Radio Communication

April 1988

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FRONT COVER
FIELD DAY 1949

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Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

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

A contribution will only be considered for publication on the understanding that the person submitting it is the original author and owner of the whole copyright, and that on acceptance for publication such copyright will become the property of the RSGB in consideration of the above-mentioned payment by the RSGB to the contributor.

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

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ABC
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The TS-440S from Kenwood

As many of you will know, Kenwood have a current policy of running three HF lines; the '1' series which started with the TS-120, went on to the TS-130, and now crowned by the TS-140; the top of the range '9' series having the TS-930 and TS-940; and the '4' series which began with the TS-430 and is now completed with the TS-440S.

The TS-440S is designed to be a compact version of the TS-940S, and in RF performance it proves to be so. Chris Lorek, when reviewing the TS-440S said "There was no suggestion of the dreaded reciprocal mixing..." and went on to say "Trio engineers have done well considering the standard TS-940S performance – the TS-440 actually outperforms it in this respect." What this means in down to earth listening terms is that the receiver presents you with a quiet background, with signals simply appearing and disappearing when you tune across them, with none of the 'sharsh" noises as you approach a strong signal. Kenwood engineering at its best.

Whilst on the subject of the receiver, Geoff Arnold said in his review in Practical Wireless, "The receiver in particular is a joy to use, with clever use of spare microprocessor power to give automatic bandwidth selection according to mode." Again this typifies the Kenwood belief that their equipment is designed to be used by a human being, and they want to make it as easy as possible for you to enjoy your hobby.

Of course not everyone wants to use their amateur licence for actually communicating with other people, and if you want to sit and count control knobs then Kenwood is not for you. I have just been looking at a colour spread picture in an American magazine which shows the very latest HF transceiver to appear on the market. It has 84 push buttons and 30 control knobs – and that is just on the front panel. You chaps with 10 fingers on each hand should be well pleased. Mind you, the TS-440 has 37 buttons so even we mortals with 5 fingers will be occupied fully.

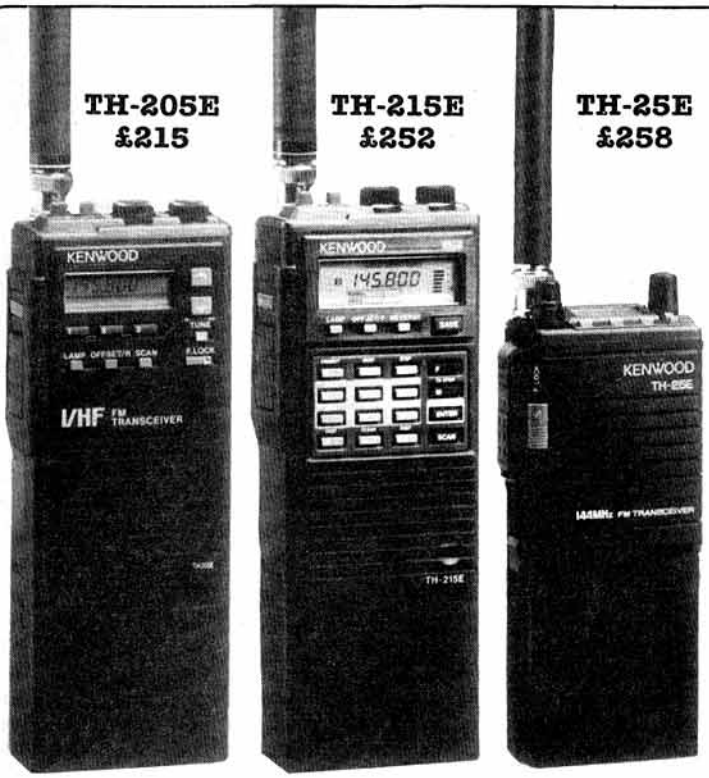
As a radio amateur, there are other excellent design features to which your attention should be directed. Amongst the most obvious of these is the frequency readout and the way it behaves. Sounds silly? Then consider tuning to 3750 kHz and chatting on lower sideband to Fred. The readout on the transceiver reads 3750 (of course). Then Fred says "Check me on upper sideband", and you move the mode switch to USB. If you are using a Kenwood rig, the readout still shows 3750 and you are indeed listening and transmitting on 3750 upper sideband. BUT – many other transceivers leap sideways by 3 kHz and you then have frantic retuning to find Fred. Small point you may say, but it is intensely irritating in use, and Kenwood make sure that it does not happen in their equipment; not HF, not VHF, not UHF.

By now you are probably thinking "The geriatric idiot is meandering again", but it never ceases to amaze me how lessons learned long ago need re-teaching at regular intervals, and minds need opening to old truths. That is, after all, what education is all about. Enough – back to the TS440S.

I absolutely guarantee that you will be impressed by the TS-440S when you sit down and use it; and that is best accomplished by going to one of our branches or your nearest Approved Kenwood Dealer. Don't bother with anyone who clearly doesn't have the background or connections to understand what the equipment is all about, because transceivers like the TS-440S are better explained by someone with genuine product knowledge.

For full details of the TS-440S, Kenwood produce an 8 page brochure which is yours for the cost of postage and packing. For full details of all the Kenwood range, simply send £1 and we will fill an envelope with info. and send it right back. If it takes 8 pages to describe the TS-440S there is now ay in which I can adequately cram it into this space – send for the brochure. 73 John Wilson G3PCY/5N2AAC

Classical quote. Alfred Austin, (1835-1913) wrote:- *"You want a seat? Then boldly state your itch, be very radical, and very rich."* (He must have known about some of the newest transceivers...)



Many handies make light work (you may groan!)

How do you describe a group of small transceivers? Perhaps a "clutch" of handhelds? Anyway, all that aside, there is no doubt that Kenwood scored a real hit with the TH-205 and TH-215, which give you high power, handy size, performance plus, and at attractive prices. Now it's time to introduce the new baby (and I use the term advisedly), because it really is small; in fact it will fit into a shirt pocket – but it pokes out up to 5W of RF, (depending on battery pack used), has LCD frequency readout on its top face, and in this age of keypads on everything actually uses a tuning knob to cover the band in 12.5 kHz steps.

