RADio COMmunication

NOVEMBER 1982

A COMPARATIVE REVIEW OF TWO 144MHz MULTIMODE TRANSCEIVERS

by
J. C. Worsnop, G4BAO
and
J. F. Wilson, G3UUT

THE ICOM IC290E

and the

YAESU MUSEN FT480R

Commences on page 952

Journal of the Radio Society of Great Britain

RSGB

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VOLUME 58 No 11

RADio COMmunication

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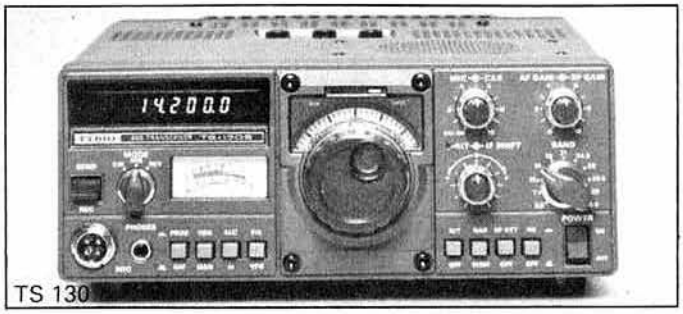
One could be forgiven for thinking, that after 15 years of handling amateur radio equipment for six days a week, I would be tired of it. Why is it, I ask myself, that sitting down to use **any Trio HF transceiver** still gives me **such pleasure and satisfaction?** No doubt those of you who are wise 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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Fife KY7 5DE. 0592-756962

ESSEX
Waters & Stanton Electronics
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01-669 6700

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0222 24167/8

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High St. Handcross
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

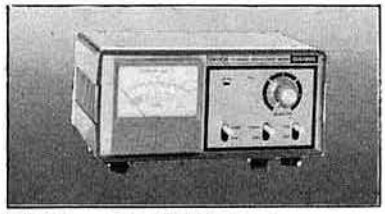
TRIO

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.

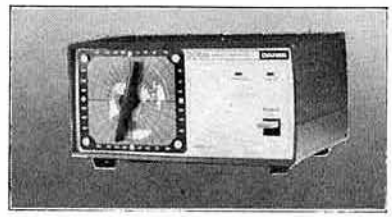
		Price inc. VAT	Carr.
VHF AMATEUR RECEIVERS			
SR9	2m FM tunable/xtal receiver 144-146MHz.....	46.00	1.50
POWER & SWR METERS			
CN520	1·8-60MHz mini cross needle power/SWR meter	32.50	1.50
CN540	50-150MHz mini cross needle power/SWR meter	35.00	1.50
CN620A	1·8-150MHz cross pointer power and SWR meter. 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
ANTENNA ACCESSORIES			
CS201/TW2	Two way 50 ohm coax switch. 0-500MHz.....	11.98	1.00

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



DR7600R	As for DR7600X but using the DAIWA round controller.....	152.00	5.00
KS065	Deluxe bearing for fixing stays to rotating mast.....	18.50	2.00
MOBILE WHIP ANTENNAS			
DA500	Dual band whip. 2·7dB gain on 2m and 5·5dB gain on 70cm. 200W.....	16.50	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 NRD, NSD line

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

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

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

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

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

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

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

POWER SUPPLY UNIT
NBD 515.
£148.35 inc. VAT

TRANSMITTER
NSD 515.
£1223.60 inc. VAT

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

SPEAKER
NVA 515
£34.50 inc. VAT

LOWE ELECTRONICS Access BARCLAYCARD VISA LOWE ELECTRONICS Access BARCLAYCARD VISA

EMPORIUM NEWS

Good afternoon,

Emporium News—another action packed instalment. **Dick Smith,** explorer, entrepreneur and **friend of the company** has just left in his bell jet ranger helicopter. Destination **London** after being **the first guy** to fly a helicopter **single handed across the Atlantic.** I was a bit disappointed that the television coverage of Dick's flight mentioned **his landing at Balmoral** to see **the Royal Family** but did not mention that after his stop there he **dropped in at Matlock** to see his friends **Lowe Electronics.** Talked in to the adjoining playing fields by myself on 40 metres Dick's **VK2DIK/Helicopter mobile** made a perfect landing batted in by David our man in the showroom **whose wartime experience** proved so useful! I would also like to have said that he was using Trio for the flight but as it was an American helicopter it was obviously Collins equipment. Anyway, **our Trio TS830S** provided **spot on performance** on both 40 metres for the flight down the UK and on the 20 metre band across the Atlantic.

The MX2 and MX4 are selling extremely well—in fact, as you read this we will probably be out of stock. Again I must apologize: I told you in all sincerity that the MX4 was available in **semi-kit form** and would cost only £75.00 including VAT. **Unfortunately** the rigs have arrived and, wait for it, they have already been assembled by the factory so we have had **to revise the price** to £75.00. Yes, the same price and the number of guys who are getting together and buying two is amazing. Of course our special, never to be repeated price for two MX4's, is £150.00 including VAT. Why not get together with a friend and talk across town on 4 metres. You will find that 200 mW goes a long way. **The MX2** is more or less the same as **the MX4** but obviously is on 2 metres. The first 2 metre sideband hand portable rig and a very good performer. Giving the same 200 mW of output is ideal for the local SSB contact and just the rig to drive that homebrew 2 metre linear.

The MX2 is slightly more expensive being £86.50 including VAT. An optional kit is available, the M2 @ £12.90 including VAT. The M2 contains a lead made up with a jack plug on one end and a SO239 on the other providing connection from the rig to your own aerial system—a 12 volt DC kit, a carrying strap and an earpiece. **Just to refresh your memory** regarding the specification of the MX4, I repeat: frequency range 70.15 to 70.25 MHz, mode USB and CW, power 200 mW, power source 9V DC. The MX2 is similar but having a frequency range of 144.25 to 144.35 MHz.

Two new products from Daiwa this month: **the CS401 coaxial switch** giving **4 way** switching. An extremely well made device having a power rating of 2.5 KW PEP (1KW CW), impedance 50 ohms and an insertion loss of less than 0.2 dB. The CS401 costs £36.99 including VAT, carriage £2.00. **Of course we still have available the CS201 2 way switch** which costs £11.98 including VAT, carriage £1.00.

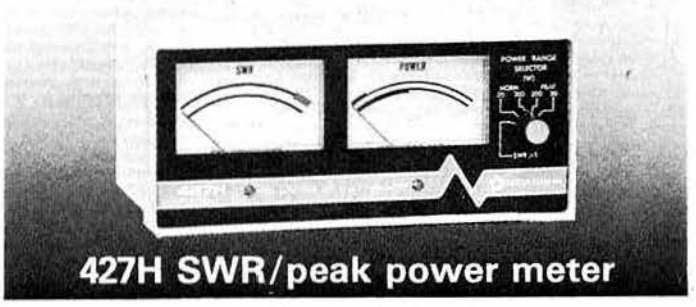
The second new product is a **new power supply.** You all know about the PS300 30 amp max 22A continuous PSU at £117.99 including VAT, carriage £5.00.

We now have from Daiwa **the PS200D.** A fully metered regulated PSU giving 20A @ 9-15 volts. The PS200D costs £98.00 including VAT, carriage £5.00 and is another piece of equipment having **the now well known Daiwa attention to detail, quality and reliability.**

I took the assorted **tool kits** to Wales to show the North Wales clubs the range— **very popular** they proved especially the 6 piece assorted screw driver sets. £1.97 each they are, a price including VAT. Carriage on this small item is only 75p. **Let me remind you** of the small tools we are now stocking: a complete set of pliers of all varieties, each costing only £4.49 including VAT, carriage being 80p. These tools are not of poor quality but represent very good value for money. No need to buy the full set all at once, build your collection slowly as and **when you require an additional piece.**

We still have available **the Daiwa infra red mike,** a very popular item amongst those of you who are mobile. If you are not familiar with this piece of equipment let me remind you. Daiwa with this design have at last removed the curly cord between microphone and rig so no longer do you have **major problems when negotiating roundabouts,** etc. The mike cable has been replaced with a beam of infra red which is transmitted from the microphone, picked up by a sensor just above the windscreen and fed into the control box attached to the underside of your rig. Not only does the control box modulate your rig but also provides **the necessary switching.** So there you are, **the Daiwa infra red** mike, a safe way to go mobile. Can be made to **fit any rig** and available at £35.00 including VAT, carriage £2.00. Also available for your mobile operation is a comprehensive noise filter kit for your car. This kit should provide all the necessary pieces to quieten the electrical interference caused by your car to your mobile transceiver. To my way of thinking, this kit is short of one component which is essential for mobile operation, that is an **EFIW** suppressor or possibly an in line **EFIW/LRIG DNEIRF QRM** filter. Unfortunately, one is not included.

I hope those of you who visited us on our **Open Day** had a good time. I would like to thank all of you who came on behalf of everybody concerned with the company. I especially enjoyed **the brass band**—they played all John and my requests. Unfortunately, our list of requests was so long that nobody else's requests were played! The only problem during the day was when our Conservative MP arrived for a conducted tour the brass band had, unfortunately, got the wrong sheet of music and struck up boldly



playing "**The Red Flag**". A few red faces—no, I am only joking. The band performed superbly. **The balloons blew up** and floated away and last but not least **the girls** from the packing department **welcomed everybody with a kiss.** A glorious day all round.

Regarding Trio equipment, **the TR9130** seems to be firmly established as a multimode mobile transceiver. Green readout, 25 watts, battery back up and an additional memory. **Again Trio's attention to detail,** those small improvements **to an already fine piece of equipment** have resulted in the "**only**" mobile 2 metre multi mode transceiver—**the Trio TR9130.**

Anyway, that's about it for now as I have just heard a rumour that **wives and girlfriends** are going to be allowed to operate their **husbands'/boyfriends'** equipment without passing the exam, so I am putting all my rigs on the **second-hand sales shelf** before the bottom drops out of the market.

So, until next time Gud DXes 73es FBYLS, XYLS, esFBOM, etc.

David

DATONG
NEW PRODUCT

MODEL FL3-A NEW AUDIO FILTER WITH AUTO-NOTCH

A NEW AUDIO FILTER FROM DATONG MODEL FL3

Model FL3 gets it all together! It combines all the power of the FL2 which continues in production with a remarkable new automatic notch filter - a concept which we pioneered with our FL1.
In one stylish case Model FL3 offers the complete solution to receiver audio processing. We believe that such a powerful combination of filtering capabilities has never been offered before in one package.

NOTCH FILTER SCANS CONTINUOUSLY

User of our FL1 will confirm the practical advantages of an automatic notch filter. With absolutely no help from you the operator the automatic notch tirelessly scans the receiver's audio output until a continuous audio tone is received. When it is the notch filter locks on and removes it. If the tone changes in frequency the auto-notch follows.

SHOOTS DOWN TUNE-UP WHISTLES AND HETERODYNES

Imagine the benefits. A tune-up whistle no longer causes any problem; after a second or two it simply drops out of ear shot. Those tiresome whistles that occasionally descend on a QSO become a thing of the past. Only the "LOCK" lamp on the FL3's panel reminds you of what you are thankfully missing.

PLUS LOW PASS, HIGH PASS AND MANUAL NOTCH

While all this is happening you still have three other independent filters at your disposal. Imagine, for example that another SSB station starts up 2 kHz high. Instead of trying to copy through all that high-pitched monkey chatter simply wind down the low-pass filter (the right hand knob) and wipe it out.
Then perhaps a teleprinter starts up 300 Hz above your carrier frequency; a touch on the high-pass filter knob (the middle one) cures that.
Finally maybe a second whistle appears. Since the auto-notch is busy, just bring in the manual notch as well and tune it out (left hand knob).

PHENOMENAL SKIRTS WINKLE OUT CW

For CW and RTTY the low-pass, high-pass and manual notch filters combine to give a 12 pole fully variable filter with remarkable skirt selectivity. Compared with lesser filters you can use a much wider bandwidth for a given interference suppression - this makes tuning easier and reduces ringing effects.

ATTENTION FL2 OWNERS!

At Datong we don't believe in "planned obsolescence". There's no need to throw away your FL2 to get an FL3. Instead you can convert it to an FL3 using our conversion unit, Model FL2/A.
This is a fully assembled PCB module with its own board-mounted "IN/OUT" switch and "LOCK" lamp. Installation involves four soldered connections to the existing FL2 PCB and one track cut.
Model FL2/A is also suitable for building into other equipment where an automatic notch function is required.

FREE HARDWARE KIT

As an introductory offer Model FL2/A will be supplied complete with a punched and printed FL3 front panel to replace the FL2 panel, plus PCB mounting hardware.

TECHNICAL REPRINT OFFER

The filtering in Model FL2 and now in Model FL3 has been carefully conceived to give maximum possible benefit in real life reception conditions. The thinking behind the product design has been described in depth by the designer, Dr D A Tong in "Ham Radio", November 1981. A limited number of reprints of the article are available free on request.

DATONG ELECTRONICS LIMITED

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

PRICES

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

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

See previous advertisement or price list for further details.

Data sheets on any products available free on request – write to Dept S.W.

DATONG ELECTRONICS LIMITED

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

The professional double act that turns on the amateur.

IC-Rx70, The very latest from Icom! £469.

The New Rx 70 receiver from Icom is designed to provide a really stunning performance at a price not much greater than its inferior competitors.

It covers all modes (when the FM option is included), uses 2 CPU – driven VFO's for split frequency working, has 3 IF frequencies – 70MHz, 9MHz and 455KHz and a dynamic range of 100dB.

Other features are:-

Input switchable through a pre-amplifier, direct or via an attenuator.
Selectable tuning steps of 1KHz, 100Hz or 10Hz.
Adjustable IF bandwidth in 3 steps (455KHz)
Noise limiter. Switchable AGC. Tunable notch filter.
Squelch on all modes. RIT. Tone control.
Tuning LED for FM (discriminator centre indicator)
Recorder output. Dimmer control.
Separate antenna sockets for LW-MW with automatic switching.
Large front mounted loudspeaker - 5.8W output.
Frequency stability 1st hour ± 250Hz, thereafter ± 50Hz, sensitivity -SSB/CW/RTTY better than 0.32 μv for 12 dB $\frac{S + N}{N}$.
Am – 0.5 μv, FM better than 0.32 for 12 dB Sinad.
Built in mains supply – DC optional.
Size 286mm x 110mm x 276mm – weight 7.4Kg.

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

Introducing the NEW IC-740

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

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

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

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

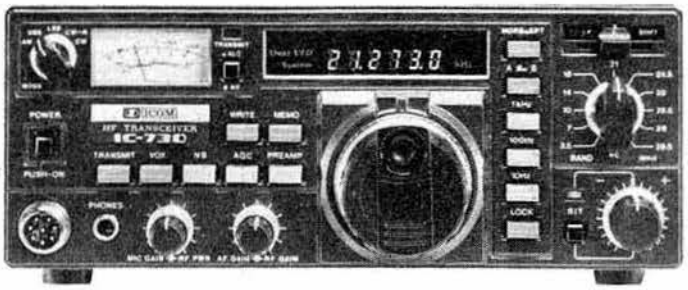
With 10 independent receiver and 6 transmitter front panel adjustments, the IC-740 operator has full control of his station's operating requirements.

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

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

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

IC-730 The best for mobile or economy base station £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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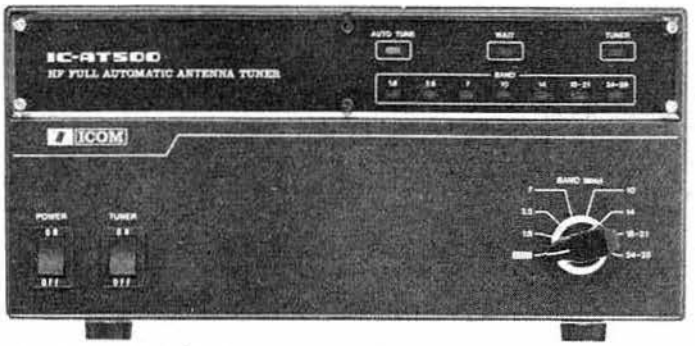
IC-AT500 Automatic antenna tuner £299.inc.
100W version AT100 £249.inc.



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

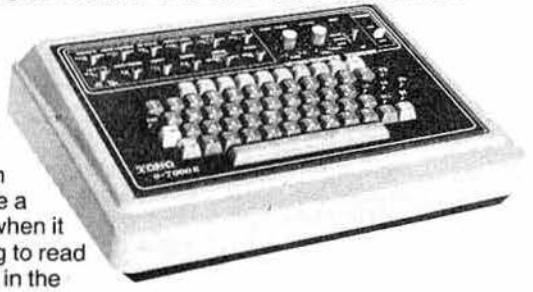
It was only when we started to use the new fully automatic antenna tuners from ICOM that we realised just how far ahead of their competitors they are! The very fast tune up time and simplicity of use make them a real worthwhile addition to any station even if the rest of your station isn't ICOM. If it 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
IC123	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.

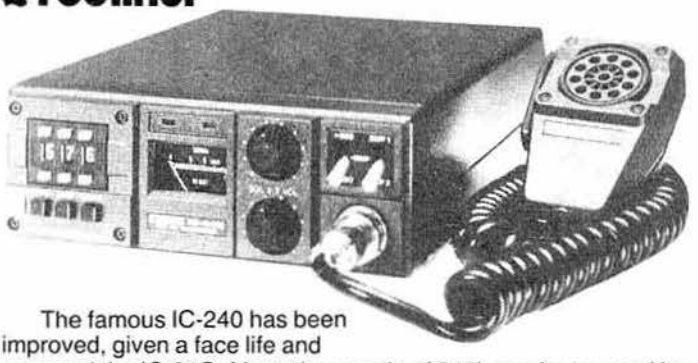
Multimode mobiles
IC-290E £366./IC-490E £445.inc.

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.

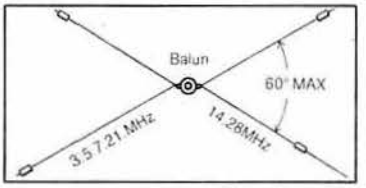
Thanet Agents Agents (phone first – all evenings and weekends only, except Scotland).
Scotland – Jack GM8 GEC (031 665 2420)
Midlands – Tony G8AVH (021 32 - 2305)
North West – Gordon G3LEQ (0565 4040 Ansafone available)

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
S & S Amateur Radio Lancs (07) 744 22239
Alyntronics Tyne & Wear (0632) 761002
Fanthorpes Humberside (0482) 223096
LAM Electronics Glos (0242) 43891
Booth Holdings Avon (02217) 2402
Telecom S Yorks (0226) 5031
Gemini Lancs (0204) 652233

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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 £189 Special Price Reduction!

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.

NEW PUBLICATION "Radio Amateurs Antenna Handbook" by W6SAI & W2LX **£3.95** plus 70p p&p. We were so impressed with this book that we decided to offer it for sale in UK. Limited quantity, so hurry!

FDK 2M ALL MODES—GREAT VALUE £259 Special Price Reduction!

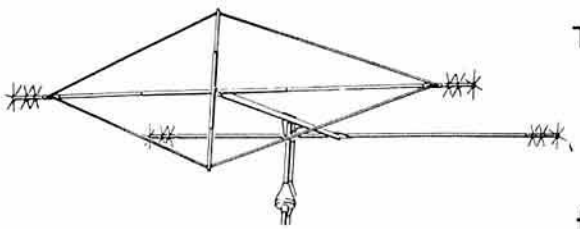
M750E 10 WATTS
FM-SSB-CW

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

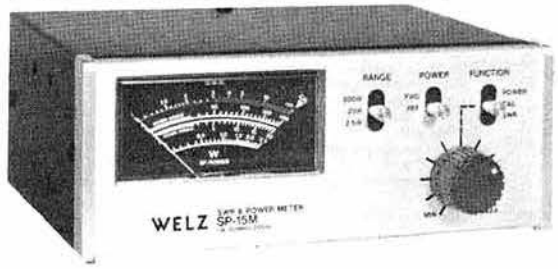
WELZ®

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

COMING SOON!
THE NEW WELZ
DIAMOND RANGE
OF HF & VHF ANTENNAS

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

FACTORY GUARANTEE WARNING

Waters & Stanton are sole authorised UK distributors of Welz products and are able to offer a complete factory back-up service with good stocks of "direct from factory" spares and calibration facilities. In order to help preserve this service customers are strongly urged to buy only from authorised dealers. The only dealers in the South able to offer this service are **WATERS & STANTON ELECTRONICS, THANET ELECTRONICS, AMATEUR RADIO EXCHANGE, BREDHURST ELECTRONICS, LEE ELECTRONICS.** Customers in other areas should telephone for details of their nearest stockist or order direct.

WATERS & STANTON ELECTRONICS

18-20, MAIN ROAD, HOCKLEY, ESSEX TEL: (0702) 206835/204965

		Price Inc. VAT	Carr. & Ins.
FDK RANGE			
M.700EX	2m FM 25 watt.	189.00	n/c
M.750E	2m FM/SSB/CW 10w.	259.00	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.	179.00	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
SP380	1·8-500MHz 200w	49.95	n/c
SP10X	1·8-160MHz 200w	£19·95	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
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	1,078.00	n/c
TS830S	160-10m transceiver	694.00	n/c
VFO230	Digital VFO	215.00	2.00
AT230	All band ATU	119.00	2.00
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 TR2300	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 FT102	All band transceiver	685.00	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 transceiver	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 tcvr	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			
IC740	HF transceiver 100W	699.00	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
MML70/50S	4m 50 watt linear/preamp	85.00	1.25
MML70/100-S	4m 100 w linear/preamp	139.00	2.00
MML144/30L-S	1-3 w I/P 30 w O/P	69.95	1.75
MML144/50S	2m 50 w linear/preamp	85.00	1.25
MML144/100-S	2m 100 w linear/preamp	139.95	2.00
MML144/100LS	2m 100 w (1 or 3w i/p)	159.00	2.00
MML432/20	70cm 20 w linear/preamp	85.00	1.25
MML432/50	70cm 50 w linear/preamp	109.00	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	37.90	0.75
MMC435/600	70cm ATV converter	27.90	0.75
MTV435	70cm ATV 20 watt tx	149.00	1.25
MM1000	ASCII to morse converter	69.95	1.25
MM1000KB	Morse converter with keyboard	99.95	2.00
MM2001	RTTY to TV converter	189.00	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	169.00	1.25
MMT28/144	10m transverter	109.00	1.25
MMT70/28	4m transverter	119.95	1.25
MMT70/144	4m transverter	119.95	1.25
MMT144/28	2m transverter	109.95	1.25
MMT432/28-S	70cm transverter	159.95	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	29.90	0.75
MMC50/28	6m to 10m converter	29.90	0.75
MMC70/28	4m to 10m converter	29.90	0.75
MMC70/28LO	4m to 10m converter	32.90	0.75
MMC144/28	2m to 10m converter	29.90	0.75
MMC144/28LO	2m to 10m converter	32.90	0.75
MMC432/28-S	70cm to 10m converter	37.90	0.75
MMC432/144-S	70cm to 2m converter	37.90	0.75
MMC1296/28	23cm to 10m converter	34.90	0.75
MMK1296/144	23cm to 2m converter	69.95	0.75
MMK1691/137.5	1691MHz Meteosat converter	129.95	1.25
MMA28	10m low noise preamp	16.95	0.75
MMA144V	2m RF switched preamp	34.90	0.75
MMA1296	23cm low noise preamp	34.90	0.75
MMDO50/500	500MHz digital meter	75.00	0.75
MMD600P	600MHz prescaler	29.90	0.75
MMDP1	Counter amplifier/probe	14.90	0.75
MMF144	2m bandpass filter	11.90	0.75
MMF432	70cm bandpass filter	11.90	0.75
MMR15/10	15dB, 10 watt attenuator	11.90	0.75

DATONG

PC1	General Cov. Converter	137.42	n/c
VLF	VLF converter 28-29MHz coverage	29.90	n/c
FL1	Agile audio filter	79.35	n/c
FL2	Multi-Mode audio filter	89.70	n/c
ASP/B	Automatic r.f. clipper (Trio)	82.80	n/c
ASP/A	Automatic r.f. clipper (Yaesu)	82.80	n/c
D75	Manual r.f. speech clipper	56.35	n/c
D70	Morse Tutor	56.35	n/c
MK	Keyboard morse sender	137.42	n/c
RFA	Broad band pre-amplifier	33.92	n/c
AD270	Active dipole (indoor mounting) 12v DC	47.15	n/c
AD370	Active dipole (outdoor mounting) 12v DC	64.40	n/c
MPU	Mains power unit	6.90	n/c
DC144/28	2 metre converter	39.67	n/c
Codecall 'A'	4000 link programmable codes	32.20	n/c
Codecall 'B'	4000 switch programmable codes	33.92	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

AN INVITATION

We're only 10 mins from Southend-on-Sea. Why not come and visit our large showroom where everything is on display and can be demonstrated. There's a couple of nice country pubs nearby that serve good ale and food And a brisk walk along the sea front (or down the pier and back if you can manage 2¾ miles) will blow the old cobwebs away! You can reach us by rail on the Southend to Liverpool Street line or by road via the A127 or A130. We look forward to seeing you soon.

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 larger 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.

AUTUMN SPECIALS

2M FM rigs.....£189
2M SSB rigs.....£89
PCS3000 + cable kit.....£189
FDK Palm IV 70cm handhelds.....£109
YAESU FT101's Latest models.....£685

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	79.00	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 RC) (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
SL*00 Alignment bearing for 250	13.50	1.50

HF ANTENNAS (Various manufacturers)

Mini-Products HQ-1 20/15/10m 2 el. 1kw "Mini-Beam		119.00	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		161.00	4.00
Hy-Gain 12AVQ 20/15/10m vertical 2kw		50.60	3.00
Hy-Gain 14AVQ 40-10m vertical 2kw		64.00	3.00
Hy-Gain 18AVT/WB 80-10m vertical 2kw		109.25	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	199.00	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	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	£13.80	3.00
20SE	14MHz whip	£15.35	3.00
RG4M	Base for all above aerials	4.50	1.50
GSS	Gutter/boot mount	4.50	1.50
MB5	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		
Mosley RD5	50ft coax	29.92	2.00
	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
ATC720SP	Synth Air Rec 118-136Mz	189.00	n/c
ATC720	Hobby version of above	129.00	n/c

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. .....

AMATEUR ELECTRONICS UK

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YAESU

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

FT-101ZD Mk III

YAESU's FT-101ZD **WITH FM** is still rolling off the line as fast as YAESU can produce - thanks to its very comprehensive specification and competitive price. Incorporates notch filter, audio peak filter, variable IF bandwidth plus many other features.

FT-ONE SUPER HF TRANSCEIVER

The ultimate in HF transceivers - the superb FT-ONE provides continuous RX coverage of 150KHz-30MHz plus all nine amateur bands (160 thru 10m).
All-mode operation LSB, USB, CW, FSK, AM, *FM • 10 VFO system • **FULL** break-in on CW • audio peak filter • notch filter • variable bandwidth and IF shift • keyboard scanning and entry • RX dynamic range over 95dB! and **NO** band switch!!!

*OPTIONAL

AMATEUR ELECTRONICS UK

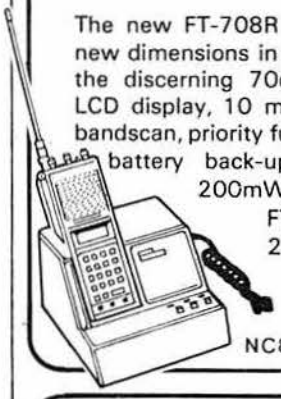
NEW! FT-230R 25watt 2m FM mobile

- 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

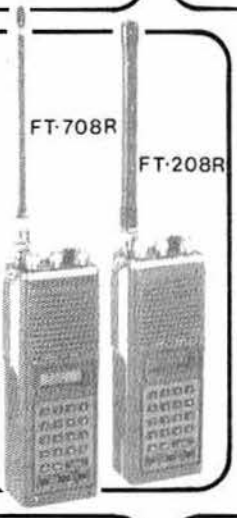
10 memories, 2 VFO's, LCD display, C size battery, easy car mounting tray, 2·5 watts out.

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

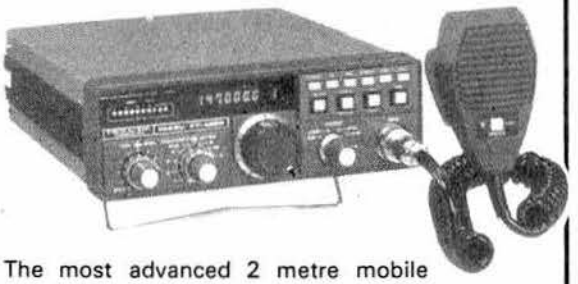


The new FT-708R and FT-208R provide new dimensions in operating flexibility for the discerning 70cm and 2m operator. LCD display, 10 memories, memory and bandscan, priority function, internal lithium battery back-up. RF output FT-708R, 200mW low, 1 watt high, FT-208R, 300mW low, 2·5 watts high.

NC8 Charger DC PSU



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



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

FRG-7 General coverage receiver

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

FRG-7700 High performance communications receiver

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

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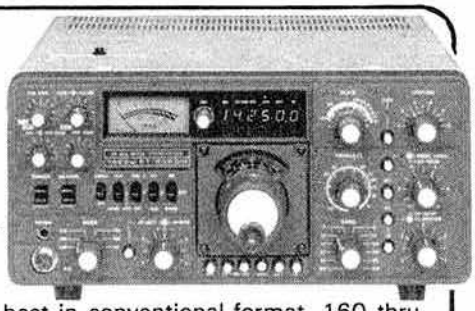
For full details of these new and exciting models, send today for the latest YAESU PRICE LIST & LEAFLETS. All you need do to obtain the latest information about these exciting developments from the World's No.1 manufacturer of amateur radio equipment is to send 36p in stamps and as an added bonus you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

FT-902DM Competition grade HF transceiver



The HF transceiver with the pedigree for the man who insists on only the best in conventional format. 160 thru 10 metres including WARC bands.
All-mode capability, SSB, CW, AM, FSK **and FM** transmit and receive. Teamed with the FTV-901R transverter coverage extends to 144 & 430MHz.

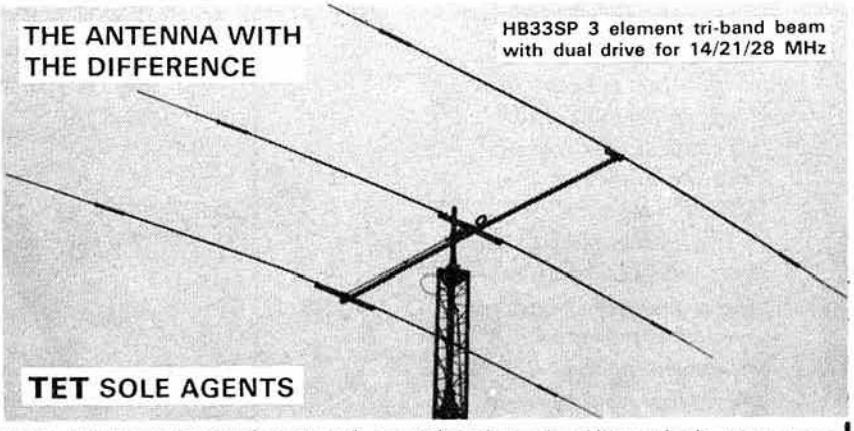
FT-707 All solid-state HF mobile transceiver

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

TET ANTENNA SYSTEMS

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

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



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	Price 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	2.60
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

- Full range of VHF/UHF Beams now in stock — an S.A.E. for full details please

YOUR LOCAL TET STOCKISTS

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

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

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

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

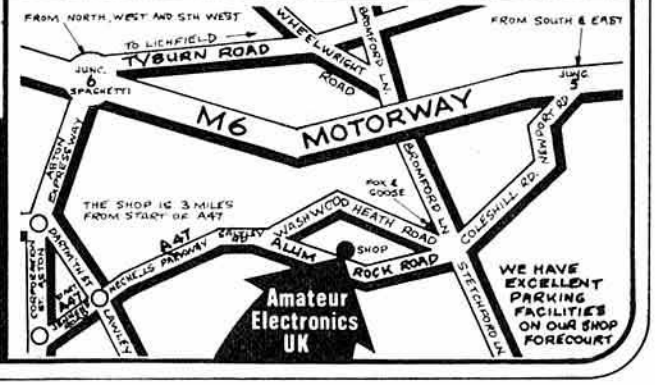
Uppington Tele Radio, 12-14 Pennywell Road, Bristol BS5 0JT

AGENTS

North West – Thanet Electronics Ltd, Gordon, G3LEQ, Knutsford (0565) 4040
Wales & West – Ross Clare, GW3NWS, Gwent (0633) 880 146
East Anglia – Amateur Electronics UK, East Anglia, Dr. T. Thirst (TIM) G4CTT, Norwich 0603 66189
North East – North East Amateur Radio, Darlington 0325 55969
Shropshire – Syd Poole G3IMP, Newport, Salop 0952 814275

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

WHERE TO FIND US



SMC SERVICE

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

FREE FINANCE

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

You pay no more than the cash price!!

GUARANTEE

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

WIDE COVERAGE ALL MODE RX; FRG7700 £299 inc.

VAT @ 15% & SECURICOR

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

*** SPECIAL OFFER! ***

'7700 THE ONE WITH FM!

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

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

- ★ 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

LOW PRICE

LAST CHANCE

- ★ 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

FT230R £239 inc.

VAT 15% & Securicor

YAESU

FT730R for 70cm HERE SOON!

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Edinburgh	Jack	GM8GEC	031-657 2430 Day / 031-665 2420 Eve
Stourbridge	Brian	G3ZUL	(03843) 5917
Bangor	John	GI3KDR	(0247) 55162
Tandragee	Mervyn	GI3WWY	(0762) 840656
Neath	John	GW4FOI	(0639) 55114 Day / (0639) 2942 Eve
Jersey	Geoff	GJ4ICD	(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.

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

SPECIAL OFFER

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

FT902DM £885 inc. VAT @ 15% & SECURICOR

*Option ** D & DE Models

FT102 £725 inc. VAT @ 15% & SECURICOR

"INSTANT" H.P.

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

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

FREE SECURICOR

FT101ZD £635 inc. VAT @ 15% & SECURICOR

*Option

FT707 £569 inc. VAT @ 15% & SECURICOR

PLASTIC BY 'PHONE

SMC FM MODIFIED VERSION AVAILABLE

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

*Option

hy-gain

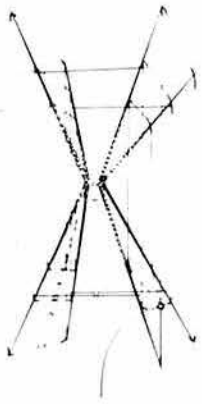
The TH7DXX is a new 7 element (10-15-20M) broadband VSWR less than 2:1 at band edges! Compact 20' (6·1M) turning radius—31' (9·4M) longest element dual driven element Yagi which by combining monoband *and* high Q, ultra high power, trapped parasitics provides an average front to back of 22dB on 20 and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

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

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

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

Gem Quad



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

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

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

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

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

J-BEAM

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

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

Kenpro

KR600RC
£132.25

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

KR400RC
£90.85

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

KR500
£86.25

Elevation Rotator (180°) Up to 50kg of Load. 1½in-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 1¾" stub.

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

Rotary bearing 3-way guying.

Takes 1²⁹/₃₂" mast.

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

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

CDE

AR40
£69.00

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

CD45
£125.35

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

HAM IV
£228.85

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

T2X
£287.50

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

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

SOUTH MIDLANDS COMMUNICATIONS LIMITED

BRANCHES: CHESTERFIELD · GRIMSBY · STOKE · LEEDS · BUCKLEY

COAX SMC PLUGS

BNC PLUG 50 ohms

UG88	Standard type 5.5mm	£0.78
UG599	Large type 11.2mm	£3.22

BNC SOCKET 50 ohms

UG290	Standard 4 hole type	£0.78
UG1094	Nut fixing type	£0.76
UG69	Free, cable-end, 5.5mm	£0.94

BNC COUPLER 50 ohms

UG914	Back to back female	£1.07
UG491	Back to back male	£1.66
UG274	'T' 2 female 1 male	£2.23
SMC3FBNC	'T' 3 female	£2.02
UG306	Elbow, Male-Female	£1.86

BNC INTERSERIES ADAPTOR 50 ohms

UG255	BNC plug – UHF socket	£1.76
UG273	BNC socket – UHF plug	£1.76
UG201	BNC socket – N plug	£3.28
UG349	BNC plug – N socket	£3.16
UG606	BNC socket – N socket	£2.59

UHF PLUG

PL259	Standard type 11.2mm	£0.55
PL259P	Push on type 11.2mm	£0.79
UG175	Reducer 5.0mm	£0.14
UG176	Reducer 5.6mm	£0.14
PL259R	Reduced type 5.0mm	£0.67
PL259A	Deluxe type 11.2mm	£1.50
PL259B	Deluxe type 5.0mm	£1.13
PL259SL	'Solderless' 11.2mm	£0.63
PL259SS	'Solderless' 5.0mm	£0.63
PL259E	Angle type 5.0mm	£0.95
PL259M	Metric type standard 11.2mm	£0.75
L42P	For LDF2/50 Heliax	£9.20
L44P	For LDF4/50 Heliax	£9.00
PL259PM	Panel mount 4 hole	£1.07

UHF SOCKET

S0239F	Standard 4 hole fix	£0.48
S0239F31000	4 hole PTFE Au plate	£0.97
S0239T	2 hole fixing type	£0.48
S0239NI	Nut fixing inside type	£0.59
S0239NO	Nut fixing outside type	£0.59
S0239E	Free angle type 5.0mm Free cable end 5.0mm	£1.01 £2.22
MX913/C	Dust Cap c/w chain	£0.46
MX913/M	Dust Cap metric type	£0.46

UHF COUPLER

PL258	Back to back female	£0.91
PL274	Back to back chassis	£1.07
SMCPL/PL	Back to back male	£1.38
M359	Elbow male-female	£1.07
M358	'T' 2 female 1 male	£1.38
M358AF	'T' 3 female	£1.70
M458	'X' 3 female 1 male	£2.13

UHF INTERSERIES ADAPTORS

UG255	UHF socket – BNC plug	£1.76
UG273	UHF plug – BNC socket	£1.76
S0/25	UHF socket – 2.5mm jack	TOS
S0/35	UHF socket – 3.5mm jack	£0.79
S0/NF	UHF socket – N socket	£1.96
UG146	UHF socket – N plug	£2.25
UG83	UHF plug – N socket	£1.96

UHF CABLES

PL36PL	3.0° RG58 PL259 ends	£1.85

N PLUG 50 ohms

UG536	Small type 5.5mm	£2.82
UG21	Standard type 11.2mm	£1.55
L42W	For LDF2/50 Heliax	£7.40
L44W	For LDF4/50 Heliax	£10.80

N SOCKET 50 ohms

UG58	Standard 4 hole fix	£0.94
UG1052	Free cable end 5.5mm	£2.85
UG23	Free cable end 11mm	£1.70
L42N	Free jack for LDF2/50	£7.40
L44N	Free jack for LDF4/50	£10.80
MX913C	Dust cap c/w chain	£0.46

N COUPLER 50 ohms

UG107	'T' 2 female 1 male	£3.74
UG28	'T' 3 female	£3.16
UG57	Double male adaptor	£2.70
UG29	Double female adaptor	£2.13
UG27	Elbow male-female	£2.24

N INTERSERIES ADAPTORS 50 ohms

UG201	N plug – BNC socket	£3.28
UG349	N socket – BNC plug	£3.16
UG606	N socket – BNC socket	£2.59
UG146	N plug – UHF socket	£2.25
UG83	N socket – UHF plug	£1.96
S0/NF	N socket – UHF socket	£1.96

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

HANSEN

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

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

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: 6¼ × 2¾ × 4¼"

FS300 £40.25

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

FS7 £35.65

VHF/UHF WATTMETER & BRIDGE
FS7 145MHz & 432MHz 5, 20, 200W
Power average ±10%. SWR 1:1-3:1
Power Max: 144MHz, 200W
432MHz 20W
Size: 6¼ × 2¾ × 4¼". 'N' type sockets

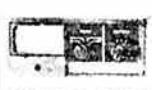
FS711 £32.20

REMOTE INDICATOR TYPE
FS711H 1·8-30MHz 20 & 200W
FS711V 50-150MHz 20 & 200W
FS711U 430-440MHz 5 & 20W
Power ±10% SWR 1:1-3:1 ±3%
Indicator 5 × 2¼ × 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: 6¼ × 2¾ × 4¼"

SWR3S £23.00

WIDE RANGE POWER & SWR
SWR3S 3-5 150MHz 20 & 200W
Power average ±10%. SWR 1:1-3:1
Power Max: 200W 3-5 30MHz
50W 50 150MHz
Size: 6 × 2¾ × 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 × 2¾ × 2½". 'On the Air' LED

8 new models in stock. See for details

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

SMC-HS

HF, VHF, UHF ANTENNAS
MOBILE VERTICALS

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

Model	Band	Gain	Type	Power	Length	Price
20SE	20m		(1¼λ)	100W	1·72m	£15.35
17SE	17m		(1¼λ)	200W	1·92m	£14.20
15SE	15m		(1¼λ)	130W	1·72m	£13.80
12SE	12m		(1¼λ)	200W	1·92m	£13.40
10SE	10m		(1¼λ)	100W	1·72m	£12.65
4E	4m	0dB	½λ	150W	1·03m	£7.65
2H/PL	2m		(1¼λ)	50W	0·17m	£3.45
2QW	2m	0dB	¼λ	200W	0·49m	£2.30
2VE	2m	3dB	½λ	50W	1·06m	£10.35
2NE	2m	3dB	½λ	150W	1·30m	£6.90
78SF	2m		(1λ)	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	⅝λ	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	Mag Mount c/w 4 mtrs RG58 PL259 *For use with smaller antennas only*	£8.45

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

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

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

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

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

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

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Mr E. G. Allen, G3DRN, QSL Bureau manager, 30 Bodnant Gardens, London SW20 0UD

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Affiliated societies: £14.50 (including *Rad Com*); **£8.70** (excluding *Rad Com*).

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Telephone 01-837 8688. Telex 25280 (RSGBHQ G)

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

RSGB SUNDAY NEWS BROADCASTS

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

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

INTENDED RECEPTION AREA	NORMAL READER	RESERVE READER	LOCAL START TIME
Frequency: 3·640MHz. Mode: ssb			
NE Scotland	GM3HGA	GM3VEY	1130
Frequency: 3·650MHz. Mode: ssb			
SE England	G2MI	G4ARZ	0900
Midlands	G2CVV	G8QZ	0930
SW England/Wales	G8ML	G3JFH/G4IEY	1000
Northern Ireland	GI3GAL	GI3SXG	1030
NE England	G5VO	G3MCF	1100
E Scotland	GM4CUZ	GM4FLP	1430
Midlands	G8QZ	G2CVV/G3SZJ	1800
Frequency: 3·660MHz. Mode: ssb			
Central Scotland	GM3TCW	GM3ULP	1130
Frequency: 7·0475MHz. Mode: a.m.			
UK (from Northern Ireland)	GI3GGY	GI2DHB	0900
UK (from N Midlands)	G3LEQ	G2CVV	1100
Frequency: 144·250MHz. Mode: ssb (horizontal polarization)			
N from Carlisle	G4LAA	(Vacancy)	0930
SW from the Midlands	G3BA	G3KQF	0930
NE from S Devon	G3CHN	G3PBV	1000
NW from Manchester	G3SMT	G3SMM	1000
NNW from Cleveland	G4JJB	G8FTZ	1000
W from Carlisle	G4LAA	(Vacancy)	1030
SE from Lincoln	G3NRO	G8ZVF	1030
SW from London	G3FZL/G3VAG	G3IIR	1030
S from Aberdeen	GM8GHV	GM8MBP	1030
W from Bristol	G4CJZ	G3ZWY	1100
W from Bangor, Co Down	GI3TLT	GI3SXG	1130
Frequency: 145·525MHz (S21). Mode: fm (vertical polarization)			
Caithness	GM4KNQ	GM4LNN	0930
Cornwall	G2ABC	G3NPB	0930
North Hampshire	G8CKN	G3PZN	0930
Suffolk	G3ZNU	G4FZZ/G4HMF	0930
Leeds	G3SPX	G8XGN	0930
Co Down	GI3WEM	GI4DOR	0930
Edinburgh	GM4EHO	(Vacancy)	0930
E Cornwall/S Devon	G3ZYY	G8XTE	1000
Londonderry	GI2DHB	GI4AHD	1000
London	G3FZL/G3VAG	G3IIR	1000
Birmingham	G3BA	G4LCM	1000
Lincolnshire	G3NRO	G8ZVF	1000
Tyneside	G4LDT	G8TKU	1000
Glasgow	GM4HCO	GM4CXM	1000
Elgin	GM4ILS	(Vacancy)	1000
Southampton	G8LVC	G8ADM	1030
E Sussex coast	G8SC	G3ZFE	1030
Bristol	G4CJZ	G3ZWY/G8NNU	1030
Manchester	G3LEQ	G3JWK	1030
Dumfries	GM3MSG	(Vacancy)	1100
Brighton coast	G3ZYE	G8GEZ	1100
Preston	G8WAT	(Vacancy)	1100
Enniskillen	GI6EZT	GI4CZW	1100
Huntingdon, Cambs	G8BBK	G8TQI	1100
Jersey	GJ4JWA	GJ8YVL	1100
Barmouth, Gwynedd	GW4LNK	GW6CGR	1100
Clwyd/Merseyside	GW4IEQ	G8NNS	1100
Aberystwyth	GW4JXB	GW8MAW	1130
Exeter	G3LSD	G8TKL	1130
Leicester	G4JYS	G4EYL	1130
Scarborough	G4OSD	G4EEV	1130

QTC
Amateur radio news

1983 RSGB National Exhibition

The Exhibition & Rally Committee is pleased to announce that the Society will be holding a national amateur radio exhibition and convention at the National Exhibition Centre, Birmingham, on Saturday and Sunday, 5-6 March 1983. This replaces the Alexandra Pavilion event.

Initial information is available from the Exhibition & Rally Committee chairman, Norman Miller, G3MVV, "Avon", Gardiners Lane, Crays Hill, Billericay, Essex CM11 2XA.

QSL Bureau

G4RAA-RZZ series. The sub-managers for this callsign series are: Mr & Mrs J. Brakespear, G8RZO/G8RZP, The Chequers Stores, Eastchurch Road, Minster, Sheppey, Kent.

IRTS golden jubilee

The Irish Radio Transmitters' Society this year celebrated its golden jubilee, and the high point took place on 19 June when 170 people attended the jubilee dinner at the Burlington Hotel, Dublin. Among the guests at the dinner were Louis van de Nadort, PA0LOU, chairman, Region 1 IARU; Bob Barrett, GW8HEZ, executive vice-President, RSGB; Ian Kyle, GI8AYZ, RSGB Council member for Northern Ireland; George Waters, director-general of Radio Telefis Eireann, the national radio and television network: and two founder members of the society, Donal O'Dwyer, EI8B, and Hugh McElligott, EI8D.

The toast to IRTS was proposed by PA0LOU, who congratulated the society and traced the links it had with IARU. In his reply, Tom O'Connor, president of IRTS, thanked PA0LOU and said how honoured the society was to have him as a guest at the dinner. He also referred to the long-standing relationship which existed between IRTS and the RSGB, and said how pleased the society was to have representatives of the RSGB present on such an historic occasion.

Honorary membership of the society was conferred on Louis van de Nadort, PA0LOU; Bob Barrett, GW8HEZ; and Ian Kyle, GI8AYZ.

Many letters of congratulation were received from fellow member societies of the IARU, and a congratulatory telegram was received from IARU headquarters in Connecticut.

Special anniversary station

On 19 December 1982 the BBC is celebrating the 50th anniversary of the official start of the Empire Service (now renamed the External Service). To commemorate this, Ariel Radio Group has obtained special callsigns and will be using them during the period 1-31 December.

The stations will be GB2BBC, GB3BBC and GB8BBC in central London, G3BBC in west London, and GB4BBC at Caversham near Reading. In addition, several other BBC club stations around Britain will participate. The bands in use will be 3·5, 7, 14, 21, 28 and 144MHz, and maximum activity will be centred around 19 December. A special QSL card will be issued for contacts made with these stations.

Stolen equipment

Between 10 and 17 August from Scunthorpe Amateur Radio Club: FDK 750E multimode transceiver, serial number 03051. Information to G8TIY, tel 0724 732438, or Scunthorpe Police, tel 843434.

On 24 August from a car in Swansea: Trio TR7500 serial number 661938; fast charger BC5 for Trio TR2400, and eight C-type rechargeable batteries. Information to G8CEZ, QTHR, or Swansea CID.

On 7 September from the shack of G4FRK: Yaesu hf transceiver FT201, serial number 5F304335, and Magnum 2 transverter. Information to Thornton Police Station, Cleveleys, tel 856822, or G4FRK, QTHR.

On 20/21 September from a car at Leith Nautical College: Yaesu FT290R, serial number 1K060795, modified 144-148MHz; Revco 5λ/8 antenna, and Hokushir 7λ/8 antenna. Information to Portobello Police, Portobello, Midlothian, or G4KFK, QTHR.

Visitors to 4U1ITU

Licensed radio amateurs visiting Geneva and wishing to operate the station 4U1ITU should give advance notice, in writing, to: The Station Manager, 4U1ITU, PO Box 6, Place des Nations, 1211 Geneva 20, Switzerland. Anyone wishing to operate the station over a weekend must also contact the station manager beforehand, to be shown details of the station and procedures.

While any licensed amateur may operate the station under the authority of the station manager, operators are reminded that most of the equipment has been donated by manufacturers and well-wishers and that it should be used with care (linear pa valves etc are expensive!).

1983 NARSA exhibition

The annual exhibition of the Northern Amateur Radio Societies Association, formerly held at Belle Vue, Manchester, will take place at a new venue next year. This will be at Pontin's Holiday Village, Southport, on 19-20 March. Overnight chalet accommodation will be available in the village; details and booking forms from Pontin's, Southport. Further details nearer the date or from M. Bainbridge, G4GSY, 7 Rothbury Close, Bury, Lancs BL8 2TT.

Can you help?

Mr H. L. Wilson, EI2W, 9 Haddington Lawn, Glenageary, Co Dublin, Eire, is preparing a vhf history of the period 1950-66, and wishes to obtain the following copies of the *RSGB Bulletin:* July, August, November, December 1957; February, June, July, September, December 1958; March, April, May, December 1959; July 1960; February, May, June, October 1961; February, June 1962; February, August 1963; January, February, November, December 1964; February, June, August 1965; and August, December 1966.

Dengie ARC

The inaugural meeting of the Dengie Amateur Radio Club, attended by 24 people, was held at the Burnham Sailing Club, Burnham-on-Crouch, Essex, on 16 August. It meets at Burnham Sailing Club on alternate Wednesdays, and further information can be obtained from the secretary, Mr A. Hodge, 43 Cherry Gardens, Maldon, Essex CM9 6ES.

RAE course, Grantham

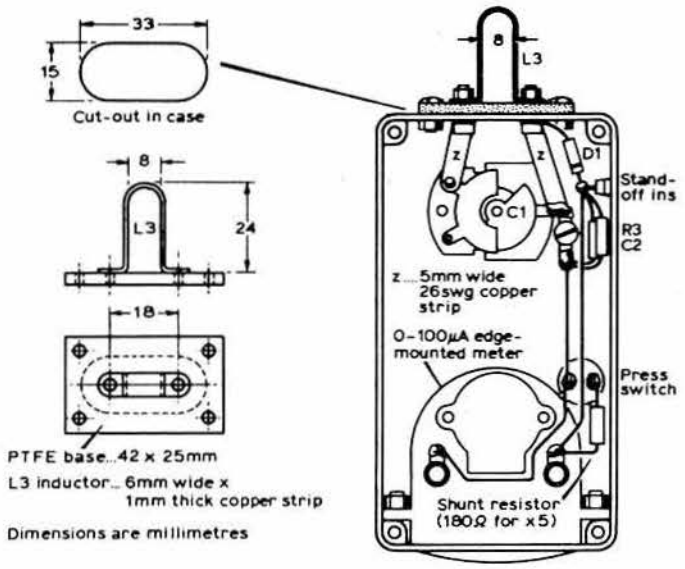
Late advice of this course has been received. It is held at the College of Further Education, Stonebridge Road, Grantham, 6.30-9pm on Wednesdays. Details from the college, tel 0476 3141.

Satellite frequency sub-band

The item in "QTC", October, concerning operation on the 144MHz band, referred to the whole 145·8 to 146MHz satellite sub-band, not just to 145·8 and 145·825MHz.

"Absorption wavemeters for 144MHz"

There was an error in the wiring arrangement shown in Fig 6 of this article in the September issue, p764. A corrected component layout diagram is given below.



A directional active loop receiving antenna system

by J. A. LAMBERT, G3FNZ*

LOOP ANTENNAS have been used for receiving mf and hf signals for many years, and active systems (ie systems in which an electronic amplifier forms an integral part) for not quite as long—but nevertheless for long enough that they are now a recognized tool in the armoury of the radio systems engineer. In the past, loops have been used in portable radios—in the days before ferrites took over as the antenna for the ubiquitous transistor set.

A second use was for direction finding, where the azimuth pattern of a vertically-polarized loop is a figure of eight, thus giving two nulls or minima in received signal strength at 180° to each other (Fig 1). In order to eliminate one of the nulls it was common practice to mount a whip adjacent to the loop and to feed it to one side of the coil that coupled the loop to the tuned rf stage of the receiver. This extra input would unbalance the azimuth pattern to such an extent as to reduce one of the nulls by a significant amount, thus giving a clear definitive directional property to the antenna.

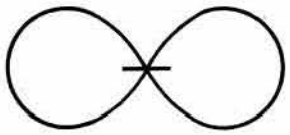


Fig 1. Azimuth pattern of vertically-polarized loop

This unbalancing of the output of a loop can be achieved without the use of a separate whip by converting a single-turn loop into two monopoles by inserting a significant impedance in series with the turn diametrically opposite to the feed point (Fig 2). For magnetically-induced waves the loop will still operate as a continuous loop with the conventional figure of eight azimuth pattern. The two lobes being of opposite electrical polarity (Fig 3).

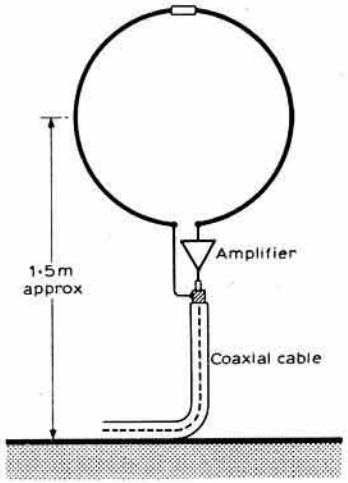


Fig 2. Unbalanced loop achieved by inserting series impedance

If we now consider the performance of the loop with respect to electrically-induced signals, the two halves of the loop perform as short monopoles closely mounted, each of which will produce like polarity outputs (Fig 4). When combined with the magnetically induced outputs these will add in one instance and subtract in the other, thus producing a cardioid pattern (Fig 5).

The choice of load impedance is important, as it will have a marked effect upon the feed point impedance. If a wideband high-performance amplifier is inserted at the feedpoint it is possible to obtain a constant-impedance low-noise output over a wide band of frequencies, eg 2 to 30MHz, and with the very significant capability of being combined into groups to simulate electrically the performance of most hf receiving antenna arrays. An optimum system may therefore be designed for any specific requirement and, if necessary, changes in performance can be easily and rapidly achieved.

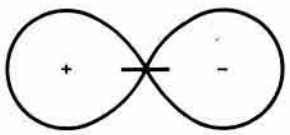


Fig 3. Opposite polarity of the two lobes of the magnetically-induced waves in a continuous loop

Fig 4. Combined like polarity of two close-coupled monopoles

Active loop antennas offer many attractive features, for example:

(a) Simple to install.
(b) Low weight and windloading.
(c) No elaborate structure, concrete foundations etc.
(d) Suitable for permanent, temporary or portable use.
(e) Components immediately reusable in new configurations.
(f) Modules easily stored for emergency operations.
(g) Single flexible cable feeds each loop.
(h) Full control of beamwidths, vertical angle of arrival and null directions.
(i) Loops are normally mounted with their centres about 1·5m above ground—an earthmat system only being needed when low-angle reception is required and is in any case considerably smaller than that required for a conventional antenna.

Loop performance

Typical performance figures obtained with a commercial (as opposed to military) loop are as follows:

Frequency range	2-30MHz
Directivity	3dB
Front-to-back ratio	12dB
Amplifier noise factor	5dB
Intermodulation products. 2nd order	30dBm
3rd order	18dBm
1dB output compression point	0dBm

The dc power supply is normally mounted adjacent to the receiver, and the dc is fed to the loop amplifier via the coaxial cable in order to reduce cabling, with suitable filters fitted to separate the rf from the dc. However, if the distance from the antenna to the psu and receiver is short, then for amateur use it may be better to delete L2/C10 and feed dc in via a separate line.

It will be observed that directivity and not gain is given for the loop—this is because system performance is limited by external noise in the hf

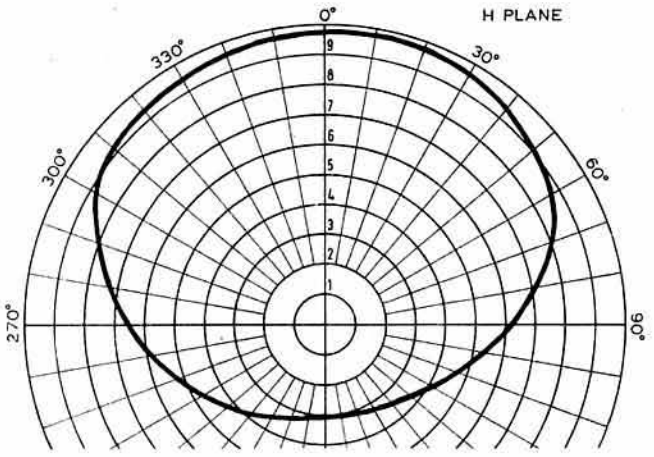


Fig 5. A cardioid horizontal radiation pattern (hrp) is maintained with a consistent front:back ratio—typically 12dB—over a wide band

* 49 Rede Court Road, Strood, Rochester, Kent ME2 3SP.

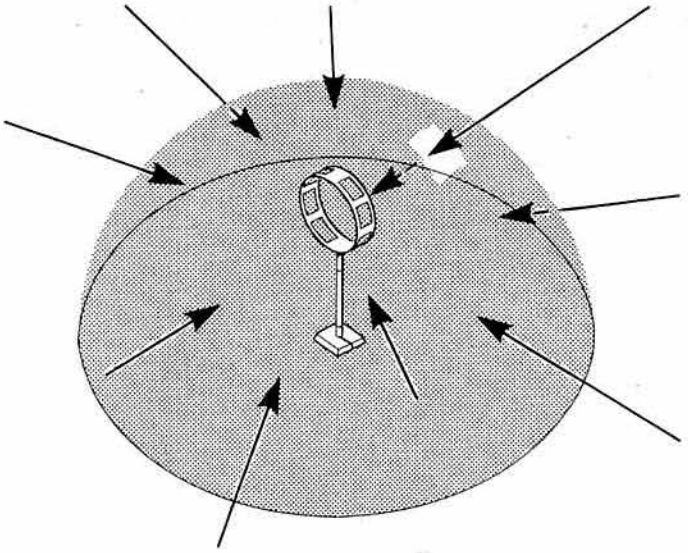


Fig 6. Pictorial representation of arrival of wanted signal and also of unwanted signals, all of which have to be considered when calculating directivity

band. Absolute gain is not the determining factor, as an increase in gain provides more signal but also correspondingly more noise.

Directivity is computed from the radiation pattern of an antenna, and relates the response of an antenna to a plane wave arriving from the optimum direction to the average response to signals arriving from all directions (Fig 6).

Antenna arrays

Normally the power supply unit would be placed in the receiver building, and the dc to the amplifier fed via the coaxial feed, which could be any 50Ω cables such as UR67 for short or medium runs or 0·5in foam-filled cable for long runs.

A simple beam antenna of two or more loops would use a hybrid combining unit fitted on one of the loop mounting poles. This would be connected to the individual loops by cables of equal length in the case of a broadside array, and cables of different lengths to give the required phase relationship for an endfire array.

When more than one beam is required from an array, this is arranged by dividing the outputs from individual loops with suitable phase differences. Splitting and recombining is carried out on the signal output from the power supply unit to avoid the complexity of filtering and recombining the dc supply.

As coaxial cables are used to provide path delays for beam forming, directions of fire are maintained over wide bandwidths. Varying elevation angles of endfire arrays and varying slew-angles for broadside arrays may be obtained sequentially by switching or simultaneously using hybrids.

Endfire (Fig 7)

An endfire array provides a single directional beam with low sidelobe levels and a high back-to-front ratio maintained over a wide frequency band. The radiation patterns, Fig 8, show that as the operating frequency increases, both horizontal and vertical beamwidths decrease. By choosing the correct

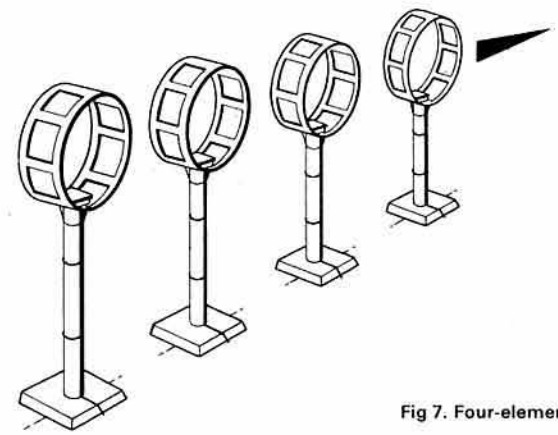


Fig 7. Four-element endfire array

Table 1. Directivity of loop arrays

Frequency	Number of loops	Directivity (dB) Endfire	Broadside
f Max	2	8·1	9·1
$\frac{f\ Max}{2}$	2	5·4	6·2
$\frac{f\ Max}{4}$	2	4·6	4·3
$\frac{f\ Max}{8}$	2	3·9	4·0
$\frac{f\ Max}{16}$	2	3·8	3·9
f Max	4	10·9	12·2
$\frac{f\ Max}{2}$	4	8·1	9·2
$\frac{f\ Max}{4}$	4	5·8	6·3
$\frac{f\ Max}{8}$	4	4·4	4·5
$\frac{f\ Max}{16}$	4	4·1	4·0
f Max	8	13·5	15·9
$\frac{f\ Max}{2}$	8	10·9	12·2
$\frac{f\ Max}{4}$	8	8·1	9·3
$\frac{f\ Max}{8}$	8	5·8	6·3
$\frac{f\ Max}{16}$	8	4·4	4·5

spacing, the performance of an array can be optimized for the frequency band required; see Table 1.

Endfire arrays allow choice of beam elevation angle—from very low angles for long-distance circuits to near-vertical incidence for short circuits. The elevation angle may be fixed or adjustable by switching.

With any of the arrays, unwanted interfering signals can be suppressed by designing nulls into the array pattern. The number or bandwidth of the nulls can be greater for the longer arrays (ie arrays with more loops).

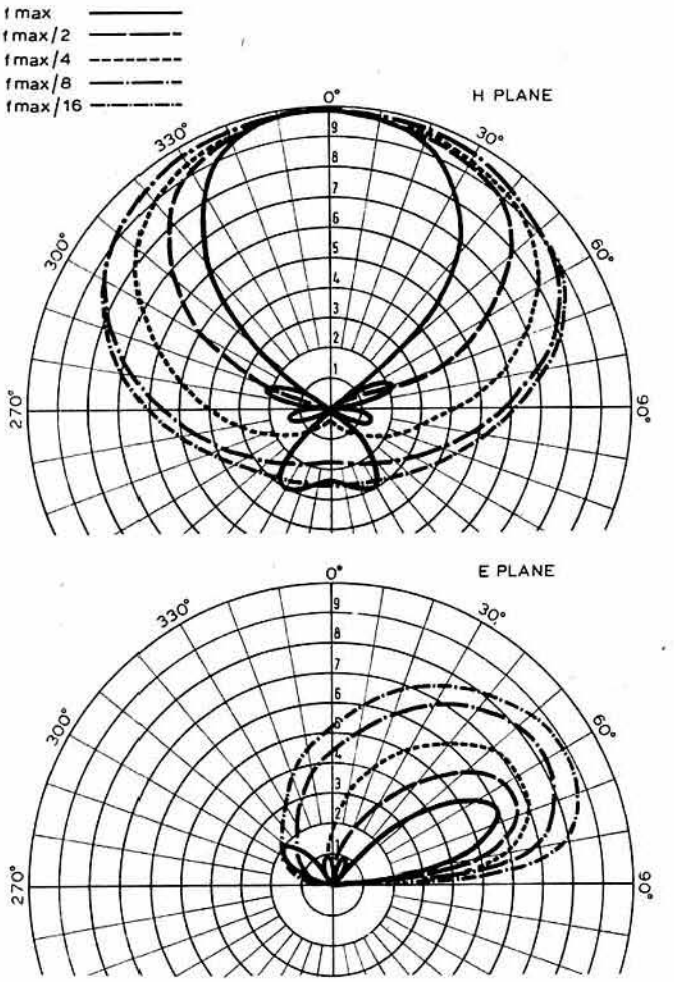


Fig 8. Four loops in endfire is a useful general purpose array which provides an antenna of moderate gain with azimuth and elevation beamwidths which are capable of covering a large area of territory

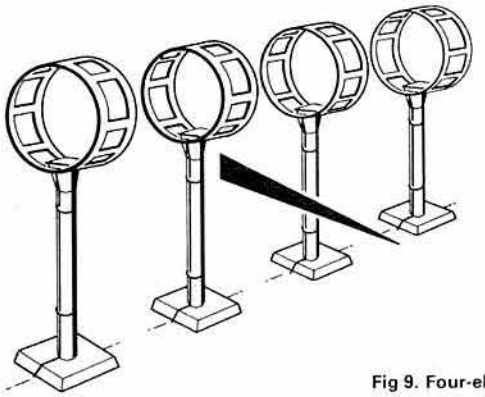


Fig 9. Four-element broadside array

Broadside (Fig 9)

The characteristic of broadside arrays is a beam which is wide in the elevation plane and narrow in the azimuth plane. The vertical radiation pattern is not dependent on the number of elements, and its beamwidth changes little with frequency. The horizontal radiation pattern varies widely with frequency; the beamwidth being inversely proportional to frequency (Fig 10).

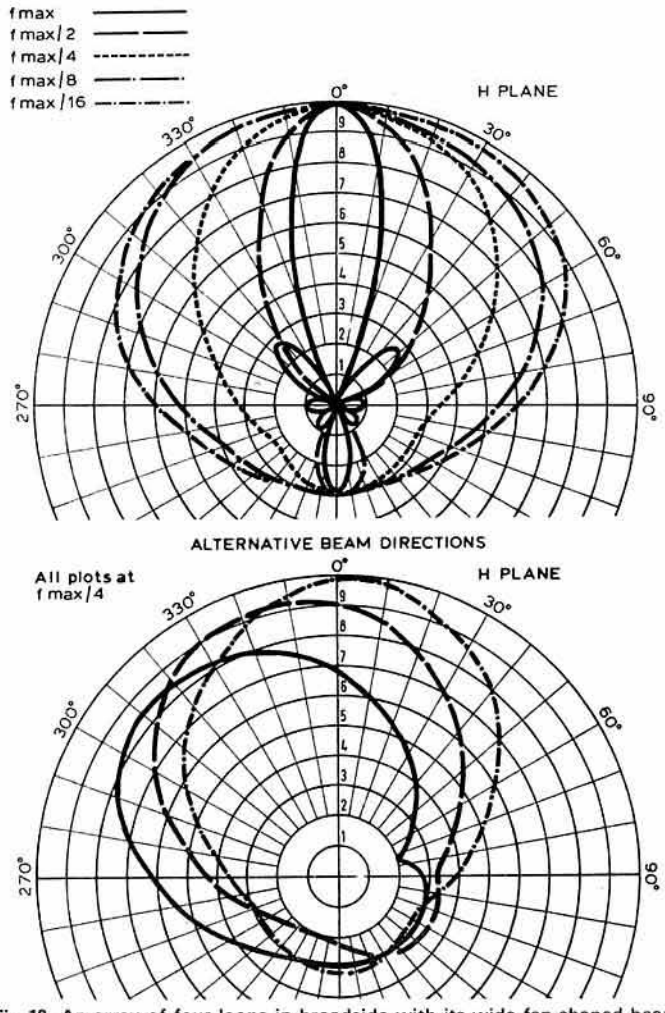
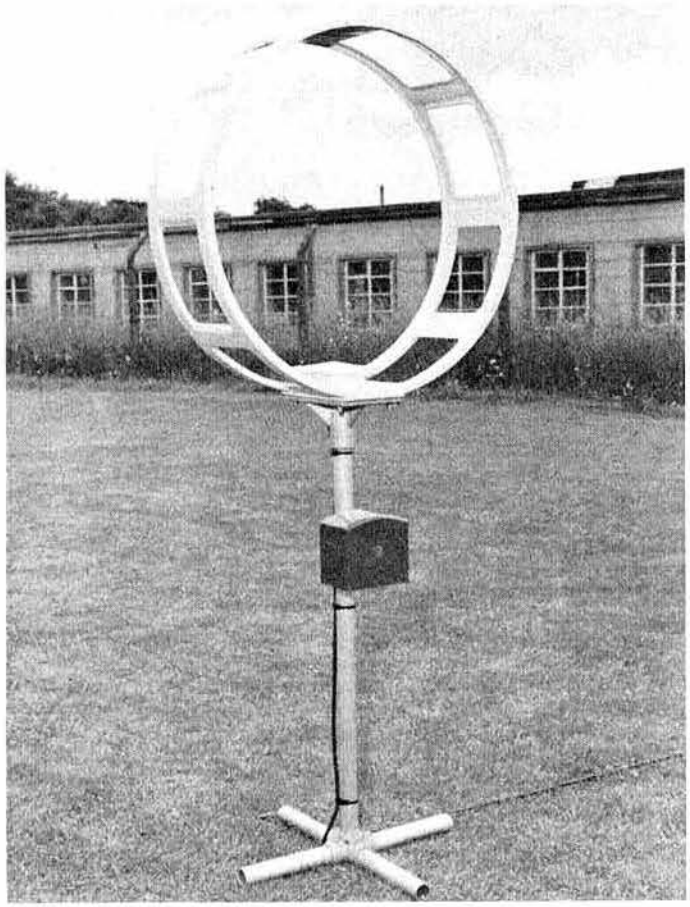


Fig 10. An array of four loops in broadside with its wide fan-shaped beam provides good rejection of unwanted signals. It will accept signals at many angles of arrival, so detailed knowledge of this parameter is not needed

By suitable array design the beam maximum, usually normal to the line of the elements, can be slewed typically up to 45° from the normal. The design can provide a single slewed beam, switched slew angles or a number of simultaneous outputs to different receivers.

