Japan. As it is now spring in the southern hemisphere, the path to Australia and South Africa will remain open longer. The season of short-skip conditions via sporadic-E is coming to an end. On **14MHz**, traffic with North America will worsen slightly in the second half of the night. Chances for dx on this band are best before midnight because of earlier darkness.

Distances covered will increase on **7MHz** and, as the winter season advances, the chances of dx on this band will increase when the greatest part of the path lies in darkness—QRM permitting. Distances will also increase on 3·5MHz compared with last month. Interruption by the dead zone will only occur in the second part of the night because of interference.



HF propagation study

Band predictions for September 1982

Using the table

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

The probability of signals being heard is given on a 0 (indicated by a dot) to 9 scale; the higher the number the greater the probability, with 1 meaning 10 to 19 per cent of days, and so on. A plus sign indicates a probability of up to at least 1.

	28MHz	21MHz	14MHz	10MHz	7MHz	3·5MHz
GMT	000001111122 / 024680246802	000001111122 / 024680246802	000001111122 / 024680246802	000001111122 / 024680246802	000001111122 / 024680246802	000001111122 / 024680246802
EUROPE						
Moscow	.....1.....	...1455554..	1.1666677872	635544445798	874211112588	+42.....25+
Malta	....11.....	...15555551.	211777778985	876654456899	997421123689	++4.....3++
Gibraltar	.....	....2432231.	1..387777882	652765556898	997632223589	+++3.....2++
Iceland	.....	.....11111..	36667751	31.365556786	875532223568	+++3.....235
ASIA						
Osaka	....12.....	...25541....	...253224442	....2...2573	351	.....2.
Hong Kong	...123321...	...36666541.	1...32236884	2.....3686	363	.....3.
Bangkok	...234441...	...45667651.	3...12236885	4.....3688	1.....366	43
Singapore	...2444431..	...45667862.	3...12226885	3.....3688	1.....366	43
New Delhi	...244441...	..155667621.	421..2226786	73.....3689	51.....368	2.....45
Teheran	...3554542..	..2655678731	745211225898	963.....3689	741.....368	5.....45
Colombo	...3554541..	..1446678521	53...1225898	72.....3689	5.....368	2.....45
Bahrain	...4555552..	1.2655678742	8552..225899	963.....3689	84.....368	5.....45
Cyprus	...2443442...	...787788741	746655557898	986322224799	8741....1478	+4.....24+
Aden	...4655663..	2.2645678854	9761..125899	973.....2689	851.....368	52.....45
OCEANIA						
Suva (S)	.....	....2444141.	..165322573.	..152...251.	...2....3..	.....
Suva (L)	...1.....41	3216421..274	.1375211274.	..152...251.	...2....3..	.....
Wellington (S)	.....	...24444.1...	..1753234741	..152...263.	...2....3..	.....
Wellington (L)	31	331431....74	124752111552	..252...153.	...2....2..	.....
Sydney (S)	...13322....	....57656411.	..1452235762	....12...3662	.....33.	.....
Sydney (L)	.....	11.141....54	111452111274	...22...1451	.....22.	.....
Perth	...355421...	..15776652..	41.132225764	2....1...3686	364	.....4.
Honolulu	.....	.....1..241.	..134311551.	..452...22..	...22.....	.....
AFRICA						
Seychelles	...45565221.	2.2545677764	964...225899	961.....2689	83.....368	+.....45
Mauritius	...4666651.	212555678975	9641..225899	962.....2689	83.....368	+.....45
Nairobi	...466676521	411645578976	9862...25899	984.....2689	872.....367	+4.....45
Salisbury	...366677631	521755578986	9873...25899	9951....2689	883.....367	+5.....45
Capetown	...266677631	41.765578987	98662..25899	9973....2589	885.....368	5+2.....35
Lagos	...176678741	53.675558997	99772...5899	8985....2589	7862.....368	4+3.....35
Ascension Is	....7655663.	44.186556885	996651..1699	99852....389	7862.....167	453.....35
Dakar	....6666775l	331386556995	997751..1699	99852....379	7862.....157	553.....25
Las Palmas	....3443341.	...188877872	774776556799	998743223589	887421...268	++5.....4+
S AMERICA						
South Shetland	3667641	41.126668885	987652125568	89852...2236	6862.....13	353.....
Falkland Is	.....566675.	321237666785	997752121368	99852.....36	7863.....14	4+3.....
Rio de Janeiro	.....765464.	331127655785	9977521..269	99852.....48	8763.....16	+53.....3
Buenos Aires	.....566575.	321117655685	9977521...158	99852.....26	8863.....3	543.....
Lima	.....54454.	21...22654464	88655321...16	89852.....3	6863.....1	3+4.....
Bogota	.....54353.	11...4654454	8864432...16	89853.....3	6863.....1	3+4.....
N AMERICA						
Barbados	.....554454.	11..27644574	8865532...48	99852.....16	8863.....3	5+4.....
Jamaica	.....43343.	1....3654454	87533321..16	89852.....3	6863.....1	3+3.....
Bermuda	.....143243.	1....5654574	87533321.147	89852.....15	7863.....2	4+3.....
New York	.....22222.	1....2554563	763213221136	79752.....4	5863.....1	253.....
Mexico	.....2232.	1.....354442	66323122...2	48752.....	2663.....	.43.....
Montreal	.....22121.	2555563	763213221246	79752.....14	5863.....1	253.....
Denver	.....1.1.	34332	54211..122113	47742.....	1563.....	.23.....
Los Angeles	.....11.	25431	44211..231.1	26742....1....	.363.....	..3.....
Vancouver	.....	2221	32111..25212	25642....2....	.252.....	..2.....
Fairbanks	.....	.....111.	211442124533	23452...2211	.122.....	.....

The Sunspot Index Data Centre in Brussels has provided the following information. Provisional mean sunspot numbers for March, April, May and June were 153·7, 122·5, 81·4 and 110·4 respectively. The maximum/minimum daily numbers each month were: March, 189 on 28th; 116 on 9th; April, 152 on 11th/79 on 30th; May, 130 on 27th/46 on 3rd; and June, 147 on 10th/32 on 29th. The predicted smoothed sunspot numbers for September, October, November and December 1982 respectively are: (classical method) 117, 114, 111 and 108; and (SIDC adjusted values): 131, 128, 125 and 122.

Mobile rallies calendar

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

12 September—Telford Mobile Rally, Telford New Town Centre Malls, Telford, Shropshire (exit 12 off M6 on to A5; A442 from N or S, follow signs to town centre). Opening 11am, but 10.45am for disabled, with special parking arrangements. Talk-in via GB4TRG on S22 fm and SU8/20. All the usual attractions, and even more space. Full catering and licensed premises on site. Unlimited parking. Further details from G8DIR, tel Shrewsbury 64273, G8UGL, tel Telford 584173, or G3UKV, tel Telford 55416, all QTHR.

12 September—Vange ARS Mobile Rally, Nicholas School, Basildon, Essex. 10am-5pm. Talk-in on S22 with callsign GB4VMR. Many attractions including trade stands, bring & buy, raffle, door prize and refreshments. Details from Albert Smith, G4FMK, QTHR, tel 0268 683805.

19 September—Peterborough R&ES Mobile Rally, the Wirrina Sports Stadium, Bishops Road, Peterborough. Situated on the river embankment with plenty of car parking space. Open 10.30am till 5pm. Details from D. T. Wilson, G4KSW, 4 Conway Avenue, Peterborough, tel Peterborough 76238.

26 September—Harlow Mobile Rally, Harlow Sportcentre, Hammarskjold Way, Harlow, Essex. Bar, restaurant, parking, bring & buy, trade stands. 11am to 5pm. Details from Phil, G8FRG, QTHR.

3 October—Great Lumley ARCS Rally, Community Centre, Great Lumley, Nr Chester-le-Street, Co Durham. Open 11am. Talk-in on S22. Usual attractions including bring & buy. Further information from Max Hanaghan, G8HPW, QTHR, tel 078324 3946.

6 November—North Devon Mobile Rally, Memorial Hall, Bradworthy, nr Holsworthy, north Devon. Open 10am-5pm. Talk-in on S22. Details from G8MXI, QTHR, tel Bradworthy (0409 24) 202.

12 December—Leeds & DARS Second Christmas Rally, Pudsey Civic Hall, between Leeds and Bradford. Open 11am. Talk-in on S22 and SU8. Details from J. Greenwood, G4IMF, QTHR; N. Barker, G4FIM, QTHR, or tel Leeds 794507, daytime.

Looking ahead

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

5 September—BATC Convention, Post House, Leicester.

11 September—Scottish Amateur Radio Convention & Exhibition, Aberdeen.

11 September—RSGB Zone C conference, at Scottish Amateur Radio Convention, Aberdeen.

26 September—Welsh Amateur Radio Convention, Oakdale Community College, Blackwood, Gwent. Details from GW3KYA.

7-9 October—11th ARRA Amateur Radio Exhibition, Granby Halls, Leicester. **NOTE CHANGE OF DATES.**

9 October—Midlands VHF Convention, Wolverhampton Polytechnic. Details from J. P. H. Burden, G3UBX.

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

COUNCIL PROCEEDINGS

A brief report on the Council meeting held on 6 May 1982

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

Apologies for absence were received from Messrs Baptiste, Bazley and Fisher, and Dr Evans.

Financial report by the honorary treasurer
The honorary treasurer reported that the interim audit was due to commence during the following week, and commented that *Rad Com* costs were down on estimate, due mainly to lower postage and printing costs.

Mr Cornish spoke of the legal requirements of the Lambda Investment Company Ltd, and said he would ask the Finance & Staff Committee to consider increasing the number of directors following the vacancy caused by the death last year of Mr R. F. Stevens, G2BVN.

The question of reduced subscriptions was discussed and while it was generally felt that the current system was not perfect, it was agreed that the Finance & Staff Committee should give further consideration to the matter.

Secretary/general manager's report
Mr Evans spoke first on the subject of membership, and referred to the latest available figures which he had circulated. The increase in membership in recent months had slowed down considerably but may have returned to normal, judging from the April figures. There had been a much more noticeable level of resignations following the subscription increases, which commenced in October 1981, which had now started to work into the statistics. Of those who had written to resign, the present economic climate was cited as the major reason for having to economise by letting membership lapse. Some were giving up amateur radio and others were turning to different activities (eg computers). Only a few had expressed any view on Society policy as a reason for leaving. However, none of these comments had included those who simply let their membership lapse, although there were still indications that total lapsing figures were in line with those experienced by all different types of associations. It was felt that the long delay in Home Office licensing was, to some extent, responsible for the rather abrupt change in membership growth.

The Alexandra Palace exhibition in the new pavilion had gone well, though many lessons had been learned, not only by RSGB staff and volunteers, but also by Alexandra Palace staff who had not had an opportunity to experience many such large events in the new pavilion. It was noted that there were now several other main exhibitions in the country, which meant that RSGB needed to either make its own event rather smaller or very much bigger.

The honorary treasurer was assisting in the preparation of the general manager's report on the criteria required for a new HQ and that this could be combined with a progress report. Mr Evans stressed that while we remained active in seeking new premises, it was essential to get the right building. This might not be easy as the Society's requirements were specialised for a variety of reasons. Mr Evans commented on planning in relation to interference problems and said that the level of planning problems could easily justify a full-time member of staff, and that the Society was having to spread its resources thinly in this area.

Raynet
Mr Lundegard outlined his concern over the current handling of paperwork and routine matters by Raynet, and said that in his opinion there would eventually be a need for a member of RSGB staff to deal solely with routine Raynet matters. It was noted that this was already part of the thinking of the Finance & Staff Committee. The general manager agreed that there was a need for someone to deal with Raynet's routine paperwork, and added that it was hoped to utilise the computer for part of this, when various software changes, planned for over a year, were completed.

Mrs Heathershaw said that the amount of correspondence to the Raynet Committee had decreased since there was now someone in each region to deal with local matters. The committee had spent the first few months of the year trying to ascertain Raynet members' requirements, and as for administration the committee would wait for assistance from the computer and a member of staff.

It was generally felt that communications within Raynet would improve as the present zonal representative scheme became established.

Membership and representation
Council noted that:
(i) Reduced subscriptions had been granted to 16 members.
(ii) Subscriptions had been waived in respect of four members on medical grounds.
(iii) Affiliation had been granted to: Antrim & District Amateur Radio Club; Army Apprentices College, Harrogate; Aylesbury Vale Repeater Group; Biggin Hill Amateur Radio Club; Derwentside Amateur Radio Club, Consett, Co Durham; Eccles & District Amateur Radio Society; Radio Club of Fakenham, Norfolk; Gibraltar Amateur Radio Society; Kiruna Radioklubb, Kiruna, Sweden; Leicestershire Worked-All-Britain Group, Loughborough; Nene Valley Radio Club, Wellingborough; Nottinghamshire & Derbyshire Border Amateur Radio Club, Ilkeston; Parallel Lines Contest Group, Nottingham; Riversdale Amateur Radio Station, Liverpool; Stanford-le-Hope & District Amateur Radio Club; University of Warwick Amateur Radio Society; Winchester Amateur Radio Club; Wrexham Amateur Radio Society.
(iv) The following area representatives had been appointed: Mr L. G. Mays, G2CWR, Torbay area; and Mr D. F. Campbell, GI4NKD, Mid-Ulster.

Election of Council members on sub-committees
Mr Bellerby summarized the recommendations put forward in his paper on this subject:
1. With effect from 1983, Council places on sub-committees to be the subject of Council ballot;
2. That casual Council vacancies on committees be filled in the same way.

A discussion took place on the advantages and disadvantages of these recommendations, during which it was generally agreed that each committee should have Council representation.

The results of votes taken at the end of the discussion were:
Recommendation 1 was carried—7 being for, 4 against and 2 abstentions.
Recommendation 2 was carried—8 being in favour, 4 against and 1 abstention.

Antique items of amateur radio equipment and Society history
Mr Hawkyard said that he and Mr Jessop had been collecting material for some time, and proposed the formation of a working group to consider the whole subject of historic items of equipment and Society history. Mr O'Brien supported this proposition, and Council agreed to the setting up of such a working group.

Committees
Mr Jessop circulated a graph giving details of current committee membership, and pointed out that two committees remained without Council representation.

It was unanimously agreed that Mr Knight should join the Interference Committee, and that Mr Bellerby should join the Propagation Studies Committee.

IARU proposal 169
It was unanimously agreed to vote in favour of Mr R. L. Baldwin's election as president of the IARU.

CB
Mr Jessop said that the Society was badly off in its lack of adequate Parliamentary contact, especially compared with the cb movement.

The GM replied that he would like to see a publication on amateur radio sent to all MPs quarterly but that there was insufficient staff to deal with such a project at present.

IARU Region 3 Manila conference
Dr Allaway reported that his attendance at the conference had been a most interesting experience. The presence of an RSGB representative had been most valuable and it was hoped the Society would participate in any future conferences, perhaps playing a slightly more active role. He had circulated a report on the conference.

Mr Bellerby, who had been able to visit the conference, congratulated the President on the way he had represented the Society, and echoed Dr Allaway's sentiments regarding the conference.

Council expressed its appreciation of the fast circulation of the comprehensive report from Dr Allaway.

Microwave manager's report
The general manager read a report from Dr Evans concerning restrictions in the licence schedule on microwave operation. It was planned to set up a joint Home Office/RSGB working party to consider these matters.

Overseas meetings
The President reported that he had received the following invitations: from REF to attend its agm on 30 May; from IRTS to attend its golden jubilee dinner in Dublin on 19 June; and for the Society to participate in the Bulgarian society's df championships in September.

Dr Allaway also reported that the EMC symposium (originally to have been held in Poland in April) had been rescheduled for Zurich later this year. RSGB had been asked to participate and papers were now requested.

Review of committee business
Education
Mr Pratt reported that work on the RAE cassette course for the blind was now completed and copies had been produced by RAIBC.

Council agreed that Messrs Newnham, Oxley and Scarr be asked to represent the Society on C & G RAE Advisory Committee for 1982.

It was also agreed to invite Dr Houghton, GW4JNE, to serve on the Education Committee.

Exhibition & Rally
Mr Hawkyard referred to the increased but nevertheless disappointing attendance figures at Alexandra Palace, and said that the committee would prepare a report and recommendations for consideration.

HF
Council accepted the recommendation to invite Messrs Thom, G3NKS, and Atherton, G3ZAY, to join the committee.

Mr Bellerby suggested that in future committees be asked to supply brief details of new members being recommended.

HF Contests
The minutes of two meetings of the committee were accepted without comment.

IARU
Dr Allaway spoke of the delay in producing the booklet on operating behaviour, promised at the Region 1 IARU Conference in Brighton in April 1981.

Interference
The minutes of two meetings of the committee were accepted without comment.

Licensing Advisory
The general manager undertook to prepare a report for Council on recent Home Office meetings on behalf of the committee.

Membership & Representation
The minutes of a meeting of the committee were accepted without comment.

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

Propagation Studies
Council accepted the committee's recommendation that Mr Smith, G8KG, be invited to join the committee as a corresponding member.

Raynet
Council noted that the zonal representation scheme was to be reviewed prior to the September Council meeting.

Technical & Publications
Some discussion took place on the committee's recommendation regarding the advertising of cb. It was decided to refer this back with a request for further information.

Two new books had been published since the last Council meeting: *Radio Communication Handbook* (combined volumes 1 and 2) and *HF Antennas for All Locations*.

It was likely that the subject of the October IEE lecture would be slow-scan colour tv.

VHF
Mr McClintock commented that the VHF Committee had not accepted proposals for the Repeater Working Group to become a full committee. He also spoke of the recent very successful VHF Convention.

OBITUARIES

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

Mr C. M. Denny, G6DN
Mark Denny died on 29 June, aged 90. He was one of the pioneers of amateur radio. His interests and enthusiasm extended over more than 70 years and he was to be heard daily on 3·5 and 144MHz until shortly before his death. He first held a permit to transmit in 1911 and was instrumental in the formation of the Newcastle-upon-Tyne Wireless Society in 1913. At the time of his death he was president of the Thornton Cleveleys ARS, and an honorary life member of South Manchester RC, both clubs of which he was the founder.

At the outbreak of the first world war he was a telegraphist in the Royal Navy. He was commissioned in the Royal Flying Corps on its formation and through this became involved in the development of early aircraft radio, and gave the first public demonstration of air to ground radio in the presence of HM King George V.

Mr A. Grundy, G2HKA
Arthur Grundy died on 19 April. He was an active member of Liverpool & DRC until 1956, and since the end of the second world war had been a keen dx operator. He was active on 3·5MHz.

Also:

Mr J. Bieberman, W3KT;
Mr Bradley, RS46485;
Mr J. R. Ellison, G8OVJ;
Mr F. R. Haslam, G4KLM, on 18 May;
Mr R. J. Jackson, RS45048, on 1 May;
Mr K. G. Keyse, G8ESL, in November 1981;
Mr C. K. Lewis, RS42692, on 16 November 1981;
Mr W. E. Nutton, G6NU, in January;
Mr P. Pienaar, ZS6BKV, in November 1981;
Mr S. Raddon, G8SML;
Mr J. D. Roake, G8EOB, on 30 May;
Mr R. G. Thorburn, G3HIP, on 27 April; *and*
Mr F. T. Wilson, VK5QA.

YOUR OPINION

RMS POWER
The Editor
Radio Communication
Sir—May I draw your attention to several minor printer's errors in my letter published on page 432 of the May issue of *Rad Com*. In para 2, line 12, "i^2R" should read "I^2R". In para 7, the third sentence should read "As a "root mean square" value it would be strictly defined as $P_{RMS} = \sqrt{\text{Average value of } p^2}$ where "p" is the instantaneous value of power. Now since $p = i^2R$ then $P_{RMS} = \sqrt{\text{Av. value of } (i^2R)^2}$."

I recognise the difficulties in typesetting (and typing!) this sort of material, and this letter is prompted by a desire to forestall any criticism of my own inconsistency in distinguishing between instantaneous and other alternating quantities.

W. J. Omer, G3DOJ

Sir—Following G3DOJ's comments on the subject of the misuse of the term rms power, I would like to make a further observation. Being engaged in the manufacture of high-power audio amplifiers for public address, disco, and the music profession, I know that this has been a term which has been used for some time. We print on our amplifiers, for example, 250W continuous sine, into a specified load, such as 4Ω.

In the specification sheets we state similarly "Max continuous sine . . ." into the various loads permitted. The reason we do not use average power, as suggested, is that the users of this type of equipment often overdrive the amplifiers well into flat-topping, where the average power well exceeds the max sine value. Taken to the extreme where a square wave is produced, the average power is now twice the max continuous sine power, guaranteed to cook one's speech coils. We warn that overdriving amplifiers may result in loudspeakers being damaged.