As always, I will advise you to ask for a brochure on the new TH-25E because I cannot possibly tell you all about it in this small space; about the 14 memories; the range of accessories; the auto battery saver; and so on... and about its 70cm brother the TH-45E, which is shown here. Funny thing about Kenwood equipment; it always 'feels right', and this applies not only to the larger HF transceivers but even more forcibly to the TH-25E. If the Asahi camera people had not already used the phrase "Just hold a Pentax", I would have liked to have applied it to the TH-25E. Why don't you grasp one and see if you agree.

THIS AND THAT

Our Head Office is at Matlock, but we have conveniently placed branches around the country. Each branch is run by a manager who is an active radio amateur and also keen to help you. He normally stocks everything in our extensive range and can demonstrate all major items of radio equipment to you. Note though that all mail orders must be sent to Head Office at Matlock.

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In London, at 223 Field End Rd., Eastcote, Middx.
Tel. 01 429 3256.

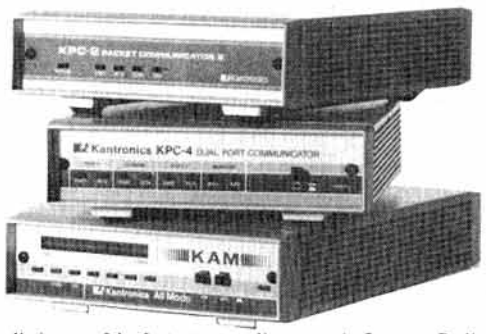
In Bournemouth, at 27 Gillam Rd., Northbourne.
Tel. 0202 577760.

Branches are normally open from Tuesday to Saturday inclusive, with lunch breaks to suit local conditions. If in doubt, just telephone your nearest branch.

Words of Wisdom from the Workshop
Barrie Lowe reminded me that we still carry stocks of valves for older equipment (even boxed 6D6 and 6C6 would you believe). If you want to give your trusty receiver or transceiver a new lease of life, just write to Barrie and ask him for the latest valve list.

STOP PRESS. Coming soon from JRC, the JST-135 matching transceiver for the NRD-525 receiver. Now you know why we did not handle the interim JST-125 model.

KANTRONICS



Packet radio is one of the fastest expanding areas in Amateur Radio. Access is available to national and international data, messages may be left or 'mailboxes', and of course you may conduct a QSO just like RTTY or AMTOR.

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KPC4 £298 inc. vat. (carr £8)
A dual port TNC allowing simultaneous operation on two bands (if you can keep up the pace). All the features of the KPC2 plus gateway between ports.

P.S. WEFAX means you can receive those wonderful Met forecast pictures off-air.

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The 45 watt wonder for 2 metres. Common sense facilities, ease of use, and a massive 45 watt output make the TM-211E probably **TM-221E** the most wanted FM mobile around. All this and an amazing receiver (see Ham Radio Today July 1987). All you need in a compact package, including all channel spacings (5, 10, 12.5, 15, 20, and 25 kHz). P.S. it also has a 70 cm brother, the TM-421E, and a remote controller available for operating them both together.
TM-221E...£317.30 (carr. £8) **TM-421E...£352.84**

Called by many "The perfect 2 metre Base Station", the TS-711E is **TS-711E** as close to perfection as state of the art can make it. All mode operation, full band coverage, continuous tuning or step tuning for FM channels. Two separate VFO's, 40 memories storing frequency, mode, repeater shifts, even whether or not you need a tone burst. Optional voice synthesiser, the list of features is almost endless. (And it too has a 70 cm brother, the TS-811E).
TS-711E...£940.00 (carr. £8) **TS-811E...£1094.00**

Versatile 2 metre multi mode mobile or fixed station, the TR-751E **TR-751E** again shows that Kenwood magic touch in making a complex transceiver so easy to use. Virtually a miniature version of the TS-711E, the TR-751E set new standards of performance at its introduction, and has continued to win friends ever since, continuing as it did the line started by the TR-9000 and TR-9130. (And, you guessed, it has a 70 cm counterpart, the TR-851E).
TR-751E...£599.00 (carr. £8) **TR-851E...£699.00**

To be perfectly honest, the RZ-1 came as a surprise to us. We didn't expect **RZ-1** Kenwood to come up with a mobile monitor receiver covering 500 kHz to 900 MHz, but here it is. Designed to fit in a standard car radio slot, the RZ-1 seems to have everything. Direct frequency entry, manual tuning, 100 memories, readout of station name on display, scanning, stepping, am/fm modes, unbelievable... Of course this level of facilities does not come cheaply, but the RZ-1 really adds a new dimension to the wide range monitor market.
RZ-1... £465.00

Top of the range, the TS-940S has everything the discerning HF **TS-940S** operator requires. Amateur bands from 160 to 10 metres, together with a general coverage receiver tuning from 150 kHz to 30 MHz. Operating modes USB, LSB, CW, AM, FM, FSK. Forty memory channels, each effectively a separate VFO. Easy keyboard frequency entry. Leadership in the field. The TS-940S is the transceiver everyone wants to own one day.
TS-940S...£1995.00 (carr. £8)

Kenwood common sense. The TS-140S shows the way to go in **TS-140S** balancing performance, operating features, and ease of use; all at an attractive price. All mode amateur band transmit with an excellent general coverage receiver. Full break in CW is provided for the real operators, but so is FM for idle chatting on ten metres (although why one would use FM in preference to SSB or CW, I cannot imagine). Every TS-140S we can obtain is instantly sold. Ask around and you will find out why.
TS-140S...£862.00 (carr. £8)

Virtually the receive section of a TS-940S, the R-5000 is probably **R-5000** the best HF receiver right now. Notice the family resemblance to the TS-440S which gives it a clean, easy to operate look, and of course Kenwood have applied all their ergonomic skills to make you "at home" the moment you begin to use the R-5000. All mode of course, and has an optional internal VHF converter which extends you to 108-174 MHz.
R-5000...£875.00 (carr. £8)