Arrangements in which elements are arrayed in two dimensions—ranks and files—can be designed to combine the properties of broadside and endfire arrays.



A single active loop on a temporary stand. The amplifier is contained in the box mounted within the loop. The large box on the support pole is a hybrid combiner unit for a multi-loop array. Notwithstanding its appearance this is a single-turn loop—the apertures being inserted to reduce windloading

Dual beam

It has previously been mentioned that it is possible, in the case of an endfire array, to steer the elevation pattern—and similarly the azimuth pattern—in a broadside array. In systems engineering it is sometimes found to be desirable to have both high and low angles of elevation covered or to receive simultaneous circuits from different azimuth bearings. To meet such requirements it is possible to provide equipment to enable two distinct beams to be received independently from one array.

The design of the individual array is identical to that for covering endfire

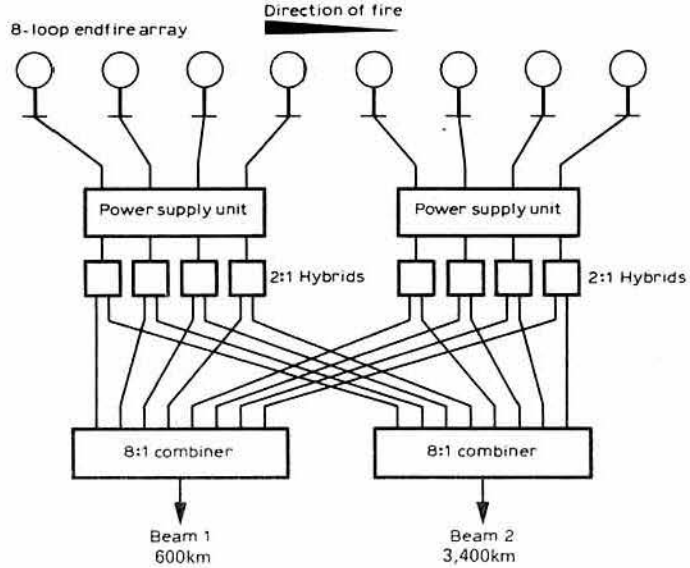


Fig 11. Block diagram of an eight-loop endfire array with dual beams to receive simultaneous signals from two circuits at distances of 600 and 3,400km

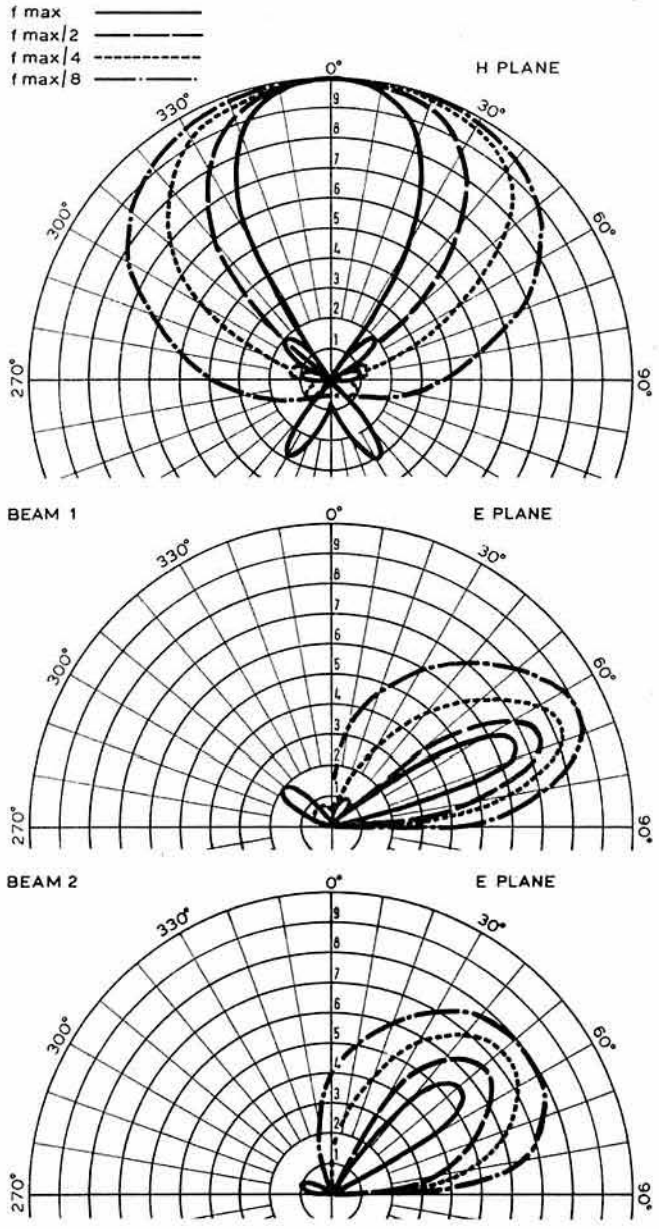


Fig 12. Beam patterns of the eight-loop endfire array with dual beams shown in Fig 11

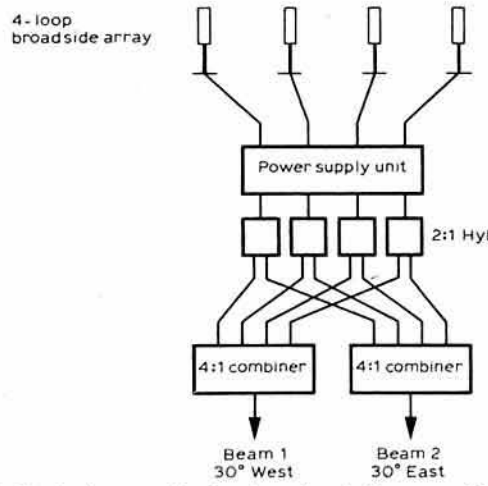


Fig 13. Block diagram of a four-loop broadside array with dual beams to receive two circuits at distances of 800 and 1,200km bearings separated by 60° in azimuth

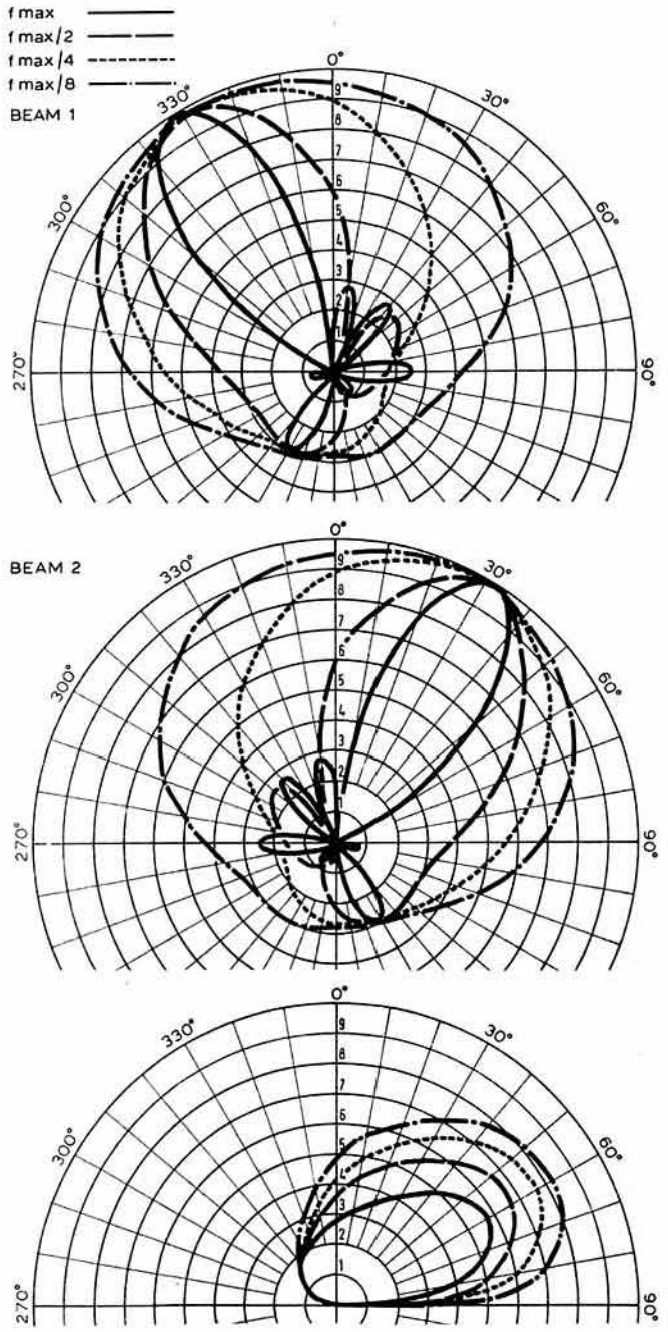


Fig 14. Beam patterns of the four-loop broadside array with dual beams shown in Fig 13

and broadside arrays. It is important to note that the two outputs are completely independent of each other, and it is therefore possible to receive a long distance hf signal using that output of the endfire array providing the low-angle coverage, while at the same time receiving a short-distance signal from the beam steered to cover the higher angles (Figs 11 and 12).

In the broadside application it would be possible to receive a signal from, say, 30° east of the normal bearing and at the same time receive another circuit coming, say, from 30° west from the other output, (Figs 13 and 14). It must be remembered when deciding to use a two-beam array that the array beams must be within the limits of the beam of a single loop, ie it would be unwise to steer a beam in elevation by more than 50° or performance will fall off considerably. In the same way, when steering the broadside array it is necessary to stay within the azimuth beamwidth of a single loop.

A further restraint on beam steering is the appearance of large side lobes when the beam is steered over a wide angle. The appearance of these lobes limits the steering of the beam of high-directivity arrays to around ±3 beamwidths.

It will be noted that for this type of system it is necessary to bring back an individual cable from each of the loops to the receiver room.

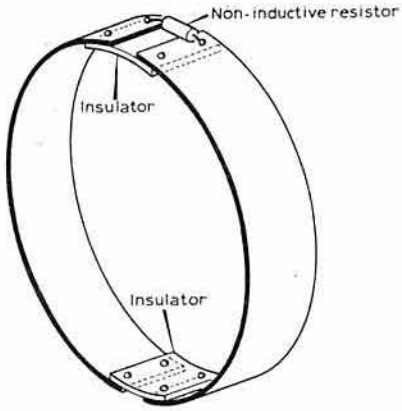
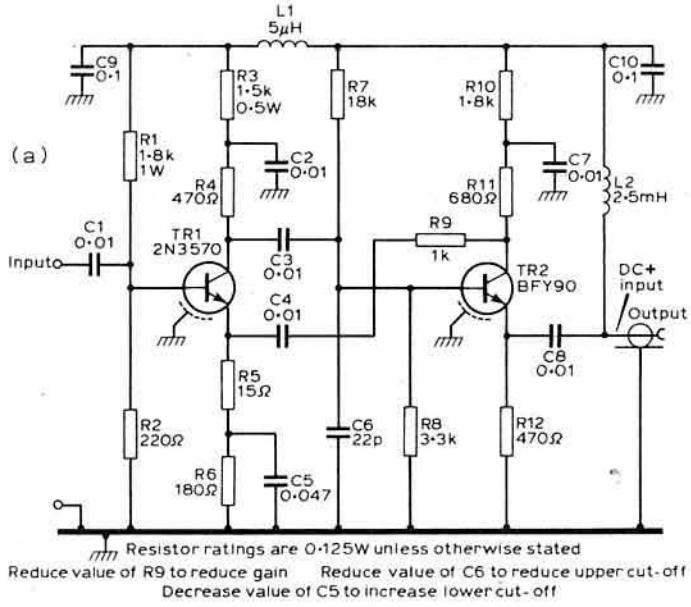


Fig 15. Suggested construction of an experimental loop antenna, the amplifier being connected across the lower insulator

Other configurations

There are many more configurations possible, such as constant-performance arrays of loops in log-periodic form to give a constant-azimuth beamwidth over a wide frequency band, or sector arrays where loops are mounted in a ring and adjacent loop groups switched into use to give azimuth beam selection.

The constant-performance array of loops placed in log-periodic form may also be utilized to form an azimuth sector coverage antenna by placing



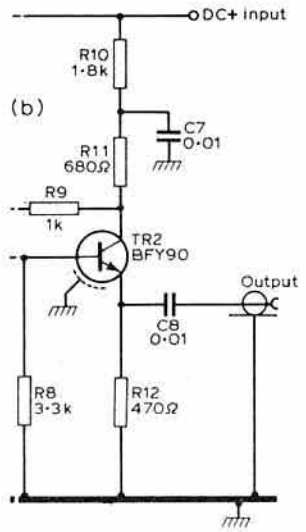


Fig 16. Amplifier circuit diagram: (a) shows the normal arrangement for feeding the dc input via the coaxial cable; (b) shows the alternative arrangement for a separate dc input

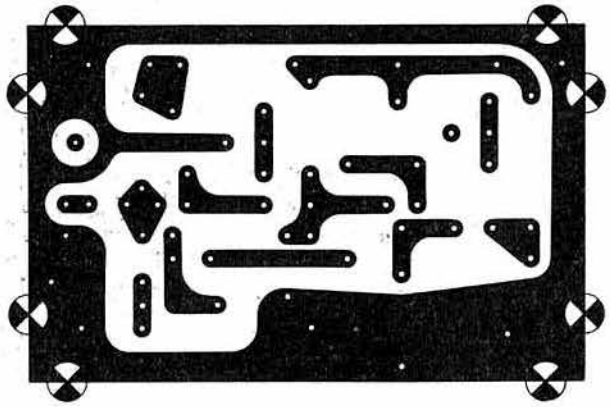


Fig 17. Printed circuit board, Side 1

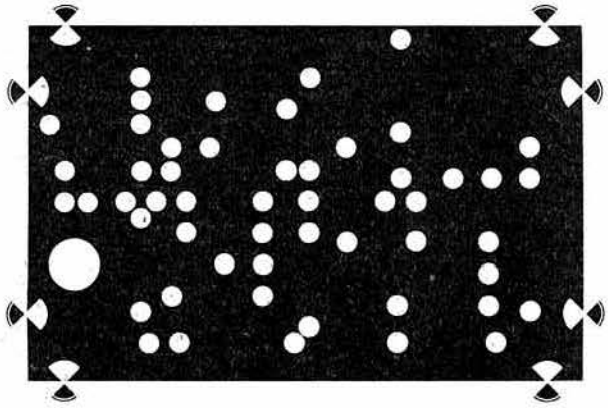


Fig 18. Printed circuit board, Side 2

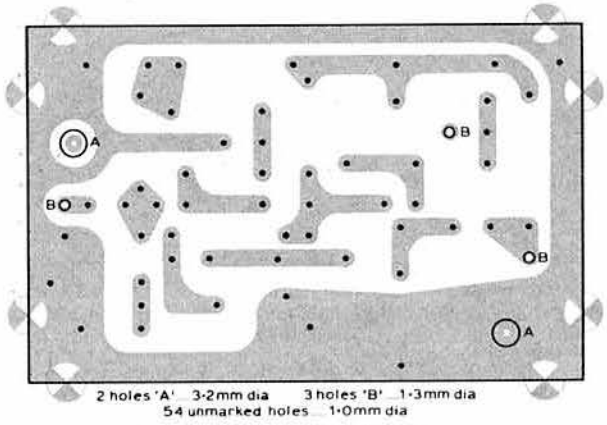


Fig 19. Printed circuit board drilling data

log arrays in the form of a rosette; by combining adjacent arrays a constant beamwidth is achieved in both azimuth and elevation over a wide frequency range of up to 2–30MHz. The composite antenna may be designed to meet the exact requirements of the system engineer.

Construction

The construction of loops for experimental purposes, hf band monitoring, Intruder Watch etc, should present no problems. The loop itself is 1m in diameter and, in order to achieve a substantially constant match to the amplifier together with structural stability, it is suggested that it be made from a 150mm-wide strip of 16swg aluminium. Having formed the loop it should be cut into two equal parts (Fig 15) and then rejoined, utilizing two blocks of insulating material, thus resulting in a firm 360° loop separated into two electrically equal parts.

A 0·5W carbon non-inductive resistor of a value between 47 and 100Ω is then connected across one of the loop junctions, and a broadband low-gain amplifier across the other. The amplifier should be broadband from 2 to 30MHz with low noise and low level of intermodulation products. The design of a suitable amplifier is shown in Figs 16–20, and it will be noted that

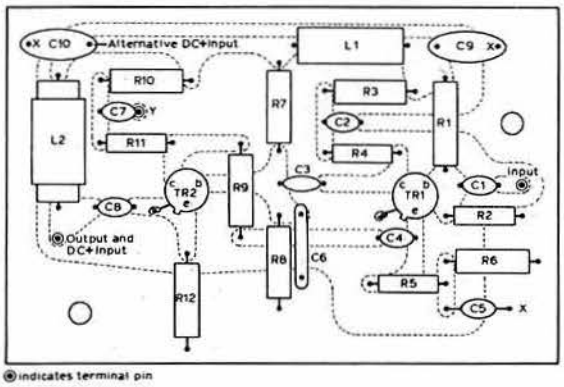


Fig 20. Printed circuit board component layout
1. All components to be spaced approximately 0·06in (1·5mm) from face of board.
2. Earth leads of transistors to be soldered to component side of board as shown.
3. Connections at points marked "X" to be soldered on both sides of board.
4. Pin marked "Y" to be soldered to component side of board

it incorporates a filter to separate the rf from the dc supply. It will be necessary to provide a 24V dc supply capable of providing 30mA, and this unit will also require a filter to enable the rf only to be connected to the station receiver.

It has been stated that optimum performance is obtained when the loop is 1·5m above ground, and although the professional version of the loop utilizes a custom-produced casting, the amateur constructor will find that an electrical conduit flange, plus 1·5m of conduit to be a satisfactory method of mounting.

An interesting series of experiments may comprise varying the loop height and altering the value of the element-joining resistor.

Components list

R1	1·8k 1W RS	**C1, 2, 3, 4, 7, 8**	0·01μF min ceramic plate 40V dc Sasco
R2	220 0·125W RS		
R3	1·5k 0·5W RS		
R4, 12	470 0·125W RS	**C5**	0·47μF silvered mica RS
R5	15 0·125W RS		
R6	180 0·125W RS	**C6**	22pF silvered mica RS
R7	18k 0·125W RS	**C9, 10**	0·1μF mico-min plaquette RS
R8	3·3k 0·125W RS		
R9	1k 0·125W RS	**L1**	5μH 1A RS238-255 or equiv
R10	1·8k 0·125W RS		
R11	680 0·125W RS	**L2**	2·5μH Home Radio
		TR1	2N3570 Fairchild Micro Marketing
Terminal pins	Type SS 3-off RS		
		TR2	BFY90 Farnell
		PCB	FR4GID double-sided 1·5 by 46 by 72·6mm

Acknowledgement

The author expresses his appreciation to the management of C & S Antennas Ltd for permission to publish data and the photograph contained in this article. □

BOOK REVIEWS

Radio Handbook (22nd edn). Edited by William I. Orr, W6SAI. Published by Howard W. Sams & Co Inc (UK Prentice/Hall International). 1,200 large double-column pages. Price £24.45.

In *Rad Com* June 1980, in reviewing the 1,135-page 21st edition of this mammoth, long-established and deservedly popular amateur radio handbook, I highlighted its excellent value, just over 1·1p/page for a well-printed, hard-cover book. Sadly, but perhaps not surprisingly, the new edition has almost doubled in price and now costs approximately 2p/page, though this must be rated as still good value for money by current standards. The new edition has 64 more pages and about double this number of fresh material, with useful up-dating noted in many, though by no means all, of the 35 chapters, and roughly 90 per cent of the material is carried forward from earlier editions. This does not mean that the book is badly dated, but it does mean that one cannot recommend it as a "good buy" for those whose shelves already include a recent edition.

The new edition is particularly strong on high-power linears ranging up to a 4kW p.e.p. amplifier (8877 power triode with 4kV 1A power supply) designated "for commercial service". It is perhaps just as well that "danger high voltage" warnings have been added to many of the valve amplifier diagrams! The chapter on frequency synthesis has been almost doubled in length, and rather more material has been included on uhf—including a 600W amplifier (3CX400U7) for the proposed American 902 to 928MHz band, and there is even an explanation of multi-cavity klystrons for high-power shf operation. Although information is included on the WARC 1979 bands, very few of the constructional projects (and none of the hf receivers) make provision for them—indeed the receivers and exciters chapter remains virtually untouched. Several new antenna ideas have been added, including a number originally published in *Rad Com*. Re-arrangement of a number of the chapters improves the general presentation, and indeed for his many skilful revisions of this enormous and comprehensive handbook Bill Orr deserves the thanks of all amateurs interested in the theory and construction of their equipment. An historical sidenote: the publishers have dropped the old "Editors and Engineers" imprint although for many years this had been maintained only as a division of the Howard W. Sams publishing house.

Chapters: Introduction to amateur radio communication (17pp) Direct-current circuits (25pp). Alternating current, impedance and resonant circuits (37pp). Semiconductor devices (54pp). Electron tubes (11pp). Special microwave tubes (13pp). Radio-frequency power amplifiers (26pp). Specialized circuitry for semiconductors and vacuum tubes (13pp). Single-sideband transmission and reception (32pp). Communication receiver fundamentals (51pp). Generation and amplification of radio-frequency energy (66pp). Frequency-synthesis (23pp). Frequency modulation and repeaters (27pp). Specialized amateur communications systems and techniques (42pp). Amplitude modulation and audio processing (19pp). Radio interference—rfi (23pp). Equipment design (25pp). Transmitter keying and control (17pp). Mobile and portable equipment (54pp). Receivers and exciters (73pp). HF and vhf power amplifier design (22pp). HF and vhf power amplifier construction (136pp). Power supplies (44pp). Radiation and propagation (31pp). The transmission line (18pp). Antenna matching systems (20pp). HF general purpose antennas (28pp). HF fixed directive antennas (20pp). VHF and uhf antennas (36pp). Electronic test equipment (44pp). The oscilloscope (18pp). Construction practices (14pp). Electronic maintenance and calculations (50pp). Nomenclature of components and miscellaneous data (14pp). Index (8pp).

G3VA

The Gunnplexer Cookbook, R. M. Richardson, W4UCH. Published by The Ham Radio Publishing Group. Obtainable from M/A Com Ltd, Humphries Road, Dunstable, Beds LU5 4SX. Price £11.

Given the worldwide popularity of the versatile 10GHz Gunnplexer manufactured by Microwave Associates, it was inevitable that sooner or later literature describing its application in the field of amateur radio would appear. W4UCH in Vol 1 of the *Gunnplexer Cookbook* has attempted to do this with somewhat mixed results. Although the book has only recently been published, in places the text is very dated, eg it refers to the 1976 10GHz dx record as being current.

The section in Chapter 1 dealing with Gunn diode theory is very superficial. The *Ham Radio* article by Fisk should have been included as it would have not only set the scene for later chapters but would also help the reader to understand the limitations of the Gunnplexer for narrow-band applications. Also, of course, the concept of negative resistance and how it can be made to occur at 10GHz should be of interest to the reader. (Personally it is felt that the microwave amateur likes to know how the devices that he uses actually work!)

Chapter 2 contains some useful information on Gunnplexer system path capabilities and oscillator characterization. There is no discussion, however, of the threshold performance of the various types of modulation which might be used with the Gunnplexer. This is a pity because for many amateurs the weak signal or marginal path performance of a microwave system is of great interest.

The following two chapters deal with power supplies and proportional temperature control systems. The latter are obviously meant for use in home stations, due to the heavy current drain incurred. In practice it is questionable whether such a system is really necessary provided that an efficient afc system is employed.

The next chapter deals with i.f. amplifiers, and includes very useful information on suitable preamplifiers. A design for a home-brew anf motor would have been useful here to back up comments on the importance of correct matching between the preamplifier and the mixer diode.

Chapter 7, which deals with weatherproofing and mounting the Gunnplexer head, would have been much more useful if it had included a design for a rugged, dismountable tripod. The use of a photographic tripod, as depicted in the illustrations, is definitely not to be recommended!

The next three chapters cover afc systems, a basic complete 10GHz transceiver and a weak signal source. To the reviewer, the latter seemed unnecessarily complex, the design by G3WDG being much preferred due to its much smaller parts count.

The remaining chapters of the book are devoted to descriptions of a narrow-band phase-locked Gunnplexer system and wide-band links for tv and computer applications. Although the text on the "Crystalmatic" narrow-band system makes interesting reading, the reviewer feels that the G3JVL ssb system is much easier to implement, albeit with lower resulting output power.

Although the above comments may appear unduly critical it is hoped that they are taken as being constructive and will be noted in the preparation of any future revised edition. The reviewer found the *Cookbook* made very interesting and informative reading, and hopes that Volume 2 will not be too long in arriving!

G8AGN

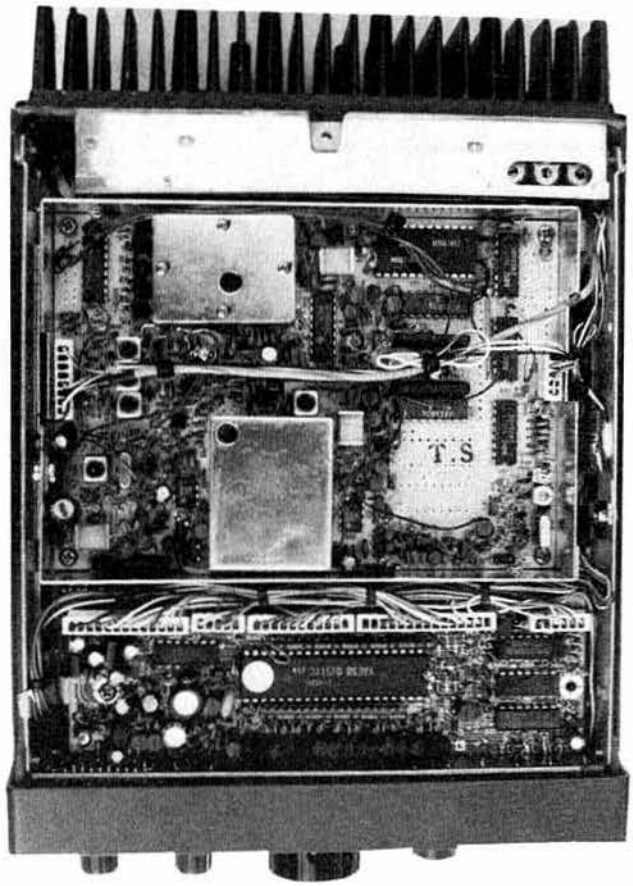
EQUIPMENT REVIEW

The Yaesu Musen FT480R and the Icom IC290E

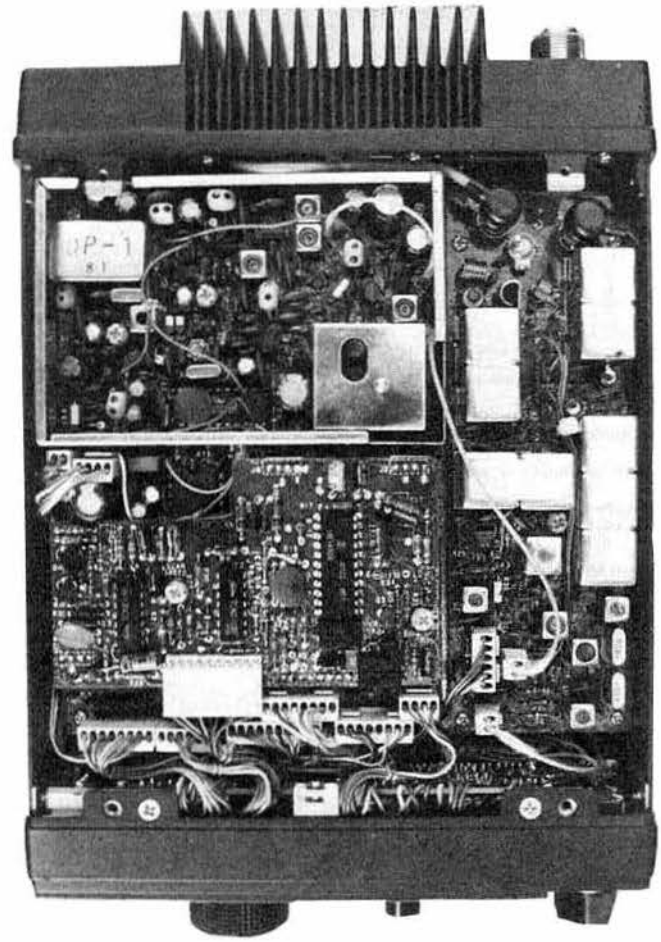
144MHz multimode transceivers

by J. C. WORSNOP, CEng, MIEE, G4BAO*, and

J. F. WILSON, CEng, MIEE, G3UUT**



FT480R view with top cover removed



IC290E view with top cover removed

Introduction

The aim of this review is to compare the facilities and performance of two top-of-the-range 144MHz multimode mobile transceivers. Both equipments utilize a microcomputer-controlled pll (phase locked loop) synthesizer to provide an impressive range of facilities, with scanning controlled from the microphone or front panel.

The reviewers' equipments were both supplied with full mobile mounting kit, 12V dc power lead, plugs and sockets, scanning microphone with mobile mounting hook, and handbooks.

Operating facilities

The equipments provide transmit and receive facilities in the 144 to 146MHz band in the usb, lsb, cw and fm modes. Repeater operation is provided for by a ±600kHz shift, or a variable offset that can be programmed into the equipment. The synthesizer provides an "A/B" two-vfo system, with tuning steps shown in Table 1.

Table 1. Tuning steps

Equipment	Steps	
	FM	SSB/CW
IC290E	5,25kHz	100Hz, 1kHz
FT480R	1,12·5,25kHz	10Hz, 100Hz, 1kHz

The IC290E provides five memory channels and the FT480R provides four, which can be scanned either manually or automatically. Each provides a priority channel which is automatically checked during vfo A/B operation. Both equipments can also scan the full tuning range, and the IC290E can scan between two programmed frequency limits. Scan can be programmed to stop on busy or empty channels, and lock, or the IC290E can pause for a variable time on the channel then continue the scan. Scan controls for pause time and busy or empty stop are under the main cover on the IC290E, and externally on the underside of the FT480R.

Receiver facilities include noise blankers, rit, external speaker, and fm squelch. The IC290E also provides squelch on ssb/cw, and two speed agc. Transmitter facilities include high or low power output, repeater access tone

*10 Garry Drive, Cambridge CB4 2PD.
**Westcroft Cottage, High Green, Great Shelford, Cambridge CB2 5EG.

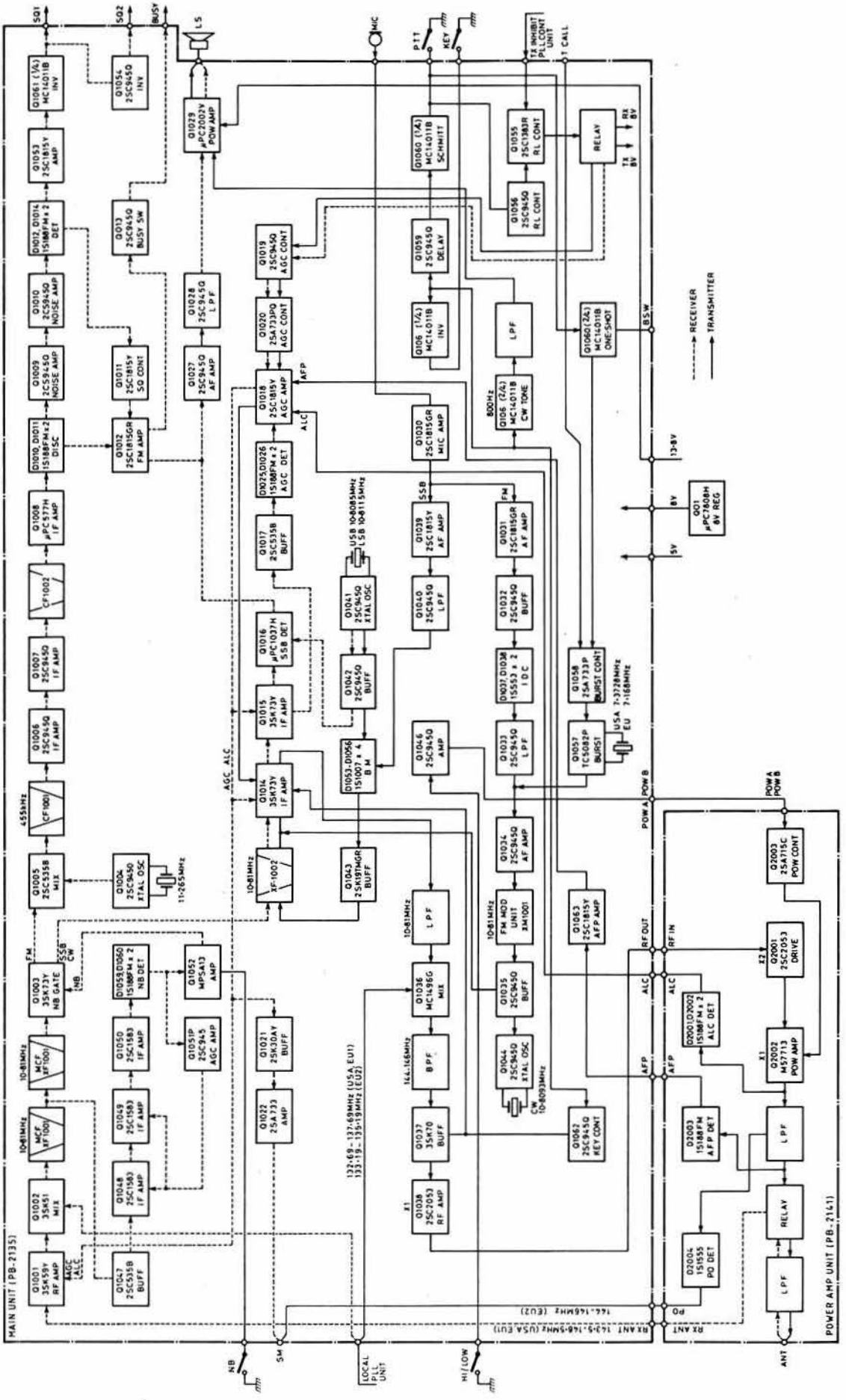


Fig 1. FT480R main and power amplifier block diagram

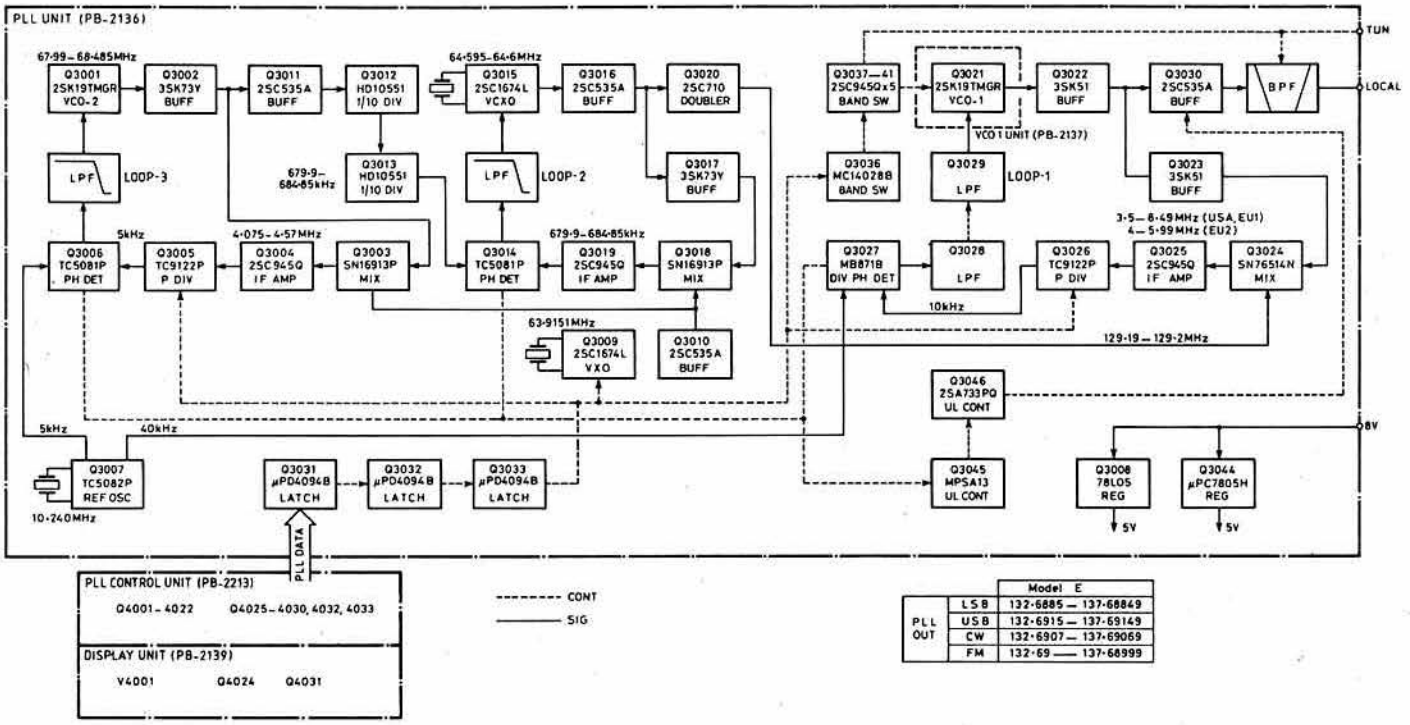


Fig 2. FT480R pll unit block diagram

(the FT480R provides an external tone input for sub-audio CTCSS tone lock) operation. Both equipments operate semi-break-in cw with sidetone.

Both equipments were supplied with instruction manuals, board layouts, and circuits. The clearer layout of the Yaesu handbook made it easier to follow.

Descriptions

The IC290E has dimensions 64 (h) by 170 (w) by 218mm (d) and weighs approximately 2·9kg.

Top and bottom lids can be removed for access to the circuit boards on both sides of a central chassis. The Yaesu equipment seems to have rather more "flying wires" on the boards than does the Icom. The switches inside the case of the IC290E make usage difficult, but they need not be operated in normal use. On the other hand the switches under the FT480R are vulnerable to mis-handling if the base station wire stand is not fitted.

The IC290E frequency display uses red l.e.d. read-outs which become difficult to see in bright sunlight. The FT480R uses green gas-discharge displays, and these are definitely better.

The S-meter on both models consists of a row of l.e.ds to indicate signal strength in the receive mode and power output in the transmit mode. On fm the FT480R meter does not seem to measure signal strength directly, as it varies with modulation.

Circuit descriptions

IC290E

Receiver

The signals from the antenna are fed via a two-element helical filter and low-pass filters (in the pa unit) and via the antenna switch to the low-noise mosfet rf amplifier. They then pass via a three-stage bandpass filter to a fet mixer where they are mixed with a 133MHz signal from the pll to produce a 10·75MHz i.f. signal. This i.f. signal passes via a crystal filter to the i.f. unit, where it passes through a buffer amplifier and splits two ways, depending on the mode selected.

In the fm mode the signal is passed to an integrated circuit which consists of a mixer/local oscillator combination to produce a second i.f. of 455kHz. This signal is fed to an external ceramic i.f. filter to provide the main selectivity and back in to the ic to be demodulated. It then passes to the squelch and audio stages and out to the loudspeaker. In the ssb and cw modes, after the first i.f. buffer amplifier, the signal is fed to the noise blanker circuitry, a conventional feed forward type where the noise and signal are amplified separately and the main signal delayed. The noise signal is then used to control a gate in the main signal and blank it when a noise pulse occurs.

The i.f. signal then passes to the ssb filter to provide the main selectivity of the receiver, and on to the agc-controlled amplifier stages. Signals from these i.f. amplifiers then pass to a product detector with a crystal controlled bfo. Demodulated audio then passes to the audio and squelch stages common to both ssb/cw and fm.

Transmitter

The audio signals from the microphone are amplified, limited and filtered, and fed to the two modulators. In the fm mode a varactor diode frequency modulates a 10·75MHz crystal oscillator, and this signal, after suitable filtering and amplifying, is fed to the final mixer to produce the output frequency.

The ssb is also generated at 10·75MHz using a balanced modulator and the crystal filter. The signal is fed to a common i.f. amplifier with the fm signal, and on to the final mixer and amplifier stages. The power amplifier stages are discrete up to the 200mW level, and then fed to an integrated circuit power amplifier to the final level. The ic is followed by the t/r switching diode and a three-stage low-pass filter.

FT480R

Receiver

The signals from the antenna are fed via a low-pass filter and the antenna changeover circuit to a low-noise mosfet rf amplifier. They are then passed to the gate of the mixer where it is mixed with the signal from the pll unit to produce the 10·81MHz first i.f. signal. The first i.f. then splits to the noise blanker i.f. and to the noise gate to produce the noise blanker function in a similar way to the IC290E: the main signal delay is produced by a second i.f. filter in the signal path. The i.f. signal after the noise blanker then splits again and takes paths dependent on the mode selected.

In the fm mode the first i.f. signal passes to a second mixer and crystal-controlled local oscillator to produce a second i.f. signal at 455kHz. This signal is then passed to a ceramic filter which provides the main selectivity, and on to a three-stage amplifier with another ceramic filter. The signal is then demodulated, fed to a noise squelch circuit and on to the audio stages and loudspeaker.

Transmitter

The audio signal from the microphone is amplified and the signals on ssb and fm split to two separate speech-processing routes.

On fm the signal is amplified then limited and filtered and fed to the phase modulator to produce a frequency-modulated signal at 10·81MHz. This signal is then amplified and mixed with the output of the pll to produce the

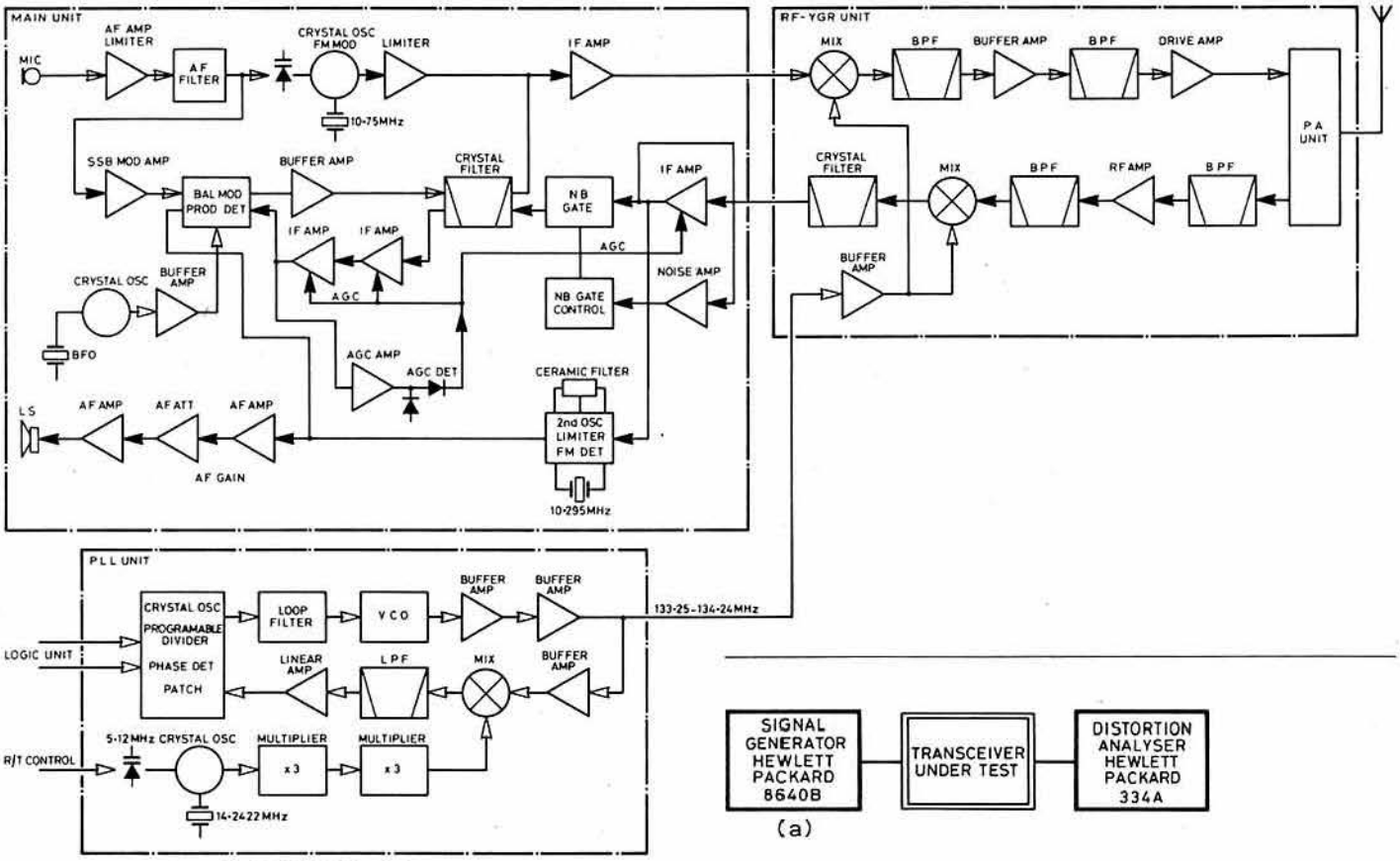


Fig 3. IC290E block diagram

final frequency. The signal then passes through amplifying stages and hence on to the power amplifier unit, where it is passed through a single-stage driver to a power amplifier ic module, and on via filters and antenna switch to the antenna.

On ssb the stages after the mixer are identical to fm, with the addition of alc circuitry. SSB generation is done at 10·81MHz using the balanced-modulator/filter method, with some speech clipping and filtering.

MEASUREMENTS

All measurements were made using the equipments powered from a laboratory-quality 12·5V 5A regulated power supply. Signal voltages are quoted in pd across the antenna terminals at 145MHz. The measurement arrangements are shown in Fig 4. Two signal measurements were made using a hybrid combiner to prevent intermodulation occurring in the two signal generators.

Receiver measurements

The receiver measurements were made using the "SINAD" method as opposed to a straight signal to noise measurement. This method may be new to many amateurs, so a short description of the technique should be useful. SINAD is an acronym for "SIgnal to Noise And Distortion", a measurement of signal + noise + distortion to noise + distortion, and is a method used in most professional mobile radio specifications. Instead of switching off the test signal modulation and measuring the noise remaining, the modulated test signal is left switched on, but the fundamental modulation frequency is notched out using a distortion analyser, leaving only noise and distortion.

12dB SINAD is the standard SINAD level used in all the tests.

Sensitivity

The maximum usable fm sensitivity of the receiver is the minimum level of signal modulated at 1kHz with 60 per cent of peak modulation which will produce a SINAD ratio of 12dB. SSB measurements were made using an unmodulated test source producing a 1kHz beat note. Noise plus distortion was measured using a distortion analyser connected across the loudspeaker of the receiver. The FT480R required 0·13μV for 12dB SINAD on ssb and 0·15μV on fm. The IC290E required 0·1μV on ssb and 0·14μV on fm.

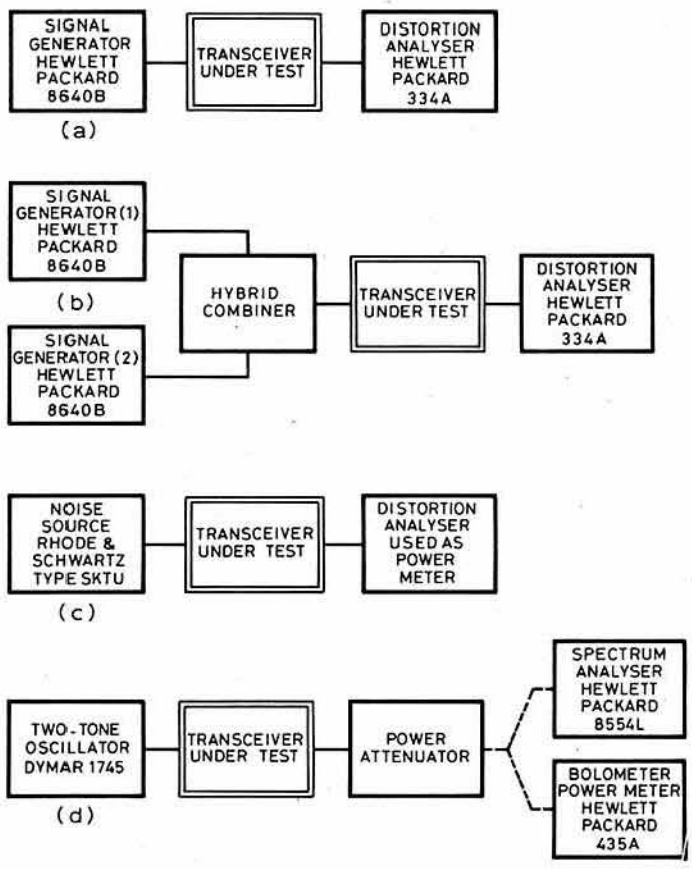


Fig 4. Test arrangements. (a) Single generator receiver measurements. (b) Two-generator receiver measurements. (c) Noise figure. (d) Transmitter measurements

Noise figure

The overall noise figures (rf to af) of the equipments were measured using a calibrated noise generator. The noise output of the generator was low enough so that the age circuits were inoperative.

The IC290E produced a noise figure of 5dB and the FT480R a noise figure of 6dB. These results are consistent with the differing sensitivities within the accuracy of the measuring system.

Spurious responses

The image and i.f. breakthrough responses were measured as the signal required to give 12dB SINAD and were measured in "dBm" (dB relative to 1mW in 50Ω).

For the IC290E the image response was −25dBm and i.f. response −33dBm. This gives image and i.f. rejections of 102 and 94dB respectively related to sensitivity. For the FT480R, the image response was −52dBm and the i.f. was −14dBm, giving image and i.f. rejections of 73 and 111dB respectively.

The receivers were terminated in 50Ω and the full range 144 to 146MHz was tuned carefully. No spurious responses were found on the IC290E, but the FT480R had one at 145·915MHz.

Two-signal intermodulation

To measure the third order intermodulation distortion, two signals 50 and 100kHz away from the reciever frequency of equal level were applied at the antenna. The levels were increased equally until a third-order intermodulation product was generated on channel. When this signal reached 12dB SINAD the levels were noted. The FT480R required −46dBm, but the IC290E required only −59dBm, showing some 11dB worse performance. (79dB and 68dB respectively when referenced to sensitivity).

Blocking

A test signal was applied via the hybrid to produce 12dB SINAD, and a signal was applied ±500kHz from the channel, increasing in level until the on channel SINAD degraded to 6dB. The IC290E and the FT480R both required −20dBm off-channel to produce this effect.

AGC performance

An on-channel signal was applied and the level increased until the output ceased to rise linearly with input. Both equipments had a threshold of 0·7μV.

Selectivity

FM. A test signal modulated at 60 per cent of peak deviation at 1kHz was applied via one port of the hybrid combiner to produce 12dB SINAD. A second signal modulated as before, but at 400Hz, was applied to the other port at the spacing shown in Table 2 and increased to degrade SINAD by 6dB. The table gives the signal level relative to on-frequency sensitivity, to produce the effect.

SSB. The same measurement was made on ssb but using two unmodulated signals and the on-channel signal adjusted to give a 1kHz beat note and 12dB SINAD. The results are shown in Table 2.

Table 2. Selectivity

Unwanted signal spacing (kHz)		Level relative to sensitivity to 6dB degrade SINAD	
		FT480R (dB)	IC290E (dB)
FM	±25	80	81
	±100	98	95
	±300	100	100
SSB	+5	67	67
	−5	72	71
	±10	78	74
	±25	88	94
	±100	98	99
	±300	100	100

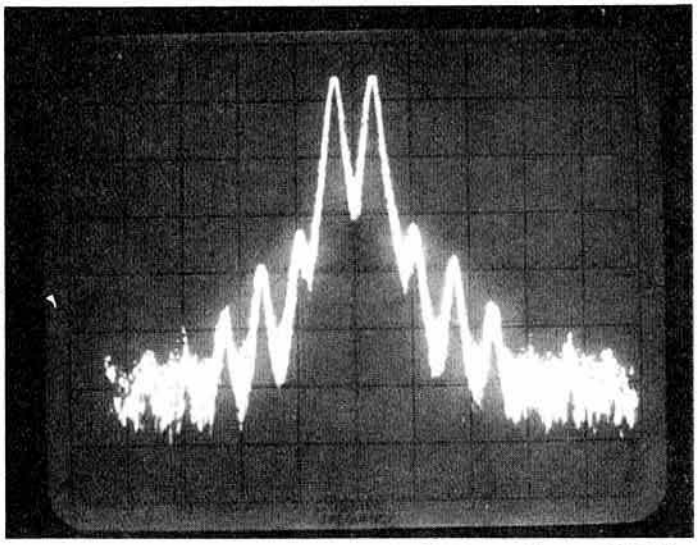


Fig 5. IC290E two-tone spectrum at 145MHz. 20W p.e.p. Vertical 10dB/div, horizontal 2kHz/div

Transmitter measurements

Power output

This was measured at 145MHz in the low and high power positions using a bolometer type power meter and a calibrated attenuator, in the fm mode of the set. The results are shown in Table 3.

Table 3. CW output power

Equipment	Low power (W)	High power (W)	Total supply current (A)
IC290E	0·8	9·0	2·85
FT480R	0·6	15·0	3·10

SSB measurements were made using a two-tone audio signal to produce a p.e.p. output power of 20W. This power level was used because each equipment produced the equivalent of that power with loud speech into the microphone. It was considered that was a reasonable power to simulate normal operation. The results are shown in Figs 5 and 6.

Deviation

Deviation was measured as 4·5kHz peak maximum for the FT480R and 4·8kHz for the IC290E.

Transmitter spurious outputs

The transmitter spurious outputs were measured and the levels shown in Table 4.

Table 4. Transmitter spurious outputs

Spurious	Level (dB) relative to carrier	
	FT480R	IC290E
Local oscillator (output frequency−i.f.)	−68	−68
Second harmonic	−82	−77
Third harmonic	−74	−69
Fourth harmonic	−80	−70
Fifth harmonic	−80	−75
Sixth harmonic	−76	−82

Phase noise

The now almost universal use of frequency synthesizers and the increasing congestion on the vhf bands has made the spectral purity of a transmission of much greater importance than in the past. Most frequency synthesizers generate the output frequency in a voltage-controlled oscillator at vhf, which is inherently noisier than a transmitter employing crystal oscillators and multipliers. The phase noise of a signal is simply the level of the noise sidebands produced by random phase and frequency modulation of the oscillator and the subsequent amplifier stages. (The amplitude noise is generally less of a problem than phase noise.) It is usually specified in terms of the level of noise relative to the carrier level measured in a 1Hz bandwidth at various frequencies from the carrier.

In amateur practice the effects of poor phase noise are usually noticed as an increase in receiver noise level when a strong local transmitter is keyed-up —in fact this can be caused by noise on the transmitter or by noise on the receiver local oscillator. As the receiver local oscillator signal cannot be measured directly, the effects of phase noise can be observed by performing a receiver selectivity measurement at various frequencies from the wanted channel. See **Receiver selectivity.**

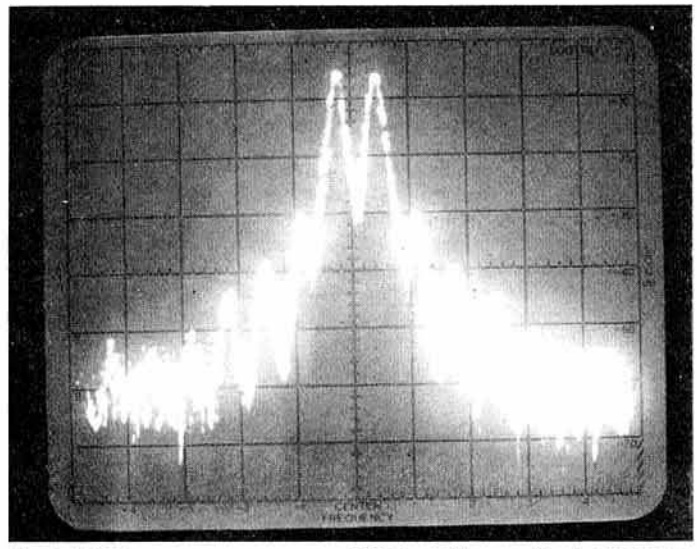


Fig 6. FT480R two-tone spectrum at 145MHz. 20W p.e.p. Vertical 10dB/div horizontal 2kHz/div

Table 5 shows the transmit phase noise of IC290E and FT480R —both reasonably good for synthesized equipments. The receiver measurements close to carrier correlate well with these figures, but beyond ±100kHz from carrier, the noise generated by the transmitter power amplifiers becomes predominant, particularly in the case of the FT480R. The transmit phase noise on both equipments was constant irrespective of transmission mode.

Table 5. Phase noise spectrum

Offset (kHz)	Phase noise (dB/Hz) relative to carrier	
	FT480R	IC290E
±5	−108	−108
±10	−115	−116
±25	−125	−125
±100	−128	−135
±300	−130	−140
±1,000	−137	−151

Transmitter adjacent channel
This was an empirical measurement made by speaking into the microphone on fm and noting the level of signal in the next 25kHz channel up. It was −70dB down on carrier for the FT480R, and −65dB for the IC290E.

On-the-air results and conclusions

The reviewers' first impression of both these equipments was that they were far too complicated to fully utilize "on the move", and that a mobile should be as simple to operate as possible. The impressive array of facilities offered could best be used in portable operation where concentration is not distracted by driving. The manufacturers have, however, made operation on the move simpler by the addition of the memory channels and the scan facilities, and if the operator limits himself to one mode, and use of the memories, operation of both equipments is simple and not too distracting.

When the supply is disconnected the memory functions are lost and the channels have to be reset. This means that either the set has to be permanently installed and risk theft and damage to the car, or when re-installed, the full rigmarole of memory re-setting has to take place. The simple addition of low-power memory with battery back-up could have solved this problem.

The reviewer's car used in the test is not suppressed electrically, and it was found that the noise blanker on the FT480R was far more effective than the IC290E. So much so that a fault on the 290 was suspected.

Audio quality and signal reports were good on all modes; no real difference could be noticed between each rig. The slightly worse noise figure and sensitivity of the FT480R produced no noticeable difference in operation. Both equipments would benefit from the addition of a keypad for frequency entering.

Both equipments were used as base stations on all modes, and the semi-break-in cw function was found to be very useful. Also the cw sidetone is a welcome addition. The equipments were both keyed at meteor scatter speeds, and the keying circuit performed well.

The better intermodulation performance of the FT480R far overcomes the slightly worse sensitivity. Apart from this, there is little to choose between the two equipments from an operating point of view.

In general, measurements were made as closely as possible to professional mobile radio standards, and the equipments performed well in most respects. Both met professional specifications in many areas, but of course measurements at temperature extremes were not attempted.

Bibliography

Home Office document MPT1302 March 1977.

Acknowledgements

The FT480R and IC290E reviewed in this article were kindly loaned by SMC and Thanet Electronics respectively. □

NEW PRODUCTS

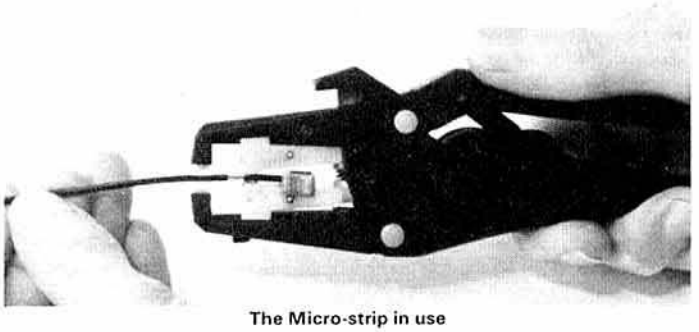
Micro-stripper for electronic wires

Micro-strip, a new wire stripper which is self-adjusting for depth of incision and gripping pressure, and which will deal with all pvc insulations and some thermo-resisting insulation, has been introduced by AB Engineering.

A patented self-adjusting floating cam adjusts the stripper's mechanism to the correct stripping depth, and at the same time automatically sets the gripping pressure exerted on the insulation by the gripping jaws, thereby preventing damage to the insulation. To operate, a stop is set to the required stripping length. The wire is then fed through the front of the tool to this stop position and the handles are squeezed. As the stripping blades are flat and are self-adjusting around the diameter of the wire, single or multiple wires, or round or flat conductors may be stripped with equal ease. The Micro-strip will deal with all sizes of wire up to a maximum of 1·5mm diameter without any adjustment; for very thin or thick insulations an adjustment mechanism is provided.

Exchange of stripping blades can be accomplished without special tools in less than 2min. A self-sharpening wire cutter is also built into the tool at an ergonomic point where maximum leverage is attained. The cutter is fully shielded to prevent injury, and the cutting blade is easily exchangeable.

Further information can be obtained from AB Engineering Company, Timber Lane, Woburn, Milton Keynes MK17 9PL, tel 052525 322.



The Micro-strip in use

Sabtronics Model 2033 dmm

This low-cost handheld digital multimeter has just been introduced by Sabtronics International Inc of Tampa, Florida. Features include 0·5 per cent basic dc accuracy, large 3·5 digit liquid crystal display, an attractive, rugged new case design with pushbutton function and range switches, easy-access battery compartment, and tilt stand.

The unit will measure ac or dc voltage from 100μV to 1,000V in five ranges, resistance from 1Ω to 20MΩ in five ranges, and ac or dc current from 10μA to 2A in three ranges. It is powered by either a single 9V PP3 battery or an optional ac adaptor. An optional high-voltage probe is also available as an accessory.

The Model 2033, fully assembled and complete with test leads, costs £36.75 plus VAT. Further details from Black Star Ltd, 9A Crown Street, St Ives, Huntingdon, Cambs PE17 4EB; tel 0480 62440.

Digital and electronics circuit kit

The aim of this new kit from Carter-Richardson Electronic Systems is to make the teaching of digital electronics and logic as simple as possible both in introductory courses in colleges or for individuals investigating digital electronic devices.

The kit consists of eight types of interlinking modules which are available separately or can be bought as a kit with a progressive guide to experiments. Standard TTL74 series integrated circuits are used in the kit to teach the properties of the standard gates and combinational circuits. Then the properties of the different flip-flops are demonstrated, and sequential circuits for serial and parallel registers, accumulators etc are developed. Indications are given of how the use of the kit may be extended.

The problem with even the simplest experiments using ics is that one must spend a lot of time soldering up permanent circuits or make do with a cats-cradle of wires and crocodile clips. The kit provides a third alternative; circuits can be made up in a matter of minutes and dismantled in a matter of seconds.

Further information can be obtained from Carter-Richardson Electronic Systems, Greta Side, Keswick, Cumbria CA12 5LG.

The triambic keyer

by MICHAEL B. RHODES, G4FMS*

Introduction

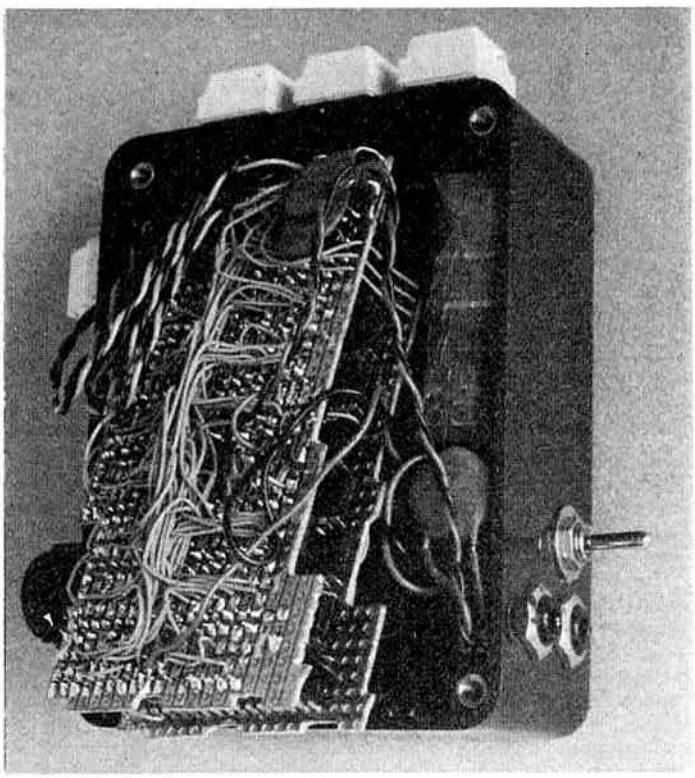
A recent magazine survey of keys and keyers revealed one of the most frightening arrays of grotesque mechanisms ever invented by man. But perhaps the morse keyboard will gradually make these obsolete—or will it?

Admirable though the keyboard may be in many applications, the author has always thought that for generating morse code it is somewhat over-populated with keys whose layout is not even entirely convincing as a man/machine interface using the English language. There seems to be a need for something more portable and less elaborate—say, with three or four keys—and making use of some of the cheap logic circuits now available to co-ordinate the actions and take the hard work out of keying.

Development of the idea

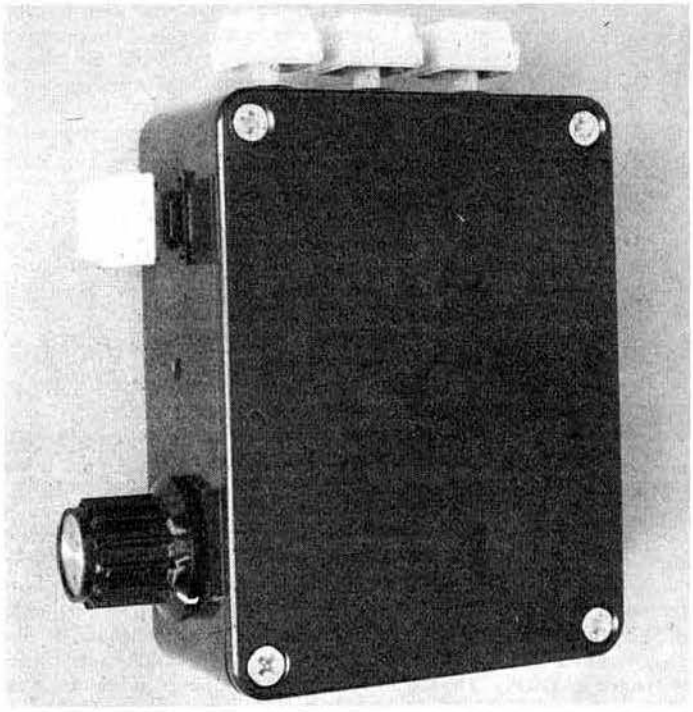
The problem with the existing paddle type of keyer appears to be the accuracy demanded from the operator to synchronize with the starting and stopping of strings of dots and dashes which so readily emanate from the device. In particular, the ability to terminate a string of dots seems to be the most critical action—there being only half the time to perform this operation compared to that available to stop a string of dashes. (Some attempt has been made to alleviate this situation in the iambic keyer by incorporating a dot store, but this only works for a few letters.)

This leads logically to the idea that if the key normally used for generating dots were replaced by two keys—one which could stop the string of dots after one dot or an odd number of dots, and a second which would generate pairs of dots—then the operator accuracy required when generating dots would be equally matched to that required for generating dashes. A total of three keys should not be significantly more difficult to operate than the current two paddles now in general use in the iambic keyer.



Only a masochist with a life-long ambition to copy the Bible onto a postage stamp would choose a box this size but it shows what can be done. The battery, on/off switch, sidetone on/off switch, and jack sockets are mounted on the opposite side to the ptt switch and speed control

*"Wesley Mount", Spring Bank, New Mills, Stockport SK12 4BH.



The ubiquitous plastic box. The three morse keys on top, the ptt and speed control on one side. In between these last two can be seen the small hole behind which is mounted the sidetone transducer

Specifying the design

So, the proposal is for a keyer with three keys (a "triambic" keyer) with iambic operation, and with the necessary logic memories consistent with ease of operation. The three keys generate respectively "dash", single "dot" and double "dot"; each pair of keys can be used in iambic mode, and an extra memory is provided to cope with the situation where the third key is pressed before the action of the first two has been completed. The keys working in the iambic mode are the last two to be pressed and to remain pressed; if the three keys are pressed in rapid succession, the first key will be ignored after its output has occurred once.

The single dot key requires further explanation. Pressing this key alone causes an output of one dot, and then the action is automatically terminated. The single dot key is of course also required for iambic operation in conjunction with, say, the dash key, so in this case if the dash key is pressed immediately after the single dot key, the normal iambic output will ensue; ie dot-dash-dot etc. If, however, the dash key is released and the dot key remains pressed, the action will terminate after the next dot, thus allowing the operator plenty of time when terminating a letter ending in a dot.