Perhaps the abbreviation mcs could replace rms, when referring to power output.

John R. Hey, G3TDZ

OPEN INVITATION
The Editor
Radio Communication
Sir—A lot has been written recently about the lack of home-constructed equipment in use at the moment, not enough "Kiss"-ing and too many "Kids". One reason for this may be the lack of practical detail in many published designs for simple equipment. The first rig is always the most difficult to build (at least I think it will be) simply because a lack of confidence turns the smallest doubt into a cause for panic.

With the variety of modes of modulation, methods of modulation, graphs of cross-modulation and the like, is it any wonder that the first-timer wants to be led by the hand and not just dropped into a maze of theoretical diagrams with a soldering iron and a price list? What is needed is a published design for a simple, inexpensive transceiver with plenty of written detail aimed at the newcomer. In view of recent comments in *TT*, perhaps a double-sideband QRP transmitter and direct-conversion synchronous receiver would be very appropriate.

If somebody would like to earn a few quid by writing an article on such a rig I, for one, would be very glad to make my first home-brewed leap into the ether.

C. P. Norfolk, G6FRZ

(Any takers?—*Ed*)

CABLE TELEVISION
The Editor
Radio Communication
Sir—As radio amateurs, we should view with alarm the Government's proposal to allow a nationwide cable television network in Britain. The editorial and leading article in the February 1982 *QST* illustrate the problems that are caused to radio amateurs by an ill-conceived cable television system without adequate controls. There can be no doubt that cable tv represents potentially a major source of interference problems for the radio amateur.

The RSGB, as our representatives, should involve itself at an early stage in any discussions on technical standards to be adopted, to ensure that there will be no mutual interference between cable television and amateur radio. The ordinary amateur can play his part by making sure that his MP and the Home Secretary are aware of the potential problems.

Julian V. Moss, BSc, G4ILO

THE MORSE TEST
The Editor
Radio Communication
Sir—Is it not time we "killed off the holy cow" and scrapped the morse test as a requirement for an amateur A licence? This will seem like sacrilege to the older amateurs, but I am sure the reason that used to be given, that if an amateur was interfering with shipping etc he could be contacted by code, is a bit ridiculous now.

When I took my driving test some years ago and had to use hand signals as well as the electric type, I was told it was necessary in case the electric ones broke down. The Ministry of Transport eventually scrapped hand signals.

Many reasons are given for retaining the morse test, but in my opinion none of them hold much water. If we ignore the most common one "I did it, so why shouldn't they", the next reason is that code has a narrow bandwidth and can often easily get through when telephony cannot. This I entirely agree with, but so can rtty which is also only another form of operating and becoming more popular than code, but we do not have to take a typing test. How long will it be before everyone has an electronic morse encoder/decoder?

I know several A licence holders who have never used code since passing the test, and do not intend to. One of them recently could not copy about 8wpm, and certainly would not pass the RAE again without a great deal of studying—he works hf telephony dx on most evenings. In a recent conversation with a new G4, he told me he had never handled a resistor and never intended to, and said he bought all his gear—I asked him if the shop put the mains plugs on for him.

If everyone was honest they would admit that the morse test is really used to limit the number of operators on hf to, perhaps, the more dedicated—so avoiding the cb mentality which is becoming so pervasive on 144MHz. I suggest that the situation on 144MHz is a result of making the RAE so easy. I am not suggesting going back to the older, harder format, but having a second higher level of RAE, more technical and including a test of skills learned during, say, a year of B licence operating. Practical skills can easily be tested by a theory examination. This could also be used to qualify for an A licence by people who resent having to spend time rote-learning something they never intend to use, instead of pursuing technical merit to a much higher degree.

Another reason often given is that learning code makes a better operator. One only has to listen for a short while to Japanese amateurs to appreciate their skill and etiquette; they have abandoned the morse test as a qualification for the hf bands—that also kills the myth about international legal requirements.

Amateur radio should be all things to all fair-minded and tolerant radio amateurs, but surely the technically superior should not be excluded from the hf bands while letting in Pavlov's dogs. After all, the morse test neither requires nor confers any additional technical skills over and above that required by the RAE.

Roy Hesford, G8WLS

Special event stations

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

4 September, GB4RAF
The station will operate at RAF Sealand Open Day on the hf bands, cw and phone, 144MHz fm, ssb and 432MHz sstv. Talk-in on 145·550, S22. Special QSL cards will be available.

9-12 September, GB4RB
Dumfries & Galloway R & ES will be operating the station from St Michael's Church Hall, Dumfries, during the World Burns Federation visit to the town. Operation is planned on all hf bands and 144MHz. Special QSL cards will be available via the bureau. Details from GM4NNC, or C. D. S. Rodgers, 5 Elder Avenue, Lincluden, Dumfries.

25 September-2 October, GB8CXX & GB2MU
The station will be operated during the University of Manchester and Umist introductory week for new students. Operation will be on 144MHz fm/ssb, and 432MHz fstv. There will also be full operation on the hf bands during the week using the club callsigns G3VUM and G3CXX. Details from Duncan Wheelhouse, G8TRP, c/o Umist Radio Society, PO Box 88, Sackville Street, Manchester M60 1QD.

4-8 October, GB2ICR
This station will be operated at the International Congress of Railway Radio Amateurs, Gunton Hall, Lowestoft. Most modes and bands will be used, but preference to FIRAC members and frequencies will be given. QSL cards are available via the bureau, and for FIRAC members via the FIRAC bureau. Details from G. Sims, G4GNQ, QTHR.

17 October, GB2MDJ & GB8MDJ
The Medway AR & TS will operate these stations on the last open event of its diamond jubilee year at Fairfax Hall, Leeds Castle, Kent, at the invitation of the Leeds Castle Trust, which has also provided 1,000 QSL cards depicting Leeds Castle. Equipment will be provided by KW Electronics and Thanet Electronics. Disabled visitors will be admitted free of charge, and Leeds Castle Trust will provide many amenities for them. Further details from Ruby Sivyer, G6DJV, tel 0634 61927, after 6pm.

CONTEST NEWS

The Commonwealth Contest 1982 results

"80 poor, 40 not too bad, 20 and 15 excellent, 10 patchy". This sums up the reactions of most entrants to conditions during the 1982 Commonwealth Contest. The hf bands provided very good openings and for many 21MHz was open for the entire 24h period. However, the lower frequency bands and 3·5MHz in particular were rather poor, with static levels, especially in North America, making copy of weak signals very difficult.

The contest was dominated by Canadian entrants this year and they took the leading four overall placings. Top honours went to a previous overall winner, Lee Sawkins, VE7CC, with last year's winner, John Sluymer, VE6OU, pushed into second place. Top positions were closely fought, the final placings being determined very much by accuracy of logs and attention to bonus points, rather than by sheer number of contacts. It is pleasing to see some increase in activity from VE, and it is hoped that efforts at increased publicity are bearing fruit. The HF Contests Committee is grateful for the help of *CQ* magazine in this respect, which reproduced the rules in full, but it is unfortunate that despite a considerable membership in Canada, ARRL published only a passing reference in *QST*.

Russ Coleston, VK4XA, again lead the Oceanic stations, which were well represented thanks largely to the excellent publicity organized by John Tutton, VK3ZC. Jim Smith, VK9NS, provided many welcome bonus points giving many stations, particularly in Europe, their first contact with Norfolk Island on 7MHz. VK9NM on Lord Howe, and VK9XM on Christmas Island provided additional dx spice during the contest.

It is not until eighth overall position that the first European call appears. Al Slater, G3FXB, maintained his apparently relentless hold on the Colonel Thomas Rose Bowl for the leading UK entrant. Attention to log accuracy, a comprehensive selection of competitive antennas, and the benefit of years of propagation knowledge which produces just those few extra bonus contacts seemed to be the keys to his success. Many logs included comments that there are few contests which have this kind of strategic requirement, and the Commonwealth Contest is a welcome relief from the more common high QSO rate type of event.

At the outset of adjudication, just five points separated the two leading logs in the listener section. After extensive checking, the same narrow margin remained! So this year the Receiving Rose Bowl was awarded to C. Bradbury, BRS1066, with Eric Trebilcock, BCRS195, relegated to second position. Ron Thomas, BRS15822, who has won this section a number of times in the past, mentioned that this would be his last entry in the receiving section as he has now passed his licence examination and expects to hold a G4 call by next year. Congratulations, the committee looks forward to an extra entry in the transmitting section.

The only area of the rules which was commented on was the system of bonus scoring. There was some feeling that UK prefixes or countries should score separately and that some adjustment should be made to more equally balance the scoring between Canada, Europe and VK/ZL. Over a number of years covering sunspot maxima and minima, it is evident that the scoring system is, in fact, fairly well balanced. In recent years, G stations have come close to being overall winners and it must be remembered that the majority of overall leaders have very extensive antenna systems, both for the hf and the lower frequency bands, and that this may be the deciding factor rather than any supposed geographical advantage.

Comments

"Real change to have contest that is not wall-to-wall full of stations" – *VP2MIX*;
"Beam adrift, tower down, so inverted-V at 20ft into snowbank!" – *VO1AW*;
"Treat to work VK9NS on 40m" – *G2HLU*;
"Hot and humid both days (35°C)" – *VK3RJ*;
"Still thrilling to make contact with stations first worked 30yr ago" – *G3EBH*;
"Good stuff again! Feel VEs have an advantage by virtue of geographical location and start/finish time" – *VK2AQF*;
"Conditions on 3·5MHz poor but encouraging to get brief opening to UK, although heard many more stations than I could work" – *ZL1AZE*;
"My first 'BERU', disappointing hearing G stations using beams and working VK/ZLs that I couldn't hear. How about having a restricted section?" – *G4KLN*;
"My last G contest was the first 'BERU' in 1930 when, as VK7JK, I was second overall to VK2NS" – *VK3JF*;
"Best ever assortment of VK call areas. 21MHz was open to somewhere or other for about 17h" – *VE7BS* (single-band);

Peter Naish, VK2BPN, who has been a regular entrant in BERU for many years

VK3MR, who is famous for his rhombic farm which puts out one of the most consistent dx signals from the southern hemisphere

"Chief reason for entry is to prove that there *is* a G3EFS as well as G3ESF—some stations needed a lot of convincing!" – *G3EFS*;
"'BERU' – thoroughly enjoyed – long may it continue." – *VK6AJ*.

The following check logs, which were of great use in checking, are gratefully acknowledged: G3WP, G4CNY, G6NK,VE1ACK, VE3EK, VK2EL, VK4AK, ZL1BKF, ZL2OM and VS6JW.

G3MXJ

TRANSMITTING SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	VE7CC	7,588	71	G8BM	1,968
2	VE6OU	7,434	72	G3VW	1,855
3	VE3BVD	6,772	73	VK3VF	1,700
4	VE5RA	6,311	74	VK3YK	1,678
5	VK4XA	5,798	75	ZL3AGI	1,655
6	ZL2BR	5,562	76	G3JKY	1,635
7	VK9NS	5,524	77	VK3XU	1,595
8	G3FXB	5,449	78	VK2II	1,580
9	9H1CH	5,328	79	Z23JO	1,508
10	G3MXJ	5,265	80	VK2DBL	1,480
11	VE2ZP	5,125	81	G3CCZ*	1,410
12	G3PEK	5,055	82	VO1HP	1,380
13	ZL2RY	4,900	83	VK3XX	1,350
14	9J2BO	4,785	84	G8QZ	1,315
15	ZB2EO	4,750	85	G3HAL	1,240
16	G3OZF	4,615	86	G4AZN*	1,225
17	VE2WA	4,605	87	VK5BN	1,205
18	VE3JKZ	4,598	88	VK4SF†††	1,195
19	VK3XB	4,590	89	GW3NYY	1,190
20	VK3MR	4,583	90	VO1QU†††	1,173
21	VK2BPN	4,265	91	G4BUO	1,165
22	VO2CW	4,230	92	G2AJB	1,140
23	VK7BC	4,165	93	VK7GB	1,130
24	G5RI	4,155		GW3MPB*	1,110
25	T30AT	3,935	94	VE5BAF*	1,110
26	VK1CC	3,929		VK3FC	1,110
27	G3SXW	3,915	97	VK3CG	1,105
28	G3DYY	3,900	98	G3AWR	1,075
29	G6CJ	3,790	99	G5ND†††	1,065
30	C53AP	3,780	100	VK5FG	1,035
31	G2QT	3,730	101	G3TBK**	1,000
32	VK2GW	3,720	102	G3GSZ*	985
33	G3XTJ	3,665	103	G4KRS†††	955
	VE7UZ	3,665	104	VK3APN††	942
35	ZL1AIZ	3,655	105	VK2ZC	940
36	9V1TL	3,445	106	VE7IQ	935
37	G3EBH	3,350	107	ZL1AZE†	919
38	VK3ZC	3,335	108	G4MSK	845
39	VK3AEW	3,305	109	VK2SU	825
40	VK2AQF	3,245	110	VK5HO	795
41	VK3RJ	3,240	111	VK6HD†	790
42	VK3BKU	3,203	112	VK3KS	760
	VK6RU	3,203	113	G4KLN*	755
44	G5MY	3,185		G6GH	755
	VK4UR	3,185	115	G3UYM**	740
46	VK3CM	3,080	116	VE6CNV	685
47	VK3KF	3,040	117	G2GM	650
48	G3KSH	2,895	118	G4IOM**	635
49	VK6FS	2,695		VK3BLN*	635
50	VK7CH	2,595	120	G3YBH	530
51	G3EFS	2,500	121	VO1AW	510
52	G3UFY	2,460	122	G3WRR	505
53	VE4RF	2,416	123	G2VJ**	495
54	G2HLU	2,355	124	G3WJS*	475
55	G3JJG	2,303	125	VK5KL	440
56	G3ESF	2,271	126	VK2BDU†	390
57	VK5GZ	2,250	127	VK2GT	375
58	VE3KZ	2,238	128	VK3SV	360
59	VK1UD	2,225	129	ZL1BLJ*	320
60	VK2DID	2,220	130	VK3CT	250
61	VK5UM	2,155	131	VY1DD†††	236
62	VK5RG	2,150	132	VK7ZO†	225
63	G3VDL	2,125			
64	VK6RZ	2,070			
	VP2MIX*	2,070			
66	VK3BDH	2,045			
67	VK3JF	2,020			
68	VE7BS	1,999			
69	VK6AJ†††	1,978			
70	VK7RY	1,975			

RECEIVING SECTION

Posn	Station	Points
1	BRS1066	2,927
2	BCRS195	2,922
3	BRS15822	2,745
4	BRS44395	1,795

† 3·5MHz single-band * 21MHz single-band
†† 7MHz single-band **28MHz single-band
††† 14MHz single-band

AWARD WINNERS

Senior Rose Bowl	L. Sawkins, VE7CC
Junior Rose Bowl	J. Sluymer, VE6OU
Col Thomas Rose Bowl	A. J. Slater, G3FXB
Receiving Rose Bowl	C. A. Bradbury, BRS1066

BAND LEADERS

3·5MHz overseas	ZL1AZE	21MHz home	G3CCZ
7MHz overseas	VK3APN	21MHz overseas	VP2MIX
14MHz home	G5ND	28MHz home	G3TBK
14MHz overseas	VK6AJ		

How the leaders made their scores

QSOs/bonus

	3·5	7	14	21	28	Equipment
VE7CC	24/24	103/44	204/62	217/55	83/43	No details
VE6OU	18/12	80/42	240/61	272/58	108/40	TS820. T4XB. R4B. MLA2500. 3·5/dipole, 7/3-el, 14/3-el, 21/4-el, 28/5-el
VE3BVD	30/14	100/39	180/47	243/48	131/34	T4XB. R4B. MLA2500. 3·5/slopers, 7/2-el, 14/4-el, 21/5-el, 28/5-el
VK4XA	26/18	44/28	145/56	133/53	52/41	TS520S. 3·5/Zepp 7/Zepp HF/3-el tri
G3FXB	13/11	48/33	108/65	91/55	56/36	T4XC. R4C. 3·5/dipole 7/3-el Yagis. HF/quad Yagi

70MHz Cumulative Contest results

Despite the late publication of the rules for this event, and the omission of the session intended for 28 February, a good entry was received, with many entrants commenting on how much they enjoyed the contest. Several requests were received to hold sessions in the evenings on an eight-day cycle (like the 432 and 1,296MHz Cumulatives). The contest will definitely be held again in 1983, but before setting the rules the committee would like more feedback on preferences for an eight-day cycle or alternate Sundays.

Some comments from the logs: "Rules and timing just right"–*G4ERP/P*; "Evening contests would perhaps give more activity on the band"–*G4ANT*; "I would perhaps have operated in earlier sessions if I knew when they were!"–*G4HNS/A*; "More of the same please"–*G3BPM*; "People don't beam east very often"–*G4FRE/A*.

Most stations found the later sessions had the best conditions and activity. EI2CA worked G4ANT in every session. Congratulations to G4ERP/P and G4ANT, operated by G3JOC and G8VLL, who will receive certificates.

G3XDY

Posn	Callsign	Points	QSOs	Sessions	Best dx	Km
1	G4ERP/P	880	140	5, 6, 7	GM3TAL	475
2	G4ANT	828	101	1, 2, 5	EI2CA	502
3	G4HNS/A	666	110	5, 6, 7	GJ6UW	412
4	G3WHK	599	107	5, 6, 7	GM3WOJ	466
5	G3UKV	566	102	2, 4, 5	GM4DIJ	355
6	G4LNV	442	86	5, 6, 7	GM3WOJ	439
7	G3PSP	437	90	2, 5, 7	EI2CA	410
8	EI2CA	412	30	5, 6, 7	G4ANT	502
9	GW3LDH	406	59	1, 6, 7	GJ6UW	440
10	G4AFJ	381	74	4, 5, 7	G4CIZ	293
11	G4ENB	371	76	2, 4, 6	GM3WOJ	410
12	G3BPM	298	68	4, 5, 7	GD2HDZ	405
13	G4CIZ	259	38	5, 6, 7	G4ANT	396
	G4FRE/A	259	45	2, 3, 5	G4FRO	266
15	G5UM	238	60	1, 5, 7	GD2HDZ	266
16	G4EYD	145	36	5, 6, 7	G3DAH	240
17	G4FKI	126	44	2, 4, 5	G3KMS	–
18	G3FIJ	113	21	7	G3KMS	297
19	GM3TAL	86	10	1, 5, 6	G4ERP/P	475
20	G4FMC	73	17	1, 5, 6	GD2HDZ	260

70MHz and SWL Contest results

This contest again proved to be very popular judging by many enthusiastic comments on the log sheets. "Thanks for a fine contest", *G3JEQ/P*; and with "a reasonable number of stations active", *G3VNQ*; it was "nice to hear so many 'new' calls on four metres", *G3TBK*. G4FRO sums it up: "Lots of people on – excellent contest – roll on VHF NFD 4m section".

A variety of equipment was used, ranging from the sophisticated contest station to handhelds at the milliwatt level. A lot of cw was also heard in this contest, some stations using the mode exclusively.

Conditions ranged from "above average" (G3OIC), to "very poor" (G3PFM/P), with a lot of slow QSB causing stations to "disappear and then reappear in a pile-up" at GD4IOM. "Nothing heard from GM, GU, GJ, GI or EI" (G3TCU), is a frequent comment from stations in the Midlands and Home Counties.

Several operators commented on GW4ALE's "splattering" signal, but it seems that none had actually notified GW4ALE until well into the contest. The group were then able to cure the problem promptly and to the satisfaction of nearby stations. GW4ALE/P would like to "make a plea for contestants to notify stations with defective signals, for everybody's sake".

Regrettably the adjudicator received no swl logs at all, but thanks for detailed and helpful checklogs from G3SLI/M, G3VNQ and G2DHV.

Congratulations to the winner of the portable section, and the winner and runner-up of the fixed section, who will receive a certificate, as well as a thank you to those who took the trouble to send in logs, just to prove that there is 70MHz activity in certain parts of the country.