You brute. If it wasn't for all the safety interlocks I would operate my **TL-922** TL-922 with all the covers off, just to admire the sheer engineering beauty of the innards. The TL-922 is THE linear amplifier, and once you own it you will never part. The effortless ease with which the TL-922 produces RF power has to be experienced to be believed, and it is probably the world's most sought after station accessory.
TL-922...£1495.00 (carr. £8)

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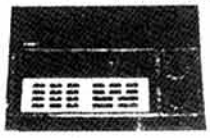

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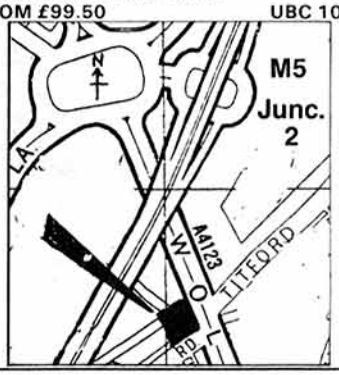

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Sony 2001D Short Wave/Airband DEI IIXF RX with ANI kit	£395.00

Many more makes and models in stock, PLEASE CALL FOR PRICES. DELIVERY COSTS and any advise or information, or send large SAE (Insured post and packing £10.00. Carrier £12.50).

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* = Extended Receiver coverage available, call for details.

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FT690RMK2 6MTR 2.5W MULTIMODE STANDARD ACCES	£399.00
FT690RMK2 6MTR 2.5W M/M AS ABOVE C/W NICADS CH	£425.00
FT790RMK2 NEW 70CM 2.5W MULTIMODE DUE OUT SOON	£499.00

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*ICOM IC28E 2MTR 25W MOBILE WITH FREE 5/8 ANTENNA	£359.00
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ICOM IC-48e 70cm 25W	£429.00
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ICOM

IC-4GE 70cm FM Handportable

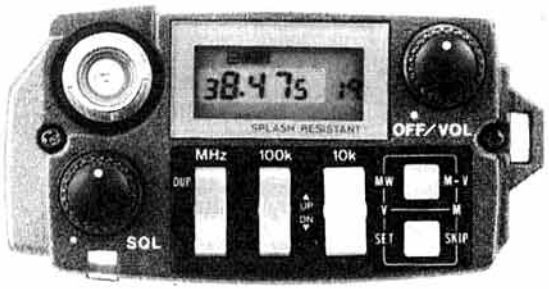
The IC-4GE is the first in a line of new handportables to be announced from ICOM. The small compact style provides easy operating and rugged durability. Other models for 2mtrs and 23cm will be released later this year.

A full 6 watts of RF power is available when using the IC-4GE with the option IC-BP7 nicad pack. The IC-4GE is equipped with a total of 20 memory channels. Each memory can independently memorise frequency, offset direction and frequency.

All circuits are designed using low power dissipation techniques to create a special power save circuit in the transceiver. The power saver circuit functions if no signal is received or no switch operation is performed for more than 30 seconds. In addition, the power saver circuit can be turned off for packet communications.

Two different scans, programmed scan and memory scan are provided and in addition memory skip channels can be programmed to skip selected memory channels during memory scanning operating. The squelch monitor function allows you to monitor weak signals without having to adjust the squelch control. The high impact case is splash resistant by the inclusion of rubber gaskets. The IC-4GE is supplied with a IC-BP3 nicad battery pack, flexible antenna, AC wall charger, belt clip and wrist strap. It is compatible with many of the existing accessories for ICOM's IC-2/4 and IC-02/04 series of handportables.

Also available for the IC-4GE is a large range of optional accessories including a variety of rechargeable nicad power packs, dry cell battery pack, desk charger, headset and boom mics and new slimline speaker mics. For more information on the IC-4GE or any other ICOM handportable contact your local ICOM dealer or ICOM (UK) LTD.



◀ Actual Size ▶

Icom (UK) Ltd.
Dept RC, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.

Count on us!

IC-575, 28/50MHz Dual band multimode.

The ICOM IC-575 base station has been developed to meet the demand for advanced communications for the recently acquired 6m band. Similar in appearance to the IC-275/475 2m and 70cm base stations, the beauty of this new transceiver from ICOM is that it gives you the best of both worlds, 6 & 10m in one compact unit. The IC-575 covers 28-30Mhz and 50-54Mhz. Operating modes are SSB, CW, AM & FM. Power output is 10 watts (AM 4 watts) with a front panel control to reduce output for QRP operations. A pass band tuning circuit narrows the I.F. passband width, eliminating signal in the passband. A built-in notch filter eliminates beat signals with sharp attenuation characteristics.

Some PLL systems have difficulty meeting the lockup time demands placed on them by new data communications. This is why ICOM developed the DDS (Direct Digital Synthesizer) method. With a lockup time of just 5msec the DDS method allows the IC-575 to handle data communications such as packet or AMTOR. 99 programmable memories can store frequency, mode, offset frequency and direction. A total of four scanning functions for easy access to a wide range of frequencies, memory scan, programmed scan, selected mode memory scan and lock out scan. The IC-575 has an internal A.C. power supply, but can also be used on 13.8v DC for mobile or portable operation.

Optional accessories available are the UT36 voice synthesizer, the IC-FL83 CW narrow filter, SM7 external loudspeaker, HP2 communication headphones and SM8/SM10 desk microphones. Other transceivers available in this range are: IC-275E 2m multimode 25w, IC-275H 2m multimode 100w, IC-475E 70cm multimode 25w, IC-475H 70cm multimode 75w.

IC-505, 50Mhz Transceiver

The IC-505 is a 6mtr BAND SSB, CW, FM (Optional) transceiver. It can be used as a portable or like other transceivers of this type as a base station unit. When used with an external 13.8v power supply the 505 gives 10 watts RF output, 3 watts or 0.5 watts on low power is available when using internal batteries. Other features include 5 memories with memory scan, program band scan, dual VFO's with split operation.