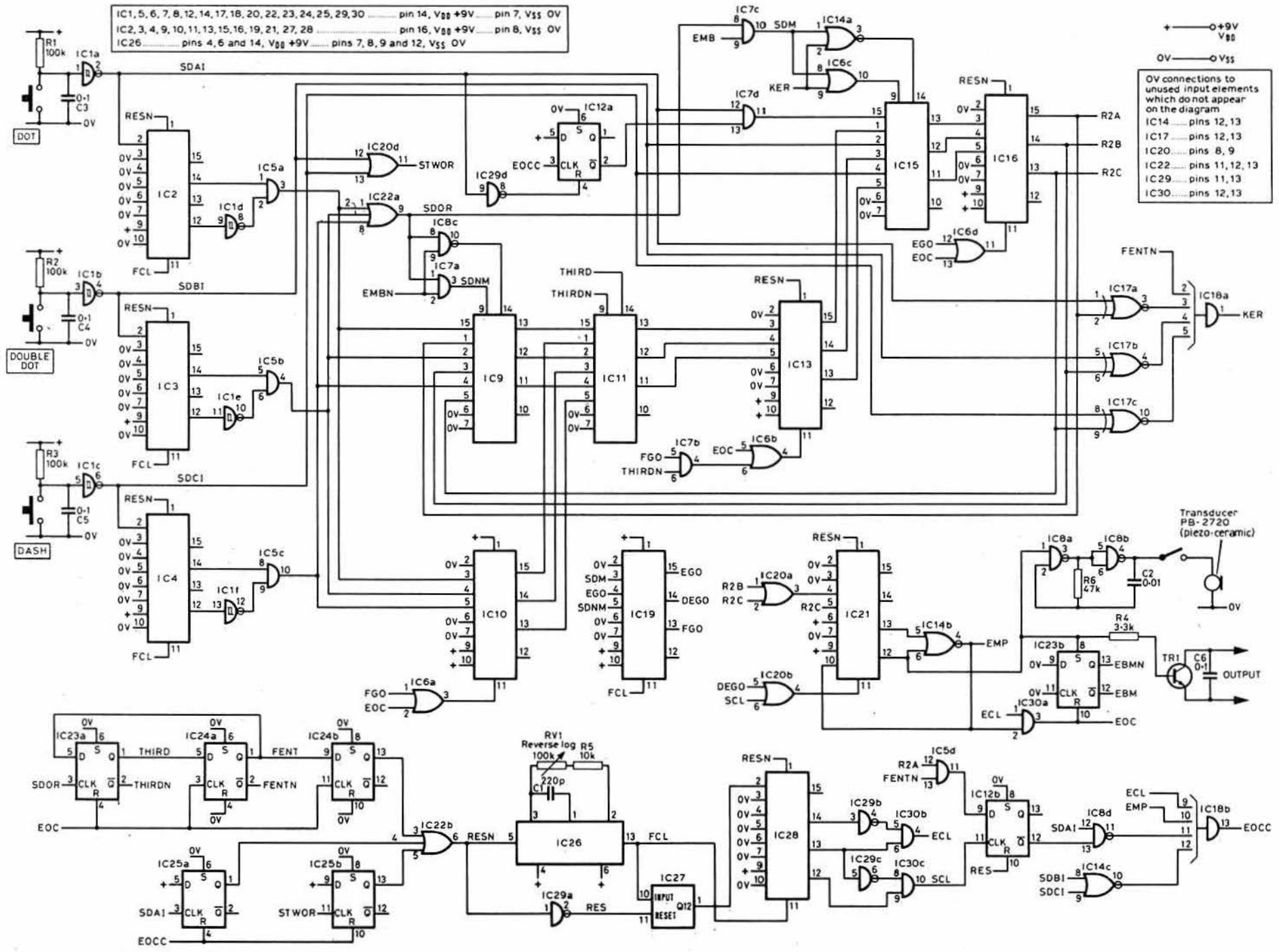
Storage is provided effectively for each key and works in a somewhat similar manner to the dot store found in iambic keyers. If, for example, a "dot" is pressed during the time when the "dash" is being held, then a dot output will occur in its proper turn irrespective of when the dash key is released. Similarly, pressing the dash key immediately after the single dot key and holding the dot but not the dash will cause a self-terminating output of letter "R" (dit-dah-dit).

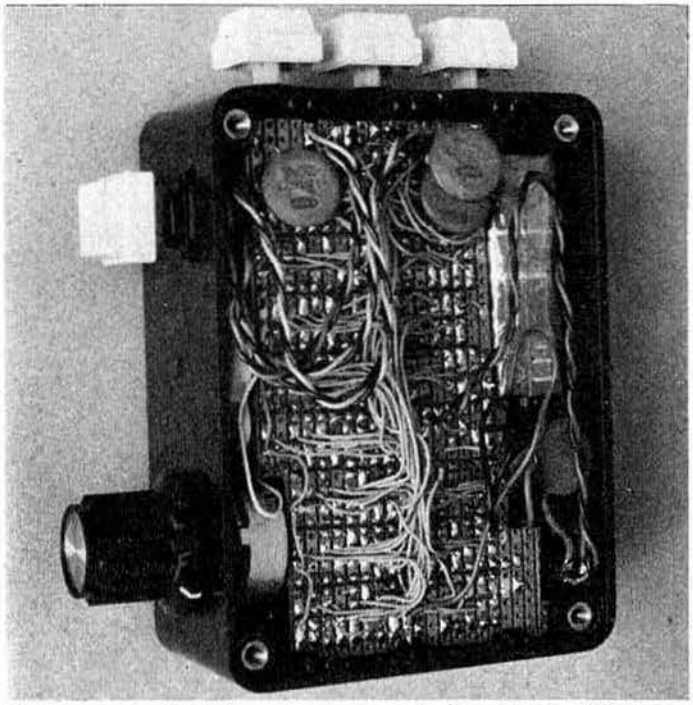
This may all sound very complicated, but the keyer has been designed so that it does what the operator would expect it to do. In fact, 50 per cent of letters can be keyed simply by tapping the three keys in the appropriate order (one-shot mode), with no timing constraints at all, always assuming they are tapped faster than the output is required (letters A, B, D, E, F, I, L, N, R, S, T, U, V). Five other letters are considerably easier to key because critical operator timing is relaxed (C, G, P, X, Z) and the rest are unchanged compared with the iambic dot memory keyer, but they were not too difficult anyway (J, K, O, Q, W, Y).

The result is that after a very short period of practice—probably no longer than would be required to get used to a normal paddle keyer—the operator of the triambic keyer should be able to achieve greater accuracy or speed with less effort.

The model

To test the above ideas, the author constructed a mechanism and some logic to go with it. The mechanism consisted of three keyboard switches mounted in a row and operated by the fore-finger (dash key), the middle finger (single dot) and the ring finger (double dot) respectively. This arrangement appears


IC1, 5, 6, 7, 8, 12, 14, 17, 18, 20, 22, 23, 24, 25, 29, 30 ..... pin 14, VDD +9V ..... pin 7, VSS 0V
IC2, 3, 4, 9, 10, 11, 13, 15, 16, 19, 21, 27, 28 ..... pin 16, VDD +9V ..... pin 8, VSS 0V
IC26 ..... pins 4, 6 and 14, VDD +9V ..... pins 7, 8, 9 and 12, VSS 0V
+9V VDD
0V VSS
0V connections to unused input elements which do not appear on the diagram
IC14 ..... pins 12, 13
IC17 ..... pins 12, 13
IC20 ..... pins 8, 9
IC22 ..... pins 11, 12, 13
IC29 ..... pins 11, 13
IC30 ..... pins 12, 13
DOT
DOUBLE DOT
DASH
R1 100k
R2 100k
R3 100k
C3 0·1
C4 0·1
C5 0·1
SDA1
SDB1
SDC1
RESN
FCL
SDOR
STWOR
SDNM
EMBN
THIRD
THIRDN
FENT
FENTN
EOCC
SDM
EMB
KER
EGO
EOC
FGO
DEGO
EMP
ECL
SCL
EBMN
EBM
RES
R2A
R2B
R2C
RV1 Reverse log 100k
R5 10k
C1 220p
R4 3·3k
R6 47k
C2 0·01
C6 0·1
TR1
OUTPUT
Transducer PB-2720 (piezo-ceramic)
IC1 IC2 IC3 IC4 IC5 IC6 IC7 IC8 IC9 IC10 IC11 IC12 IC13 IC14 IC15 IC16 IC17 IC18 IC19 IC20 IC21 IC22 IC23 IC24 IC25 IC26 IC27 IC28 IC29 IC30



The ics are mounted in two columns on each of two sheets of Veroboard which are "folded" after construction and commissioning with the ics on the inside. This makes the wiring completely accessible after folding. To conserve space, the three top switches slot in between the two boards, helping to locate the latter and making a very compact assembly

to suit the author, but others may find different arrangements more satisfactory. An alternative mechanism could take the form of a twin-paddle keyer but with the right-hand paddle (for right-handed operators) split horizontally into two, so that the upper part is operated by the fore-finger and the lower part by the middle finger, the left paddle being operated by the thumb as usual.

The logic was selected mainly for ease of construction and modification in the development stage, and for low-power consumption so that the equipment could be powered by a small battery. It uses a range of cmos components. An alternative of using a microprocessor with one or two support chips was ruled out because it would have consumed more power and required prom "blowing" facilities.

For any who would like to tackle a tested design, a brief description of the prototype logic follows, but it is pointed out that the task is most suited to those who enjoy good eyesight and possess a suitable soldering iron.

Description of the logic

Inputs from the three keys are taken via Schmitt triggers (IC1) to shift registers (ICs 2, 3, 4). The outputs from the Schmitt triggers are used to indicate that a key is pressed. The outputs from the shift registers are used to generate pulses to indicate the time of pressing the keys and to gate the appropriate register at that time.

The three-bit registers are used to store information from the keys. Registers IC13 and IC16 work in iambic mode if two or more keys are pressed together, register IC10 comes into operation only when the third key is pressed and the action of the previous two is in progress. A fourth register, IC21, is loaded in parallel from register IC16 and then outputs the dots and dashes in serial.

On pressing the first key, the action—which of the three keys—is entered into register 16 and then transferred to register 21 for transmission. If a second key is pressed before this action is completed, the new action is stored in register 13 which is subsequently loaded into register 16. If two keys remain pressed the actions will cycle in registers 13 and 16.

IC17 detects if only one key is held, so that the iambic mode will cease and register 16 will revert to being the only memory register in use.

As previously mentioned, if a third key is pressed the action will be entered into register 10 and will follow through registers 13 and 16 in turn; the action remembered in register 16 at the time of pressing the third key being lost. If two keys remain pressed, the iambic mode will operate on the last two actions.

The basic timer, IC26, is cmos 4047 astable which is followed by a 12-stage divider, IC27. This simplifies the provision of relatively fast clock pulses at the beginning and end of the action for shifting and loading registers. FCL is the basic fast clock; SCL, the slow clock, occurs at each morse output time (= 1 dot or one-third dash).

The "stats" on the left of the timer determine whether the astable runs or not, and their combined efforts are used to reset the rest of the logic and ensure that the registers are empty for the start of the next letter. All unused inputs are connected to 0V (Vss).

The mechanism and logic described can be fitted neatly into the ubiquitous plastic box—in this case 100 by 76 by 41mm. The three keys have been mounted at one end, and a thumb-operated ptt switch (for those rigs without full break-in or vox) and a speed control mounted along one side, as shown in the photographs. Also included within the box are the battery (PP3) and sidetone transducer. The whole thing slips easily into the jacket pocket. One word of warning—only masochists should use a box as small as the size quoted!

Components list

R1	100kΩ	RV1	100kΩ (preferably reverse log)
R2	100kΩ	TR1	NPN (depends on drive required)
R3	100kΩ	Transducer	PB-2720 (piezo ceramic)
R4	3·3kΩ	IC1	40106 hex Schmitt trigger inverter
R5	10kΩ	IC2, 3, 4, 10, 13, 16, 19, 21, 28	40194 four-bit bidirectional shift reg
R6	47kΩ	IC5, 7, 30	4081 quad two-input AND gate
C1	220pF	IC6, 20	4071 quad two-input OR gate
C2	0·01μF	IC8	4011 quad two-input NAND gate
C3	0·1μF	IC9, 11, 15	4019 quad AND/OR select gate
C4	0·1μF	IC12, 23, 24, 25	4013 dual-D flip-flop
C5	0·1μF	IC14	4001 quad two-input NOR gate
C6	0·1μF	IC17	4077 quad exclusive NOR gate
		IC18	4082 dual four-input AND gate
		IC22	4075 triple three-input OR gate
		IC26	4047 monostable/astable multivibrator
		IC27	4040 12-bit binary counter
		IC29	4069 hex inverter

Conclusion

Tests with the keyer have so far proved very promising. It is quite straightforward to use and eminently suitable for working portable.

While designing the logic, the idea of adding a fourth key—for generating "N"—was kept in mind, so the more adventurous can, by adding two or three more ics, pursue the ideas presented above a stage further. With four keys no fewer than 20 letters are available for operation in the one-shot mode. □

NEW PRODUCT

CM100 pcb construction kit

As electronic circuitry becomes increasingly complex, more sophisticated methods of construction are required. For this reason Electrolube Ltd has introduced its new CM100 circuit maker which is a comprehensive kit for the creation of professional-quality circuit boards. CM100 provides all the necessary hardware and chemicals to produce positive photographic film masters from published circuit layouts, enabling either single- or double-sided boards to be made easily and quickly from these masters. The kit is aimed at everyone interested in electronics, from R and D engineers to enthusiastic novices who need a simple, low-cost production system. CM100 can produce pcbs photographically without the need of darkroom, expensive camera equipment or ultra-violet light, and no previous photographic experience is needed.

Great care has been taken to make CM100 complete. As well as containing six double-sided copper-clad glass-fibre circuit boards, plus everything else required to complete the process, there are comprehensive instructions, workbench charts and "trouble shooting" charts to help the first-time user complete the operation. A special feature is the purpose-designed frame which can be used as an exposure frame for the photographic part of the process, as well as a component assembly frame. The foam back is heat-resistant, which allows the frame to be used to hold the components firmly in place for lead cropping and soldering.

Contact Electrolube Ltd, Blakes Road, Wargrave, Berks, tel 073 522 3014, for a list of Electrolube distributors stocking the CM100. These stockists will also supply extra chemicals, materials etc for the kit.

TECHNICAL TOPICS

Pat Hawker, G3VA

A FEW MONTHS AGO Ray Cracknell, Z22JV, expressed the view (*TT* May 1982) that the pre-war system of issuing "artificial aerial" experimental licences but having no Radio Amateurs' Examination had considerable merit. The system virtually ensured that by the time an amateur went on the air he had acquired a working knowledge of the principles and practices of amateur hf transmitters. Such practical know-how is not necessarily guaranteed by the current arrangement of having a technical/regulatory RAE with the high probability of securing a "pass" by rote learning of licence conditions, plus sufficient study to achieve a 40 per cent or so "pass mark" on the seemingly perverse selection of theoretical questions of an often dubious nature and reflecting transmitter practices that have only limited relevance to modern factory-built rigs.

Practice makes perfect

There is, naturally, a view held by those who have recently passed their RAE that those of us who were never obliged to sit the exam hold our licences "under false pretences" (to quote a recent jibe). Perhaps so—it all depends on what you mean by amateur radio and what value you place on mugging up enough basic theory to get a ticket and then letting it go rusty while you use a consumer appliance.

For my part, I would willingly see the RAE replaced by one simple test: applicants would be required to build, by themselves, a usable home-built transmitter for the mode(s) of operation and power, and possibly the bands, for which they would then be licensed. The sole proviso is that the design would have to be of a "junk box" type (ie not based on an exact copy of a design taken from a constructional article) and shown to have been successfully debugged without the aid of laboratory facilities and test instruments. Once the licence was granted the holder would be required to use his home-built transmitter for six months, and would then be entirely free to use factory-built equipment if he or she so wished.

Of course such a "test" would almost certainly be administratively impracticable, and I imagine that we will have to live with, if not love, the conventional RAE approach! But I remain convinced that the practical construction and subsequent debugging and maintenance of amateur gear should be recognized as continuing to have a role to play in amateur radio. Such a policy would provide "self-training" of an entirely different order from that offered by the RAE pass followed immediately by the acquisition of the latest black box.

It is the debugging of equipment rather than its initial construction that calls for a real understanding of electronics. It is worth quoting the views of a highly professional engineer, Peter Baxandall, who is on record as having stated: "It seems to be sometimes overlooked that engineering is logically concerned with how to make things and solve practical problems . . . the path along which the competent engineering designer travels in order to end up with a first-class design, whose final theory is properly understood and in which the effects of component tolerances are known, is often very different from that implied in many text books and published articles . . . - more discussion of such practical matters as parasitic oscillation, earthing techniques, minimizing hum etc . . . would help less-experienced design engineers to become aware of some of the things that have been found out the hard way by others . . . millions of pounds must be spent annually by industry in sorting out such 'mundane' matters."

Most radio amateurs are not, and do not seek to be, professional electronic design engineers, but they should surely strive to understand in some depth the equipment they use, unless they are content to become glorified cb operators. The person who has made a transmitter (even a simple one) work as it should do, will in the process learn more about how circuits work, neutralization, the effect of component values and tolerances, as well as the causes and cures of frequency drift, hum loops, parasitics, tvi, matching and Murphy's Law, than he or she is ever likely to gain from theoretical studies alone, necessary though these are.

I must confess that after some 30 years of homebrew equipment I succumbed a few years ago to acquiring a certain amount of factory-built equipment. But recently I have had the salutory (and enjoyable) experience of refurbishing and modifying a decrepit homebrew rig for use on the 10·1MHz band (what an excellent band this will be when the fixed services finally move out and the USA ratifies the WARC 1979 agreements!). The work has underlined how easy it is to get a rig working satisfactorily on the bench, but for it then to develop unforeseen problems when used operationally—and incidentally the continued value of the full RST system that some wish to see shorn of the still useful T report! Hum loops and instabilities may seem "old hat" in these days of phase-locked loops and operational-amplifiers, but they can still provide head-scratching challenges. How delightful it is to note a number of home brewers using simple equipment on this band.

The absorbing Yagi

It is well known that parasitically-excited antenna arrays such as the Yagi and cubical quad have a lobe pattern that restricts the front-to-back ratio when compared to the deepest nulls towards the sides. This significantly reduces the value of such arrays for some applications including the 144MHz df "fox-hunts" popular in Europe, or for rejecting unwanted noise or interference from the back.

John Beech, G8SEQ, has spent considerable time experimenting with Yagi arrays, and has developed what appears to be an important new technique that can be used to clean up the side-lobe pattern of a Yagi and produce very high f/b ratios—for example, around an astonishing 75dB for his 13-element array. While it is much to be hoped that he will produce a full length article for *Rad Com* on his work, the following notes explain the basic idea and indicate strongly that this technique seems worthy of further investigation. As far as I and G8SEQ are aware this is a completely new technique—although when one says that it is not unusual to find that somewhere in the literature similar proposals have appeared before, but failed to make an impact.

John Beech points out that the typical Yagi array is made up of a driven element, a reflector, a number of directors and sometimes launch directors. For his new element he has coined the term *absorber element*. He writes: "What does the absorber do? Exactly what the name implies. It absorbs rf energy. At first sight that may seem a contradiction to what an antenna element should do. But there are many occasions when what we really need is a deep null in a particular direction or a much improved f/b ratio to reduce pick-up, local electrical interference or ignition interference from passing cars etc.

"The absorber element is strategically placed to knock out a side lobe. I think this could be any side lobe, although so far I have used one only to improve the f/b ratio of arrays by placing the absorber element behind the reflector. This is mechanically much simpler than for other lobes. For a 144MHz compact df antenna I have used an absorber *instead* of a reflector.

"So what does the absorber element consist of ? It is simply a dipole element at the array frequency (two 19in rods for 144MHz) with a chunky carbon resistor in the centre. The resistor should be equal in value to the centre impedance of the element when this is mounted in position on the array, and is best found by experiment using low power (ideally about 1W but less than 10W) in the transmit mode, aided by someone carefully monitoring your signal at a distance of more than about five miles. A small 100Ω slider pot or other preset resistor can be used for the initial setting up, although it is possible to "guestimate" the impedance and then simply use a carbon resistor near to this value. Final tuning is done by moving the absorber element towards or away from the reflector until optimum results are achieved. If the array is to be used for high power, a suitably-rated resistor must be used but, provided the antenna already has a reasonable

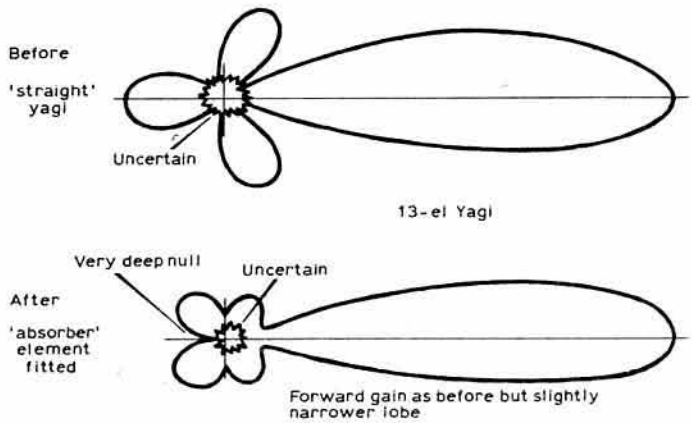


Fig 1. The effect of adding a G8SEQ "absorber element" to a 13-element 144MHz Yagi antenna. Power radiated in the backward direction is absorbed, creating a deep null that can be adjusted by "fine tuning" the absorber element

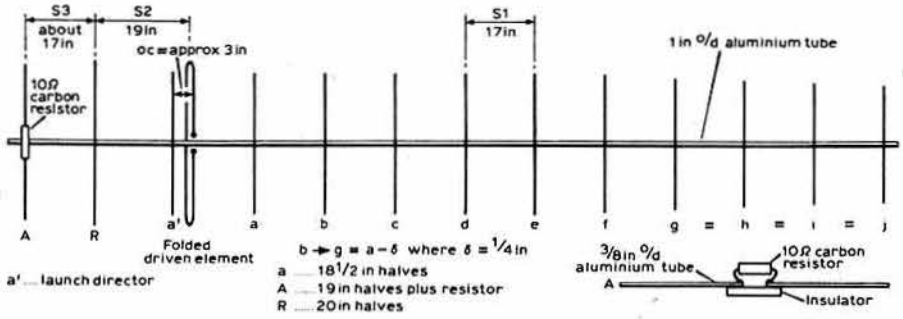


Fig 2. Details of G8SEQ's 144MHz array. Front to back ratio about 78dB

f/b ratio, this is unlikely to be more than 25W even for the full legal power.

"To some extent the absorber element can be adjusted to give you the pattern you require. If you want to block out electrical interference or ignition noise from behind the antenna, first find the position giving the optimum f/b ratio and then 'detune' it slightly as this will broaden the null. On the other hand, for a df antenna you need the deepest, sharpest possible null to provide the most accurate bearing plus 'sense' . . . be adventurous, fit a 'radio black hole' to your antenna."

John Beech believes that the absorber technique could have a number of other applications. For example, on a sensitive eme array much of the "noise" comes from directions other than the moon. For domestic or professional television reception one could conceive this as a valuable technique for reducing co-channel interference; for rebroadcast (rbr) links, as widely used in the UK, it is generally felt that a 30dB null is about the limit for fixed arrays (one problem with narrow deep nulls on a high structure is mechanical rigidity). G8SEQ suggests that one can regard the Yagi array as a directional bandpass filter, and that the absorber is the element that has been missing for years. With the same thinking which is now sometimes being applied to absorptive low-pass tvi filters, the unwanted rf is safely dissipated in a dummy load rather than attempting merely to "short-circuit" it with a reflector. There is good reason to believe the absorptive ("hybrid") filter offers the better approach—it seems equally possible that "absorber elements" may come to play an important role in antenna design.

"German quad" or "G2PL Special"?

Many years ago the late Peter Pennell, G2PL, discovered during a series of gales that his two-element quad operated unexpectedly well as an omni-directional antenna when his tilt-over mast was in the "down" position with the quad reflector virtually on the ground. So was born "The G2PL Special" (*TT* July 1968 and many editions of *ART*). A few years later S. M. de Wet, ZS6AKA (*TT* June 1972) showed that large horizontal loops of many shapes, including the quad square, formed useful, non-critical, multiband systems. A practical snag is that square loops normally require four support masts or poles, although it may be possible to make use of buildings, trees etc. Loops less than a wavelength in circumference can also be used (for example, on 3·5MHz) although the radiation resistance falls fairly rapidly.

The horizontal square loop or horizontal quad thus has a respectable history as a practical and useful antenna. But I must admit to a degree of surprise when George Twist, EI5CF (G3LWH), drew my attention to an article by Dr Richard L. Schatz, WA3GWY, in *73 Magazine* May 1982, entitled "Americanizing the German Quad—the world's best antenna". Sure enough the "German Quad" (described by WD4CPK/DF3TJ in *73 Magazine* June 1978) turned out to be our friend "The G2PL Special" in the ZS6AKA form, although decked out with some stubs whose presence seems to be superfluous to the design. This article is a "rave" account of what the author claims to be "the best and probably the least-expensive antenna one can use". Perhaps we should all have taken more notice of the G2PL Special before it was first Germanized and now Americanized!

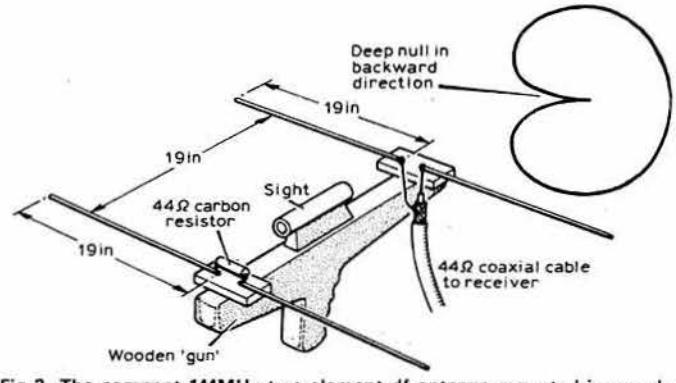


Fig 3. The compact 144MHz two-element df antenna mounted in wooden "gun" assembly with "sight" and adjusted to provide very deep null in backward direction

EI5CF clearly did not recall the G2PL/ZS6AKA notes, and has been testing the system as described in *73 Magazine*. With tuned feeder, a 69ft per side element at about 25ft above ground, he has at least confirmed that, even if not "the world's best antenna", it does form a useful and effective antenna suitable for all seven bands from 3·5MHz to 28MHz, though on a few bands he has had some difficulty in getting the final swr presented to his TR7 down to the 2:1 needed to prevent the protection circuits from reducing output power. But altogether a useful approach to a simple antenna providing virtually omni-directional coverage, and which one could possibly convince the authorities falls within the restrictions applied to 18 and 24MHz!

Nulling and adaptive antennas

In the August 1982 *TT* some techniques for adapting the pattern of a pair of antennas to provide electronic nulling of unwanted signals were discussed. This resulted in a number of comments and further suggestions being received from readers; it is also of interest to note that manual and automatic nulling techniques are currently being developed, as a form of electronic counter counter measure (eccm) for tactical military communications, even for manpack and vehicle vhf equipments.

Electronic nulling is often referred to as a facility provided by adaptive antennas. An adaptive antenna array consists of an array of elements in which the output signals are combined in such a way as to optimize some factor; this factor may be forward gain, or directivity or, nowadays, more usually the signal-to-interference ratio. Thus a beam may be steered towards a wanted signal while a deep null would simultaneously be directed towards the interfering sources.

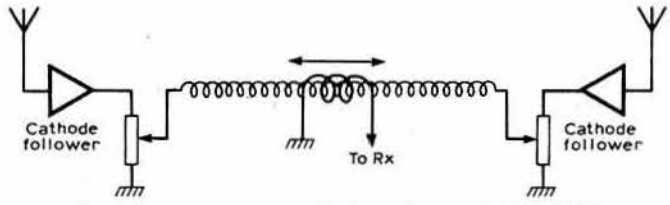


Fig 4. The simple antenna phasing unit as recalled by GU5ZC

Roger Bunney, whose interest in long-distance tv reception will be well known to readers of *Television*, has been seeking for several years to overcome persistent rfi from a local industrial vdu installation. In 1980 he noted the appearance of the G3JFK AVP4 antenna vector processor for use with rotary beams, and subsequently developed, with advice from G3JFK, an electronic phasing unit for Band I television frequencies (41–68MHz) which provides phase cancellation (180°) of an unwanted signal by using a second Band I array erected on the same mast that carries his main antenna. The phasing unit is fully described in *Television* January 1981, pp140–1. It uses voltage-controlled diode attenuators.

In practice this system has proved very effective for nulling out an unwanted BBC Channel 3 transmission or for eliminating interference from a single vdu source. Unfortunately this still leaves him with the problem that, during working hours, the interference stems from up to six different vdus so that it is not possible to eliminate the rfi completely. His main dx antenna is at 53ft and he mounts his second antenna at 35ft. The system is capable of reducing the unwanted BBC channel by at least 30dB and typically over 40dB with careful adjustment.

The *TT* notes in the August issue mentioned the professional unit

developed in the early 'sixties by Christopher Henn-Collins, GU5ZC. This has reminded him that while doing consulting work in Chicago in the 'fifties, he worked with an American engineer called Dwight Sinninger who described to him a device termed a "QRM device" capable of providing directional reception by adjusting the phase and amplitude of the output from two fixed antennas, and similarly able to "phase out" an unwanted signal. Basically, the idea behind the device was to improve reception in the hf range by using two antennas of any type and then coupling them in an optimum way to the receiver: Fig 4.

GU5ZC writes: "The device as I remember it consisted simply of a helix about 10 or 12in long and about 0·5in diameter wound at about two-wire-diameter spacing on an insulating tube. The coupling coil could be moved over the length of the main coil by means of a conventional string drive. In use, the coupling coil was simply adjusted for strongest signal or for optimum nulling of interference as desired. The two potentiometers served to adjust the overall antenna pattern by adjusting the relative outputs, and in practice it may be desirable to balance the outputs by backing off the 'pot' associated with the 'best' antenna a bit."

GU5ZC seems to recall that the coupling coil consisted of about 20 turns, but clearly some experimentation may be needed to obtain optimum coupling, depending on the impedance step-down provided by the cathode followers or their semiconductor equivalents.

Power oscillator transmitters

Many of the pioneering contacts in the very early days of hf were made using single-stage power oscillators, initially in the form of rather unstable variable-frequency master oscillators but later more often crystal controlled. Then during the 1939–45 period they were used by both sides in a number of wartime clandestine transmitter-receivers, including the excellent AP4 sets designed and built by Polish engineers in England (keyed 6L6 co with small superhet receiver) and the Whaddon Mk7 (also known as the "Paraset") which consisted of a metal 6V6 with two 6SK7 valves as a "straight" receiver: Figs 5, 6. A feature of the Mk7 was the complete absence of metering but, instead, two small pilot bulbs were used for tuning the oscillator and antenna; a technique still valid provided you do not absorb too much of the limited rf output (about 4 or 5W) in the process. The transmitter section of such rigs proved very effective over distances of several hundreds of miles even with the makeshift antennas used in the field. It is perhaps only fair to add that the users encountered a particular hazard when using the Mk7 in urban areas; the regenerative receiver oscillator was directly coupled to the antenna and could be detected by the skilled German df teams. As a result the later Mk15 receiver with an extra 6SK7 used to isolate the antenna from the detector, or the "rival" A3 (the so-called B2 Minor) built by Marconi for SOE with a superhet receiver, was often preferred by those working in the field.

Power oscillators are inherently less efficient than a power amplifier stage, but for QRP operation the overall efficiency can actually be higher, particularly with valves. Even with solidstate it is still possible to obtain good results on 3·5 and 7MHz (and 10·15MHz) with a single-stage cw rig, at least if you are satisfied with crystal control. *TT* April 1981, p332, provided details of a 10MHz vmos power fet oscillator capable of providing

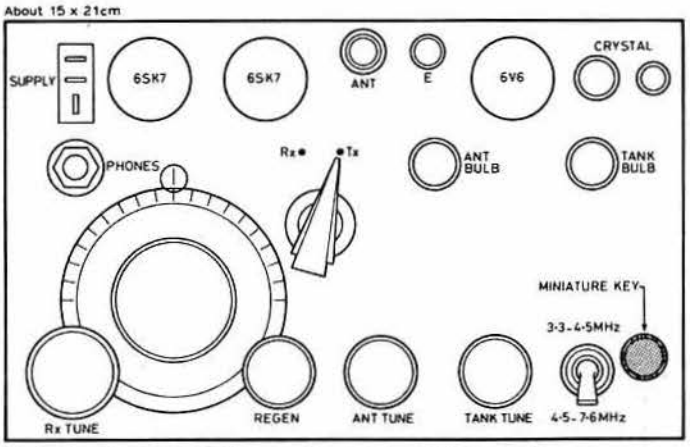
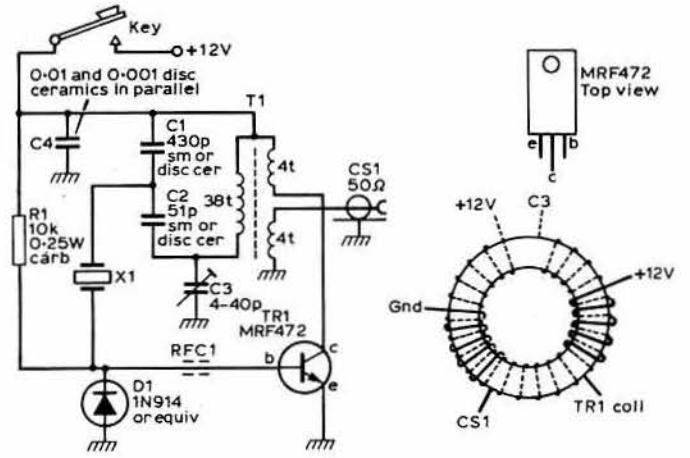


Fig 6. Panel layout of Mk7 transmitter-receiver. Built in small metal container with separate psu

5W output with a 28V power supply. A miniature 7MHz rig using a low-cost Motorola MRF472 npn medium-power bipolar transistor is fully described by Dennis Monticelli, AE6C, in *QST* July 1982, pp34–6: Fig 7. With a 12V supply (about 300mA load) this "one-cubic-inch" rig can produce a useful 2·1W of rf output with a total dc input of 3·6W, or an overall conversion efficiency of some 58 per cent—a better efficiency than is achieved in most multi-stage rigs! The home-made heatsink is made from 0·062in aluminium or brass 1·375 by 0·625in (bent into a square-U shape). Such a rig can produce a fair amount of harmonic output, and AE6C recommends it should be connected to the antenna via a low-pass filter and atu.



▲ **Fig 7. The 7MHz "Cubic Incher" miniature transmitter with about 2W rf output. RFC1, ferrite bead (FB 43·101 or equivalent). T1, toroidal transformer wound with No 26 enamelled wire on T50-2 iron-dust core, 38t primary, 4t each secondary. Fundamental FT243 or HC-6/U type crystal**

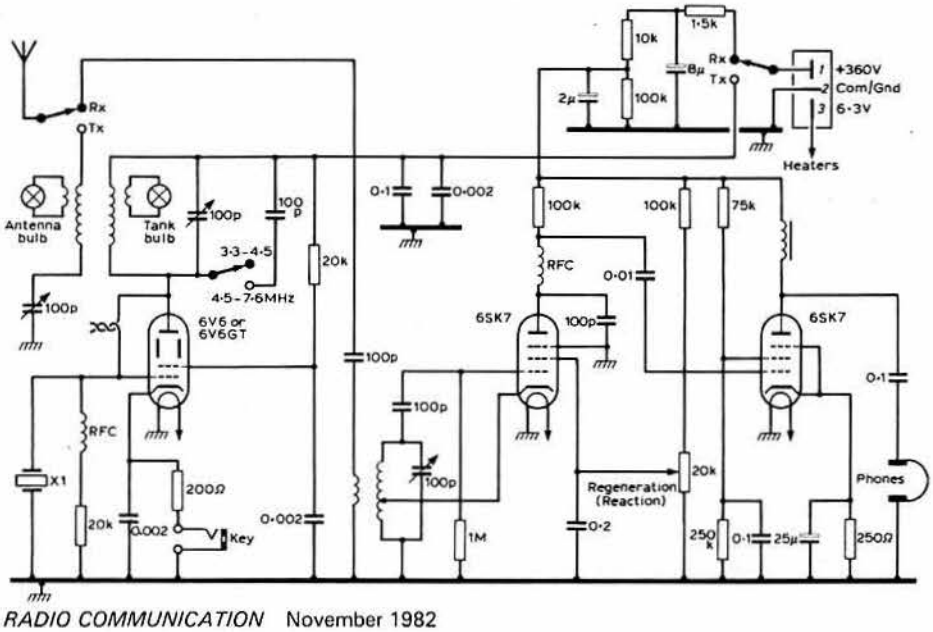


Fig 5. Circuit diagram of the Special Communications Mk7/B transmitter-receiver used in 1943-4 for clandestine links. Also known as the "Paraset"

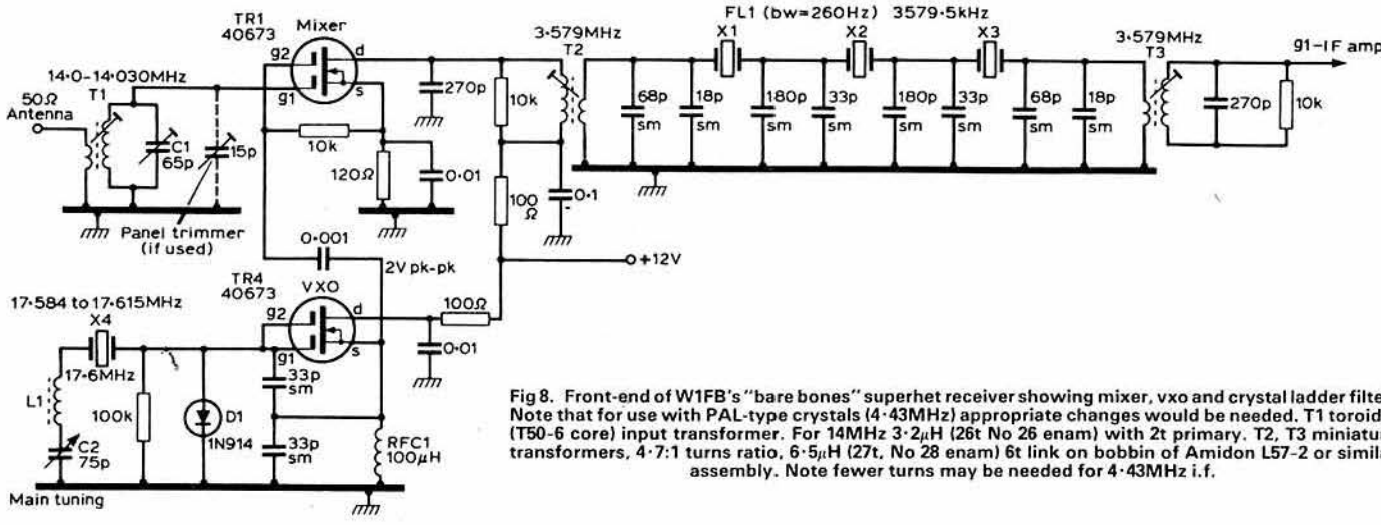


Fig 8. Front-end of W1FB's "bare bones" superhet receiver showing mixer, vxo and crystal ladder filter. Note that for use with PAL-type crystals (4·43MHz) appropriate changes would be needed. T1 toroidal (T50-6 core) input transformer. For 14MHz 3·2μH (26t No 26 enam) with 2t primary. T2, T3 miniature transformers, 4·7:1 turns ratio, 6·5μH (27t, No 28 enam) 6t link on bobbin of Amidon L57-2 or similar assembly. Note fewer turns may be needed for 4·43MHz i.f.

Simple receivers

It would be misleading to suggest that there is any simple solution awaiting the amateur who wishes to build his own high-performance multiband or general coverage hf communications receiver—if there is a really practical solution then I would be glad to pass on the good news! But problems are much reduced if the receiver covers only a single or possibly two bands, such as 3·5 or 14MHz or 7 to 10·15MHz. For the cw operator, the 10MHz band, though narrow and at present containing a number of high-power fixed-service stations due to move out over the next few years, will increasingly offer an almost ideal combination of medium-distance and dx contacts, open for a high percentage of the time. Listening recently to the solid 10MHz signal from VK3MR's fine rhombic antennas, I was reminded of the findings of the German Deutsche Welle hf broadcasters *(Telecommunication Journal* Vol 46, 6/1979, pp320-7) that superior service can be provided for Australia and New Zealand by using the dark 24,000km long-path on about 9MHz which is often some 25dB up on the 21MHz daylight 16,000km path.

But to get back to simple receivers. In *QST* June 1982 pp29-33, Doug DeMaw, W1FB, in an article entitled "Build a bare-bones cw superhet", describes a 14MHz (adaptable to 7, 10 and 21MHz) receiver that eliminates virtually all the usual frills and yet would appear eminently suitable for on-air cw and, possibly, ssb operation. It uses only six dual-gate mosfets (all 40673 or 3N211, or alternatively MPF102 or 2N4416 could be used for TR4, TR5 or TR6) plus a single ic (741) as af amplifier.

The secret of the cost-efficiency is: *(a)* the use of a variable crystal oscillator (vxo) as a stable local oscillator covering only a segment of the band; *(b)* a narrow-band crystal ladder filter based on three tv colour-subcarrier reference-oscillator crystals; and *(c)* crystal controlled bfo using a fourth colour-burst crystal shifted slightly in frequency with a trimmer. The vxo technique does restrict coverage unless several crystals are used. W1FB considers that with a fundamental-type crystal in HC-6/U style holder, the stable frequency shift can amount to 30kHz in the 14MHz band, but only about 5-10kHz on 7MHz, and presumably 15kHz on 10·1MHz.

W1FB pulls the crystal with L1 comprising a 6μH toroidal inductor (36 turns, No 26 enamel wire on Amidon T50-6 toroid core). Larger frequency spreads can be obtained by increasing the inductance of L1, but it will usually be found that the stability then degrades towards that of a conventional LC oscillator; nevertheless some compromise may be possible on 7 or 10MHz, and it could be that most of the 10·1MHz can be covered with adequate stability. The limits of true vxo spread vary with different types of crystal. The original design is based on NTSC-type tv crystals (3·57MHz) and for PAL-type crystals (4·43MHz) it would clearly be necessary to use a vxo crystal of appropriate frequency.

Figs 8 and 9 show some details of the "bare-bones" design. The concept seems an excellent combination of the simplicity of a direct-conversion receiver with the single-signal selectivity offered by a superhet. There is also scope for further development; for example, a low-gain tuned rf amplifier to provide more premixer selectivity and other refinements can be added at some cost to the basic simplicity. It is not claimed as a "high performance" design but one well suited to portable and/or QRP operation.

Differential direct conversion

Paul E. Gili, WA1WQH, in *Wireless World* September 1982, pp46-8, describes a most interesting "differential direct conversion" 3·5MHz receiver intended for use with a small loop antenna. It is claimed that differential circuits, akin to push-pull operation, reduce the effects of poor predetection selectivity, untuned signal detection, induced hum and power supply ripple; all of which are well recognized problems with conventional single-ended unbalanced direct-conversion receivers. The block outline of his receiver is shown in Fig 10, and a detailed circuit diagram is given in the original article.

The untuned rf stage is based on an MC1590 ic, operating in the push-pull mode and providing about 20dB gain for the relatively weak signals from a small balanced loop antenna. The product detector is a CA3049 and, since there are no unbalanced ports, WA1WQH suggests that it could be regarded as a "triply-balanced" arrangement, and is driven by a square-wave signal.

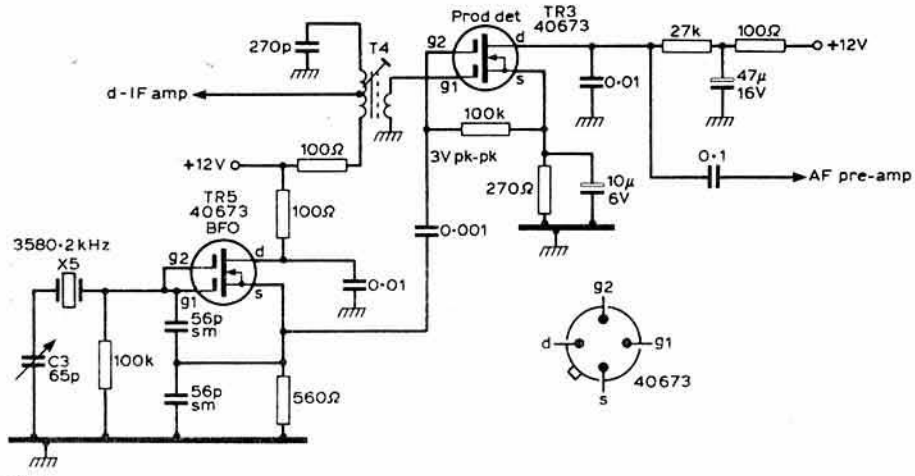


Fig 9. Product detector and crystal-controlled bfo stages of the "bare bones" superhet. T4 as T2, T3 of Fig 4 but with centre-tapped primary

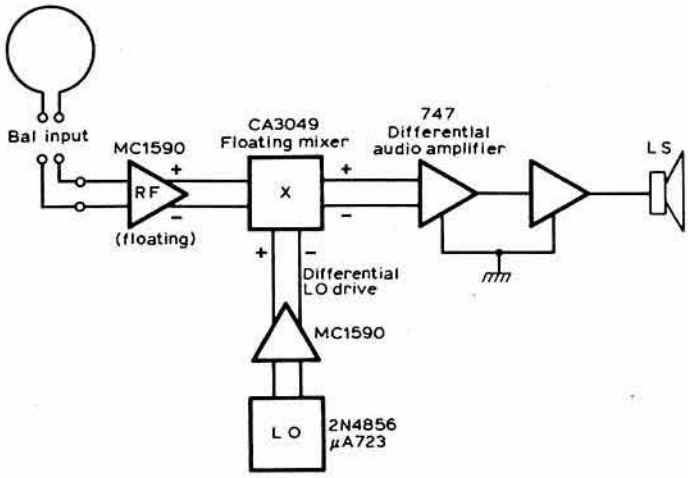


Fig 10. Block diagram of WA1WQH's differential direct-conversion 3·5MHz receiver *(Wireless World)*

The local oscillator comprises a 2N4856 fet in conjunction with a μA723 ic, and is tuned electronically by using the collector/base junction of a 2N5663, although WA1WQH comments that mechanical tuning might be preferable. A second MC1590 ic is used to provide the differential local oscillator drive to the product detector. A 747 twin op-amp forms a differential first audio amplifier with some 40dB gain, with a second 747 used to form a high-Q active af filter for cw reception, after which the signal can be amplified as required using single-ended operational amplifiers.

This is evidently an interesting and novel form of dc receiver making ingenious use of readily-available devices.

Helping the handicapped

Over 30 years ago I helped to put together an appeal to RSGB members, on behalf of the National Institute for the Blind and St Dunstan's, to lend a hand in helping the blind users of the Talking Book Service. In those days mechanical or mains-powered record players with 12in discs running at 24rpm were used. It was pointed out that amateurs could help by showing the blind users how to operate the rather cumbersome machines correctly and clearing up some of the simple faults that tended to occur. At the time several hundred readers volunteered and their help was much appreciated.

I was reminded of this recently on receiving a letter from an amateur who before his retirement a few years ago was a very senior professional broadcast engineer. To spare his blushes I will let him remain anonymous but I feel that his experience deserves to be known to, and acted upon by, others. He writes:

"One of my many interests these last several years has been repairing radios for the blind. To-date I have fixed 350 and saved the county's Association for the Blind over £7,000 which they could not possibly have afforded. About five per cent of the sets are "beyond local repair" and I break them up for parts. It is not a question of taking work away from the radio trade, since few dealers in this area seem interested in repairing sets. In about 10 per cent of cases an apparently completely 'dead' set can be restored to life merely by resoldering the connections on the pcb. Often the connections look perfectly ok but have obviously over a period of time suffered chemical change and become open-circuited (possibly a kitchen atmosphere does not help). Most of these transistorized sets are at least 10 to 15 years old, and one wonders how much amateur equipment these days is discarded that is capable of being similarly restored."

For those with time, patience and the necessary skill this does seem to be an extremely useful public service, and one suspects that many local associations for the handicapped would welcome such assistance.

18 and 24MHz and the W8JK

With the release, albeit with severe restrictions, of the 18 and 24MHz bands for low-power cw operation, it is appropriate to think again about suitable antennas and equipment modifications. For the time being, the antenna restriction of zero gain relative to a dipole, rules out some of the suggestions made earlier such as the classic 14MHz W8JK driven-array (*TT* October 1981 "A new look at the W8JK"). If fed with twin-line or open-wire feeders via an atu, a W8JK acts as a bi-directional array on *all* bands from 14MHz to 28MHz (and rather less efficiently on 10MHz).

No less an authority than John Kraus, W8JK, has recently restated (*QST* June 1982, pp11–4, "The W8JK antenna: recap and update") the very real attractions of this 45-year-old design when it comes to multi-band use.

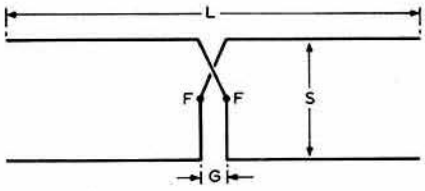


Fig 11. The basic centre-fed W8JK antenna. Typically spacing S is about λ/8 on the lowest frequency used. L can range from less than λ/2 to more than 3λ/2. For 14MHz and above L can be 7·3m, S2·6m. Centre-gap G forms part of measurement L. *Gain:* 14MHz 5·7dBi, 21MHz 6·7dBi, 28MHz 7·7dBi, 50MHz 8·2dBi. Values for 18 and 24MHz bands can be interpolated

Among its plus points he lists: *(1)* continuous frequency span of more than 3 to 1; *(2)* no traps or loading coils; *(3)* no critical dimensions, as the entire antenna and feed system is resonated; *(4)* it can be used horizontally or vertically for optimum radiation angle; *(5)* it is ideal for finding round-the-world (long path) openings; *(6)* it has theoretically zero radiation off the ends of the elements; *(7)* it can be fed with low-loss, inexpensive twin-line (or very low-loss cut-away 300Ω line or open-wire line); and *(8)* a compact single-array with 7·3m elements can cover 14, 18, 21, 24, 28 and 50MHz bands. Minuses, I suppose, are that the bi-directional pattern does not give protection against continental European signals when the array is used in the UK and the gain tends to be lower than a good Yagi array; it should also be remembered that the low radiation resistance does not make this a good antenna system for installing in a roof space, although this applies also to a Yagi array.

W8JK provides a useful table of the performance characteristics of a W8JK array, with 7·3m elements spaced 2·6m, of the form shown in Fig 11. Values for the 18 and 24MHz bands can be interpolated. Remember that to convert dBi gain into gain reference to a dipole you have to subtract 2·1dB. Although it is important not to confuse these two different ways of expressing antenna gain, it is becoming clear that there are merits in using dBi in this connection. Gain in dBi is the gain of an antenna over an isotropic radiator; that is, an imaginary antenna that radiates equally well in all directions.

The antenna described by W8JK includes an elaborate balance-to-unbalance matching unit with a movable "trombone" formed by sliding aluminium tubes to provide an effective junction to 50Ω coaxial cable. This is an elegant arrangement, but would appear to require different dimensions on different bands. However, it should be appreciated that this refinement is not essential in circumstances where the twin-feeder can be brought all the way down to a flexible atu providing balanced output. The only disadvantage is that the line will be voltage-fed on some bands.

One must stress that the present restrictions rule out the use of a W8JK array on 18 and 24MHz in the UK, though of course these are temporary restrictions, and the design is entirely suitable for the other bands. Furthermore some, at least, of the plus points apply equally to a simple flex or rotary 14MHz dipole fed with balanced twin line, forming the mis-named centre-fed zepp (in other words a centre-fed doublet or dipole). It might also be possible to devise a system with remote switching that would remove drive from the second element on the new bands only.

A possible problem with 18MHz operation that I have not seen mentioned elsewhere is that the second harmonic falls around 36·2MHz. This is slap in the middle of the standard vision i.f. used in all British and European television receivers (a frequency that was chosen in part to avoid harmonic relationship with the amateur bands!). This should not present any great problem with a "clean" 10W of carrier power but may prove quite a tvi hazard when the power restrictions are lifted. Again, it is necessary to stress that it is the responsibility of the amateur to effect a cure when tvi can be traced to harmonic radiation, even though it could be argued that susceptibility to i.f. breakthrough is a function of the tv receiver design.

RF choke resonances

Another potential problem with the new WARC bands that has not so far attracted attention is that presented by the use of transmitter-type rf chokes that form an essential part of pi and pi-L output networks or interstage coupling.

Most of the rf chokes used in the pa stages of existing hf transmitters have been designed not to exhibit series-resonances close to any of the traditional amateur hf bands—but this is no guarantee that they will work effectively at 10, 18 or 24MHz.

A series-resonance within or close to one of the new bands can seriously reduce the efficiency of the amplifier. Symptoms include the failure of an amplifier to "dip" effectively when unloaded, and/or the rf choke showing signs of heating up. There is of course the danger that if a high-power

amplifier is operated over a period of time in such a condition the valve(s) may be permanently damaged by dissipating excessive power, leading to over-heating of the electrodes or the valve envelope.

The following notes are adapted from comments on rf chokes that have appeared in many editions of *The Radio Handbook*. RF chokes are inductances designed to have high impedance over a wide range of frequencies. A practical rf choke, however, has inductance, distributed capacitance and resistance. At low frequencies the capacitance has little effect, but as its operating frequency rises it results first in a parallel-resonant circuit at some specific frequency (tending to raise the impedance) but then if the frequency is raised still further a point of series-resonance (low impedance) is reached. As this series-resonant frequency is approached or left, the component's performance as a choke is seriously impaired. Series-resonant frequencies of rf chokes can be determined with the aid of a gdo by short-circuiting the terminals or leads of the choke.

While rf chokes designed to be effective above 7MHz can have their first series-resonance above 40MHz, those designed for use also on 1·8 and 3·5MHz are quite likely to have a series-resonance in the range 10 to 30MHz. *The Radio Handbook* notes rather ominously that "most commercial transmitting-type chokes have series resonances in the vicinity of 11 or 24MHz". Clearly this is something to guard against when modifying existing transmitters or building new ones for the WARC bands.

EPHEMERIS
Satellite news and views

R. O. Phillips, G4IQQ*

Reference orbits for 6 and 7 November 1982

	6 November			7 November		
	Orbit number	EQX gmt	Longitude °W	Orbit number	EQX gmt	Longitude °W
RS3	3932	0129	328·2	3944	0112	325·3
RS4	3903	0113	320·7	3915	0106	320·5
RS5	3898	0140	327·6	3910	0134	327·8
RS6	3925	0040	314·8	3937	0025	312·5
RS7	3909	0013	306·3	3921	0003	305·4
RS8	3891	0120	321·1	3903	0117	321·9
AO8	23808	0036	88·5	23822	0040	89·7
AO9	5986	0037	142·0	6001	0021	138·0

UOSAT lives

It is nice to start the column this month with some good news about UOSAT. After some five months of attempts to regain control of the spacecraft, success was eventually achieved on 20 September. To put the problem into perspective, it took a very large amount of rf power at 144MHz into the 150ft dish at the Stanford Research Institute, California, to overcome the de-sense of the telecommand receiver. With the vhf data beacon switched off, the University of Surrey was then able to turn off the uhf data beacon and subsequently re-activate the vhf telemetry beacon. Initial analysis of the data indicated that the performance of all on board systems was nominal except for a low eht voltage on the radiation counter. If all is well, the university will be able to continue the exhaustive commissioning tests which will ultimately lead to attitude orientation of the spacecraft with respect to the earth. The confidence of the team at Surrey in regaining control of the spacecraft has been such that since April they have refurbished the command station, and this should make the remaining manoeuvres easier to carry out. In spite of the fact that UOSAT has already spent one year in orbit there is chance of a useful lifetime of at least another 18 months to two years.

Phase 3B

The first operational launch of the European Space Agency's Ariane launch vehicle attracted considerable attention both from the commercial satellite users and a great number of amateurs around the world. The failure of the launcher some 12min after lift-off came as a great shock to all those involved and resulted in both of the payloads—MARECS-B and SIRIO-2—being placed at the bottom of the ocean rather than 36,000km above the earth. The reason for the failure will not be known until after detailed analysis of the telemetry data has been carried out, but preliminary indications point to a malfunction in one of the fuel pumps in the third stage of the rocket. If it is shown that the problem was caused by a component failure rather than a design error, it seems likely that the launch programme should be delayed by no more than a few months. This is likely to delay the launch of EXOSAT (L6) until the end of the year, and that for Phase 3B (L7) until around March 1983.

The frequency plans for the two communication transponders were given in *Radio Communication* April 1982, and though little additional information has been made available, current assessments indicate that the station requirements may not be as substantial as had been thought. An effective radiated power of 1kW is likely to be required for both the mode B and mode L transponders, which is well within the capabilities of many terrestrial stations, particularly at 435MHz

Satellite status reports

As expected, the short life of ISKRA 2 came to an end after 53 days on 9 July 1982. The mission was only partially successful and little was heard of the 21 to 29MHz transponder, though the 29MHz beacon produced very good signals with even very modest receiving equipment.

The other Russian satellites, RS3–RS8, continue to perform very well with active communication transponders (mode A) on RS6 and RS8. The codestore on RS7 has been used recently to provide indication of forthcoming activity periods.

Nothing to report on Oscar 8 except that both transponders continue to function admirably and the telemetry indicates that on-board parameters are quite satisfactory.

Sharing problems

Mention was made in this column in April of the difficulties that have arisen of interference to links both to and from amateur satellites operating in the IARU recommended sub-band at 145·8–146MHz. The extent of terrestrial usage of this part of 144–146MHz has been highlighted recently by the exceptionally good tropospheric conditions giving an insight into operation over a very large area of Europe. It would be easy to say that the operators of offending stations are probably not members of their national societies and therefore may not be aware of the agreed band plans. However, as recent events have demonstrated, there are still a number of fm repeaters operating above 145·8MHz, and there can surely be no excuse for this.

It has been argued that one way to enforce the IARU band plans would be to have them included in the Home Office licence conditions. This, however, would seem to be a rather negative approach and would, in any event, be unlikely to be favoured by the administration due to the difficulties in ensuring compliance. Perhaps the most suitable avenue to follow at this time would be that of all members if the RSGB setting a good example in respect of the band plans. Additionally it would not be unreasonable for the Region 1 office of the IARU to remind the national societies of the various recommendations and resolutions that were approved at the Brighton conference 18 months ago. Any other reasonable suggestion would be received with interest.

Other news

For those who are able, or can afford, to combine both amateur radio and computing as hobbies, ASMAT-UK has produced a book on software covering all aspects of amateur satellites. The publication will be available either directly from Ron Broadbent, G3AAJ, QTHR, or at many of the exhibitions and rallies throughout the year.

As a means of helping newcomers get their feet wet, "teach-ins" are being organized by G4CUO and G3AAJ each Monday evening at around 7pm on 3,780kHz. Guidance is provided on how to interpret the satellite orbital data and convert it into azimuth, elevation and time for individual locations. Discussions are also planned on how to decode the telemetry from the various satellites. It is advisable to check for precise details by listening to the Sunday morning net (at 1015am) on 3,780kHz.

News has been received of a proposal to include amateur payloads onboard two geostationary USA domestic satellites. The transponders would operate in the 5·7 and 3·4GHz amateur satellite allocations, though it is not clear if the antenna coverage would permit operation from Europe.

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Ken Willis, G8VR*

THE EXTRAORDINARY CONDITIONS have continued, and I suspect that when we come to look back on the summer of 1982 it will stand out as having been one of the most eventful periods in vhf history, characterized by record-breaking contacts on tropo, aurora, Es and ms, with two or more modes peaking simultaneously on some occasions. The current high level of activity on the vhf bands in this country and Europe has clearly increased the probability that no openings are missed and that when they occur there is plenty to be worked. This contrasts very sharply with the USA, where vhf activity is confined mainly to repeaters and fm apart from a very few dedicated weak-signal operators. This is not to denigrate repeater and fm operation, of course, and indeed operators using these modes have been somewhat neglected in *4-2-70* during the past few months due to the need to report the remarkable achievements on ssb and cw. Hopefully a better balance will be possible as winter approaches, bringing with it the likelihood of flatter conditions.

Meanwhile we have experienced another mammoth aurora followed by what may well have been the most extensive tropo opening on record. Some of the contacts made would have been regarded as well-nigh impossible only a few years ago. What is so encouraging is that "average" stations have featured in these contacts—stations with suburban locations using simple antennas and low power, as opposed to those with eme arrays and the erp to match.

It is difficult to perceive that anything really significant could now occur to extend vhf coverage still further, but after the experiences of this year it would be rash to make any predictions.

Aurora

The solar disturbance which occurred on 12 July, giving rise to the intense auroras of 13 July and 7 August, was due to come round again during the first week in September. It did not disappoint us, for between 6 and 12 September there was a marked rise in solar activity, and the Meurdon "A" index achieved its highest level of solar cycle 21 when it reached 162 units. A very large coronal hole existed on the sun, and on the morning of 6 September the hf bands went very dead, while on 144MHz strange noises on northerly beam headings suggested that something was in the air. On the frequency of SK4MPI a weak T9 carrier with a beam heading of about 030° persisted for several hours, and around 1200gmt G4CJG (Durham) was heard calling "CQA" with a very auroral tone. In a short QSO with G8VR he commented that things "looked good", and shortly after this the band went berserk, with signals from all over Europe being copied at great strength in the UK.

The aurora lasted for some five hours in the south of England, and for coverage it must compare with the event of 13 July. GW3NYY thought that this was true, though the strength of signals reaching his location was perhaps not as strong as on the previous occasion. Nevertheless stations in the British Isles were able to work into F, ON, PA, D, Y22, OZ, SM, OH, YU, I, HG, OK, UP2, UR2, UQ2 and UB5, quite apart from the usual GM, GW, GI and EI prefixes. The QRM was enormous because the aurora peaked at a time when many of the East Europeans had arrived home from work, and pile-ups developed as many of them worked their first real dx. Many of the callsigns copied were new to UK operators, though several of the "old gang"—well known to users of the vhf net—were in evidence, such as YU1EU, YU3ES, HG8ET, HG8CE, OK2KZR/P, I3LGP and I4BXN.

The geometry of this aurora is worthy of study, and it would be interesting to draw in the lines of beam headings of various stations in an attempt to determine where the active "patch" was located. At the beginning, stations in the south heard GMs and OZs, plus a few SMs, all on a beam heading of about 010°. The action moved, however, and later a QTF of almost 090° (from AL square) was necessary to access the HG, YU, OK and I stations. Most stations in the south maintained similar beam headings for the entire aurora. The Scandinavian stations largely disappeared after the first hour, but returned towards the end of the event. Most of the southern stations concentrated on the HG, OK, YU and I regions, and by implication heard nothing much from the USSR. However, G4IJE (Essex) turned his beam towards the north after working a string of southeast Europeans and immediately worked several Russian stations. In a busy session he worked UR2EQ (NT), UK2RDX (MT), UR2AD (MT), UR2RIW (LS), UQ2GLO (KQ), UQ2BKH (KP), and RR2RBD (MS). He was then called by UB5WAL/P, exchanging 59 reports, and went on to work UB5WCS/P and UB5WBJ/P, both of which he thinks were at the same station as UB5WAL but using their own calls.

At G8VR the Russians were inaudible with the beam set at 085°. Several other stations report the same effects; it was as if the Russian signals were reflected from a quite different patch from the south-eastern Europeans, since otherwise no simple geometry can account for what was being observed. Even the most southerly stations, I4BXN (FE), I3LGP (GF) and F6EBO (CE), were received best on an 085° beam heading, and this, coupled with the lack of Scandinavian signals, suggested a reflecting patch very south and located somewhere over the Baltic, ie, relatively overhead for the UP2, UQ2 and UR2 stations. G4IJE also worked OH1ZAA (KV), OH2TI (MU) and OH1PS (LU) during the "Russian" period, again supporting the view that this was a separate reflecting region. Paul picked up five new squares in this aurora.

G4ISM (Whitstable) worked many stations in the countries listed above, and in addition was called by a YO, though no QSO resulted. G4IYA (Gravesend) worked several HG, YU and OK, but also managed a contact with UR2RIW (LS) in the early stages of the aurora. He heard nothing of the later Russian signals, though he was not QRV for the entire event. GW3NYY was another who worked a number of the HG, YU and OK stations, and he had contacts with I3LGP and IW3EFQ; he also heard nothing of the Russian stations. G4KLN (Leeds) worked 14 squares during the event; his most interesting contacts being with LX1GR (DJ), F6FTC (CG), OK3TJK (II) and HG0HO (KH)—the last being a QRB of 1,733km.

G4FBK (Harrow) was at home recovering from a strenuous period operating in the 144MHz contest—he had his first auroral contact at 1357gmt, and his best contacts in the whole event were IW3QBC (GG), F6ELI (ZE), YU2DG (JF), HG0HO (KH), HG0DG (KH) and OK2BSO (JJ). Dave, GM4DJS, in Wishaw, uses quite low power in auroras. On this occasion with 30W to a 10-element Yagi he had 12 contacts between 1715 and 1812gmt with G, GI, DL, DJ, OZ, ON and PA. He missed the earlier part when the really choice prefixes were coming in.

The above information relates to 144MHz cw operation. However, the ssb fraternity were not to be left out of this, and some excellent contacts were made using this mode. Pride of place possibly goes to G8XIR (Gravesend). Kevin has not had much auroral experience, but on this occasion worked no less than 56 stations, all on ssb, the best being YU1NDL (JE), YU1AFN (KE), YU7AR (KF), OE1QJU (II), OE1NUI (EH), and F1JG (CD). It was not all that long ago when ssb auroral contacts were regarded as being so rare that if one or two barely intelligible tape recordings of such contacts could be played at a lecture, the audience would comment on how intense the aurora must have been to allow contacts by this mode to be possible.

GI8YDZ, in Co Antrim, worked "numerous PA, DL, ON, G etc" but also had some useful contacts with F6HLD (CG), OE9XXI (EH), OE5OLL (GI), OE3NDA (II) and OE5VHL (GI). His best contact was over a distance of 1,743km. Alan should do even better in future since he is installing a pair of 16-element Tonnas and a masthead preamplifier, plus 350W of rf.

G6GGE (Chiswick) worked many German stations, the best being Y23KK (FK) at 725km. He heard, but could not work, Italian stations in GG square. During the aurora he checked his tv receiver and on Band I received pictures from Italy. On Band I Channel E2 he copied various buzz-saw noises, while Lille was received with totally auroral tone with the indoor dipole looking east-west.

During the auroras of 13 July and 7 August, operation on 432MHz proved very successful. In this event, G4FUF went on to the higher frequency band and was rewarded by a contact with YU2DI in HE square—real dx, this. On the same band, using 100W of rf to a 46-element Parabeam, G4KGC worked DF1OH (EM), F6CER (BI), DF3EE (DL), DJ6MB (DK), DL6WU (EJ), PA0EZ (CM), PA0FRE (CL), G3AAV (ZN) and G4FUF (AL). These are remarkable achievements, though there might be a tendency to overlook them at a time when so much was happening on the 144MHz band. Until quite recently auroral contacts on 432MHz were virtually unknown.

Between 1730 and 1845gmt on 7 September there was another quite strong aurora which reached the south of England. Signals from GM, GI, EI, SM, D, PA and ON were copied at good strengths, but there was less activity than on the previous day, many operators no doubt waiting to see if the longer distance signals would come through. The beam heading for this event, from AL square, was around 040°.

G4KLN reports an aurora on 18 September when Dutch and German

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stations were audible in Leeds, as well as the usual GMs, but no time was stated for this event and no other stations have reported it to date.

21 September saw yet another aurora, this time reported by G4IJE. It was a two-phase affair, and Paul first noticed it around 2140gmt when he heard GM3WCS at 59A and worked him, as did G4IYA and G4DEZ. There was little else on the 144MHz band at this time, but later, around 2325gmt, a second phase developed, and G4IJE worked SM0HAX, SM0DCX, LA3EQ and, on ssb, GM8OEG and GM8MVP. In this same period Paul monitored several beacons: GB3ANG and DL0PR on 144MHz were both auroral. On 70MHz no amateur signals were heard, but Gdansk and Wrocklaw (fm broadcast) were both very rough. On 50MHz nothing was heard from GB3SIX either aurorally or otherwise. In this same aurora, G8XIR (Gravesend) worked GM6GAS in YR square. The event petered out in the south around midnight gmt.

All in all, a very interesting period of auroral activity which may, however, emphasize the fact that we are passing the post-sunspot magnetic peak and that such events may be somewhat rare in the future. Let us hope that this proves to be a bad piece of forecasting!

On 26 September a major auroral event commenced around 1300gmt and continued for nearly five hours in the south. Northern stations were heard working into OK and YU, while several German and Dutch stations were working into the USSR. Signals were very strong and activity high as the event occurred during a Sunday afternoon. Towards the end of the event the Russians started to appear in the south, and RQ2GAG (MQ), UP2BKH (KP) and UC2ACA (NN) were worked at G8VR. G3UVR reported working "loads of OKs", and some DLs were heard in QSO with UB5. The QTF was between 045° and 160° for most of the event. More about this next month.

Tropo

On 12 September a high-pressure area started to build up over the English Channel, and by the following day it had become more defined and centred over southern England. By noon on 14 September the area had greatly expanded, and its centre had moved to somewhere in the region of HN square, so there now existed a vast, stable weather condition extending from Eire to Russia, bounded on the north by Denmark and on the south by North Africa. This is illustrated in the weather map reproduced here. The pressure at the centre was only 1024mb, and at the rim no more than 1016mb.

The classical conditions for a big tropo opening are usually regarded as being met when a region of very high pressure which has existed for some days starts to decline, producing the right meteorological conditions for super refraction of vhf and uhf waves. However, vhf dx enthusiasts will also know that when there is a sharply defined high-pressure area, signals seem to run along the lower pressure isobars rather like water trickling through a valley, so a group of parallel isobars pointing, say, towards Scandinavia will usually produce some dx from that region.