G4KGC

PORTABLE SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	GW4ALE/P	1,012	118	YM04f	GJ3YHU/A	413
2	G3JEQ/P	644	102	ZL77h	GM3WOJ	480
3	G4ADV/P	579	50	XK46b	GM3WCS	628
4	G3VIP/P	538	70	ZN49j	G4ADV/P	452
5	GW6GW/P	479	73	YL25a	G4ANT	322
6	G3PFM/P	394	54	YK09e	G3JYP	408
7	G3LTY/P	260	38	AL56b	GD4IOM	498

FIXED SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	G4ANT	747	89	AM27c	EI6DT/P	513
2	GD4IOM	656	59	XO67d	G3LTY/P	498
3	G4HNS	537	95	ZM05j	GJ3YHU/A	413
4	G4NVA	475	71	YN69a	GJ3YHU/A	440
5	G3XBY	445	81	ZM52j	GM3WCS	432
6	G3TBK	405	65	ZN77g	G4ADV/P	401
7	G4APL	350	68	ZL60j	GD4IOM	438
8	G4FRO	323	51	YL37c	G3JYP	334
9	G4LNV	318	56	ZL46g	EI9Q	424
10	G3JYP	309	33	YO38j	G4ADV/P	481
11	G3UEY	305	59	YM80a	GM3WOJ	344
12	G3TCU	296	60	ZL67c	GD4IOM	425
13	G4ENA	288	52	YL29b	G3JYP	316
14	G3OIC	280	57	ZM41e	GD4IOM	266
15	G3IOI	254	48	AL33a	GD4IOM	445
16	G3ZNU	231	35	AM77g	G4ADV/P	457
17	G4HMG	206	48	ZL38e	G4ADV/P	324
18	GW4HBK	144	26	YL25f	G4ANT	330
19	G5UM	143	33	ZM35b	GD4IOM	294
	GW4IOI	143	26	YL31h	G4APL	270
21	G3PBV	132	16	YK32b	G4ANT	415
22	G4FMC	55	13	ZM42a	GD4IOM	269

April 144MHz CW Contest results

Judging from the many comments made on the 427 form this was a most enjoyable event, with plenty of sunshine for the portable stations.

Conditions were classed as normal to average despite a large high pressure system over the UK. Unfortunately, with the isobars running from north to south over Europe dx was limited to DL.

Again there appeared to be a lot of QRM caused by stations not using all of the cw sector of the band, and thus losing possible dx.

Congratulations and awards go to the winner and runner-up, G3BDQ and G3NNG.

G4BEL

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	G3BDQ	1,095	91	AK04	DJ1BZ	640
2	G3NNG	865	96	ZL23	DK3UZ	812
3	G4MDZ	830	77	AL76	DK3UZ	667
4	G3UTS/P	791	75	YO20	F5JY	616
5	G4BJM/P	710	90	ZM64	DK8SG	784
6	G4DEZ	631	57	AL35	DK3UZ	659
7	G4BP/P	626	64	ZO46	DK8SG	899
8	G6GN	557	68	YL48	DK2BJ	650
9	G3TBK	495	65	ZN77	F6BRZ	477
10	G3KUE/P	484	64	YO78	F5JY	478
11	G4MKF/A	453	63	ZL44	GM4CXM	539
12	G4EKT	431	53	CM70	PA3BRS	440
13	G4GUF	399	41	AM49	DK8SG	625
14	G4EUE	380	60	ZM33	PA0ERW	502
15	G4MDU	353	53	ZM66	DJ9UX	562
16	G3TGL	338	56	CL48	PA0ERW	520
17	G4HRC/A	334	54	AL31	DJ9UX	487
18	G4NCJ/A	326	52	YP29	GI4CZO/P	475
19	G4KLN	295	45	ZN23	GM3XOQ/A	686
20	G5DS	292	45	ZL49	GI3SXG	508
21	G3FIJ	282	40	AL05	G3UTS/P	379
22	DK3UZ	271	15	EN20	G3NNG	812
23	G4ARI	270	48	ZM24	PA0FHG	414
24	G5HD	236	27	XK09	G4EKT	440
25	G3VRW	192	28	YN19	G3BDQ	374
26	G3TUX	173	33	YO20	G3UTS/P	430
27	G4FKS	124	26	ZN13	G3DDS	340
28	G5UM	115	27	ZM35	G3UTS/P	238
29	G4AGO	101	25	ZL66	PA0ERW	445
30	G3YXX/P	79	23	ZL78	G4LAD	300
31	G4BRT/P	43	7	–	G3NNG	330

7MHz Contest 1983 rules

Licensed radio amateurs and listeners throughout the world are invited to take part in these RSGB 7MHz contests. Please note that the HF Contests Committee is contemplating adding 3·5MHz operation next year. Your comments please.

General rules

1. Entrants must operate in accordance with the terms of their licences.
2. Unmarked duplicate contacts will be penalized at 10 times the number of points claimed, and logs containing in excess of five unmarked duplicate contacts will automatically be disqualified. Duplicate contacts should be included in logs, marked as such, and without any claim for points.

Transmitting section

1. **Eligible entrants.** British Isles: RSGB members only.
   Rest of world: all licensed amateurs.
2. **Periods.** Phone: 1200gmt 5 February to 0900gmt 6 February 1983.
   CW: 1200gmt 26 February to 0900gmt 27 February 1983.
3. **Sections.** Single-operator only.
4. **Bands.** Phone: 7·04–7·10MHz.
   CW: 7·00–7·03MHz. Entrants in the cw section are requested not to operate above 7·03MHz.
5. **Exchange.** RS(T) plus serial number starting at 001. Serial numbers when sent must be recorded from non-competing stations.
6. **Scoring.** (a) British Isles stations with: European stations, 5 points per QSO; non-European stations, 15 points per QSO; British Isles stations may not work each other.
   (b) European stations with: British Isles stations, 5 points per QSO.
   (c) Non-European stations with: British Isles stations, 15 points per QSO.

Note: for scoring purposes aeronautical mobile and maritime mobile stations will count only as minimum score and not for any bonus or multiplier. Entries from GB stations, aeronautical mobile and maritime mobile stations will not be accepted.

7. Multiplier. (a) British Isles stations: one for each different country worked (ARRL DXCC List applies). In addition V/call, VK, W, ZL, ZSE areas will each count as a country for this purpose.

(b) One for each different British Isles prefix worked, ie: G2, G3, G4, G5, G6, G8, GD2, GD3, GD4, GD5, GD6, GD8, GI2, GI3, GI4, GI5, GI6, GI8, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GM2, GM3, GM4, GM5, GM6, GM8, GU2, GU3, GU4, GU5, GU6, GU8, GW2, GW3, GW4, GW5, GW6, GW8 (a maximum of 42). Note that the prefix GB will not count.

8. Final score. QSO points multiplied by the number of different multipliers contacted.

9. Logs. Log sheets should be headed: date; time (gmt); callsign of station worked; RS(T) and serial number sent; RS(T) and serial number received; if multiplier; and QSO points claimed. A summary sheet is required showing the countries or prefixes worked.

10. Declaration. Each log must be accompanied by the following declaration—"I declare that my station was operated in accordance with the rules of the contest and in accordance with the terms of my licence". The declaration must be signed and dated.

11. Address for entries. Entries must be sent to G3KDB, RSGB HF Contests Committee, PO Box 73, Lichfield, Staffs WS13 6UJ, England. Misdirected entries may be disqualified.

12. Closing date for receipt of logs. Phone contest, 2 April 1983; CW contest, 23 April 1983.

13. Awards. The Thomas (G6QB) Memorial Trophy will be awarded to the leading British Isles entrant. In the cw contest certificates will be sent to the entrants placed first, second and third in the British Isles, European, and non-European sections of each contest.

14. Dispute. All entries become the property of the RSGB. In the event of any dispute the ruling of the Council of the RSGB shall be final.

Receiving section

1. Rules as transmitting section except as superseded below.

2. Eligible entrants. British Isles: RSGB members only.
Rest of world: all listeners.

3. Scoring. (a) British Isles listeners should log only overseas stations in contact with British Isles stations. European stations logged count 5 points, others 15 points. (b) Overseas listeners should log only British Isles stations participating in the contest. European listeners may claim 5 points per QSO logged, others 15 points.

4. Multiplier. As transmitting section.

5. Logs. Log sheets must be headed date; time (gmt); callsign of station heard; callsign of station being worked; if multiplier; and points claimed. Note that the callsign of the stations being worked may only repeat once in every five contacts logged unless it is a new multiplier.

6. Declaration. As transmitting section plus "I certify that I do not hold a transmitting licence".

144MHz Fixed Contest rules

0900-1700gmt, 5 December 1982

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

All entries and check logs to VHF Contests Committee, c/o L. Hawkyard, G5HD, The Eyry, Newton St Petrock, Nr Torrington, N Devon EX38 8LU.

IARU Region 1 144MHz & RSGB 144MHz Trophy Contest 4-5 September, 1982 — *Amendment*

Rules published in the July 1982 issue of *Radio Communication*. All entries and checklogs to VHF Contests Committee, c/o M. C. Sharpe, G2HIF, 20 Harcourt Road, Wantage, Oxon OX12 7DQ.

IARU Region 1 UHF/SHF Contest 2-3 October 1982 — *amendment*

Rules published in the July 1982 issue of *Radio Communication*. All entries and check logs to VHF Contests Committee, c/o Mrs P. Suckling, 46 Windsor Close, Towcester, Northants NN12 7JB.

RSGB UHF/SHF Contest rules

1400-1400, 2-3 October 1982

Bands: 432MHz to 24GHz

This contest is timed to coincide with the IARU Region 1 Contest.

Each band will be tabulated individually and no multipliers will be used. Contestants wishing to have their logs forwarded to IARU should clearly state this on Form 4422.

On 2·3GHz and above, crossband contacts will count for half-points. Crossband contacts must be clearly marked in the logs.

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

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

432MHz Cumulative Contest rules

1900-2100gmt, 8, 16 October 1982

2000-2200gmt, 24 October, 1, 9, 17 and 25 November 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 check logs to VHF Contests Committee, c/o W. McClintock, G3VPK, Maple Leaf, Great Braxted, Witham, Essex CM8 3EJ.

1,296MHz Cumulative Contest rules

2100-2300gmt, 8, 16 October 1982

2200-2400gmt, 24 October, 1, 9, 17 and 25 November 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, 13-26.

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

BARTG Autumn VHF RTTY Contest 1982 rules

Duration. 1800gmt Saturday 11 September until 1100gmt Sunday 12 September 1982. A rest period of at least 4h must be taken during the contest period and must be declared on the summary sheet.

Band. 144MHz only. Contacts via a repeater or satellite will not be valid.

Operators. Licensed amateur radio stations within Zones 14 and 15 who are permitted to use rtty as a mode of communication. Portable operation is allowed but must be from one location or within 1km of a quoted location for the whole of the contest. Contest logs from swls will also be very welcome.

Contacts. Stations may not be contacted more than once during the contest period.

Messages. Messages shall consist of the following:

(a) Time of start of contact in gmt, to consist of a full four-figure group. This information must be passed in both directions and be logged. The use of expressions such as "same" or "same as yours" are not permitted.

(b) RST report, normal figure group.

(c) Message number. This will consist of a three-figure group starting at 001 for the first contact made and will continue consecutively throughout the period of the contest.

(d) QRA locator (normal five-symbol locator) is preferred, or QTH given either as a town or as a bearing and distance in km from a town (max distance 25km). The town must be identifiable on a 1:500,000 tourist or route planning map.

Logs. Logs shall be entered on A4 size sheets and be accompanied by a cover sheet similar to the RSGB Form 427, giving address for correspondence, site and equipment details, comments and signature(s) of responsible person(s) etc. The log entry shall contain: Date; time of start of contact; RST report sent; message number; time received; callsign of station worked; his RST and message number (these may be combined, eg 599001); QRA and/or QTH received; estimated distance; and points claimed. It will be useful to include your own QRA at the top of each log sheet.

Scoring. All two-way rtty contacts will score in accordance with the distance chart below. Proof of contact may be required in certain cases where the station worked does not appear in any other contest log received.

Distance chart

0-50km score 1 point	250-300km score 11 points
50-100km score 3 points	300-350km score 13 points
100-150km score 5 points	350-400km score 15 points
150-200km score 7 points	400-450km score 17 points
200-250km score 9 points	450-500km score 19 points

and pro rata on 50km circles.

Awards. Certificates will be awarded to the top scorers and runners-up in each section.

(1) Single-operator stations UK and Europe.	See note (a) below.
(2) Multi-operator stations UK and Europe.	See note (a) below.
(3) Short wave listeners UK and Europe.	See note (a) below.

The judges' decision will be final and no correspondence can be entered into in respect of entries or logs received after the closing date for entries. All contest logs shall remain the property of the British Amateur Radio Teleprinter Group.

Entries. All logs must be postmarked no later than **Saturday 9 October 1982** to qualify. Send logs to BARTG contest manager, c/o Ted Double, G8CDW, 89 Linden Gardens, Enfield, Middlesex, England EN1 4DX.

Additional notes. (a) Single-operator stations may be fixed or portable but must be set up and operated by one person only, otherwise entry may be made under the multi-operator section. (b) Credits may be claimed for contacts made during the contest towards the BARTG VHF Century Award, provided that the claim for the award is made no later than three years after the date of the contest.

(c) Supplies of log and summary sheets are available from the contest manager at the address shown above on request and on receipt of a large (A5 minimum) self-addressed envelope.

BARTG Spring Contest 1982 results

The following was well-supported and all six continents were heard in the UK. The following G stations were listed among the 118 entrants in the single-operator section: 4, G3HJC; 12, GM3ZXL; 13, GI4AHP; 52, GW3EHN; 53, G4NJW; 72, GI4KQA; 74, G4IPZ; 87, G4EEV; 105, G3RDG; and 112, G3KQS. In the multi-operator section, 1, G3ZRS; 4, G3RDG; and 7, GW6GW, were listed. There were no British entrants in the listener section.

During the contest rtty activity took place in Alaska, Antarctica, Antigua, Argentina, Australia, Austria, Balearic Islands, Belgium, Brazil, Bulgaria, Burundi, Canada, Canary Islands, Cayman Island, Channel Isles, Chile, Czechoslovakia, Denmark, German Democratic Republic, German Federal Republic, Ecuador, Eire, England, Estonia, Euro-USSR, France, French Guyana, French Morocco, Greece, Guantanamo Bay, Hong Kong, Hungary, Iceland, Indonesia, Italy, Ivory Coast, Japan, Kuwait, Latvia, Malaysia, Malta, Mellila (North Africa), Mexico, New Caledonia, Newfoundland, Northern Ireland, New Zealand, Nicuaragua, Norfolk Island, Norway, Netherlands, Oman, Philippines, Portugal, Romania, South Africa, Sardinia, Scotland, Songapore, Spain, Sri Lanka, Sweden, Switzerland, United States of America, Vanuatu, Venezuela, Wales, Yugoslavia, Yukon Territory (NWT).

Contests calendar

4-5 September	144MHz & SWL *(Rules and amendment in July/September issues)*
4-5 September	IARU 144MHz *(Rules in July/September issues)*
4-5 September	SSB FD *(Rules in June issue)*
5 September	LZ DX *(Rules in August* MOTA*)*
11-12 September	European DX (Phone) *(Rules in August* MOTA*)*
11-12 September	Cray Valley RS 12th SWL *(Rules in July issue)*
11-12 September	BARTG Autumn VHF RTTY *(Rules in September issue)*
18-19 September	Scandinavian Activity *(Rules in September* MOTA*)*
19 September	10GHz Cumulative 1982
19 September	DF National Final, Colchester/Chelmsford
25 September	AGCW-DL VHF/UHF CW *(Rules in March* 4-2-70*)*
25-26 September	Scandinavian Activity *(Rules in September* MOTA*)*
26 September	RSGB Region 1 VHF *(Rules in July issue)*
2-3 October	IARU VHF *(Rules and amendment in July/September issues)*
2-3 October	RSGB UHF *(Rules in September issue)*
2-3 October	VK/ZL/Oceania (Phone) *(Rules in September* MOTA*)*
3 October	ON (3·5MHz *(Rules in September* MOTA*)*
9-10 October	VK/ZL/Oceania (CW) *(Rules in September* MOTA*)*
10 October	ON (144MHz) *(Rules in September* MOTA*)*
10 October	21/28MHz Phone *(Rules in May issue)*
17 October	21MHz CW *(Rules in May issue)*
October/ December	432MHz Cumulatives *(Rules in September issue)*
October/ December	1,296MHz Cumulatives *(Rules in September issue)*
6-7 November	144MHz CW
6-7 November	Marconi Memorial CW
7 November	LF CW (WAB) *(Rules from D. Roberts, G4FQO, QTHR.)*
13-14 November	European DX (RTTY) *(Rules in August* MOTA*)*
13-14 November	1·8MHz (2nd)
5 December 1983	144MHz Fixed *(Rules in September issue)*
5-6 February	7MHz (Phone) *(Rules in September issue)*
26-27 February	7MHz (CW) *(Rules in September issue)*

CLUB NEWS

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organizations will be published in the January 1983 issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **November** issue should reach them by **18 September** and for the **December** issue by **16 October.**

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

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

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

Accrington (North Western Repeater Group)—16 September. Globe Bowling Club, Willows Lane, Accrington. Sec Howard Aspinall, G3RXH.

Ainsdale (AARC)—14, 28 September. Ainsdale Scout HQ. Sec Norman Horrocks, G2CUZ, tel 0704 77604.

Blackburn (East Lancs ARC)—7 September (Sale of surplus equipment), 5 October (There will either be a talk on receivers or a slide show "Into space"), 7.30pm. Shadsworth Leisure Centre, Blackburn. Pro G4CGT, tel 0254 75037.

Blackpool (B & Fylde ARS)—7 September, 5 October. Contact Jim Newland, G5ND, for details of programme, tel 0253 64588.

Bury (BRS)—14 September ("Radiography", by Andrew Rennison, G8LIR), 7, 21, 28 September (Informal) 7.30pm. Mosses Community Centre, Cecil Street, Bury. Details from David Hensby, G8TKD, tel (daytime only) Whitworth 2213.

Chester (C&DARS)—7 September (No programme details available but note that this is the first meeting of the 1982/3 session and is at the new venue, Chester RUFC, Hare Lane, Vicars Cross, Chester), 8pm. Sec Chris Hopley, G8ICT.

Leyland (LHARG)—13 September, 7.30pm. Rose & Crown, Ulnes Walton, Leyland. Sec Arthur Jolly, G4JCO.

Manchester (MUARS)—Activities to be held during "Freshers Week", when it is hoped to enrol new members into the society, include a special station, GB2MU, which will be operational 25 September-1 October on 1·8 to 28MHz, 144 and 432MHz, with ssb, cw, fm, rtty, and possibly high-definition tv on 435·6MHz. The location will be on the first floor on the north side of the Students' Union building. Further information from the University of Manchester ARS, The Students' Union, Oxford Road, Manchester M13 9PR.

Manchester (South Manchester RC)—3 September (Discussion evening), 10 September (Mini lecture contest), 17 September ("GB3MC repeater", by Trevor Hopkins, G8TYY), 24 September (Surplus equipment sale with G3ZBZ as auctioneer), 1 October (Club quiz), 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec David Holland, G3WFT, tel 061-973 1837.

Preston (PARS)—2 September (Final arrangements for SSB Field Day), 16 September ("Microprocessor programming", by G. Wimlett, G8GLS), Lonsdale Club, Fullwood Hall Lane, Fullwood, Preston. Sec George Earnshaw, G3ZCX.

Stockport (SRS)—8 September (Junk sale), 8pm. Southlands Hotel. Note: all equipment for sale must be taken in by the rear car park entrance. 22 September (Provisionally, there is to be a talk on tvi), 6 October (Ladies night at the Southlands Hotel). Sec Stan Aspinall, G3VSA, tel 061-437 1437.

Thornton Cleveleys (TCARS)—10 September (To be announced), 17 September (Judging of the club construction competition), 24 September ("The suppressed aerial techniques", by Eric Salisbury, G3AVT), 1 October (Talk by the video division of BAC), 8 October (Sale of surplus equipment), 8pm. Thornton Cleveleys Sports Centre, Victoria Road, Cleveleys. Sec Mrs Jen Ward, G8YOK, tel Poulton-le-Fylde 890114.

Warrington (UK FM Group Western)—2 September, 7 October, 8pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Wirral (WARS)—1 September ("Flotilla sailing around Corfu", by Garry O'Keefe-Wilson, G4MIA), 15 September ("Basic fault finding on electronic equipment", a talk by Cedric Cawthorne, G4KPY), 6 October (Sale of surplus equipment), 7.45pm. Minto House School, Birkenhead Road, Hoylake, Wirral. Sec Gordon Lee, G3UJX, tel 051-677 1518.

Wirral (W&DARC)—8 and 22 September ("Sun, earth and radio", parts 1 and 2, by Gordon Adams, G3LEQ), 8pm. Irby Cricket Club. Sec Gerry Scott, G8TRY, tel 051-630 1393.

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

Barnsley (UK FM Group Northern)—5 September, 3 October, 7 November, 7.30pm. The Royal Hotel, Church Street, Barnsley. Sec G4LUE.