The easy-to-read LCD readout includes frequency, memory scan and call modes. Full metering of battery condition signal strength and power output is provided. When fitted with the optional EX248 FM unit the IC-505 offers 50MHz operation at an affordable price.

Helpline: Telephone us free-of-charge on 0800 521145, Mon-Fri 09.00-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.
Datapost: Despatch on same day whenever possible.
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ARE COMMUNICATIONS

TS–140S + SIX METRES = TS–680S!

160m to 10m. *Including the 6 metre band.* The new **Kenwood TS-680S** Transceiver is a full feature HF multimode transceiver, with a frequency range of 1.8–56 MHz. Not only does it include the new 6m Amateur band, it also has a *general coverage receiver*, 100 watts output between 1.8 and 30 MHz and 10 watts output on 6m. All this! **And it is only the size of the *old* TS-440S!**
Available now. Price **Phone!** including 6 metres.
COMPARE PRICES WITH OTHER 'IMPORTERS'!

JST 125T from the Japan Radio Company

Now available ex-stock. **The Fabulous JST 125T transceiver.** 1.8 to 30 MHz including general coverage receiver, the JST 125T offers high performance in both operation and build quality. We are pleased to announce that the superb range of JRC equipment is now available from stock. Contact us now.
SAE for Colour leaflet.
JST 125T from £1,395.00.
Special offer during April.
Free JRC Deluxe Headphones and Base microphone worth over £150.00!

New Yaesu FT23R/FT73R Handhelds

Every so often, the **'Big Three'** YAESU, ICOM and KENWOOD produce a product out of the ordinary. Without question, Yaesu seem to produce more winners than the others, and the latest Handhelds, the FT23R/FT73R are no exception.
A.R.E. have purchased large quantities to ensure the very best deals.
Our prices include Nicads/Charger and are not 'hidden extras' as noted in some of our competitors' advertising.
FT23R 2m c/w FNB10/NC28C only £249
FT73R 70cm c/w FNB10/NC28C only £259
London: 01-997 4476

Yaesu FT736R

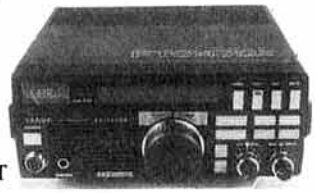
At last! Yaesu have decided that their VHF/UHF reigning champion, the FT 726R, should be replaced. The new FT 736R has so many advanced features, it would probably take two pages of advertising to list them all! As usual A.R.E. can offer this superb piece of equipment, covering 6m, 2m, 70cm and *23cm* Amateur Bands at a huge saving over list price. Please phone for your own special A.R.E. super deal.

The FT747GX HF "Economy" Transceiver

Fully compatible with all FT757GX accessories. The new FT747GX is a real winner! Just look at the features:

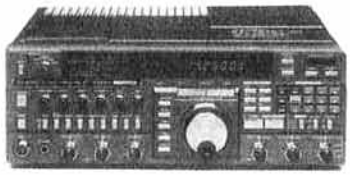
- 160–10M HF Transceiver
- General Coverage Receiver
- All Mode ★INCLUDING FM FITTED★
- 0–100W Output (25W AM Carrier)
- Computer Control Display
- Large Clear LCD Display
- Simple Operation

In stock now at only £659.00 inc. VAT



The New Yaesu FT767GX M

All HF + 2m/6m/70cm + Gen Cov. Multimode, Semi-duplex, Keyer, Tracking 2 VFO's Ten memories, Notch/IF shift, Audio peak Filter, CW filter etc, etc.
Odds are you have seen one or worked someone using one, either on HF or 2m/6m/70cm. **The new FT767GX M.** We're so impressed, all the licensed operators at A.R.E. have one! We believe we have probably supplied more **FT767GX M**'s than any other retailer. **WHY?** Our unprintable part-exchange or cash prices – that's why!
Phone now for your special A.R.E. super deal. *SAE for colour leaflet.*



Plus 2m or 6m module worth £169 fitted Free!

'NOW AVAILABLE WITH A.R.E. MODS IMPROVING SYNTHESIZER PERFORMANCE'

Copal SC-1500 Printer

A.R.E. have at last been able to secure a shipment of these superbly built 9 pin DOT Matrix printers. Features include:

- 9 pin superb Draft or NLQ Quality
- 180cps in Draft mode (THAT'S FAST!!)
- 80 Column, parallel.
- Epson or IBM/Amstrad Compatible (specify which).
- Ideal for use with **PAKRATT PK-232.**
- 1 Year Parts & Labour Warranty.
- **LOW PRICE ONLY £172.95 incl. VAT**
- Printer cable (for IBM/Amstrad) £14.95.
- Available NOW!

The A.R.E. History Lesson.

DID YOU KNOW?

That A.R.E. has been established for almost 12 years.
The business started in a small shop somewhere in the depths of Ealing, West London, owned by Bernie & Brenda. (Bernie is the one with glasses).

Tokyo Hy-Power HT-100 HF Single banders

Now available from A.R.E. on an exclusive basis, the new **HT-100** series of ssb/cw transceivers. Only fractionally larger than a 2m mobile, the **HT-100** is the ideal transceiver for operating in the car or at home. Available on 80/40/20/15 or 10 metres, the **HT-100** would made an ideal QRP station or as a prime mover for transverting or driving a linear amplifier. Available now at only £299.00.

WAR ON 6 METRE PRICES!!

In time for the fantastic 6 metre openings. A.R.E. have yet again **SLASHED PRICES** on the NEW Yaesu FT690R mkII. Our massive bulk buying guarantees you the very best in prices and immediate delivery.

- A new boxed FT690R 6M Multimode Transceiver only **£349.00!!** (List £399.00).
- Or, supplied with a 15 Watt (Minimum) Linear Amplifier for only **£375.00.** (List £429.00).