This rather lengthy description is deemed worthwhile as during the existence of this particular weather pattern, a tropo opening occurred which has almost defied description. Readers have used terms such as "fantastic", "remarkable" and "incredible" to accompany their reports, and certainly the distances worked warranted the use of such superlatives.

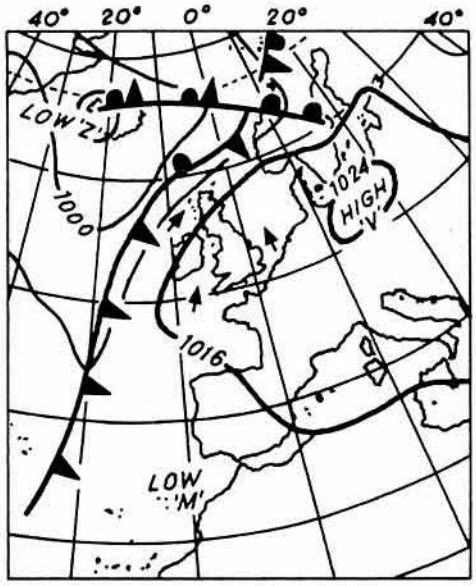
The good conditions started on 13 September when EI and GI stations were working into East Germany. G3EDD (Cambridge), back on 144MHz after a 10-year absence, could hear the EIs and GIs but not the Germans at this time, but over the next two days the whole of Europe was involved in the opening, while Scandinavian and Russian stations were putting very strong signals into the UK. Conditions were excellent on all the vhf/uhf bands.

G3TCT (Aldershot) says that he has been active on 70MHz for 15 years and has never previously experienced such tropospheric conditions. Around 2000gmt on 14 September he worked GI3TLT, and at the time was hearing several Polish fm broadcast stations, notably Gdansk (70·31MHz) which reached 37dB s:n at one point. He also noted very strong ms bursts on the broadcast signals, adding a further 10 or 20dB to the signals.

Possibly the most significant feature of this opening was the number of Russian prefixes worked by Europeans on 144, 432 and 1,296MHz. Stations which had never before heard signals from these call areas were able to work into UP2, UQ2 and UC2. G3VYF (Essex) had a contact with RC2WBG in OP square, the distance being almost 2,000km. Several reported working NP square, and in another direction many worked the rarer Swedish squares such as IS, JQ and JR which are normally only contacted by Es or ms. So far there have been no reports of contacts with Finland, but the extent of the high-pressure area suggests that the OHs were too far north to benefit from the conditions.

Over the air it was reported that UP2BJB (LP) had been worked on 432MHz. Hopefully further reports will come in, since contacts such as these justify proper documentation.

GW4HBZ was operating from his portable site (YN) on the evenings of both 13 and 14 September. From this site he considers that very exceptional



Weather situation at noon on 14 September

conditions are required to work in excess of 1,000km, but on this occasion more than 75 of his 100+ contacts were over distances greater than this. He reported much QRM on 144MHz, fm stations in the ssb parts of the band, and complained that his QTH Locator map was too small for him to see what he was working and what lay beyond! Several stations must have wished they had the larger squares map during this event. GW4HBZ's "bag" for the opening was 21 SMs, 17 Ys, 3 EAs, 5 OEs, 2 OKs, 2 LAs, an HB9, and, most interesting of all, that well-known station SR6ASD (HL). No-one else has reported hearing Poland. Two of the OEs worked were near Vienna, close to the Hungarian border. The EAs were all in VD square. GW4BHZ did all this with 30W to a nine-element Yagi, but he feels that with cw he could have done even better.

G8LFB (London) worked 16 SMs, some OZs, LAs and HB9s. His best dx was SM1LPU/1 (JQ), a rare specimen. G3KZR (Dorking) thought that 144MHz sounded like a top band contest, and his best contacts were with SM1CJV (JR), SK7GC (HS) and UQ2GDA (KQ), this last one being as distant from his location as a station in North Africa, G4KLN (Leeds) worked many stations, among them two in Gotland in the shape of SM1CJV (JR) and SM1BSA (JR); he also worked Bornholm (OZ1CSI).

G4FBK (Harrow) had just changed a pair of nine-element Tonnas for a "box" of six five-element Yagis. They seem to have worked, as his log for the event included UQ2IV (KQ), and RC2WBR (NP) as well as some choice Scandinavians. He also copied beacons SK1VHF (JR), SK7VHF (GP) and DL0PR (EO). Reception of these beacons was also reported by G6CSY who in the opening worked a new country, two new squares and his first over-1,000km QSO.

G4BAL (Kent) worked his first EI in more than 12 years on 144MHz because his location does not favour this direction. He wishes to thank EI8AYB for taking time out from his dx working to give him this contact. G6GGE (Chiswick) saw the event as having three distinct parts, each favouring a different path. He worked some new squares in Scandinavia, the best being SM1LPU/1 in JQ. Down in the West Country G4IGO had over 60 contacts on 144MHz, 26 of them over 1,000km. His best were SM7LPU (JR), SM5IXE (IS) and UQ2IV (KQ); the last being a QRB of 1,630km.

G4BPY (Walsall), a fugitive from 70MHz, has been spending much time on tv dx (to be reported here later), but took time off to listen on 432MHz during the opening and copied three interesting beacons in OZ2MHF (432·868MHz), OZ7IGY (432·930MHz) and SK7UHF (432·940MHz). The last beacon is in IQ square. All three peaked S9. He also worked into OZ and SM, Sweden being his 14th country on 432MHz. G4KGC (Northants) spent much time on 432MHz during the event and worked 8 OZs, 7 SMs, GI6DCQ (XO), GM4JLY (YR) and Y23FG. However, she was more pleased with contacts with F6GNR and F6CCH since the southeast is a very difficult direction from her location.

Other modes produced interesting results also. G8ZRE (Chester) was mobile, using 10W to a 5λ/8 whip, and on fm simplex worked SM7KBY, receiving a 57 report. G8CGK (Herefordshire) had an sstv contact with DF1YQ in West Berlin (GM) over a path of 100km on 144MHz, and complained about fm stations using this channel which is recognized as the

sstv calling frequency. On rtty, G8RBY (Leics), using 144MHz, worked OZ1GRF (Bornholm), a "first" on rtty between that island and the UK. He also worked DF1ZE (EJ), DJ5GI (EO), DD4DT (DL) and DB9YU (DL).

Ole Kval, LA8AE, reported having worked more than 200 stations on 144 and 432MHz between 13 and 14 September. Only two of these contacts were with stations *closer* than 800km! His best, and most remarkable contact was with EA1CR (XD) on ssb over a path of 2,041km, signals being 54 both ways. On 432MHz Ole's best dx was a contact with F6CCH (ZG), a distance of 1,585km. He also worked GU8FBO, GJ4ICD and OE3LFA, all on 432MHz, and wonders if all three were "firsts" with LA on this band.

G4KLX (Derbyshire) had many good contacts during this event, the best being RC2WBR (NP), UQ2GDA (KQ), UQ2IV (KQ) and RC2WCG (OP). This last station exchanged 599 reports with G4KLX, and Jonathan asked if this was the best dx from Britain during this opening.

50MHz

As announced in the GB2RS News Bulletin for 5 September, a limited number of permits are to be issued to Class A licensees for operation on 50MHz for use outside television hours. The Home Office, in making this announcement, has requested that the RSGB should provide a list of amateurs to be granted such permits, and the unenviable task has fallen to the vhf manager, G3WSN. It is intended that a questionnaire be issued to all who notify G3WSN of their wish to operate on this band, and by the time this appears in print many questionnaires will probably have gone out to all those who responded as a result of the newscast. Since any selection process is bound to result in dissent, those who apply but are unsuccessful might perhaps comfort themselves in the thought that this initial issue of permits should open the door to a more general use of the band in the future if the tests show that no major problems arise when amateurs use these frequencies. Any correspondence relating to the issue of permits should go to G3WSN, 7 Burlington Road, Swanage, Dorset BH19 1LR.

G4GLT reports what is probably the first 50MHz opening to ZS this season. On 8 September he heard ZS6BMS calling CQ at 1432gmt. At the same time the beacon station ZR6ABF on 50·020MHz was heard at 599. This beacon runs only 20W to a dipole 5m above ground. On the same day at 1447gmt the ZS6DN beacon was heard on 50·058MHz, though not as strong as usual because the antenna was beaming towards Durban for some special tests. Dave comments that the ZS6PW beacon has been off since June 1982. It is normally on 50·030MHz.

G4GLT goes on to say that he had crossband contacts on 8 September (50/28MHz) with ZS6BMS, ZS6LN and ZS6BUF, all between 1450 and 1547gmt, with signals peaking 599 on 50MHz. ZS6BMS was using 50W to an indoor dipole at the time! Dave refers to an article in the Australian magazine *Amateur Radio Action* which states that when the Meurdon Index reaches 30 or more units, this may produce a 50MHz opening a day or so later during the equinox periods. He points out that there was a major aurora on 6 September, just two days before he worked the ZS stations. How about that for correlation?

Ken Ellis, G5KW, who in previous years in this solar cycle had crossband contacts with all 48 of the mainland states of the USA (50/28MHz) has gone off to Cornwall for a couple of months to set up a station there in an attempt to work Hawaii and Alaska, the remaining two states which would give him crossband WAS. He is equipped for 50, 70 and 144MHz, so keep a look out for him in his new location.

G3TWG has sent in a record of his reception of the ZB2VHF beacon on 50·35MHz between 13 May and 15 August 1982. Several times the signal was S6/7, and mostly the times it was logged were between 1800 and 2100gmt.

70MHz

Some interesting correspondence relating to the 70MHz band arrived during September. G2HDV (Kent) wrote to say that he is back on the band after a long absence and has a Lowe MX4 giving 300mW to a three-element Yagi at quite low height. He also proposes to carry out some operating from a portable location. He can work ssb as well as cw and has had contacts with G3IOI (Essex) and G4DZO (Sussex), both more than 30 miles distant, using this QRP. However, he hopes to have a linear amplifier soon to boost this power.

Another who has returned to the fold after a lengthy absence is G3YXZ of Watford. He is using about 8W to an indoor dipole, on both cw and ssb, the QTH being about 120ft asl. On 8 August he heard GW4HBK but could not penetrate the pile-up. The next evening he heard, but could not work, G3YJX in Cornwall. On 10 August he worked G8VR to whom he passed on this information together with apologies to those stations who are experiencing difficulty in copying his weak signals. He says his cw is rusty too, but this was certainly not evident during the QSO. He comments on signals on the band which emanate from cordless telephones using nbfm. He says these are illegal, the base station frequency used being 49MHz.

Malcolm Hamilton, GM3TAL, has written about my comments in the August *4-2-70* regarding the problems of ms working between UK stations when the distance of separation is generally too short to intercept the majority of meteor trails. He refers to tests in the 1981 Geminids (December) with G3SHK (Wilts) when contacts were made using both hand-speed cw and ssb. They used about 50W and four-element Yagis, and the main purpose of his letter was to encourage others to have a go. *4-2-70* certainly supports this view, and the more recent successes of GM3WOJ/P and G4CJG/P show what a good band 70MHz can be for ms work. Incidentally, as reported earlier, the simpler the antenna the better for such work, as some high-angle radiation is exactly what is required in the absence of any elevation control.

G4IJE has had confirmation of his 70/144MHz crossband contact on ms with OZ1FDH. There was much broadcast QRM at the Danish end of the contact which made things difficult for him.

During the expedition to WR square for the Perseids shower, GM4CJG/P worked G4IJE and G8VR on 70MHz ssb ms. Reports were 26 both ways. Bursts in excess of 10s were copied at both ends of the link. Many more skeds had been arranged, but the convenient aurora meant that many stations were worked by this mode rather than by ms. Schedules with G3IKR and YU3ES were unfortunately incomplete, though the report to YU3ES (on 144MHz for crossband test) was 37. It was later discovered that YU3ES had some receiver problems which probably accounted for the QSO not being completed.

GM4CJG/P worked 41 stations on 70MHz during the aurora on 11 August, the best dx being with AL square.

Repeater information

Readers who have entered the hobby relatively recently may not be aware that the RSGB has a special role to play in repeater matters, since the Home Office recognizes the Society as licensee and operator of all UK repeater networks. From time to time it may be necessary for the Society, as holder of all repeater licences, to close down or otherwise inhibit the operation of a particular repeater. This step would only be taken when it was clear that the repeater was being operated in a way which infringed the terms of its licence, but however unpalatable the decision, the Society believes that it is better to pursue an effective in-house control policy than to force the Home Office to intervene after a complaint has been raised. Such a policy has led to suggestions that the Society should favour its own members rather than the licensing authority, and although this may be debatable on moral grounds, there is surely a case for not putting at risk the many concessions granted by the Home Office, since these must depend on the effectiveness of the Society's control of the repeater networks as seen through the eyes of the licensing authority.

To co-ordinate its repeater activities the RSGB maintains a Repeater Working Group (RWG) under the chairmanship of Mike Dennison, G3XDV. By an arrangement with the Home Office the RWG vets all applications for new vhf/uhf repeater licences. Those which the RWG supports are submitted to the Home Office in batches (phases). In the past about a dozen applications were submitted in a 12-month period. Currently vhf Phase 5 proposals are with the Home Office, while Phase 6 applications are under consideration by the RWG. Applications in respect of GB3LU (Shetlands R3), GB3OC (Orkneys R2) and GB3PA (Paisley R1) have already been accepted for submission to the licensing authority. Under consideration but not yet accepted are Dumfries/Cumbria coast, Luton/Dunstable and Wakefield.

Mike Dennison says that the first step to be taken by a prospective repeater group should be to write to him requesting a copy of the Society's publication *A Guide to Repeater Licensing*, which explains the procedures to be followed.

The RWG has received a letter of intent in respect of a proposed repeater to serve the area between GB3SS (Elgin) and GB3GN (Grampian). This is unlikely to come to fruition until some time in 1983. It will be sponsored by Grampian RG which already runs a number of repeaters in the northeast of Scotland.

GB3SR, the Brighton vhf repeater, is off the air while a new site is located for it. GB3MT, the uhf rtty/data repeater to be sited near Bolton, is progressing and should be operational by the end of the year. It will operate on channel RB12—the only one so far allocated to rtty.

The RWG has provisionally accepted a site change for GB3HU (Hull), now operating on RB10. It is intended to move this from Hull itself to the site used by the Humberside RG's vhf repeater, GB3HS. It is quite likely that a channel change will be made at the time of this move, scheduled for later this year, but to date the new channel allocation has not been decided.

In the early stages of repeater planning, two 144MHz repeaters in Scotland were licensed to operate on R4. One was GB3HI (Island of Mull) and the other GB3FF (Firth of Forth). It was expected that these two sites

would be far enough apart to prevent serious interference between the two repeaters, but this has not proved to be the case. The first and most obvious solution was to change the channel of one of the two installations. This apparently simple proposal concealed a considerable financial outlay not only for the repeater itself but for users who had invested in crystals for the repeater frequencies. There was also some opposition to the change by some users, so the whole matter had to be reconsidered.

Following a meeting held on 23 August in Kelso, agreement was reached on a proposal to change the channels of *three* repeaters in the area with a view to alleviating co-channel interference problems. If approved by the Home Office, in time, the intention is to make the following changes effective from Saturday 30 October 1982: GB3FF from R4 to R0, GB3BT from R2 to R4, and GB3SB from R0 to R2. The Central Scotland FM Group has agreed to finance these changes, and will in future include members of the Scottish Borders Repeater Group in the mailing list of the group's magazine, *FM News*. Incidentally, *FM News* contains a wealth of useful information, and can be obtained at nominal cost by contacting GM8CUS, QTHR. Some technical work will be required in making these changes, which may necessitate closing down each repeater for a period before the appointed day of the changeover.

VHF repeaters which have recently become operational are GB3BT, Berwick on Tweed (R2) and GB3SB near Duns (R0). GB3TR Torbay on R2 was scheduled to become operational from its new site on 30 September 1982.

UHF repeaters recently becoming operational are GB3HZ (Hazelmere, near High Wycombe) on RB4 and GB3SH (near Honiton, Devon) on RB11.

Thanks to G3STG for sending a copy of the Leicestershire Repeater Group's summer edition of *LENS*, their most informative newsletter. This is another excellent digest of all sorts of vhf and related information. Those wishing to receive copies of this publication should contact G4MTP, QTHR.

During the big tropo opening on 14 September, G8ZRE was mobile three miles west of Wrexham at a spot 950ft asl. He was able to access a West German repeater near Dusseldorf (Pirmasens or Essen?) on channel R9. Signals were S7 for long periods, and G8ZRE was much in demand since he was signing with a GW prefix.

Beacon news

GB3VHF (Wrotham) now back on the air, probably during October, has a new antenna system comprising two three-element Yagis at a height of 50m. The two antennas are fed 90° out of phase, one beaming 288° and the other 348° to give a maple-leaf polar diagram which should greatly improve reception of the beacon in the west. A much higher grade feeder will also be used so the erp should increase significantly.

GB3CTC beacons on 70, 144 and 432MHz should all be on the air sometime in October. The beacon keeper is G3XC, QTHR.

Negotiations are proceeding with the BBC to permit 24h operation of beacon GB3SIX on 50·020MHz. More information should be available shortly.

A new 70MHz beacon, EI4RF (WN38c), was scheduled to become operational at the end of September on a frequency of 70·130MHz, which is at the bottom end of the 70MHz band allocation in EI.

Auroral-E

The notes on auroral-E propagation in the September *4-2-70* have prompted several readers to write of their own experiences in observing this effect or something like it.

G4HZW (Cheshire) is not a vhf operator but works on 28MHz. He depends on short skip and auroras to work the more local stations such as GM, GI, EI and PA, and his interest was aroused by the auroral-E notes because he thinks he has observed the effect on 28MHz. He has gone back through his log to extract some information which he thinks is relevant.

19.12.80	Worked SM0KHS during an aurora. The signals were 56-59 and not auroral, sounding more like an Es transmission.
18.9.81	Worked TF3YH following an aurora, signals T9 both ways.
13.7.82	During a massive aurora, SM3CWE was 59 plus 10dB with heavy QSB and not auroral. Beacons DL0GI, GB3SX, DK0TE and DF0AAB were auroral, but LA5TEN was *not*.
6.9.82	GM, GI and southern G stations worked by aurora, but DJ6EA was T9 and at strength S9.

Any more information from readers on this subject will be welcome.

Meteor scatter

Things have been rather quiet in this mode of late but there are one or two news items which are of interest.

In the expedition to WR square during the Perseids, GM4KUX/P completed 20 ms contacts on 144MHz, using both ssb and cw. Countries worked were ON, D, F, OE, YU, I, Y22, OK and SM.

A station very interested in working ms cw on 144MHz is 9H1CD in San Gwann, Malta. He has a daily sked with DK1PZ which has not yet succeeded, and is very keen to improve his equipment and operating techniques. Malta is at about the limit of normal ms working for UK stations, so the existence of this operation from there is very good news.

Another Malta station once well known on ms is 9H1BT. He has been off the air due to serious QRN problems at his location caused by high voltage power lines. He hopes to have it sorted out before long and will then be back on the vhf net again.

G3WZT had some very pertinent comments to make about the use of the random frequencies for ms during major showers. These will be held over until next month when, hopefully, there will be enough space to do justice to John's views.

YO7VS, reported active again in the October *4-2-70*, has written to give details of his equipment. He has 400W to a 9-over-9 antenna, and a BF981 preamplifier, all equipment being home-made. His location is LE59c, and his address is PO Box 63, 1100, Craiova, Romania.

The vhf net

G8OMI (West Midlands) has requested information on the European vhf net, and from correspondence it appears that there are other readers who do not fully appreciate its functions and operating procedures.

The net was established a few years ago to meet the needs of vhf stations wishing to arrange schedules for ms working. It is not a formal net, but rather a meeting place for amateurs with vhf/uhf interests. The frequency used is 14,340kHz, but the coverage usually extends about 5kHz either side of this. There are no specific operating times, the net being "open" whenever short-skip permits Europeans to talk to one another on the 14MHz band. In the early morning the frequency is used by dx stations for normal QSOs, and VK and ZL can usually be heard at this time of year. As the day progresses and skip shortens, the dx fades out and the vhf fraternity takes over. Activity is usually greatest during meal breaks at midday, or after working hours, so peak times are 1100 to 1300gmt and 1500 to 1800gmt, though this is a generalization. There are 100 or more regular users of the net from G, F, ON, PA, D, LA, OZ, SM, OH, EA, CT, I, HG, YU and the USSR bloc of countries. Many of these stations know one another from long activity on the frequency, so although the prime purpose of the gathering is to arrange schedules, much information of a vhf/uhf nature is passed.

Quite often someone will break in with information such as that an aurora has started in OH, or that there is an Es opening between YU and EA. Expeditions use the net, and one can glean information about their frequencies and operating times from conversations on the net. Finally, when ms skeds are set up this can be useful too. If HG1YA arranges a sked with a PA0, anyone in the UK will be more or less along the transmission path and can listen at the time of the sked on the arranged frequency and expect to hear reflections.

Both ssb and cw are used on the net, the bulk of the traffic being on sideband. I have always found an indoor dipole and an FT200 to be more than adequate for transmission and reception of the net traffic. Tropo skeds can be arranged on the net also, and it is quite common for two stations to make an immediate QSY to 144MHz or 432MHz and to check back later to compare results. At weekends the same frequencies are used by eme operators in setting up their own skeds. When conditions are right, the net then broadens its European role to embrace USA, Canadian and other dx stations.

When the vhf bands are flat, listening on 14,340kHz can be both a useful and pleasant way of passing the time.

The IARU Region 1 band plans

Vernon Boldy, G8SVG, has asked that attention be drawn to the band plans currently in existence for 144 and 432MHz. He couples this with a request that operators adhere to the recommendations contained in the plans.

The band plans, details of which are normally published in the January issue of *Rad Com*, are based on voluntary compliance by amateurs rather than being part of the licence conditions, and it is recognized by operators throughout IARU Region 1. Intrusion into parts of the 144MHz band by operators using modes not appropriate to that part of the spectrum occur from time to time. For example, the cw section is often encroached upon by fm operators, probably in ignorance of the fact that many cw operators monitor the calling channel (144·050MHz) for hours without making any calls, giving the impression that the allocation is not being fully used.

G8SVG reports that in his location (West Yorks), many fm contacts take place between 144·400 and 144·500MHz which is, of course, part of the section allocated to ssb and cw. He also comments on the use of 144·100MHz (the ms cw random calling channel) for slow-morse transmissions by stations in West Midlands and Northern Ireland.

Some printed forms of the 144MHz band plan contain an ambiguity which has caused difficulties for ms operators. The spot frequency 144·100MHz is referred to as the "CW ms reference frequency", and a footnote states that "ms operation can take place up to 26kHz higher than the reference frequency". Some non-ms operators have interpreted this to mean that *all* ms operation on cw should be confined to 144·100 to 144·126MHz. This is of course not what was intended, as cw ms skeds can be kept in any part of the allocation 144·000 to 144·500MHz, though they are usually confined to the region 144·000 to 144·150MHz. Similarly ssb skeds are held throughout the ssb part of the band, the *random* calling frequency being specifically 144·400MHz (known as the ssb ms reference frequency in certain editions of the plan).

Though not representing a misuse of the band plan recommendations, the VHF Committee has recently received complaints that talk-in stations for rallies and other amateur radio meetings often use accepted calling channels, thus occupying the frequency for several hours. Organizers of such events are requested to consider the use of other channels for this purpose.

The band plan system can only succeed if amateurs adhere to its recommendations. Though not perfect, the system has worked well for years, so it would be unfortunate if it were to become so abused that steps had to be taken to allocate parts of the bands to a specific use by legislation rather than by general agreement.

Miscellany

Congratulations to GM3WCS and his wife Denise, GM4COO, on the birth of their first child, Peter. This information was passed on cw during the aurora on 6 September. Contrary to rumour, the babe was not born with a silver morse key in his hand.

Not an excerpt from a book on jungle warfare, but actually heard on 144MHz, this advice by a newly licensed G6 to another newcomer to the hobby: "Get as much power as you can, and when there's a pile-up, keep calling over the top of everybody until you get the frequency to yourself."

Meteor-scatter operators and 432MHz moonbouncers will be saddened to learn of the untimely death of Peter Mure, OH3TH, of Tampere, Finland. Peter and his wife were in England only five months ago when they visited G3WDG and G8VR. He was an enthusiastic cw operator who will be greatly missed on all bands.

Jose, EA2AA (YD), has sent copies of his log covering the period 6 July to 12 September, during which time he had 183 contacts with British Isles stations using both the 144 and 432MHz bands. He says he is QRV every day with antennas pointing towards the UK, and listens on both bands. He is particularly interested in 432MHz contacts, sometimes operating from EA1RCR/P. He has a 19-element antenna on 144MHz and an 88-element array on 432MHz.

LA8AK sends information on the beacon LA3UHF on 432·880MHz from ES7la. It uses a 15-element Jaybeam antenna and a power of 7W rf. It beams 150° normally but shifts to 180° in June, July and August. The message format is callsign,QTH locator and an ambient temperature indication—a series of dots to indicate that the cooling fan is running at full speed. This is a simple demonstration of how information such as auroral warnings can be included in beacon transmissions. Any reception reports will be appreciated by LA8AK, QTHR.

Nick, G4KUX, gives more evidence of activity from OY since he worked OY5NS on 144MHz while portable in Skye as GM4KUX/P. For those still needing WR square, he recommends GM5FM on cw and GM8SAV on ssb. Nick will shortly move to a "dream" location, two acres at 1,200ft asl, few neighbours and a view of six counties from the site.

G3TCT (Aldershot) reports a "rather intense" Es opening to France on 8 September. This was the day (two days after the aurora) when the 50MHz band went open to ZS and crossband contacts were made. Just what was happening up aloft at that time?

G8RBY is looking for skeds on 144MHz rtty from XK square. Write to him QTHR. □

SWL NEWS

Bob Treacher, BRS32525*

14MHz slp

Paul Crankshaw, BRS48909, sent details of this slp. No cw entries were received, but the ssb results were as follows:

Station	Countries	QSOs worth 5pt	10pt	15pt	Total
ARS49070	28	39	9	29	20,160
RS50134	32	49	0	16	15,620
BRS48909	28	47	6	15	14,560
RS49802	21	25	4	9	6,300
BRS50468	16	18	5	12	5,102
BRS42501	11	14	3	11	2,915

Conditions were quite good, but the QRM level was high. All six continents were heard, with many VKs at good signal strength. Among the dx reported were KH6TQ, KL7ISE, P29PA, 3V8AL and 6Y5RA/P.

144MHz dx report

Yet again the 144MHz band produced some exceptional dx during September—at times the band sounded more like 14MHz! Good tropospheric conditions were present on the evening of 3 September, when stations in PA0, DL, Y2, OE and OK were worked by stations in the London area. Unfortunately the conditions did not last through the major European contest on 4-5 September, when DK0OX in EI13j was the best dx logged at the writer's QTH. On 6 September a very good aurora occurred, via which Dave Whitaker in Harrogate heard the following 27 QTH squares: ZH, YJ, BK, EK, DK, YK, CL, DL, XL, YL, DM, FM, YM, ZM, DN, YN, ZN, EO, WO, ZO, EP, YP, EQ, FQ, FR and YR. Best dx logged was DF3AR (FM53e) and OZ1HNE (FR). Several stations in the south of England worked as far south as YU7AR.

Possibly the best conditions of the whole summer occurred during 13-14 September, when a slow-moving anticyclone gave extremely good dx to virtually the whole of the British Isles. On the evening of 13 September conditions favoured stations to the north and west, while on the next day it was the turn of stations in the south. Dave Whitaker reported hearing 81 QTH locator squares in 16 countries, nine of which were new. These were ZG, HP, HN, YI, ZI, HR, IR, JR and HL. He reported dx from all parts, with stations in France being very strong during the early evening of 13 September. Around 2000, stations in Scandinavia became audible. On the 14th, Scandinavia was audible as early as 1630. Best dx logged included F1GTR (ZG65g), Y38ZA (HN01c), SM7JIQ (HR28e), SM1LPU (JR32d), Y46XF (HL34h), SM5CNQ (HS46c), Y23OO (GM38e) and SK6HD (GS).

With conditions favouring the southern part of England on the following night, the writer collected 11 new squares. LA1EKO (BQ37g) was logged at 1829, followed by many DLs, including DL1MBV (FI79h), DC6ZZ (FM21e), DL3LAL (EN19b) and DD2BS (EM32b). LA8EW (DS78g), SM7MVR (IQ13d), SM7JLT (GQ68f), SM7NJF (HP31j) and SM7HTH (HQ71e) all provided much-needed squares. On cw UQ2GDA (KQ) was worked by several stations in the London area. On 432MHz it is rumoured that OHs were heard, while on 1·3GHz stations in OZ and SM were audible. This was a superb opening, and one which may have brought the 1982 vhf dx season to an exciting end.

HF rumours

With every dxer in G (and the world) awaiting the Heard Is expedition early next year, appetites were being whetted by the many trips in preparation at the time of writing. K4YT was busy activating Africa, being good copy from 5Z4RK (via W2TK). Operation was also scheduled from 5X. ZM7JT had

1982 hf countries table

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS47745	166	197	203	127	113	30	836	ssb/cw
BRS8841	186	195	209	130	101	14	835	ssb/cw
BRS25429	167	186	186	146	110	35	830	ssb
BRS44703	129	155	162	106	103	26	681	ssb
BRS46228	115	108	170	134	107	32	666	ssb
ORS46084/7Q7	156	201	196	79	30	1	663	ssb
BRS25901	121	162	151	84	91	29	638	ssb/cw
ORS45992/7Q7	148	199	195	70	25	0	637	ssb
BRS35509	120	139	158	94	93	6	610	ssb
BRS1066	99	143	135	95	66	41	579	ssb/cw
BRS30694	115	135	108	53	51	28	490	ssb/cw
BRS31440	118	85	106	74	67	27	477	ssb
BRS45033	161	123	183	3	6	0	476	ssb
BRS48675	85	112	122	57	40	20	436	ssb
BRS18529	39	76	68	114	108	28	433	ssb
RS45466	51	102	92	54	57	16	372	ssb
BRS30493	47	89	112	40	31	6	325	ssb
ARS50886	63	101	88	30	28	2	312	ssb
RS44984	43	40	106	26	13	1	229	ssb
RS49327	44	43	94	11	10	14	216	ssb

*79 Granby Road, Eltham, London SE9 1EH

Location and telephone numbers of swls prepared to give dx addresses

Norman Jennings, BRS48675, Rye, East Sussex. Tel Rye 2530.
Kevin Cooke, G6GWR, Cardiff, South Glam. Tel Cardiff 752636.
Peter Lincoln, Aldershot, Hants. Tel 0252 317870.
Harold Moss, BRS18529, Sevenoaks, Kent. Tel 047485 2400.
Jim Dunnett, BRS30694, Prestatyn, Clwyd. Tel 07456 88480.
Den Marriott, RS50367, Bexleyheath, Kent. Tel 01-303 2493.
Brian Russell, BRS33915, 163 Halton Road, Runcorn, Cheshire WA7 5RJ.

been heard on 14·265MHz at 0730, QSL via ZL2BJU. OE2VEL was also expected to activate A22, 3D6, and possibly 7P8; QSLs via OE2DYL. A St Peter & Paul Rocks operation was also scheduled. 5Y4ITU, active during the ITU convention in Nairobi, was a catch for the prefix hunters. G3SXE would be delighted to receive listener reports on his signals during his recent expedition as 6Y5PL, VP5PLX and G3SXE/W4. He is QTHR.

10, 18 and 24MHz

With operation on 18 and 24MHz now permitted in G-land it is hoped that your scribe will receive some reports on activity on both bands. On 10MHz, Paul Tittensor, A8808, mentioned VK, FC and OY, but in general the band seemed fairly quiet from his new QTH in Chelmsford. Brad Bradbury, BRS1066, gave a similar report. His 10MHz score still stands at 27 countries heard.

RAE passes

Several regulars have RAE passes, so hopefully they will now pass their interesting news to either G8VR or G3FKM. Congratulations are due to Kevin Cooke, BRS45466; John Ralph, BRS44000; Peter Norris, BRS47513; and Howard Banks, BRS45033.

The question of participation in the hf table and in hf contests has been raised by several readers. There is no reason to prohibit G6s from continuing to enter their hf scores in the annual table if they so wish. As for participation in hf listener contests, the HF Contests Committee is keen to publicise the fact that participation in such contests by G6 stations is allowed and is to be encouraged.

Here and there

G8GI reports a 10MHz listener report from Eric Trebilcock, BCRS195. John Ralph, now G6GWR, reported that the 28MHz beacon Z21AN had changed its callsign to Z21ANB. "What is QTC?", asks Kevin Cooke. The QTC facility is mainly evident in the WAE contests. Briefly, it is a way of passing information of earlier QSOs made by a dx station on to another EU station during that contest. Both stations can claim extra points for each QTC passed/received.

Stan Porter, ORS45992/7Q7, reported a membership of 10 for his 7Q7 SWL Club. He will be travelling to G via ZS, PY, YV, 9Y4, W4, W2 and VE2 and hoped to be back in 7Q7 by Christmas. John Lord, the other 7Q7 correspondent, reports monitoring a QSO between a G and A71AD, when the latter said he did not QSL *any* swl reports. Well, now we know—don't waste any more ircs!

December challenge

In last month's column your scribe set a "challenge" relating to HAC. Next month there will be a challenge for those keen on the lower frequency bands. For December try this one—see how many *countries* you can log on 14MHz between 1 and 31 December. Only one small proviso—at least 10 countries from *each* of the six continents must be logged, ie Europe, Africa, Asia, North America, South America and Oceania. Entries to reach your scribe by 15 January 1983, showing full callsign and signal report at your QTH. A prize will be awarded to the best entry.

HF review

September seems to have seen a change for the better on the higher frequency bands. The Cray Valley RS contest found good conditions, and several reporters mentioned the chore of writing up logs. G4DFI will no doubt provide a full report in due course. Steven Muster, BRS47745, Dave Whitaker, BRS25429, Paul Crankshaw, BRS48909, John Ralph, G6GWR (ex-BRS44000) and Paul Tittensor, A8808, provided the following information on dx heard during late August and September: *28MHz:* FH8CB, VQ9CI, 5H3TM, 5N0ATW. *21MHz:* AX9NYG (Cocos-Keeling Is), W6IAE/KH0, F6FIC/TZ. *14MHz:* FW0AG (SM0AGD trip), T2ADE, VR6KY, 5W1DQ. *7MHz:* JW5DQ (via LA5DQ), UM8MDX, V2AN, VQ9GD, XT2AW (0623), ZF2DZ (0520), KA3BUJ/8R1 (0626), 9L1AP (0628) and 9M8JS (1818—via VK9NS). *3·5MHz:* D44BC (0430), HZ1AB, KH6XX, TR8DX, ZD7HH and ZL4OY/A (Campbell Is). *1·8MHz:* HZ1AB, SM6EHY, WA2SPL.

QSL returns of note which were mentioned this time included G4JVG/OH0, OH0NA, K1MEM, VE1DXA, YU3TAA, UA3, UB5, UC2, UQ2 and EA6, all on 1·8MHz; and DF3NZ/ST2, UK1PGO and JT0YFU on 28MHz.

Finale

News, views, comment and table scores for the 1982 table to reach your scribe by Tuesday 16 November. Late copy no later than 24 November. □

MICROWAVES

Charles Suckling, G3WDG*

Operating news

The month of September was very interesting for microwave operators, with two good openings. Conditions were good over the south of England on 3 September. G3OSS (Finchley) reports hearing GU3KFT and G4CCH at S9+, GB3BPO, ON5SHF, GB3IOW, GB3FRS, GB3NWK and GB3CLE at S9 or greater, PA0QHN at S7 and GB3AND at S4. The second opening occurred during the period 13–15 September, and can best be described as spectacular! At the beginning of the lift, stations in the West Country were favoured, and as the opening continued stations further east began to experience the good conditions.

Activity on 1·3GHz was high, and the longest distance contact reported so far was between G4KDH (AL) and OH0NC (KU71g) at 1,520km, which may be a new Region 1 record. G3OSS was very active during the lift, and among his best contacts on 1·3GHz were OZ1FEF (EQ), DF8DO (DL), PA0VVA (CL), GW3PPF/P (in Mid-Glamorgan, running 1W to an Alford slot antenna), DK6AS (FM), SM6GWA (FS), SM6ESG (GR), SM7CFE (HQ), OZ3SW (GP), PA0WMX (DM), F2KX (BJ) and SM1BSA (Gotland Is, JR22h). The latter station is known to have worked a number of UK stations in the southeast. For G3LQR he was the best dx at 1,232km.

G3LTF spent much time listening during the opening, and worked two new squares: BJ (F2KX) and BI (F6CER). He (and G3LQR) also tried with UP2BJB (LP06d) on 1·3GHz (signals were excellent on 432MHz) with nil results; it is thought that the Russian had a one-way contact later with PA0EZ.

G8IEM (ZK) also experienced excellent propagation conditions, and worked OE2CAL (GH) at 1,079km for a new personal record. His previous best contact was HB9AMH/P on 7 July at 723km.

Moving up in frequency to 3·4GHz, G4BYV made good use of the lift to make what is probably a new Region 1 record on this band. He worked DB5KS (DL77h) over a distance of 464km; 53 reports were exchanged. G4BYV was using 500mW output from a BXY27 multiplier with phase modulation, an interdigital mixer using a HP2350 diode and a 4ft dish. No details of DB5KS's equipment are available, except that he was using ssb. G4BYV was also heard by DD3KL in DK13d.

On 5·7GHz G3LQR increased his best dx to 240km by working PA0CRA (CM75a). G3LQR's 70mW was copied at S9 by PA0CRA, who has a 2·5dB nf gasfet preamp. Signals in the reverse direction were only 519 despite PA0CRA's twt-generated 8W, and G3LQR suspects a problem with his receiver! G3ZEZ and PA2DOL were also active—G3ZEZ copied PA0CRA, and PA2DOL received G3LQR.

Despite being very busy on the lower bands, G3LQR also found some time for 10GHz, and worked several stations across the North Sea. Towards the end of the lift, the Bushey beacon, GB3SWH, was received at 20dB above noise for about two hours until it faded into the noise. This was the strongest signal from GB3SWH yet heard by G3LQR. He also received a strong signal from the Gent beacon, and reports that the beacon is still not keying.

Expedition news

XM square was activated on 1·3GHz during August by the GB2XM expedition. The equipment used consisted of a masthead-mounted Microwave Modules transverter and a 4 × 23-el F9FT array. The stations worked were G4KGC, G3AUS, G4KIY, G4LRT, G6GN, G3FYX, G4MAW, G3OSS, G3TDG, G8GP, GW3CBY and G3PBV. During the contact with G3PBV, GB2XM was also copied by GJ4JWA. Most contacts

*46 Windsor Close, Towcester, Northants

were made on cw. GW8TVX would like to thank all stations worked for their patience and effort, and apologizes to those stations missed due to the atrocious weather.

News from abroad

News has just come in of a new 1·3GHz VK-ZL record contact, between VK2BDN and ZL1AVX. The path length was 2,134km, and the contact followed an S9 QSO on 432MHz. Signal reports exchanged were 52/53 on ssb, and the equipment used was a Microwave Modules transverter and a 70MHz dish at ZL1AVX, and a 2C39 mixer/pa delivering 35W into 2 × 27-el Loop Yagis at VK2BDN.

On the other side, on the Pacific, the Hawaii-California path opened on 1·3GHz on 30 July and 10 August, when KH6HME's beacon was received in California. Unfortunately KH6HME was not at home during the openings, so no contact resulted. The exact path length is not known, but is approximately 3,000km.

YU1AW reports that 10GHz activity in Yugoslavia is still growing rapidly, mainly with wideband fm equipment. His own best contact so far was with fellow YU1AWW club member YU1BB over a 202km path.

New QTH

Rolf Niefind, DK2ZF, vhf editor of *CQ-DL*, has advised us that he has moved QTH. His new address is Wurzeldeich 17, D-2890 Norden 1, W Germany (Tel 4931-15884). He remarked that during lift conditions he will be operating on 10GHz from the North Sea coast (DN37), with 64mW of wideband fm and a 33dB gain dish. He recommends that the best times for super-refraction over long sea paths seem to be between 1700 and 2100.

Interdigital converter improvements

Since the W2CQH interdigital converters for 1·3 and 2·3GHz were published in *QST* January 1974, p11, together with a number of very close copies (*VHF Communications*), many amateurs have had considerable success with them. The main advantage of these designs is that all the necessary microwave functions, ie final local oscillator multiplication, filtering, mixing and signal filtering are all performed by one assembly, which is based on an interdigital filter. This means that a separate final local oscillator multiplier does not have to be constructed, nor is any additional filtering necessary to suppress image noise.

The original local oscillator chain was rather difficult to tame, and the writer has recently had considerable success using the "High-quality uhf source for microwave applications" (*Rad Com* October 1981, p906) as the local oscillator. Crystal frequencies are 96MHz for the 1,296MHz version, and 90·6667MHz for 2,320MHz (for 144MHz i.f.). The additional circuitry required to interface the local oscillator board to the multiplier is shown in Fig 1. The attenuator may be required between the local oscillator board and the multiplier to reduce the drive power to 50–100mW. When tuning up, the local oscillator board should be first tuned up into a 50Ω load (see original article). The rf output may then be connected to the matching circuit, via the attenuator if necessary, which is adjusted to give maximum voltage of at least 1·5V on the test point (TP).

When tuning up the converter (particularly the 2·3GHz version) it is possible to tune the interdigital filter to the wrong harmonic. A simple Lecher line can be used to check the lo frequency (Fig 2). First, tune the lo tuning screw for maximum mixer current, connect the Lecher line to the antenna socket and minimize the mixer current with the signal tuning screw. To obtain greater sensitivity, the mixer current meter shunt may be temporarily removed. Next, short-circuit the two Lecher lines together

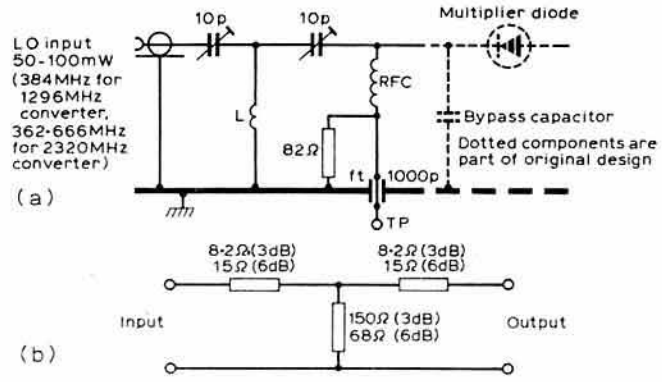


Fig 1. (a) Matching circuit to interface local oscillator board to diode multiplier. (b) 3/6dB attenuator for connecting between local oscillator board and matching circuit (see text)

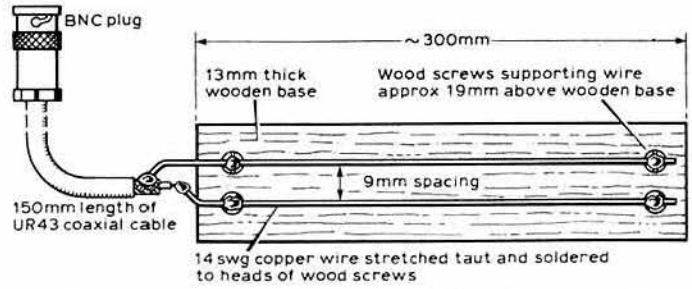


Fig 2. Simple Lecher line which may be used for checking local oscillator frequency

using a suitable metal object, such as a screwdriver, and slide this up and down the line until a small peak in the mixer current is observed. Note the position of the short-circuit, and slide it away from this point until the next peak is found. The frequency in megahertz being measured is then equal to 15,000/d where d is the distance between the two points in centimetres.

Some constructors have experienced instability in the original i.f. preamplifier. The writer has replaced this in his converters with a 144MHz preamplifier using a BFR34A (*Rad Com* April 1980, p374, Fig 4, omitting the changeover relay). For best performance, the preamplifier should be totally screened.

Awards

The "up" conditions of mid-year (and beyond) have been reflected in the number of award claims reaching G5UM. Only a few days after he had despatched a 1·3GHz sticker for 20 squares worked to G4KCT of York, a fresh claim arrived for 25 squares worked: Baz Firth had been fortunate enough to receive a further batch of cards from the bureau that made his update claim possible. They made very interesting reading: all were by ssb, and typical of the reports being exchanged at the time was an S9 one from DF9LN.

Even farther north, G8PNN in Northumberland added five more squares to achieve the 1·3/20. And farther north still, GM8BKE of Glasgow earned himself the FMD "first contact beyond 600km" by producing a card from SM6ESG for a contact at 1,022km on 30 July. Chris Towns, who was using 30W into a single quad loop Yagi, observed sadly: "I never thought it would be possible on 23 from this QTH . . . the ironic part is that I leave this site for good on 8 August for AL square". Certificate No 26 in the 1·3/5 category went to G6AWM/P.

In the 1·3GHz squares competition, G4KIY of Peterborough is still out in front in consequence of the arrival of 10 more exotic QSLs that put him on 1·3/40.

In what G5UM described as "a positive shipping order", Dave Robinson, G4FRE, sent in a claim for his operations as ON8QK/P when he achieved five squares on 2·3GHz; operations by G4MRS/P (the new callsign taken up by the G4BPO team at the British Telecoms Research Labs in East Suffolk) for their basic 1·3GHz-five-squares parchment; a few more cards to bring his own station up to 10 squares on 1·3GHz; and a claim on behalf of a colleague of his, G8HPU, who put in for a "first time on 10GHz beyond 150km" claim. This now puts G8HPU/P at No 58 in the 10GHz section of the awards manager's ledger, close behind G8AGN/P, whose claim came in only three weeks earlier. At G8HPU/P (AL07b) the equipment used consisted of a 24in dish, 'JVL transverter and IC202 with talk-back on 432MHz by way of safety net. The latest 10GHz award was issued to G3KPT/P for five squares worked and confirmed.

Another packet from East Anglia contained cards from Vernon Cracknell, G4KPZ, of Huntingdon, in an operation that took him straight to 20 squares verified on 1·3GHz without going through the preceding stages. Now his callsign sits at No 6 in this category. The claim included such exotica as SM, GM and several German and Netherlands cards.

On 1·3GHz, where a certificate may be earned for a first contact beyond 600km, the latest issue has been to GM8BKE for working SM6ESG at a QRB on 1,022km—and the QSL was received within a week. On 2·3GHz G4LRT won himself a sticker for his existing FMD Microwave Certificate by working SM6HYG at 1,021km on 29 July.

Another 2·3GHz distance award, and a 2·3/5 squares award, were issued to DF4LY. The DF4LY station is typical of that now being used on the Continent: 10W of rf from a 2C39 pa, a two-stage NE645 preamplifier feeding an interdigital mixer, and a 2m diameter dish. DF4LY noted that he hopes to work more G-stations on 2·3GHz and that he plans to be active on 3·4GHz next year.

No doubt the phenomenal conditions of September will bring a spate of fresh claims for the currently available Microwave awards.

THE MONTH ON THE AIR

John Allaway, G3FKM*

THE OPENING PARAGRAPH of September *MOTA* seems, unfortunately, to have been misread or misunderstood by at least two readers to represent an attack on Class B licence holders in general and frequencies above 30MHz in particular. The comments were prompted by news from ARRL that FCC is considering issuing an amateur licence which, for the first time, does not require the applicant to take a morse test. Until now all grades of American licence have required one. The writer's assumption was that, since ARRL is well known for its sensitivity to the needs of USA amateurs, there could not have been much demand for such a licence in the past, and indeed the League is believed to oppose its introduction. To us in Britain this seems strange, and there must be a reason for the difference in outlook. One possible answer might be that the availability of cb in the USA for many years had enabled some who merely wanted short-distance phone communication to achieve their objective. In Britain, on the other hand, no cb was available until recently and the only way to get permission for even simple local phone communication was to go through the not inconsiderable effort of obtaining an amateur licence—Class B being marginally easier because no morse test is involved. Positively no intention to start a "phone versus cw", "hf versus vhf" or any other kind of controversy was or is intended—each to his own interests!

Perhaps this is an appropriate time to emphasize that opinions expressed in *MOTA*, are, and always have been, those of the writer, and are not necessarily the official views of the Society.

G4DJJ reports receipt of QSL cards for alleged rtty contacts on hf addressed to an operator called Archie. The real G4DJJ is not currently active on that mode.

KA3ARF (Marc Chappelle, 2502 Allendale Rd, Baltimore, Md, 21216, USA) offers his services as QSL manager to anyone planning an expedition. Please contact Marc direct.

21MHz band plan

It appears that in several countries, including Britain, the band plan for 21MHz, agreed at all IARU regional conferences and adopted for worldwide use, is not always being observed. In its simplest form the plan suggests limiting the sector 21,000 to 21,150kHz to telegraphy only, with the remainder of the band up to 21,450kHz accommodating telegraphy and telephony. RTTY transmissions, it is recommended, should be made within 20kHz either side of 21,100kHz, and sstv 5kHz either side of 21,340kHz—the latter being Region 1 figures.

The Society has received a letter from IARU HQ pointing out that although band planning in our country is not mandatory it would be appreciated by many amateurs in the rest of the world if we accepted this "gentlemen's agreement".

Welcome

To the following who joined the Society during August: EA8AQ, F6DBY, SM5AQD, SP5ARH, VE7CIM, YC0BQZ, YD0DON, ZS6AF, Z21CL, 5B4KO, 9M2AA, and 9V1VI. New listener members include W. Thomson (HZ), D. Crookall (F), M. Samson (J6), R. Barnard (EA) and P. Edmundson (EA8).

Top band

With mid-winter ahead and the level of sunspot activity falling, we can look forward to some interesting events on 1·8MHz. VK6HD's winter schedule was printed in *Rad Com* August p694, and Mike is still keeping to this. HZ1AB will be making special efforts to work into Europe each Wednesday when he will come on to the band at 2130 and 2300, transmitting on 1,801kHz and listening between 1,827 and 1,852kHz. From Jamaica 6Y5IC is often active on 1,822kHz at 0400 looking for Europe near his own frequency, and from Cyprus 5B4PW has been worked by Europeans around midnight on 1,853kHz.

Band planning for the future has already come under discussion, and the IARU Region 1 HF Working Group has suggested that it may ultimately be a good idea to move the "dx window" up by 5kHz, as it would appear that many of the new countries coming onto the band as a result of WARC have a lower band edge at 1,830kHz. An article concerning the problem was expected to appear in *QST* in October.

*10 Knightlow Road, Birmingham B17 8QB

Pat Wong Siu Lam, VS6GW, who is a very keen constructor, uses a Yaesu 310D and groundplane antenna on the hf bands

DX news

The Royal Omani ARS was formed in 1972 under the gracious patronage of His Majesty Sultan Qaboos Bin Said, A4XAA. To celebrate the 10th anniversary of this occasion it is intended to operate a special event station from 0200 27 November to 1800 28 November. The callsign will be A4XX, and operation will be ssb only on 14, 21 and 28MHz. A special QSL card will be issued, as well as a specially-endorsed Oman Award (see "Awards").

Several stations using A6 prefixes have been heard. These include A6AQ who has been worked on 14,210kHz around 0800. *DX'press* also lists A6XTH, Theo; and A6XAW, Tom. The last mentioned is believed to keep schedules on 14,240kHz at 1900. The position is confused, as G4CHP, although knowing some senior personalities in the country, has recently been refused a licence and told that amateur radio is definitely not permitted. HZ1AB is now active on Wednesdays on 1·8MHz, and is to be found on 1900 on 14,110kHz before going to top band (see "Top band").

According to *DX News Sheet* the relief crews due to arrive in FB8X and FB8Z in October include some amateurs. ZD9BV had worked no Europeans on 7MHz up to 30 August, but he is active on 21,335kHz at 1800, and willing to make schedules any days except Wednesday, Friday or Sunday. 5R8AL is reported to be found regularly near 21,320kHz from 1630, on 14,290kHz from 2000, 21,362kHz at 1530 has also been mentioned, and a regular appearance on Mondays, Wednesdays and Thursdays at 1500 on 21,300kHz or 21,070kHz is also noted.

F6FIC/TZ is likely to be in Mali for four more months, and at the time of writing was awaiting a beam from IDXF. He has been on 21,272kHz at 1700 at weekends, and on 14 and 21MHz during the week. DK2XN/TZ has been reported on 14 and 21MHz ssb. Those looking for 5T on 7MHz might look for 5T5ZR who is active daily from 0400 to 7,072kHz.

ZS2RM has logs and QSLs for the following ZD9 activities: ZD9BO 29 May to 18 November 1970, ZD9BR 11 November 1970 to 10 November 1971, and ZD9GA from 11 November 1971 to 26 January 1972. His QTH is Box 5181, Walmer 6055, Rep of South Africa.

5V7HT has been worked on 14MHz ssb in the early morning, and 5V7HL is active regularly on 28,600 and 14,285kHz on Wednesdays and Sundays from 2200. On other days he may be found between 1600 and 2200 on 14,205, 21,305 or 28,600kHz.

Stations in Kenya were using the 5Y4 prefix during October. The situation in Mozambique seems confused. At present no QSLs from C9 stations are being accepted for DXCC credit; however, OH3EB/C9 should have an IC740 and beam by now and operates from a UN base in the north of the country.

TY9ER, who was active from Benin in 1981, is now DC9VM.

K4LQ/C6A is located on Andros Is in the Bahamas and will be there for a year. He hopes to be on the lower frequency bands, and will probably be active during the CQ WW DX contests. ZF1AE will be on Cayman until February, and should be sought after 1200 between 14,205 and 14,225kHz.

VP8AEN is not expecting to return to South Georgia but will go to join VP8ANT on Adelaide Is. British Antarctic Survey scientists have returned to South Georgia but it is not known whether any have amateur calls. VP8AEI was sadly one of the three men lost during September when on an expedition over the ice. There are several USSR bases in Antarctica and they

use the callsigns 4K1A–4K1J. Stations in the Arctic use the 4K0 prefix. UK3WAA makes a list of those wishing to work 4K0A at 1400 on 14,205kHz —this then takes place at 1600.

ZL4OY/A is often found with ZL4PO/C near 7,080kHz between 0600 and 0900. The former also likes joining the Open House net on 14,332kHz at 1100. VR6KY keeps a schedule with QSL manager LA7JO on 14,170kHz at 0630 on Sundays, and on 7,045kHz at 0530 on Wednesdays. She has an FT707, HW101 and dipoles, but expects to have a TH3 beam and dipoles for 1·8 and 3·5MHz in due course.

SM3CXS has asked that all those applying for QSLs for contacts with SM0AGD from his various Pacific stops should be sent "one contact per envelope". With a very large number of applications this enables cards to be answered much more quickly.

G3YJI has found that QSLs sent direct to BV2A/B need to be registered to be delivered safely. K2CM has confirmed that he QSLs for all BV2A contacts worldwide, but not BV2B which must be sent direct to Tim.

VK0AN will continue to be present on the 14,220kHz net until he leaves Macquarie Is. There is a possibility that he will accompany the VK0JS Heard Is expedition group. VK9ZA may be found sometimes after the Pacific DX Net has finished on 14,265kHz, and also between 1100 and 1600 on 14,205kHz. He leaves on 16 December.

Julia, H44JE, uses dipoles on 14 and 21MHz. She is on 21,225kHz almost daily from 0900 to 1100 in contact with her father, G3FIX.

CE0ZAD, on Juan Fernandez Is, is often to be found on 21,230kHz at 1930, with CE3RC acting as "net control".

The German dx news bulletin is now being transmitted in English on Mondays at 1700 on 21,285kHz, and at 1800 on 14,190kHz. There is a German version at 1700 on 3,750kHz each Friday.

Overseas news

Reg Cherrill, W3HQO, founder and first president of the Ex-G Radio Club, has at last (after 25 years) relinquished the task of editing the club's bulletin. His job has been taken over by George Nixon, GI3OEN/W6, Reg will be visiting the UK next June.

Zoltan Szamosi, HA5AJ, has written to say that all amateurs visiting Budapest will be welcomed at the HA5BKV club station. The address is Radioclub HA5BKV, Budapest VII.ker. Akacfa-u.15. Hungary (telephone 427-799) and letters should be sent via MRASZ Secretariat, PO Box 11, Budapest 1400.

Les Anstead, G4HOU, formerly ZF1JA and A9XBJ, has been in Qatar for two years. He has just received a licence and is now on the air as A71BJ, and he has an FT101ZD and trap dipole; a TH3 beam should be available by now. Les hopes to be on most days at 1200 between 21,220 and 21,240kHz, and to be active on cw next year.

WA4WTG has supplied a list of stations for whom he acts as QSL manager. These include J3ABG, FY7AE, P29RY, HH2P, LZ2JF (13/2/78-27/3/79), TJ1BF (up to December 1980 only), ZP5KS, V2AK, VP2AK, 4X4s NJ, UF, VB, 4Z4DX, 4Z4LF (from 12/9/82), 4Z4HF, 6Y5MC, 6Y5RL, 8P6AH, 8P6BN, 8P6IB, 8P0A and 9Y4E. Kappy's address will be found in "QTH Corner".

Eric Lomax, G4DGR (formerly 5N2ABG), reports that Eric Sherlock, well known as 5N2ESH and G3BQH, died recently. G4DGR recently received a letter from Joe Browne, 5N2AAJ, president of NARS, which says that the Nigerian society is alive and active with a large membership. Its relationship with the PTT is very cordial, and the society has been invited to join in the work of the frequency allocation committee. Members now have an official identity card to obviate problems with the security services, and there is now a 144MHz repeater active. Eric and G3JKO (formerly 5N2AAF) run an ex-5N net on 3,645kHz at 0745 on Saturdays, and any former Nigerian licensee is welcome.

Lyell Louttit, formerly VS6BE, who is now VK2BE

QTH CORNER

A35JL	via K9AUB, G. R. Huff, 2 Circle Drive, Springfield, Il, 62703, USA.
A71BJ	(UK only) via Amcomm Services, 194 Northolt Rd, South Harrow, Middx HA0 2EN.
GU5VS/A	G4HNP, A. Allan, 219 Joel St, Eastcote, Middx HA5 2PJ.
SM0AGD/KH1	(see ZM7AG).
OH0W	via OH2BAZ, V. Flink, Patolantie 10 as 10, SF-00640 Helsinki 64, Finland.
T2AGD	(see ZM7AG).
T30BY	Box 34, Tarawa, Kiribati.
T31AE	(see ZM7AG).
F6FIC/TZ	via F6CRS, J. Laurent, Bourg Bas, Saint-Agne, 24520 Mauleydier, France.
WA4WTG	Bob Kaplan, 445 NW 202 Terrace, Miami, Fla, 33169, USA.
VK9ZA	via VK6YL, Mrs G. Weaver, 23 Corbel St, Shelley 6155, W. Australia.
VR6KY	via LA7JO, S. Lindblom, Myrsnipevegen 38, 7022 Kattem, Norway.
VS5MS	via N2OO, R. Schenck, PO Box 345, Tuckerton, NJ, 08087, USA.
ZM7AG	via SM3CXS, J. Svensson, Berghemsv. 11, 86021 Sundsbruk, Sweden.
ZP5XDW	via N4DW (new QTH), PO Box 35, Bristol, Va, 24203, USA.
5W5DQ	via KB6JK, R. Hudgins, 119 Huntington Dr, Vacaville, Cal, 95688, USA.
9N1A, 9N1YOU, 9N38	via W1GAY, D. Kreamer, Box 637, Dukes County, Vineyard Haven, Mass, 02568, USA.

Expeditions

An expedition to Alderney by G5VS, G5APC, G3SXW and G3TXF will be on the air from 1200 25 November until 2400 28 November. All bands 1·8 to 28MHz and the callsign GU5VS/A will be used. QSLs go to G4HNP.

Possible operation from Heard Is by VK9NS and others was reported in last month's *MOTA*. A statement concerning the other group planning such a trip has also been received from VK6XI of the VK6 DX Chasers Club (6 Briar Place, Ferndale 6155, W Australia). Briefly it says that a group of VK6 amateurs has a plan to operate from Heard during the January/February 1983 period. The party will leave in a yacht from Freemantle and an estimate of the cost is A$127,000, of which the amateur group will probably be expected to find A$30,000. There will be two amateurs in the party, the rest will be connected with mountaineering on the island. The Federal Executive of WIA is acting as trustee for donations, which should be sent to the VK6 Division, WIA, PO Box 10, West Perth 6005, W Australia. QSLs will also be dealt with from VK6. The members of the VK6 group include VK6s XI, UN, FS, YL, DY and NE. Sponsorship has been received from IDXF, NCDXA and CDXA, and the callsigns VK0HI and VK0CW allocated. The first of a series of bi-monthly newsletters has been issued.

In a letter dated 29 August, VK9NS said that he was leaving 9M8 immediately after having made over 10,000 QSOs from 9M8JS/9M8NL on five bands, mostly on cw. He was going via Tasmania to finalize the contract for the vessel for his proposed visit to Heard Is. This is the *Cheynes II*, a ship which has 37 previous Antarctic trips to its credit. Any interested radio operators should contact Jim immediately at PO Box 90, Norfolk Is, Australia 2899 giving full details (including cold weather experience!).

K6JG, WA6OET, W6OUL and W7CB have been issued with the callsigns 5W1EE, 5W1EF, 5W1EG and 5W1EH for use during their visit to West Samoa from 20 to 30 November. During the CQ WW DX Contest they will be active on all bands 1·8 to 30MHz.

KP2A, WB4FNA and WA6YOU will be in Nepal from 20 December to 1 January. They will use their own calls/9N1 except on 28, 29 and 30 December when they will use 9N38 in honour of the King's birthday. The expedition is being supported by the IDXF, and activity will be on the usual dx frequencies with the emphasis on cw operation.

According to *DX News Sheet*, LA8CJ has confirmed that no licences for Bouvet have been issued, and DK9KD has confirmed that the operation which he was planning for this winter has been cancelled.

VK3DET was due to be on the air from A35TN for six to eight weeks from mid-October. Following this he is due to be 5W1DW for a week and then VK3DET/KH8 for one final week.

DF2AO has written to say that DL6PE, DK8KW and he operated from "Sealand" (51°53'N, 1°28'E) as S1AB, S1AD, S1AH and S1AS, from 1 to 5 September. DL2NO is acting as QSL manager, and DXCC status has been applied for.

WAB weekend

Last year the WAB organization raised £200 for RAIBC through a sponsored net involving mobile stations activating WAB "squares". This year a similar event will be held on 11 and 12 December, and it is hoped to make at least 2,000 mobile to fixed-station contacts. The proceeds will be shared equally between RAIBC and leukaemia research. Sponsors are being sought—rates last year were from 1p to 20p per 20 contacts. Please contact Dave Brooks, G4IAR, 28 Avon Vale Road, Loughborough, Leics LE11 2AA. Nets will be active on 1·93, 3·76 and 7·06MHz during the weekend, and all are welcome to join in.

D68AAB (G4LJF) at work on the beach at Malouga, the northern tip of Grande Comoro

QSL via . . .

AH3AC - KB2RV
CT2EV - WA3HUP
EK0K - UA9OBA
FC0FRV - DJ2AA
FH0FLO - FR0FLO
H5AFU - G4KLF
HS4REL - OE2REL
J28DS - F6DZQ
J40BE - KL7IUW
OY1JH - SM0DJZ
P29GO - G4KGO
PJ8DFS - SM5AQD
PY0SP - N6CW
T30DB - G8LGB
TR8CR - F6AQO
ZC4CS - JI1VLV
ZC4ZD - G3JKS
5B4LY - OE2PAL
5Z4RK - W2TK
KA3BUJ/8R1 - N7YL
9Q5VT - W2TK

Contests

Congratulations to **G3KTJ** on winning the **1982 Bermuda Contest.** He should have already enjoyed his visit to VP9 to collect his award. Scores were as follows:

Callsign	Points	Callsign	Points	Callsign	Points
G3KTJ	999,768	G3TMN	120,512	G4GFH	7,189
G5CMX	763,224	G4HBI	46,935	GI4NKE	6,710
G3UKS	733,040	G4IJW	32,088	G4KAL	4,900
G4CNY	724,416	G3YBD	15,400	G4BYA	4,745
G3VPW	723,030	G3OGQ	14,896	G3YBH	4,080
G3VOF	213,934	G4FJT	12,600		

In the **Third EUCW Fraternising CW QSO Party,** Class A top score was ON5GK (347 points). Top UK entry was G4IZZ (187) who was overall fourth. G4MVA (131) was also listed. In the Class B (QRP) section, OK2BMA led with 143 points; GW8PG came 12th with 21. GW3OKA led the Class C section with 403 points; G4EDR scored 41.

Austrian 160M CW Contest

1900 20 November to 0600 21 November

Each contact counts one point. Stations may be worked once only. Each prefix worked counts as a multiplier. Each OE prefix counts as two multiplier points. Exchange RST plus serial number (from 001). Listeners must log both calls and reports. Logs must be posted before 31 December to: OVSV-Austrian 160M CW Contest, PO Box 999, A-1014 Vienna, Austria.

In the 1981 event **GW3NYY** was the only UK entrant and came fifth with 9,699 points.

Trinidad and Tobago QSO Party

0000 20 November to 2359 21 November

1·8 to 28MHz, ssb and cw, and Oscar. Exchange RS/T plus serial number (from 001). List date, time, station worked, numbers sent and received, and enclose "copy of log". A certificate will be awarded to those working five or more 9Y4 or 9Y50 stations—please include US$2 or equivalent in ircs if eligible for an award, and post no later than 21 December to: TTARS, PO Box 1167, Port of Spain, Trinidad. West Indies. This party celebrates 50 years of amateur radio in 9Y4, 20 years of independence, and five years of existence as a republic.

TOPS Activity Contest

1800 4 December to 1800 5 December

Single operator stations must take a seven-hour rest period, 3·5 to 3·6MHz cw only, use lowest 12kHz for dx contacts *only*—contacts between stations in the same continent will not count if made in this segment. QSOs with own country count one point, with own continent two points, with other continents six points. QSOs with TOPS members count an additional two points. Exchange RST and serial number. TOPS members will give their number. Final score is QSO points × number of prefixes worked. Send logs before 31 January 1983 to B. Arting, SM3VE, Bergesvegen 26, S-823-00 Kilafors, Sweden. In the 1981 event **G3LCG** was leading UK station (37,848 points). Others were G3SGQ (33,696), G3ESF (18,816), and G3AWR (10,229).

European RTTY Contest

0000 13 November to 2400 14 November

Rules for the WAEDC RTTY Contest are the same as for the other DARC contests held in August and September, except that contacts between European stations are allowed. However, QSOs with stations in one's own country are not permitted. Other European countries count as a multiplier of one only, regardless of band. Official DARC forms may be obtained from DF7FB, PO Box 1147, D-6455 Erlensee, FR of Germany (sae and ircs please).

Awards

The Dip-Med

Awarded to licensed amateurs and listeners who have confirmation of contact with, or reception of, at least 15 of the 26 Mediterranean countries, one of which must be Malta. The countries are: 9H, EA, EA6, EA9, F, FC, CN, 7X, 3V, 3A, I, IS, IT, SV, 5B, SV5, SV9, ZB2, YU, ZA, 4X, OD, SU, TA, YK and 5A.

9H Diploma

Awarded to licensed amateurs and listeners who have confirmed contact with or reception of stations in Malta. European applicants require 10 points, others five. Each QSO counts as one point, except 9H1MRL (MARL club station) which counts two points.

For either of the above awards, send list (certified by two other amateurs) plus (from Europe) 12 ircs or US$2 or from elsewhere 15 ircs or US$3. They are free to blind/handicapped operators. Apply to MARL, PO Box 575, Valletta, Malta.

Oman Award

A special version of this award may be applied for with "Tenth Anniversary" endorsement. This will be awarded for working the special station A4XX on three bands. Submit log extract certified by a radio club official plus five ircs and send (before 31 May 1983) to: Awards Manager, ROARS, PO Box 981, Muscat, Sultanate of Oman.

Wanganui Award

Issued by Branch 48 of NZART, requirements being log details of contacts or confirmed reports (certified by another amateur or listener) with or from three stations in Wanganui (club station ZL2JA counts as two) since 1 January 1982. Send full log details plus five ircs to Award Custodian, PO Box 7058, St Johns Post Office, Wanganui, New Zealand. The award is free to blind/disabled operators.

Around the bands

The G8KG report this month is short and to the point. "It is now clear that after the steep fall in April and May, mean solar activity is on something of a plateau, with the 27-day average solar flux fluctuating gently above and below 165 sfu, and only a few daily values above 200 being recorded. At the same time the average level of geomagnetic activity continues to rise and, with a few days to go, September has already qualified as the most disturbed month so far in Cycle 21."

The following are thanked for their contribution to this part of *MOTA:* G2BON, G2HKU, G5JL, G3s BDQ, GHY, GVV, HEQ, KSH, NWG, SVW, XBY, YRM, GM4CHX, G4EHQ, GW4KGR, G4OBK, G5CFJ and RS30694.

Stations listed in italics were using A1A.