Denby Dale (DD&DARS)—Second and fourth Wednesdays in each month, 8 September (Computer programming), 11 September (Demo at Denby Dale Carnival), 17/18 September (Newsome Scouts), 22 September (Surplus sale), 13 October (G3BLL), 16/17 October (JOTA), 27 October (Film evening), 7.30pm. Pie Hall, Denby Dale. Sec J. Clegg, G3FQH. Date for next year's diary, 19 June, 1983 DD Rally.

Goole (GR&ES)—Mondays, 6 September ("SSTV", by G4NLG), 13 September ("ATV", by G8VHL), 20 September (Computer night), 27 September (Club open night), 7.30pm. Goole Junior Chamber Buildings, 17 Boothferry Road. Sec, G8IOH.

Halifax (Northern Heights ARS)—Wednesdays, 7.45pm. Bradshaw Tavern, Bradshaw, Nr Halifax. Sec G8NWK.

Leeds (White Rose RS)—Wednesdays, 8pm. Moortown Rugby Football Club, Moss Valley, Alwoodley, Leeds. Thursdays, club net, 8pm. 3·775MHz or 21·35MHz depending on propagation. New sec G3KWT.

Pontefract (P&DARS)—9 September (Visit to N Wakefield RC junk sale), 16 September (Industrial controls), 23 September (Film evening "Power stations"), 30 September (On the air night), 7 October (Visit to Ferrybridge power station), 14 October ("The energetic electron", by G3ESP). The Carleton Community Centre, Wakefield. Sec G4ISU.

Wakefield (NWRC)—Thursdays, 2 September (AGM), 9 September (First great junk sale), 7.45pm. Carr Gate Working Men's Club, Wakefield. Sec G3SPX. Club call G4NOK. This club has 67 members already, and a shack is being built.

Wakefield (W&DARS)—7 September (Home equipment evening), 14 September (Joint 144MHz df event with Pontefract & DARS), 21 September ("Interference", by G4DXA), 2 October (Club project evening), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G4BLT, tel Wakefield 255515.

York (YARS)—Fridays, 7.30pm. United Services Club, Micklegate, York. 15 October (Annual dinner). Sec Keith Cass, G3WVO. The next event is the departure of Les, G4MIY, on an extended cruise in his 50ft ketch *Miander*, when operation on/MM is planned.

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

Atherstone (AARC)—9 September ("Home construction", by Rev George Dobbs, G3RJV), 16 September (Informal meeting), 7.30pm. The Tudor Centre, Coleshill Road, Atherstone. Sec G4IAG, tel Fillongley (0676) 41814.

Birmingham (Midland ARS)—21 September ("Antennascope", by Naylor Strong, G2RQ), 7.30pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham RS)—Thursdays (HF night on the air), Fridays (Construction and morse classes) 7.30pm. 6 October, 7.45pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G8RGQ, tel 021-459 8312.

Birmingham (University of Birmingham ARS)—3 October (Annual freshmen's fayre—including GB2UB, multi-band station. All freshmen and visitors welcome), Fridays during term, 7.30pm. Tuesdays (RAE classes), 7.30pm. Club room, second floor, Students' Union (above Midland Bank). Sec Chris Driver, G6CMD, tel (before term) 01-462 8788.

Bromsgrove (B&DARC)—10 September ("Satellites", by Phil Parker), 24 September (QRP meeting), 8pm. Avoncroft Art Centre, Bromsgrove. Club net Wednesdays, 144·850MHz, 8pm. Sec G4LVK, tel 021-445 2088.

Malvern Hills (MHRAC)—14 September ("Yagis", by Roger Dixon, G4BVY), 7.30pm. The Red Lion Inn, St Ann's Road, Great Malvern. Sec G4GFX, 9 Wyche Road, Malvern, tel Malvern (06845) 62900.

Redditch (RRC)—9 September ("Aerials and feeders", by Dave Yates, G3PGQ), 23 September (Natter night), 8pm. WRVS Centre, Ludlow Road, Redditch. Morse classes available. Sec G3EVT, tel Alcester (0789) 762041.

Shrewsbury (Salop ARS)—9 September ("Sporadic-E" by Martin Harrison, G3USF), 16 September (Natter night), 23 September ("Computers", by Don, G6FHM), 30 September (Natter night and Raynet discussion), 7 October (Natter night), 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G6AKE, tel Shrewsbury (0743) 66969.

Solihull (SARS)—21 September ("Computers in the shack", by Dick Richardson, G4MQW), 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. Sec G4JDL.

Stourbridge (StARS)—6 September (Constructional evening), 20 September ("Microwaves up to 10GHz", talk), 4 October (Constructional evening), 7.45pm. Library, Longlands School, Brook Street, Stourbridge. Sec G8JTL, tel Lye (038482) 4019.

Stratford-upon-Avon (S-upon-A&DARC)—13 September ("Amateur radio in the 1930s and 1940s", by Dennis Flower, G8TO), 27 September ("Fast-scan television, live demonstration", by Peter Ward, G4GYI), 7.30pm. Bearley radio station. Talk-in on S22. Programme sec G6CWK, tel Stratford (0789) 68863.

Sutton Coldfield (SCRS)—13 September (Natter night and welcome to new members), 27 September ("Communications by satellites", talk), 7.30pm. Central Library, Sutton Coldfield. Club net Mondays, except on meeting nights, 145·2MHz, 8pm. Sec G8TUR, tel 021-353 2061.

Warwick (Mid-Warwickshire ARS)—7 September (Surplus sale), 21 September ("Using the Sinclair Spectrum computer on an amateur station", by Paul Evans, G4BKI), 8pm. 61 Emscote Road, Warwick. Club net Mondays on non-meeting days, 145·350MHz, 8pm. Sec G8RZR, tel Warwick (0926) 499730.

Worcester (W&DARC)—20 September (Members' projects and natter night at the Old Pheasant, New Street, Worcester), 4 October ("Simple antennas and how to tune them", by Dave Yates, G3PGQ), 8pm. "Odd Fellows Club", New Street, Worcester. Sec G8TZE, tel Tewkesbury (0684) 293890.

REGION 4—RR M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. Tel Derby (0332) 556875.

Derby (D&DARS)—1 September (Junk sale), 8 September ("War games", a talk by M. Roth), 15 September (Technical topics), 22 September (Natter night), 29 September (Talk on antennas) 7.30pm. Top floor, 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Grimsby (GARS)—6 September (Visit by RR4, G3SZJ), 20 September (Jamboree-on-the-Air), 7.30pm. Cromwell Social Club, Grimsby. Sec Trevor Matthews, G3RGC, tel Grimsby 884060.

Mansfield (MARS)—3 September (Talk on electrical safety, by G4GYU), 21 September (Social meeting), 7.30pm. Victoria Social Club, Princes Street, Mansfield. Sec Duncan Walters, G4DFV, tel Mansfield 648679.

Melton Mowbray (MMARS)—17 September (AGM), 7.30pm. St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 3369.

Newark (N&DARC)—2 September (Visit to Notts Police HQ), 7 October (Social evening), 7.30pm. Palace Theatre, Appleton Gate, Newark. Sec Roger Hiscock, G4MDV.

Nottingham (ARCON)—2 September (Forum), 9 September (Talk by G3YUT), 16 September (Junk sale), 23 September (Activity night and foxhunt), 30 September (Talk by G8JYP), 7.30pm. Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham. Sec Paul Chapman, G4IJL, tel Nottingham 623828.

Wigston (WRC)—Fridays, 7.30pm. United Reform Church, Wigston Magna. Sec Alan Faint, G6GWH, tel Market Harborough 62827.

REGION 5—RR J. S. Allen, G3DOT, 77 Rosslyn Crescent, Luton, LU3 2AT. Tel 0582 508515, home, 0582 21151 ext 200, work.

Cambridge (CUWS)—No meetings during vacation. Details of club from T. J. Gleeson, G8TUG.

Corby (C&DARG)—Fridays, 8pm. The Hightrees Scout Centre, The Nook, Corby. PR G8IZU, tel 0536 513154.

Dunstable Downs (DDRC)—Alternate Fridays, 8pm. Chews House, Dunstable. The club did a good job in organizing the "talk-in" station at the Woburn Rally—well done. Sec G4ENB.

Leighton Linsdale (LLRC)—13 September (AGM), 27 September (Quiz night return match—LLRC v AVRS), 7-10pm. Vandyke Community College, Room A64,

Vandyke Road, Leighton Buzzard, Beds. Sec John Hart, G8GIK.

Luton (Kent Process Controls ARC)—1 September (Demonstration of equipment by Photo Acoustics of Newport Pagnell, G3TLF), 8pm. The Club House, Tenby Drive, Luton. Sec G3DOT.

Northampton (NRC)—2 September ("The Russian satellite", by G8LHR), 16 September ("Analog to digital converters", by G8EUX), 30 September ("Setting up a vhf station", by G4LYC), 8pm. Kingsthorpe Community Centre. Sec G3VMU, tel Northampton 28516.

St Neots (SN&DARC)—6 September ("Video", by G8RYL), 20 September (AGM), 7.30pm. The Horseshoe Inn, Oford Darcy, nr Huntingdon. Sec G4FOH.

Shefford (S&DARC)—2 September (Preparing for SSB Field Day), 9 September (Discussion on SSB Field Day), 16 September (Natter night), 23 September ("Impressions of Pakistan", by G3DOT), 8pm. Church Hall, Shefford, Beds. Sec Brian, G4MEO.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

Aylesbury (AVRS)—7 September ("Frequency synthesizers", by G3RZP), 5 October ("British Telecom, the new challenge", by G6AGE), 8pm. Stone Village Hall, Stone. Details from Mike Marsden, G8BQH, tel 0296 641785.

Harwell (HARS)—4/5 September (144MHz contest), 21 September ("VHF then and now", plus a detailed look at the RSGB vhf awards system by Jack Hum, G5UM). East Wing Room, AERE Social Club. Details from Ann Stevens, G8NVI.

High Wycombe (Chiltern ARS)—20/21 September (Hazlemere Craft Fair), 29 September (Talk by G4JCC). Sir William Ramsey's School, High Wycombe. Details from G3NCL, tel High Wycombe 712020.

Milton Keynes (MK&DRS)—Second Monday in each month, 8pm. Lovatt Hall, Newport Pagnell. Fourth Monday in each month, 8pm. The Globe, Long Street, Honslope. Details from D. White, G3ZPA, tel Milton Keynes 501310.

REGION 7—RR Pat Walker, G8HMG, 12 Brownlow Road, Redhill, Surrey RH1 6AW. Tel Redhill 64035.

Biggin Hill (BHARS)—21 September ("Running a QSL Bureau", by Arthur Milne, G2MI), last Tuesday in each month, 8pm. Biggin Hill Memorial Library. Sec Ian Mitchell, G4NSD, tel Biggin Hill 75785.

Cray Valley (CVRS)—First and third Thursdays in each month, 8pm. Christchurch Centre, Eltham High Street, Eltham SE9. Sec Peter Clark, G4FUG. Congratulations to the CVRS on raising £400 for the RAIBC from the sponsored JOTA station GB4RES.

Croydon (Surrey Radio Contact Club)—First and third Mondays in each month, 6 September (Surplus equipment sale), 8pm. TS Terra Nova, 34 The Waldrons, Croydon. Sec Ray Howells, G4FFY, tel 642 9871.

Thames Ditton (Thames Valley ARTS)—7 September ("DX working", by Nigel Cawthorne, G3TXF, and Roger Western, G3SXW (ex-EP2IA, YA1R), 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec Julian Axe, G4EHN, tel 946 5669.

Wimbledon (W&DRS)—Second and last Friday in each month, 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon. Acting Secretary of the club is now Ken Bailey, G3EPU, tel 01-546 1390.

This is a shorter list than usual. Would club secretaries please help by supplying details of future programmes. If you do not have an up-to-date newsletter a phone call will suffice.

REGION 8—RR K. A. Crouch, G8KEN, 14 Victoria Road, Capel-le-Ferne, Folkestone, Kent CT18 7IR. Tel 0303 55241.

Canterbury (EKRS)—2 September (Tape talk), 16 September (Natter night), 7 October (AGM, please attend; if you have anything to say this is the time to do it), 7.30 for 8pm. The Cabin, Kings Road, Herne Bay. Details from Derek, G8ELS.

Dover (SEKYMCAARC)—1 September (Natter night/contest planning), 8 September (Open evening/tba), 15 September (Open discussion, subject to be advised), 22 September (Films), 29 September (TVS weatherman Ron Lobeck), 6 October (Natter night), 7.30 for 8pm. YMCA, Godwynne Road, Dover. Information on RAE classes from G4EGQ. Morse lessons and general information from G3VSU.

Eastbourne (Southdown ARC)—First Monday in each month, 7.30 for 8pm. Chasley Home for Disabled ex-Servicemen, Southcliff, Eastbourne. Sec has new telephone number, 0323 643028, for details.

Hastings (HERC)—Wednesdays, 15 September (TBA), 20 October (Junk auction), first Wednesday in each month (Committee meets, 479 Bexhill Road), second, fourth and fifth Wednesdays in each month (Micro nights, 479 Bexhill Road), third Wednesday in each month (Main meeting, West Hill Community Centre), all at 7.30pm. Details from sec Alan Beecher, G8VEA, tel Hastings 216516.

Tunbridge Wells (West Kent ARC)—17 September (2m foxhunt), 1 October (Open evening, beginners welcome), 8pm. Adult Education Centre, Monson Road, Tunbridge Wells. Club also meets intermediate Tuesdays at the Drill Hall, Victoria Road. Details from Brian, G4DYF, tel 0732 456708.

Thanet (RCT)—10 September (Talk by Post Office), 24 September (Talk on rtty), 1 October (AGM, members are requested to attend to voice opinions on the first year of club), 8pm. Birchington Village Centre. Details from Ian Gane, G4NEF, tel 0843 54154.

Cray Valley RS members G4FUG (l) and G3XMD presenting a cheque for £400 to G3NBT (r) for the RAIBC. The money was raised from the CVRS-sponsored JOTA station GB4RES. *Photo:* **G6CSY**

REGION 9—RR W. J. Colclough, G3XC, Highview, Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Camborne (Cornish RAC)—2 September ("The Coastguard", with films by Aubrey, G3XMT), 7.30pm. SWEB Room, Poole, Camborne. Pro S. Rodda, G6DFE, 1/2 Penrose Terrace, Penzance, tel 0736 3948 or 3524.

Exeter (EARS)—13 September (Open night), Community Centre, St David Hill, Exeter. Informal meetings first and third Mondays. The Scout Hall, Emmanuel Road, Exeter. Pro Geoff Draper, G6EWN, 19 Sunnymead, Copplestone, Crediton, Devon EX17 5NQ.

Plymouth (PRC)—6 September (HF activity evening and meeting), 13 September (RSGB video lecture), 7.30pm. Tamar School, Paradise Road, Millbridge, Plymouth PL1 5QW. Pro Peter Connor, G8XTE, tel 075537 319.

Saltash (S&DARC)—3 September (Slide show by Chris Gallacher, G4JCX), "C31YG, a dxpedition to Andorra"). 17 September (Practical microcomputing with Jonathan Wright, G8ZJW), 7.30pm. Toc H, Burraton, Saltash. Sec Kevin Hall, 12 Rashleigh Avenue, St Stephens, Saltash, Cornwall.

As club news is short, and at the request of many readers of this column who are also active repeater group members, the following details give an up-to-date report on the regional machines:

GB3CH. This group met for their AGM in July. The repeater is now operating at a high level of efficiency, the transmitter providing maximum output and the receiver desensing on sun noise at sunrise and sunset. The new secretary of the group, Chris Bartram, G4DGU, comments "to obtain the above standard of efficiency requires cash. Despite many donations both in kind and money the annual subscriptions have had to be increased to £3. The treasurer is Graham Scott, G8MXE, who would be pleased to receive donations and enrol new members. Constructive comments concerning GB3CH by telephone (during working hours on 0409 24 543) or through GB3CH would be appreciated by G4DGU. The group combined with the Plymouth Club for VHF VFD, providing equipment for the three higher bands, and worked a lot of dx.

GB3HB. This group is known as the Mid-Cornwall Repeater Group. It has the financial assistance of the Cornish, Newquay, and ECC St Austell clubs, and their members are promoting a uhf repeater to operate on RB15 from the same site as GB3NC. The licence is included in Phase 6 and is due to be authorized at any time. All the equipment is available and ready for commissioning, and initial trials will take place as soon as possible. The financial situation is now much the same as for other new repeaters (poor) but it is to be hoped that once the equipment is available for use this situation will improve. Sec is Nigel Blackmoor, G8ARH, and treasurer Rawley Surridge, G8XNZ.

GB3NC. The oldest repeater in Cornwall is sponsored by the Newquay club assisted by Pye Telecom Amateur Radio Group. It operates on R5 and is still maintaining a reliable service. The single feeder and filter system which has certain advantages over separate antennas for transmitters and receivers has given no problem. Originally a single dipole was used, but this was found to give considerable horizontal radiation due to reflections from the metal tower. Changing to stacked dipoles rectified this problem, and also gave a 3dB increase in erp, at the same time improving reception. With the filtering used on this system the desensing of an acceptable quieting signal is undetectable. The single feeder system allows both receiver and transmitter antennas to be at the same height (not possible with separate antennas, unless spaced a considerable distance apart). Sec is John Birkbeck, G3WKC, and treasurer Ted Warne, G3YJX.

GB3ND. After considerable ups and downs things are on the move again. Some help is being given by the GB3CH group, the North Devon, and the Exmoor club. The RR wishes them the best of luck in the somewhat barren (radio-wise) wastes of North Devon. Contact Les Hawkyard, G5HD.

GB3SI. Situated at St Ives County Secondary School and operating on R1. The custodian (as he likes to be called) is David Blackford, G3MPB. This repeater is a schools project rather than a group, although a number of local amateurs are involved, with G4BKI being the logic man, assisted by G4DLH, G4FCZ, G4BHC and G3MPB. The sponsors of the equipment of which there were many came from various amateur radio equipment suppliers in the UK. The transmitter and receiver are from a modified IC240. Power out is restricted to 8W due to desensing of the receiver (both the transmitter, receiver and antennas being at the same height and close to each other). A system of filters manufactured by Weycom has been ordered from the USA. When installed it is anticipated that the problem will be considerably reduced. Also in the offing is a micro control unit which will have various additional modes to those already available, such as service "S", emergency "E" etc.

GB3TR. The new location for this repeater is between Torquay and Newton Abbot, 600ft asl. A brand-new 60ft tower has been provided and erected. New logic, based on the GB3US design, and a completely new transmitter, are available. The biggest problem appears to be a lack of help from club members. This repeater is a Torbay club project, so members please give a hand. Contact Colin Coker, G4FCN.

GB3WD. West Devon Repeater Group was formed about a year ago, mainly by members of the Plymouth club. It is proposed to operate a vhf repeater at the BBC site on Hessary Tor. This should serve the locations not covered by GB3NC in the Plymouth area, and give additional coverage to the east. A problem has arisen due to the BBC asking for a yearly rental of some £400 plus electricity used. Support to negotiate over the situation is urgently needed from those in a position to do so. Another problem which has emerged is that a structural report on the mast is awaited before any further thought can be given to increasing the number of antennas erected. It must be stated, however, that the Hessary Tor mast is one of the oldest and is subjected to the severest of weather, being located on the summit of Dartmoor. RR9 wishes the group the best of luck, as any alternative site would not be comparable with Hessary Tor. Contact Ken Price, G3WYJ.

REGION 10—RR P. A. Jones, GW4HAT, 68 Pastoral Way, Tycoch, Swansea SA2 9LY.

Aberystwyth (ARSGBG)—This club meets on a very informal basis approximately every six weeks at The Bay Hotel, Aberystwyth. Next scheduled meeting is 5 October. Sec Simon Mee, GW4CTV, tel Aberystwyth 828365.

Swansea (SARS)—Club call GW4CC now in full use. First and third Thursday in each month, 7.30pm. Lecture Room 'N', Applied Sciences Block, Swansea University College. Club net each Sunday, 1000gmt, 28·530 or 28·310MHz if QRM high. Activity this month is the organization and participation in SSB Field Day on 4/5 September. Sec Roger Williams, GW4HSH, tel Swansea 404422.

REGION 11—RR B. H. Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Colwyn Bay (Conwy Valley ARC) (GW6TM)—9 September (Club meeting, programme tba), 7.30pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. 12 September (Coach trip to Telford Rally). Sec J. N. Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL22 7DS, tel 0745 823674.

Dolgellau (Meirion ARS) (GW4LZP)—2 September (Radio quiz, quizmaster Bob, GW3KOR). Nannau Country Club, Llanfacreth, nr Dolgellau, Gwynedd. Sec W. K. Judge, GW4KEV. Pro Len C. Bridges, GW6COM, c/o Irem Idris, Barmouth Road, Llanelltyd, nr Dolgellau, Gwynedd LL40 2TD.