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A World First. Transmit on 2 metres and receive on 70cms (or visa-versa) *at exactly the same time.*
Not only is that unique from a Handie, but with the following specification and at a fraction of the size of its nearest competitor, is there really any other rig that compares?

- Dual band operation 144-146 and 430-440MHz. Full duplex.
- Receiver coverage: 130-169.995 and 410-470MHz.
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- 5 watts output on both bands (With optional CNB120).
- Dual synthesised VFO's.
- Programmable ctcss tones 67-250.3Hz (With optional CTD/N500).
- Programmable Repeater Offset on either band between 0-39.9MHz.
- Reverse Repeater facility.
- Dual Watch priority channel.
- Programmable Call Channel on both bands.
- Ten programmable memories, including repeater offset, tone squelch etc, on both bands.
- Four different scanning modes.
- Battery save facility.
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- Switchable 20dB Attenuator.
- High or Low power control.
- Squelch defeat switch.
- Illuminated Wide Angle LCD display.
- Digital 'S' Meter/Power output display.
- Low battery Warning indicator.
- TX LED indicator.

UPGRADE NOW.
THE NEW STANDARD C-500.
Now available from stock.
£369.00 incl. VAT.

Their aim was to offer the latest equipment at discount prices (whatever price consortium fixing there was going on), at the same time as it was available in Japan.
This is still true today. **Yet again**, during 1987, A.R.E. were ahead of the competition in supplying latest releases from Japan, often long before the so called "Official Importers" had a chance to place orders with the manufacturers. How many of you saw the KENWOOD TS-680S HF+6M transceiver on our stand at Leicester **last year** for £995, only to see an inferior TS-140S without six metres, pop-up some 3 months later from the **"DALES OF DERBYSHIRE"**, at a similar price??!!
Another major aspect of the old A.R.E. days was the incredible range of "Part-Exchange" equipment available. Over the last year, we have been designing a system for the placement of your used and unwanted amateur equipment. We already know that a lot of Radio Amateurs prefer to use our facilities for selling or buying equipment. It is much faster (and safer) than using the small AD's in magazines. It is called the **A.R.E. Mailbox**. The way it works is very simple. It employs a powerful database programme that can store thousands of customers requiring either information on new products, latest lists of second hand equipment, the latest discount prices available, equipment they have to sell, plus much more. **To "log on" is free.** If we sell a piece of your second hand equipment, we add a small commission, (guaranteeing your minimum price required), arrange collection and delivery, sometimes within 1 week of you giving us your details! (We have been known to place equipment for sale/wanted within the same day!!)
If you would like further details of the **A.R.E. Mailbox**, contact me today and I'll send you information by return. Better still, include a list of equipment or accessories for sale or required and I'll contact you even quicker!!

73's Martin G4HKS

Opening Hours London Mon/Fri 9.30 to 5.30 London Tel: 01-997 4476

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INTRODUCING THE FT736R FROM YAESU

The FT-736R is a solid-state, frequency-synthesized VHF and UHF amateur transceiver incorporating up to four band modules covering the 50, 144, 430 and 1200 MHz amateur bands. The standard model provides 25 watts RF power output on the 144 and 430 MHz amateur bands in SSB, CW, and FM modes, with any two of the remaining three bands installable as options (10 watts output on the 50 and 1200 MHz bands).

An 8-bit CMOS main microprocessor and 4-bit i/o coprocessor provide exceptional digital integration and control: including selectable tuning rates or mode-dependent channelized tuning in selectable steps for each mode. Operating conveniences usually found only on HF transceivers, such as front panel adjustable IF shift and IF notch, a noise blanker, all-mode VOX and three-speed selectable AGC are included. GaAs FET receiver RF amplifiers are provided in the 430 and 1200 MHz band modules.

The innovative memory system includes one hundred general purpose memories plus ten full duplex cross-band memories, all of which store mode and receive and transmit frequencies independently. In addition, fourteen vfos are provided: two general purpose plus one PMS (Programmable Memory Limit Scanning) on each band, two special-purpose full duplex vfos, and up to four clarifier (receiver offset) memories, one per band.

Each of the two full duplex vfos can be selected so that its receive and transmit frequencies and modes can be displayed and tuned independently, or linked to tune synchronously in opposite directions for satellite operation. You can retain twelve satellite uplink/downlink modes in the special vfos and ten full duplex memories at all times. Of course, metering of either transmitter or receiver parameters is selectable during full duplex communications. For CW operators, the FT-736R offers quick changeover semi break-in and includes provisions for an optional internal electronic keyer and narrow (600 Hz) CW crystal filter.

Naturally, with FM the predominant mode on the VHF and UHF bands, the FT-736R includes all manner of convenient features for both FM simplex and repeater operation, special narrow FM mode (to cut adjacent channel interference in crowded areas), Automatic Repeater Shift when tuned to 2-meter repeater subband and a 1750Hz Burst Tone Generator is installed as standard. An enhanced CAT (Computr Aided Transceiver) System allows addition and customization of features and user-designed controls from an external computer. The FT-736R also includes a t/r-switched DC supply line for masthead preamplifiers, activated from the front panel, and digital input connection directly to the modulator for high performance packet radio tnc interfacing. Optional add-on accessories include the TV-736 Amateur Television Modulator/Demodulator for ATV operation, FIF-series CAT Interface Units, SP-767 External Loudspeaker, FMP-1 AQS Message Processor, and FVS-1 Voice Synthesizer and FTS-8 CTCSS Tone Squelch Unit (both mount internally).