1·8MHz. 0000 *UA9FKW.* **2100** *LA, OZ1W.* **2200** *C30OH, EA3VY, SM.* **2300** *YU3EF, 5B4PW.*

3·5MHz. 0000 *WA1KPJ.* **0400** *CN2AQ.* **0500** *CX8DI,* EA8XS, *PY7COM,* YV5ANS, 8P6OR. **2000** 4X6DX. **2100** UK0AMM. **2200** *UA0AG.*

7MHz. 0300 PY1-PY7 (until 0600). **0500** *CT2EV, FK8CE, HH2VP, W6-W7, XT2AW.* **0600** CE8AGF, VP2KBV, ZB2GR, *ZL, KA3BUJ/8R1.* **1700** FH0FLO. **1800** *HZ1AB, JA2YKA.* **2000** *JA3FYC, ZL1JJ.* **2100** *FP8AA, LU8DQ, VK3MR, ZC4RB.* **2200** *KV4CX, OH0W, UM8MXU, ZD7BW.* **2300** *VK6HD.*

10MHz. 0300 *9Y4IH.* **0400** *DL2GG/YV5.* **0500** *VE7ZG, VK2,3,5, ZL1-ZL3.* **0600** *CY5DN, VK2PA.* **0700** *AX2DSG, ZL4QO.* **1400** *LX1YZ.* **1800** *JA.*

Members of the Imperial College ARS, G5YC team who visited Andorra last April. L to r: G6APO, G4GWR, G4MLM, G6DYN, G4GSP, G4JCX and G6GHJ

14MHz. 0500 *KH6* (until 0900), *SU1MU, TL8ER,* UK1PGO. **0600** AH3AC, KL7 (until 0900), YK1AO. **0700** FK8CC, *FW8AG,* KC4AAA, VK9ZA, 4U1VIC. **0800** *AH2G, FO8s BI,DF, OX3UD,* VK (until 1000), ZL (until 1100), 5W1DQ. **0900** KL7PW. **1000** FP0JA. **1300** *HL1AQ.* **1400** *M1C, VE8YH.* **1500** VS5GA. **1700** VK (until 2100). **1800** *J28DP.* **1900** A71AD, T30DB, TR8DX. **2000** HZ1AB, VP8ANT. **2100** *CN8CY, FP8FU, FR0GGL/G,* VP8AOS, *5N8HEM.* **2200** *G6ZY/EA6,* HR1JSH, *VP2MM, 4K1A.* **2300** *YI1BGD.*

21MHz. 0600 JA (until 1600). **0700** *TL8ER.* **0800** *BY1PK,* ZL (until 1000), VK (until 1300), 5W1EJ. **1000** AX9NYG, H44DC, *HZ1SS,* VK9ND, WH0AAB, 9L1MS. **1100** CR9s AN,*BK,* P29GO, T31CK. **1200** *WL7E,* P29MF, *UA0YAD,* W (until 2300), YB (until 1700).**1300** *DU6HM,* FM7BX, KC6IN, KH0AB. **1400** A6XJA, *J28DS,* F6FIC/TZ, *3B8FK, 4U1UN.* **1500** A71BJ, *FR0GGL/G, JY9RC,* 5R8AL. **1600** *FB8YJ, HS4REL,* TL8DC, TR8CR, VS5HG, W7 (until 2000). **1700** EP2TY, *VP9AA,* VS5s DA, DD,LH, *ZD9BZ* (?), 4K1HK, 5H3BH, 7Q7LW, 7X2ARA, 9V1VI. **1800** A22FY, A92P, VP8NY, VU9GI, 8Q7AZ, 9M2TE, *9Q5VT.* **1900** FH0FLO, *VP8ANT.* **2000** ZD7BW. **2100** XT2BM.

28MHz. 0500 A4XCB, JY5VJ, J28DM, TJ1CK, VK (until 0900), ZS (until 1800), 4S7FG, W6YB/3D6. **0900** 5H3DM. **1000** *FR7CA,* PY (until 1900). **1100** TR8DX, ZD7BW, ZP5AD, 5R8AL, 8P6OR. **1300** A4XJM, FH0FLO, *W1,* ZC4MR. **1400** *FG7BE, J28DF,* SU1BA, VP8LP, *VU9RYL,* Z21AV. **1500** *FG, HK, LU, PY, PZ1BQ, W4, ZP5XDW,* **1600** CP,*CX,* FH0FLO, TU2GA, VQ9IB. **1700** *FY7YL,* J88AM, N5AU, 5N8ARY, 7Q7LW. **1800** *W1, W5, W6* (until 2000), YV. **2000** PY5.

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

All items for the **January 1983** issue to reach G3FKM by **25 November** please.

Mobile rallies calendar

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

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 Christmas Rally, Pudsey Civic Centre. Open 11am. Admission free. Licensed bar and full catering facilities. Talk-in on S22.Details from G4FIM, G3YEE or G6CNP, all QTHR. Tel 0532 794507.

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

19 June 1983—Denby Dale & DARS Mobile Rally, The Shelley High School, Skelmansthorpe, nr Huddersfield. More details early next year.

31 July 1983—Rolls Royce ARC (Barnoldswick) Mobile Rally, Sports & Social Club, Barnoldswick. Open 11am. Details from Leslie G. Logan, G4ILG, QTHR.

Looking ahead

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

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

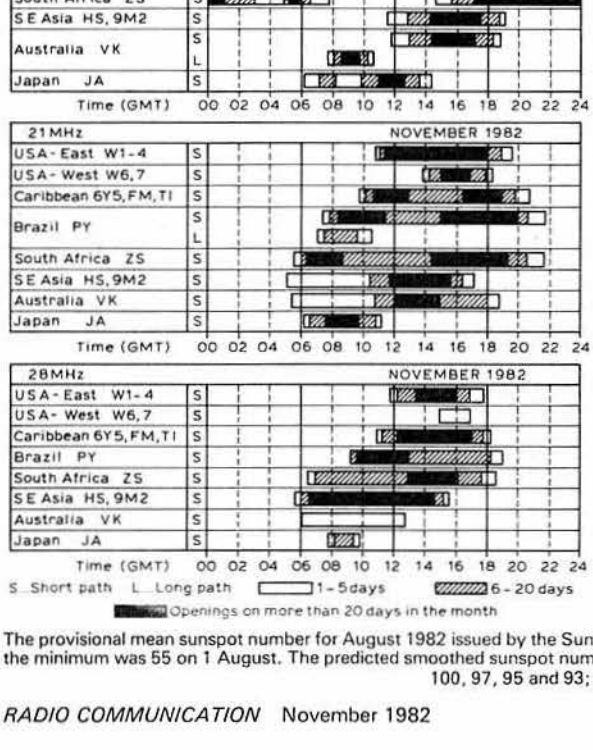
15 January, 1983—RSGB Presidential Installation, Bloomsbury Crest Hotel, London WC1N.

Propagation Predictions

The F2 mufs reach their maximum in the northern hemisphere at the beginning of November, and this will provide good propagation on **28** and **21MHz**. Present solar activity will be sufficient to facilitate traffic with the east coast of North America, but the west coast will only be heard under exceptional circumstances. Central and South America, South Africa and South and South-East Asia will be heard with certainty. Seasonal changes will mean that **28MHz** will close about 1800 to 1930gmt and open again in the morning about 0700 to 0800gmt.

Traffic with all continents will be certain on **21MHz** (except on days with interference) even with the west coast of North America and Australia. Under favourable conditions there will be a chance of dx via the indirect path on this band during the winter months, as can be seen on the chart. Towards the end of the month this band will close about 2100gmt.

The best chance for dx on **14MHz** will be from late afternoon until about midnight. During the latter half of the night only traffic with South America and Africa will be possible. There will be no noticeable changes on **7** and **3·5MHz** compared with last month. Local traffic will be interrupted by the dead zone in the early hours of the morning.



HF propagation study

Band predictions for November 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. Additionally 50MHz F-layer and 1·8MHz openings are indicated by a "plus" sign in the 28 and 3·5MHz columns respectively.

	28MHz	21MHz	14MHz	10MHz	7MHz	3·5MHz
GMT	000001111122	000001111122	000001111122	000001111122	000001111122	000001111122
	024680246802	024680246802	024680246802	024680246802	024680246802	024680246802
EUROPE						
Moscow	....68872....	....1999981..	11.788789821	664765568986	987533236899	++42....3+++
Malta	....67664....	....999993....	22.787789952	785865568998	998632236899	+++3....3+++
Gibraltar	....16543....	....799883....	.1..98789951	574676567997	999853235899	++++2....25++
Iceland	.....2552....	.....179981....	.....7888982.	341.76678984	887554346789	+++52....35+
ASIA						
Osaka	.....5.....	.....85.....	...4764221.1	1..253335634	....2..13672	.....44.
Hong Kong	....885.....	...38884....	...15656641.	2....23346875	1.....14785	.....4+2
Bangkok	...28+961....	...478896....	1....25568621	3....3236886	2.....13787	.....4+4
Singapore	...267762....	...478897....	1....25568722	3....2236886	1.....13785	.....4+2
New Delhi	...28884.....	...568881....	211125567322	731..2236878	62.....13788	4.....4++
Teheran	...399982....	...7778971..	323523568743	8752..236888	862....13788	+4.....45+
Colombo	...389983....	...5578981..	21....3568843	62....236888	51.....13788	2.....4++
Bahrain	...488872....	...7678972..	533312568854	9741..236889	862....13778	+3.....45+
Cyprus	...299985....	...7989994..	654765678975	997532357999	88621.125788	++3.....25++
Aden	...388885....	...65679941.	7333.1368986	984....36899	861....13778	+4.....455
OCEANIA						
Suva (S)	.....143....	....15884....	....6666851.	...2533464..	...221.132..	.....
Suva (L)	....321..11.	11.187532653	.1267555772.	.14422354..	....21...21..	.....
Wellington (S)	....1441....	....68864....	.....176684..	....35334641.	...121.131..	.....
Wellington (L)	.....	11..31...111	112375334631	...3422353..	....12...21..	.....
Sydney (S)	...166651....	.....49886...	....37656861.	.....4324673.	....1..1451.	.....2..
Sydney (L)	.....	.....442..121	..1.75543752	....15323563.	.....2...241.	.....
Perth	...366531....	....5788861..	1...135568842	1.....2236884	13762	.....43.
Honolulu	.....	.....3..	121.412.662.	.251532263..	..4521.131..	.....2.....
AFRICA						
Seychelles	...355651....	....55578641.	7321.1368986	952...136899	83.....13778	5.....45+
Mauritius	...3677751...	....55578962.	7521..368997	841....36899	62.....13788	4.....4++
Nairobi	...2777851...	1..655689731	8633..168998	984....36899	872....3688	+4.....455
Salisbury	..14567631.	21.555589853	9833...47999	984....15899	862....2688	+3.....4++
Capetown	...4578741.	32.355578974	98341..26899	9851....3699	862.....488	+4.....5+
Lagos	...8888952.	32.286569975	994741.26999	99851...3799	7882.....588	555.....2++
Ascension Is	...687673...	22..86557755	997451..2699	99963....489	8884.....168	55+.....3+
Dakar	...5988962.	12..97658974	8874731-3799	99974...1589	87851....278	55+2.....4+
Las Palmas	...599884....	99989951	675486667998	999864334799	989741..2589	++++4.....2++
S AMERICA						
South Shetland	...2456631.	12..78877764	776375422356	5676421...23	24432.....1	.....
Falkland Is	...2667862.	11..78765663	78737531.247	789742....14	57762.....2	2443.....
Rio de Janeiro	...1654541.	11..58555652	8872741..268	999751....37	88862.....15	+5+3.....2
Buenos Aires	...2555752.	78655563	7772752..147	899652....15	78862.....2	45+3.....
Lima	.....98861.	1865551	55613551..25	7895532....3	58862.....1	25+3.....
Bogota	.....98761.	1865551	445.1551..36	8885432....5	77762.....2	4553.....
N AMERICA						
Barbados	.....498861.	8855661	546.364..268	9885531...37	88762.....5	5543.....2
Jamaica	.....88861.	1875651	445.2552.146	8884532....15	77762.....2	4553.....
Bermuda	.....189861.	.....687776.	444.36532367	8884532...137	87762.....15	5543.....2
New York	.....6885..	.....288884.	333.25553466	888343221136	777621....14	4543.....
Mexico	.....885...	.....29753.	333.41562124	68835223....2	478621.....	.553.....
Montreal	.....5885...	.....288884.	333.25565565	888343232246	777621....14	4443.....
Denver	.....163....	.....6872..	332.2.165343	688251232113	478521.1...1	.453.....
Los Angeles	.....53.....	.....1862..	232.2..56322	477252133..2	268521.1....	.353.....
Vancouver	.....1.....	.....561..	231.21.37652	576142135323	257521.121.1	.243.....
Fairbanks	.....	.....11..	23..43347742	565153336654	245521.13322	..22.....

The provisional mean sunspot number for August 1982 issued by the Sunspot Index Data Centre, Brussels, was 105·9. The maximum daily number was 161 on 9 August, and the minimum was 55 on 1 August. The predicted smoothed sunspot numbers for November, December 1982, and January, February 1983 respectively are (classical method) 100, 97, 95 and 93; (SIDC adjusted values) 108, 105, 103 and 101.

QSL cards as historical documents

by JOHN D. HEYS, G3BDQ*

THERE ARE few radio amateurs who do not collect QSL cards in respect of their own contacts, and the cards—although often regarded as mere "wallpaper"—are nevertheless needed to claim some of today's seeming proliferation of awards and "sheepskins". The author, however, is one of a growing number of collecting enthusiasts who are always looking out for vintage, special or rare cards from all over the world. Such collectors regard pinholes, glue marks, bent corners and folds as desecration!

The origin of the QSL card is obscure, but in an article in *QST* September 1924, written by USA amateur Howard S. Pyle, 8FT, he states that his compatriot 8UX began the "Amateur dx Report card fad". Home-made handwritten or typed QSLs on plain or postal stationery cards were being exchanged before the first world war in the USA, but printed cards as we know them seem to have appeared in that country during 1920 or 1921. Bill Hall, VK2XT, has some examples of 1921 American cards and kindly forwarded photocopies of them. Of these cards the only one which had been properly printed originated from 9ARM and is especially interesting as it gives details of the equipment at his station. 9ARM had a big 1kW spark transmitter and a straight receiver using the Schnell circuit for detection. His near neighbour 9UU sported a home- or office-duplicated QSL, and he had 1kW of spark and also a low-power cw rig using "G" tubes in a Colpitts circuit. This latter transmitter could put 1·5A into his antenna system, and for reception 9UU used the then-popular Paragon commercially made set followed by a three-step audio amplifier. These 1921 cards give no indication of the wavelengths in use, but at that time around 200m seemed to be used on both sides of the Atlantic.

The transatlantic tests

One may read at some length about the organization and results of the transatlantic tests of 1921–23 in *World at their Fingertips*, by John Clarricoats, G6CL, but to find details of the equipment used by many of the participants one must look at their old QSL cards. Old-timer Bill Corsham, G2UV, who died in December 1981, took part as a listener in the whole series of winter tests. His old logbook records the time, strengths and calls of the American stations heard, but to cover these bare bones with accurate details of the equipment used one must examine the QSL cards he received to confirm his reports.

Arthur W. Lee, 1BHR, of Gardiner, Maine, was heard by "Uncle Vic" on 20 December 1922. His card tells us that he was (unusually for an American station) running only 10W to a "British aircraft hookup" and he had 2A of antenna current. His receiver was a Paragon followed by two lf amplifier stages, and his phones were made by Brandes. 1BHR claimed on his card to have been heard in England, Holland and France at distances up to 4,500 miles. His wavelength was stated to be 200m, and it must be remembered that in late 1922 such a wavelength was considered "short".

It was not until 27 November 1923 that the first amateur transatlantic contacts were achieved between Léon Deloy, F8AB, and the two Americans Schnell and Reinartz on a wavelength around 100m. The author has in his collection 10 American QSL cards from 1923, all being confirmations of listener reports sent by G2UV and all reflecting the then superiority of the American amateur stations over those in Europe. There was a great difference in power levels. The Americans generally were high powered, and of the 10 mentioned three were using 500W. A further two ran between 200 and 250W, two used from 100 to 150W, and only three stations had 20W transmitters. In the UK 10W was the legal limit (later special 1kW permits were issued), but it is significant that Deloy was using about 500W when the historic first transatlantic QSOs were achieved.

The notes of the high-power stations at that time must have been T1 or less, as due to the difficulties in obtaining high voltage dc most amateurs applied raw ac to their anodes. Perhaps pride of place in the author's QSL collection is taken by cards dated May and June 1924 from Léon Deloy, F8AB, and John L. Reinartz, 1XAM/1QP (Kewpie). Both these items are confirmations of reception by G2UV and are historical treasures. John Reinartz had 1kW and could operate on any wavelength between 10 and 100m "as required". Deloy gives no information regarding his equipment.

The antennas used by successful dx stations at that time were short for the frequencies involved, but they had lots of capacitance tuning derived from the multi-wire cages of both the vertical and horizontal elements which seldom ran to more than 100ft overall. One USA station described his antenna as a vertical six-wire cage 125ft long, and almost everyone used a counterpoise system. The latter was often a multi-wire fan of wires between 70 and 100ft in length and about 10ft above the ground. The counterpoises helped to bring the systems into resonance (sometimes series capacitors are mentioned) and on no cards at that time are the concepts of $\lambda/2$ or $\lambda/4$ antennas mentioned.

Pioneers of the mid and late 'twenties

A QSL card collector takes special delight in obtaining the cards of well-known or otherwise "famous" radio amateurs of the past. Contemporary with the stations mentioned above was Hugh Ryan, (G)5BV, of Wimbledon (where he still lives). Shortly after Deloy worked Reinartz and Schnell, the British stations (G)2KF, (G)2SH, (G)2OD and (G)5BV all made QSOs "across the pond". Hugh Ryan's contact with the Canadian C1BQ, and soon afterwards USA station U1XW, followed previous near misses as early as 2 December when U8AJW and (G)5BV heard one another but no proper QSO resulted. This was on 200m, but later success was ensured when (G)5BV went down to the new dx wavelength of 100m. Hugh's first QSL cards were printed in red and black, and on them is the information that his antenna was at a height of 82ft and at that time he had worked Scotland, Wales, Holland, France, Belgium and Denmark. The card also informs that there was a "low-power set (1W) QSO Scotland, Holland".

Another early Canadian station, 1AR, had perhaps one of the earliest pictorial QSL cards. A specimen dated 6 May 1924 is printed in two colours and depicts the "Globe Trotter", an oddly-dressed figure running around the world bearing what appears to be the notorious (or infamous!) "Woof Hong" (an object too horrible to describe) which is still used during the mystical initiation ceremonies at ARRL conventions. 1AR also tells us that he was a member of the Royal Order of Trans Atlantic Brass Pounders (ROTAB). By January 1925 1AR had worked Europe, west coast USA and New Zealand, and was then using a wavelength of 80m.

J. W. (Jimmy) Mathews, G6LL, was without doubt the leading British pioneer on the 10m band. One of his achievements was in being the first British amateur to contact USA on that band. The actual QSL from his American contact, W2JN, confirms the historic occasion and it tells us that it took place on 21 October 1928 at 1430. Jimmy Mathews was S5-6 with QSB down to S2 and was reported having perfect cw. C. K. Atwater, W2JN, who lived in Upper Montclair, NJ, stated on the card that he was using a 1-V-1 receiver and a UX852 tube in a series-fed Colpitts oscillator circuit with 3,000V ac at a current of 50mA. His antenna was a $\lambda/2$ horizontal Zepp with a $\lambda/4$ feedline. On W2JN's card is written,

> Hearty congratulations OB and many thanks for the first G QSO on 10 metres. UR's is the best rig I have hrd on 10—copied you *solid* from 1430 to 1625!

Another of G6LL's first 10m contacts was with G2FN (ex AI2KT of India) Lt F. Rodman of the Worcestershire Regt. G2FN's QSL to G6LL is dated 6 September 1928 and on it is written,

> I guess this effort is worthy of a card to commemorate the first "G" QSO on this band. I did not expect to hear you.

On 28 October 1928 Rodman was the first British station to work the west coast of the USA on 10m. His power was only 10W to a TPTG oscillator; whereas G6LL was using a multi-stage transmitter with crystal control, a remarkably "modern" rig for 1928.

By 1929 world wide dx was being worked on 40 and 20m, and sending QSL cards direct induced prohibitive postal costs. This in turn led to the setting up of QSL bureaux in many countries, the first national society bureau being that operated by the RSGB. A study of this inception of the bureaux with their rubber stamps and different ways of levying funds (many bureaux used adhesive labels like stamps which cost about ½d each, but the RSGB QSL Bureau has always been free to members) is a fascinating topic, but it lies outside the scope of this article.

QSL cards from stalwarts of the past who helped to nurture the growth of our hobby and build up the influence of our national society are worthy of collection. Gerald Marcuse, G2NM—whose card bears the legend "The station that made history in Amateur Radio and Empire Broadcasting—Born 1913: Still Running!"—and John Clarricoats, G6CL, are two amateurs with outstanding talents suited to their time and who will never be forgotten. G6CL's QSL card in the early days boasted that he never used more than 5W. A 1924 card produced by Artificial Aerial Licence G2AIF when examined reveals that it was the first card of none other than Arthur

* "Whitefriars", Friar's Hill, Guestling, Hastings, E Sussex TN35 4EP.

Milne, G2MI, "Mr QSL" himself, who ran the RSGB QSL Bureau so well for nearly 30 years, and yet somehow found the time to work his share of the dx on all bands.

Incredibly, in 1929 G6TW, G2DT and others were then operating on the 5m band. A card from the former proclaims that he was a pioneer 5m station and was winner of the RSGB Silver Cup in 1929.

The Netherlands pirates

British amateurs had much trouble in convincing the authorities that they should again be allowed to transmit when the first world war ended. It was a long but successful struggle, and in mid-1920 licences to transmit were issued. However, Holland, which had been a neutral country throughout the war, refused to grant transmitting licences until 1930—even Russian amateurs were on the air before then! It is not surprising that many Netherlands amateurs took the law into their own hands and became pirates operating under cover in danger of arrest if discovered. Some of the call letters used by these pirates were remarkable. In 1925 G6IZ received a QSL card from NPB7 which had been sent openly through the post. In that same year the operator of N-OPX asked on the back of his card that G2UV should send a card in return via Mr R. Tappenbeck of Noordwijk on Sea, Holland. In the following year this same amateur, whose card now bore the callsign POXX, revealed all:

> Dear OM . . . I will explain to u the position. I am not R. Tappenbeck, but R. Tappenbeck is our traffic manager. The Dutch amateurs are very careful with their addresses and names. Now R. Tappenbeck has made the foundation for a Dutch section IARU and most of the Dutch transmitter amateurs are members of this section. Because transmitting is forbidden in Holland R. Tappenbeck, who has the list of all Dutch amateurs, *won't* give the calls and names and addresses of each other (sic) to us so I don't know who is NOGN, NOZM, N2PZ, NORO etc. From you I myself now know that PCTT is R. Tapp himself! My home is about 80 miles from PCTT. Best 73's and 88's, ur Ex NOPX. Call sign now POXX; but soon N4PX because R. Tapp will make other call signs.

Despite the restrictions imposed by their government the Netherlands amateurs persisted in their efforts, worked dx all over the world and were eventually rewarded with recognition and licensed status as PA0 stations. A collection of the "under cover" Netherlands stations would reveal that they were quite up to date for their time, and because they were free to operate as they wished they did not conform to the normal amateur bands. POXX worked between 28 and 44m and between 75 and 95m; by February 1926 he had worked nine countries.

Some more QSL history

Reference was made earlier to the way the QSL card reveals the gradual development of transmitters, receivers and antennas, and it is interesting to note that receiver techniques stayed almost static for many years. Some of the American pioneers in the transatlantic tests during 1922 and 1923 were using superhets. Such big (often with seven or more valves) receivers were often derided by those working with simple two- or three-valve regenerative sets. Simple and efficient "straight" receivers remained in use right up to the start of the second world war. The author well remembers visiting an SM station in 1951 who was successfully working the dx with such a receiver, and of course the 0-V-1 was the basic design of the American Grebe CR series of short wave receivers. These were perhaps the first commercial sets which tuned well below 100m, and Deloy brought one over from the USA for his transatlantic QSO. Valves and other parts had so improved that by 1926 the Grebe CR18 could be used down to 10m.

Transmitters were universally home built, and although based upon published articles in the radio press they bore the stamp of their makers! Components were not easy to find and substitution and improvisation were inevitable. The few clear photographic QSL cards showing stations of the 'twenties and 'thirties give us a valuable pictorial record of amateur stations. These cards were usually from the most successful operators and represented the best in layout and design. The untidy "rats' nests" of ordinary mortals seldom appear on QSL cards! Three notable cards of the photographic type came from G5DC, G5BA and G6NP. These cards are so clear and show such detail that individual components can be identified without difficulty.

This practice of having your QSL card bear a picture of the station layout persists, and some fine examples (particularly from America) are to be found on contemporary cards. A collection of these cards would be an interesting sideline and would give an accurate record of the development of equipment over the years. Unfortunately few amateurs can resist having the om in the picture, and this tends to detract from the ideal where the pictorial record of the equipment is paramount.

It may surprise our present generation of radio amateurs to learn that in earlier years some QSL cards were overtly political. In 1929 the card from I1LL, which was the call of the official station of the Fascist XV Legion "La Lionessa", showed a soldier and all the trappings of that political faction. Even more surprising is a card sent by G2QD in 1934. This was the callsign of W. S. Bogle, whose address was shown as the headquarters of the British Union of Fascists, King's Road, Sloane Square, London. The design on the card incorporates the Union Flag, four red bolts of lighting and two bundles of rods with axes, or fasces, the symbol of that particular party. Political propaganda emanated also from some prewar German stations, and their cards bore the Swastika symbol. These cards are rare, but more common are the offerings from stations behind the "curtain" which are still coming to us through the QSL Bureau.

QSL card production

Some mention has been made already of Bill Corsham, G2UV (who incidentally was a prize winner for reception during the transatlantic tests in December 1921) and who must also be credited with the introduction of QSL cards to Europe. When at first reporting to the American amateurs taking part in the tests he sent letters. In return came QSL cards, so "Uncle Vic" decided to produce his own card. He had 500 small 2·5 by 3·5in cards printed in late 1921, but of these cards only one remains so far as is known. This card, suitably framed, hangs in the office of the RSGB general manager. A second example was sent by G2UV to illustrate an article in *Short Wave Magazine* May 1972, but this card seems to have vanished. Bill Corsham's second QSL card is printed on a standard-sized postcard, and the author considers himself fortunate in having a fine specimen dated 1923. At that time G2UV operated on 200m running 10W of tonic train, cw and phone. His antenna was a five-wire "sausage" 70ft long and 40ft high, with a counterpoise in the form of a four-wire fan, each wire being 70ft long and 12ft above the ground. His receiver was a simple two-valver plus extra lf amplification when needed. The card is to station 0NY (Holland–Belgium?) and on it Bill records in manuscript that his best dx transmission to date was to 2JZ (British) and best reception from 9OX in the USA.

In an article recently published by a monthly philatelic journal, a well-known postcard and stamp collector attempted an article on QSL cards. He showed an abysmal ignorance of the subject and firmly stated that before the last war there had been no specially printed cards, only handwritten or picture postcards! He will be surprised to learn that we had here in Britain a specialist printer of QSL cards as early as 1924! The printer was the well-known amateur G6MN of Worksop, and he was the first to supply cards to amateurs all over the country. Later came G6DS, to be followed by Messrs Atkinsons and others. Eric Martin, G6MN, produced a superb card for his own use in 1928 which was printed in five colours and had the Union Flag flying proudly on the left to be balanced by the familiar red diamond of the RSGB T & R Section on the right. This card was something in the way of an advertising card and on the reverse was printed,

> HAMS! Have your Cards and Note Headings printed by a HAM who knows what you want. Latest automatic machinery.
> Two colours:
> 100 for 7/6, 250 for 11/6, 500 for 13/6, 1000 for 18/-
> Three colours and border:
> 100 for 8/5, 250 for 12/6, 500 for 15/-, 1000 for 20/-

G6MN estimates that before 1940 some 30,000 different radio amateurs had cards printed by him, and his work continued after the second world war until he sold his business in 1975. On his reckoning well in excess of five million cards were printed by him. Many of these with the G6MN imprint must still exist.

Conclusion

This article must necessarily touch only lightly some of the many facets of QSL card collecting, but it is hoped that it may stimulate others to take up this fascinating sideline and start a collection. The cards are there somewhere but the problem is locating them. So many interesting and rare historical cards were lost or destroyed during the last war. Some ended up as salvage for repulping, and many others were thrown into dustbins or used to further the combustion of 5 November bonfires! Fortunately some remain, either treasured by their original recipients or temporarily stored or hidden in lofts or lumber rooms.

Finally, may it be suggested that we all let it be known to our next of kin (preferably in writing) that when we inevitably join the ranks of the silent keys our QSL cards should be saved from destruction. We cannot afford to throw away and lose for all time some of the detailed history of our great hobby. □

COUNCIL PROCEEDINGS

A brief report on the Council meeting held on 14 August 1982

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

Apologies were received from Mrs Heathershaw and Messrs Barrett, Bazley, Bellerby, Cornish, Fisher, Hall, Hutchinson and Knight.

Financial report
Mr Evans reported that as the honorary treasurer had been unwell he had visited Mr Cornish to discuss draft end-of-year accounts. Copies of the draft accounts were circulated to Council, and Mr Evans answered questions from notes provided by Mr Cornish.

Secretary/general manager's report
Mr Evans reported that during the financial year 1981-2, membership growth had continued and a figure of just under 10 per cent for the year had been achieved. The honorary treasurer and the general manager were presently looking into and overhauling various Society insurance policies.

Mr Evans outlined the positon with regard to the 1983 Council elections. Mr Lundegard raised the question of overseas members voting in Council elections, and some discussion ensued. Council accepted that it had never been practical for overseas members to vote in Council elections unless they received *Radio Communication* by airmail. Mr Evans said that he had received two letters on this matter in the last five years and in both cases the impracticalities had been appreciated once they had been pointed out.

In the absence of Mr Cornish, Mr Evans reported on the negotiations which were in progress to purchase a new headquarters building.

Membership and representation
Council noted that:

(i) Reduced subscriptions had been granted to 22 members.

(ii) Subscriptions had been waived in respect of 16 members on medical grounds.

(iii) Affiliation had been granted to: Abergavenny & Nevill Hall Amateur Radio Club; Dynamics Hatfield Amateur Radio Society; East Cleveland Amateur Radio Club; Flight Refuelling Amateur Radio Society, Wimborne, Dorset; Home Counties Amateur Television Group; Lough Erne Amateur Radio Club; Ripon & District Amateur Radio Society; Rossendale Valley Amateur Radio Club; Rowner & District Amateur Radio Society; Sheffield University Union Amateur Radio Society; Swale Amateur Radio Club; Worked All Britain Awards Group, Ilkeston, Derbys; Worthing & District Video Repeater Group; Wyre Forest Repeater Group, Warley, West Midlands; United Kingdom Horizontal FM Group, Middlesex.

(iv) Messrs L. W. Craven, G4EQI, and M. R. Hobson, GM8KPH, had been elected as representatives for Regions 3 and 12 respectively.

(v) The following area representatives had been appointed: Mr J. C. Burbanks, G3SJJ, Nottingham area; Mr D. Fleet, G8MAI, South Cheshire area; Mr K. A. Saunders, G8SFM, Swindon area; and Mr J. R. Tootill, G4IFF, Ipswich area.

1983 RSGB President
The election of Mr D. E. Baptiste as President for 1983 was confirmed.

1983 RSGB National Exhibition
Messrs Hawkyard and McClintock gave a report on the Exhibition & Rally Committee's view of the National Exhibition Centre at Birmingham as a possible venue for the Society's exhibition. The NEC offered an excellent communication centre, with a potential larger attendance, adequate hotel accommodation within fast travelling time, plus good banking, refreshments, and loading facilities. There was also a strong case for the inclusion of lectures.

After some general discussion, the Exhibition & Rally Committee's recommendation to hold the 1983 exhibition at the NEC, with the possibility of including spectrum conventions, was unanimously agreed.

J. C. Pershouse, deceased
Mr O'Brien reported that a legacy of £600 from the estate of the late Mr Pershouse had now been received and paid into the Society's legacy account.

Raynet
Council discussed various Raynet items, including appointment of controllers, records and public relations.

Microwave manager's report
Dr Evans reported that the last Home Office meeting had not been encouraging; one disappointment being that part of the 10GHz band was going to be subject to increased sharing.

VHF manager's report

1. Following the Home Secretary's announcement regarding an independent review of the spectrum 30-960MHz, a preliminary paper outlining the Society's views has been produced rather rapidly, and further submission would be made at a later stage in conjunction with the Licensing Advisory Committee.
2. Following the Home Office meetings in April and July, the Society remains hopeful that some form of experimental licences may be made available for the 50MHz band.
3. Mr Fisher shares the concern of other Council members over spectrum abuse, particularly on the 144MHz band. It is hoped to collate further information on this.

Review of committee business
Education
Recommendations to invite Mr M. Shardlow, G3SZJ, and Mr E. C. Palmer, G3FVC, to serve on this committee, were agreed.

Exhibition & Rally
The committee's recommendation to invite Mr M. A. C. McBrayne, G3KGU, to be a corresponding member was accepted.

IARU
Council noted the committee's request for 1984 Region 1 Conference papers to be received by 1 August 1983.

Membership & Representation
Council agreed that an RRs' conference should be held on 30 October 1982.

Microwave
The recommendation to appoint Mr R. W. L. Limebear, G3RWL, as a corresponding member, was agreed.

Propagation Studies
The inclusion of Mr R. J. Hughes, G3GVV, as a corresponding member, was agreed.

Raynet
The proposed meeting with Sir Leslie Mavor at the Civil Defence College, Easingwold, York on 18 September was agreed.

Technical & Publications
Dr Evans spoke of a recommendation concerning the advertising of cb equipment which had been referred back to the committee, following Council's last meeting. After a brief discussion it was unanimously agreed that every precaution should be taken to keep cb items out of *Radio Communication* advertisements.

VHF
Council agreed to the addition of Mr J. Wilson, G3UUT, and Mr K. Willis, G8VR, to the committee. It further agreed to the recommendation that Mr J. A. Morris, G4ANB, remain as a corresponding member.

VHF Contests
Council agreed the following awards:
Council Cup—GW4LIP
VHFCC Cup—Martlesham Radio Society, G4MRS
Hanson Trophy—RS32525

Correspondence
Dr Allaway had received invitations to attend a function of the ARI in September, and JARL's 30th anniversary celebration of the recommencement of amateur radio activity in Japan. The latter would be associated with discussions on international amateur radio between JARL and visiting society representatives. Attendance at both was approved by Council.

The President also reported receipt of a letter from the Hong Kong ARS, regarding the delay in RAE results causing delays of 12 months in resitting the exam.

YOUR OPINION

AN EX-REME ARS?
The Editor
Radio Communication
Sir—I have often wondered why no amateur organization existed for ex-REME technicians and engineers comparable to the Royal Signals, Royal Navy and RAF bodies; after all, during the war many amateurs served in it, as I recollect from personal experience. It is true that various clubs exist for current servicemen in places like Aborfield, but I am unaware of any central organization existing for those who suffered in places like Gopsall Hall and No1 TTC Derby.

If this mention of war-time locations rings a painful bell in the memories of fellow members, perhaps they would care to get in touch with me, QTHR.

P. J. Horwood, G3FRB

T REPORTS
The Editor
Radio Communication
Sir—Now that equipment, both commercial and home constructed, has reached the stage where the T report in the RST is almost redundant, I have a suggestion which could, if adopted on a large scale, help to pass on a more meaningful level of information to the "other" station. I am not for a moment suggesting that the cw we hear around the bands is not worthy of criticism, but I fail to see how nine levels of "tone" can be justified.

As is already the practice in auroral operating, why not use a letter suffix and leave the numbers to the meteor merchants. Hardly anyone sends the full four dashes and dot for T9; so already we have A for auroral and N for nine. How about M for hum or C for clicks or chirp? Apart from hum, none of these parameters can be expressed in the 1-9 code, and I have not heard a T8 report sent even if the other station was T6! Sending anything but T9 fills us with paranoia and the fear that no one in that country will send us a QSL. An M would be a lot more innocuous, and at the same time convey the nature of the fault, thereby reducing long-winded explanations, which a non-English speaking station would find hard to follow.

It is only an idea. Maybe you have a better one?

Stewart Cooper, GM4AFF/G4AFF

21 AND 28MHz—USE THEM OR LOSE THEM
The Editor
Radio Communication
Sir—Illegal transmissions on the above bands and 144MHz have increased markedly during the past few months, and I would like to put in a plea for the greater use of these bands for inter-G working, particularly during the decline of the present solar cycle. The 3·5 and 7MHz bands are often overcrowded and have a high level of static and man-made interference. There is plenty of room when the bands are not open for dx and, on 28MHz, there is room even when the band is open. (Does anyone hear anything between 29·5 and 29·7MHz?)

I also feel that these bands could be used for one link of duplex crossband contacts; either using two hf bands or employing either 70 or 144MHz. This form of communication is very much neglected by amateurs, and I would like to add weight to the suggestion of

G5UM urging the greater use of duplex. (*Rad Com* November 1981, p1041).

Why do we shy away from this convenient form of conversation? Also, why do so few amateurs use vox? Practically every hf black box has it fitted, but most operators still stick to long-winded overs.

The writer can operate on hf and 144MHz ssb, and often monitors 144·300MHz. The use of 29·6MHz is suggested as a calling frequency for both simplex and duplex local calls. Has anyone any other suggestions? If so, why not tune up on one of the frequencies?

J. Stebbings, G4BTV

POWER

The Editor
Radio Communication

Sir—W. J. Omer (*Rad Com* May 1982) is to be commended on his objection to the idiot-term "rms power". He comes close to the bull of his target when he asks us to refer to "average power". However, the term that he seeks is known in British Standard 204:1960 (and in my licence conditions) as "mean power".

Any advertiser claiming so many watts "rms power" does not clearly understand his product, and I suggest that the RSGB cease the use of this term in its publications.

Ivan Wood, CEng, Z23JJ

QSL CARDS

The Editor
Radio Communication

Sir—The letter from GI4DOR (March) arouses my sympathies, but I fear that he is unduly optimistic regarding the cost of getting QSL cards for DXCC by direct airmail. He will require both dx and USA callbooks at about £25; the USA listings being necessary because many non-USA stations have USA QSL managers, and because some of those in the dx listings are entered as "QSL via W. . .". An up-date service is available for each book (at a price) but for one year only. Several editions will be required to ensure that the address needed is available.

To apply for DXCC once the magic "100 + " cards are to hand it is necessary to send them to the ARRL for checking, and enclose return postage. Registered mail is advised, although I cannot imagine what compensation would be payable in the event of loss. The total cost of the round trip appears to be about £12.

I now have over 100 countries confirmed, but have decided not to apply for DXCC, and wonder why anyone bothers. If a fellow amateur asks what your score is, you tell him and he accepts what you say. If a layman asks and you tell him you have worked 100 countries, he says, "Is that good? How many are there?". You say, "Over 300", and he replies, "So you've a long way to go yet. I thought you could 'get' anywhere with your set: if you can 'get' New Zealand, why the fuss about talking to Monaco?"

In short, awards impress nobody, and card collecting is often at the root of bad behaviour and pile-ups. I now send cards only in reply to those received, and when my present stock has gone I will never send another.

Ron Price, GW3LIY

Sir—Many years ago it was considered that "a QSL card was the final courtesy of a QSO". However, today, many stations prefer not to QSL for various, quite understandable reasons. This attitude, however, changes the character of the many operating awards now available from a requirement to work a station in a country (or county or "square") to working one who is willing to send one of those valued QSL cards. At contest time, when the rarer stations are more readily workable, the situation is even more acute. Perhaps the thought of several hours' work in addition to the normal contest clerical work provides the ultimate deterrent.

May I suggest, therefore, that for vhf awards a partial alternative—which may also increase the participation in smaller contests—is possible. During adjudication, each contest log is presumably checked. Therefore, if an sae were enclosed with each entry, could not the log be returned, suitably endorsed by the adjudicator. Thereafter, contacts recorded in that log be considered to be confirmed in a similar manner to those confirmed by QSL card.

W. B. Kendal, G3GDU

Sir—Having been licensed for almost a year now, I find myself with a problem that is becoming all too familiar; it is not the usual problem about not enough QSL cards, I am getting too many! Being unemployed, I have a very limited supply of my own QSL cards, and trying to convince my wife that buying more cards is more important than eating or paying the mortgage is just not on.

I try to be fair, and anyone sending me a card will usually receive one back in due course, but my supply of cards is running out and there is no possibility of replacing them. I am trying to save the cards I have left in case, quite by accident of course, I work some dx. Have you noticed how nobody admits to chasing the dx?—with nobody chasing the dx, how come there is none for me?

When I say, "Please no QSL", now you will know why. Not that there is a great deal of point in saying "Please no QSL", because invariably the answer is "R R QSL via the buro". Why do we not have a Q code for "No QSL required"? I suggest using QNC—(Q No Cards).

It always amazes me that the Q codes are so little used during a cw QSO; and not only that, if you do use them they are just not understood. While recently in contact with a German station, his over was wiped out by someone tuning up on frequency and then asking if it was in use. So when he passed it back I said "Sorry om no copy, please QSL". To which came the reply "R R QSL via the buro". I think that years of misuse by the ssb boys have frightened people off using Q codes. We have already resorted to sending QSL, meaning "QSL card", instead of the correct "I am acknowledging receipt"/ "Can you acknowledge receipt?".

I only work cw, because it is infinitely superior to ssb, and it never ceases to amaze me how people will mess about on phone and then to go on the key and become a smashing cw op—and they would never dream of pranking while on the key.

K. M. Fox, G4MDQ

OBITUARIES

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

Mr L. E. Howes, G3AYA
Lionel Howes, who died on 31 August, was editor of *Practical Wireless* for many years before his retirement, and was well known and respected in the amateur radio publishing world.

Mr J. Jones, G3MZE
John Jones died on 23 July, aged 55. Though not active recently, he was well known as a keen dxer on 14MHz cw.

Mr J. Lord, G3BIA
Jack Lord died 9 July, aged 77. He was a keen amateur and operated regularly on cw and a.m. He was a founder member of the "Early Worms", a 3·5MHz a.m. net which started in the 'sixties, and belonged to the net until his death.

Mr D. Melia, G8XRF
Denis Melia died on 12 July. Although only recently licensed, his interest in radio went back many years. He was an active member of the Worcester & DARS committee.

Mr J. Wylde, G8BM
John Wylde died on 25 September. He was a member of the Wirral ARS, of which he was chairman for several years, and he had also served as RSGB area representative for Wirral. He gave outstanding support to the local development of amateur radio over a long period, was an accomplished and keen cw operator on hf, and a great Field Day enthusiast.

Also:

Mr G. H. Arthur, GJ4JVP;

Mr F. C. D. Barnes, RS44355;

Mr F. J. Coleridge, Z22JC, on 21 July;

Mr F. Griffiths, RS13667;

Mr M. J. Jones, RS42612, in August;

Mr C. W. McDonald, RS49354, on 10 July;

Mr R. A. F. Payne, RS37235, on 23 February;

Mr P. K. Pepper, RS44875;

Mr G. P. Phillips, G3CCU;

Mr M. V. Rubeck, G4DMO, on 30 July;

Mr B. C. Thompson, RS31644, *and*

Mr J. K. Tibbett, RS10248, on 11 April.

The International Amateur Radio Union Region 1 Satellite Co-ordination Group

An open letter to all radio amateurs using amateur radio satellites in IARU Region 1 (Europe, Near East and Africa).

Dear OMs,

During the World Administrative Radio Conference 1979 (at which your country was represented and signatory) a New amateur service was agreed by 154 nations. This was the amateur satellite service, and having been recognized worldwide the next step was to place some form of order into the new service. Each region was charged to discuss this at its next conference.

For Region 1 this was the Brighton Conference April 1981, which some 200 delegates from Europe and Africa attended, representing **you**, the user. During the conference 14 member society delegates agreed to the formation of the Satellite Co-ordination Group, and discussed at great length its aims and hopes for the future of all satellite matters. At the end of the conference all delegates agreed to charge A.Gschwindt, HA5WG, and R.J.C. Broadbent, G3AAJ, with the task of placing on record for the next conference in 1984, definite proposals from every member nation as to what they and their members wished to aim for in the future on all bands where amateur satellites could legally be used.

To date, 18 months after the conference, with three specific letters sent to every national society and a reminder in each issue of *Region 1 News,* only two societies have had the courtesy to respond by written word. Those two are AMSAT-SM (which was not represented at Brighton) and ARAB. The undersigned thanks these societies for their support.

To the others he would address the following questions:

(a) Do you, or have you asked your national society to do so, publicised the request for input?

(b) Have you, as a delegate, any further input than that agreed round the tables at Brighton. If so, please write to me *now.*

(c) Presuming that members of satellite groups, or individual members, read this open letter, have you instructed your IARU Region 1 official in his duties in respect of your usage of the amateur satellite bands? If not, please do so now. It is in your interest to do so.

To refresh the memories of delegates at Brighton, and for the benefit of all users of satellite bands, the following is a list of questions requiring *your* response:

(1) What amateur bands are the majority of your amateurs interested in using, what bands are restricted in your country for use by satellite users?

(2) What type of spacecraft would you like to see built in any future space programme?

(3) Have you facilities for launch, building, testing and evaluation of space or ground equipment for amateur spacecraft? Are you willing to help on any programme?

(4) Have you facilities for ground control of any future amateur spacecraft?

(5) Are you able to help fund any future space programme within IARU Region 1, either via your national society or as an individual?

(6) What percentage of amateurs in your country is interested in amateur satellites, and what bands do they mostly use?

(7) Would you be willing to assist in an educational programme in your country for the whole satellite service?

(8) Most importantly. To what frequencies do you think future amateur spacecraft should be programmed, and do you think we need to go into the shf and uhf bands in future or stay on vhf and hf?

Please write to me at 94 Herongate Road, London E12 5EQ, with your answers and any thoughts on the above subjects. Please give some early response to this letter; it is in your interest.

To individual members reading this open letter. Please ensure the contents are brought to the notice of your national and local radio society and ask for its response as soon as possible. In particular, a response from officials of organizations already building amateur spacecraft within Region 1 would be appreciated.

Finally, what questions do you expect to be resolved at the 1984 conference in respect of the amateur satellite programme now in existence? It is up to *you* to instruct the SCG secretary what to place before the delegates at the conference.

R.J.C. Broadbent, G3AAJ,
Secretary, Satellite Co-ordination Group, IARU Region 1.

CONTEST NEWS

RSGB HF Contests Championship 1982–3 rules

1. RSGB hf contest general rules do not apply.
2. No entries for the championship are required.
3. The championship will be decided on the basis of RSGB hf single-operator contests held between 1 October 1982 and 31 July 1983.
4. Points will be awarded to the leading 10 UK stations in the results published in *Radio Communication* as follows:

Contest	Position									
	1	2	3	4	5	6	7	8	9	10
21/28MHz Telephony	80	70	60	50	40	30	20	15	10	5
21MHz CW	80	70	60	50	40	30	20	15	10	5
2nd 1·8MHz	40	35	30	25	20	15	10	5	0	0
1st 1·8MHz	40	35	30	25	20	15	10	5	0	0
7MHz CW	70	60	50	40	30	25	20	15	10	5
7MHz Phone	70	60	50	40	30	25	20	15	10	5
Commonwealth	100	90	80	70	60	50	40	30	20	10
Low power	30	25	20	15	10	5	0	0	0	0
R Round-up	60	50	40	35	30	25	20	15	10	5
Summer 1·8MHz	40	35	30	25	20	15	10	5	0	0

5. Points gained by stations using the same basic callsign (with or without suffixes) and entering two or more of the individual contests will be totalled and a table published in *Radio Communication*.
6. **Club stations.** To be eligible for inclusion, a club station must be operated by the same single-operator during each contest. In the event of a club station meriting an award, the award will be made to the operator concerned and not to the club.
7. **Awards.** The winner will receive the G2QT Trophy. A certificate will be awarded to the runner-up.

The Commonwealth Contest 1983 rules

Attention is drawn to minor changes that have been made to the rules:

- For the benefit of overseas entrants, the relevant sections of the general rules for RSGB hf contests have been consolidated within these rules.
- The requirement for check lists of call areas worked has been dropped. No duplicate check sheets or lists of prefixes are required.
- Eligible entrants for the receiving section will be extended to include those holding vhf-only transmitting licences.
- Suitable log and cover sheets are available from RSGB headquarters.

TRANSMITTING SECTION

1. When. From 1200gmt on Saturday 12 March 1983 to 1200gmt on Sunday 13 March 1983.

2. Eligible entrants. Members of the RSGB resident in the UK and radio amateurs licensed to operate within the British Commonwealth or British Mandated Territories. Entries from GB, aeronautical mobile or maritime mobile stations will not be accepted.

3. Contacts. CW(A1) only in the 3·5, 7, 14, 21 and 28MHz bands. Contacts may be made with any station using a British Commonwealth callsign, except those within the entrant's own call area. UK stations may not work each other for points. In accordance with IARU recommendations, contestants are requested to operate within the lower 30kHz of each band, except when contacting novice stations that operate above 21,100kHz and 28,100kHz. A contact exchange consists of RST and a three-figure serial number commencing with 001 and increasing by one for each successive contact throughout the contest, irrespective of band in use. Serial numbers, when sent from non-competing stations, must be recorded.

The Commonwealth Contest is a single-operator, single-transmitter event. Evidence of simultaneous operation on more than one frequency may result in disqualification.

4. Scoring. Each completed contact will score five points. In addition, a bonus of 20 points may be claimed for the first, second and third contacts with each Commonwealth call area (as listed in the accompanying table) on each band. All British Isles prefixes (G, GB, GD, GI, GJ, GM, GU and GW) count as one call area.

5. Logs. Separate logs for each band must include gmt, callsign of station worked, RST/serial number sent, RST/serial number received and points claimed. Separate band totals should be added together and the total claimed score entered on the cover sheet. It is important that logs are carefully checked for duplicate contacts. Unmarked duplicate contacts for which points have been claimed will be heavily penalized and logs containing **in excess of five** will be disqualified.

6. Entries. Entries may be single- or multi-band. Single-band entries should show contacts on one band only; details of contacts made on other bands should be enclosed separately for checking purposes. Multi-band entries will not be eligible for single-band awards.

Each entry will consist of the separate band logs together with a cover sheet and declaration that the rules and spirit of the contest and the terms of the entrant's licence were observed.

Entries should be addressed to D. J. Andrews, G3MXJ, 18 Downsview Crescent, Uckfield, East Sussex TN22 1UB, England. Adjudication of this contest will commence on Monday 16 May 1983. Any entry received after this date may be excluded from the contest. Overseas stations are therefore advised to forward their logs by airmail.

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.

7. Awards. To the winner, the BERU Senior Rose Bowl; to the runner-up, the BERU Junior Rose Bowl and to the leading UK station, the Col Thomas Rose Bowl. Certificates of merit will be awarded to: (a) first, second and third placings in home and overseas multi-band sections; (b) the leading home and overseas single-band entries on each band; (c) the leading station in each overseas call area.

RECEIVING SECTION

1. When. Times and dates as for the transmitting section.

2. Eligible entrants. Members of the RSGB resident in the UK and all swls resident in the British Commonwealth or British Mandated Territories. Only the entrant may operate his receiving station for the duration of the contest. Holders of transmitting licences covering frequencies below 30MHz are not eligible to take part.

3. Scoring. To count for points, a station outside the entrant's own call area must be heard in a contest contact. CQ or test calls will not count for points. A station may be logged only once on each band for the purpose of scoring. When both stations in a contact are heard, they should be logged separately and points claimed for both entries provided that the stations are outside the entrant's own call area.

Each completed log entry will score five points. In addition, a bonus of 20 points may be claimed for the first, second and third stations heard in each British Commonwealth call area on each band. All British Isles prefixes count as one call area.

4. Logs. A separate log is required for each band. Logs should show the date/time gmt, callsign of station heard, RST/serial number sent by the station heard, callsign of station being worked and points claimed.

5. Entries. Each entry will consist of the log sheets, cover sheet and a signed declaration that the receiving station was operated in accordance with the rules and spirit of the contest and that the entrant does not hold a transmitting licence for frequencies below 30MHz. Entries should be addressed and sent as in rule 7 of the transmitting section. 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.

6. Awards. The BERU Receiving Rose Bowl to the winner. Certificates of merit to the leading entrant in each continent.

COMMONWEALTH CALL AREAS

The following call areas are recognized for the purpose of scoring in the 1983 Commonwealth Contest:

A2	Botswana	VR6	
A3	Tonga Is	VS5	
A5	Bhutan	VS6	
C2	Nauru	VX9	Sable Is
C5	Gambia	VY1	Yukon
C6	Bahamas	VY0	St Paul Is
G/GB/GD/GI/GJ/GM/GU/GW		VU	India
H4	Solomon Is	VU	Laccadive Is
J3	Grenada	VU	Andaman & Nicobar Is
J6	St Lucia	YJ	
		Z2	Zimbabwe
J7	Dominica	ZB2	
J8	St Vincent	ZC4/5B4	
P2	Papua New Guinea	ZD7	
S2	Bangladesh	ZD8	
S7	Seychelles	ZD9	
T2	Tuvalu		
T3	Kiribati	ZF	
V2	Antigua		
V3	Belize		
VE1		ZK1	Cook Is
VE2		ZK1	Manihiki
VE3		ZK2	Nuie
VE4		ZL1	
VE5		ZL2	
VE6		ZL3	
VE7		ZL4	
VE8		ZL	Auckland & Campbell Is
VK1		ZL	Chatham Is
VK2		ZL	Kermadec Is
VK2	Lord Howe Is	ZM7	
VK3		3B6/3B7	Agalega & St Brandon
VK4		3B8	Mauritius
VK4	Willis Is	3B9	Rodriguez Is
VK5		3D2	Fiji
VK6		3D6	Swaziland
VK7		4S7	
VK8		5H3	
VK9	Christmas Is	5N2	
VK9	Cocos Is	5W	Samoa
VK9	Norfolk Is	5X5	
VK0	Heard Is	5Z4	
VK0	Macquarie Is	6Y5	
VK0/VP8*	Antarctic	7P8	
VO		7Q7	
		8P	
VP2E	Anguilla	8R	
VP2K	St Kitts, Nevis	9G1	
VP2M	Montserrat	9H	Maltese Is
VP2V	British Virgin Is	9J2	
VP5	Turks & Caicos	9L1	
VP8	Falkland Is	9M2	W Malaysia
VP8	S Georgia	9M6/9M8	E Malaysia
VP8	S Orkney Is	9V1	
VP8	S Sandwich Is	9Y4	
VP8	S Shetland Is		
VP9		*All calls operated from Commonwealth controlled areas of the Antarctic (VK0, VP8, ZL5 etc) count as one call area.	
VQ9	Chagos		
VR1	British Phoenix Is		

3·5MHz Field Day 1982 results

Entries for both sections of the contest were up on last year, with 15 entries received for the 15W section A, and five entries for the 5W section B. However, the comparatively low number of entries suggests that the contest is not quite to members' liking. On behalf of the HF Contests Committee, I should like to thank all those operators who took the time to forward their views on possible changes to the contest to make it a more enjoyable event. The number of operators who remarked on the "dinner break" are too numerous to mention! All comments will be considered by the committee in the coming months and the outcome reported.

Only one log—that of G3WKS/P, was faultless. With so many 339 and 449 reports exchanged during the contest the number of callsign errors or incorrectly copied serial numbers could perhaps have been expected, but as a result some operators will notice differences between their claimed scores and those that appear below. Indeed, one station lost 90 points, when a little more care in receiving the details would have put it among the certificates. Everyone learns in the long run!

Congratulations are due to G3VER/P (Verulam ARS), operated by G3JKS and G4DJX from Royston, Hertfordshire, who won the 15W section A for the second year in succession. They used a TS120V with a 3·5MHz dipole at 35ft. The 5W section B winners, again for the second year in a row, were G4DDX/P, located at Weston Park Scout Camp, nr Stevenage in Hertfordshire. A TenTec Argonaut and a trap dipole at 30ft secured their victory.

Subject to Council approval, the Houston-Fergus Trophy will be awarded to G3VER/P, and certificates of merit will go to G3XTJ/P, G3AHD/P, G3RRA/P, G4DDX/P, G3BBC/P and G3VIP/P. *BRS32525*

Section A (15W maximum)

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	G3VER/P	62	515	9	G4ODR/P	43	375
2	G3XTJ/P	56	500	10	G3XEP/P	41	365
3	G3AHD/P	44	405	11	G3SFG/P	42	360
	G3RRA/P	46	405	12	G3DIT/P	33	355
5	G3SZS/P	49	390		G3NKS/P	34	355
6	G3WKS/P	35	385	14	G3YRC/P	24	250
	G6AJ/P	43	385	15	G4KKQ/P	21	155
8	G4MBC/P	40	380				

Section B (5W maximum)

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	G4DDX/P	54	510	4	G4GZQ/P	29	305
2	G3BBC/P	41	410	5	G3JKY/P	24	275
3	G3VIP/P	30	330				

Check logs were gratefully received from G4BP/A, G4BCY/P, G4CZB/P and G4KGG/P.

70MHz Trophy Contest results

This contest was remarkable for the complete absence of GW portable stations. This changed the complexion of the event, with March & DARS winning section "O" from AN square. GD4IOM was the winner in section "F", and as overall winner, the Isle of Man ARS will receive the VHF Managers Trophy. Conditions were rather variable with deep QSB prevalent. Sporadic-E was commented on by many entrants, but this year the only contacts made via this mode were crossband with F0FDB, and did not count for the contest. The holiday season may have been one reason for the absence of many regulars and the lower number of contacts made than in the June contest.

Comments from the logs included: "At least on this band everyone isn't beaming to the Continent", *GD4IOM;* "After learning of the score accumulated by GD4IOM I am wondering why I bothered to send in an entry!", *GD2HDZ;* "Contest too long", *G4BRK and G3NPI;* "I needed all the time available between 0900 and 1659", *GM3FDW/P;* "Lots of regulars missing", *G3JEQ/P;* "This contest has generated considerable interest in a 70MHz revival in GI" *GI4DBB/P;* "Several of the portable stations seemed to have very loud signals but very poor receivers" *G5UM;* "Where were the GW portables?", *G3TAA and others.* *G3XDY*

SECTION F

Posn	Callsign	Points	QSOs	QTH	Power	Ant	Best dx	Km
1	GD4IOM	889	75	XO67	120	4Y	G3DAH	497
2	G4ANT	789	86	AM27	100	4×3Y	GI4DBB/P	592
3	G4EKT	545	59	ZN10	25	8Y	G4ADV/P	527
4	GD2HDZ	464	44	XO68	80	4Y	G4DZO/P	483
5	G4BRK	434	76	ZM68	160	3Y	GI4DBB/P	520
6	G3RQZ	414	68	AL51	133	4Y	GI3TLT	517
7	G4NVA	380	61	YN69	40	2×6Y	G4ADV/P	381
8	G4HON	374	58	YN50	30	5Y	G4ADV/P	401
9	G4LNV	335	54	ZL46	35	6Y	GM3WCS	539
10	G3NPI	333	66	ZM76	70	6Y	GM3FDW/P	423
11	G4NWT	313	68	ZL38	40	4Y	GD4IOM	395
12	G3IOI	270	51	AL33	40	6Y	GD4IOM	445
13	G4FRO	248	34	YL37	100	4Y	GI3TLT	389
14	G4IDE	203	33	YM30	35	3Y	GI4DBB/P	404
15	GM3TAL	156	12	YQ73	30	4Y	G3SFG/P	580
16	G3LXP	142	36	ZL19	50	4Q	GD4IOM	391
17	G5UM	127	30	ZM35	18	3Y	GM3FDW/P	359
18	G4AFJ	107	23	ZM05	100	2Q	G4ADV/P	407
19	G3SJX	101	27	ZL60	15	4Y	G3ZQM/P	408
	G3TAA	101	25	AL41	50	2Q	GD4IOM	436
21	G4FKI	71	23	AL31	8	3Y	GD4IOM	426
22	G4NVT	60	17	AL33	–	–	GD4IOM	444

SECTION O

Posn	Callsign	Points	QSOs	QTH	Power	Ant	Best dx	Km
1	G3PMH/P	792	96	AN61	130	8Y	GI4DBB/P	489
2	G4ADV/P	721	55	XK54	80	4×4Y	GM3WCS	650
3	GM3FDW/P	647	50	YP20	110	6Y	G4DZO/P	565
4	G3ZQM/P	605	58	YO20	50	4Y	G4ADV/P	544
5	G4DZO/P	575	80	AK11	100	10Y	GM3FDW/P	565
6	G3JEQ/P	562	90	ZL77	50	8Y	GM3WCS	575
7	G3SFG/P	507	78	ZL76	160	5Q	GM3WCS	578
8	G3TCU/P	455	53	YL63	18	4Y	GM3FDW/P	514
9	G4EMK/P	385	59	ZM29	50	7Y	GI4DBB/P	490
10	GI4DBB/P	317	24	WP77	120	6Y	G4ANT	592
11	G4KKC/P	247	52	ZL59	11	4Y	GD4IOM	432
12	G3RAL/A	189	41	ZM14	100	4Y	G4ADV/P	385
13	G3PJX/P	134	33	ZL58	25	8Y	G3ZQM/P	405

Check log from G2DHV received with thanks.

432MHz Low Power Contest August 1982 results

There was good support for this contest, although a clash of date with the Woburn Abbey Mobile Rally probably reduced participation somewhat, as there was a noticeable absence of southern stations. Overall conditions were average to poor, with considerable QSB on contacts over 100km. However, there were some bursts of good conditions, and in spite of the low power good dx contacts were made. Several participants welcomed the opportunity to dig in the noise without the problems of splatter from high power stations.

The rules received support from most entrants, and the power limit would appear to be about right. Suggestions for changes included "Drop the power limit to 1W", *GW4KKC/P;* "Power limit should be 25W", *G8ULU;* "Who thought this one up? Very underpowered for this band", *G8RZP;* and "Limit all portable events to low power", *G3TA.* The timing also came in for some comment. It seems that 8h was perhaps a little long in the prevailing conditions, although had conditions been good more than 8h would have been justified. However, everything depends on the propagation and it is a pity that the excellent conditions of a few days earlier did not last for the contest.

Certificates go to the leading station and runner-up in each section. G2DHV is thanked for a checklog. *G3FZL*

OPEN SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	GW8TFI/P	901	112	YL25	DF4KT	705
2	G3ZLL/P	881	133	ZN53	ON4ZN	518
3	G3YTE/P	750	120	ZN61	F5NS	469
4	GW4ERP/P	653	108	YN75	PA0FRE	531
5	G4LIN/P	579	84	ZM70	DF4KT	517
6	G4KKF/P	559	71	ZO72	G8DPV	458
7	G8PXB/P	513	62	ZO57	G3AUS	473
8	G4NVA	474	95	ZN61	F5NS	468
9	G4AVV/P	390	50	AL45	DF4KT	438
10	G3VRE/P	360	64	ZL52	PE1CKK	478
11	G4OHM/P	355	79	YM50	PA0FRE	438
12	G6OI/P	337	73	YM05	G8MKV	351
13	G3TCR/P	333	71	ZL54	PA0EZ	460
14	GW8AAP/P	328	64	YN65	G3TDG	305
15	GW4KKC/P	287	51	YL03	G8PXB/P	325
16	G3VIP/P	260	48	ZN49	GW4KKC/P	275
17	G8KAX/P	216	34	AM71	G4DGU	339
18	G8UIO/P	203	49	ZM73	PA0FRE	304
19	G8BQO/P	195	41	YN28	G8DPV	393
20	GW3ORA/P	115	29	ZO57	G8PXB	332
21	G6IAF/P	103	23	ZN18	GW4KKC/P	289

Disqualified G8RZP under rule 23 (a) – declaration must be signed.

FIXED SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	G4MHC	487	73	YM79	DF4KT	667
2	G3TA	360	67	YL20	DF4KT	640
3	G8ZHP	320	46	ZM29	PE1FPC	380
4	G4NBS	265	61	ZL48	DJ9DL	534
5	G8ULU	242	28	AL56	DF4KT	429
6	G4MID	208	28	AM64	PA0EZ	304
7	G4OLN	145	42	YM40	G8DPV	313
8	G8BHD	134	26	AL41	DF4KT	487
9	G8JAY	103	27	YL10	G8VXB/P	284
10	G8ABI	83	21	YM50	GM3KJF/P	297
11	G8SRL	65	20	ZL67	PA0FRE	365
12	G6AFH	60	26	YN49	GM3KJF/P	206
13	G6ECO	33	13	YN40	GW8TFI/P	210

Summer 1·8MHz Contest 1982 results

This year's event was held under poor conditions with high QRN almost everywhere. Only 156 calls appeared in the logs, including 35 Europeans and one UA9. The highest UK entry for five years was therefore very satisfying, although the overseas entry was slightly down.

Ron Stone, GW3YDX, was the clear winner of the UK section, using a TR7 and inverted-V at 60ft. His 127 contacts included 52 bonuses. Second placed Walt Davidson, GW3NYY, used an FT901DM and an end-fed λ/2 at 200ft to secure 118 contacts and 48 bonuses. Drake twins and a 60ft high dipole took Al Slater, G3FXB, into third place with 113 contacts and 50 bonuses.

The overseas section was won by a French station for the first time. Paul Levy, F9KP, used an FT101E and λ/4 wire to make his 60 contacts.

An excellent crop of first timers was headed by G3XTC at the key of G3WIM. There seems to be some confusion as to the status of a "First time entrant". The category refers to the operator, and does not include later entries using a different callsign. G4ERP/P was an interesting first timer. Well known in vhf circles, he operated from a site 950ft asl! He also had G8KTK as co-operator, clearly getting his feet wet at the deep end. G4OBK reports that all his contacts bar one responded to "QRS pse", reflecting the sensible good manners associated with top band contests over many years.

Logs were generally well presented, unmarked duplicates were few and far between, and all entrants deserve praise for their high level of accuracy despite the adverse static levels. However, some re-scoring of bonuses was necessary and one entrant will notice a large increase in his score. Would entrants please check their country lists in future – UB5 and UT5 are the same country, but UA2 is a separate DXCC country.

Finally, a sad quote from Hans, HB9AQS: "The contest was shortened for me by a power failure at 2325 . . . yes, such things happen even in well-organized Switzerland . . ." *G3XTJ*

Contests calendar

October/ December	432MHz Cumulatives *(Rules in September issue)*
October/ December	1,296MHz Cumulatives *(Rules in September issue)*
6-7 November	144MHz CW *(Rules in October issue)*
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) *(Rules in October issue)*
13-14 November	Esperanto (ILERA) *(Rules in October* MOTA*)*
14 November	OK DX *(Rules in October* MOTA*)*
20 November	Verulam ARC (1·8MHz) *(Rules in November issue)*
20-21 November	Trinidad & Tobago QSO Party *(Rules in November* MOTA*)*
20-21 November	Austrian 160m CW *(Rules in November* MOTA*)*
27-28 November	CQ WW DX (CW) *(Rules in October* MOTA*)*
28 November	Verulam ARC (144MHz) *(Rules in November issue)*
4-5 December	Tops Activity *(Rules in November* MOTA*)*
5 December	144MHz Fixed *(Rules in September issue)*
1983	
5-6 February	7MHz (Phone) *(Rules in September issue)*
26-27 February	7MHz (CW) *(Rules in September issue)*
12-13 March	Commonwealth *(Rules in November issue)*

UK SECTION

Posn	Callsign	Points	Posn	Callsign	Points
†1	GW3YDX	628	20	G3GC	385
†2	GW3NYY	579	F*21	G4ERP/P	373
†3	G3FXB	570	22	G4BOU	340
*4	GM4KWS	565	23	G3BPM	317
5	G3PDL	547		G3TXF	317
6	G3IGW	524	25	G3SXW	310
7	G3OAY	505	26	GM3UM	301
8	G4NUT/A (G4BJM)	491	F27	G4HVC	286
	G5RS	491	28	G3ZRZ	258
10	G3MXJ	484	29	G3KSH	244
11	G4DJX	473	30	G3BGM	235
12	G4GIR	470	31	G4EBK	233
13	G3OZF	459	32	G3WZR	193
14	G3SSO (G3NKS)	452	F33	G4OBK	191
15	G4BUO	440	F34	G4MLU	162
F†16	G3WIM (G3XTC)	438	35	G8OZ	151
17	G4KGG	434	36	G3PEK	140
F18	G4EXD/A	425	F37	GW4IGF	108
19	G3CCZ	406			

OVERSEAS SECTION

Posn	Callsign	Points	Posn	Callsign	Points
†1	F9KP	310	F†13	UP2BCG	174
†2	OK1DFF	296	14	DL9SAN	149
†3	OZ1W	289	†15	UA3OOQ	148
†4	DJ3XK	280	16	F8FE	142
5	OK1DFP	224	17	HB9AQS	141
6	DL0TN	219	18	DF1BT	104
†7	UA2FCW	212	19	UB5WBJ	98
†8	HB9AFI	202	20	OL5BCV	83
9	DL8BAV	190	21	LZ2CW	80
10	OL3BAQ	188	22	UB5VK	72
11	DK0BW/P	182	23	OK2SWD	8
F†12	UB5PBA	180			

Check logs received with thanks from G3RFS, G3RPB, G4GYP, G4KZD, OK2BWM and UK6LCB

†Certificate winners *Multi-operator F First-time entrant

South Manchester DF Qualifying Event results

The South Manchester qualifying event took place on 25 July. The weather was fine for the 16 teams as they assembled at the start near the Manchester Ship Canal before splitting equally between stations "A" and "B".

The "A" station, G3FVA/P, was located about 13 miles NW of the start, near Aspull, and was operated by Dave Holland from an old "spoil" heap. A lot of wire had been erected, running up and down the slippery slopes, and the transmitter was hidden in a very nasty forty-five degree bramble/hawthorn infested slope. The area also became infested with df competitors after 1400. The first arrival (with lots of threats and curses) was Roger Shepherd at 1438, complete with scratches and nettle stings! Various people appeared throughout the afternoon, and most were not very polite.

The "B" station, G3UHF/P, was located some 12 miles SE of the start, near Ringway Airport, and operated by Dave Bolton and John Murphy. They had found a nice squalid and fetid swamp, complete with an impregnable bush about which several competitors declared "he can't be in that". A circular antenna completed the fun, literally sending competitors round in circles. One competitor was in the wood for the duration of the contest.