Rhyl (R&DARC)—9 September, 23 September (AGM and slide show), 7.30pm. Ambulance Station Rhyl. Sec B. Jones, GW8OYT, 6 Rhodfa Maes Hir, Rhyl, Clwyd, tel 0745 37284.

The above three clubs are the only ones in Region 11 to have sent RR11 any new programme information. Will other club secs please send R11 programmes for "Club news". 73, *GW2FLZ.*

REGION 15—RR J. T. Barnes, GI3USS, Whitegables, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ. Tel 0247 3948.

Ballyclare (E Antrim ARC)—GI4KKK—14 September (AGM), 8pm. Fairview Primary School, Hillmount Avenue, Rashee Road, Ballyclare. Members please note change of venue. Details from sec J. Welch, GI4JXM, tel Ballyclare 40384.

Banbridge (Mid-Ulster ARC)—12 September (AGM), 3pm. QTH of GI4BAC. Members note change of date. Contact sec D. Campbell, tel 0762 42620.

Bangor (B&DARS)—GI3XRQ—3 September (AGM), 8pm. Sands Hotel, Bangor. Contact GI4JTF.

Belfast (BRSGBG)—15 September (AGM), 8pm. Shorts Supervisors Club, Belmont Road, Belfast. Contact GI4JDX.

Lagan Valley (LVARS)—GI4GTY—13 September (AGM), 7.30pm. Rathvarna Teachers Centre. New members especially welcome. Sec GI8SXN.

REGION 16—RR. T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Harlow (H&DRS)—Tuesdays, 7 September ("Radio and electronic aids in the Lifeboat Service", by G8ZKZ), 8pm. Mark Hall Barn, First Avenue. Details from Cilla Mann, G4KVR, c/o Mark Hall Barn, First Avenue, Harlow.

Ipswich (IRC)—1 September (Final planning for SSB Field Day), 4/5 September (SSB Field Day at Otley), 8 September (Planning for ESWR 1983), 29 September (Equipment sale). Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

Martlesham (MRS)—First Wednesday in each month, 7.45pm. British Telecom Research Labs, Martlesham Heath. Visitors are always welcome but must first contact G3ZNU for security clearance.

Stowmarket (S&DARS)—6 September ("Micro computers", by G8MYE). Red Cross Hut, Station Yard. Details from Jim Lowe, G8SCB, tel Needham Market 721296.

Vange (VARS)—Thursdays, 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.

Basingstoke (BARC)—15 September ("Commercial approach to communications", by G4EFY), 20 October (AGM), 7.30pm.Chineham House, Popley, Basingstoke. Sec G6CPA, tel Tadley 07356.

Bournemouth (BRS)—3 September (Natter night), 17 September ("SMC equipment", by Nigel Curzon), 1 October (AGM), 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel Ferndown (0202) 877945.

Dogmersfield (UKHFM Group)—Results of the AGM: chairman, G3UAV; sec/treasurer, G8YLH; contest officer, G8PMT.

Fareham (F&DARC)—1 September (No meeting), 8 September ("A tuned balun coupler for the hf bands", by G3CCB), 15 September (Natter night), 22 September ("Trio equipment", by Telecoms of Portsmouth) 29 September (Natter night), 7.30pm. Portchester Community Centre. Sec G4ITG, tel Fareham 234904.

Farnborough (F&DRS)—8 September (Pre-AGM discussion), 22 September (Construction contest), 7.30pm. Railway Enthusiasts Club, Farnborough. Sec G4BJQ, tel Farnborough (0252) 43036.

Southampton (SUARC)—Tuesday evenings, informal meeting every lunchtime in the Clubroom, Old Union Building. Sec G4LYL.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Cheshunt (C&DARC)—1 September (Natter night), 8 September ("Amateur radio, a very special hobby", open discussion), 15 September (Natter night), 22 September ("RF measurement tech", by Les, G6BTQ), 29 September (Natter night). The Church Room, Church Lane, Wormley, Nr Cheshunt, Herts. This club is actively engaged in fostering newcomers to pass the RAE. It also holds morse classes and will be starting a class in September if enough people are interested. Details from Bob Gray, G6CNV, tel Dane End 254.

London (West Civil Service ARS)—This club has recently started up again after a long absence. They hold their meetings mainly during the lunch hour at The Civil Service Rec Centre, Monck Street, Millbank SW1, on first and third Mondays in each month. 6 September (G3AAJ on satellites). Details from G. Costin, G4GFU, tel 01-632 6444, day-time.

Chiswick (ABCARC)—21 September (Discussion on oscillators opened by G3IGM), 7.30pm. The Committee Room, Chiswick Town Hall, High Road, Chiswick, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.

Edgware (E&DRS)—4/5 September (SSB Field Day at Copthall playing fields), 9 September (Informal), 23 September (To be announced), 8pm. 145 Orange Hill Road, Burnt Oak, Edgware. Sec has new QTH: 11 Batchworth Lane, Northwood, no tel yet. Details from G4MLU, tel 01-652 7402. This club holds regular morse classes.

Grafton (GARC)—4/5 September (SSB Field Day at the Farm, Hemel Hempstead), 10 September (Radio and electronics "Call my Bluff"), 24 September ("Morse on the hf bands", by G3MCD), 8pm. Five Bells Pub, East End Road, East Finchley, London N5. Sec Jim Chambers, G4IBK, tel 01-346 5841.

Harrow (RSH)—3 September (Talk, to be announced), 10 September (Constructional contest), 17 September (Surplus equipment sale), 24 September (Informal and practical evening), 7.30pm for 8pm. Roxeth Room, Harrow Arts Centre, (opposite the Alma Pub), High Road, Harrow Weald, Middx. Come up on GB3HR for instant talk-in to the premises on club night. Details from Chris Friel, G4AUF, tel 01-868 5002.

Havering (H&DARC)—1 September ("Practical meteorology", by a visiting speaker to the club), 8 September (Natter night), 15 September ("The RSGB antenna and mast planning panel and its work", by G4ERX), 22 September (Natter night), 29 September ("Civil engineering", by G8KAX), 8pm. Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Details from A. Negus, G8DQJ.

Southgate (SARC)—For details of September meetings please contact sec. All meetings are held at St Thomas's Church Hall, Prince George Avenue, Oakwood, London N14. Sec John, G8EWG.

Stevenage (S&DARC)—2 September ("The RSGB", by David Evans, G3OUF), 16 September (Talk by C. Barber, G4BGP), 8pm. Staff Canteen, British Aerospace, Site B, Argyle Way, Stevenage. This club holds morse classes. Details from Terry, G6CRF, tel Stevenage 62860.

UK FM Group—For information on this group and future policy please contact Pat Spenceley, G8LZA by letter, or J. Parkins, G8KVP.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ. Tel 0272 848140.

Bath (B&DARC)—8, 22 September, 7.30pm. Englishcoombe Inn, Englishcoombe Lane, Bath. A junk sale is planned for September. Details from Colin Rose, G8YCV, tel 0272 218279.

Bristol (BRSGBG)—27 September ("The RSGB", by executive vice-President Bob Barrett, GW8HEZ). 7.30pm. Queens Building, Bristol University. Details from Chris Short, G8GLQ, tel 0272 621253.

Bristol (North Bristol ARC)—Fridays, 7.30pm. c/o Self Help Enterprise, Braemar Crescent, Northville, Bristol. Topics for September include plans for visit to ARRA Amateur Radio Exhibition at Leicester in October. Details from Ted Bidmead, G4EUV, tel 0272 691685.

Bristol (Shirehampton ARC) Fridays, 7pm. Twyford House, Shirehampton. RAE and cw classes commence for the winter period. Plans for contests etc during the month. Details from Ron Ford, G4GTD.

Cheltenham (CARA)—First Thursday and third Friday in each month. 7.30pm. The Old Bakery, Chester Walk, Clarence Street, Cheltenham. 2 September ("The Doug Charman video tape"), 16 September (Natter night). Details from John Holt, G3GWW.

Gloucester (GARS)—Thursdays, 7.30pm. Chequers Bridge Centre, Painswick Road, Gloucester. 9 September (AGM (all members requested to attend)). The club will also be taking part in SSB Field Day from the Scout Headquarters, Tuffley. Details from Tony Martin, G4HBV.

Portishead (Gordano ARC)—Fourth Wednesday in each month, 7.30pm. Ship Hotel, Down Road, Portishead. Details for the September meeting will be given on GB2RS. Details from Bob Coles, G8ROC, tel 0272 877789.

Yeovil (Y&DARC)—2 September ("History of radio", RSGB tape), 9 September ("How to build your own equipment", by G3MYM), 16 September ("How to wind your own coils", by G3MYM), 23 September ("VHF rx noise factors", by G3DSS), 30 September (Construction night and committee meeting) 7.30pm. Building 101, Houndstone Camp, Yeovil. Details from Don McLean, G3NOF, tel 0935 24956.

The Worked All Britain Award Group

The annual general meeting of the Worked All Britain Award Group was held at Drayton Manor Park on 24 April 1982.

Prior to the AGM a cheque for £200 was presented to the Radio Amateur Invalid and Blind Club by the president, G4FQO.

Any licensed amateur of short wave listener may become a member of the Worked All Britain Award Group by purchasing a book at a cost of £3 plus £1 for postage. Applications to G4KSQ, QTHR. Awards are also available to non-members. Further details are available from G4HPU.

G4JMA receiving a cheque for £200 on behalf of RAIBC from G4FQO

MEMBERS' ADS

CONDITIONS OF ACCEPTANCE

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Members' Ad form printed on the back of a *recent* address label carrier used to mail *Rad Com* to the advertiser: this will automatically provide proof of membership and should not be more than two months old. No acknowledgement of receipt will be sent, and advertisements not clearly worded or punctuated, or which do not comply with the conditions of acceptance, will be returned. No correspondence concerning this service will be entered into.

Trade or business advertisements, even from members, will not be accepted for "Members' Ads" but should be submitted as classified or display advertisements in the usual way. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions, or for the quality of goods offered for sale. Advertisements for citizens band equipment will not be accepted.

Warning. Members are advised that they should, as far as possible, ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The "purchase" of goods legally owned by a finance company could result in the "purchaser" losing both the goods and the cash paid.

The current rate is £1 for 40 words or less: advertisements containing more than 40 words will cost an additional £1 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

Closing dates in 1982 for issues in brackets, are **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 officer.

FOR SALE

TS520S with remote vfo, £350. ASR33 terminal, 110 baud, 20ma ASCII, paper punch and reader, stand, good cond, £100. CT100 rtty demodulator, £75. KDK mobile tx/rx, FM144-10 SXR11, £100. IC202, ssb portable, £90. KW E-Zee Match, £10. 50Ω dummy load, £10. BC221 freq meter, £10. G4EDC. Tel Worthing 501425.

Heathkit SB104A 100W solidstate broadband hf ssb/cw tx/rx, digital display, instant QSY, Heath built, plug-in boards, matching psu/spkr, manuals. All perfect and immac (12V dc operation also), marvellous rig, cost £865, £375. Collect/Securicor at cost. G4GTU, QTHR. Tel Rustington 4123.

Icom IC701 hf tx/rx, PS701 power supply, desk mic, as new cond, orig boxes, manual, £500. Jeff Campbell. Tel 01-743 7571.

TR9000 2m multimode, little used, in exc cond, orig packing, £295. G4MVS. Tel 01-644 8249.

HW32A dc power supply, Hustler whip mic, £75. HW100 matching spkr, power supply, £110. IC215 25W linear, nicads, charger, mag mount, whip, mobile mount, £100. AT5 matching ps, £18. All items buyer collects. G2CCH, QTHR. Tel Erith 37073.

Giving away four-track tape recorder (mono), RF24 unit, large valved mains psu, all wkg, old wd scope, not wkg; selling 19in rack attenuator unit, silver-plated coils, suit hb linear, £15 ono. 3in square meters, 25-0-25μA, 0-50mA, £3 each. Lots of components, caps, resistors etc, £10 the lot. Class D wavemeter, £2. Buyers collect. G3YHG, QTHR. Tel Reading 67367.

70cm TR3200 fm tx/rx, 12 xtals fitted, RB0, RB2, RB4, RB11, SU8, SU18, SU20, 5/8 whip, extra mic, charger, case, nicads, £120 ono. G8MLC, QTHR. Tel Cowes 293038.

Doesn't anyone want a TR2400 for £140? No response to my ad in June issue. Modified as on p43 of January issue. ZX81, £45. G3XRM, QTHR. Tel 0724 845436.

Yaesu FT480R 2m multimode, £300. Hirschmann 250 rotator, £32. Jaybeam 8-el 2m Yagi, £12. All under one year old, used little. Special offer for complete package. G6DPK. Tel Barnsley (0226) 385110.

IC280E 2m fm tx/rx, immac cond, psu, mag mount, vertical antenna, £160. G8DHZ, 9 South Terrace, Redland, Bristol. Tel Bristol (0272) 731365.

Shack clearance: HW100, psu, prof built, comp with history, £140. HF 2-el quad booms (2), IC201, orig packing, preamp, good rig, £230. Sota 100W mobile 12V linear (2m), up to spec, one l.e.d. duff, £65. Trio R1000, in exc cond, orig packing, £230. 88-el 70cm Jaybeam, unused but assembled, two 8-over-8 2m Jaybeams incl harness, 4-el 4m Jaybeam, any offers? Sharp PC1211 pocket computer with QRA, contest score and air navigation progs, (incl cassette interface), £65. MMA144V preamp, £20. Sinclair micro-tv, exc cond, in new box, case, £50. Linear bits, 2CX250 bases (vhf) and lots more. *Wanted:* Collins KWM2A or Drake TR7 2m transverter (40W op min). Can deliver to most places Aberdeen to Weymouth! All offers or ono. G4AFF, Antrim Flight, HMS Antrim, BFPO Ships, London.

Icom IC240, preamp, mobile mount, book, £130, or swap MMT 432/144. MMT144/28 transverter, freshly serviced by MM, £70. G3RWL, QTHR. Tel 01-366 4297.

Trio TS520S, mint cond, used little, 10/160m, £375. KW E-Zee Match, £25. Trio 2m BPF2 bandpass filter, £10. G6PO, QTHR. Tel 253 885893.

Yaesu FT101ZD fm, SP902, a.m. board, fan, mic, full service manual, used four times only, £590. Trio 8400 10W 70cm fm mobile, £200. G6JDO. Tel Leeds 642050.

Yaesu FV901DM, £160. FTV901R, £170. 2m plug-in, £55. 70cm plug-in, £105. KDK mobile 2015R, £130. Icom mic ICSM2, £20. All mint cond. G3XNH, QTHR. Tel East Horsley 4805, work, Godalming 29757, home.

Icom IC225 pll synth, 80 channels, 144, 146, repeater, reverse toneburst, mic, £140. Icom IC3PA psu for the IC225, £30. KW Vanguard 160/10 a.m., cw, manual, £40. Please write first. Charles Cotter, c/o Kerjons Green, Chagford, Devon.

Pye Bantam 2m fm 2W portable, S18, S20, S23, nicads, helical, mic, diagrams, £40. Jaybeam 2m 5/5 slot with vertical mounting kit, £12. PMH/2C circular phasing harness, £4. W.H.Y? G8SSI. Tel 01-689 8389, (Croydon).

EK150 electronic iambic keyer, £40. Balun by Western, 1kW, £6. 7BRP Creed, £20. CW keyboard, £40. External vfo FV101, fit 101B and E series, £40 ono. *Wanted:* cross pattern monitorscope for rtty. Motorized winch for Versatower. G4KDZ, QTHR. Tel Tony, Grays (Essex) (0375) 78783.

KSR33 ro printers: two used little with stands, £100 each. One older, £60. Manual, £5. 370VA 2500V transformer, matching tapped auto-transformer, £15. Solartron twin-beam scopes: CD1400, 15MHz, spare differential plug-in, vgc, £120. CD1014, 5MHz, £60. Manuals, £5. T157 programmable calculator, new nicads, charger, £18. New Eddystone 898 dial, £10. 19in rackmount case, 6in, new, £18. 50MHz dfm module, new, £25. Trio JR310, narrow filter, calibrator, fm demod, £90. 813 with base, £8. G8MLK, QTHR. Tel 01-289 7415, after 6pm.

Shack clearance: Lafayette HA500 rx, £40. Marconi valve millivoltmeter TF2603, 2GHz, £100. Europa 2m transverter, £60. Pye Vanguard hi-band, comp, £10. UR70 coaxial, 75Ω, 35m, several pieces, £2 each. Transformer. W.H.Y? G8FIY, QTHR. Tel 08954 42547, evenings.

Bantam hb fm, unmod, nicads, charger, handbook, £45. G3ZVC ssb tx/rx, 1246AX filter, £50. Commercial top band/80m ssb/cw tx/rx, £40. 898 dial, £10. Roller coaster and matching 500pF variable, £10. G3YGM, QTHR. Tel Falmouth (0326) 311506.

HF linear, homebrew, property of silent key, three spare new PL519s, £25. Buyer collects. G3JIC, QTHR. Tel St Helens (0744) 23916.

Elizabethan tx, 150W, 3-5-28MHz, £10. Marconi Seaspan tx, 120W, would modify new bands, mains psu, handbook, £35. LG300 tx, 150W, 3-5-28MHz, £25. HB psu, £10. Labgear matching mod/psu, £25. WS36 tx, vfo/co, 10-40MHz, 2/807 psu, £35. G3JFC, QTHR. Tel Crayford 522489.

Colour video monitor, decoder panel type CVB 3189, pal 18in tube unit, 19 by 23 by 19in, £50. Decca tv tuner, uhf, audio and video output, self-contained audio monitor, £35. G4DZV, QTHR.

Eddystone EA12 amateur band rx, perfect cond, service manual, £125. 67 Tregenna Avenue, South Harrow, Middx.

MMA 144V low noise preamp, £25. G8WTM. Tel 0245 62174.

MMT 432/28S transverter, £90. QM70 432/28 transverter, £70. Oscaramp 10m preamp, £5. JXK converter 144/28, £5. All with instructions. G4ALV, QTHR. Tel 01-460 3852.

FT480R 2m multimode mobile, 15 months old, as new, boxed, £275. P. Spurdens, 14 Montpelier Street, London SW7. Tel 01-589 5111, ext 1777, between 8.30am and 6pm.

AR88D gen cov rx, good cond, S-meter, accessories, £55. Willing to deliver within reasonable distance around Manchester. Tel 061-988 3526.

TRS80 model 3 computer, 48k ram, twin disks, RS232C, all purchased from Tandys, tons of free software incl all 12 adventures, scripsit, assembler, disassembler, powerful debugger, many big, five video games, line printer 6, will separate. Tel Bracknell 24277.

FT280 2m multimode, similar to FT480, £275. Eddystone 770R vhf rx, 19-165MHz, £100. KW lpf, £20. Keats, G4CCN NOT QTHR. Tel 03942 75959, ext 537, day, 03943 6529, evenings (Suffolk).

Yaesu FT200, FP200, in exc cond, many compliments about speech quality from this rig, the perfect newly licensed G4 rig, bargain at £185. Buyer collects. G4MGF, QTHR. Tel Thanet 22343.

Receive morse on your ZX81, copies up to 200wpm, auto speed tracking, continuous scrolling display, needs only 2k ram, program listing with explanatory notes and circuits for interfacing, £3.50. G4IDE, QTHR. Tel Wolverhampton 781760.

Drake R4C, all filters, 14 extra xtals, T4XC, MS4/AC4, astatic 10DA desk mic, W4 pwr meter, Heath SA2-060 deluxe atu, all exc cond, manuals, £650 firm, buyer arranges collection. G4DEH. Tel Newmarket 4757.

FT101ZD six-band model, mic, fan, manual, parts list, mint cond, £440. Trio JR500S rx, 80-10m plus WWV, £60. G6IF, QTHR. Tel High Wycombe 20733.

FL2100Z nine-band linear, six months old, hardly used, £335. Microwave Modules MMT70/144 4m transverter, new double conversion type, £80. Trio/Kenwood VFO230 vfo, as new, £160. G4AEL, QTHR. Tel 0272 793211 or 426486.

Trio TR2400 handheld with charger, used only for RSGB broadcast copy, £125. Unused Katsumi MK1024 program memory keyer, £75. G3AVD, QTHR. Tel 07373 61976.

Yaesu FT200, FP200, exc cond, £210. Shure 201 mic, £5. HB af speech processor, £5, or exchange all for FT7. G4NEY. Tel St Ives (0480) 66708.

FT208R, spkr, mic, car adaptor charger, nicad battery charger, used very little, £185 ovno. 35mm camera Minolta XG2 incl autowinder, 90-210 zoom lens, £125 ovno. G6CVZ NOT QTHR. Tel Walsall 612451.