OPTIONAL ACCESSORIES

FEX 736/50	50MHz module	£239.00	XF455MC	600Hz CW Filter	£60.00
FEX 736/1.2	1.2 GHz module	£425.00	SP767	External Spkr c/w Audio Filters	£69.95
FMP-1	AQS Message Processor c/w display	£189.00	MD-1B8	Desktop Microphone	£79.00
FTS-8	CTCSS Tone Squelch Unit	£45.00	MH-1B8	Hand Scanning Microphone	£21.00
FVS-1	Voice Synthesiser Unit	£33.00	FIF232Cvan	CAT/TNC Interface for Packet & CAT	£T.B.A.
Keyer Unit B	Internal Iambic Keyer Unit	£15.95	FIF232C	CAT Interface for RS232 O/P	£75.00
TV-736	Fast Scan TV(ATV) Mod/Demod Unit	£159.00	FIF65A	CAT Interface for Apple II series	£60.00

See outside back cover for more details

FT736R RRP £1450 inc VAT c/w 2m & 70cms

COMING SOON from TOKYO HY-POWER

The HT-100 SERIES

The HT-100 series is a series of compact light weight HF/VHF SSB/CW mono band transceivers from TOKYO HI-POWER. Despite being so compact the transceivers feature everything necessary for the dedicated HF operator, including 20W (PEP) output (10W (PEP) HT106), digital display, 'S' meter and semi break-in on CW. Options available for the radios are HP-100S external PSU c/w loudspeaker, 500Hz CW filter, noise blanker unit and mobile mounting bracket.

HT-106 6m £325.00 HT-120 20m £299.00 HT-180 80m £299.00

HP-100S	External PSU c/w Loudspeaker	£99.00	HNB-100	Noise Blanker Unit	£19.95
HBK-100	Mobile Mounting Bracket	£9.00	HCF-100	500Hz CW Filter	£45.00

All TOKYO Hy-Power products carry 1 year Guarantee

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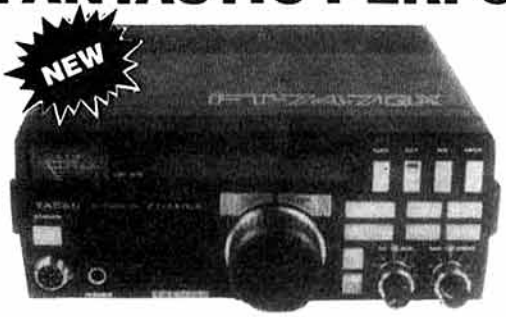

FM UNIT.....£39.99
MMB38 .....£22.00
TCXO-747.....£28.95

The FT-747GX is a compact SSB/CW/AM and (optionally) FM transceiver providing 100 watts of PEP output on all hf amateur bands, and general coverage reception continuously from 100 kHz to 30 MHz.
A front panel mounted loudspeaker and clear, unobstructed display and control layout makes this set a real joy to use.
Convenient features include operator selectable coarse and fine tuning stems optimized for each mode, Dual (A/B) vfos, along with twenty memory channels which store mode and skip-scan status for auto resume scanning of selectable memories. Eighteen of the memories can also store independent transmit and receive frequencies for easy recall of split-frequency operation. Wideband (6kHz) AM and narrowband (500 Hz) CW IF filters are included as standard, along with a clarifier, switchable 20 dB receiver attenuator and noise blanker.
User programming for more advanced control by an external computer is possible through the CAT (Computer Aided Transceiver) System.
The transmitter power amplifier is enclosed in its own diecast aluminium heat-sink chamber inside the transceiver, with forced-air cooling by an internal fan allowing full power FM and packet, RTTY, SSTV and AMTOR operation when used with a heavy duty power supply.

FT747GX R.R.P. £659.00 inc VAT

NEW IMPROVED

NOW EVEN BETTER!

- ★ All mode SSB (USB + LSB) CW, AM and FM
- ★ All Band Tx (General Coverage RX)
- ★ 100% Duty cycle (100W CW, FM 25W AM)
- ★ Pushbutton mode selection
- ★ Switchable VFO steps (All modes)
- ★ New Notch Filter
- ★ Dual VFOs and 10 memories (Freq & Mode)
- ★ Computer compatibility (with optional interface)

FP757HD Heavy Duty P.S.U.	£239.00	FAS-1-4R	Remote antenna Sw	£80.00
FP757GX Light Duty P.S.U.	£69.00	FC757AT	Automatic ATU	£349.00

FL7000 500W solid state linear amplifier £1600.00

FT 757GX2 RRP £969.00 inc VAT

LET THE RADIO DO THE TALKING!

FT212RH & FT712RH

NEW FROM YAESU

We are pleased to announce a new series of FM vhf and uhf mobile transceivers for the amateur. The 45/5W FT-212RH and the 35/4W FT-712RH.

Smaller than their predecessors these models utilise a new cpu with greatly expanded features, most notable of which are 19 memories and support for the DVS-1 Digital Voice System, which can digitally record and playback from the microphone or the receiver.

FT212RH.....£349.00
FT712RH.....£375.00
DVS 1, voice memory unit.....£79.00
FTS12, CTCSS unit.....£60.38

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On many regular priced items SMC offers Free Finance (on invoice balances over £120) 20% down and the balance over 6 months or 50% down and the balance over a year.
You pay no more than the cash price!
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Importer warranty on Yaesu Musen products
Ably staffed and equipped Service Department
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—SMC

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AR50	Bell type, 5 pos. pre-select	£149.00
CD45	Bell type, meter readout	£219.00
G-600RC	Bell type, 360 deg. meter	£219.00
T2X	Bell type, meter readout	£399.00
HDR300	Bell type, Digital readout	£699.00
G-800SDX	Bell type, 450 deg. var. spd	£325.00
G-1000SDX	Belltype, 450 deg. var. spd	£368.00
G-2000	Bell type Meter ± 90 deg.	£445.00
G-400	Bell type, Meter ± 180 deg.	£149.95
G-500	Elevation, Meter ± 90 deg.	£149.95
G-500B	Elevation, H/D KR500	£259.95
G-5400	Azimuth/Elev. Dual control	£279.00
G-5400A	Azimuth/Elev. Computer cont.	£339.00
G-5600	Azimuth/Elev. Dual control	£369.00
G-5600A	Azimuth/Elev. H/D Comp. cont.	£389.00

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9525	Rotary bearing Guy type	£19.95
KS050	Rotary bearing 1 5/8" mast	£19.95
KS065	Rotary bearing 2" mast	£29.95
KC038	Lower mast clamp G-400/600	£16.95

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RC5W	5way for G-400RC etc.	per/mtr	£0.48
RC6W	6way for G-250/400 etc.	per/mtr	£0.66
RC8W	8way for CD45 etc.	per/mtr	£0.72

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MARK II

NEW

70cms VERSION NOW AVAILABLE

Have you ever wanted to control the polarisation of your xy crossed Yagi from RH-LH, CIRCULAR, VERTICAL or HORIZONTAL, even whilst transmitting? Then this revolutionary product is what you have been waiting for! The SMC POLARPHASER enables you to alter the polarisation of your aerials continuously through the full 360°. For satellite users the benefits to be obtained from instantaneous shack control of polarisation are obvious, enabling effective utilization of receive capabilities and power resources along with the ability to reduce or even totally eliminate co-channel interference for terrestial use.