Posn	Name	Club	Time of arrival Station "A"	Station "B"
1	R. Parsons	Burton-on-Trent	1526·5	1417
2	W. North	Mid-Thames	1526·75	1416
3	D. Newman	Slade	1535	1421
4	G. Whenham	Coventry	1542	1439
5	C. McKenzie	S Manchester	1544·5	1428
6	C. Merry	Dartford Heath	1439	1559·5
7	R. Shepherd	Mid-Thames	1438	1559
8	R. Vickers	Slade	1444·5	1619
9	D. Yorke	S Manchester	1518	1619·5
10	T. Gage	Mid-Thames	1503	1625
11	M. Ellis	S Manchester	1535	1629·5
12	T. Winter	S Manchester	1448	–
13	G. Taylor	Ariel	1500	–
14	M. Easterbrook	Dartford Heath	1523	–
15	C. Wells	Mid-Thames	–	1607
16	P. Harris	S Manchester	–	1620

D. Newman and G. Whenham qualify for the National Final.

Slade Radio Bert Simmonds Memorial Trophy 1982 results

The following are the final placings in the 1982 Bert Simmonds Memorial Trophy Competition, which is based on the results of the RSGB df qualifying events, and adjudicated by the Slade Radio Society.

Posn	Name	Club	Pts	Posn	Name	Club	Pts
1	B. M. Bristow	Mid-Thames	45	13	R. Shepherd	Mid-Thames	4
2	R. J. Parsons	Burton-on-Trent	25		G. A. Whenham	Coventry	
3	M. P. Hawkins	Chelmsford	20		P. Tyler	Mid-Thames	
4	W. J. North	Mid-Thames	16	16	E. L. Mollart	Mid-Thames	3
	P. H. Lisle	Mid-Thames			W. L. Pechey	Mid-Thames	
6	C. M. Wells	Mid-Thames	9	19	J. E. Drakeley	Slade	2
	G. H. Taylor	Ariel			I. R. Butson	Colchester	
8	A. M. Simmons	Mid-Thames	7	21	C. McKenzie	S Manchester	1
	C. D. Merry	Dartford Heath			R. A. W. Brocks	Chelmsford	
	D. E. Newman	Slade			M. G. Easterbrook	Dartford Heath	
11	C. D. Plummer	Mid-Thames	6		A. Williams	Braintree	
	J. R. Vickers	Slade					

Slade DF Qualifying Event results

On 22 August 23 enthusiastic df teams gathered near the Staffordshire village of Church Eaton for the last qualifying event of 1982. Their initial bearings revealed that both hidden stations lay in the same general direction, towards Telford, where a maze of new roads were to confound their navigators.

Station "A" was in fact 20km away, in one of the large woods surrounding the Wrekin. This proved to be a challenging site, as the various possible approaches all involved a long run uphill from the road, and vicious brambles combined with intricate old quarry workings to impede the competitors' progress.

Station "B" was 13km from the start, on an overgrown spoil tip from a long-defunct coal mine. As this site had fairly convenient road access, and the natural vegetation was not dense enough to provide easy concealment, the organizers had to resort to other tactics to make it interesting. They achieved this by using about 600m of antenna, part of which ran through an unpleasant marsh to ensure that the "wire followers" got their feet wet! Unfortunately, a sharp shower in the early part of the afternoon led to transmitter failure, and two or three transmissions were lost before the emergency reserve equipment could be rushed to the site.

Graham Taylor and Roger Parsons were presented with their prizes, and the president of Slade Radio Society then presented the Bert Simmonds Memorial Trophy to Brian Bristow, who had won three events and come second in three others.

Posn	Name	Club	Time of arrival Station "A"	Station "B"
1	G. H. Taylor	Ariel	1529	1429
2	R. J. Parsons	Burton-on-Trent	1447	1535
3	P. Tyler	Mid-Thames	1437	1536
4	D. E. Newman	Slade	1607	1455
5	W. J. North	Mid-Thames	1523	1610
6	G. A. Whenham	Coventry	1531	1616
7	D. A. York	S Manchester	1458	1619
8	S. Carey	Dartford Heath	1531·5	1625
9	E. L. Mollart	Mid-Thames	1524	1626
10	P. M. Williams	Slade	1534	1627
11	W. L. Pechey	Mid-Thames	1512·5	1629
12	D. C. Holland	S Manchester	1528	1629·5
13	M. G. Easterbrook	Dartford Heath	1512	1630
14	P. H. Lisle	Mid-Thames	1522	–
15	T. C. Gage	Mid-Thames	1528	–
16	A. Judd	Mid-Thames	–	1542
	C. McKenzie	S Manchester	–	1542
18	C. D. Merry	Dartford Heath	–	1544
19	B. M. Bristow	Mid-Thames	1603	–
20	A. Williams	Braintree	1623	–
21	P. Woollett	Dartford Heath	1625	–
22	J. E. Drakeley	Slade	–	1628

One competitor failed to locate either station.
G. H. Taylor and P. Tyler qualify for the National Final.

Salisbury DF Qualifying Event results

Eighteen teams assembled on Knowle Hill, a high point on the chalk downs of southern Wiltshire, for the start of this year's event. The weather throughout the day was superb, and good signals were received at the start.

About half of the competitors headed for station "A", which was operated by G2FIX/P. This was sited six miles north of the start, half way up the steep slopes of Wick Ball Hill, in almost impregnable gorse and bushes. Several people only found the transmitter by accidentally falling through the undergrowth immediately above it.

The remaining half headed first for G3FKF/P at station "B", located 14 miles south-east of the start. Here the approach across the bogs of Black Gutter Bottom was treacherous unless one kept to the tracks.

Thanks are due to G4NWJ who operated the "B" station, and to Sir Evan Nepean, G5YN, who managed the event.

Posn	Name	Club	Time of arrival Station "A"	Station "B"
1	C. Wells	Mid-Thames	1421	1521
2	B. Bristow	Mid-Thames	1420	1522
3	P. Lisle	Mid-Thames	1526	1419
4	R. Parsons	Burton-on-Trent	1433	1544
5	C. D. Merry	Dartford Heath	1601	1429
6	E. Mollart	Mid-Thames	1602	1430
	A. Williams	Braintree	1457	1602
8	T. Gage	Mid-Thames	1603	1431
9	R. Vickers	Slade	1611	1421
10	D. Newman	Slade	1619	1422
11	R. Goodearl	Mid-Thames	1626	1509
12	S. Holley	Salisbury	1629	1508
13	W. Pechey	Mid-Thames	1430	–
14	W. North	Mid-Thames	1452	–
15	A. Judd	Oxford	1501	–
16	S. Carey	Dartford Heath	1604	–
17	M. Easterbrook	Dartford Heath	–	1610
18	P. Woollett	Dartford Heath	1614	–

C. Wells, E. Mollart and A. Williams qualify for the National Final.

Barking R&ES 144MHz Contest results

TRANSMITTING SECTION

Posn	Callsign	County	Points	Posn	Callsign	County	Points
1	G6ERP/P*	Glos	13,720	16	G8NNJ/P*	Essex	3,300
2	G8WBO/P*	Wilts	11,110	17	G6CHK	Bucks	2,790
3	G8SRC/P*	Wilts	8,736	18	G8RZA*	Essex	2,652
4	G8YLH	Hants	7,360	19	G8JXV	Surrey	2,430
5	G6EUZ/A	Kent	7,308	20	G4KLX	Derbys	1,960
6	G8ZHP	Lincs	7,134	21	G4DFI	Kent	1,820
7	G8VLL	Norfolk	6,086	22	G8ZYZ	Kent	931
8	G3XNO/P	N Yorks	5,984	23	GD3YDO	IoM	882
9	G4MPN/P	Leics	5,402	24	G4KVI	Bucks	880
10	G8KAX/P*	Essex	5,069	25	G8NMO	Berks	629
	G8MLO/P	London	5,069	26	G8UDV/P	London	615
12	G8KUC	Kent	4,900	27	G8ZYL	Kent	574
13	G6ECM	Kent	4,865	28	G8CSY	Kent	408
14	G4MEJ	Bucks	4,797	29	G8UEI/P	Avon	350
15	G8ZPC	Cheshire	4,563	30	G8CKC	Devon	224

LISTENER SECTION

Posn	Name	Station	Points
1	N Henbrey*	BRS28198	1,470

*Certificate winners

Verulam ARC Transmitting and Receiving Contest 1982 rules

Section 1. 1·8MHz 2000gmt to midnight, Saturday 20 November.
Section 2. 144MHz 0900 to 1300gmt, Sunday 28 November.
The rules for this contest are the same as those of previous years.

Those who do not have copies of these rules should obtain them from F. Claytonsmith, G3JKS, 115 Marshalswick Lane, St Albans, Herts, tel 59318, after 6.30pm.

Separate logs for each section should also be sent to him, postmarked not later than **13 December 1982.**

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 **January 1983** issue should reach them by **13 November** and for the **February 1983** issue by **11 December.**

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

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

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

Accrington (North Western Repeater Group)—18 November, 8pm. Globe Bowling Club, Willows Lane, Accrington. Sec Howard Aspinall, G3RXH.

Ainsdale (AARC)—9, 23 November. Ainsdale Scout HQ. Details from sec Norman Horrocks, G2CUZ, tel 0704 77604.

Barnoldswick (Rolls-Royce ARC)—3 November (Fourth AGM), 1 December (A film show, by Lynn Millard, G8LWK), 8pm. RR Sports & Social Club, Barnoldswick. RSGB slow morse transmissions have now commenced from the shack on Friday evenings starting at 8pm on 145·550MHz (S22) fm. Reports will be welcome. Sec Leslie Logan, G4ILG, tel Barnoldswick (0282) 812288.

Blackburn (East Lancs ARC)—2 November (Home construction night), 7 December (AGM), 7.30pm. The Shadsworth Leisure Centre, Blackburn. PRO Norman Jenkin, G4CGT, tel 0254 75037.

Blackpool (B & Fylde ARS)—2 November, 7 December. Venue from Jim Newland, G5ND, tel 0253 64508.

Bury (BRS)—9 November ("Test equipment", by Mike Horrocks, G8GTP, and Gordon Cratchley, G3IXC), 14 December (AGM). Informal meetings on 2, 16, 23, 30 November, 7.30pm. Mosses Youth & Community Centre, Cecil Street, Bury. Pro David Hensby, G8TKD, tel (daytime only) Whitworth 2213.

Manchester (UMIST RS)—Contacts for the new academic year are Dave Crye, G6BSK, and Dave Brooke, G6GZH, c/o UMIST Union, PO Box 88, Sackville Street, Manchester M60 1QD.

Manchester (South Manchester RC)—5 November ("Practical receiver measurements", by Tim Winter, G4AOK), 12 November (A lecture by Gordon Dove, "My own choice"), 19 November (Annual dinner at the Bowden Hotel, Altrincham. Guest of honour the President of the RSGB), 26 November (A discussion evening on direction finding techniques), 3 December ("Getting started on rtty", by Roger Higson, G4NTY). Informal meetings Mondays, in the club shack, 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec Dave Holland, G3WFT, tel 061-973 1837.

Rossendale (RVARC)—The RR is very pleased to welcome to the "Club News" column this newly affiliated club, whose officers are chairman, Duncan Adams, G6GZN; treasurer, Myke Oldham, G6DDQ; sec Mrs Celia Adams, G6GZM. Meetings are Wednesdays, 8pm. Bishops Blaize Hotel, Burnley Road, Rawtenstall. Third Wednesday in each month (Formal meeting, 17 November, talk on sstv by Peter Burnett, G4BLL). Details from sec, 373 Bury Road, Rawtenstall, tel 0706 220935.

St Helens (St H & DARC)—Thursdays, 7.45pm. Conservative Club, Boundary Road, St Helens. At the recent AGM the following new officers were appointed: chairman, Peter Roberts, G4KKN; treasurer, Bill Marsden, G8TIW; sec, Dave Filer, G4OAM, who is QTHR as G8BLE, tel 0744 820471. Morse classes have recommenced and the club now has an additional callsign, G6LCK. The club net is every Sunday at 11.30am on 145·225MHz.

Stockport (SRS)—10 November ("Tenerife 2", by Stan Aspinall, G3VSA), 24 November (Natter night and construction competition), 8 December (AGM), 8pm. Blossoms Hotel, corner of Bramhall Lane and Wellington Road, Stockport. Sec Stan Aspinall, G3VSA, tel 061-437 1437.

Tarporley (MCARS)—3 November ("Post Office equipment" by G6HZJ), 10 November (Visit by the crime prevention officer), 17 November ("Microwaves", by Dr M. W. Dixon, G3PFR), 24 November ("Who's where on vhf and uhf", by R. E. Linton, G8XMZ), 1 December ("Video recorders", by Rick Dodd, G8PNL), 7.30pm. Cotebrook Village Hall, Sadlers Lane, off A48, Tarporley. Talk-in is available on 145·200. Sec Rick Dodd, G8PNL, tel Winsford 57766.

Thornton Cleveleys (TCARS)—5 November (Natter night), 12, 19, 26 November (No details), 8pm. Thornton Cleveleys Sports Centre, Victoria Road, Cleveleys. Sec Mrs Jen Ward, G8YOK, tel Poulton-le Fylde 890114.

Warrington (UK FM Group Western)—4 November, 2 December. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Wirral (WARS)—3 November (Chairman's night), 17 November ("The ham radio scene in Australia", a tape talk by G3TKN/VK2EAO), 7.45 for 8.15pm. Minto House School, Birkenhead Road, Hoylake. Sec Gordon Lee, G3UJX, tel 051-677 1518.

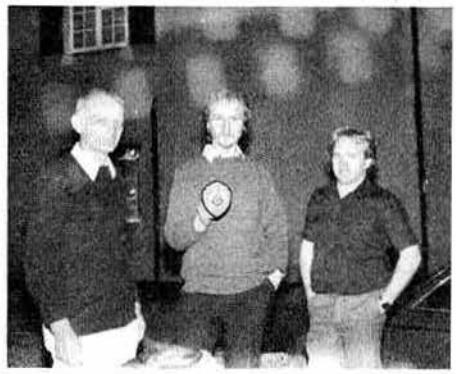
Wirral (W&DARC)—10 November (Activity evening; bring your rig, computer, printer, terminal unit or whatever), 24 November (Social evening and presentations with Basil O'Brien, G2AMV, as guest of honour), 8 December (Chairman's night). D&Ws on 3, 17 November, 1 December. Meols, Oxton and Neston, 8pm. Irby Cricket Club, Irby Mill Road, Irby. 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)—7 November (AGM), 5 December, 7.30pm. The Royal Hotel, Church Street, Barnsley. Sec G4LUE.

Goole (G&DARS)—2 November (RSGB video), 9 November ("Broadcast listening", by G8IOH), 16 November (Quiz night), 23 November ("Video engineering"), 30 November (On the air), 7 December (Project evening), 7.30pm. Goole Junior Chamber Buildings, 17 Boothferry Road, Goole. Chairman, G3VBI. Details from G8IOH or G8VHL.

Members of the South Cheshire ARS celebrate the 80th birthday of Arthur Bagley, G3JJS. L to r: G8MAI, G4LVR, G8PMP, G3IVX, G3JJS, G8THX, G8UVN and G4ERQ



Pontefract & D ARS held a foxhunt on 22 July which was won by G4BLT, who is here seen after receiving the winner's shield from G4PPO (l) watched by G6JPZ (r). *Photo:* G4ISU

Halifax (Northern Heights ARS)—First and third Wednesdays in each month, 7.45pm. Bradshaw Tavern, Bradshaw, nr Halifax. Sec G6CJL, tel Bradford 834442. The club net frequency is 145·275MHz.

Halifax (H&DARS)—First and third Tuesdays in each month, 16 November (Demo by Chris Moulding of Radio Services), 7.30pm. Clairmount Liberal Club, Clairmount Road, Halifax. Sec G4LEC, tel 0422 33080.

Leeds (White Rose RS)—Wednesdays, 8pm. Moortown Rugby Football Club, Moss Valley, Alwoodly, Leeds 17. 4 December (Christmas dinner). Club net 8pm, Thursdays, 3·775MHz or 21·35MHz depending on propagation. Sec G8UYZ.

Leeds (L&DARS)—Mondays, 8pm. Old Hall Golf Club, Woodhall Lane, Calverly, Leeds. Sec G6CJI, tel Dewsbury 455516. The club had almost a 100 per cent pass rate in the RAE. Their Christmas rally will be held on 12 December at Pudsey Civic Centre. Last year's was first class, should be worth a visit this year.

Mexborough (M&DARS)—Fridays, 7pm. Harrop Hall, Dolcliffe Road, Mexborough. New sec Mrs G. Drohen, 5 Swinburn Avenue, Adwick le Street, Doncaster.

Pontefract (P&DARS)—11 November ("Crime prevention", by Pc Reevel), 19 November (Annual dance with buffet), 25 November (RTTY demo), 9 December (Pie and pea evening). CW classes every Monday. The Carleton Community Centre, Pontefract. Sec G4ISU.

Spen Valley (SVARS)—Thursdays, 11 November, (Talk by the president, G3YPC), 25 November ("Gadgets in amateur radio", by G3UGF), 9 December (Committee/project night), 8pm. Old Bank Working Men's Club, Mirfield, W Yorks. Sec G4MLW.

Wakefield (NWRC)—Thursdays, 7.45pm. 25 November ("Reminiscences of World War Two", by G4OOC), 9 December (Christmas dinner at Dam Inn, Wakefield). Carr Gate Working Man's Club, Wakefield. New sec G6ELC, tel 0532 536633. CW classes are being held each week, and a club project is in progress.

Wakefield (W&DARS)—2 November (Pie and pea supper at the Rose & Crown, Methley), 16 November (Film show), 30 November (Home computer evening), 14 December (Christmas social evening at Holmfield House), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G4BLT, tel Wakefield 255515.

York (YARS)—Fridays except the third in each month, 7.30pm. United Services Club, Micklegate, York. Sec Keith Cass, G3WVO. Following the club picnic in September, the members were filling in the odd moments until the dinner on 15 October by working club member Les, G4MIY/MM, on his yacht.

REGION 3—RR L. W. Craven, G4EQI, Grass Moor, Radford Road, Alvechurch, Birmingham B48 7DT. Tel 021-445 1347.

Atherstone (AARC)—11 November (AGM), 18 November (Informal meeting). The Tudor Centre, Coleshill Road, Atherstone. Sec G4IAG, tel Fillongley (0676) 41814.

Birmingham (Midland ARS)—16 November (Surplus sale), 7.30pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham RS)—3 November (AGM), 7.45pm. All members please attend. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G8RGQ, tel 021-459 8312.

Bromsgrove (B&DARC)—12 November (Talk by MH/MS Repeater Group), 23 November (Visit to Harris Brush Works), 26 November (QRP night), 8pm. Avoncroft Art Centre, Bromsgrove. Sec G4LVK, tel 021-445 2088.

Hereford (HARS)—5 November (Grand surplus &

equipment sale), 19 November (Talk & demonstration of slow-scan tv by Grant Dixon, G8CGK), 8pm. Civil Defence HQ, Gaol Street, Hereford. Sec G4CNY, tel Hereford (0432) 3237.

Much Wenlock (Wenlock ARES)—10 November (Natter night with informal computer demonstrations), 24 November ("South Shropshire mining history", by Ken Lock), 8.30pm. Raven Hotel, Much Wenlock. Sec G3ZSL, tel Bridgnorth (0746) 861332.

Redditch (RRS)—11 November ("Amateur radio through the years", by Tom Douglas, G3BA), 25 November (Natter night and rtty morse practice), 8pm. WRVS Centre, Ludlow Road, Redditch. Sec G3EVT, tel Alcester (0789) 762041.

Stourbridge (StARS)—1 November (Constructional evening), 15 November (Annual surplus sale), 7.45pm. Cross Inn, Hagley Road, Oldswinford, Stourbridge. Sec G8JTL, tel Lye (038482) 4019.

Stratford-upon-Avon (S-upon-A&DARC)—8 November ("Amateur radio on a shoestring", by Rev George Dobbs, G3RJV. Also on the same evening an official visit by the President of RSGB, Dr E. J. Allaway, G3FKM), 22 November ("Aircraft communications", by Greg Lovelock, G3IIII), 7.30pm. Bearley radio station, talk-in on S22. Programme sec G6CWK, tel Stratford (0789) 68863.

Sutton Coldfield (SCRS)—8 November (Natter night), 22 November (AGM), 7.30pm. Central Library, Sutton Coldfield. Sec G8TUR, tel 021-353 2061.

Telford (T&DARS)—3 November (G3ZME on the air, informal evening), 10 November ("Raynet in Shropshire", by Don, G6FHM), 24 November ("A new twist to co-ax", by Tony, G3DMC), 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G8UGL, tel Telford (0952) 584173.

Walsall (WARC)—3 November ("Antennas", talk and slides by G4FAJ), 17 November (G4HLL on the air), 1 December ("RSGB", talk by G4EQI, RR3), 8pm. Forest Comprehensive School, Bloxwich. Sec G4FAJ, tel Brownhills (05433) 2169.

Warwick (Mid-Warwickshire ARS)—2 November (RSGB audio-visual presentation "Satellite communications"), 16 November (Demonstration evening—members items). 61 Emscote Road, Warwick. Sec G8RZR, tel Warwick (0926) 499730.

Wolverhampton (WARS)—1 November ("Amateur satellites", talk by John, G8EDG), 8 November (Natter night), 15 November ("Field day, American style", slides/talk by Gordon, G4DGM), 22 November (Committee meeting, club room open to all members), 29 November ("TV outside broadcasting", talk by Joe, G8UGW), 8pm. Wolverhampton Chamber of Commerce & Industry, 93 Tettenhall Road, Wolverhampton WV3 9PE. Sec G8EDG, tel Wolverhampton (0902) 763617.

Worcester (W&DARC)—1 November (Club meeting and discussion on "Repeaters in the Severn Valley", to be held at Odd Fellows Club), 15 November (Informal club meeting to be held at Old Pheasant), 8pm. Odd Fellows Club, New Street, Worcester. New sec G4NRD, tel Evesham (0386) 41508.

REGION 4—RR M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. Tel Derby (0332) 556875.

Derby (D&DARS)—3 November (Junk sale), 10 November ("Paging systems", by Bert Mason, G4AOA), 17 November ("Heraldry", by George Treece, G3JIY), 24 November (Technical topics), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Mansfield (MARS)—5 November (Junk sale), 16 November (Social meeting), 7.30pm. New Victoria Social Club, Princes Street, Mansfield. Sec Duncan Walters, G4DFV, tel Mansfield 648679.

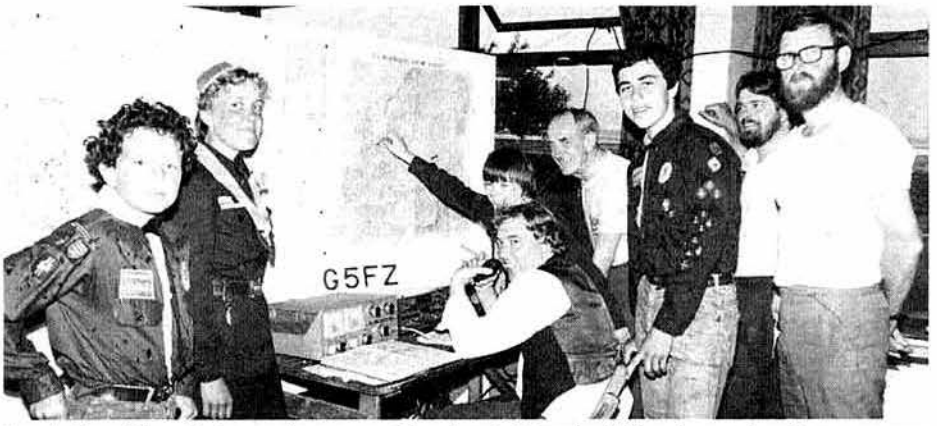
Newark (N&DARC)—4 November ("TVI, bci", a talk by Fred Ward, G2CVV), 2 December (Members' projects built during 1982), 7.30pm. Palace Theatre, Appleton Gate, Newark. Sec Roger Hiscock, G4MDV.

Scunthorpe (SARC)—2 November ("G2GZA in OK Land"), 9 November (AGM), 16 November ("Thoughts on hf receiver design", by G3PDL), 23 November (Visit to Scunthorpe Fire Station), 30 November (Natter night). Thursdays (Morse class by G3TMC), 7.30pm. Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. Sec Joe Sheardown, G8TIY, tel Scunthorpe 732438.

Spalding (S&DARS)—5 November (Construction contest for G2BQC Memorial Trophy), 10 December (Junk sale), 7.30pm. White Hart, Market Place, Spalding. Sec Ian Buffham, G3TMA, tel Spalding 3845.

REGION 5—RR J. S. Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT. Tel 0582 508515, or at work on 0582 21151, ext 200.

Bedford (B&DARC)—10 November (Question and answer session on local 432MHz repeater GB3BD, by G8ELA), 24 November (Talk on transistors by G4KWH), 7.30pm. The Club House, Ravensden. Sec G6JJT.



Lincoln Short Wave Club recently ran a special station for "Poacher '82", an international Scout camp at Lincolnshire Showground, operating G5FZ on hf and G6COL on vhf. Visitors to the station included Finnish Guide Anna-Marie (second left), and also in the photograph are G6EFQ (operating), G5NS behind, and G3PVU and G3XZF looking on. *Photo:* Fiona Hamilton

Cambridge (CUWS)—8 November ("Amateur tv", by Malcolm Appleby, G3ZNU), 22 November ("Satellite development in broadcasting", by Mr M. W. Harman of BBC Research). Informal evenings on Mondays in the St John's College bar. Details from T. J. Gleeson, G8TUG.

Dunstable Downs (DDRC)—Fridays, 5 November (Firework barbeque), 19 November (Constructor's contest), 8pm. Chews House, Dunstable. Sec C. Asquith, G4ENB.

Leighton Linslade (LLRC)—8 November ("Wheatstone's great invention", by Alan, G4ODI), 22 November ("Electronic surveying and geology", by Ian, G4JXZ), 7-10pm. Vandyke Community College, Room A64, Vandyke Road, Leighton Buzzard, Beds. Sec Peter Brazier, G6JFN.

March (M&DARS)—Informal meetings, as the club is looking for new premises. Details from sec G4KPZ.

Northampton (NRC)—4 November (Natter night), 11 November ("Digital to analog conversions, and vice versa", by G8EUX), 28 November ("FM technics, part 2", by G3NEV). Details from sec G3VMU.

Peterborough (GPARC)—25 November. Southfields Junior School, Stanground, Peterborough. Sec G8ZVW.

Shefford (S&DRS)—4 November (Constructors' contest), 11 November ("Nigeria", by John, G6JTT), 18 November ("Power supplies", by Terry, G4OXD), 25 November (Provisionally booked for "Technical topics", by Nick), 8pm. Church Hall, Shefford. Sec G4MEO.

Thanks to all the club secretaries who have supplied information this month. By the size of my mail bag it looks as if the summer holidays are over and clubs are preparing their autumn and winter season! —*RR5.*

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

Aylesbury (AVRS)—30 November (RSGB film show), 8pm. Stone Village Hall, Stone. Details from Mike Marsden, G8BQH, tel Aylesbury 641783.

High Wycombe (Chiltern ARC)—10 November (Committee meeting, JH Ltd), 24 November (Second leg inter-ARC quiz, Chiltern v Maidenhead). Sir William Ramsey's School, High Wycombe. Details from G3NCL, tel High Wycombe 712020.

Maidenhead (M&DARC)—4 November ("DX-pedition to Andorra", by Brian Coleman, G4NNS), 16 November (Talk on Maidenhead club history, by Eric Palmer, G3FVC). Red Cross Hall, The Crescent, Maidenhead, Berks. Details from Roger Hemmings, G3VCT, tel Bourne End (06285) 21036.

Vale of White Horse (WVHARS)—2 November (Junk sale), 7 December (Christmas social evening), 7.30 for 8pm. The White Hart Hotel, Harwell Village, Berks. All meetings will include morse lessons to begin at about 7.40pm. Sec Ian White, G3SEK, 52 Abingdon Road, Drayton, Abingdon, Berks. Tel 0235 89559.

With so many clubs in the region, RR6 should have a longer list, so please get in touch with him and give your club's programme.

REGION 7—RR Pat Walker, G8HMG, 12 Brownlow Road, Redhill, Surrey, RH1 6AW. Tel Redhill 64035.

Ashford (Echelford ARC)—Second Monday and last Thursday in each month, 8 November ("Maurice Davies talks on "Flight simulators"), 8pm. The Hall, St Martin's Court, Kingston Crescent, Ashford, Middlesex. Sec Anton Matthews, G3VFB, tel 01-892 2229.

Bexleyheath (North Kent RS)—First and third Tuesday in each month, 2 November ("Technical topics", by Pat Hawker, G3VA), 16 November (Quiz evening), 8pm. The Pop-In Parlour, Graham Road, Bexleyheath. Sec Pelham Conduit, G4KCZ.

Biggin Hill (BHARS)—A visit is planned to the Crystal Palace tv transmitting station on 16 November. Usually on the last Tuesday in the month in the Biggin Hill Memorial Library, 8pm. Sec Ian Mitchell, G4NSD, tel Biggin Hill 75785.

Coulsdon (CATS)—Second Monday in each month, 8 November (Construction contest), 7.30pm, St Swithun's Church Hall, Grovelands Road, Purley, Surrey. Sec A. R. Bartle, tel 01-684 0610. The first half-hour of each meeting is devoted to helping beginners and to morse practice.

Croydon (Surrey Radio Contact Club)—First and third Mondays in each month, 1 November ("The British Telecom national tv distribution network", by John Simkins, G8IYS), 8pm. The second meeting each month is an informal discussion with an opportunity to practice cw. TS Terra Nova, 34 The Waldrons, Croydon. Sec Ray Howells, G4FFY, tel 01-642 9871.

Crystal Palace (CP & DRC)—Third Saturday in each month, 8pm. All Saints Church Parish Rooms, Church Road, South Norwood SE25. Sec Geoff Stone, G3FZL, tel 01-699 6940.

Guildford (G & DRS)—Second and fourth Friday in each month, 12 November (RTTY night), 26 November (Construction contest), 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec Helen Mullenger, G8SXB, tel Aldershot 20384.

Kingston (K & DARS)—Third Wednesday in each month, 17 November (AGM), 8pm. Alfriston, 3 Berrylands Road, Surbiton. Sec Robin Pellatt, G4LJI, tel 01-399 8113.

Redhill (Reigate ATS)—Third Tuesday in each month, 16 November ("Raynet", by G4BLJ and members of the Surrey & Sussex Raynet Group), 8pm. Constitutional & Conservative Club, Warwick Road, Redhill. Sec Chris Barnes, G8FEE, 25 Hartswood Avenue, Reigate RH2 8ET.

Thames Ditton (Thames Valley ARTS)—First Tuesday in each month, 1 December (Junk sale), 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec Julian Axe, G4EHN, tel 01-946 5669.

Would clubs in the region not mentioned here please send RR7 their winter programme as soon as possible.

REGION 8—RR K. A. Crouch, G8KEN, 14 Victoria Road, Capel-le-Ferne, Folkestone, Kent CT18 7IR. Tel 0303 55241.

Canterbury (EKRS)—4 November (TBA), 18 November (Natter night), 2 December (TBA). The Cabin, Kings Road, Herne Bay. Details from G8ELS. Listen to GB3KS for any updates on the above.

Chichester (C&DARC)—2 November ("Satellite broadcasting", by Jim Slater of IBA. Meet in the Long Room), 18 November (Club meets in Green Room), 7 December (Club meets in Long Room), 7.30pm. Fernleigh Centre, North Street, Chichester. Sec T. Allen, G4ETU, tel West Ashling 463.

Crawley (CARC)—3 November (Junk sale), 10 November (Informal at G3JKF), 24 November (Visit to Bredhurst Electronics), 8 December (Members' evening). Formal meetings on fourth Tuesday in each month at Trinity United Reformed Church, Ifield Drive, Crawley. Informal meetings on second Wednesday in each

month at members' homes, and consist of beer, sandwich, and a rag chew. Sec G4IQM.

Dartford Heath (DHDFC)—10 November (Meet at Malt Shovel PH, Eynsford), 14 November (DF hunt). Details from Steve, G4NKM.

Dover (SEKYMCAARC)—3 November (Natter night/committee meeting), 10 November (Construction update), 17 November (RNLI talk and film), 24 November (Visit to Dover Harbour Board. Confirm with Alan, G3VSU), 1 December (Natter night/committee meeting), 7.30pm for 8pm. YMCA, Leybourne Road, Dover. At 9pm the club shack is re-opened for members' use. Coffee bar open all evening. Details from G3VSU, G4EGQ, or G8KEN, or GB3KS on S20.

Eastbourne (Southdown ARS)—8 November (Committee Room No 1, Wealden District Council Offices, Vicarage Field, Hailsham), 14 November (SARS Fixed Station Contest, please support this event. The Devonshire Award will also be available. Contact G4MJC for list and information about this fine award), 7.30pm. The Chaseley Home for Disabled ex-Servicemen, Southcliff, Eastbourne. Details from sec G6BGT, tel Eastbourne 640727.

Hastings (HERC)—17 November ("Cassette mechanisms", by Mike Jones), 7.30pm. The club now has exclusive rights to two adjoining rooms, and use of the main hall and a committee room at the Ashdown Farm Residents Association Community Centre. Meetings on the third Monday in each month will continue at the West Hill Community Centre, but RAE, morse classes, micro nights and Friday meetings will be at the new venue. Details from Alan Beacher, G8VEM, tel Hastings 216516. *(RR8 would like to say that of all newsletters sent to me that of Hastings is the longest, most informative and best produced of all. Many thanks for the monthly issues.)*

Horsham (HARC)—4 November ("Direct broadcasting satellites", by Pat Hawker, G3VA), 8pm. The Guide HQ, Denne Road, Horsham. 2 December (AGM. Venue to be advised.) Details from Tony Wadsworth, G3NPF.

Maidstone (MYMCA ARC)—5 November (Beginners' RAE), 12 November (Bring & buy sale. This will be a mini rally with RSGB book stall. Lots of things to buy just in time for Christmas. Your support and money made very welcome), 19 November (Beginners' RAE), 26 November ("Layman's guide to air traffic control", by Dave, G6HXR), 3 December (Beginners' RAE), 8pm. YMCA Sports Centre, Melrose Close, Maidstone. Details from G4GKW or G4EMC.

Thanet (RCT)—5 November (Operating evening), 13 November (Wine & cheese party), 19 November (Talk on antennas, by G3LCK), 26 November (Visit to HM Coastguard at Dover), 8pm. Birchington Village Centre. Sec Ian Gane, G4NEF.

Tunbridge Wells (WKRS)—12 November (HF/vhf contest plans and natter night), 26 November ("African journey", by G4DME), 8pm. Adult Education Centre, Monson Road, Tunbridge Wells. Intermediate Tuesdays, Drill Hall, Victoria Road. Details from Brian, G4DYF, tel 0732 456708.

RSGB area rep Graham Edy has now moved, but can be contacted on Maidstone 29462. If you think your club or area should have an RSGB area representative then telephone RR8 for details of how to go about it. Several clubs have been approached by me to get representation in various areas but only one club has done anything positive. *73.*

REGION 9—RR W. J. Colclough, G3XC, Highview, Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Camborne (Cornish RAC)—4 November (Sale of surplus equipment). Computer section: 15 November ("Data processing", by Chris Guppy), 7.30pm. SWEB Room, Pool, Camborne. Congratulations to G8XNT, now G4PCW, and sec S. Rodda, G6DFE, now G4PEM.

Plymouth (PRC)—15 November (Talk and slides "Amateur radio yesterday and today", by RR9, W. J. Colclough, G3XC), 7.30pm. Tamar School, Paradise Road, Millbridge, Plymouth PL1 5QW. Pro Peter Connor, G8XTE, tel 0755 37319.

Saltash (S&DARC)—5 November (AGM), 19 November (The club's 400th meeting), 7.30pm. Toch H, Burraton, Saltash. Sec Kevin Hale, G6IEV, 12 Rashleigh Avenue, St Stevens, Saltash, Cornwall.

GW8BXQ, GW8XXH and GW3EMZ photographed at the Pembroke & D ARC "Bucket & Spade Party"

Torbay (TARS)—Fridays, 7.30pm. Last Saturday in each month, special meeting, 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay. Details from L. G. Mays, pro, "Atlanta", Clennon Avenue, Paignton, tel 0803 558714.

Treverbyn (English China Clay RC)—8 and 22 November (Meetings re-start at Pentewan Road Labs, St Austell). Items of interest planned for the winter season range from micros to 10GHz equipment. Sec M. Porter, G4OKS. Details from J. Redfern, G8HSZ, tel St Austell 3647.

REGION 10—RR P. A. Jones, GW4HAT, 68 Pastoral Way, Tycoch, Swansea SA2 9LY.

Abergavenny and Nevill Hall (A&NHARC)—This is the first entry for this long established club. Meetings are held Thursdays, 7.30pm. Above Male Ward 2, Pen y Val Hospital, Abergavenny. RAE classes are run each Tuesday, and as this is an affiliated RAE exam centre, interested people can register here for the December exam. Further details from sec D. F. Jones, GW3SSY, tel 0495 791617.

Aberystwyth (ARSGBG)—Next scheduled meetings (subject to confirmation), 16 November and 4 January 1983, 7.30pm. Bay Hotel, The Seafront, Aberystwyth. Sec Simon Mee, tel Aberystwyth 828365.

Bridgend (B&DARC)—10 November (Homebrew construction competition), 7.30pm. NCB Social Club, Tondu, Bridgend. Club net 145·325MHz, 7pm, Wednesdays. Sec Peter Lynn, GW8WCI, tel Bridgend 861115.

Newport (NARS)—Mondays, 13 December (ARRL film show), 7pm. Brynglas House, Brynglas Road, Newport. HF dx group meet Thursdays. Club station operational on 144MHz and hf. Sec Robert Johns, GW4NXD, tel Pontypool 56348.

Pembroke (PRSGBG)—26 November ("Preparing for the RAE", by GW6HYA), 7.30pm. The Defensible Barracks, Pembroke Dock. Sec Martin Shelley, GW3XJQ, tel Pendine 267.

Swansea (SARS)—First and Third Thursday in each month, 18 November (Lecture on the early days of television by Dr T. Davies, GW4ADL). Club station, GW4CC, with new hf rig, is now in full operation at each meeting. The club made a good score of over 1,200 contacts with 145 multipliers in the recent SSB Field Day (subject to confirmation). Club net Sundays, 1100gmt, 28·530MHz, controller Cen, GW4BIQ. 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)—11 November (Talk on maps and locators by GW2FLZ), 7.30pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec J. N. Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL28 7DS, tel 0745 823674.

Dolgellau (Meirion ARS) (GW4LZP)—4 November (Surplus gear sale), 2 December ("Dirty work on an oil rig", by John Morris, GW6DDF), 11 December (Annual Christmas dinner), 7.30pm. Nannau Hall Country Club, Llanfachreth, nr Dolgellau. Sec Mr R. Halhead, GW3KOR, Bryn Derw, Golf Road, Dolgellau.

Anglesey (ARG)—A new society. Contact Mr C. Williams, GW6DOK, Afallon, Llanddaniel-Fab, Gwynedd LL60 6NN, or GW8TKW, or GW4ODL, for information.

REGION 12—RR M. R. Hobson, GM8KPH, 4B Tummel Crescent, Pitlochry, Perthshire PH16 5DF. Tel 0796 2140.

Elgin (Moray Firth ARS)—First Monday in each month, 7.30pm. The Spey Bay Hotel, Spey Bay, Nr Fochabers. Wednesdays, 7.30pm. The Club Room, Moray College of Further Education, Elgin. Details from club sec Rev Stanley Bennie, tel Buckie (0542) 32312.

Perth (P&DARG)—Tuesdays, 8pm. Perth City Sports & Social Club, Leonard Street, Perth. Wednesdays from 29 October (Practical class and morse tuition). Details from club sec Richard Barnes, GM6ESY, tel 073882 575, work, or GM4DQJ.

REGION 13—RR A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.

Dunfermline (DARS)—Second Wednesday in each month, 7.30pm. Fraser Lounge, City Hotel, Bridge Street, Dunfermline. Details from GM3CIG.

Edinburgh (Lothians RS)—11 November (Surplus sale), 25 November (Superquiz), 9 December (TBA), 7.30pm. Drummond High School, Broughton Street, Edinburgh. Details GM6JAG, tel 031-664 5403.

Fife Raynet Group. Details from GM4LYQ.

Glenrothes (G&DARC)—Wednesdays and third Sunday in each month, 21 November ("Contests", by GM3YOR), 19 December (TBA), 7.30pm. Clubrooms, Provosts Lands, Leslie, Fife. Details from GM8ZTV, tel Kirkcaldy 203582.

The club will be holding their annual open night and get-together at the Laurel Bank Hotel, Markinch, Fife on 17 November at 7.30pm. GM3OLK will be giving a live demonstration of satellite tv during the evening and entrance free, £1.50, includes buffet supper.

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Colchester (CRA)—4 November ("Fast scan amateur television", by G4MYQ and G4JIE), 18 November ("Marconi, the man and his work", by J. Stanley-Wood of the Marconi Co Ltd), 2 December ("Care and use of batteries", by G8UNZ), 7.30pm. Colchester Institute. Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 70189.

Ipswich (IRC)—10 November ("Pilot tone ssb", by G4FZZ), 24 November ("Morse the easy way", by G4BAV), 8 December ("Amateur radio in the USA", G5EEP). Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

Norwich (Norfolk ARC)—3 November (Open evening), 10 November (Short meeting), 17 November ("QRP", a G4LDG special), 24 November (Short meeting), 1 December (RSGB film), 7.45pm. Crome Community Centre, Telegraph Lane East. Details from Paul Gunther, G8XBT, tel Norwich 6110247.

Vange (VARS)—4 November (Junk sale), 11 November ("Archery", by Terry), 18 November ("HF linear", by G3OCI), 25 November ("Antennas", by G3IOI), 2 December (Junk sale), 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)—17 November (Constructors' competition), 7.30pm. Chineham House, Popley, Basingstoke. Sec G6CPA, tel Tadley (07356) 4964.

Bournemouth (BRS)—5 November (Mini lectures by G4LKI), 19 November ("Prestel", by Mr Hope-Smith of British Telecom), 3 December (Receiver design by John Button), 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel Ferndown (0202) 877945.

Fareham (F&DARC)—3 November (Natter night), 10 November ("DX on the hf bands", by G4JCC) 17 November (Natter night), 24 November (Mystery talk by G4IJP), 7.30pm. Portchester Community Centre, Sec G4ITG, tel Fareham (0329) 234904.

Farnborough (F&DRS)—10 November (Surplus equipment sale), 24 November (AGM), 7.30pm, Railway Enthusiasts Club, Farnborough. Sec G4BJQ, tel Farnborough (0252) 43036.

Winchester (WARC)—18 December (New members' night), 8pm. Log Cabin, Stockbridge Road. Anybody interested in joining the club is invited along. Seasonal food and drink will be available at this, the last meeting in 1982. Sec G6FBR, tel Winchester (0962) 66764.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ. Tel 0272 848140.

Bristol (BRSGBG)—29 November ("The GB3AA repeater", by Terry Rowe, G8NNU), 7.30pm. Queens Building, Bristol University. Details from Chris Short, G8GLQ, tel 0272 621253.

Bristol (Shirehampton ARC)—5 November (Construction contest), 12 and 19 November (Impromptu talks and demonstrations), 26 November (Junk sale/auction), 7pm. Twyford House, Shirehampton. Details from Ron Ford, G4GTD.

Cheltenham (Smiths Industries RS)—Second Thursday in each month, 7.30pm. Club House, Newlands, Bishops Cleeve. HF, vhf and fstv operating under the club callsign G4MEN. Morse tuition is also available. Details from sec, c/o Sports & Social Club Office, Smiths Industries Aviation Division, Evesham Road, Bishops Cleeve, Cheltenham, Glos GL52 4SF.

Gloucester (GARS)—Thursdays. 4 November ("Amateur radio on a shoestring", by Rev Dobbs), 7.30pm, Chequers Bridge Centre, Painswick Road, Gloucester. Members are reminded of the construction contest for homebrew QRP equipment, also on 4 November. 2 December ("A Police talk on crime prevention"). Details from Tony Martin, G4HBV.

Yeovil (Y&DARC)—4 November (RSGB tape and slide "Further thoughts on propagation"), 11 November ("Moonbounce" by G4DGU (Mutek)), 18 November ("How to use a Smith chart" by G3MYM), 25 November (Committee meeting and natter night), 7.30pm, Building 101, Houndstone Camp, Yeovil. Details from Don McLean, G3NOF, tel 0935 24956.

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 **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

Unused Gem Quad, garden too small to build this fine antenna, £90. Will exchange for good cond triband beam, two- or three-element. Please write or call at 506 Evesham Road, Crabbs Cross, Redditch, Worcs.

FT720 Yaesu control head, 2m deck, 70cm deck available, virtually unmarked, £145 ono. M. Hurrell. Tel Shorne 3856, evenings or Medway 46284, day.

Yaesu FT101, 160-10m, WWV (ok for 10MHz), cw filter, fan, mic, good cond, performance, 11th 1982 RSGB 7MHz cw, £260. *Wanted:* urgently, Drake T4X or T4XB and AC4. Would also consider TR4. G3ZZD. Tel Steve Ireland, 0892-34117.

Pye boot mount Cambridge, converted to fm, 6ch, all leads, control box, £50 ono. Creed 6S6 reader, £10. Creed 7TR3 perforator, £15. Creed 7E printer and cover, £20. All can be seen working. G8HQS, QTHR. Tel 021-706 8752.

Hustler 5BVT 10-80m trap vertical, good cond, £45. G. Rust, G6KND. Tel Earith (Cambs) (0487) 842050, evenings, Cambridge (0223) 312448, business.

10A stabilized pu, 13·8 or 24V, new, £35. Airmec lab power unit (ideal linear), Crabtree 60A elcb, new, £25. 30ft heavy duty armoured cable, ok house/shack link, £15. Second world war radio and test equipment. GW8TSP, QTHR. Tel 0639 820356.

Trio TS520S hf tx/rx, 160-10m, vgc, £340. DG5 digital readout counter, £65. FT290R, mobile mount, unused, £225. G3UCE, QTHR. Tel Heysham 51760, evening.

Sommerkamp TS280FM 40-8W, £120. MM converter, 144 hf, £10. AR88D for spares, £10. *Wireless World* Teletext unit, works, boxed, £85. Philips W4506 reel-to-reel, 207 by 0·25in tapes, good cond, four-track, £150. Tel Gravesend 872392.

QRP TenTec PM2B cw tx/rx, covering 80, 40, 20m bands, in wkg order, 2W dc input to pa stage, any offers. G3PKR, QTHR.

Trio JR500S hf rx, 160-10m manual, £45. DX160 gen cov rx, 1·55-30MHz, long, medium waves, external spkr, manual, exc cond, 240V or 12V, £65. G8SIG, QTHR. Tel 06065 54178.

Yaesu FT101ZD Mk2, a.m., cw filter, fan, WARC bands, 18 months old, mint, £465. ATU FC10Y twin meters, £75. G4KHL, QTHR. Tel Fleetwood 71586.

1155 wartime rx with df antenna, USA R210 rx, seven bands, hf, both wkg with own power supply, £30. Telequipment oscilloscope, double trace, as new, £85. *Wanted:* good mobile hf tx/rx, new bands not important. G4HRT, QTHR. Tel 0532 665568.

Collins radio, exc cond. Tel Derby 557705.

STE Milan Arac 170 multimode 10m, 70cm rx, used little, £90. Philips valved cctv system, comp, may need attention, exchange for 23cm transverter, offers. W.H.Y? GW6AYM, QTHR. Tel Swansea (0792) 204146, evenings.

Tower: 40ft heavy duty fixed base mount Westower, retracts to approx 25ft, tiltover capability, only 2yr old, in immac cond, suitable for up to full size hf beams etc, £300 ono. G3XLG, QTHR (Oxon). Tel 0608 737567.

FT221R 2m base station, all mode, 15W, listen on input, vfo, 88 xtal channels optional, clean rig, going sstv hence sale, best offer secures. GI6JSL NOT QTHR. Tel Seamus, Newry (Co Down) 61125, 9am-5.30pm, Monday to Saturday.

Icom IC240 2m fm mobile rig, modified 54 channels, mobile mount, leads, mic, manual, boxed, good cond, £110. Sony two-head open reel stereo tape deck TC266, £20. G8YPJ NOT QTHR. Tel 0296 28399.

Datong model D70 morse tutor, cond as new, £30. G4NTJ. Tel Loughborough (0509) 842936.

FRDX400S, comp with matching spkr, £140. KW swr meter, 75Ω, vgc, £15. Tel Frank, Swanley (Kent) 63968.

FT401 560 p.e.p., 80-10m, cw filter, fan, SP401, £250. MEL 100 p.e.p. 2-16MHz xtal control tx/rx, £50. HB Bantam nicads, charger, £50. G3ZVC 9MHz tx/rx board, cw filter, £40. 898 dial, £10. SL611C (3), SL612C (3), SL620C, SL621C (2), SL622C (2), SL630C (7), SL1626 (6), offers. G3YGM, QTHR. Tel Falmouth (0326) 311506.

TR2300, fine cond, reverse repeater mod, accessories (except batteries), £105. VB2300 10W pa, £45. MB2 mounting bracket, £10. Belcom psu, £10. LAR psu/charger, £15. All manuals and orig packing. Postage and packing inclusive. GW4CPZ, QTHR.

FT101E, 160-10m, mint cond, mic, orig packing, operating and workshop manuals, £350. DC supply for FT200 (DC200), £50. Generator 12V, 25A, wkg order, £35. *Wanted:* Drake TR7, SP7. G4AQA, QTHR. Tel 0482 655856.

FT101ZD-AM, £640. TR2300, £165. 3in scope, £100. ATU, £28 ono. All unused, in box. AVO Mk7, £40. Heathkit transistor tester, IT18, £25. Heathkit sig gen RF1U, £25. Calibrator, £8. Mullard valve tester with cards, £30. Portable valve tester, £35 or w.h.y? Scotch copier, £60. Tel 051-548 6111, after 6pm.

2m fm Cambridge rx, tx, 6ch, manual, Jaybeam ground plane antenna, ready to go, £45. 15 Mere Farm Road, Oxton, Birkenhead, Merseyside. Tel Ian, 051-653 7042.

Racal RA17 with manual, offers? Buyer must collect. G8OTB, QTHR. Tel Nick, Cambridge (0223) 353631, weekday evenings (late) only.

Morse Tutor D70, £35. CWR600 Morse Master, receive only, output on uhf, domestic tv (cw, 350wpm, rtty), three months old, demonstration by appointment, £160. Sanyo spkrs, 40W, stands, 18 by 11 by 6·5in, £60. Tel Steve, 01-514 3904.

Trio TR7010 2m ssb only tx/rx, £85. Microwave Modules MMT28/144, three months old, £80. *Wanted:* SP101 for FT101E. G4NKT, ex-G8DVQ, QTHR. Tel 0272 564740.

KW2000B, good cond throughout, frequency stability mods, recently re-valved, ac psu, spkr, manual, circuit diagram, £200, carriage paid. G3VOO, QTHR. Tel Blandford (Dorset) (0258-87) 648 after 6pm or at weekends.

KW2000A, ac, psu, spkr, manual, circuit diagrams, Shure mic, rfc/m speech clipper, spare valves, £165. G3DWS, QTHR. Tel 021-475 6267.

Cupboards, each 6 by 3 by 1·5ft with shelves and locking doors, £70 each. Buyer(s) collect. L. J. Devaney. Tel 01-579 2424, ext 2565, day time only.

FL2100B linear amplifier, mint. 2m Pye Cambridge mobile, boot-mounted, all cables, control unit, antenna, £35. GDO with all coils. All property of deceased amateur. Enquiries G8BJP, QTHR. Tel 0843 31069, evenings.

FT101 Mk2, fan, mic, orig packing, wide filter fitted in a.m. mode, £270 ono. Buyer pays carriage. G8ETR. Tel 0245 83262.

Swan 700CX, matching 230XC psu/spkr, Datong asp, Yaesu fist mic, manual, spare valves, lovely rig, runs full legal limit, £350. G4IOU, QTHR. Tel Congleton 5194.

Icom 701, £575. Trio 520, £325. Tono Theta 7000 communications computer, £385. All immac, possibly deliver. G3NZT. Tel Newby Bridge (0448) 31550.

50Ω carbon resistors, brand new, dissipate 150W in air, 250W in oil, suit coaxial construction, £13. G3PVD, QTHR. Tel 061-487 1376.

Liner 2 2m ssb with 10m modification, two tx/rxs in one, preamp, piptone, manual, mod sheets, good cond, £90 ono, or exchange for 2m fm equipment, any type or cond. G6BGW, QTHR. Tel 061-665 1722.

CQ, CQ, CQ: calling all RSGB members who would like some decent hi-fi gear, namely my Hafler DH101 preamp. It is new and unused, built and tested. I need the QRK urgently, hence only £150. G6HPQ NOT QTHR. Tel 0702 351936.

FT290R with mods by ARE, nicads, charger, soft case, MML 144/30LS, the lot for £275 ono. Hardly been used, going QRT. Buyer collects. G6AWI, QTHR. Tel 01-423 1602.

Gem quad 2-el antenna, good cond, used two weeks before mishap, now repaired and ok, £90 ono. Buyer to collect. G4AGP, QTHR. Tel Newcastle-upon-Tyne 684605, evenings after 6pm.

Icom 2E handheld, used little, comp with charger, instructions, £125 ono. Pair PF1s on RB4, wkg, incl batteries, homebrew charger, £25 ono. One PF1 rx, no receive xtal, £5 ono. Tel Benfleet 58364.

Cabinet AR88, good cond, £6. Antenna, 2m 5/8 whip, unused, £5. Buyer collect. Tel Luton 27595.

FRG7700 memory, FRT7700 atu, orig packing, manual, used little, as new, prefer buyer collect, but will include Securicor delivery within reason, price around £295. Tel Peter J. Willars, Northampton (0604) 407840.

TR2200GX 2m tx/rx, fitted S10, S16-23, R0, R4, R6 xtals, nicads, charger, flexiwhip, £75 ono. G4NVB/G8TTK, QTHR. Tel 0908 647033.

TS130S, in mint cond, PS30 psu, both as new, workshop service manual, £520 plus p&p. No haggling please. ASR33 110 band printer, keyboard (ASCII), stand, £70 ono. Buyer collects or pays petrol. Tel Gt Wenham (Suffolk) 311665, after 6pm.

Eddystone 358X, gc, all coils (40kHz-31MHz), manual, homebrew psu, £40. Ambit 9ch 2m monitor, xtalled for R6, cased, £25. Tradiper gdo, £8. Homebrew scope, wkg, but needs attention, £10. B. Kemp. Tel Cambridge (0223) 64352, after 6pm.

KW202 rx, wkg but needs slight attention, buyer to collect, offers. G4MU, QTHR. Tel 0604 582951.

Kenwood TR7730 2m mobile tx/rx, 25W output, eight months old, hardly used, as new, £200. G4MUT. Tel Reading (0734) 693766.

Datong D70 morse tutor, £35. Morse key, Admy patt No 7681, £11. Both as new. Collect or postage extra. G6IKG. Tel 0444 451346 (West Sussex).

American URA8A frequency shift converter, loop supply, £40. Creed 8BRP printer, Creed 85R reperf, £20 each. Boonton 232A glide scope generator, £15. Advance type H1 audio gen, £15. Eddystone 640 rx, rough but sharp, £20. Collect. G3JDK, QTHR.

HF solidstate separates, Redifon 1·5-30MHz channelized, a.m., cw, ssb, integral psus, comp with circuits, technical manuals, both wkg, ideal basis for homebrew vfo mod—I'm lazy, gone JA, £95 ono. W.H.Y? G4KMU, QTHR. Tel Botley 3605.

AR40 rotator and control box, £30. Transformer, 2300-1750-0-1750-2300 at 1·75kVA, £15. Buyer collects. G3OHE, QTHR. Tel 0429 61186.

Standard C78 70cm portable/mobile with nicads, charger, CMB8 mobile bracket, CPB78 10W amp/preamp, all in orig packing, manuals, Oscar, 3 by 5λ/8 mobile colinear antenna, magmount, £275 the lot. G4LGK, QTHR. Tel 09064 22060.

Homebrew mains psu, 150V, stab 300V, 1,000V, suit LG300, £10. Hallicrafter S20R Sky Champion, handbook, wkg, £20. KW low pass filter, £5. Two boxed RCA 813s, two boxed English 813s, offers. Russian multimeter, £10. Stone, G3JFC, QTHR. Tel Crayford 522489.

Hygain 12AVQ vertical, 10, 15, 20m, comp with radials, good dxer, as new, £30. Comp RAE correspondence course, £20. Tel Redditch (Worcs) 41158.

FT101B, in exc cond, plastic cover on front panel, as new, comp with cw filter. G3VHA, QTHR. Tel 0562 730484.

TS120S, PS30 psu, AT120 antenna tuner, MC30S

mic, standby set, used little, £375 ono. Pye Westminster, fm, 6ch tx/rx. B. Tatterson, 70 Stoney Lane, Lightcliffe, Halifax. Tel Brighouse 711758, after 6pm.

160,000μF, 20V, 57,000, 50V, £1 each. 5 by 6in heatsinks, with 2 by 2N3055 or similar, £2·50. Pye vhf base station, QQV06-40A pa, £10. DA30, P27/500 valves, new, boxed, many others similar era, 50p each. Offers for lot? Tel Mark, Atherstone (Warks) 3874.

Racal RA17 rx, 0-30MHz, full coverage, bandspread facility, full scale covers 1MHz, 100Hz-5kHz bandwidth, exc cond, £150 or exchange 2m equipment. G6LDK. Tel Graham, Wakefield (0924) 368463, home.

Eddystone 730/1A rx, 500kHz-30MHz, £80. G3XVL. Tel Chesham 784883.

KW2000E, ac psu, 12V dc psu, Shure desk mic, £250 ono. G4LVI, QTHR. Tel 061-865 2535.

Trio FT3200 12ch 70cm portable, eight channels fitted, cw mic, 5/8 whip, carrying case, mobile mount, dc lead, charger, new nicads, new magnetic mount, 2 × 5/8 whip (λ/4 on 2m), manual, workshop manual, £150. G3IDW, QTHR. Tel Swindon 822055.

TR7500 2m tx/rx, good cond, £140 ono. Tel Manchester (061) 860 6444.

FT901D, memory, fm unit, a.m. filter, SP901, £645. FT480R, £290. MMC1296/28 converter, £20. MMT432/144 transverter, £95. MMV1296/432 varactor, £18. G4BEL, QTHR. Tel Ely 740355, evenings.

Icom IC210, orig, unmodified, good cond, manual, mic, matching psu, £150. Trio R1000 rx, boxed, £220. G4MPD. Tel Northwich 47552.

Trio JR310 rx, SP5DX spkr, 144MHz conv, £100. Pentax S1a slr camera, 1:2/55, case, £40. Auto lenses Super Takumar, 1:3·5/35, £40. Hanimex 1:2·8/135, £30. Weston Master V, £20. All exc cond. Tel Loughborough 263711.

TR7800 2m fm 25W low pwr posn, 15 memories, priority channel, memory scan, keyboard entries, repeater shifts, up/down mic, £160 ono. G4FAS, QTHR. Tel 061-437 7784 (NE Cheshire).

Winkler switches, two bank, two pole, 24° index, eqpt, £1 each. Ribbon cable, 14-way, 14/0076, approx 100yd, 25p/yd, or £20 the lot. 1,800ft instrumentation tape, 0·5in wide, 6in spool, unused, £10. G8MUX. Tel Disley (06632) 2707.

Trio TS180S, psu, mic, 1·8kHz ssb, 500Hz cw filters, memory unit, new bands, £600. R1000, comp, £200. Both in exc cond, orig packing. G4EBL, QTHR. Tel 021-777 4901, evenings.

Drake T4XC, R4C, AC4P/S, unused, kept as spare rig, two manuals, £500 cash. Buyer collects. *Wanted:* Shure 444 mic. G2UZ, QTHR. Tel Leeds 784074.

Sommerkamp TS280FM, 10W, vgc, £100. *PW* 2m converter, in diecast box, £7. QQV03/20A with base, £5. All post extra at cost. *Wanted:* MM144/28 transverter. G3RB, QTHR. Tel Whitley Bay 530504.

TS520SE, immac cond, cw filter fitted, accessories, £330. Golfbag antenna, offers? Tel Rushden (Northants) 59169.

Surplus to requirements: 42ft framed base mount, dismantled, still under manufacturer's warranty, £400 ono. Frequency calibrator CT432, £15. Six-el Jaybeam quad, assembled, never used, spare elements, £25. Buyers to collect all items. Tel Mike, 02572 65748, after 5.30pm, weekdays.

Exchange Icom 255E, in vgc, for Icom 402 straight swop. Would consider buying IC402 for cash. G3GZQ, QTHR. Tel 036-44 3608, evenings or weekends.

Yaesu FT290R, multimode 2m tx/rx, nicads, charger, carrying case, helical, mobile mount, £225. G6DZQ. Tel Norwich (0603) 614167.

Medical student in debt: IC202 144·0-144·8 2m ssb tx/rx, in exc cond, all accessories, incl nicads, charger, £100. MML144/25; 25W linear amplifier, £30. Icom SM2 desk mic, in perfect cond, £20. All above plus wavemeter, powermeter, 2-el HB9CV antenna, comp set of leads, perfect base or portable station, £150 ono. G8OIU NOT QTHR. Tel 01-254 5724.

Eddystone 750 rx, £50. Europa C 2m transverter, repeater shifts, FT101 leads, £65. Heathkit SB610 monitorscope, £50. New hand mic, 600Ω, £5. Londex 12V relay, £5. New CDE rotator motor TRA94, £10. All plus carriage. G3IDW, QTHR. Tel Swindon 822055.

Shack clearance: Liner 2, £75; RA1 rx, £25; Avo sig gen, £20; 1in vidicon scan coil, £5; 70cm cavity wave meter, £5; many more bits, all ono. *Wanted:* PET two disk. W.H.Y? G4ANP, QTHR. Tel 0709 893995.

Bearcat, £150. BC221, £10. Europa B, £40. TF338 attenuator, £5. 1·8MHz, a.m./cw tx, mains/12V, £10. Redifon TR286, £20. 70cm 8/8, £3. 2m 5-el, £3. Valves, components, books, mags, sae list. G3JKY, 25 Clarendon Rise, Lewisham SE13 5ES. Tel 01-852 6028.

Webster 9MHz ssb eight-pole xtal filter, PW Helford pcbs, tx ferrites for transformers 9MHz board, assembled, not wkg, £60 incl postage. GW6CIR. Tel 0352 713987.

Collector's item: Hallicrafters S36A vhf comms rx, 27-146MHz, US Navy model RBK13, wkg order, orig cond, no manual, circuit inside lid, some spare valves, £25. Class D wavemeter, £10. Tel 0272 843321, Bristol area.

Icom IC255E, 25W 2m fm, good cond, normal plus scanning mics, mobile bracket, £170. Marconi sig gen, a.m., fm faulty, with cct, £20. Heavy, so buyer collects. G3VEZ, QTHR. Tel Bournemouth (0202) 425044, after 5pm.

Marconi R220/R220, two receivers in one cabinet, ideal 4m set-up, handbook, mint cond, £25. Collins R390A/URR, triple conversion superhet, three handbooks, cabinet, £200. Tel Kettering (0536) 511940.

Creed 7DRP teleprinter, very clean, good worker, £15. Creed 6S6M tape reader, £10. Creed 85R printing reperforator, keyboard, homebrew wooden silence box, £5. Nagard 5101 pulse group generator, £10. Buyer collects. G4GGC, QTHR. Tel 0787 71842 (Suffolk).

TS180S solidstate hf rig, matching PS30, ATU180, mic, memory backup, manuals, mint cond, used little as back-up rig only, all boxed, ready to operate 100W station, £650 ono. G4LOA. Tel Mike, Guildford (0483) 67288, evenings, Walton (09322) 46396, days.

KW600 linear, £60. GLA1000, new, £250. *Wanted:* One or two pairs of QY3-125s. High voltage wkg decoupling capacitors, 0·01 or thereabouts. Tel Colwyn Bay 55156.

FT901DM, £595. FV901DM, £160. FTV901R, 2m/70cm, £330. FP901 with phone patch, £45. YC30S, £55. CPU2500RK, £180. FRG7000, £200. FC901 atu, £100. MM2000, £100. BC221, 240V ps, £15. All mint. Copley-May, Flat 21, 17 Clarges Street, W1Y 7PG. Tel 01-499 0264.

Swan 350 hf tx/rx, 10-80m, cw mic, £150. KW107 Supermatch, £75. HQ1 minibeam, £80. 30ft galvanized tubular tower, 3 by 10ft sections (dismantled), £90. Buyers collect. G4GYC, QTHR. Tel Ruislip (08956) 72543.

FT101B, used little, mic 444, spare pas, orig packing, operating manual, £325 ono. G3LLL clipper for above included. G4EXK, QTHR.

Calscope 10MHz dual beam scope, probes, instructions, £75. TMK 500 multimeter, £10. Chess-computer Challenger, 10 levels, £35. Revox B77 recorder, three motors, two speeds, 10·5in nab reels, £350. Offers or exchange 2m fm mobile equipment. Cooper, RS50155. Tel Chelmsford 469683.

FT902DM hf tx/rx, comp with SP901 spkr, YH55 headphones, all items six months old, change of QTH forces sale, £750. G6CHB, QTHR. Tel 0632 462606.

Wayne-Kerr lcr bridge type B121, precision instrument, exc cond, £25. Comprehensive technical manuals TS239, USM32, USM38, USM50, £10 each. URM25D, TS175B, TS186D, HRO50, RA98B, £7·50 each. CT212, RA17L, RA137, HRO7, £6·50 each. Postage extra. *Wanted:* 6J4WAs (CV5029). G3GUU, QTHR.

Scope Telequipment D53 dual trace, dc to 25MHz, in good wkg order, manual, £100 ono. G6DQV NOT QTHR. Tel Oxford (0865) 59291, ext 331, day, 725421, night.

Skyrace R517 handled aircraft rx, as new, £30. Drake R7 rx service manual, new, £10 plus p&p. Coombe Cottage, Pitchcombe, Stroud, Glos GL6 6LL. Tel Stroud 3081.

Teletype ASR33 model, paper tape reader, punch, comp with makers floor stand, one owner since new, orig cost over £900, exc cond, spare paper rolls etc, ideal computer terminal, rtty etc, bargain for quick sale, £135. G3EKF, QTHR. Tel 0420-62952.

2m linear, Mirage B1016, 10W input/200W min output, as new cond, orig pkg, £150 or swop TR2300. VB2300, mobile mount etc, or w.h.y? G6BJA. Tel Andy, 0226 82290, day, 41943, evenings or weekends.

TS120S, VFO120, mint cond, orig boxes, manuals, mobile mount, £395 ono. Microwave Modules MM144/28 transverter, £55. G3LMH, QTHR. Tel 0962 881644.

FT401 560W p.e.p. tx/rx, cw filter, hb, £250. 15ft telescopic antenna with insulated base, £10. Walters type 51 morse key, £8. RN stainless steel key, £10. 400-0-400V, 400mA transformer, 0-40-45V 400mA transformer, 20-0-20V transformer, 5H, 0·06A choke. G3YGM, QTHR. Tel 0326 311506.

Heathkit HW12 tx/rx, 3·6-3·8MHz ssb, 200W, HP23 matching power supply, must be collected, £70. Multiband traps, 1kW epoxy moulded, £5. G3JBU, QTHR. Tel 0604 401800.

FT101EE, FV101B, as new, used only for transverting, £340. General radio unit oscillators types 1209B, 1218A, 250-950MHz, 900-2000MHz, offers. G8KWI, QTHR. Tel 0276 27601.

IC2E, 10MHz coverage, comp, as orig, DC1 (13·8-9·5V converter for mobile use), hardly ever used, £120. G8ZNI, QTHR. Tel Bracknell (0344) 84969.

Realistic PRO2001 vhf-uhf scanning rx, exc cond, used little, Discone antenna, £100. Datong AD270 active antenna, psu, £30. Mizuho receiving atu, kilohertz Sky Coupler, £15. Tel 01-458 1523.

FT277/FT101, fan, mic, spare valves, handbook, £195. FL2277/FL2100 linear, handbook, £150. FT101 spkr/phonepatch, £30. Beautiful FT101 quality leather carrying case, £35. Lot for £390. FT207R, handbook, spkr/mic, nicads, antenna, mains charger, £140. NC2 battery eliminator/quick charger, £30. RSL145GP 5 λ/8 ant, £15. Lot for £175. W3DZZ 1kW multiband antenna (cost £40), damaged/repairable, £15. Blaupunkt "Frankfurt" car radio, sw/mw/lw/vhf fm, push button/manual tuning, exc cond, £45. Taylor, G3UCT, QTHR. Tel Fleet (02514) 6998.

Drake R4B, T4XB, power supply overhauled and revalved by agents, 160 to 10m, £375 ono. Drake TR4C, power supply, 300W p.e.p., 80-10m, good cond, £300 ono. GW8TDJ, QTHR. Tel 0443 226650, after 5pm.

Yaesu FT708R 70cm tx/rx handheld, unused, incl two nicad packs, £125. G8ZFF. Tel Hatfield (07072) 62745.

US Navy field strength meter, 100-156MHz, mint cond, £15. Deluxe roller coaster, geared drive, turns indicator, new, boxed, £20. Army morse key on polished wood base, new, £5·50. All plus postage. *Wanted:* 3B22 mv rects. Manual, Furzehill VTVM200. G3GUU, QTHR.

40ft two section tower, comp with 21ft heavy duty ground post, £150. G3VQL, QTHR. Tel Shrewsbury 55179.

Nascom 1, unexpanded, Kansas City tape interface, £100, buyer collects. Trio TR7200G 1/10W, fitted S20-22, R0, R4-7, £120, no offers. G4BVC, QTHR. Tel Leicester 708585.

Two cheap psus, 13·8V, one at 5A, one at 8A, £5 each plus carriage. Philips tape recorder EL3302, vgc, £5. Suitable psu, £5. SD306 preamp, 144MHz, £3. G8ESK, QTHR. Tel 0274 45611.

Pye Bantam fm, £30 ono. Freq meter BC221, £20 ono. G4JMV, QTHR. Tel 051-486 8319.

Shack clearance, must sell: *Rad Com* 1976-82, *SWM* 1975-8, *PW* 1970-82, *PE* 1967-74, £1 each plus large sae. TV 1972 and 1978, same price. Robin Bayley, 8 Field Lane, Kemberton, Shifnal, Salop.