CW rtty keyboard, ex-job, £90. Buyer to collect. G4KQG. Tel Nottingham (0602) 257396.

FT101ZD, fan, mic, SP901 spkr, immac, £420. Datong asp auto speech processor, mains psu, wired Yaesu or Trio, £40. Hygain TH3 Mk3 triband beam with balun, £50. Seen assembled, buyer collects. Clarke. Tel Ashtead (Surrey) 72626.

BC342, famous old rx, 240V auto transformer, some spare valves, £10. DX4OU, comp, valved, but faulty, £10. Must be collected. Tel 01-561 2773 (Hayes, Middlesex).

Drake 2B a.m., cw, ssb, incl matching spkr, 2AQ, 2AC, as new, £125. Normende Globetter, model 808, brand new, £120. Sony 110K bw monitor tv, £55. TRS80 computer, 16K level 2 vdu cassette, accessories, £255. Tel 01-590 9366.

NEC CQ110E ssb tx/rx, never used, still G8, £400 ono. Creed 7 teleprinter, manuals, £12. Three Friden ASCII printers, punch, reader, transformer, technical manuals, £50 ono. Five electronic keyboards with two-pitch switch bank, £50 ono. G8PLC, QTHR.

TS180S with all filters, PS30, SP180, mic 35, new WARC bands installed, £600 ono. IRCs 19½p each plus postage. 1980 international callbooks, offers? G3XTT, QTHR. Tel 0954 210630 (Cambs).

Yaesu FT101ZD Mk3 fm, fan, mic, FC902, FF501 dx filter, few odds and ends, only few months old, in orig boxes, £600. Tel 01-639 1460.

Racal frequency counter SA540, £60. Creed 7B teleprinter base and cover, £30. Trio mobile mount for TS120V, £12. Hi-mound morse key HK708, £7. G4LMN, QTHR. Tel Norwich (0603) 54854.

Eddystone 830 superb professional communications

rx, 300kHz-30·5MHz in nine bands, tuning to 1kHz, filters, bfo, calibrator, mains operation, £140 ono. Roy Stephenson, Thrum Mill, Rothbury, Northumberland NE65 7XH. Tel 0669 21081, work, or 0669 20658, home.

Drake R4A, extra xtals, exc cond, Joymatch Joystick, Drake spkr, £100 no offers. Chris Lee, 315 High Road, Chadwell Heath, Essex. Tel 01-597 7740.

Multi Palm 2 xtals S20-23, 145·700, 145·725, 145·675, GD, CNO, offers. Reason for sale, need QRK. G4MQL. Tel Rodger, Woburn 545.

Yaesu FT227, £110. Epsylon cctv camera psu cct, good wkg, £45. Burndept BE35M uhf hand portable, battery, charger, wkg GB3CB, £50. Also mobile version wkg GB3CB, manual, £45. G4EIG. Tel 021-706 2339, daytime (business).

Hal DKB2010 dual mode keyboard, rtty/morse, 2k memory, RVD1005 vdu, converts Baudot send and receive to video, mint, half price bargain, £350 ono. Yaesu FT202R, 6ch handie, nicads, NC1 charger, unused, £85. G3UFU. Tel Bourton 840138.

T & R Bulletins, bound volume 1931/32, *RSGB Bulletins,* bound volume 1953/54, *Bulletin/Radio Communication* 1964-80, offers. Please arrange collection. SAE enquiries. GM6MS, QTHR.

HW101, HP23A psu, £160. GC1U rx Mohican, £40. All in exc cond, service manuals, buyer collects. G3ONL NOT QTHR. Tel 0728 860607.

Trio TS700G 2m multimode, vgc, fitted piptone preamp, mic, £260 ono. Tel Weymouth 786930 or 73240.

Yaesu FLDX400, FRDX400 160-10m tx/rx, 2m conversion, well-built multiband outfit, vgc, £250 ono. Tel Newbury 48626, evenings.

Lab clearance: uhf and microwave components, GR slotted line, unit oscillator 250-960MHz, coaxial components mixers, attenuators, stubs, line stretchers, directional couplers 2,000/400MHz. Prefer buyer collects, sae list. Hodgson, 7 Wykewane, Malvern, Worcestershire WR14 2SU. Tel 06845 64520.

Shure 444 desk mic, mint, orig packing, £21. SP101B spkr, mint, orig packing, £15. G4FXS, QTHR. Tel 021-458 3537.

Lucas 18ACR alternator, new, £20. RS3·5 digit l.e.d. displays reference 258, 782, £10 each. Dawe lab precision white noise generator, as new, handbook, £25. *Wanted:* vfo PLV1 for IC210/225. Info product detector for B40D. All items carriage extra. G3WWL, QTHR. Tel 021-353 8874.

Sommerkamp FT277ZD, nine-band, fm, fitted fan, 12V unit, bought March, used only for rx, best offer around £625. Tel Allan, Reading 864069.

Kenwood TS520SE, new cond, buyer collects, £320, cash only. *Wanted:* KW109. G2UZ, QTHR. Tel Leeds 784074.

Going QRT: EA12, FLDX500, SB610, DFM5, TR2200GX, TH3JR, Heath HT1G tower, TR44, KW Match, TE57 gdo, Heath 1M18U vvm, RF40, B43/R220, psus, manuals, books. SAE list. GM3VXR, QTHR. Tel Motherwell 65443, evenings or weekends.

TS830S, absolutely mint, orig packing, manual, one very careful owner, 18 months old, £600. G3SIH, QTHR. Tel Melksham (0225) 703443.

Icom 255E, 18 months old, vgc, 25W fm cw, scanning mic, 7λ/8 gutter mount antenna, £185. Prefer buyer collects. G4EAX, QTHR. Tel Long Eaton 69238.

Trio TS520, very clean, plus HF5, both £295 or would split. G4MXQ. Tel 072681 5436 (Par, Cornwall).

FT707 80-10m tx/rx, 100W o/p incl WARC bands, £400. FT227R 2m fm tx/rx, 10W o/p, 5kHz steps, covers 144-148MHz, £100. Both comp with mobile mounts, mics, and working. House purchase forces sale. Keal, G4HDU. Tel 0704 33095, daytime, 0695 423062, evenings.

Mosley TA32JR, three months old, as new, erected for two hours only, cost new £118, accept £85 plus postage. Bush, mains, battery, mw, lw, fm radio/tv, quartz clock, good cond, cost new £175, accept £75. Buyers collect or arrange carriage. G6JVF. 32 Dereham Road, Pudding Norton, Fakenham, Norfolk. Tel Adrian, Fakenham 4348, after 5pm.

Trio TR7500 2m 40ch fm mobile, £150. Trio TS700G 2m multimode base stn, £275. 70cm transverter, £100. 40W 12V 2m linear, £25. Yaesu FT101E, used only to transvert, £385. All in mint cond. G4GSR. Tel Dave, 051-227 1919, or 051-428 1845.

FT200B/FP200 hf tx/rx, £200. Liner 2, psu, £75. Palm 2, as new, £80. Pye Cambridge, not wkg, £10. ZX81, 16k books, perfect, £100. G4IFB, QTHR. Tel Gary, 01-642 1465.

Uniden 2020 deluxe hf five-band tx/rx, 80-10m, separate filters for usb/lsb/cw 600Hz, digital frequency display, mains or 12V, immac cond, one owner, £275. G4FAS, QTHR N E Cheshire. Tel 061-437 7784.

Solartron CD1400 double beam oscilloscopes, wide band Y amplifiers, trigger/sync timebase X amplifier, one portable, £60, one rack mounting, £50. G4LRX, QTHR. Tel 0252 515581, evenings.

FT101E, plastic cover on front panel, £325. Mizuho SB2M, £73. Both immac, used little. QQVO640A 4CX250B valves, new, £9.50 each. Carriage post at cost. *Wanted:* Daiwa CNA2002 atu 7500R rotator, HQ1 G4MM minibeams. Hope, GM3MGT, QTHR. Tel 0383 822932.

Station contents: Icom IC730, £520. FT101ZD fm Mk3, £590. FRG7700M, FRT7700, FRV7700E, £445. All new. Dentron GLA1000, £200 ono. Mics, books, etc. Would consider exch for modest economical car, top cond. SAE enquiries please. G3MIN, QTHR. Tel Shoreham, Sussex (07917) 3552.

40ft two-section tower, comp with 21ft heavy duty ground post, £150. G3VQL, QTHR. Tel Shrewsbury 55179.

FDR Multi 2000, 144MHz multimode tx/rx, built-in psu, suitable for base stn, £160. ZX81, Sinclair built, £45. 28/144 Microwave Modules converter, £12. G6CYM. Tel Paul, Alderley Edge 583480.

FRDX400, FLDX500, £210 or exch FRG7700, 2m gear, good gen cov rx. AVO 8, £40. Heathkit V7A vvm, £25. GW3ZNN NOT QTHR. Tel Wrexham (0978) 262855, evenings.

FT707, FP707, £485. FT227RB, £140. DX33 Penetrator 3-el tribander, few months old, £75. 2m/5dB colinear, £10. 2m/8Y, £5. Creed model 45 perforator, five-unit with keyboard, £10. 7E, £10. G3XYT NOT QTHR. Tel 021-373 7294.

Marconi Kestrel rx, 200kHz, 4·5MHz, 12V dc, wkg order, £40. 12AVQ vertical antenna, £20. G whip multi mobile all band auto selection, comp with all coils, 10/160 chrome base, brand new, gift at £50. All carriage at cost. G3OAZ, QTHR.

FT101E, 160-10m, mint cond, 600Hz cw filter, mic, spare pas, orig packing, operating and workshop manuals, £365 ono, or will swop for TS130V in similar cond. G3WBP, QTHR. Tel 0249 815066.

Collins KWM1 ac psu, £175. Collins 75A2 rx, £100. Collins KWM2A ac psu, 12V psu, mobile mount, £500. BC1031A panoramic adaptor, £50. G3GBB NOT QTHR. Tel Bury St Edmunds (0284) 66496, evenings.

TS520SE, cw filter, mic, immac cond, £360. KW E-Zee Match, £25. QTH Northants. Tel Rushden 59169.

FT250, power supply, exc cond, £200. Buyer to collect. Tel Nottingham 257396. G. Kirk, G4KQG.

Trio TS820S digital tx/rx, perfect cond, used very little, going QRT, £450. G4GEZ. Tel Luton 38866, or Harpenden 61265, evenings.

Jaybeam 2m 14-el PMB14 Parabeam, as new, not used, £40. Muirhead audio sig gen, built-in frequency checking scope, xtal calibrator, decade type setting, 1Hz-111kHz, £50. G3VWE, QTHR. Tel 0272-656783.

FT227R 2m tx/rx, synthesized 144 to 146MHz, 10W output, fixed or mobile, in mint cond, boxed, all standard accessories, £160 ono. G3SZU, QTHR. Tel 0533 865726.

HF rig: Trio TS120V, £280. MM 2m transverter to suit, £70, or make offer for both. G4FRO, QTHR. Tel Bristol 426851, work, Pilning 3422, home.

Det bung, three beds, two lounges, one 17 by 12ft, integral garage, bathroom, shower, sep wc, large gardens, planning permission for 60ft tower, rural situation yet central for Wigan, Bolton, Leigh, Manchester, near M6, M61, M62, good vhf site, £34,000 ono. G4IAV, QTHR.

Valves, gold pins, holders, cans, five E88CC, one CV4014, CV2276, CV3998, CV4024, CV4064, three wirewound pots, 2,500Ω, 10,000Ω, 1,000Ω, all mounted on two panels from spectrum analyser, comp with resistors, condensers, cheap, to clear. J. Terry, G4GEU, QTHR. Tel 021-444 3114.

P40 40ft Versatower, AR22 rotator, comp with headset, 3yr old, exc cond, £250. G4BBI, QTHR. Tel Chesterfield 474202.

Trio R820 digital rx, triple conversion 160-10, sw broadcast bands, a really amazing rx, will transceive with TS820, going QRT, £450. G4GEZ. Tel Luton 38866, or Harpenden 61265, evenings.

KVGXF9B filter, xtals, £30. 813 bases, £1.50. G2DAF Mk2 tx, psu, HW12, HW32A, homebrew psu, enclosed rack, ball slides, 6ft by 19in panels, bound *RSGB Bulletins* vols 28-40, bound *SWM* vols 10-22, *Newnes Radio & TV Servicing,* vols 2-5, 1955-60, offers. GM3NJF. Tel 0770 6502.

FT221R, Mutek front end, 11 xtals, £360. 2m 10XY, £10. 2m 5λ/8 mag mount, whip, £8. Guitar, £10. Himound mechanical bug key, £10. Polaroid land camera, bw and colour, £10. G3ZXF, QTHR.

HV40 cctv camera, comp with vidicon, good cond, £50. PF2UB, fitted SU18, comp with car adaptor, £70. MM 144/30LS pa, three months old, £55. G8HED NOT QTHR. Tel 0782 519439, weekends only.

Yaesu FRG7700, good as new, £210. John Hancock, 9 Bransford Close, Ashton-in Makerfield, Wigan WN4 9EY. Tel Wigan (0942) 714651.

Trio TS120V 500Hz filter, case marked, two HRO Seniors, GC, bs coils, DRK cw keyboard, R4C 1·5kHz filter, command rxs lw-vhf, circuits, all sensible offers. G3YRQ, QTHR. Tel Ian, Leigh (0942) 679948.

Atom rtty program, auto letts/figs shift, 5-150 baud, program on cassette, details for terminal and interface, £12. Software to run ASCII with above, £2 extra. Morse tutor program, £5, or all three progs, £15. Tel Melton Mowbray 69119.

Datong D70 morse tutor, £36. 18AVT/WBA vertical antenna, £45. D5/2M Jaybeam, £10. Q6/2M, £18. Stolle 2010 rotator, ideal for 2m work, £30. G4MRR NOT QTHR. Tel Letchworth 74234, evenings and weekends.

Pye Pocketphones tx and rx PF1, two pairs SU8 and RB6, comp with nicads, £30 ono each pair. Battery charger for above nicads, £6. All items plus carriage. GW4HAT, QTHR. Tel Swansea (0792) 290770, evenings.

Trio TR7200G, 2m fm tx/rx, fitted all repeaters, six simplex channels, matching Trio external vfo, 30G, Jaybeam colinear, λ/4 wave magmount antennas, all coaxial, cables, mic, mobile mount, the lot, £200. G4HBU, QTHR. Tel Bristol 611093.

Xitex MRS100 tx/rx, will interface with most computers with manual and interface connections, cost over £150, had little use, £70. G4CGT, QTHR. Tel 0254 75037.

SWTP 56k ram computer, intelligent terminal, two 5·25in disc drives, swop for any good hf equipment. G4DRH, 36 Clifton Street, Lytham, Lancs FY8 5EW. Tel 0253 730033.

Yaesu 101Z, mic, fan, additional 600Hz N filter, operation on all three new bands, orig packing, £425. CSC MAX50 frequency counter, cost £62, accept £25. Multimeter, 20,000Ω/V, 29 ranges, accept £12.50. G6VS. Tel Blackpool (0253) 823541.

TenTec Omni C, power supply, TenTec speech processor, matching electret mic, xtal filters 500Hz, 1·8kHz, 2·4kHz, exc equipment, in fb order, £650. Gregg, G3SQS, 2 Park Road, Granborough, Bucks MK18 3NS. 3,740kHz, 1600bst, any day.

Army rx R107, R208, 1·2-17·5MHz, 10-60MHz, all wkg, ssb mods, handbooks, £35. Collect only. G4IBK, QTHR. Tel 01-387 7050, ext 413.

AR22 rotator, cw control box, 13m cable, £25. Honda E800 generator, 12V dc, 230V ac output, £90. Tavasu whip cw coils, 10-180m, £10. Carriage extra all items. G3VLL, QTHR. Tel 0302 876000, ext 128, office hours only.

Yaesu FT101ZD Mk3, one year old, fan, mic, 300Hz cw filter, a.m., easy conversion to fm, perfect, unmarked cond, boxed, £560. G4HBU, QTHR. Tel Bristol 611093.

Eddystone 730/4 rx, 0·5-30MHz, vgc, manual, circuit diagrams, £65. Buyer collects or carriage extra. Codar PR40, £10. PW 2m converter, £6. Both in good cond. Mike Ganley, 4 Walnut Grove, Trowbridge, Wilts BA14 0HR.

Kenwood TV502 2m transverter, suitable for TS520 etc, £50. G3RK, QTHR. Tel Wangford (Suffolk) 619.

2m fm handheld mobile tx/rx, FDK, synthesized 25kHz channel spacing, 2W out, toneburst etc, nicads, charger, remote spkr/mic, helical antenna, manual, good cond, can deliver, £100 ono. G8KKJ. Tel Ashford (Kent) (0233) 37238, weekday evenings.

Pye uhf pocketphone PF1 rx, wkg order, £5. Pye Cambridge rack mount a.m. rx, exc wkg order, £15. Search 9 2m rx, vfo, 7ch, exc, £35. Fotaba 4m digital radio control system, cost £125, accept £55. 27/28MHz converter for car radio, new £5. VHF air band/11m rx, £4. *Wanted:* PF1 tx, nicads, 70cm colinear/beam. David Ash, G6HLK. Tel (0538) 382117, daytime (Staffordshire).

FT221RD all mode tx/rx, vgc, no mods, preamp, speech processor, £275 the lot. AR40 rotator, 28ft mast, rigging, 6-el quad, 88-el multibeam, Slim Jim, 20m UR67, all vgc, offers? G4JUZ, QTHR. Tel 01-789 2622, evenings.

Outward-going shack, one tems, one NR56, seven channels, three repeater, requires two front-end transistors, £40. Odd valves: 12 B9G, new, 6C4, 12AT7, EL91, one fm tx/rx, boot-mount Westminster, requires rf rx board, £30. G8BWI, QTHR. Tel Cambs 314532.

G4MH mini-beam, never used, in orig box, £60. GM5DRY. Tel 0224 23553, evenings.

Complete Collins S-line, 30L-1, £650. TR7/psu, 1·8 filter, fan, service manual, kit, £700. 221RD, seven xtals, £285. IC2E, mic/m, regulator, all in day-by-day use, £155. GW3NWV, QTHR. Tel 0407 830774.

MZ80K computer tapes, rtty tx/rx, £7.50. Morse rx autospeed, £5. Listings only, comp with simple i/o circuit, £4 and £3. New Basic adding 12 new commands, still in 14k, auto number, renumber, append, trace, etc, £10. Communications package with check log and QRA into distance/points, fab for contests, satellite orbital predictions, work the USA on 70cm, random morse trainer guaranteed to bring up your morse speed or kill you, £10. A. Sinclair, 35 Prestonfield Avenue, Edinburgh EH16 5EG.

10GHz radar scanner, brand new, in box, £15. 12V relays, 25A contacts, 75p each. DPST 100A rotary switch, £1. 2m colinear antenna, £15. Osram DET18,

new, £2. G4IOY, QTHR. Tel 01-455 0540, before 5.30pm.

MM4000 rtty, comp, Redifon 6288R atu, 2m and 70cm Parabeams, Solatron CD1400 with two CX1441, one CX1442 vert amps, CX1443 CX1444 hor amps, manuals, offers invited for quick sale. G4CEQ, QTHR. Tel Downland (NE Surrey) 55908.

Trio TS530S, six months old, used on receive side only, absolutely perfect cond, comp with instruction manual, boxed, £495. G2BAR three-el 10m beam, boom to mast plate, £30 ono. RS48051. Tel Bristol (0272) 836562, anytime.

Collectors' items: oscilloscope, Philips GM3152B circa 1940, £20; T1154 atu, £2; 1132A rx, £20; indicator unit, type unknown but similar to "Gee", £10. G4DZS, QTHR. Tel 01-979 1563.

Trio SM220 station monitor, comp BS8 panadaptor for use TS820/830, £195. Workshop manual TS820, £9. Cheesley, G4CHP. Tel Swainsthorpe 470365.

FT707 eight-band, 100W out, t/8 cw narrow filter, vgc, owner bought GC tx, £470. FP707 psu with spkr, £80. HW8 QRP tx, four-band, used little, £70. G4HQV NOT QTHR. Tel 059069 5718.

Yaesu FT290R, 3SK88, listen-on-input mods (by dealer), soft case, flexible helical, mobile mount, desk mic, £230 or consider swap for IC402. Akai 4000DB open-reel tape deck, dust cover, six tapes, £85. G8URI, QTHR. Tel Romford (0708) 751808.

Boxed as new: FT902DM, few hours use, must be sold, hence £650. Heathkit SB101, comp mic, key, cw filter, £100. G3TA/G3MOT, QTHR. Tel Miserden 571.