	2 metre	70cms
VSWR	less than 1.5:1.	less than 1.3:1
Frequency	144-146MHz.	430-440 MHz
Power	150 watts.	100 watts
Connectors	SO239 or 'N' (please specify).	'N'

£49.00 inc VAT (SO239) **£69.00** inc VAT

£54.00 inc VAT ('N') P&P £2.25

UK Patent No. 2157894A. Manufactured by S.M.C. Design by G2HCG

MORSE KEYS

MORSE KEYS			p.p.
HK702	Straight Key	£42.95	
HK703	Straight Key	£38.45	£1.20
HK704	Straight Key	£26.35	£1.20
HK705	Straight Key	£22.49	
HK706	Straight Key	£21.80	£1.00
HK707	Straight Key	£39.95	£1.75
HK710	Straight Key	£39.95	£1.75
HK808	Straight Key	£66.95	£1.75
HK711	Key Mounting	£41.75	£1.50
BK100	Mechanical Bug	£38.35	£1.60
MK701	Single Lever Paddle	£38.35	£1.60
MK702	Single Lever Paddle	£36.25	£1.60
MK703	Squeeze Key	£34.50	£1.75
MK705	Squeeze Key	£32.78	£1.75
MK706	Squeeze Key	£30.48	£1.75
HK802	de Luxe Brass Key	£109.00	£2.00
HK803	de Luxe Brass Key	£104.50	£2.00
HK804	de Luxe Brass Key	£101.99	£2.00

MORSE EQUIPMENT			
KP100	Squeeze 230/13.8V	£109.25	£2.00
Dewskey Std	Star Masterkey	£54.69	
Dewskey M	Star Masterkey Memory	£94.99	
D70	Morse Tutor (Datong)	£56.35	FOC
MMS1	Morse Tutor (M/M)	£129.95	FOC
MMS2	Morse Tutor Advanced	£168.82	FOC

MICROWAVE MODULES – RTTY EQUIPMENT			
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MM1001KB	Morse Keyboard	£135.00	FOC

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	CW, RTTY, AMTOR, FAX	£269.95	

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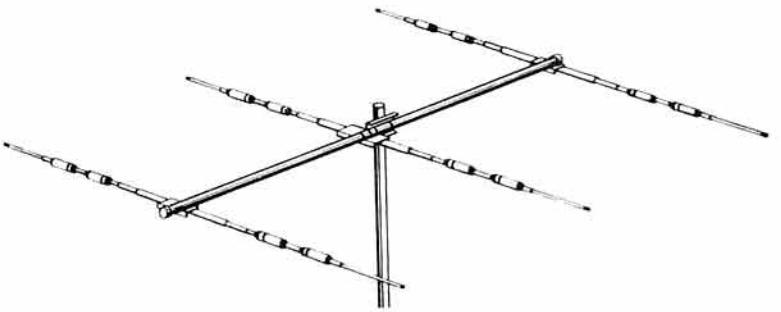

Due to the strong pound and our special purchase we can now offer for a limited period up to 15% discount on their range of antennas and 10% on their larger rotator Ham IV. Buy now whilst stocks last (from January 1st they increased their prices and if the dollar recovers prices could go up by 30% to 40%).

			Offer Price	P&P
12AVQ	Vert. 10-15-20M	~~£78.95~~	£71.00	£3.75
14AVQ	Vert. 10-15-20-40M	~~£105.00~~	£95.00	£3.75
18AVT	Vert. 10-15-20-40-80M	~~£172.00~~	£146.00	£3.75
18V	Vert. 10-80M tapped coil	~~£48.50~~	£43.65	£4.50
TH3Jnr	3 Ele. Yagi 10-15-20M	~~£299.00~~	£254.00	£4.50
TH2MK3	2 Ele. Yagi 10-15-20M	~~£279.00~~	£249.00	£4.50
EX14	5 Ele. 10-15-20M Explorer	~~£499.00~~	£449.00	£7.50
QK710	EX14 to cover 40M	~~£499.00~~	£449.00	£6.50
TH5MK2	5 Ele. 10-15-20M T'bird	~~£649.00~~	£575.00	£7.50
TH7DXX	7 Ele. 10-15-20M T'bird	~~£755.00~~	£669.00	£7.70

			Offer Price	P&P
105BA	5 Ele. Yagi 10M	~~£220.00~~	£187.00	£3.95
153BA	3 Ele. Yagi 15M	~~£135.00~~	£121.00	£3.95
155BA	5 Ele. Yagi 15M	~~£338.00~~	£288.00	£5.90
203BA	3 Ele. Yagi 20M	~~£269.00~~	£233.00	£4.90
204BA	4 Ele. Yagi 20M	~~£420.00~~	£357.00	£7.30
205BA	5 Ele. Yagi 20M	~~£499.00~~	£425.00	£9.40
DB10-15A	3 Ele. Yagi 10-15M	~~£269.00~~	£199.00	4.80
AR40	Famous Bell Type		£125.00	Free
CD45	Medium Bell Type		£219.00	Free
Ham IV	Heavy Duty Bell	~~£359.00~~	£329.00	Free
T2X	Very Heavy Duty Bell	~~£449.00~~	£399.00	Free