SEM Ezitune, SO239 sockets, will also test resonant freq of antennas, list £30, accept £20. KW75 low pass filter, SO239 sockets. G2UZ, QTHR. Tel Leeds 784074.

Ambit G3WPO gdo, fully assembled, wkg, £15. Bradley CT471C multimeter, mains battery probes, manual, offers. Avo 7, needs attention, £10. Evershed and Vignoles dionic conductivity apparatus, comp with case, wkg, offers. Lonnon. Tel 025-681 298, evenings.

Racal RA117 rx, RA98 sideband adaptor, MA197B pre-selector, manuals, lot, £200. B40, £35. B41, £15. Trio TR2300 fm portable, £95. Thomas, GW4AXR. Tel Swansea (0792) 74671.

FT150 Sommerkamp, vgc, reasonable offer, EC10, mint. batt/mains, £70. Datong morse tutor, £36. Dual 505 record player, new, boxed, £60 ono. *Wanted:* 2m ssb/cw tx/rx. Telescopic antenna pole. G2CYN. Tel Bedford 711538, weekends.

Telequipment D43 D-beam scope, 15MHz, handbook, wkg, £60 ono. *Wanted:* xtal filter, KVG XF51A and any other spares for FT75. Motor for golfball typewriter. HD rotator (cowl gill). Tel Horndean (0705) 596058, evenings.

Keyboard morse sender, variable speed, cw monitor, 9V operation, £35. EK9X Katsúmi electronic keyer, £15. Heathkit reflected power meter, 75Ω, £10. G3UQZ, QTHR. Tel 021-373 8806.

Icom IC4E 70cm fm tx/rx, nicads, charger, case, λ/4 whip, mint, boxed, £150. AR245 2m fm tx/rx, 5W, nicads, charger, extension spkr mic, car charger, case, boxed, £125. G6IHI. Tel Keith, Tiptree 815468.

Mullard high speed valve tester, Avo valve tester, both comp, instructions etc, Taylor 65A sig gen, Pye component tester, Atlas trapped vertical antenna, 40/20/15/10, TW2 with power pack, offers. G3GXX, QTHR. Tel 058 3679.

Property of late Alan Fletcher: high class lab and receiving equipment, generally in superb cond, eg Plessey RC411R, £350. R390A, £375. HP175A 50MHz oscilloscope, £150. Many other items. Tel Bob, 0602 255493, or John, 0733 67604, for further details. Lists from F. J. Branson, 111 Park Road, Peterborough.

Trio TS830S, fitted cw filter, exc cond, £600. High stability communications rx, Marconi model type H2301, 500kHz, 30·5MHz in 30 switched ranges, xtal controlled, manual, £300. Eddystone 770R rx, mint cond, manual, £140. G4IZG, QTHR. Tel 0903 41109.

2m ssb G3ZVC module, £50. DJ5HD vfo, suits G3ZVC, £25. Both incl circuits. QM70 2W linear, bandpass filter, for G3ZVC, £30. Marconi BD871 camera channel, lens, manual, £35. Sensible offers considered. Buyer collect/carriage extra. G8KZG. Tel Wargrave 3121.

Heath HR1680 ssb cw rx, good clean cond, perfect wkg order, £150. Buyer collects or pays carriage. L. Mann, 7 Homefield Close, Swanley, Kent. Tel Swanley 63605, after 6pm.

Trio 9500 70cm multimode, two months old, mint cond, £350. G6ADL, QTHR. Tel Kettering 710004.

CDR rotator type AR44, controller, about 20ft of

control cable, suitable for 3-el beam, £49. Buyer collects or pays carriage. G3GVV, QTHR. Tel Tonbridge 353360.

144MHz 15W linear, £30. Band two fm stereo, 6-el Yagi, £5. Black and white 14in uhf tv, £35. Transformer, 21V, 5A, £3·50. PF1 pocketphone rx adaptor, £6. G8KMV, QTHR. Tel 0438-54689.

Pye Westminster dash mount, 144·750, S20, S22, R0, R4, R6, 10W, £70. Ferguson Courier mono portable, £40. MMC435/600, £20. Jaybeam 5Y/2M, £8. Ringo Ranger ARX2, £18. 70cm 5/8 folded colinear, £5. *Wanted:* Storno BU501A battery, Pye W15U pa unit, 4·5 or 10W version. Prefer buyers inspect/collect, otherwise carriage at cost. G6ACI, QTHR. Tel Don, 051-260 9085, evenings.

Mizuho Sky Coupler atu, £25. Microwave Modules 2m converter, output 28-30MHz, £15. Hamgear PM11DX preselector (mains), in nicer case, covers 1·8-30MHz, £10. FR101 manual with circuit, £3. Heathkit HR10B manual, £1. All plus postage. Tel 0224 638089.

SOTA SCL144P 2m linear, 10W in, 100W out, 12V dc, rx preamp, £80. G4NNO/G8IHP, QTHR. Tel 0742 57189.

FT101E, first class cond, mic, spare output, driver valves, ZL2BAF mod, professionally installed, orig packing, £335. Highmound morse key, as new, £8. G4FST, QTHR. Tel Christchurch (0202) 483962.

Pye Ranger tx/rx, 2m, spares, £15 or will split. 2m conv 4-6MHz i.f., £12·50. HB 14ft wooden mast, £7·50. 5Y/2M, £8. SR9 2m mon rx, £37·50. 19 set valves, offers? Buyers collect. G6ANP, QTHR Avon. Tel 027583-2768, weekends.

KW2000A, psu, stabilized, immac, overhauled, new 6146Bs, £185. KW2000, psu, exc cond, overhauled, new pa, £130. FT725RVH fm 2m 25W tx/rx, scanner, memories, brand new, £195. G3TSL, QTHR. Tel Mike, Blackpool (0253) 52453, anytime.

HW101, HP23A psu, £150. GC1U rx Mohican, £30. All in exc cond, service manuals. Buyer collects. G3ONL NOT QTHR. Tel Debenham (Suffolk) (0728) 860607.

88mH toroids, American, suit BARTG, ST6 etc, £2·25 each inclusive. *Wanted:* Hygain 18AVT or 14AVQ. *CQ Magazine* 1975-80. Chris Pedder, G3VBL, Thorncliffe, 5 Royalty Lane, New Longton, Preston, Lancs PR4 4JD. Tel Preston (0772) 612289.

Datong rf speech processor, battery holder damaged, £49. Datong morse tutor, cost £49·45, £25. MM 144/40, £25. All good cond. Reason for selling going hf. Buyer collects or carriage extra, Can deliver 25 miles Manchester. G8XAT, QTHR. Tel 061-224 8925.

Yaesu 901DM, as new, no mods, £550. Drake 12V dc mobile power supply for Drake tx/rx, unused, £40. Storno 600 12ch radiotelephone, 136 to 174MHz, £110. Mains power supply for Eddystone EC10, model 700, £18. Storno 6ch uhf radiotelephone, new, £120. Burns frequency standard "Locks to Droitwich" transmitter, £40. Datong morse tutor, £37. *Wanted:* single-paddle morse key. Balun unit suitable for TA33 beam. G4HYQ, c/o 14 Spring Meadow, off Holly Spring Lane, Bracknell, Berks. Tel 0344 3696, evenings. This equipment will not be available until after 14 November as the owner is living abroad and will not be returning until this date.

TS700 144MHz multimode, 240/12V, £250. 11 xtals for TS700 popular channels, £20. U450 70cm tx/rx, xtalled 433·2, £25. 70cm Cambridge, xtalled six channels with fittings, £55. FT202, xtalled six channels, with nicads, £80. G8BEQ, QTHR (Hyde, Manchester). Tel 061-368 9019.

Video tape, Sony high density 0·5in b&w, vgc, 5in, £2. 7in, £3, plus p&p. G3UDV. Tel 01-998 6225, 7-9pm.

Sinclair mini tv, cw nicads, ac pack, etc, exchange for w.h.y? GW3COI, QTHR. Tel Abersoch 2675.

1,296MHz items: MM transverter, £125. Mutek LNA, gain block, bpf, £25. Four by 23-el Tonna with frame coupler, £100. 4ft dish alloy, £25. Dish feed Mutek, £25. German pa module, 250W rf out, hb psu, £190. Details G3SPJ, QTHR. Tel 01-311 8405.

Daiwa DR7600R rotor, £105. Ham M rotor, needs slight attention, £65. Hygain 40m beam, offers. Hustler mobile antenna, 80/40/10m, resonators, etc, £45. Trap dipole, 40/80m, W3-2000 £20. Datong speech clipper, £35. 4m AM25B, offers. MK Products slow scan monitor, needs attention, offers. G3VOF. Tel Ingrebourne 73366.

FT200 tx/rx, FP200 ac psu/spkr, all 10m xtals fitted, vgc, manual, spare valves, £215. SEM ·Tranzmatch atu, 80-10m, vgc, £38. Hansen FS5E swr/power meter (dual), boxed, as new, £18. G4MOW. Tel Blandford (Dorset) (0258) 53930.

FT101B tx/rx, mains/12V, mic, leads etc, £280. Datong rfa broadband preamp, 5-200MHz, £22. SEM 70cm preamp, £5. Drake TR7/TR5/R7, 500Hz cw filter, £30. Tel Poulter, G3WHK, QTHR. Tel 01-330 5795, after 6pm.

IC202S 2m ssb, one year old, orig packaging, £110 or exchange hf gear, HW8, w.h.y. with cash adjustment. 4-el quad Yagi, never used outside, £18. Buyer collects. G6CXL. Tel Sheffield (0742) 443797.

Daiwa automatic atu, 2·5kW high power model CN2002, mint, boxed, £150 ono. 2m solidstate linear, 3W for 100W output, 13·5V at 16A, £75 ono. G4GZS, QTHR. Tel Rugby 815506.

2m station: FT290R, three months old, nicads, charger, swr meter, new Jaybeam 4-el quad, Ultra Slim Jim, retreating to hf, £200. G3RRG, QTHR. Tel 061-442 8534.

TS830S incl 250Hz cw filter, VFO230, five memories, SP230 with audio filters, almost new, absolutely immac, comp, £750. FT225RD, 2m multimode, Mutek rf board, absolutely immac, offers over £540. All above boxed, as new. G3TSL, QTHR. Tel Mike, Blackpool (0253) 52453.

UV eproms, 5V, 2716, £1. 2532/2732, £2. 2564, £5 + 50p post any quantity. Discounts for 25 or over. Linsley-Hood cassette deck (Hart kit), perfect, £50. G3VMK, QTHR. Tel 0602 635170.

As new, cartonned and under warranty, Azden PCS300 fm handheld, 144-146MHz, output one or 3W, band or memory scan, lcd readout, charger, nicad pack, handbook, £168. Post extra. Tel Frome (Somerset) 64694.

FR and FLDX400S, Yaesu, in vgc, orig panel covers, can be seen wkg, £275 the pair. Buyer collects. Tel Arundel 883157, after 8pm.

Datong D75 rf speech processor, connecting cables for Yaesu, as new, £35. Codar PR30 pre-selector, 1·5-30MHz, £8. G4MOW. Tel Blandford Forum (Dorset) (0258) 53930.

40ft crank-up, tiltover tower, post mounting, £250. TA33JR, coaxial, £65. G3JAH, QTHR. Tel Kirkham (Lancs) 683150.

IC251E, £375. IC451E, £495. MM50/432, preamp, £80. MM100/144, £95. MM 23cm transverter, £120. Four by 23-el for 23cm splitter, 65ft helic cable, £165. Tel 0621 741515.

VHF-uhf varactor multiplier (Pye), suitable 2m-70cm, £5·50. Centre zero meter, 100-0-100A for vswr or fm use, £1.20. 10A mains filter, assy (Belling Lee), £5·50. Jaybeam chimney mounting kit for antenna mast, £6. G4GCJ, QTHR. Tel 0908 644253.

Monitorscope YO100, as new, £60. G-whip mobile antenna, bumper mount, 10, 15, 20, 80m, £30. J. West. Tel 01-577 0872, or 04446-3141, evenings.

Trio TR9000, used little, full service manual, £285. BO9 base plinth for the above, £20. G8YFZ, QTHR. Tel Southport (0704) 42664.

MZ80K computer tapes, rtty tx/rx, £7·50. Morse rx autospeed, £5. Listings, £4 and £3. All comp with simple i/o circuit. 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.

Heathkit HW32 20m ssb tx/rx, spares, handbook, £65. Hallicrafter S20A rx, spare valves, £20. ZVC ssb tx/rx board, £30. Geloso 2m vfo, £5. G4JUM, QTHR. Tel 03722 75798, after 6pm.

MM1000, morse keyboard, mint, £80. Yaesu FT202R, 6ch handle, nicads, NC1 charger, £75. Realistic, PRO2008 dig scanning rx, 68-512MHz, £55. All items plus carriage. G4BYG, QTHR. Tel Hull, 659947, after 6pm.

TS530S, not used transmit, fitted cw filter, £475 ono. AT230, £80. Both mint. G3UEY, QTHR. Tel Pershore 553037.

Going QRT: FT101EE 160-10m, £325. FL2, incl mpu, £65. E-Zee Match, £20. 12AVQ (unused), £35. 15m dipole, other accessories, manuals, sae for details. G4FKE, QTHR. Tel Slough 25416, evenings, Iver (0753) 654011, days.

HW101 heavy hb psu, mic, manual, will deliver up to 50 miles, or buyer collect, £140. MM 145/28MHz, lo converter, £15. G3MWO, QTHR. Tel Beyton (Suffolk) (0359) 70218.

Reluctantly going QRT. Hence all my mint equipment offered at 30 to 50 per cent below list: 30ft Alumast, Western DXF33 tribander and balun, CDE TR44 rotator, 40m RG8U coaxial, eight wire control cable, used four months only, £370; Icom IC701, psu/spkr, electret mic, £668; Yaesu YO301 monitorscope, £120; Daiwa CNA1001 automatic atu, £100; Yaesu 202R 6ch handheld, nicads, case, NC1 charger, £85; HAL DKB2010 keyboard, 2k store, three programmed memories, sends rtty at four speeds, morse 3-100wpm, morse tutor, £173; HAL RVD1005 vdu, converts rtty send and receive to video, £140; HAL ST6 terminal unit, FSK, AFSK, auto-start, self-contained loop supply, tuning meter, compatible with above keyboard and vdu, £90; Professional b&w monitor, 12in flat-faced black screen, metal cabinet on tilt and swivel mount, £60; Yaesu desk mic, 500Ω, £10. Heath Cantenna 1kW dummy load, filled transformer oil, £10; Nagasawa TWS120N two-way uhf coaxial switch, gold-plated connectors, comp with three "N" plugs, unused, £16; Hansen swr meter, £10; Dowkey coaxial relay, unused, £10; five-band trapped dipole, £10. All carriage extra. J. L. Barry, Apple Holt, Queens Grove, Penselwood, Wincanton, Soms. Tel Bourton 840138.

Creed 444 teleprinter, 250V ac, 50 baud machine, £65. Elliott EF628 uhf base station, 10W, comp with manual, £20. Bay 96 varactor tripler, 15W in, 9W out, £7·50. 144MHz preamp, £9. GW8HDH, QTHR. Tel 0792 202287.

FT101B, mint, £350. Yaesu FC902 atu, as new, £125. Tel Great Yarmouth 700344.

Jaybeam 8XY 2m antenna, comp with phasing harness, £20 ono. G6DXR. Tel 021-354 4125.

Icom 240, 12 months old, mobile bracket, manual, all channels wired in, mag mount, swr meter, immac, £135. Buyer collects, going hf. G6GKN, QTHR. Tel Tadley 2798, evenings.

FT7, 80/10 tx/rx, hardly used, £250. GW3COI, QTHR. Tel Abersoch 2675.

FT290R, nicads, charger, Hokuskin GPV5 colinear antenna, Jaybeam HO/2M halo antenna, stabilized mains power supply, all new July 1982, cost £324, offers for the lot please. Going QRT. G6FB, QTHR (nr Portsmouth). Tel 0705 370087.

Yaesu FRG7000 gen cov rx, features 250kHz, 29·9MHz, a.m./ssb digital frequency readout, digital clock/timer, preselector, fine tuning, volume/tone control, exc cond, £200 ono. Harding, 23 Winston Avenue, Ipswich. Tel 74015.

Property of late G6BQ: Drake 2C, Q-multiplier, auto transformer, circuit, £120. HRO 5T, psu, spkr, two sets of coils, superb 160m bs coil, £45. ETM2B keyer, £25. Variac controlled psu, 0-3kV, 1A, £50. Drake TV3300 lp filter, £12. LG300, lp filter, £30. US Navy wavemeter LM14 (BC221 equivalent), psu, charts, £20. Vespa Mk1 psu, £15. Avo model 7, £5. Collins 500Hz, 455kHz mechanical filter, £15. 833A boxed, new, £40 each. 813, £3 each. Bases, £1·50. Boxed 805, £2 each. Large ceramic 5p 2W switch, £5. 1,000pF widespaced capacitor, £15. RF25 unit, £2. Q5er, £2. HT psus, capacitors, other items please enquire. G4BUO. Tel 0732 359742.

HA600, hambands bandspread, gc, good order, £17. MM 144/4 converter, homebrew psu, marker, £25 lot. *PW* timestep 3·5 digit counter, ok top and 80, built, tested, case unfinished, £15. Homebrew items, good appearance, drawings supplied. G4LEG, QTHR. Tel 0329 46984, after 6pm.

Racal RA17, rack mounting, handbook, buyer collects, £99. G3GVV, QTHR. Tel Tonbridge 353360.

FT290R, mint, few hours use, nicads, £200. Microwave Modules 70cm conv, 28MHz i.f., £12. 50W 2m linear, as new, £25. G3ZAG, QTHR. Tel 01-205 5601, weekends only.

KW2000A ac psu, spkr, manual, circuit diagram, £125 ono. G3HPB, QTHR. Tel 0903 65486, after 6pm.

Manuals: GEC BRT400/402, Pye base PTC703Z 704Z, Ranger PTC2001/2, Bendix Compass rx SCR269A/C, Hudson AM105/108, KW2000B. Hallicrafters HA1 digital keyer, £25. Manuals, £2 plus postage. G3ANK, QTHR. Tel 01-302 0865.

Free IC22A when you donate £80 to the G6ATA multimode appeal. S8, S19-23, 144·8, R0-7, RR5, 7, input R0, 6, mobile mount, preamp, auto tb. G6ATA, QTHR. Tel 0235 24184.

Two 13-el portable Tonnas with homebrew power combiner, £50 (might split). Toyo T435 power meter, £19. MMA 144V preamp, £19. Power supply, 28V at 3·5A, £15. *Wanted:* Bird thruline vhf/uhf elements. G8KAX. Tel John, Hornchurch 57782, evenings.

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.

Daiwa DR7500X rotator, new, tested, boxed, £75. Yaesu 202R, fitted S20-23, R2, R3, spkr/mic, nicads, charger, case, handbook, unboxed but vgc, £75. Heathkit HA201A fm 10W amp, vgc, £18. G3AES, QTHR. Tel Hull (0482) 54335.

FT101 Mk2, 10-160m, fan, mic, spare valves, exc cond, £250. Comdel CSP11 rf speech processor, £10. BC221 with tables, £5. One QV06/20 and two QQV06-40A, new, £5. G4KWL, QTHR. Tel Reading (0734) 871330.

Trio TR3200 70cm fm handheld, fitted RB0, RB2, RB4, RB6, RB10-11, RB13-14, SU8, SU20, nicads, special charger, helical antenna, 5λ/8 whip, good cond, £120. G8FSL, QTHR. Tel 01-360 5221 (north London/south Herts border).

BC348Q rx, psu mod, £15 ono. Drake DL300W dummy load, £12. Drake TV3300 lp filter, £10. Cambridge ant noise bridge, £5. £35 the lot. Cash and carry please. G4KKG, QTHR. Tel Yeovil (0935) 25327.

Yaesu FT480R 2m multimode, £220. Microwave Modules 144/100S linear, £70. Drake 12A 13·8V psu, £35. LAR vhf Omnimatch, £15. Daiwa CN540 swr

meter, £18. Datong morse tutor, £25. Morse key HK707, £6. All as new, boxed. G6CIG, QTHR. Tel 0234 41013.

W1191 heterodyne wavemeter, 100kHz-23MHz, 2V filament valves, recently built mains psu in battery compartment, £15. Unused, boxed valves: E55L, A2674, A2688 (vhf low noise triode), all £6 each. CV3998 (5A/170K, E180F), £2. G3UYD, QTHR. Tel 04215-2309.

Trio R1000, 12V dc adaptor, reason for sale replaced by FRG7700, exc cond, £180. Tel Kings Langley (Herts) (09277) 65713.

Trio TS180S, all bands, all filters, Trio psu, one owner, mint, delivery negotiable, £520. Ham rotator, £70. Trio TL922 linear amp, 160-10m, 2kW, £500. 100ft 12-core cable, £20. GM4AGS, QTHR. Tel 0382 543113.

Icom 701 psu, desk mic, as new, 10h use only, 18AVQ/WB, £600. Nascom 48k, cased, monitor, basic progs, etc, gift at £195. G8VPE. Tel Great Yarmouth (0493) 728194.

Search-9 2m rx, vfo, three xtals fitted, 3A power supply, discone base antenna, 26-514MHz, λ/4 mobile antenna, £60. *Wanted:* 70cm tx/rx, Wood & Douglas, Pye Westminster etc. S. Clifton, 97 Redland Drive, Kingsthorpe, Northampton.

Standard C78 70cm fm portable, CP78 10W linear, CM8 bracket, CL8 case, £160 the lot. As new, boxed. G6CIG, QTHR. Tel 0234 41013.

Oscilloscope: Hitachi V302B, dc-30MHz, dual trace, two probes, new, boxed, £260. IC240, mint, £130. IC22A, 16 channels, £75. Hokushin 2m 7/8, £8. *Radio Communication* vols 1968-81, 50p per volume. Burndept miniature 70cm tx board, £3. G4BWW, QTHR. Tel Southport 29036.

Argonaut 515 with psu, cw filter, calibrator, £220. GW4LZA NOT QTHR. Tel Anglesey (0248) 713262, after 10 November.

Trio 120S, hf tx/rx, AT120 matching tuner, noise cancelling mic, exc cond, £425. Yaesu 480R, rev rep mods, £290. 48K Nascom 2, much expanded, interested? G4HWL, QTHR. Tel Petersfield (0730) 4059, evenings and weekends.

RTTY-sstv shack clearance: Creed 75 printer; Creed 6S/6M tape reader auto-tx, rtty motor-speed strobe forks, 87·6, 125, 150V; many *RTTY Journal (USA)* back issues; SSM1 sstv monitor; Hammarlund HQ129X hf rx; BC221 freq meter; unused HC6U xtals, 38·666, 27·500, 9·000MHz. All at low prices or offers considered. Free Mosley V-4-6 vertical (collect). G2FUD, QTHR. Tel 061-928 1321.

Trio TS515/PS515, 180W, mint cond, no faults, £230. G3JJA, QTHR. Tel 0270 69708.

Trio R1000 communications rx, exc cond, orig packing, £195. Tel Bracknell (0344) 50359.

HF atu, Amtech 300, perfect cond, takes long wire or PL239 coaxial connectors, £25. Tel Basildon (0268) 20801, evenings and weekends.

Southport QTH: three bedrooms, hobbies room, adjoining two famous golf courses, authorized Versatower, offers over £55,000 house, and over £50,000 land. Appointment to view. G3THJ, QTHR. Tel Southport 65131.

Pye Cambridge hi-band fm wkg, no mods, exchange for lo-band fm or Westminster, must be wkg. G4OSR, QTHR. Tel Long Eaton 63914 (Nr Nottingham).

Roland DS1 distortion pedal, £15. Ross RE261 stereo headphones, boxed, as new, £20. 1:1 dipole, T-piece, baluns, £12. SWR/pwr AEC, SWR, 50A, 150MHz, £10. Yaesu YD148 dual impedance desk mic, boxed, as new, £15. Tel Richard, 0376 21869, after 6pm.

KDK 10SX Digital Two, 2m fm tx/rx, over 10W output, vgc, £140. Standard C146A 5ch portable, 2W output, xtalled S20-22, R3, R6 nicads, charger, ext mic, £65. Carriage extra. G8GCU NOT QTHR. Tel Heathfield 3122 (Sussex).

Trio TS530S, YK88SN narrow ssb filter, mint cond, 10 months old, £450 plus carriage, no offers. SP230, £25. *Wanted:* Fourth edn *RSGB Handbook*. G4GCU NOT QTHR. Tel 0642 456292, after 6pm.

Versatower P60, unused winch, cables, two sets Courlene guys, counterweights, all fittings, good cond, less than current 30ft price, £380. Ham M rotator with cable, £100. AR40, £35. G3THJ, QTHR. Tel Southport 65131.

ITT SF1 Starphones, one xtalled RB10, one xtalled SU8, incl charger, nicads, £35 each or £60 pair. Two Pye AM10B Cambridges, high band 12·5kHz, incl control gear, £25 each or £40 pair. Walters, G8JGF, QTHR. Tel Ridley (0773) 862289.

Yaesu FT130V 10W hf tx/rx, new bands, in perfect cond, purchased new on 10.8.82, £400. Tel Fareham 236906, weekends or evenings only, please.

SB200 Heathkit 80/10 linear, £180. HM102 power swr meter, £25. AR88D, S-meter, spare valves, museum piece vibrator, dc psu, £60. All with instruction manuals. G3THJ, QTHR. Tel Southport 65131.

Yaesu FT902DM, FC902, YD148 fm filter, a.m. filter, WARC, hardly used, £850. Need money for own new company. Tel Ripley (0773) 860952.

FRG7 fm, fine tune fitted, £150. Trio 2400 2m handheld, base charger, mic, case, mobile charger, spare nicads, handbooks, all vgc, £220. Multitester, £15. All ono for quick sale. Buyer collects or arranges transport. G8SBU, QTHR. Tel 0329 232799, evenings and weekends.

Antenna farm materials for all bands, Yagi, quad, rhombic, etc, aluminium plastic tubes, steel heavy duty masts, bases, cast aluminium spiders for quad/Yagi, thick/thin coaxial insulators, thick Courlene guys etc. G3THJ, QTHR. Tel Southport 65131.

Trio 9R59DE gen cov rx, matching spkrs, in orig packing, manual, good cond, selling as I have purchased an hf tx/rx, £60. Richard Everitt, 15 St Mary's Road, Bluntisham, Huntingdon, Cambs. Tel Ramsey (0487) 840968, after 6pm.

4CX350 2m linear parts, comp, all metalwork, fans, vhf/uhf base/chimney, 1182-0-1182 400mA transformer, rect and reg boards, high volt caps, three valves, as per *VHF Communications* 2/1978, £85. Eddystone 770S uhf rx, good cond, wkg, comp with case, offers. WW teletext decoder, comp with all options, wkg, boxed, £75. Roll op HP85 thermal paper, £5. G8NTH. Tel Guildford (0483) 34954, after 6pm.

Ferguson stereo reel recorder, Sanyo stereo portable cassette recorder, loud spkrs, headphones, technical books, *Radio Communication* 1964-82, comp, valves, resistors, capacitors, insulators, etc, moving house. G3THJ, QTHR. Tel Southport 65131.

FT200, psu, all 10m, ideal for starting on hf bands, £200 ono. G4JTR, QTHR. Tel Reading 476873.

KW Vespa Mk2, Lafayette HA350 rx, Sphinx tx, US Army bug key, homebrew 1kW linear. Property of the late G6YC, the lot, £100. G3CDM, QTHR. Tel Darlington (0325) 58365.

Datong PC1 gen cov receive converter, as new cond, £75. G3GVC, QTHR. Tel Doug, Horndean (0705) 595448, after 6pm.

Homebrew psu, all in one neat cabinet, individually fused, switched 750V, 250mA, 315V, 130mA, 210V, 50mA, stab 12V 100mA, stab −150V 50mA bias, variable stab, 6V ac, 6A, £55. G2CNN, QTHR. Tel Mundford 326.

Bungalow: approx 1,300 sq ft area, 850ft asl, south facing, two garages, large outbuilding, approx 7 acres intersected by trout river, no Indian or antenna problems, poles in for V beams, caravan potential, details Baker, New Bungalow, Bontnewydd, Aberystwyth. Tel 097421 608.

Trio TR2200GX, 12 channels, fully xtalled, simplex S16, S19, S20-23, repeaters R1, R3-7, R0 spare, mint cond, comp with nicads, charger, case, strap, a real bargain at £80 ono. G6CUN. Tel 0242 515074.

UB10BN Cambridge, 6ch, all xtalled, SU8, SU18, RB2, RB4, RB6, RB10, boot mounting, comp with all harness, spkr, mic, control box, £35. G8DPW, QTHR. Tel 0732 832032.

FT101E with 10MHz and cw filter, 240V ac or 12V dc, mint cond, orig packing, plastic cover on front panel intact, £360. Drake MN7 300W atu and power meter combined, bal/unbal/lw inputs, mint, £90. G4OBK. Tel Chorley (Lancs) 74451.

TS520SE, Kenwood, as new, orig packing, manual, desk mic, 2yr old, but used little, £340. G4KNP NOT QTHR. Tel Canterbury (0227) 711383, between 5 and 7pm any evening.

Surplus to requirements: in orig boxes, Palm 6, seven xtals, charger, £100. 700E 2m fm, £100. 7800 70cm fm, £180. Lunar 160W 2m linear fm, £110. Key T901 Curtis keyer, £12·50. Carriage at cost. G3BKL, QTHR. Tel 0980 862489, after 7pm.

FDK Quartz 16, R1-7, S20-23, mobile bracket, mic, cheap, ideal first 2m rig, £80. G3WPB. Tel Ferndown (Dorset) (0202) 644546.

TS520, £340 ono. Two Mk123 sets, some spares, £60 and £30 each. PF70, xtalled on SU8, £40. G4GOP, QTHR. Tel 0532 785724, evenings, 6-7pm.

2m linear, Electronic Developments type 144S, ssb, fm, 100W p.e.p. out, integral psu, rf switched fan, preamp, used little, cost £145, £70. GW8HVK, QTHR (Dyfed). Tel 09747 281.

Xtals: many and various, cheap, sae list. G3GAD, QTHR.

QTH Blackburn: superb hf/vhf location on 500ft hill, three bed semi det, gas ch, det garage, large garden, vacant possession, lovely views, £27,000 ono. G4DVI, QTHR. Tel 061-442 8518.

Europa B 2m transverter, with 640 pa, £60 ono. *Wanted:* Trio TS520 ext vfo or dig reader. W.H.Y? G4NQB. Tel Stan, Wolverhampton 764214.

Exchange 1969 Nikon F camera, photomic head, 50mm by 1·4, 28mm by 3·5, 200mm by 3·5 lenses, all in used cond, for 2m multimode, anything considered. G6IVC. Tel Martyn, Southport 35775.

Liner 2, £50. Philips 22in ctv, vgc, £69. 200 valves, old and new, offers? Trio 9R59, £15. Sound City 120A, speakers, £99. Telequipment S32A scope, £30. QQV0640 linear, psu, £30. Dual gate mosfets, 27P ctv, monitor, gwo, £25. *Rad Coms*, offers. Tel 01-360 0210.

FDK Multi 3000, 1-10W, 144-148, 2m multimode, base, mobile, ac/dc, six memories, vox, repeater shift, toneburst, rit digital readout, exc rig, £275. Postage extra. GM6HNA, QTHR. Tel 0387 62146.

Sommerkamp TS280 2m fm 80ch synth, 10W rig, unmarked, mic, manual, mobile bracket, box, swap for Heathkit WH101 or hf tx/rx, good wkg order, or sell, £130. G6DMQ. Tel Wolverhampton (0902) 332295, only after 11 December.

FRG7, 12 months old, exc cond, hardly used, no mods, manual, owner gone G6, £140 ono. Tel Keswick 72500.

FRG7, battery holder, freq meter, one year old, as new, £150. Will ship Securicor. GM5DRY. Tel Aberdeen (0224) 23553.

FDK 700EX 25W fm tx/rx, as new, boxed, £120. G3XCE, QTHR.

WANTED

Yaesu FT2FB series front end rx board/components. I need the first stage and helical filter missing from rx purchased secondhand. Please telephone if you can help. G8BIH. Tel John, 0420 82739, any time.

Collector requires pre-1930 radio items: xtal sets, wireless rxs, horn spkrs, wireless magazines and books. Any literature on pre-war television. G4OGT. Tel 01-660 2240, evenings only.

6A7 valve for LM13 freq meter (UX7 based), Eddystone S750 rx. *For sale:* AR88D with correct S-meter, good cond, handbook, offers invited. Marconi TF517 sig gen, 18-58, 140-300MHz, £10 ono. C. Collins, G3THX, 60 Alexandra Road, Skegness, Lincs PE25 3RE.

Matched pair output transistors and driver for Atlas 210X. G4OGB. Tel 0427 752528.

ZX80/81 rtty information. Programmes, new keyboard, baud rate change etc. Auto speed tracking cw receive programme. Beg, borrow or buy! David, G4JLU, QTHR.

Second world war radio equipment for private collection. No 19 sets, incomplete units considered. RS40042. 2 Park Road, Amersham, Bucks. Tel Amersham 6881.

Drake L4B lin amp and MN2000. Collins tx/rxs. Must be in wkg cond. Tel Derby 557705.

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.

For the Wireless Museum: radio mags, books, catalogues, QSL cards, service-sheets, Gamages catalogue, any old knobs! Keys, valves, cartridge player, Tractrix horn, Voight pick-up. Collection arranged. Details please to hon curator, G3KPO, QTHR. Tel Ryde (0983) 62513.

Wiring diagram or manual for Eddystone S740. Borrow or buy. Expenses paid. Bill Dunn. Tel 041-886 3746, after 6pm.

KW107 or KW109. Henson, 11 Potters Croft, Horsham, Sussex. Tel Horsham (0403) 61923.

Circuits or manuals for Heathkit GR91 rx and GD1U grid dip meter, buy or borrow. G8ASP, QTHR. Tel 05827 3770.

Transformer, 20-0-20V, 2A capacitor, ·001μF, 5kV, 250pF tuning capacitor, transmitting type, all needed to get my hf linear on the air. G4COY, QTHR.

SN7600 ind repeat ind, new or ex-equip for repair of Heathkit GR9900TV. GM4HBM, QTHR. Tel Cumbernauld (023-67) 25104, evenings.

Datong morse tutor D70 for hire or sale to housebound ham. Would like to study for my class A licence, so let me be the first to congratulate you on getting yours. G8RSL, QTHR. Tel Iver 651716.

BPO type 610 morse key with large knob, or the old Griffin London No 423 Mk3, 1914 key. Must be in good cond. Details and price to GW4JKR, QTHR. Tel Llanfairpwll (Anglesey, N. Wales) 715582.

For Commodore VIC20 computer: pre-programmed cassette or program listings on morse tuition. RS49701, 15B Seymour Gardens, Ilford, Essex.

QTH: VK6MI/G2CXO foreign service officer returning to UK on retirement in November seeks good hf dx QTH in southern England, preferably within 100 miles of London but would consider attractive locations further afield. Detached house, minimum three bedrooms. Price range probably £45,000 to £70,000. Approved beam installation or planning permission essential. Details to G. Miles OBE, c/o 33 Silverdale Road, Petts Wood, Kent BR5 1NH.

Old timer requires ssb hf tx/rx, must be reasonable price, valves no objection if current, must be in wkg order. G3AEC, QTHR. Tel 08854 248.

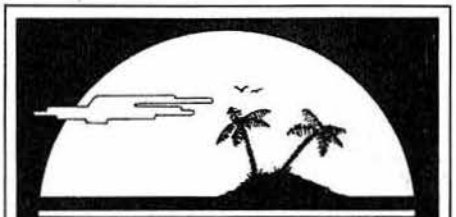
AR88D or similar rx. Tel Stevenage 62909, after 6pm weekdays, after noon weekends.

Cheap 70cm rig which will get RB10 and/or RB2. Tel Southport (0704) 74194.

FL50 tx, 898 dial, Electroniques 1·6MHz i.f.s. GM8MLH, QTHR. Tel 0838 2304.
Yaesu FT290R, flawless, nicads, charger, carry case etc. SEM Z-Match atu, preferably with built-in Ezitune. SWR power meter covering the hf bands. Ditto for vhf bands. Hugh Gilmour, G3AUV NOT QTHR. Tel Wickham (Hants) (0329) 833069.
KVG xtal filters types XF9B, with or without carrier xtals, XF9E fm filter. *For sale:* KLM 160 2m linear amplifier, £70. G8KLV, QTHR. Tel 0249 50880, after 6pm.
KW204 tx and matching KW spkr. G8WTY, QTHR. Tel Malvern 4968.
Denco/Electroniques valve type 85/465kHz, bfo coils, MF455-10CK or 15CK with/without carrier xtals. AR77 rx in good mech/elect cond. Light duty rotator/ctl box. Q-multiplier, 465kHz. G3ICH, QTHR. Tel Hemyock 680234.
RTTY t unit ST5 or ST6. G2DAF rx and tx. Reasonable, equipment may be wkg or not but should be comp. Tel John, Orpington 37955.
G4MH minibeam. KR400RC rotator or similar. KW107 atu. G4GVM. Tel Ilfracombe (0271) 62319.
Drake R4B, would consider vgc R4A. MS4 spkr. Eric Tittensor, 7 Westridge Drive, Huddersfield HD4 7AX. Tel 0484 652129.
Bits for G2DAF linear twin-gang 450pF capacitor, rf choke, 1,500V transformer, or 2kV power supply. Tel Lapford (Devon) (883) 471.
Signal generator type 101 10SB, 6016, ex-RAF. Any info, calib charts. Data copied and returned within two days. G8DPS, QTHR. Tel 01-399 8787.
Eddystone 898 dial, variable capacitor, four section, 75pF each section, rotor plates must be semi-circular, for G2DAF Mk2 rx front end. GD3RFH, QTHR. Tel 0624 843209.
Selsyn-Desyn or Magslip type of remote indicator. Please state volts, freq etc. G8BYA, QTHR. Tel 0785 56257, after 6pm.
Workshop manual or alignment data for TS510, beg borrow or buy. All expenses refunded. G3GZQ, QTHR, Devon. Tel 036-44 3608.
SX111 rx. Must be in good cond, reasonable price. Might consider a Hammarlund HQ170A in similar cond. Please tel Highcliffe 6914 (Dorset area).
For club station: TS700S 2m tx/rx. G3RR, c/o G4ILG, QTHR. Tel 0282 812288 (club sec).
Z-Match, any make. XF9B filter. G3KGN, QTHR. Tel 0702 77779.

Eddystone rx type 750, 940, 740, 840, 640, non-goer considered for swl. G3MZR, 84 Bonner Road, London E2.
Present address of Dynamco and/or service information for Dynamco oscilloscope comprising D7100 display unit, amplifier, 1Y2 timebase, 1X2, copying facilities available, postage refunded, data costs subject to negotiation. GW3ZFG, QTHR. Tel 0222 62411.
Codar T28 160/80m rx. G4DCX, QTHR. Tel Bristol 671409.
GW4BXS: please contact G8DPW, QTHR. Tel 0732 832032, regarding the offer he made at the BARTG rally bring & buy on 29 August for the Pye uhf mobile equipment.
FP707 power supply, matching power supply for FT707, approx £80-£85, will travel within 35 mile radius to collect. G6LFS. Tel Peter, Congleton (Cheshire area) (02602) 4026.
FV401 remote vfo for FT401 or any remote vfo with 8·7-9·2MHz cover. G3FJA, QTHR. Tel Ruislip 39235.
FT221RD, must be in exc cond. Will collect. G6GYQ, QTHR. Tel Weston-super-Mare 28659.
AR88LF tuning dial and Perspex front panel. Bezel (or suppliers name). Good cond 18AVT or equiv. R. Banister, G4BEE, 127 Collingwood Road, Chorley, Lancs PR7 2QF.
Old Scuba diving books and equipment, Navy or commercial. Manuals for 62, 38, 46 sets and Mk123 tr metal case for 62 and 18 sets. Canvas case for 46, 38, 88 and A510 sets. Spares for R209 Mk2 and 18, 62 sets. Accessories for Mk123. G8MQT. Tel 07073 27233, anytime.
2,000V transformer at 500mA from mains for psu, or more than one to provide these values. Anything similar ok. Suitable rectifiers and capacitors. G8KKJ, Parsonage Farm, Frittenden, Kent. Tel Ashford (Kent) (0233) 37238, weekday evenings.
Yaesu FT225RD, 144-148 tx/rx, in mint cond, offering up to £400. Will arrange carriage. Hughes, Can-y-Gwynt, Northop Road, Flint Mountain, Flint, Clwyd CH6 5QG. Tel Flint (03526) 61871.
Manual/circuit diagram for Marconi CR100, photostat acceptable. G2DAF rx. Details and prices to J. P. Wright, 44 Wilmott Way, Basingstoke, Hants. Tel Basingstoke 68649.
Linear, small (500W approx), suitable for use with FT101ZD into Mosley TA32JUN mini beam, must be in good order, comp with instructions. G4KHR, QTHR. Tel 0262 76106, between 6 and 7pm.

Fax receiving equipment for weather maps. Thruline elements, 250H, 250C, 25C. Bencher key. Lopass filter. Microscope accessories, slides. Channelmaster 9508 rotator. FV901. YO901P. *For sale:* c/w interface details, PET computer morse send program, £5. Receive program, £6. G3AZI, QTHR. Tel 0772 37815.
HF linear amplifier, SB200, KW1000, Dentron etc, or homebrew wkg or unfinished project will all major components. Rotator for light hf beam. GM4NFI NOT QTHR. Tel 0397 4361.



DX NEWS SHEET

DX NEWS-SHEET has been published since 1962, and is available world-wide. It contains up-to-date information on dx stations currently active, full QSL addresses, details of forthcoming dxpeditions, contests, new awards, DXCC matters, daily propagation forecast, and also enables you to keep your prefix list up to date. Items are arranged in alphabetical order for easy reference. It is mailed each Wednesday.

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SWR POWER METERS

SWR 25	3.5-150MHz twin meter	12.96
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TET P220	3-30MHz 2000 Watts	56.75
Yaesu YS 200	1.8-150MHz 200 Watts	46.50
Yaesu YS 2000	1.8-60MHz 2000W PEP/RMS	61.80
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

VAT included Carriage 75p.

TET ANTENNAS

HB 33SP	3 El Tribander 10/15/20 mts	189.23
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 mtrs.	105.60

VAT inclusive. Carriage £4 per item.

MONITOR RECEIVERS

DAIWA VHF - Scan and VFO Control	49.00
AR 22 SYNTHESISED 2 metre Receiver	79.00

INFORMATION FOR TRIO R1000 OWNERS

We don't have to tell you how good the receiver is – neither do we have to tell it is **missing** one essential feature – FM! No longer! Amcomm have specially designed a unit to complete your listening pleasure. It is small and will fit with minimal effort and time. It comes with really simple and concise instructions which can be read and used by the most non-technical users. The FM1000 is available now post free at **£15.99** inc. VAT from AMCOMM.

ROTATORS

Skyking SU 4000	88.50
ART 3000 hd	88.50
KR 400RC	92.50
KR 400 1wr bkt	10.35
Hirschmann 250	45.00
AR 40	79.00
2" KS 065 bearing	16.50
1¼" S100 bearing	16.50

VAT included - Rotor Carriage £1.00

MORSE KEYS

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

DESK MICROPHONES

SHURE 444D Dual Impedance	45.00
SHURE 526T Mk II Power Microphone	49.00
ADONIS AM502 Compression Mic 1 O/P	39.00
ADONIS AM601 Compression Mic + Meter 1 O/P	49.00
ADONIS AM802 Compression Mic + Meter 3 O/P	59.00

VAT included Carriage 90p.

NEW

DATONG

FL3	Audio Filter with Auto Notch	129.37
FL2A	Converter PCB to upgrade your FL2 to FL3. Supplied complete with new FL3 Front Panel	39.67
	Complete Datong range available ex stock. Ring for information and price	

ANTENNAS

Wide range in stock including BANTEX – HYGAIN – JAYBEAM – TELECOM – HOKUSHIN – TET.

Bantex ⅝ mobile whip complete antenna	9.99
Bantex ¼ W mobile whip complete antenna	3.99

MOBILE SAFETY MICROPHONES

ADONIS AM 202S Clip-on	20.95
ADONIS AM 202F Swan Neck + Up/Down Buttons	30.00
ADONIS AM 202H Head Band + Up/Down Buttons	30.95

VAT included - Carriage 50p.

HY-GAIN ANTENNAS

12AVQ	Vertical 10-20m inc	P.O.A.
14AVQ/WB	Vertical 10-40m inc	
18AVT/WB	Vertical 10-80m inc	
14RMQ	Roof mounting Kit	
18V	Vertical 10-80m inc	
18HT	"HY Tower" 10-80m	
103BA	3 Ele Yagi 10m	
105BA	3 Ele Yagi 10m	
153BA	3 Ele Yagi 15m	
155BA	5 Ele Yagi 15m	
203BA	3 Ele Yagi 20m	
204BA	4 Ele Yagi 20m	
205BA	5 Ele Yagi 20m	
402BA	2 Ele Yagi 40m	
DB10/15A	3 Ele Yagi 10-15m	
TH3JNR	3 Ele Yagi 10-15-20m	
TH2MK3	2 Ele Yagi 10-15-20m	
TH3MK3	3 Ele Yagi 10-15-20m	
TH5DXX	"Thunderbird" 5 Ele	
TH6DXX	"Thunderbird" 6 Ele	
HYQUAD	2 Ele Quad 10-15-20m	

VAT inc. Carriage shown for mainland only

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.

AMCOMM 20 – 1 pair KW20 Traps, 1 W2AU Balun, 1 PL 259, 1 pair insulators and 65ft soft drawn copper wire – coverage 40 – 10 metres, full instructions included. **£33.50** including carriage and VAT.

WARC TRAPS AVAILABLE SOON – SEND FOR DETAILS

AMTECH

New improved range Made in England

AMTECH 300B – To suit all coaxial and random wire antennas – 160 – 10 metres, 300W PEP. **£44.95** including VAT and carriage.

AMTECH 200B – Random wire ATU rated 200W PEP, will tune virtually any wire over 160 – 10 metres – excellent for base, mobile or temporary QTH – **£31.95** including VAT and carriage.

AMTECH 100B – Miniature mobile impedance match, ideal for that difficult matching when mobile – rated 180W PEP and has switched positions. **£17.95** including VAT and carriage.

AMTECH FM7 – Transform your FRG 7 or any receiver to FM. Small easily installed PCB with 455KHz/IF. **£14.99** including VAT and carriage.

AMTECH FM1000 – £15.99 inc. VAT and carriage.

YAESU RANGE

FT1	General coverage transceiver	POA
FT102	Price on application	
FT101ZFM	160-10m 9 band transceiver	POA
FT101ZDFM	160-10m 9 band transceiver	POA
DIGT 101Z	Digital unit for	POA
DCT101Z	DC adaptor	POA
FV101Z	Remote vfo	POA
FANT101	Fab for 101 series	POA
FT902DM	9 band AM/FM transceiver	POA
FT902D	9 band transceiver	POA
FC902	9 band atu, swr/pwr etc	POA
FTV901R	Transverter fitted 2m module	POA
430TV	70cm module for above	POA
144TV	2m module for transverter	POA
70TV	4m module for transverter	POA
YO901P	Monitor scope with pan. adap	POA
YO901	Standard monitor scope	POA
FV901DM	Remote vfo for 901	POA
SP901	External speaker	POA
FL2100Z	9 band 1200W linear	POA
FP707	230V AC power supply	POA
FC707	Aerial tuner (unbalanced only)	POA
MR7	Metal rack for above	POA
MMB2	Mobile mounting bracket	POA
FRG7	0.5-30MHz receiver	POA
FRG7700	SSB/AM/FM recvr. dig. readout	POA
MEM7700	Memory unit for above	POA
Converters		
FRV7700A	118-150MHz	POA
FRV7700B	50-60MHz & 118-150MHz	POA
FRV7700C	140-170MHz	POA
FRV7700D	70-80MHz & 118-150MHz	POA
FRT7700	Receiver aerial tuner	POA
FF5	LF filter for above	POA
FT480R	2m all-mode transceiver	POA
FP80A	230V AC power supply	POA
FL2050	50 watt linear	POA
FT780R	70cm all-mode transceiver	POA
FT290R	2m all mode portable	POA
NC11C	AC charger	POA
CSC-1	Carrying case	POA
MMB-11	Mobile mounting bracket	POA
FL2010	10 watt linear for FT290	POA
FT208	2m synthesized portable FM	POA
NC9C	AC charger	POA
FT708R	70cm hand-held	POA
FP12	230V/12 amp psu	POA
YP150Z	150W dummy load power meter	POA
YH55	Standard 8 ohm headphones	POA
YH77	Lightweight headphones	POA
QTR24D	World Ham clock	POA
YM34	600/50k ohm base mic 8 pin plug	POA
YM35	600 ohm hand mic. up/down 8 pin p.	POA
YM36	600 ohm as above (no up/down)	POA
YM37	600 ohm hand mic. 8 pin plug	POA
YE7A	600 ohm hand mic. 4 pin plug	POA
YD844A	600/50k ohm base mic. 4 pin plug	POA

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MICROWAVE MODULES

MMT144/28	2M Transverter for HF Rig	109.95
MMT 432/28S	70cm Transverter for HF Rig	159.95
MMT432/144R	70cm Transverter for 2M Rig	184.00
MMT70/28	4M Transverter for HF Rig	119.95
MMT70/144	4M Transverter for 2M Rig	119.95
MMT1296/144	23cm Transverter for 2M Rig	184.00
MML144/30	2M 30W Linear Amp (3W I/P)	69.95
MML144/50	2M 50W Linear Amp (10W I/P)	85.00
MML144/100S	2M 100W Linear Amp (10W I/P)	139.95
MML144/100LS	2M 100W Linear (1/3W I/P)	159.95
MML432/20	70cm 20W Linear Amp (3W I/P)	85.00
MML432/50	70cm/50W Linear Amp	109.95
MML432/100	70cm 10/100W Linear Amp	228.64
MM2001	RTTY to TV Converter	189.00
MM4000	RTTY Transceiver	269.00
MMC50/28	6M Converter to HF Rig	29.90
MMC70/28	4M Converter to HF Rig	29.90
MMC144/28	2M Converter to HF Rig	29.90
MMC432/28S	7cm Converter to HF Rig	37.90
MMC432/144S	70cm Converter to 2M Rig	37.90
MMC1296/144	23cm Converter to 2M Rig	69.95
MMD050/500	500MHz Dig. Frequency Meter	75.00
MMD600P	600MHz Prescaler	29.90
MMDP1	Frequency Counter Probe	14.90
MMA28	10M Preamp	16.95
MMA144V	2M RF Switched Preamp	34.90
MMF144	2M Band Pass Filter	11.90
MMF432	70cm Band Pass Filter	11.90
MMS1	The Morse Talker	115.00

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AMCOMM

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AMATEUR RADIO EXCHANGE

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 ● Band width control from 2.7kHz to 500Hz ● APF control ● RF processing ● Tunable audio network for speech tailoring ● SSB/CW/AM/FM

OUR PRICE OF £725 INCLUDES AM/FM BOARD

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

IC-R70

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

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

All this... and much more... for £469

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

MBA READER

New from the USA, a superb CW/RTTY/ASCII receiver with its own built-in video display.

● Automatic morse tracking, 3-99 wpm.
● RTTY speeds, 60-70-75-100 wpm.
● ASCII speeds, 110 and 300 bauds 13v DC.

£179 inc. FREE stand

FT-290/FT-790

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

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

ALINCO AMPLIFIERS

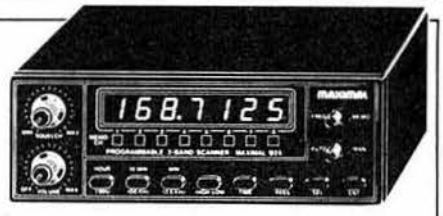
These two new RF amplifiers from ALINCO are undoubtedly the smallest units yet available in the UK measuring just 156mm x 91mm x 28mm, but there is nothing diminutive about their performance.

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.

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

Both excellent value at £39 and £59 respectively.

MAXIMAL MK-4000



As sole importers we are proud to offer this first-class scanning receiver featuring 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

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BARCLAYCARD VISA — Buy it with Access

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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 1012	Digital unit		90.00
DCT 101Z	DC Adaptor		42.50
FV 101Z	Remote vfo		112.00
FT902DM	9-Band AM/FM Transceiver		885.00
FC 902	9-Band atu, swr/pwr etc		135.00
FTV 901R	Transverter fitted 2m module		285.00
430 TV	70cm module for above		185.00
144 TV	2m module for Transverter		100.00
70 TV	4m module for Transverter		80.00
FV 901DM	Remote vfo for 901		260.00
SP 901	External speaker		31.00
FL 2100Z	9-Band 1200W linear		425.00
FT 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		29.00
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
MR7	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 7700A	118-150MHz	69.75
FRV7700B	50-60MHz & 118-150MHz	75.50
FRV 7700C	140-170MHz	65.95
FRV 7700D	70-80MHz & 118-150MHz	72.45

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

TRIO-KENWOOD

TS 930	Gen. coverage transceiver	NEW	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		212.00

ICOM

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

MICROWAVE MODULES

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

MORSE EQUIPMENT

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

MOBILE SAFETY MICROPHONES

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

DRAE

FULLY PROTECTED POWER SUPPLIES

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

DATONG

PC1	Gen. Cov. Converter HF on 2m		137.42
VLF	Very Low Frequency Converter		29.90
FL1	Frequency Agile Converter		79.35
FL 2	Multi-mode Audio Filter		89.70
FL 3	FL 2 with auto notch	NEW	129.37
ASP	Auto R.F. Speech Clipper (Trio or Yaesu plug)		82.90/89.70
D 75	Manually controlled R.F. Speech clipper		56.35
RFC/M	R.F. Speech Clipper Module		29.90
D 70	Morse Tutor		56.35
AD 270	Indoor Active Filter (inc. PSU)		54.05
AD 370	Outdoor Active Filter (inc. PSU)		71.30
MK	Keyboard morse sender		137.42
PTS1	Programmable tone squelch system (two units)		45.99
RFA	Wideband preamplifier		33.92
MPU	Mains Power Unit		6.90

BENCHER

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

TONO

THETA 9000E	RTTY/CWASC11	650.00
THETA 7000E	RTTY/CW/ASC11 Receive only	550.00
THETA 350	As above, basic unit	259.00
THETA 550	The latest—a winner!	299.00

AMPLIFIERS

UC 70	430MHz 55W + preamp	149.00
2M-50W	144MHz 30-50W	65.00
2M-100W	144MHz 100W + preamp	115.00
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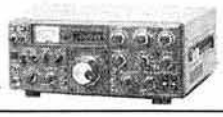

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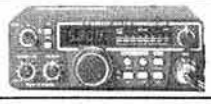

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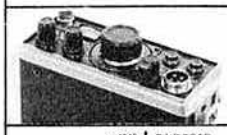

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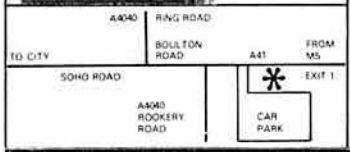

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Masthead GaAs FET preamplifier for 2m	October 1982
A GaAs FET preamp for 23cms	August 1982
3SK88 miniature 2m preamp	April 1982
10dB gain, 20-30W 2m linear amplifier	June 1982
10dB gain, 12W 70cm amplifier	October 1982
70cm Amateur TV & communications band converter	January 1982
23cm converter (2m or 10m output)	March 1982
10/6/4m converter, with 2m output	August 1982
An autoranging simultaneous SWR and Power meter	July 1982
An automatic modulation meter	November/December 1981
UOSAT doppler tracking receiver	May 1982
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Here are just a few items of interest to the faithful constructors of the communications fraternity, appearing in the first volume of the magazine.

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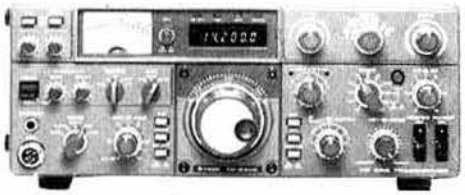

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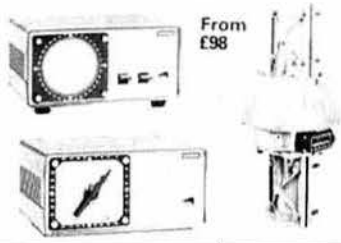

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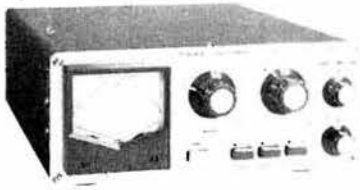

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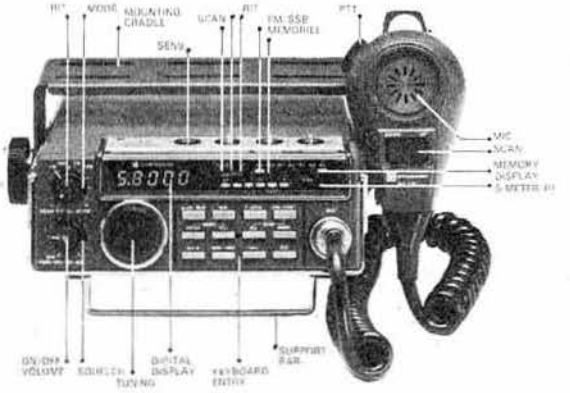

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IC 740	8 band 12vdc. Mobile (+ FM)	699.00	(—)
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IC 251E	2m base Multimode	499.00	(—)
IC 25E	2m 25W Mobile	239.00	(—)
IC 290E	2m Multimode Mobile	366.00	(—)
IC 2E	2m FM Handheld	159.00	(—)
IC 4E	70cm FM Handheld	199.00	(—)

FDK TRANSCEIVERS

Multi 700EX	2m FM 25W Mobile	189.00	(—)
Multi 750E	2m Multimode Mobile	289.00	(—)
Expander	70cm Transverter for 750E	199.00	(—)
PS 750	230v a.c. 6amp psu	69.00	(2.00)

RECEIVERS

TRIO			
R600	Gen. Cov. HF 0·15-30MHz	235.00	(-)
R1000	Gen. Cov. HF 0·2-30MHz	297.00	(-)
YAESU			
FRG7	Gen. Cov. HF 0·5-30MHz	199.00	(-)
FRG770	Gen. Cov. HF 0·15-30MHz	329.00	(-)
FRG 7700M	Gen. Cov. HF & memories	409.00	(-)
ICOM RX70	New Gen. Cov. HF	469.00	(-)
SX 200N	VHF-UHF Scanning Receiver	264.00	(—)
R517	Handheld Airband Receiver	49.50	(1.00)
ATC-720	Fully synth. Airband Receiver	135.00	(—)

DATONG D70 MORSE TUTOR
£56.35 inc VAT and carriage

DATONG PRODUCTS

		£	C&P
PC1	Gen. Cov. Convtr. HF on 2m Rig	137.42	(—)
VLF	Very Low Frequency Converter	29.90	(—)
FL1	Frequency Agile Audio Filter	79.35	(—)
FL2	Multimode Audio Filter	89.70	(—)
FL3	New FL2 plus auto-notch	129.00	(—)
FL2/A	Conversion for FL2 up to FL3	39.67	(—)
ASP/B	Auto RF Speech Clip. (Trio Plug)	82.80	(—)
ASP/A	Auto RF Speech Clippers (Yaesu Plug)	79.35	(—)
D75	Manually con. RF Speech Clipper	56.35	(—)
RFC/M	RF Speech Clipper Module	29.90	(—)
D70	Morse Tutor	56.35	(—)
AD270	Indoor Active Dipole Antenna	47.15	(—)
AD370	Outdoor Active Dipole Antenna	64.40	(—)
MPU1	Mains Power Unit	6.90	(—)
MK	Keyboard Morse Sender	137.42	(—)
RFA	Broadband Preamplifier	33.92	(—)
Codecall	Selective Calling Device (Link Prog)	32.20	(—)
	(Switch Prog)	33.92	(—)

DUMMY LOADS

DL30	PL259 30W Max. 150MHz	5.00	(0.50)
CT15A	WELZ PL259 50W Max. 450MHz	6.95	(0.75)
CT15N	WELZ N connector 50W Max. 450MHz	11.95	(0.75)
T100	SO239 100W Max. 500MHz	22.95	(0.75)
T200	SO239 200W Max. 500MHz	34.00	(1.00)
DL600	SO239 600W Max. 350MHz	29.95	(1.50)
CT300	WELZ SO239. 1kW Max. 250MHz	42.95	(2.00)

TELEREADER (CW and RTTY)

CWR 680	Tasco	189.00	(—)
Tono 500		299.00	(—)

WELZ SWR POWER METERS

SP15	HF/2m 200W	29.00	(0.75)
SP45	2m/70cm 100W	45.00	(0.75)
SP200	HF/2m 1kW	59.00	(1.00)
SP300	HF/2m/70cm	79.00	(1.00)
SP400	2m/70cm 150W (N connectors)	59.00	(1.00)

DAIWA SWR POWER METERS

CN620A	HF/2m Crosspointers 1kW	52.80	(—)
CN630	2m/70cm Crosspointers 200W	71.00	(—)
CNW518	3-30MHz 1kw cross pointer + ATU	175.00	(—)

OTHER SWR POWER METERS

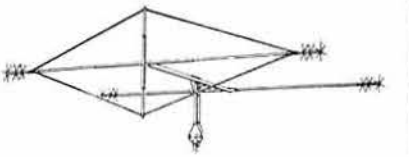
Model 110	HF/2m Single meter	11.50	(0.50)
YW-3	HF/2m Twin meter	11.50	(0.50)
T435N	2m/70cm (N type) Twin Mtrs.	34.00	(1.00)

MORSE EQUIPMENT

HK 707	Up/Down Key	10.50	(0.50)
MK 704	Squeeze Paddle	10.50	(0.50)
HK 704	Deluxe up/down key	16.95	(0.50)
EK 121	Elbug	32.00	(0.75)
EKM 1A	Side Tone monitor to EK 121	10.95	(0.50)
EK 150	Electronics keyer	74.00	(—)
—	General Practice Oscillator	8.75	(0.50)
Datong D70 Morse Tutor		56.35	(—)
Microwave Modules MMS-1 Morse Talker		115.00	(—)
Datong MK Morse Keyboard		137.42	(—)

MICROWAVE MODULES

		£	C&P
MMT144/28	2m Transverter for HF Rig	109.95	(—)
MMT432/28S	70cm Transverter for HF Rig	159.95	(—)
MMT432/144R	70cm Transverter for 2m Rig	184.00	(—)
MMT70/28	4m Transverter for HF Rig	119.95	(—)
MMT70/144	4m Transverter for 2m Rig	119.95	(—)
MMT1296/144	23cm Transverter for 2m Rig	184.00	(—)
MML144/30LS	2m 30W Linear Amp (1/3 I/P)	69.95	(—)
MML144/100LS	2m 100W Lin. Amp (1/3W I/P)	159.95	(—)
MML144/40	2m 40W Linear Amp (10W I/P)	77.00	(—)
MML144/100S	2m 100W Lin. Amp (10W I/P)	139.95	(—)
MML432/20	70cm 20W Lin. Amp (3W I/P)	77.00	(—)
MML432/50	70cm 50W Lin. Amp (10W I/P)	109.95	(—)
MML432/100	70cm 100W Lin. Amp (10W I/P)	228.64	(—)
MM2001	RTTY to TV Converter	189.00	(—)
MM4000	RTTY Transceiver	269.00	(—)
MMC50/28	6m Converter to HF Rig	29.90	(—)
MMC70/28	4m Converter to HF Rig	29.90	(—)
MMC144/28	2m Converter to HF Rig	29.90	(—)
MMC432/28S	70cm Converter to HF Rig	37.90	(—)
MMC432/144S	70cm Converter to 2m Rig	37.90	(—)
MMC435/600	70cm ATV Converter	27.90	(—)
MMK1296/144	23cm Converter to 2m Rig	69.95	(—)
MMD050/500	500MHz Dig. Freq. Meter	69.00	(—)
MMD600P	600MHz Prescaler	29.90	(—)
MMDP1	Frequency Counter Probe	14.90	(—)
MMA28	10m Preamp	16.95	(—)
MMA144V	2m RF Switched Preamp	34.90	(—)
MMF144	2m Band Pass Filter	11.90	(—)
MMF432	70cm Band Pass Filter	11.90	(—)
MMS1	The Morse Talker	115.00	(—)



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444D	Dual Impedance (s.s.b.)	39.00	(1.50)
450	Dual Impedance (FM)	35.00	(1.50)
526T	Series II Power microphone	53.00	(1.50)
Adonis			
AM303	Power Mic + Scan buttons	29.00	(1.00)
AM503	Compression Mic + Scan buttons	39.00	(1.00)

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Adonis	AM202S Clip-on	21.00	(—)
Adonis	AM202HD Headband + scan buttons	31.00	(—)
Adonis	AM202F Swan-neck + scan buttons	33.00	(—)

HEADPHONES

HS 4	TRIO economy	10.35	(1.00)
HS 5	TRIO deluxe	21.85	(1.00)
HS 6	TRIO lightweight	14.95	(1.00)
YH 55	YAESU standard	10.00	(0.75)
YH 77	YAESU lightweight	10.00	(0.75)

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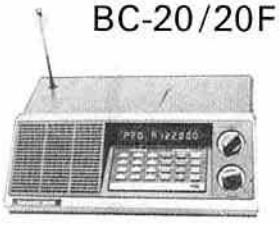

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ZA-2A Balun	£14.95
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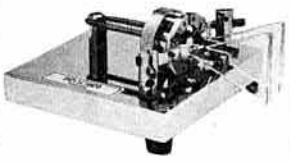

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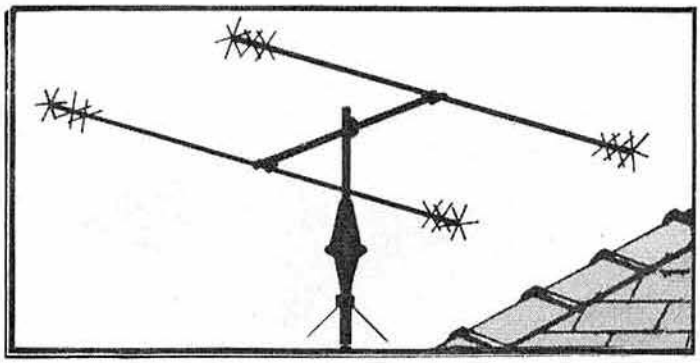

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Operating frequencies	10m, 15m, 20m	Wind resistance	80 mph
Forward gain (ref D pole = 1:00)	3·6 dB	Weight	14 lbs
		Rotator requirements	AR40

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FT 480R	£379	£190	£15.90
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FT 290R	£249	£125	£10.40
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IC251	£499	£250	£20.76
IC290E	£366	£180	£15.50
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IC4E	£199	£100	£8.25
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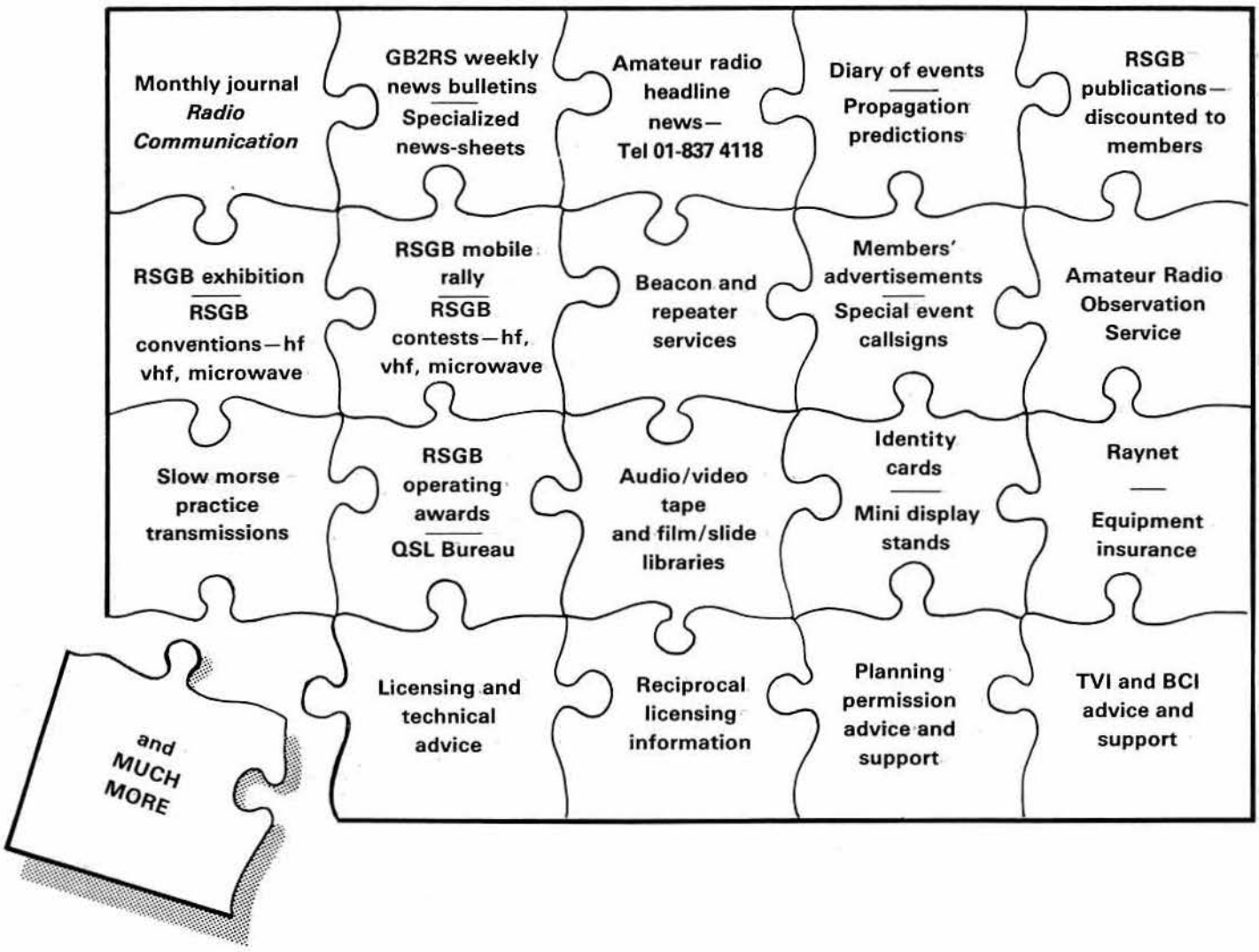
for the year ended 30 June 1982



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T. I. Lundegard, G3GJW
W. J. McClintock, G3VPK
H. S. Pinchin, BSc, MBIM, G3VPE
D. M. Pratt, BTech, CEng, MIEE, MIERE, G3KEP
G. M. C. Stone, CEng, FIEE, FIERE, G3FZL†

*Resigned December 1981
†Retired 31 December 1981
**Died 30 September 1981
††Co-opted January 1982

Secretary & general manager: D. A. Evans, G3OUF

Auditors: Edward Moore & Sons, chartered accountants

Bankers: Barclays Bank Ltd

ANNUAL GENERAL MEETING

NOTICE IS HEREBY GIVEN THAT THE FIFTY-SIXTH ANNUAL GENERAL MEETING of the Society will take place at the Institution of Electrical Engineers, Savoy Place, London WC2, at 2pm on Saturday 4 December 1982 for the transaction of the undermentioned business:

1. To receive and, if approved, confirm the minutes of the fifty-fifth annual general meeting circulated with the November 1982 issue of *Radio Communication*.