Yaesu FT208R handheld, immac cond; case, helical, NC7 base charger, NC9C mini charger, YM24A external mic/spkr, all in orig packing, still under guarantee, £185. G6BBS, QTHR. Tel Cosham 388488, evenings.

FT201, exc cond, used little, full 10m mic, fan, used mostly transvert 2m, manual, £250 ono. G3PJK, QTHR. Tel 061-643 2631.

FT200 tx/rx, FP200 ac psu, good order, manual, all 10m xtals fitted, prefer buyer inspects and collects but could deliver West Yorkshire area, £190. G3ZXZ, QTHR. Tel Wakefield (0924) 279110.

IC245, multimode, fully synthesized, exc cond, £200. Sota SCL144 80W linear, £75. MMA144V 2m preamp, £25. MMC432/28S 70cm converter, £30. All boxed with manuals. J. Brett. Tel 01-789 6256.

Yaesu FT707, FP707, FC707, MMB2, MR7, YM37, cost £817, £625. Yaesu FT480R 2m multimode, list £379, £280. All as new, hardly used, unmarked, boxed, manuals. Jim Taylor, G4ERU, QTHR. Tel Bournemouth 510400.

Trio TS830S with YK88CN filter, £580. Trio AT230, £90. Katsumi EK150 electronic keyer, £45. All exc cond. Buyer collects. Tel Minehead 3754.

Yaesu FT221R 2m multimode tx/rx, suffix D, comp with orig packing, £250 ono. Will freight to UK. MM 28/144 transverter, £60 ono. MM 432/28S transverter, £100 ono. Nigel Lihou, GU8OVO, Argyll, Foulon Road, St Peter Port, Guernsey CI.

TenTec Century 21 cw tx/rx, vgc, orig packing, handbook, calibrator, reason for sale, now using TS530, £150. G4IZZ, QTHR. Tel 0723 862010.

HQ1 minibeam, almost new, £70. Change of QTH forces sale HC1400, £140. Mirage 108, £80. TS120V plus TL120, £385. All vgc with packing and manuals. G4LZK NOT QTHR. Tel Burgh Heath 61426.

FT290R, nicads, charger, soft case, helical, flexi λ/4, £200. Pye PF70, PF2UB working, SU8, SU18, RB15, spare xtals for RB4, RB10, RB0, two nicads, drop-in charger, leather case, service sheets, £65. G8PQG, QTHR. Tel Dave, Oxford (0865) 67165.

National HRO reception set R106, DF No2, ZA22906, serial No 117, with coils: 48-96kHz, 0·9-2·05MHz, 1·7-4·0MHz, 3·5-7·3MHz, 7-14·4MHz, 14-30MHz, spare valves, psu, instructions, £55 or give in part exchange for FRG7, 7700 or similar. Steve Bailey. Tel 01-399 4052.

Liner 2 incl rx amp, £70 ono. λ/4 clip mount whip, £5. Various *Wireless Worlds,* mains transformer, mixed components in bags, suit schools, clubs. SAE details of all. G3CBU, QTHR. Tel 0256 58921.

FT301 tx/rx, 100W, as new, FP301 pu, swr/power meter, all for £390. FRDX400 rx, hf, 6m, 2m, £75. Eddystone EA12, vgc, £130. Search-9 2m rx, three xtals, £30. Pianola, 250 rolls, vgc, £450. G4NFS. Tel Shanklin (Isle of Wight) 3984, after 5pm.

FDK Multi 700E 2m fm 25W mobile, good cond, Yaesu FT207R 2m handheld, spkr/mic YM24, base charger/mains unit NC3A, mobile psu PA2, boxed, instructions, going multimode and 70cm, £250 ono. G6HPQ NOT QTHR. Tel Tony, Southend 351936.

FT707, vgc, £300 for quick sale. G4DBE, QTHR. Tel 051-648 6525.

Marconi frequency meter type 11528, 100-160MHz, £12. Marconi rf power meter, 0-50, 0-100W, 75Ω, £25. Two Jaybeam 46-el multibeams, good cond, £12 each. 8-el, 2m, good cond, £8. Tel Jim, Bournemouth (0202) 518828.

FT101ZD, fm, Mk3, fan, mic, mint, this rig offered for exchange: required are KW separates, KW204, KW202, any KW ancillary equipment, cash adjustment if necessary, must be mint. G4KKG, QTHR. Tel Yeovil (0935) 25327.

Liner 2, £95. Heathkit 10-12U scope, £30. HS200 vidicon, £5. Set of Pye Olympic boards, £30. EMI 9558A photo multiplier with base, £10. New, boxed valves EF91, UBF80, DK91, many more, £20 the lot. G4AQB, QTHR. Tel Bolton 389033.

Heathkit ssb tx and rx, SB301, SB401, as new, spotless, expertly built, manuals, £195. B. L. Cedar, G8BMQ, QTHR. Tel 01-653 8489 (S London).

EC10 Mk2 gen cov rx, mains/battery supplies, £75. Dymar vhf highband fm mobile, modified 2m, 5ch, xtalled, £70. G8DKK, QTHR. Tel Luton (0582) 424809.

KDK 2025E, unmarked, as new cond, in orig packing, £145 ono. G4IMZ, QTHR. Tel 01-947 3894 (Wimbledon), evenings.

Johnson Viking Matchbox antenna coupler, senior model, power/swr indicator, orig instruction manual, £30. G5CS, QTHR. Tel 01-398 1582.

Yaesu FT707, FP707, FC707, YM36 mic, £650. G4MHR, QTHR. Tel Royston (0763) 71160.

Icom IC255E 25W fm tx/rx memories, vfos, scan etc, good cond, mobile mounts, £165. Alan Johnson, G8EAV NOT QTHR. Tel 061-633 7892.

FT202R portable 2m tx/rx, 6ch, 145·500, 145·525, 145·550, 145·200, 144·875, (Raynet), 145·125/725 (R5 rpt), charger, nicads, spkr/mic, case, two antennas, handbook, £80. 2m linear amp, 10W in, 50W out, preamp, £30. 2m fm amp, £20. G8KOM, QTHR. Tel Littlewick Green 2453.

Marconi 365FZ marine transmitting key, in exc cond, weight 2lb 2oz, price £15. P&P, £1. GW4JKR, QTHR. Tel Llanfairpwll (Anglesey, N Wales) 715582.

KW2000B ac psu, spkr, manual, circuit diagram, first class cond, new 6146B in pa, £195. Sanyo nine-band rx RP8880, 12V mains battery, a.m./fm, marine, five short wave bands, £150. G4GQN, QTHR. Tel 09284 441 (Cheshire area).

Shack clearance (going hf): FT290R, six months old, 18 months SMC warranty to run, 3SK88 fitted by SMC, nicads, charger, rubber duck, carrycase, orig box, leads etc, £220 ono. Wood & Douglas 144 Lin B linear amp, built, boxed, works well, £25 ono. PF1 multicharger (BC4), in good cond, three pairs batteries, PF70 adaptor incl, £20 ono. Sadly my Eddystone 750 hf rx must also go, vgc, 480kHz-32MHz, manual, £85. Microwave Modules atv converter MMC435/600, works well, 25dB gain, four months old, £25 ono. All items in good wkg order. Barclaycard and Access arranged via my works QTH. P. Bridges, G6DLJ. Tel 0703 891975.

Trio 2300, rev repeater, nicads, charger, 5/8 base ant, £130. 7/8 hoxin whip, £18. IC202E, recent Icom service, 25W pa/preamp, £130. Drake R4A 160, all 10m, £125. 16-el Tonna, £25. All vgc. Tel Mold 740101, evenings/weekends.

Comp 2m station comprising Icom 255E 25W fully synthesized tx/rx, exc cond, as base station use only, comp with psu, desk, hand mics, mobile mounting bracket, 9-el portable beam, swr meter, coaxial, £175 plus carriage. No offers. Tel Tamworth 898024.

Redifon Safari mobile hf tx/rx, £100 ono. Delmar 25/1W vhf/fm tx/rx, £100 ono. Datong speech processor, £15 ono. MM432/144 transverter, £98 ono. 70cm coaxial line linear, fitted with 8133 (HP ACX250), £60 ono. 70cm 88-el Jaybeam, £25 ono. 70cm 14-el Jaybeam cw 20m low-loss feeder, £15. 23cm 4-27-el quad loops, cw combiner, £65 ono. Yaesu FT101EE, cw remote vfo, £350 ono. G4HWA NOT QTHR. Tel 0276 31573.

Trio TR2200GX 2m tx/rx, fitted four simplex, five repeater, nicads, charger, helical, all orig accs, packing, first class cond, £95 ono. G4GGE, QTHR.Tel 0736 3031.

Azden PCS3000 2m fm tx/rx, remote cable kit, 12 months old, £195 ono, or swap for FT290R. SLR camera, power winder, Vivitar flash, zoom, w/angle, normal lenses, filters, aluminium case, tripod, £350 ono. G6IFZ NOT QTHR. Tel Ian, 0245 400966.

2m 8-el beam, £8. 2m 10-el beam, £8. B&W portable 12in tv, £25. G8KOM, QTHR. Tel Littlewick Green 2453.

TR2300, case, nicads, charger, rev-repeater, boxed, £120. GW8IPT NOT QTHR. Tel 051-334 6069.

Icom 260E, boxed, £220. Yaesu 2500K 25W fm key, mic, boxed, £180 ono. Small rotator, never used. £30. Poles and brackets available, will haggle. GW8VGB, QTHR. Tel Swansea (0792) 203500, or 0792 53895, daytime.

TR2200G, good cond, nicads, charger, case, 10 xtals, S18-22, repeaters, bargain, £50. Sinclair ZX printer incl orig paper, psu, £40. G6HQK. Tel Wolverhampton (0902) 69796.

Trio T599S tx, solidstate 6146Bs final, tx/rx with R599S 200W, boxed, as new, £200. Eddystone 730/4 gc rx, £120. *Wanted:* Trio R820 rx, remote vfo, VFO820. G4LW, QTHR. Tel Trowbridge 3166.

FT501, digital version of FT401, five-band, 500W p.e.p., unmodded, as new cond, packing, handbook, cw FP501 power supply, £300. Palm 2 xtals, R0, R6, S20-23, new cond, handbook, packing, £75. G3GMC, QTHR. Tel Weston-super-Mare 512271.

Parts for hf linear: four new RCA 811As, two used 811As, four valve holders, oilfilled transformer, 1,000-750-0-750-1,000, 250mA, elec, caps, widespace vcs, meters, choke, suitable cabinet 16 × 16 × 8in, £50 lot. G3UWD, QTHR. Tel 07782 2498 (Lincs).

Mint one-owner cartonned items: Datong FL1 audio filter with info, £40. Azden PCS300 fm handheld, 144-146MHz, charger, nicads, etc, band and memory scanning, 3W or 1W output, under warranty, £170. Tel 0373 64694 (Bath area).

FT480R, £290 ono. MMT432/144R 70cm transverter, £135 ono. MMT28/144 10m transverter, £70 ono. All good cond. Going hf. G8LUP, QTHR Essex. Tel 02774 4386.

Icom IC251E tx/rx, Microwave Modules 100W pa with 20A psu, antenna switch, 8XY Yagi, UR67, connectors, exc cond, cost £700, accept £500. Trio 2200G, fully xtalled, 10W pa remote spkr, revco 5/8 whip, leads, £100. G4DIC, QTHR.

Electret tie clasp mic, 600Ω amp in plug, £11 new, £7 incl post. MM preamp and 2Ω converter, 24/26MHz i.f. with power supply, £25 plus post. G3EJA, QTHR.

Wolfsen 1200 2m scanning rx, scans 12 xtal channels, five xtals fitted, full vfo coverage from 144-146, comes with mobile mount, exc cond, only a few months old, selling because of licence, £40 ono. G6IJA. Tel Shepshed 3985, after 4pm.

Microwave Modules MMS1 morse talker/tutor, helped me to get that G4, £85. Sony STRV55 digital synthesized, head amp, pulse power supply, full monty tuner amp, £120. Tel Howard, Leeds (0532) 672122, after 6pm please.

ZX80 computer, leads, handbook, no psu, £25. G3MDQ. Tel 021-354 9972.

Yaesu FT901, exc cond, used little, all mode incl fm, orig packing, £585. SP901, matching spkr, as new, £20. Shure 444 desk mic, £17. *Wanted:* VHS video recorder. G3UKM, QTHR. Tel St Annes (0253) 711536.

Xtals HC6U, 11·233, 8·083 for S20, 6·746, 8·7825 for 70-26, larger types for hf bands with 3MHz i.f., 15·8775, 15·7775, 15·5775 (10m), 12·2275 (15m), 8·6775, 8·5775 (20m), 10·155 (40m), 6·856 (80m), 4·955 (160m), £1.25 each. G3XRM, QTHR. Tel 0724 845436.

WANTED

German second world war radio equipment for collection. Any cond. Also spare parts: valves, sockets, meters, plugs, switches and others. Friedrich Bidermann, 20 The Dene, London W13 8AY. Tel 01-998 9286, evenings.

Drake R4C serial No 2100 or more. Abandoned or incomplete Helford project. G4DED, QTHR. Tel 08675 2215.

For the National Wireless Museum: old radio magazines, books, catalogues, QSL cards, service sheets, components, valves, Gamages catalogue, eight-track cartridge recorder, US Avo, collection arranged. Details please to hon curator, G3KPO, QTHR. Tel Ryde (0983) 62513.

888A short loan of manuals/diagrams, w.h.y? G3JKX. Postage refunded. FS M. J. Street, Sgts Mess, RAF Abingdon, Oxon.

Radio Communication back issues, March and May 1978, £2 paid each. Cheap gen cov rx, eg EA12, non-working unit accepted. G3ZKO NOT QTHR. Tel Maidstone (Kent) 44085, evenings.

TR9000, PS20, BO9, SP120, straight exchange for Canon Autozoom 1014 electronic super-8 cine camera, Velbond tripod, Eumig television type sound projector/recorder. No split. Consider cash adjustment. RS46005. 43 Wellington Street, Syston, Leicester. Tel 0533 600246, daytime, 609538, evenings.

RN "huff duff" rx B21B. B46 rx for spares/rebuild. Manuals. Circuits etc for same. *For sale:* CT52 miniature scope, single beam, bandwidth 1MHz, manual, transit case, collect for £15. G8LIU, QTHR. Tel Uxbridge (0895) 30006.

FT250 users manual to beg borrow or buy, or operating notes. Costs refunded. J Leaper, 11SU, RAF Hehn, BFPO40.

Suitcase or miniature tx/rxs; any spares, incomplete or damaged sets. WS62 with transistorized psu. WS (Canadian) No 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.

Crank-over tower, minimum 60ft. Heavy duty rotator either KR2000 or T2X. 6kW generator (diesel). Datong model asp. Willing to remove and collect tower. G4HQY NOT QTHR. Tel 0533 355313.

ARAC102 mosfet rx, must be good cond. Bauer single paddle key unit. Hounslow. 25B Camborne Close, Northampton. Tel 64583, evenings.

Second world war radio enthusiast requires S-meter, orig handbook, and RCA badge for AR88D. Coils GHK for HRO rx. ARC5 vhf rx. All replies answered. P. A. Hopwood, G3UKH, 58 Bolbec Road, Newcastle-upon-Tyne NE4 9EP. Tel 0632 744115.

Yaesu FT501, must be in good cond. G3IYT, QTHR. Tel 812914, evenings.

Circuit of KW76 rx. Buy or borrow, please. G3ENB, QTHR.

Xtals. Frequencies between 7,000 and 7,040kHz, 3,500 and 3,525kHz. Any base. G2OU, QTHR. Tel Derby (0332) 760187.

4-250A valves in new or vgc still needed. G3AHF, QTHR. Tel 01-989 9224.

Service information Dynamco 72 series oscilloscope, 7200, 7210, 7212 photocopy available. All costs paid. G4GEW, QTHR. Tel Downland (Surrey) 54388.

Acorn Atom program and interface info to link computer to transceiver for morse and/or rtty QSOs. G3LEK, QTHR. Tel 08894 4261.

Student would like FT101ZD or similar Trio rig. Must be in exc wkg order. Tel Bradford 578116, after 5pm.

STE ARAC 102 or 107 dual band rx or similar all mode rx. Will consider anything, good price paid esp if in good cond. Tel Phil, 0332 556218, evenings/weekends.

Second world war radio equipment for private collection. No 19 sets, incomplete units considered. RS40042. 2 Park Road, Amersham, Bucks. Tel Amersham 6881.

18AVT trap vertical, 10-80m or similar, in good cond. Give price incl carriage. G4LEA, 6 Grantson Close, Bristol BS4 4NA. Tel 0272 772435, evenings.

Xtals between 2,500-2,512kHz and 5,010-5,024kHz. Also can anyone offer frequency processing service for type 10X xtals? G3MI, 2 King Street, Chesham, Bucks. HP5 1LZ. Tel 0494 783990.

KW Viceroy in wkg order. AR88 handbook. Will collect or pay carriage. G8OWM, QTHR. Tel 06234 7149, after 6pm.

New RSGB member needs rx and any unwanted books, mags, etc to help to learn and understand amateur radio. Write D.B. Cater, 91 Belgrave Avenue, Gidea Park, Romford, Essex. Tel Romford 67872.

Suitcase or miniature tx/rxs; any spares, incomplete or damaged sets. WS (Canadian) No 29 spares, connecting leads etc. Army tx No 53. Any commercial or military a.m. fone tx or tx/rx covering 80/40m. Taylor, G3UCT, QTHR. Tel Fleet (02514) 6998.

Collins KWS1 tx, in good cond. Collins KWM2/KWM2A in first class cond. Round emblem. G3GBB NOT QTHR. Tel Bury St Edmunds 66496, evenings.

KW202 rx. G8WTY, QTHR. Tel Malvern 4968.

Trio TV502 transverter for TS520. Prefer unmodified if possible. *For sale:* Microwave Modules 50W o/p 70cm linear, £90. GM8BDX, QTHR. Tel 03612 2425.

FT221R, any cond considered. G8MII, QTHR. Tel Burntwood (05436) 72201.

Collins 51SI, Drake TR7, SP7, Racal RA117E, RA218. Must be exc cond, will collect. G5CRP, 64 Windmill Street, Macclesfield. Tel Rob, 0625 614112.

CCT diag with component values or complete manual for HRO Senior using octal base valves only. Will buy/borrow and refund all postage. National Co seems no longer at Malden USA RQ QTH and name of firm that bought Nat out. Doug Jackson, RS5858, 77 Andover Road, Winchester, Hants SO22 6AU.

Urgently: HRO rx coil packs, power units, spkrs, any spares, any cond considered but near mint or mint preferred. Collins ART13 tx, command txs, TR9 tx/rx, any cond. Can anyone help with data on coils for Marconi tx type TV5 or any other info. KT8 or VT79 valve for same. All replies answered so w.h.y? G4LBY, QTHR. Tel 0623 29473, evenings or weekends.

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FT-ONE SUPER HF TRANSCEIVER

The ultimate in HF transceivers–
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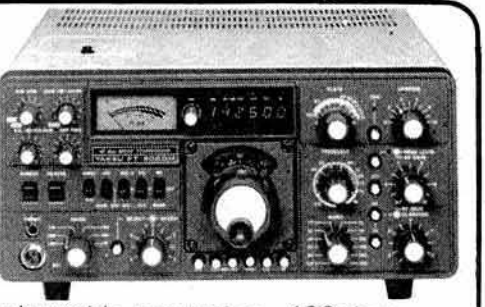
FT-101ZD Mk III

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, 100 watts PEP SSB, AM, CW (pictured here with 12 channel memory VFO). Latest bands

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.

KEEP AHEAD WITH THE NEW FT-102!

Once again YAESU lead the field with the exciting new FT–102 HF transceiver– no other manufacturer offers so many innovative features.

Better Dynamic Range
The extra high-level receiver front end uses 24 VDC for both RF amplifier and mixer circuits, allowing an extremely wide dynamic range for solid copy of the weak signals even in the weekend crowds. For ultra clear quality on strong signals or noisy bands the high voltage JFET RF amplifier can be simply bypassed via a front panel switch, boosting dynamic range beyond 100dB. A PLL system using six narrow band VCOs provides exceptionally clean local signals on all bands for both transmit and receive.

Total IF Flexibility
An extremely versatile IF Shift/Width system, using friction-linked concentric controls and a totally unique circuit design, gives the operator an infinite choice of bandwidths between 2.7kHz and 500Hz, which can then be tuned across the signal to the portion that provides the best copy sans QRM, even in a crowded band. A wide variety of crystal filters for fixed IF bandwidths are also available as options for both parallel and cascaded configurations. But that's not all; the 455kHz third IF also allows an extremely effective IF notch tunable across the selected passband to remove interfering carriers, while an independent audio peak filter can also be activated for single-signal CW reception.