2. To receive and consider the accounts for the year ended 30 June 1982, and the reports of the Council and the auditors thereon.

3. To announce the names of members to serve on the Council for the year 1983. In the event of any successful candidate(s) being of the age of 70 or over it will be necessary for their appointment(s) to be confirmed by the meeting.

4. To resolve that Messrs Edward Moore & Sons be reappointed auditors of the Society for the ensuing year, and that their remuneration be fixed by Council.

5. To transact any other business which may be properly transacted at an annual general meeting.

Any member entitled to attend and vote at the above meeting may appoint a proxy to attend. A proxy need not be a member of the Society. Members attending the meeting should bring their current membership cards.

By order of the Council
D. A. EVANS
Secretary

1 November 1982

Notes
(a) Forms for the appointment of proxies may be obtained from the secretary upon request.
(b) The instrument appointing a proxy shall be deposited at the office of the Society not less than 48 hours before the time appointed for holding the meeting.

Financial report of Council to members of the Radio Society of Great Britain

Council has pleasure to present the audited accounts of the Society and its subsidiaries for the year ended 30 June 1982 which are set out on pages *iv* to *viii*. They show that before taxation, the surplus for the year was £74,869. Corporation tax on investment income and a provision for tax on trading income absorbs £14,055, leaving £60,814 to be added to the Society's funds.

Subscription income

Subscriptions were increased by 16 per cent from 1 October 1981. The credit to the accounts for this year reflects that increase and a further rise in membership of 10 per cent. It is estimated that had there been no increase in subscription rates at 1 October 1981, the income from members would have been approximately £55,000 less.

Radio Communication and advertising revenue

The Society enjoyed savings in the net production costs of *Radio Communication* and an increase in volume of advertising.

The production costs savings were mainly due to technical practice arising from the change to the A4 format and were helped by the introduction of paper reel-feed in place of sheet-feed in the printing process, and were supplemented by lower-than-expected postal charges.

Sale of publications

Book sales showed a further rise, but increased costs of production and a change in the mix of RSGB publications and other books produced a lower gross profit.

Other income

A more vigorous approach to the use of surplus funds has produced an increase in investment income (on which the Society has to bear corporation tax). The increase of £10,000 from this source is eventually reduced by tax at 40 per cent.

General

Virtually all headings of expenditure increased during the year, reflecting once again the effects of inflation coupled with an increase in activity due to the increase in membership.

In particular, the cost of membership services increased due mainly to the costs of travelling associated with Council and committee meetings and the increased costs of projecting the Society's image by exhibitions and general publicity.

Despite increasing costs, Council is not presently considering any increase in subscriptions before 1 October 1983.

New premises

The Society is currently involved in negotiations for the acquisition of new premises. For some years it has been obvious that the limited space and character of 35 Doughty Street have imposed severe strains on the ability of the Society to conduct its many varied activities. In particular, the space limitations have prevented the engagement of additional staff to cope with the increasing workloads.

The proposals at present under discussion involve the sale of 35 Doughty Street and the purchase of a purpose-built office in the Greater London area, and would provide the Society with office and storage space to meet its foreseeable needs for a long time ahead.

RADIO SOCIETY OF GREAT BRITAIN
AND ITS WHOLLY-OWNED SUBSIDIARY COMPANIES

CONSOLIDATED INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30 JUNE 1982

	Notes	1982 £	1982 £	1981 £	1981 £
INCOME					
Subscriptions	(1)		367,226		*264,084*
Advertising	(1)		241,960		*193,801*
Book sales			280,160		*230,845*
Other income	(5)		27,229		*17,703*
TOTAL INCOME			£916,575		*£706,433*
EXPENDITURE					
Book sales					
Cost of printing		149,044		*101,635*	
Costs of editing and despatch staff		42,641	191,685	*36,588*	*138,223*
Headquarters					
Rates, lighting, heating and cleaning		16,709		*12,182*	
Repairs and maintenance		991	17,700	*1,710*	*13,892*
Administration					
Staff costs		140,059		*104,427*	
Pension		600		*750*	
Telephone, postage, printing and stationery		71,392		*61,511*	
Insurance		1,717		*1,507*	
Repairs and maintenance of equipment		2,497		*486*	
Equipment hire		20,514		*21,322*	
Depreciation of equipment	(1)	18,883		*17,133*	
Audit fees		7,500		*6,550*	
Legal and professional fees		1,970		*1,461*	
General expenses		4,664	269,796	*1,103*	*216,250*
Finance					
Bank charges		1,625		*762*	
Bad debt provision		10,626	12,251	*1,025*	*1,787*
Membership services					
Radio Communication	(6)	284,757		*258,348*	
Certificates, awards, trophies, etc		2,731		*4,499*	
QSL Bureau		9,463		*8,857*	
Beacons, repeaters, satellites and Intruder Watch		3,751		*2,517*	
IARU Region 1 contribution and levy		4,333		*4,261*	
Rallies, exhibitions and publicity	(7)	16,258		*(3,136)*	
Cost of committee, regional and Council meetings		28,981		*20,875*	
Cost of international meetings and conferences		—	350,274	*8,897*	*305,118*
TOTAL EXPENDITURE			£841,706		*£675,270*
SURPLUS FOR THE YEAR BEFORE TAXATION					
[of which £74,980 *(1981: £31,053)* arises in the Society]			74,869		*31,163*
Less Provision for taxation thereon at 40% *(1981: 40%)*	(8)				
Corporation tax		(12,500)		*(6,517)*	
Deferred tax		(1,555)	(14,055)	*18,237*	*11,720*
SURPLUS FOR THE YEAR AFTER TAXATION			£60,814		*£42,883*

RADIO SOCIETY OF GREAT BRITAIN
AND ITS WHOLLY-OWNED SUBSIDIARY COMPANIES

BALANCE SHEETS AT 30 JUNE 1982

	Notes	1982 The Society £	1982 The Society and subsidiaries £	*1981 The Society £*	*1981 The Society and subsidiary £*
FIXED ASSETS					
Freehold property at cost	(1)	—	41,675	—	*41,675*
Furniture, equipment and computer programming	(1) (2)	48,179	48,179	*50,725*	*50,725*
Subsidiary companies	(3)	42,901	—	*42,786*	—
		91,080	89,854	*93,511*	*92,400*
INVESTMENT					
Listed—at cost [Market value 1981: £19,213]		—	—	*19,503*	*19,503*
NET CURRENT ASSETS					
Stocks at lower of cost and net realizable value		120,522	120,522	*92,321*	*92,321*
Debtors and payments in advance		108,606	108,606	*76,094*	*76,094*
Bank balances and cash in hand		195,249	197,323	*141,619*	*143,927*
		424,377	426,451	*310,034*	*312,342*
Less					
Creditors and accrued charges		(89,739)	(91,086)	*(92,337)*	*(93,878)*
Corporation tax payable		(18,203)	(18,203)	*(8,393)*	*(8,437)*
		316,435	317,162	*209,304*	*210,027*
NET ASSETS		£407,515	£407,016	*£322,318*	*£321,930*
FINANCED BY					
ACCUMULATED FUND					
Balance at 1 July 1981		148,969	148,822	*106,125*	*105,939*
Surplus for the year ended 30 June 1982		60,925	60,814	*42,844*	*42,883*
		209,894	209,636	*148,969*	*148,822*
Less					
Preliminary expenses of subsidiary		—	(241)	—	*(241)*
		209,894	209,395	*148,969*	*148,581*
LEGACY FUND	(4)	2,513	2,513	6,665	6,665
SUBSCRIPTIONS IN ADVANCE	(1)	190,290	190,290	*163,421*	*163,421*
DEFERRED TAXATION	(1) (8)	4,818	4,818	*3,263*	*3,263*
(The notes on page vi form part of these accounts)		£407,515	£407,016	*£322,318*	*£321,930*

E. J. ALLAWAY, *President*

P. F. D. CORNISH, FCA, *Honorary treasurer*

16 September 1982

NOTES ON THE ACCOUNTS

1. Accounting policies:
   (a) Companies Act 1981. The accounts have been prepared in compliance with sections 149A and 152A of, and schedule 8A to, the Companies Act 1948.
   (b) Subscriptions—cash received in respect of subscriptions for the year has been apportioned on a time basis from the actual dates subscriptions were receivable, after deduction of VAT.
   (c) Advertising income is the gross amount receivable for advertisements in *Radio Communication*.
   (d) Depreciation—no depreciation has been provided on the freehold property. The Council is of the opinion that the present market value of the Society's freehold property (which is held in the subsidiary company) is in the region of £250,000, and that any depreciation required in respect of the building element would be insignificant. Other fixed assets are written off using the straight-line method over their estimated useful lives at the following rates based on cost:
      Furniture — 10 per cent per annum
      Equipment — 20–25 per cent per annum
      Computer — 20 per cent per annum
   (e) Deferred taxation has been provided at 40 per cent using the liability method in respect of timing differences which are not expected to continue for the foreseeable future.

2. Furniture, equipment, and computer programming

	1982 £	*1981 £*
Cost 1 July 1981	95,520	*73,219*
Additions during year	16,337	*22,301*
Cost 30 June 1982	111,857	*95,520*
Accumulated depreciation	(63,678)	*(44,795)*
Book value as shown in balance sheet	£48,179	*£50,725*

3. Subsidiary companies

	1982 £	*1981 £*
Shares at cost	200	*100*
Amount due from subsidiary company	42,801	*42,686*
Amount due to subsidiary company	(100)	—
	£42,901	*£42,786*

The subsidiaries, both of which are wholly owned, are: Lambda Investment Company Limited, an investment company; and RSGB (Raynet) Limited, which has been dormant since incorporation.

4. The legacy fund was established in the year ended 30 June 1976 following the receipt of an amount of £4,292.50, which the Society was informed represented a legacy from the estate of the late D. R. Shirley-Price, G8SP. During the year it has transpired that the Society was wrongly identified as the legatee by the solicitors acting for the estate who have properly made a formal request for the return of this amount on behalf of the true legatee. The sum has been repaid since the end of the year and, accordingly, an amount of £4,292.50 has been transferred out of the legacy fund and is included as a liability in the accounts.
   Legacies and donations amounting to £141 (1981: £478) properly received in the year have been credited direct to this account.

5. Other income includes bank interest of £25,834 *(1981: £14,469)* and listed investment income of £832 *(1981: £1,664)*.

6. *Radio Communication* expenses comprise the whole of the costs of printing and distribution, advertising commission, and the cost of editorial staff and the Chelmsford office.

7. Rallies, exhibitions and publicity expenses comprise:

	1982 £	*1981 £*
Society publicity and advertising	6,945	*9,359*
Deficit (surplus) on the Society's own events less the cost of participation in other rallies and exhibitions	9,313	*(12,495)*
	£16,258	*£(3,136)*

Book sales totalling £28,697 gross *(1981: £24,537)* made at rallies and exhibitions have been accounted for under income from book sales.

8. The Society is liable to pay corporation tax on its investment and trading income. Owing to the effects of capital allowances, tax on trading income has been deferred; the total provision for deferred tax is as follows:

	1982 £	*1981 £*
Excess of taxation allowances on fixed assets over depreciation charged	4,818	*5,072*
Less: Losses carried forward	—	*(1,809)*
	£4,818	*£3,263*

The taxation charge has been reduced by £2,055 (1981: £1,908) as a result of stock relief.

9. The Society administers certain prize and memorial funds, totalling £544 *(1981:£501)* which are not included in these accounts.

10. The Society is proposing to move to new headquarters. This will involve the sale of the present freehold property owned by Lambda Investment Company Limited. Such a sale will result in a substantial profit. On the basis that the whole proceeds are re-invested in a new property, capital gains tax on the profit will be deferred indefinitely.

CONSOLIDATED STATEMENT OF SOURCE AND APPLICATION OF FUNDS FOR THE YEAR ENDED 30 JUNE 1982

	1982 £	1981 £
SOURCE OF FUNDS		
Surplus for the year before taxation	74,869	31,163
Donations, legacies and interest	141	478
Adjustment for items not involving the movement of funds:		
Depreciation (including loss on disposals)	18,883	17,133
Tax suffered by deduction	(250)	(500)
Surplus on sale of listed investments	(77)	—
Total generated from operations	93,566	48,274
OTHER SOURCE		
Proceeds from sale of listed investments	19,580	—
	113,146	48,274
APPLICATION OF FUNDS		
Purchase of fixed assets, less proceeds of sale	(16,337)	(22,301)
Corporation tax paid	(2,484)	(1,705)
	£94,325	£24,268
INCREASE IN WORKING CAPITAL		
Stocks	28,201	7,563
Debtors	32,512	23,962
Creditors and subscriptions in advance	(19,784)	(84,705)
	40,929	(53,180)
MOVEMENT IN NET LIQUID FUNDS		
Cash balances	53,396	77,448
	£94,325	£24,268

REPORT OF THE AUDITORS TO THE MEMBERS OF THE RADIO SOCIETY OF GREAT BRITAIN

We have audited the accounts set out on pages *iv* to *vii* in accordance with approved auditing standards.

In our opinion the accounts, which have been prepared under the historical cost convention, give a true and fair view of the state of affairs of the Company and its subsidiaries at 30 June 1982 and of their surplus of income and of their source and application of funds for the year ended on that date and comply with the Companies Acts 1948 to 1981.

4 Chiswell Street, London EC1Y 4XB.
21 September 1982

EDWARD MOORE & SONS
Chartered Accountants

LAMBDA INVESTMENT COMPANY LIMITED

REPORT OF THE DIRECTORS

The directors have pleasure in submitting their report for the year ended 30 June 1982. The company is a wholly-owned subsidiary of the Radio Society of Great Britain (a company incorporated in England) and was formed to acquire the freehold property, 35 Doughty Street, London WC1, which is the headquarters of the Society. The directors are of the opinion that the market value of the property is in the region of £250,000.

The directors during the year were Messrs L. E. Newnham (chairman), R. F. Stevens, G. R. Jessop and P. F. D. Cornish. Mr L. E. Newnham holds one share as nominee of the Society. The directors regret to report that Mr R. F. Stevens died on 30 September 1981. Mr L. E. Newnham retires by rotation at the Annual General Meeting and, being eligible, offers himself for re-election. A resolution re-appointing Messrs Edward Moore & Sons as auditors will be proposed at the Annual General Meeting.

By order of the Board
D. A. Evans
Secretary
16 September 1982

BALANCE SHEET AT 30 JUNE 1982
and
REVENUE ACCOUNT FOR THE YEAR ENDED ON THAT DATE

		1982			1981	
	£	£	£	£	£	£
ASSETS						
Freehold property at cost			41,675			*41,675*
Preliminary expenses			241			*241*
Bank balance			2,074			*2,308*
			43,990			*44,224*
LIABILITIES						
Sundry creditors		1,347			*1,541*	
Corporation tax payable		—	(1,347)		*44*	*(1,585)*
NET ASSETS			£42,643			£42,639
FINANCED BY:						
Authorized and Issued Capital						
100 shares of £1 each fully paid			100			*100*
Revenue Account						
Rent receivable in the year to 30 June 1982		250			*250*	
Less:						
Audit fee	150			*100*		
Sundry expenses	40			*40*		
Insurance	171			—		
		(361)			*(140)*	
		(111)			*110*	
Less:						
Provision for corporation tax thereon at 40%		—			*(71)*	
		(111)			*39*	
Balance at 1 July 1981		(147)	(258)		*(186)*	*(147)*
Loan from the Radio Society of Great Britain			42,801			*42,686*
			£42,643			£42,639

Companies Act 1981. The accounts have been prepared in compliance with section 149A of, and schedule 8A to, the Companies Act 1948.
The company is proposing to sell its freehold property. Such a sale will result in a substantial profit. On the basis that the whole proceeds are re-invested in a new property, capital gains tax on the profit will be deferred indefinitely.

L. E. Newnham
P. F. D. Cornish, FCA
Directors
16 September 1982

REPORT OF THE AUDITORS TO THE MEMBERS OF LAMBDA INVESTMENT COMPANY LIMITED

We have audited the accounts set out above in accordance with approved auditing standards.

In our opinion, the accounts which have been prepared under the historical cost convention give on that basis a true and fair view of the state of the Company's affairs at 30 June 1982 and of the result for the year ended on that date and comply with the Companies Acts 1948 to 1981.

4 Chiswell Street, London EC1Y 4XB
21 September 1982

EDWARD MOORE & SONS
Chartered Accountants

THE YEAR IN REVIEW

Some of the activities of the Society in the year ended 30 June 1982

GENERAL MANAGER'S REPORT

MAIN POINTS

The Society has again seen considerable growth in most of its activities during the year. Membership has grown from 29,337 to 32,215, which represents an increase of very nearly 10 per cent, and the turnover has increased from £706,000 to £915,000. A significant proportion of the latter is due to the increase in total book sales. This expansion must be contrasted with the general background of economic depression.

A major pre-occupation throughout the year has been that of trying to maintain services under most difficult conditions while coping with this increase in level of Society activity. The difficulties have been exacerbated by three major factors. First, most of today's newcomers to the hobby know much less about amateur radio than their predecessors. Second, the transport strikes, although perhaps only a nuisance to some, had a disproportionate effect on many of our already over-stressed activities. Third, the increasing unsuitability of the Doughty Street building as the centre of the Society's administration.

Notably during the year, much energy has had to be devoted to our licensing conditions, with which we have had a reasonable degree of success.

SOCIETY ADMINISTRATION

The increased pressure on headquarters administration due to the expansion of its activities has been referred to above. One of the less obvious consequences is that much effort has had to be devoted simply to devising methods to cope with the increased load. Apart from the extra effort arising from the growth in membership and in sales of books, a significant extra load has come from a change in the background of the people becoming interested in amateur radio. Previously, most newcomers already had at least some knowledge of our hobby, which they had picked up, perhaps over some years, through contact with amateurs or via clubs. However, a large and increasing proportion now come into the hobby—and often become fully licensed—without this background, and they look to RSGB headquarters to supply what others may regard as very elementary information, but which to them is essential knowledge about a newly-acquired hobby.

What this has meant in practice is that a much higher proportion of headquarters effort has had to be devoted simply to this initial level of enquiry than ever before. It has proved necessary to increase the number of staff employed fulltime in this area from one up to three or more from time to time. Even so, this part of our activities continues to be overloaded. To provide support and to increase their effectiveness, each of the staff concerned has a visual display unit giving immediate access to an extensive information store in the IBM34 data processor. This not only enables information to be given immediately by telephone, but also provides the means by which printed matter in the form of leaflets, information packages or standard letters can be passed on to members in the most efficient way.

This extra load, in turn, inevitably generates problems in other areas. Some will be obvious to members: extra staff employed in one area means less effort spent in other areas, and therefore other services suffer; the telephone system becomes overloaded and callers can suffer considerable delays in getting answers. Less obvious to members will be the overloading of our present data processor. One of the consequences of this is that, because of the vast number of data changes we have to make each day (in the region of several thousand) it is considered essential that we produce a master copy of all the data files at the beginning of each working day in order to ensure the integrity of our records. While this copy is being made we are unable to use the data processor to answer members' enquiries which involve its use (which are the majority), and therefore it is impractical to offer an enquiry service during this process.

By the end of the working day the membership services staff have to deal with the printing of standard letters and the packaging and mailing of the 200–300 requests for information that typically have accumulated during the day. For this to be completed within the working day, it is essential that the staff concentrate all their effort in this direction. What this means in practice is that the Society is not able to offer a telephone enquiry service during the first and last hours of the working day, and this must remain the position until we are able to expand our data processing capabilities and further increase the staff effort devoted to this area.

The increased Society activity has also emphasized problems with the headquarters building. For several years, the number of people that could be employed within the building has been restricted by the building itself. In 1977 it was necessary to move production of *Radio Communication* to ease the space problem, among others. Other Society activities, such as the QSL Bureau, our full-time draughtsman and our advertising, have hitherto always operated at locations other than Doughty Street. With the extra effort devoted to membership services, it has recently proved necessary to take on additional premises close to the present headquarters to accommodate book production and advertising. Despite these extra premises, it has proved necessary to continue to use the prized reception area for temporary storage of books, much to the regret of both visitors to headquarters and of the staff who have to work under the conditions. Our thanks must go to both parties for their patience.

A most important headquarters function is to act as a focus of communication with outside bodies. High on the list of priorities is maintaining regular contact with institutions with which we need to interact, particularly the Home Office, but including, for example, the British Standard Institution, the BBC and IBA, local radio, and newspapers and magazines. Especially since the introduction of cb, we have needed to do much more—while headquarters staff can, and do, produce responses to particular demands which have been very successful in their way, for publicity to be effective it needs to be generated at the local level throughout the country on a day-in, day-out, year-in, year-out basis. How this can be achieved with our present resources is one of the items being studied by the Forward Planning Group and the Membership & Representation Committee.

The need for this publicity to ensure that the essential nature of amateur radio is recognized is exemplified by the increasing problems associated with planning permission for antennas since the advent of cb. It has proved necessary for headquarters staff to visit many local authorities to ensure that amateurs do not suffer unnecessary restraints.

As a means of improving links between the headquarters administration and members and non-members, we have continued our policy of sending headquarters staff to attend as many exhibitions and other events around the country as possible. In the case of the Society's own exhibition at Alexandra Palace, headquarters staff were required to play a major role in the organization as a consequence of the destruction of the main hall that had previously been used. It also found itself having to cover two autumn exhibitions, at Leicester and Donington Park. In all, RSGB stands were manned by representatives of the staff at 11 major exhibitions and conventions around the country. In addition, members of the staff have given talks to over 20 clubs—in their own time, of course. These represent a considerable staff effort, the benefits of which must, of course, be balanced against the reduced time available for other activities.

As regards the future of the Society's administration, two problems dominate present thinking, as will be obvious from the above review. The main need is for a larger headquarters. Many of the problems in recent years have been due to the inability to employ extra staff to deal with the additional load, as well as to provide a minimum degree of back-up to cover holidays and sickness, simply because of the limited size of the building. That it consists of five floors does not ease our problem. Following a detailed study of all aspects, especially of the financial considerations involved, Council agreed in November that the time was appropriate to seek a new headquarters building more suitable for the scale of our current operations. A significant effort has since been spent in considering the often conflicting requirements of the building itself, its siting and in the actual search for suitable premises. At the time of writing, a number of buildings had been inspected. Only one of these appeared suitable for our unusual requirements in terms of mixed office and bulk storage and handling facilities.

A second area of concern is our data processing facility. Because of the

increased scale of our operations in terms of members and turnover, and because of the ever-increasing number of services it is used to provide, the present system is proving inadequate in speed of operation and too demanding in programming time to maintain and to introduce even small changes. Consideration of a data-based management system is currently in hand.

Exhibitions and conventions

We have mentioned in general terms some of the outside activities of both staff and volunteers; it is worth looking at some specific events in more detail.

AP82

The RSGB National Amateur Radio Exhibition took place at the new Alexandra Pavilion during the year in review, and although popular with both dealers and members, the attendance over the three days was rather lower than the Society would have liked to see. Several features of the new pavilion were criticized, and it is for this reason that next year's exhibition will take place at the National Exhibition Centre in Birmingham on 5–6 March.

Conventions

The Scottish convention, Scotam '81, took place on 12 September 1981 at Glenrothes. This popular event was well attended. The Welsh Amateur Radio Convention took place, as usual, at Blackwood on 27 September 1981 and attendance was even higher than in previous years: trade stands and interesting lectures were very popular, as was the Society's book stand. We would like to acknowledge the assistance given by local club members to the Society at both conventions, especially at Blackwood.

A new event, in the shape of the RSGB HF Convention, took place near Oxford on 19 June 1982. It proved popular and successful, although, as ever, many lessons were learned by the organizers. About 450 people attended and heard some interesting lectures, although the event seemed to have a "social" character as well as possessing something of a rally atmosphere.

Headline News

A new facility was introduced during July, in the shape of a pre-recorded 3min news bulletin available by dialling 01-837 4118. This has proved very popular, with 600–800 calls per week, and it proved its worth during the problems of the new licence schedule: the message was changed as soon as new developments occurred, and members could have up-to-date information as it happened. Indeed, the only problem was that there were so many calls that it was difficult to "access" the answering machine, and at one point it had to be kept cool by means of a fan!

The RSGB and the media

Relations with the media have been good during the period under review, and the Society has been able to bring amateur radio to the attention of a wide public audience: in fact, more could have been done if the demands on staff time had permitted. Twenty-seven interviews were given to the BBC and local radio during the year, and three hour-long programmes were broadcast on local radio about amateur radio. Material for three regional television features was generated by headquarters, and staff were much in demand by both broadcasters and newspapers during the Polish crisis and the Falklands war. The misguided story in the *Guardian* concerning the supposed loss of the 432MHz band led to a good deal of work as well. Probably the highlight of the year from the media point of view was a 25min slot on Radio 1, which featured a live two-way contact between John Nelson, G4FRX, assistant to the general manager, who had joined headquarters staff from the BBC in May 1981, and Dave Sumner, K1ZZ, of the ARRL, with the assistance of the BBC's Ariel Radio Group. It may be coincidental that K1ZZ was appointed general manager of the ARRL not long after this event!

On a related topic, the Society played a small part during the Falklands war, both as far as the media was concerned and in making certain information available to the authorities. Public awareness of amateur radio was increased during this period, and the Society took full advantage of this as far as possible: several broadcast interviews took place during the period and some excellent feedback was received. Liaison with the media is seen as an important part of the Society's work, and several facilities to improve our service in this area are planned for the new headquarters.

Home Office liaison

One of the most important functions of the Society is that of liaising with the Home Office, the national body responsible in the UK for administering the amateur service. Towards the end of 1981 it was becoming obvious that a number of changes were needed in the organization of this area, in order to cope with the growing number of matters to be dealt with. The latter arose from the increasing range of specialist amateur activities that had become part of the hobby, the use by amateurs of more and more of the spectrum (including the special characteristics of the microwave frequencies), and the implementation of the WARC 79 decisions.

In addition to Home Office liaison, the existing Telecommunications Liaison Committee had a number of other responsibilities which included the Intruder Watch, the Aerial Planning Panel and the Amateur Monitoring Service. It also took upon itself other matters such as CCIR and satellite affairs. The end result was a committee which was over-sized and overloaded, and becoming less effective in dealing with its essential responsibilities.

In January 1982, Council agreed a number of major changes to the duties of the committee. First, the responsibility for the planning panel was transferred to the Finance & Staff Committee: many of the decisions regarding planning involved legal matters and the latter committee was a far more appropriate custodian. Second, the Intruder Watch inevitably was heavily involved internationally and therefore more suitably the responsibility of the IARU Committee. CCIR work was mainly concerned with publications, and logically became the responsibility of the Technical & Publications Committee. These changes meant that the committee could now concentrate on its most important function—liaison with the Home Office—and this was reflected in its change of name to Licensing Advisory Committee.

As regards the constitution of the committee, it was recognized that contact with the Home Office required to be on a day-by-day basis. For this reason, it was considered impractical for this to be done by a volunteer who necessarily could neither guarantee his availability nor call on other support services. It was therefore clear that this function had to be done by a member of headquarters staff; Council felt the importance of this role was such that the general manager should add it to the long list of his responsibilities. This decision, in fact, formalized the situation that had existed in practice for some years.

Council also agreed that, in order to provide the specialist knowledge required, the three spectrum managers must be members of the committee. The monitoring service organizer and (later) a person to concentrate on Raynet matters, would provide the expertise in those areas. The committee would, of course, have the power to co-opt additional help as necessary.

The new committee appears to be working most satisfactorily. The main feature of its operation is that committee members meet the Home Office staff at regular intervals to discuss items of current importance. This means, in practice, that the appropriate specialist is available at each meeting. An important advantage is that those responsible for making plans and decisions become increasingly aware of the constraints and problems facing the other party.

The committee was "blooded" soon after its formation with major problems associated with the publication of the new schedule. Details of this have been published elsewhere. There seems little doubt that the streamlined committee was able to respond far more quickly than its predecessor would have. Since that time, liaison has been maintained on the most constructive level, as readers will recall from the reports in "QTC" —themselves a major improvement in communicating this vital area to the membership at large.

Society affairs

The Society's 47th President, Basil O'Brien, G2AMV, completed his term of office at the end of 1981. It was intended that Jack Anthony, G3KQF, should become the 48th President, but in the event he stood down for health reasons and John Allaway, G3FKM, became President during 1982 following the first Council meeting of the year. This meeting was delayed several times due to the railway strike and bad weather. There was a total of seven vacancies for the 1982 Council: the two vacancies for ordinary members of Council were filled by the election of Mr T. I. Lundegard, G3GJW, and the re-election of Mr R. Bellerby, G3ZYE. Mr P. F. D. Cornish, G3COR, accepted Council's invitation to continue as the Society's honorary treasurer. The vacancies in Zones B, C, D, F and G were filled by Messrs H. S. Pinchin, G3VPE, W. J. McLintock, G3VPK, L. Hawkyard, G5HD, I. J. Kyle, GI8AYZ, and F. Hall, GM8BZX, respectively.

At the first Council meeting of 1982 Mr R. G. Barrett, GW8HEZ, was elected executive vice-President for the year, and the annual appointment of the Society's officers and committees also took place. Council wishes to record its thanks to Mr G. M. C. Stone, G3FZL, who retired from Council at the end of 1981, and to Mr J. Anthony, G3KQF, and Mr G. I. Knight, GM8FFX, who retired for health and business reasons respectively, at the end of 1981. As members will already know, Roy Stevens, G2BVN, died on 30 September: his experience has been greatly missed, as has that of Cyril Parsons, GW8NP, who died a few weeks later.

In the year under review, Council met nine times: details of the work of Council and the highlights of the work of its committees have been recorded in *Radio Communication* under "Council proceedings". The policy of arranging some Council meetings at weekends to reduce conflicts with members' work was continued wherever possible.

During the year, the Society's President and other Council members and headquarters staff made many visits to clubs and events around the UK. This represents an extremely heavy workload for all concerned, with meetings often taking place during evenings and weekends: many lectures on the work of the Society were given by members of headquarters staff to amateur radio clubs and societies, and these are considered an important part of the headquarters role. As discussed elsewhere, staff resources have been spread very thinly during the period under review, however, and it has not been possible to attend all the events in the calendar.

As in previous years, many hundreds of visitors from all over the world have been received at RSGB headquarters: here again, it is a matter for regret that 35 Doughty Street is very far from an ideal place for foreign visitors, and it is hoped that a future headquarters building will allow a better impression of the British national society to be conveyed to them. However, the Society continues to have useful contact with other national societies, in particular the American Radio Relay League and a number of other leading societies, and common problems and interests have been discussed and aired during the period under review. The ARRL's assistance in supplying material concerning cable television and its problems has been particularly appreciated in recent months, since this would seem to be an area of heavy Society involvement during the next year or two.

As before, a past-President's function took place during the year and was much enjoyed by all present: the event looks set fair to become an annual one.

Radio Communication

The new format introduced in January 1981 no longer looks or feels "oversized" compared with the previous format. While the "mix" of content has been maintained, there was a marked decline in the number of worthwhile constructional articles offered during the year under review. As the year ended, more articles of a substantial nature were coming in, and it is hoped that these will be leavened by more simple constructional articles, for which there is an insatiable demand.

The unexpectedly high level of advertisement content in the first year of the new format declined slightly in the second half of the year under review, and appears to have levelled out at the projected amount when the format was changed. Colin Lindsay, our advertising representative for 10 years, retired a few months prematurely in April on health grounds. His excellent service to the Society is reflected in the great increase in advertisement content during those 10 years, and our thanks are extended to him. In succession to Colin Lindsay, Mike Hawkins, senior membership services officer, was appointed advertisement officer, and the advertisement content has now become an "in-house" activity.

We take this opportunity of thanking all our regular contributors who month-in, month-out throughout the year have met their copy deadlines. Without their co-operation, the unstinting efforts of the editorial staff, and strict adherence to schedules by the printers and mailing contractors, we would not have achieved the regular despatch of issues before, and frequently well before, the scheduled first Friday in the month.

Conclusion

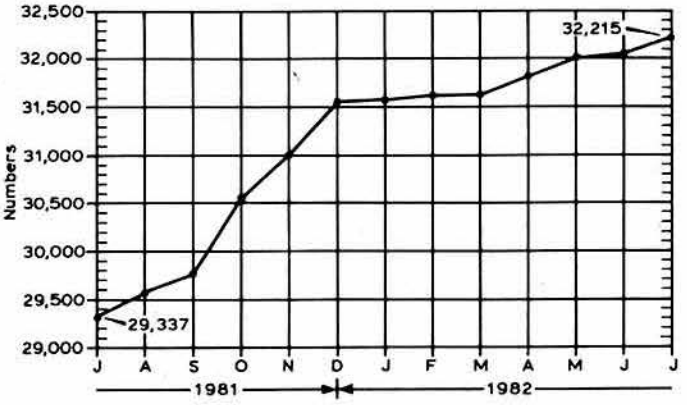
The Society has continued to do much work on all major fronts during the year under review, and many useful and important developments have taken place. It has continued to play an important part in international amateur radio affairs as one of the world's leading organizations in this field.

As always, the Society's very special thanks must go to all those volunteers who make its work possible on a day-by-day basis.

APPENDIX

MEMBERSHIP STATISTICS

Membership graph



UK main categories

Category	Percentage
Ordinary Corporate	86·42
Life	0·52
Reduced/OAP	2·83
Waived	0·99
Family	1·42
Channel Islands	0·33
Student	0·36
Associate	4·74
Honorary	<0·1
Complimentary (non-members)	0·30
Libraries (subscribers)	0·29
Clubs	1·70

SWLs comprise 26·84 per cent of UK membership.

Main overseas categories

Category	Percentage
Surface mail	62·23
Air mail	10·23
Libraries	2·77
Complimentary	10·69
Clubs	0·54
Agencies	13·54

There were 2,882 overseas members in 164 countries at the end of the 1981-2 financial year.

New members by month

Month	1981-2	1980-1	1979-80	1978-9	1977-8
July	540	291	213	214	188
August	414	295	307	311	150
September	836	679	210	249	195
October	626	288	400	379	254
November	549	581	455	483	336
December	558	280	328	140	187
January	313	483	539	510	396
February	419	529	320	301	302
March	436	320	316	415	250
April	478	491	439	226	280
May	283	437	342	339	322
June	285	696	346	366	227
TOTAL	5,737				

COMMITTEE REPORTS

Education

Committee: GW3VBP, G3HB, GW4JNE, G6NZ, G8MW, G3KEP, G2WS, GM4FZH*, G2CVV.

Six meetings were held during the year. Members of the committee attended the exhibitions at Leicester and Castle Donington, and were available to answer questions on the RAE and other educational topics. Unfortunately there were no rooms available in which to meet lecturers and instructors from further education centres.

The Science Museum lectures were given during Easter; the museum has expressed its appreciation, and we are invited to present another series of lectures next year. Although the Science Museum lectures coincided with the exhibition at Alexandra Palace, members of the committee were present at the exhibition ready to give advice.

A tape lecture for the blind, covering the RAE syllabus, was completed. Many thanks to G3HB and G3KQF. Work on the latest edition of the *RAE Manual* was completed, again thanks to G3HB.

Three members of the committee represent the Society on the C&G Radio Amateur Subject Committee.

We were very sorry indeed to lose the valuable services of our chairman, G3KQF.

Dr. Clive Smith GM4FZH joined the committee as a corresponding member. We also have our first lady member Dr Jane Houghton, GW4JNE; both are welcome.

G. C. Oxley, G8MW, chairman

Exhibition & Rally

Committee: G5HD, G3TDR, G4HHB, G3VPK, G3MVV, G3SZJ.

The committee met each month during the year under review. The largest amount of time was involved in the organization of the Alexandra Palace exhibition, the VHF Convention trade show, and Woburn Abbey Rally, plus attendance at the two Midlands exhibitions.

Alexandra Pavilion housed an excellent exhibition in the finest of venues we have seen for an amateur radio exhibition in this country, but the disappointing aspect was the actual attendance figures. The committee, in close co-operation with headquarters, is looking at various other locations in the country in the hope that a more central position can be found to house a full exhibition with lecture facilities for 1983.

One issue which has come to the committee's attention is the ever-growing number of rallies and events taking place each weekend, and the lack of support by some of the trade exhibitors is beginning to take its toll. The committee feels that in the main there are too many events following exactly the same pattern held throughout the summer months, and a possible merger of some events might be an advantage.

The assistance by headquarters staff at the various functions attended, and in delivering publications and stand materials is appreciated by the committee.

Norman Miller, G3MVV, chairman

Finance & Staff

Committee: GW8HEZ, G3HCT, G3COR, G3OUF†, G3RPE, G4CHH, G2AMV.

The work of this committee, which met 12 times during the period under review, has been dominated by the matter of a new headquarters. The inadequacy of 35 Doughty Street, especially in so far as book storage and the appointment of additional staff are concerned, has become increasingly apparent. The highly satisfactory increase in membership during recent years and the progress made in the publications department have made the need for a move urgent.

Consequently at its November 1981 meeting the committee formulated a recommendation to Council that a search for a new home for the Society should be commenced immediately. This was agreed by Council, and the committee set about the task. Discussions then followed with the general manager regarding what were considered the prime areas for a new headquarters and the amount of space required. Details of various properties on offer were supplied by estate agents. Many were submitted and a few that might have been suitable were visited by the general manager. One was seen by members of the committee, but in that case it was decided that the advantages were outweighed by the disadvantages. Also, like a large number of the buildings on offer, it was leasehold. Many of the leases were short and not considered suitable.

However, a building was found with accommodation believed to be suitable for the Society's needs not only for current requirements but sufficient to collect all the Society's activities under one roof in future years.

Much of the committee's time has been spent on this subject, but many other matters, some of them of a routine nature, have been considered. Following the death of Roy Stevens, G2BVN, the handling of insurance matters has devolved on the Society's management and policies were reviewed by the F & S Committee. This included Raynet insurance, which has been brought up to date.

The honorary treasurer has regularly presented internal accounts and budgets, and at each meeting the general manager has reported on staffing levels and requirements. It will be appreciated that the number of staff has now reached the limitations imposed by 35 Doughty Street. During the year, however, some additional rooms have been rented a few hundred yards away from No 35.

There were discussions on the cost in the UK of Japanese equipment compared with the cost of the same equipment in the USA—prompted by correspondence from several members and comments made at meetings. The resulting letter from the Society and the reply appeared in *Radio Communication* November 1981.

Another item currently being discussed is the Society's need for a more formal arrangement for the handling of bequests, and advice is being sought regarding the possibility of establishing a trust.

Altogether a most interesting year with many matters still on the agenda.

B. O'Brien, G2AMV, chairman

HF

Committee: G3ZAY, G3HCT, G4FTJ†, G4CNY, G3AAE, G4BUO, G3GIQ, G8KG*, G3DME*, G3NKS.

The workload increased very considerably during the year, and the committee met eight times, compared with five times during the previous year. The membership of the committee was increased by three.

The major activity was in organizing and running the first RSGB National HF Convention, which was held on 19 June near Oxford. This event (reported in *Radio Communication* September 1982) was attended by over 350 people, and was considered to have been very successful. The committee intends to hold an hf convention annually, and is already engaged in planning the 1983 event.

The chairman of the committee represented the RSGB on the planning committee of the three-day hf conference organized by the IEE and held in London in February 1982.

Members of the committee manned the hf stand at the Alexandra Palace exhibition in April, and dealt with numerous enquiries on hf matters.

The committee considered the implications of the FCC proposal to increase the USA telephony band from 7,100 to 7,050kHz, and a letter of objection was produced and has been sent to the FCC by the President.

Detailed consideration was given to ways of increasing the use of the 28MHz band, particularly during the approaching decline in the sunspot cycle. A 28MHz county award is currently under consideration.

J. D. Kay, G3AAE, chairman

HF contests

Committee: G3MXJ, G3HCT, G3KKQ, G3RJV*, G6LX, M. Harrington (RS20249), G3XTJ, G4BUO, G3KDB, G6AGE*, G3XDY, G4BEL*, R. A. Treacher (RS32525).

Despite considerable difficulties due to rail strikes, seven meetings of the committee were held during the period under review, at which general contest policy, specific contest rules, correspondence and review of contest adjudication, were discussed. The actual checking of entries and preparation of results is done by individual members at home. During the year, Reg Unsworth, G3WPF, and Derek Thom, G3NKS, retired from the committee. Thanks are extended for the many hours of voluntary effort they have donated. We were joined, in 1982, by Ed Hodson, G3XTJ, and Bob Treacher, BRS32525. After two years as a corresponding member, John Bazley, G3HCT, returned to full membership. The Society's contest interests are represented internationally in the IARU Region 1 HF Working Group by G3FKM and G3HCT.

No major changes were made to rules during the year, and all contests —particularly the shorter duration events such as AFS and ROPOCO— continued to attract good entries. The rules covering applications for National Field Day entries were simplified, cutting down much of the paperwork involved for both the committee and for clubs. Contest certificates have been redesigned, and the procedures for preparing and posting them revised. This has achieved a great reduction in the backlog, and certificates are now normally posted very soon after publication of the results.

Committee members were present at Alexandra Palace and at the Oxford HF Convention. Feedback from discussions with visitors at both events was very valuable. Increasing difficulty is being experienced in recovering contest trophies from winners in time for presentation at the annual general meeting, and it is being considered whether or not the retention of trophies will be permitted in the future.

The committee is grateful to its two corresponding members: Rev G. C. Dobbs, G3RJV, who advises on QRP matters; and Eric Mollart, who organizes the Society's df events.

D. J. Andrews, G3MXJ, chairman

IARU

Committee: G3HCT, G5XB, G3OUF†, G3RPE, G3WSN, G5CO, G3GVV, G3DME*.

At the Region 1 conference held at Brighton, RSGB's offer to produce a pamphlet for newly-licensed amateurs had been accepted; the first draft of this was compiled by G3GVV at the beginning of the year in review. A further conference recommendation resulted in the establishment of a Region 1 committee to work towards a common international licence; G3GVV is the RSGB's representative. Assistance, in the form of RSGB publications, continues to be provided to countries where amateur radio is developing; China and Thailand are among the recipients, but attempts to liaise with Zimbabwe have unfortunately proved unsuccessful so far; G3FKM is the Society's liaison officer. With the release of the 10MHz band the conference recommendations with respect of (a) the use of narrow band emissions, and (b) the absence of contests and awards, were put into effect. For the first time, the RSGB was represented at a Region 3 Conference; agreement reached here, over band plans for the new hf bands, resulted in (a) being accepted world wide.

Throughout the period, discussion continued concerning the re-organization of the IARU; this again was an extension of the work of the regional conferences. An advisory council (with two representatives from each region, plus the IARU HQ officers) is to be established to consider all the implications of such a reorganization.

Noel Eaton, VE3CJ (a member of RSGB), retired as president of IARU. For many years he had devoted himself tirelessly to the cause of amateur radio —guiding the policy of IARU, visiting many member societies, attending regional conferences, and in 1979 directing the amateur radio service representatives at the World Administrative Radio Conference; we wish him well in the future. His successor is Dick Baldwin, W1RU.

R. J. Hughes, G3GVV, chairman

Interference

Committee: G4BYA, G4CMU, G2FLB, G8MCQ, G3HCQ, G3HLF, G4DXA, GM8FFX, GU3YIZ*, G3BLE*, G2YS, G4FWM*.

Most of the year's work has been on the preparation of the new *Interference Manual*. The preparation is being co-ordinated by Dennis Collins, G2FLB, who should be contacted with any ideas or possible contributions.

Apart from this, 54 new cases were dealt with during the year. The proportion of these which were successful is not clear, as in many cases the last the committee member hears of a case is when he writes with advice.

Several lectures to clubs were given during the year but, regrettably, some invitations had to be declined because of the travelling involved for people who also have to earn a living.

P. F. Jobson, G3HLF, chairman

Licensing Advisory

Committee: GW8HEZ, G3HCT, G3ZYE, G3OUF†, G3RPE, G3WSN, G4FRG, G3KEP.

The year under review has seen many changes in the liaison between the Society and the Home Office. In spite of difficulties at the beginning of 1982 with the publication of the new licence schedule, the links between us have strengthened and co-operation increased under, at times, very difficult circumstances. We firmly believe that the present close co-operation can only benefit amateur radio, and although the Society has been severely criticised by a very small percentage of its membership for apparently "doing nothing", we wish to record our appreciation to the staff at Waterloo Bridge House for the patience and consideration given to the RSGB.

In January 1982, Council approved the formation of a new committee (the Licensing Advisory Committee) to replace the old Telecommunication Liaison, the terms of reference of which were detailed in "Council Proceedings" *Rad Com* April. One of the aims of this new committee is to keep the membership better informed of the items under discussion and progress made. The first of these reports appeared in *Rad Com* August 1982, and summarizes the major portion of the committee's activities in the year under review.

On behalf of the committee I would particularly like to thank the members of the Society who gave many hours of technical advice at very short notice to deal with the "Schedule" problems. It is on these occasions one realizes the wealth of knowledge and expertise that is freely given to the Society for the benefit of us all.

Bob Price, G4BSO, and his panel have once again given the Society the benefit of their knowledge, particularly in the planning field. David Pratt, G3KEP, has, during the past 12 months, assisted the Society with the running of the Amateur Radio Observation Service.

J. Bazley, G3HCT, chairman

Membership & Representation

Committee: GW8HEZ, G8KEN, G3OUF†, G3RPE, GM8BZX, G5HD, G4CHH, GI8AYZ, G3VPK, G2AMV, G3FNM, G3VPE.

This year saw the continuation of reappraising the roles of the regional representatives and zonal managers, and a careful look at the effects of the increased cb influence on RSGB affiliated clubs.

During the year several new items were added to the "membership supplies" list, including a new range of badges of different coloured enamels dependent on length of membership, followed by a brown RSGB tie, and RSGB sweaters at the end of the year.

The main topic was that of communication with the membership and how to improve it effectively at all levels. The open meetings held in various areas each year are just a small but valuable part; this year's were held in North Wales at Colwyn Bay and in the East Midlands at Nottingham. Arrangements are now well ahead for the next two at Winchester and Barnstaple next year.

The change in emphasis in "Club News" is another aspect of membership communication, and it is hoped to progress this aspect further in the future. Finally, the relatively new medium of video may well play a large part in the future Membership & Representation Committee's discussions.

R. G. Barrett, GW8HEZ, chairman

Microwave

Committee: G8AGN, G4KNZ, G3PFR, G3RPE, G3YGF, G4CNV*, G3JHM*, G3VEH*, G4FSG, G3HWR, G3WDG, G4KGC, G3JVL.

The year has seen the retirement, as chairman, of Charlie Suckling, G3WDG, but he continues as an active member of the committee and as the scribe of the "Microwave" column in *Radio Communication*. For the first time a resume of committee meetings appears regularly in the *Microwave Newsletter*, an innovation to help to keep members in touch with the many activities of the committee.

In common with the other spectrum committees and the Licensing Liaison Committee, there was intense activity immediately following the licence modifications in February. Subsequent negotiations should lead to the higher microwave bands being released for use in this country.

Voice repeaters are now in use on 1·3GHz and, with tv repeaters planned, much work has gone into both administrative tasks and technical considerations. Mike Walters, G3JVL, has provided invaluable advice and designs for antennas and filters for these projects. Beacons play a vital part in microwave operation, and an increasing number are appearing—a very high proportion of those licensed above 1GHz are active.

Other matters under consideration include: locator systems—the QTH system often being too coarse for the narrow beamwidths in use; a code of practice for microwave operators; band planning; microwave talk-back frequencies; satellites, and sundry technical matters.

Round tables, conventions and exhibitions were again well supported, and the committee stand at Alexandra Pavilion displayed a number of working exhibits. A paper on 1·3GHz mobile operation was presented at a professional IEE meeting.

P. G. Murchie, G4FSG, chairman

Propagation Studies

Committee: G3HTF, G3ZYE, F8SH*, DJ5DT*, G3BYW, G3LTP, G3NAQ*, G3USF*, G3VYF, G2FKZ, G8KG*, G4AQI, G3DME, G3JVL.

It was another busy year for the committee. With the co-operation of the IARU sporadic-E co-ordinator, F8SH, a new and intensive Es study was launched in the spring by the mass distribution of blank report forms to all the societies affiliated to the RSGB, and to some 200 selected operators on the Continent, including all the known vhf managers. This study, which is to extend over four or five sporadic-E seasons, aims to collect as many reports as possible from a dense network of stations spread over the whole of Europe. The results will provide information for CCIR that cannot be obtained in any other way.

G2FKZ, who is responsible for the propagation section of the RSGB Sunday GB2RS news bulletins, has produced another tape/slide lecture dealing with auroral propagation, this time explaining his "boundary fence" theory, an original concept that has emerged from our amateur studies. G4AQI has extended his monthly prediction table in *Radio Communication* to include data for the new bands. G3DME, the International Beacon Project co-ordinator, saw the trans-equatorial propagation experiments at first hand when he visited Zimbabwe and South Africa on holiday.

New members of the committee this year are: G3ZYE (Council representative), G3VYF (dealing with UK sporadic-E) and G3JVL (looking after our microwave interests). Each member of the committee has a specific part to play in our overall programme.

R. G. Flavell, G3LTP, chairman

Raynet

Committee: G3LRE*, G8CAC, GI3USS*, E. R. L. Bassett (RS16075), G8LWY*, G3PYN*, GW3ZXI*, G4AVV, G3XC, GM3RFA*, G4FRG, G3STG*, G4CHH, G6AJF*, G4KAR*, G6JP, G3TJP*, G2AMV, G6DDQ*, G3VPE, G3KWT*, Mrs J Balestrini, Mrs T Crane.

The experimental zonal committee member system got under way with the first full committee meeting in February, with 10 zones represented, resulting in a number of decisions designed to re-shape Raynet for the immediate future. The zonal system has apparently worked well during 1982, and a further meeting was planned to take place at the Home Defence College, Easingwold, in September, not only to have zonal reports on the system but to hear Sir Leslie Mavor, co-ordinator of voluntary effort in Civil Defence, talk about his ideas on Raynet's role both in Civil Defence and as a community service. it is intended to give Council a report on the zonal system following this meeting. .

The new Raynet report forms were used to great effect following the snows of December 1981 and January 1982, when many groups up and down the county were heavily involved with county emergency planning officers and police. Numerous reports have followed Raynet's assistance in many other emergencies.

In February, following personal visits, the Home Office re-instated the country shows and similar functions concession for Raynet to provide communications on behalf of the user services without the need for prior authority. This concession has worked well, and once again the Raynet report forms have been used to good effect. Further concessions have followed, enabling Raynet to operate during the papal visit, and the two Civil Defence exercises Intex 82 and Hardrock.

Booklets on Raynet and Raynet insurance are in hand, and a monthly update of the controllers list is now produced by headquarters from information compiled by the group information officer.

Raynet membership has continued to grow, with some 180 groups consisting of approximately 4,000 members.

RTTY is becoming a much-used mode by Raynet groups, particularly at various district council headquarters—we have been fortunate in the negotiations with British Telecom by the South Anglia group on behalf of Raynet. During the year Raynet has been evident at many rallies and exhibitions, with Raynet supplies being available. Arrangements to extend the range of supplies are in hand.

The 1982 committee, with its more direct contact with membership, has worked smoothly and well and wishes to express its thanks to all the staff at Doughty Street for their valued assistance.

B. L. Goddard, G4FRG, chairman

Technical & Publications

Committee: G4FAW, G4FTJ†, G3OQD, G3RPE, G3YGF, G3SJX, G3VA*, A. W. Hutchinson†, G4IQQ, G3HWR.

The workload on this committee continues to be very high. The committee met eight times during the year, and each meeting usually lasted three or four hours; this represents an appreciable effort by its members. It is regretted that during the year Pat Hawker, G3VA, found it necessary to resign from the committee because of the pressures of his other activities. However, he will continue as a corresponding member, and hopefully will find it possible to return as a full member in the not-too-distant future.

The year has been of mixed success. Special efforts have been made in the area of technical reviews of equipment, and particular thanks must go to Peter Hart, G3SJX, for his efforts in this direction. Of much concern to the committee has been the fall in the number of authoritative articles received for publication in *Radio Communication*. These not only form the mainstay of the magazine itself but provide material (as well as experienced writers) for our books. The latter represent an enormous contribution to amateur radio, not only in the UK but throughout the world. I am happy to report that in recent months, this downward trend appears to have been reversed.

As part of our book production, new editions of the *Teleprinter Handbook* and the *Radio Data Reference Book* are well advanced. New books have included the new editions of the *Call Book* of course, which in itself represents a considerable editorial effort by Margaret Collins. A major event was the publication of *HF Antennas for All Locations* by L. A. Moxon, G6XN. This unique book has been well received and enjoys the excellent sales it deserves. Currently, work has begun on a number of new projects which include books on amateur radio software and on constructional techniques.

The area of publications continues to represent a major activity within RSGB. Clearly the Society owes a considerable debt to the authors and volunteer effort, to the editorial staff represented by A. W. Hutchinson and R. J. Eckersley, and to the main HQ staff, all of whom are responsible for its continued success.

D. S. Evans, G3RPE, chairman

VHF

Committee: G3ZNU, G3COJ*, G3XDV, G3BA, G5KW*, G3WSN, G4FRG*, G8GOJ*, G3RWL*, G3VPK, G3VEH, G4ANB*, G4FSG*, G3VZV*, G3FZL, G3RKL*, G3SEK.

Since July 1981 there have been several changes of VHF Committee membership, and the appointment of Council member W. McClintock, G3VPK, was particularly welcomed because of his considerable knowledge of vhf and Society matters.

The highlight of the year was the RSGB National VHF Convention held for the second year at Sandown Park Race Course. The more spacious "Tote level" provided an excellent trade exhibition area with plenty of room for all to ponder and chat without being crushed. Attendance was good and the lectures proved particularly attractive, especially "Antenna Gain Measurement" by Oscar Bäckman, SM5CHK, the first international guest speaker at this event. It is hoped to provide speakers from abroad at future vhf conventions.

The committee continues to pursue interests in 50MHz band activity with the aid of Major K. E. S. Ellis, G5KW. Other work included modification of the 70MHz band plan to incorporate the beacons at the lower end of the band; beacon service continuity, planning and maintenance; continued implementation of the agreements made at the IARU Region 1 Conference at Brighton in May 1981; and, finally, the committee has, through its Repeater Working Group, been carefully co-ordinating the planning and growth of repeaters within its designated spectrum.

The committee is again grateful for the efforts of the vhf/uhf awards manager, Jack Hum, G5UM, and for the unstinting efforts of the *Radio Communication* "4-2-70" columnist, John Morris, G4ANB.

C. J. Morcom, G3VEH, chairman

RWG: G3LEQ, GM8LBC, G3PAQ*, G4KNZ, G3XDV, G4AFJ, G8IXI, GI8AYZ*, G4EFO, G3VZV*, G4CCC.

During the period under review, no 144MHz or 432MHz repeater licences were issued. This was due to a change in RWG vetting procedure and to Home Office delays. The number of operational units increased from 45 to

48 on 144MHz, and from 83 to 87 on 432MHz. A year after the issue of 10 1,296MHz licences, it is disappointing to find only one operational repeater.

Twenty-five new proposals were vetted and much technical advice given to new groups, but it has become increasingly difficult to choose sites and frequencies which would not adversely affect existing units. To assist vetting, the "Guide to Repeater Licensing" and "Repeater Performance Questionnaire" were revised. Several existing repeater groups folded, but it was encouraging to find new groups willing to take over the licence in most cases.

In co-operation with BATC and the Microwave Committee, a specification and band plan were drawn up for five 1·3GHz tv repeaters. Work also continued on the specification for an experimental repeater using ssb. Other work included processing site changes and monitoring technical standards.

Open meetings were held in Barnsley, Exeter and Newcastle-under-Lyme, in addition to eight committee meetings, though the bulk of the RWG's work was done between meetings.

M. Dennison, G3XDV, chairman

* Corresponding member
† Staff member

VHF Contests

Committee: G3MXJ*, G3KKQ*, G5HD, G8ACJ, G3VPK, G3LCH, G3XDY, G2HIF, G3FZL, G4KGC, G4BEL.

The committee attempts to evolve every year a broad style of contests calendar to cover vhf/uhf frequencies, modes and power levels. It is occasionally criticised, and together with other comments which appear by letter or on the 427 Form, these are always noted, discussed and implemented if considered to be of majority interest.

The year saw the demise of the Meteor Scatter and the 144MHz QRP contests but the establishment of the 1,296MHz Cumulatives in the calendar.

Intending contestants should note that some RSGB contests are IARU Region 1 co-ordinated contests and require points/km scoring.

The committee extends its thanks to those who voiced their comments at the VHF Convention Forum, and those who supported the RSGB-organized contests over the year despite giving the members hours of work adjudicating the contest logs.

Frank Mathews, G8ACJ, chairman

REPORTS FROM THE . . .

. . . Amateur Radio Observation Service organizer

Established in September 1977, the Amateur Radio Observation Service has now been operational for some five years. During that time the number of observers has increased from six to the present 20, most parts of the UK now being covered. Reports continue to be sent as appropriate to radio amateurs who are heard operating outside the terms of their licence, and whose continued operation in that manner could cause approaches to be made by the licensing authorities. Unfortunately the case to improve the standard of operating among licensed radio amateurs is not helped by the increasing amount of spectrum abuse by unlicensed intruders in our bands. Unlicensed operation is really in the hands of the Home Office which, given adequate resources, will take the appropriate action.

D. M. Pratt, G3KEP

. . . HF awards manager

In the period under review the number of certificates issued rose once again. With the increasing numbers of newly-licensed operators appearing on the bands, I take the opportunity of reminding applicants of certain basic rules regarding hf awards. When applying for awards, submitting claims for certification or just requesting information **you must:**

(1) Submit proof of RSGB membership.
(2) Always include a stamped self-addressed envelope when you need a reply or the return of a QSL card.

Certificates issued during the year

	G	EU	N America	S America	Asia	Africa	OC	Total
WBC	31	121	16	3	88	4	5	268
CDXC	10	5	6	–	6	–	2	29
IARU	51	210	19	9	42	4	5	340
DXLCA	4	34	–	–	9	–	–	47
BCRTA	11	28	9	1	21	2	3	75
BCRRA	3	12	–	–	4	–	–	19
WAC	55	1	–	1	1	–	–	58
	165	411	50	14	171	10	15	836

It can be seen that on average 16 certificates a week were issued. Also it is interesting to note that more stations in Asia applied for our certificates than our own membership, and it would appear that we are not great certificate hunters.

P. Miles, G3KDB

. . . Intruder Watch organizer

Despite problems arising from the change from manual to computerized processing of monitored information, the Society's Intruder Watch system continued to operate effectively and its long-established liaison link with the national administration proceeded without interruption. Easily recognized successes in the work of tracing and eliminating intruding transmissions in the exclusive amateur bands were the abandonment by the Egyptian broadcasting authority of two channels in the 7MHz segment, and the cessation of a spurious broadcast in the 10,100–10,150kHz shared band estimated to have originated from the same source.

At around mid-term the successful harnessing of Intruder Watch operations to the data processor enabled the production of the Society's Monthly Summary of Intruders to be resumed. This material was distributed to the Home Office for action and documentation and to the watchers as feedback information. Severe hold-ups in the production and distribution of guidance information and charts led to regrettable delays in introducing a number of enthusiastic volunteers to the work. It is expected that many of the bottlenecks and problems will have been overcome by the time this report is published.

During the year under review Intruder Watch received excellent support from many overseas IARU member societies, including a weekly over-the-air contact with Australian and New Zealand groups for interchanging and updating information. In conformity with a recommendation of the 1981 IARU Regional Brighton Conference (Committee A recommendation 7 relating to 28MHz intruders) the group co-ordinated reports from overseas watchers and passed the information to the UK administration. Intruder Watch had a total of 12 active members; it is expected that six or more volunteers will shortly be introduced to the work.

S. A. G. Cook, G5XB

. . . Microwave manager

The development of the microwave part of the spectrum continues to make slow but steady progress throughout the world. The one major problem arises from the fact that all our microwave bands are allocated essentially on a secondary basis, which means that it becomes easier for the national authorities to designate alternative uses on a local basis. This has already happened on 1·3GHz, where French amateurs lost the use of the critical 1,296–1,298MHz part of the allocation. More recently, German amateurs were the first to lose the prized 2,304–2,306MHz part of the spectrum. Both sub-bands are of course accepted worldwide as the preferred part of the bands for narrow-band operation. It is something of a tragedy that international working in microwaves, itself a difficult enough (but technically interesting) operation, should be impeded by lack of common operating frequencies. Clearly, consideration of future policy must include the possibility of having some parts of each band defined as exclusive amateur allocations. This problem will be an obvious topic for discussion at the Region 1 Conference to be held in Italy in 1984, preparations for which are already in hand.

The reason for the pressure on the lower microwave bands from 1 to 10GHz is simply a reflection that this part of the spectrum is getting to be "old hat", technically speaking, and therefore ready for widespread commercial exploitation. If amateurs are to be seen to be playing a genuine part in the development of the radio art, then at least some of their efforts should be concentrated on the bands above 10GHz. This clearly must be regarded as our next priority.

D. S. Evans, G3RPE

. . . Planning Advisory Panel

The work of the Planning Advisory Panel increased dramatically during the year, when 49 recorded requests for assistance were referred to the panel by the RSGB. The principal subjects on which advice was needed were: first, whether planning permission need be applied for; second, how to deal with a planning application; and third, how to deal with a planning appeal.

The panel, at present comprising 17 barristers, solicitors, planning officers and others, gave advice to members of the RSGB on an entirely voluntary basis and provided a much-needed service in this specialized field.

In addition to advising members regarding their particular problems, general aspects of planning which affect amateur radio have been kept under review—including the DoE's recently-changed view that "interference" can be a planning consideration, the fees payable on planning applications, and the effect of a proliferation of cb antennas.

. . . QSL Bureau manager

The QSL Bureau continues to be one of the Society's most popular membership services, and in the year under review one and a half million cards passed through the bureau, this being an increase of 24 per cent on the previous year. This increased workload was handled by Mrs Allen, the sub-managers, and our faithful helper G3OKQ, to all of whom the Society extends its thanks.

An interesting point is that although the number of cards going overseas almost doubled, those destined for UK amateurs decreased by some four per cent. Fortunately the use of non-standard cards has greatly diminished, although some users still seem rather hazy over the alphabet when sorting cards.

The bureau, like everyone else, has had to contend with increased postal charges, and in an effort to economize some bureaux have been sent larger packets at less frequent intervals.

Approximately 30 per cent of all cards are uncollected, and bureaux around the world must be bulging at the seams with cards which, if collected by the addressee, must surely be of passing interest only. One wonders, therefore, whether in this day and age it is not possible to rationalize the QSL scene by reducing the number of confirmations to a more sensible number. As an example, is it really necessary to QSL every European station worked?

Similarly, bearing in mind the fact that cards are not an inexpensive item, but at the same time not wishing to discourage interest in amateur radio, one wonders if the transmitting amateur should be expected to send a card in respect of every listener's report, no matter how superfluous.

E. G. Allen, G3DRN

. . . Slow Morse Practice Transmissions organizer

It has been a disappointing year, as the Society has failed to obtain the concession that would permit the transmission of random letter groups. If this were possible it would be much easier for the listeners to achieve the required standard, as, inevitably, passages of plain language encourage a degree of guesswork during reception. However, the service has expanded during the year, but most newcomers have opted for operation on 144MHz, and this still leaves the more rural areas poorly served. There is still a need for many more volunteers if the goal of nationwide coverage is to be achieved.

Once again it must be stressed that the listener has a part to play by reporting to the station providing the service. Operators will only give their leisure time to help others if they know their efforts are beneficial to their unseen and, all too often, unknown audience.

M. A. C. MacBrayne, G3KGU

. . . VHF manager

During the past year there have been a number of changes to the amateur licence, and allocations, affecting the vhf spectrum. The newly-formed Licensing Advisory Committee was heavily involved with the problems brought about by several Home Office announcements. This work will continue. In addition we have seen a reduction to the UK allocation at 70MHz. It should be remembered we retain this useful allocation at the discretion of the primary users, and for this reason, at present, this band will not be made available to Class B licensees.

The WARC decision to grant joint primary status to the amateur service at 430MHz from January 1982 has not been implemented in the UK owing to other national needs. This has led to a number of problems in this band which will require co-operation on our part. Syledis has caused considerable problems to a number of areas in the country.

Negotiations continue for an allocation at 50MHz, and for the possible use of cw by Class B licensees. Band planning demands constant reviewing in order to remain effective with the increasing traffic on our bands. Operating discipline has, in the main, been good, but it must be remembered there is increasing demand for additional spectrum by **all** users, and we must ensure we are utilizing our own allocations in the best possible way.

K. A. M. Fisher, G3WSN

. . . VHF awards manager

An analysis of the vhf/uhf awards issued during the 12 months ended 30 June 1982 shows the following:

Four Metres and Down Certificates. 70MHz Standard Transmitting, 2 (same as previous year); 70MHz Senior Transmitting, 1 (as last year); 70MHz Receiving, nil (the writer feels that there is scope on this band for more listener activity and the rendering of useful reports to the small number of occupants of this band). The totals in the three classes are respectively 141, 47 and 6. On the 144MHz band, where the activity is much higher thanks to the availability of this band to Class B members, the figures are:

Category	Number	Total issued
144MHz Standard Transmitting	35 (2 up on 1981)	614
144MHz Senior Transmitting	21 (9 up on 1981)	185
144MHz Standard Receiving	0 (4 down on last year)	38
144MHz Senior Receiving	1 (1 up on last year)	4
432MHz Standard Transmitting	13 (3 up on last year)	173
432MHz Senior Transmitting	5 (3 down on last year)	79
432MHz Standard Receiving	0 (1 down on last year)	7
432MHz Senior Receiving	0 (same as last year)	1
Supreme Award (for achieving three Seniors or two Senior Awards plus one 1,296MHz Standard):	7 (5 up on last year)	41

Four Metres and Down Microwave Awards are obtainable for first contacts made on the six microwave bands over specified distances (eg, first contact beyond 600km on 1·3GHz, et seq). During 1981–2 the number of these certificates issued was: 12 for 1·3GHz, compared with three in 1980–1; one for 3·4GHz (against nil); and three on 10GHz (two down). On the two most populous microwave bands of 1·3 and 10GHz, totals of 40 and 56 certificates have now been issued.

Four-Two-Seventy Squares Awards. One basic 20/4 certificate was issued during the year; total now 3. One sticker for 25/6 was issued; total now 2. One 30/8 sticker (total now one) and one 35/10 sticker (total now one) were also issued.

144MHz. 32 basic 40/10 certificates were issued (37 last year); total now 87. Stickers for existing certificates issued were: 60/15, 12 (total now 29); 80/18, 4 to make a total of 12; 100/20, 7 including one EA, to make a total of 15; 125/20, 3 (total 3); 150/20, 4 stickers to make a total of 4; in the new categories of 175/20 and 200/30 there have been no claimants, but at 250 squares + 35 countries there is one entry, G3IMV. It was pleasing to note that two swls entered the "squares stakes" during the year: to BRS41733 went Certificate No 1 for 40/10, and to BRS32525 Certificate No 1 for 60 squares and 15 countries confirmed.

432MHz. Basic certificates for 30 squares + 6 countries went to 8 claimants during the year; total now 19. Stickers for 40/10: 5, bringing the total to 7. Stickers for 50/13: 1, bringing the total to 3. One member, G3VYF, has reached 80 squares + 15 countries at 432MHz.

Microwave Squares Awards. 1·3GHz: 8 new basic certificates for 1·3/5 were issued, bringing the total to 23, and 19 stickers for existing certificates. 2·3GHz: one basic award for 5 squares and another for 15 squares were issued during the year. 10GHz: one basic certificate for working 5 squares on this microwave band was issued, bringing the 10GHz total to 15.

In addition to the above 200+ proficiency awards, the vhf awards manager issued a large number of winners' and runners-up certificates in respect of vhf/uhf contests held during the year, all of them upon notification from the VHF Contests Committee. Liaison with that committee is close, and attempts are being made to arrange for contest certificates to be issued simultaneously with announcements in *Radio Communication*, although one or two administrative details remain to be resolved before this desirable state of affairs can be achieved.

Finally, the enormous increase in Class B licensees and in vhf/uhf operating generally has been reflected in the large number of requests for FMD and 4-2-70 claim forms which reach the vhf awards manager, sometimes several a day being received.

Jack Hum, G5UM

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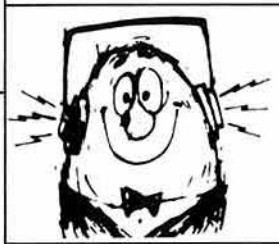

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