New Noise Blanker
The new noise blanker design in the FT-102 enables front panel control of the blanking pulse width, substantially increasing the number of types of noise interference that can be blanked, and vastly improving the utility of the noise blanker for all types of operation.

Commercial Quality Transmitter
The FT-102 represents significant strides in the advancement of amateur transmitter signal quality, introducing to amateur radio design concepts that have previously been restricted to top-of-the-line commercial transmitters; far above and beyond government standards in both freedom from distortion and purity of emissions.

Transmitter Audio Tailoring
The microphone amplifier circuit incorporates a tunable audio network which can be adjusted by the operator to tailor the transmitter response to his individual voice characteristics before the signal is applied to the superb internal RF speech processor.

IF Transmit Monitor
An extra product detector allows audio monitoring of the transmitter IF signal, which, along with the dual meters on the front panel, enables precise setting of the speech processor and transmit audio so that the operator knows exactly what signal is being put on the air in all modes. A new "peak hold" system is incorporated into the ALC metering circuit to further take the guesswork out of transmitter adjustment.

New Purity Standard
Three 6146B final tubes in a specifically configured circuit provide a freedom from IMD products and an overall purity of emission unattainable in two-tube and transistor designs, while a new DC fan motor gives whisper-quiet cooling as a standard feature. For the amateur who wants a truly professional quality signal, the answer is the Yaesu FT-102.

New VFO Design
Using a new IC module developed especially for Yaesu, the VFO in the FT-102 exhibits exceptional stability under all operating conditions.

ANCILLARY EQUIPMENT

SP-102 EXTERNAL SPEAKER/AUDIO FILTER
The SP-102 features a large high-fidelity speaker with selectable low- and high-cut audio filters allowing twelve possible response curves. Headphones may also be connected to the SP-102 to take advantage of the filtering feature, which allows audio tailoring for each bandwidth and mode of operation to obtain optimum readability under a variety of conditions.

FC-102 1.2 KW ANTENNA COUPLER

FV-102DM SYNTHESIZED, SCANNING EXTERNAL VFO

NEW! FT-230R 25watt 2m FM mobile

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

FT-290R All-mode 2m portable

10 memories, 2 VFO's, LCD display, C size battery, easy car mounting tray, 2·5 watts out.

AGENTS
North West – Thanet Electronics Ltd, Gordon, G3LEQ, Knutsford (0565) 4040
Wales & West – Ross Clare, GW3NWS, Gwent (0633) 880 146
East Anglia – Amateur Electronics UK, East Anglia, Dr. T. Thirst (TIM) G4CTT, Norwich 0603 66189
North East – North East Amateur Radio, Darlington 0325 55969
Shropshire – Syd Poole G3IMP, Newport, Salop 0952 814275

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

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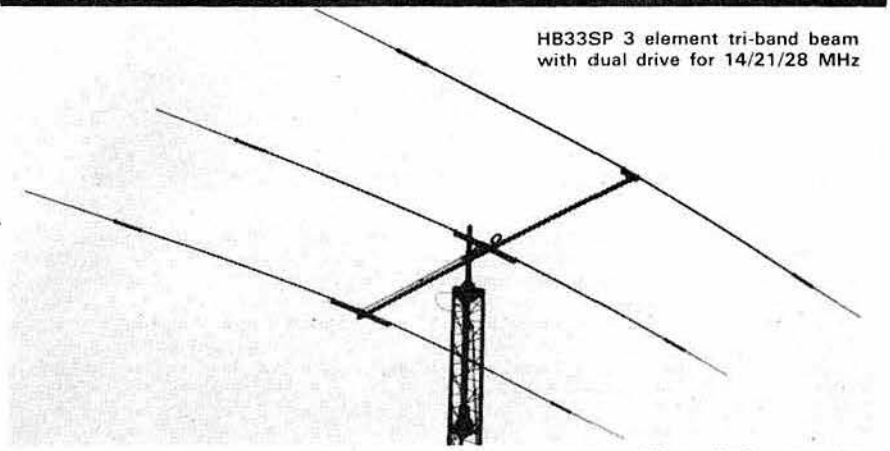
TET ANTENNA SYSTEMS

THE ANTENNA WITH THE DIFFERENCE

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

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



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

TET manufacture an exciting range of multi-element HF beams including superb monobanders plus HF verticals. Also there is a full range of VHF/UHF antennas most of which have multi-element drive or distinctive technical features.

Model	Description	incl. VAT	Carriage
HB10F2T	2 Ele. Mono Band Beams for 10 Meter Band	50.75	2.75
HB10F3T	3 Ele. Mono Band Beams for 10 Meter Band	73.79	2.75
HB15F2T	2 Ele. Mono Band Beams for 15 Meter Band	57.21	2.75
HB15F3T	3 Ele. Mono Band Beams for 15 Meter Band	88.49	2.75
HB34D	4 Ele. Tri Band Beams for 10/15/20 Meter Band	202.69	5.87
HB23SP	2 Ele. Tri Band Beams for 10/15/20 Meter Band	128.80	2.75
HB33SP	3 Ele. Tri Band Beams for 10/15/20 Meter Bands	189.23	4.60
MV3BH	Vertical Antenna for 10/15/20 Meter Band	40.25	1.75
MV4BH	Vertical Antenna for 10/15/20/40 Meter Band	49.50	1.75
MV5BH	Vertical Antenna for 10/15/20/40/80 Meter Band	71.25	1.75
MLA4	Loop Antenna for 10/15/40/80 Meter Band	105.60	2.10

YOUR LOCAL TET STOCKISTS

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

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

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

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

Uppington Tele Radio,
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- Full range of VHF/UHF Beams now in stock — an S.A.E. for full details please

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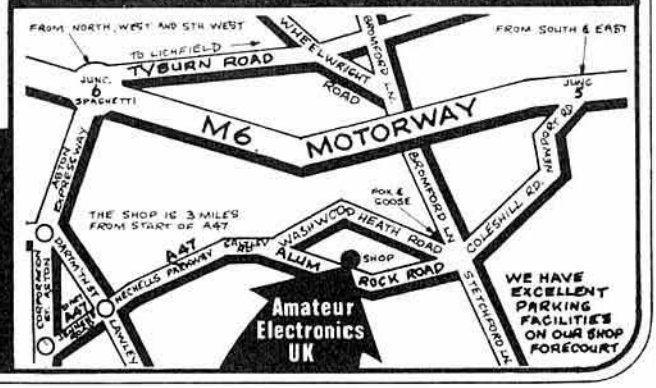
Opening hours: 9.30 to 5.30 Tues. to Sat. continuous – CLOSED all day Monday.

WHERE TO FIND US



TLNA432 s—rf switched 432MHz preamplier **£54.90**
u—unswitched 432MHz preamplifier **£26.40**

These preamplifiers are very high quality low noise bipolar transistor amplifiers covering the entire 430-440MHz band. Their noise measure is typically 1·4dB and they have an associated gain of typically 12dB. The device used is a modern highly linear low-noise transistor providing better performance at uhf than elderly devices such as the NE64535 or consumer gasfets like the 3SK97. We have paid our usual attention to excellent bandpass filtering in this case using helical resonators to ensure superb performance. As it is not possible to retain this order of performance with pin diode or low-cost relay switching, the switched version uses proper coaxial relays to enable 100w + power handling capability.

SLNA144s—rf switched 144mHz preamplifier — 1·2dB noise figure/15dB gain typical **£33.90**

As various reviewers have commented, our SLNA144s is a very fine preamp for the 144MHz band. It has been designed to complement most current transceivers—having the right combination of noise and gain parameters to ensure that the overall receiver sensitivity is limited by external factors such as sky and ground noise. Its dynamic performance is such that the following receiver will normally be the limiting factor with regard to large signal handling whilst the superb bandpass filtering will provide a substantial degree of protection against out of band signals.

The SLNA144s has been designed from the start as a preamplifier not as an afterthought to increase the sales appeal of a power amplifier.

Each sample is individually tested by people who understand the design in a pretty fundamental manner. This results in what we still consider to be the best product of its kind available.

1·2m Dish Semi-Kits from 'Parabolic' of Sweden (SM6CKU).

The kit consists of a hub-plate, preformed ribs, rim, and the nuts and bolts required for assembly. You supply the mounting bracket (or U-bolts), and the reflecting surface e.g. chicken wire.

We can supply either the basic kit or a complete antenna kit which includes the feed.

Prices:

Dish semi-kit	£45.90
Dish semi-kit and feed for either 1·3 or 2·3GHz	£78.90
	p&p £4.50

Depending upon the type of reflector used and the profile obtained, the maximum frequency of operation will be around 6GHz.

For further details give us a ring or send an sae.

THE RANGE

		£
SLNA 70s	70MHz switched preamplifier	33.90
SLNA 70u	Unswitched version of the SLNA 70s	20.38
SLNA 70ub	Unboxed SLNA 70u	12.41
SLNA 144s	144MHz switched preamplifier	33.90
SLNA 144u	Unswitched version of the SLNA 144_s	20.38
SLNA 144ub	Unboxed SLNA 144u	12.41
TLNA 432s	432MHz 1·4dB nf/13dB gain switched preamplifier	54.90
TLNA 432u	Unswitched version of the TLNA 432s	26.40
TLNA 432ub	Unboxed TLNA 432u	18.50
BLNA 432ub	1·3dB nf/13dB gain sub-min 432MHz preamplifier	12.43
GLNA 432u-1	432MHz gasfet unswitched preamplifier .8dB nf/13dB gain	46.90
GLNA 432u-2	.65dB nf/13dB gain	56.90
BLNA 1296ub	Bipolar unswitched 1·3GHz lna 1.8dB nf/12dB gain	24.50
HDRA 95u-1	1.5dB nf/8.5dB gain professional Band II high dynamic range (i/p intercept +22dBm) preamplifier	29.90
HDRA 95u-2	11.5dB gain variant (i/p intercept +16dBm)	29.90
BBBA 500u	20-500MHz broadband high dynamic range preamplifier	26.40
BBBA 860u	250-860MHz broadband low-noise preamplifier	20.50
XBPF 700ub	Band IV-V tvi filter (a true bandpass on microstrip!)	2.95
PPSU 112	Preamplifier (12v nominal) mains power supply	6.90
CISA 001	SO239 to BNC male adapter—if you must!	1.60
RPCB 144ub	FT221/225 replacement front-end board—the one and only!	64.50

Mutek also stocks antenna combiners for 2 and 4 antennas for 144, 432 and 1296MHz—ring for details.

All prices include 15% VAT. Postage on all items (unless otherwise indicated) is now £1.00 inc. VAT.

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4·5dB forward gain 18dB front-to-back
Very compact, robust construction
Complete with mounting clamp **£8.50**
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Please note that we cannot supply the HB9-CV by mail order

DEALERS FOUND GUILTY!

The CQ Centre at Merton Park were recently found guilty of paying excessively high prices for secondhand radio eqpt. Roads in the area were totally blocked as eager customers flocked in to take advantage of the generous allowances being consistently offered. A spokesman for the proprietors would only comment that this was a firm policy which the company would continue to follow. Further investigations have revealed that not only do they offer a part-exchange facility but also operate a sale-or-return service for which they only charge a nominal ten per cent. It was also found that copious amounts of tea and coffee were being served on the premises.

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Reece UH 74	50-542MHz 10 Watts	17.25
Reece T4359	144/435 MHz 100 Watts	32.50
Hansen 601MH	1.8-30MHz PEP/RMS 2000W	44.85
Hansen FS7	144/432 - 200 Watts	35.65

TET ANTENNAS

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MV5BH	Vertical 10/15/20/40/80 mts	71.25
MV3BH	Vertical 10/15/20 mts	40.25
MV4 BH	Vertical 10/15/20/40 mts	49.50
SQ22	Stacked 2 el Swiss Quad 144-146 MHz 16dB GAIN 20db F/B	55.67
SQY08	6 Element Quagi 2 mts	44.68
SSL 720	Stacked 2 x 9 element Yagi 2 mts	74.65
MLA4	Loop Antenna 80/40/15/10 mts 4 Elements of 1-8 mts	105.60

VAT inclusive. Carriage £4 per item.

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DATONG

PC1 G.C converter HF on 2 metre	120.75
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FL2 multimode audio filter	89.70
ASP.B auto RF speech processor (Trio)	79.35
ASP.A auto RF speech processor (Yaesu)	79.35
D75 manually controlled RF Sp. Processor	56.35
RCF.M RF speech clipper module	26.45
D70 Morse tutor	49.45
AD270 indoor active antenna	37.95
AD370 outdoor active antenna	51.75
MPU1 PSU for above	6.90

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HK 707	Straight up/down keyer	10.99
BK 100	Semi-automatic mechanical bug	22.12
MK 702	Up/down keyer on marble base	24.50
MK 702	Manipulator	24.50
MK 705	Squeeze paddle on marble base	21.72
EKM 1A	Morse code practice oscillator	10.50
MK 1024	Automatic memory keyer	135.13
EK 150	Semi/automatic keyer	74.00

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SHURE 444D Dual Impedance	33.00
SHURE 526T Mk II Power Microphone	46.00
ADONIS AM502 Compression Mic 1 O/P	39.00
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18V	Vertical 10-80m inc	31.97	1.73
18HT	TH7 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
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205BA	5 Ele Yagi 20m	281.75	7.59
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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	.75

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ANTENNA PARTS AND KITS

Includes the worlds finest traps - Unadilla, which are **guaranteed for five years** no condenser used - no blow up possible. Precision moulded coil forms with stainless hardware - aluminium irridite finish - fully waterproofed and suitable for **wire, vertical and beam antennas,** rated at 2.5Kw and weigh only 4oz per trap - available for 7MHz (KW40) 14MHz (KW20) 21MHz (KW15) and 28MHz (KW10) - **£14.99 + 50p p&p** VAT included.

The BALUN - The Unidilla W2AU is famous because **it's the best,** same rating as the traps and has a built in **lightning arrestor** - available 1:1 and 4:1 - get it right first time with the W2AU Balun - **guaranteed for five years - £14.99 + 50p p&p** VAT included.

THE KITS - AMCOMM 40 - 1 pair KW40 Traps, 1 PL 259, 1 W2AU Balun, 1 pair insulators and of course 120ft soft drawn copper wire - coverage 80 - 10 metres (INCLUDES 10 MHz). Full instructions included - **£37.50** including carriage and VAT.

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AMTECH

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AMTECH FM7 - Transform your FRG 7 or any receiver to FM. Small easily installed PCB with 455KHz/IF. **£13.99** including VAT and carriage.

YAESU RANGE

FT1	General coverage transceiver	POA
FT102	Price on application	
FT101ZFM	160-10m 9 band transceiver	590.00
FT101ZDFM	160-10m 9 band transceiver	645.00
DIGT 101Z	Digital unit for	90.00
DCT101Z	DC adaptor	42.50
FV101Z	Remote vfo	112.00
FANT101	Fab for 101 series	13.80
FT902DM	9 band AM/FM transceiver	885.00
FT902D	9 band transceiver	790.00
FC902	9 band atu/wattpwr etc	135.00
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FV107G	Remote vfo for above	98.50
SP107G	External speaker	29.90
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MR7	Metal rack for above	15.70
MMB2	Mobile mounting bracket	16.00
FRG7	0.5-30MHz receiver	199.00
FRG7700	SSB/AM/FM recvr. dig. readout	329.00
MEM7700	Memory unit for above	90.00
Converters		
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FRV7700B	50-60MHz & 118-150MHz	75.50
FRV7700C	140-170MHz	65.95
FRV7700D	70-80MHz & 118-150MHz	72.45
FRT770	Receiver aerial tuner	37.85
FF5	LF filter for above	9.95
FT480R	2m all-mode transceiver	365.00
FP80A	230V AC power supply	63.25
FL2050	50 watt linear	126.50
FT780R	70cm all-mode transceiver	449.00
FT290R	2m all mode portable	249.00
NC11C	AC charger	8.00
CSC-1	Carrying case	3.45
MMB-11	Mobile mounting bracket	22.25
FL2010	10 watt linear for FT290	64.00
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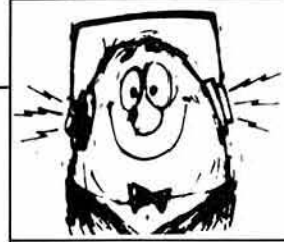

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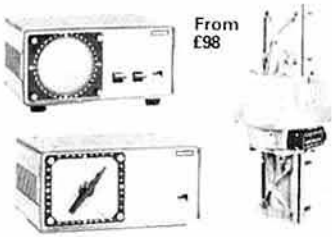

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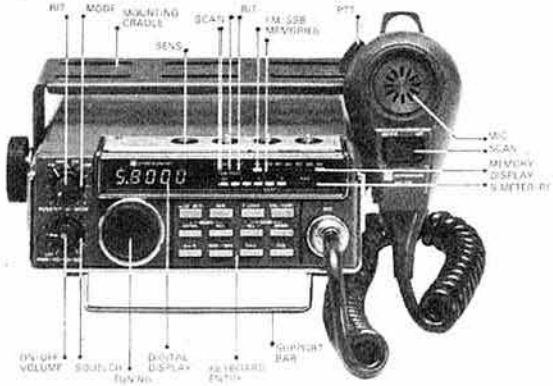

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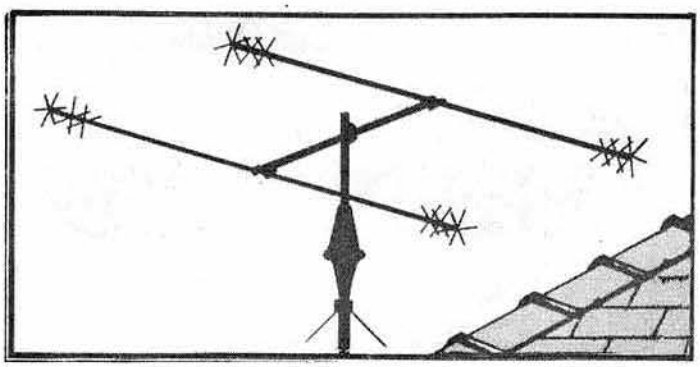

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KDK FM 2030

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The scanner seeks occupied or vacant channels and can examine either or both the memory banks or cyclically search any selected portion of the band as defined by the contents of two memory channels, moving on after a break in transmission (closed mode). A centre-zero detector and squelch open logic circuit is incorporated to prevent scanning from stopping prematurely before reaching the exact frequency.

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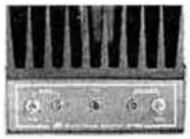

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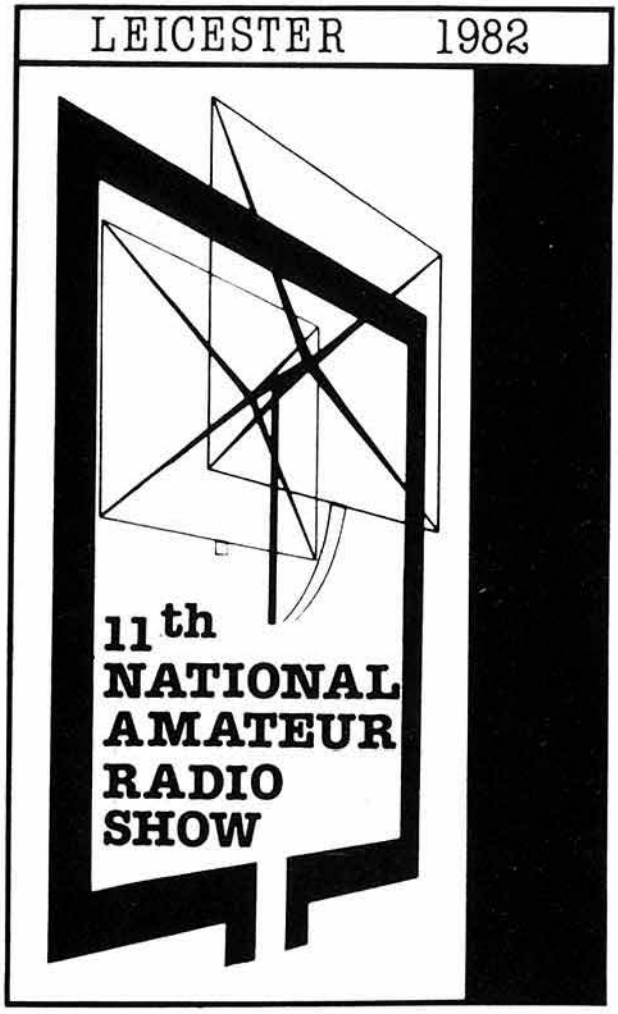

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Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, 35 Doughty Street, London WC1N 2AE
by E T Heron & Co Ltd, Silver End, Witham, Essex