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LW5/2M	Yagi 5 element	7.8dBd	£18.69	B
LW8/2M	Yagi 8 element	9.5dBd	£23.98	B
LW10/2M	Yagi 10 element	10.5dBd	£29.04	B
LW16/2M	Yagi 16 element	13.4dBd	£42.55	C
PBM10/2M	Parabeam 10 ele	11.7dBd	£57.50	C
PBM14/2M	Parabeam 14 ele	13.7dBd	£70.15	C
Q4/2M	Quad 4 element	9.4dBd	£37.09	B
Q6/2M	Quad 6 element	10.9dBd	£48.59	B
Q8/2M	Quad 8 element	11.9dBd	£60.38	B
D5/2M	Yagi 5/5 slot	10.0dBd	£33.93	B
D8/2M	Yagi 8/8 slot	11.1dBd	46.58	B
5XY/2M	Yagi 5 ele cross	7.8dBd	£36.23	B
8XY/2M	Yagi 8 ele cross	9.5dBd	£46.00	B
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PMH2/2M	2 way harness 144MHz		£14.89	A
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D8/70	Yagi 8/8 slot	12.3dBd	£33.90	
PBM18/70	Parabeam 18 ele	13.1dBd	£41.40	B
PBM24/70	Parabeam 24 ele	15.1dBd	54.05	B
LW24/70	Yagi 24 element	14.8dBd	33.35	B
MBM28/70	Multibeam 28 ele	11.5dBd	27.60	B
MBM48/70	Multibeam 48 ele	14.0dBd	44.28	B
MBM88/70	Multibeam 88 ele	16.3dBd	61.50	B
8XY/70	Yagi 8 ele cross	10.0dBd	52.90	B
12XY/70	Yagi 12 ele cross	12.0dBd	65.55	B
PMH2/70	2 way 432MHz harness		14.09	A
PMH4/70	4 way 432MHz harness		£29.04	A

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RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded 1913 Incorporated 1926 Limited by guarantee Member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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Telex 265871 (MONREF G) quoting CQQ083 on first line of message. Electronic mail via Dialcom/Telecom Gold: 87:CQQ083
Telephone 0707 59015. Telefax 0707 45145

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A NEW BEGINNING FOR BEGINNERS

Having considered and discussed the facts, over many meetings, the elected Council of the Society is convinced that without far more beginners in the hobby, the *status quo* for amateur radio cannot necessarily be maintained. In other words, encouraging more newcomers is not just desirable, it is considered essential.

Again, having discussed a wide range of input, Council is certain that one key to the future is to develop a new type of licence which will allow beginners to become involved in the transmitting side of amateur radio. The working title of this new type of licence is the "Student Licence" and can perhaps be likened to a provisional driving licence or a student flying licence. The idea is that such licences allow people to do things, but under many constraints which do not apply to a full licence. Nevertheless, they provide a practical "hands on" method for development and learning.

The constraints placed upon student radio amateurs are being discussed at present. In essence, it is envisaged that students would be limited to sections of just a few amateur bands. That their activities would be confined to only a few modes of operation: perhaps one mode per band, that their power would be limited to only a few watts and that there would probably be restrictions placed on the type of antenna used. It is not intended that students would use the popular hf or vhf bands which are already over-crowded.

Council is aware that today young people are not in the main either becoming interested in amateur rario or joining local clubs. It has identified two prime causes for this; namely, that young people of the 11-16 year age group perceive the typical one year of training period required to pass the RAE as too long, and that the price of much equipment is quite off-putting.

A typical one-year RAE course might involve 150 hours of classes. The Student Licence is being designed around a 30-hour course for regulations and practice plus the time for morse code training to 6wpm. The course, as envisaged, will be quite different from the course run for the RAE. Students will be taught the things they *have* to know to conduct themselves in an orderly and safe way on the air. They will be taught, for example, how to monitor and select a clear frequency, how to net their transmitter on to this frequency, how to put out a CQ call or reply to another station, and proper procedures and disciplines for good and safe operating. There is no question of standards not being maintained, because the students will be taught and tested on all the *basic* practicalities of amateur radio — much of which is ironically not a necessary part of the RAE course or exam. It is a sad fact that many who pass the RAE today have never even listened on the amateur bands. The Student Licence concept is to bring back the basic and essential skills into amateur radio.

What is more, we know that there will be special people in affiliated clubs, groups and societies around the country — existing Class A or Class B amateurs — who will want to become involved with the training of students as part of their effort to put back into amateur radio some of the enjoyment that they themselves have got from the hobby. The Society wants amateurs with full licences to become involved in the training of students and to revive this interest which in most, but not all cases, has been dormant for sometime. This is a whole new area of interest which is aimed at revitalising amateur radio.

Next month I will describe how the Society is planning to interest the young in amateur radio, its plans for the use of video, how it is developing the Student Licence syllabus, and the licence. Its plans to create a student section within the Society and to produce special publications and kits aimed at the beginner.

There is an old saying — more haste, less speed. Getting more recruits into amateur radio is a serious business. We know lots of members want to help — you haver told us so, but be patient, we must develop a good national plan so that every single one of us is pulling in the same direction.

David Evans, G3OUF

Members' Mailbag

THE EDITOR,
RADIO COMMUNICATION,
LAMBDA HOUSE,
CRANBORNE ROAD,
POTTERS BAR, ENG 3JE

The views expressed in published correspondence are not necessarily those of the RSGB, and readers are urged to verify independently any factual statements on which they may wish to rely as it cannot be guaranteed that such statements are correct.

FIRST RUNG ON THE LADDER

Sir—In answer to the secretary's foreword to *Rad Com* November 1987 "Will amateur radio die of old age"; well, possibly, but amateur radio telephone and telegraph operating certainly won't. Just look at the number of new callsigns.

I think that technically-minded younsters are more likely to move towards amateur radio later in life, when they have houses of their own to fill with junk, wages to afford the junk, and social standing sufficient to weather the onslaughts caused by rfi. On the average housing estate, let's face it, amateur radio is a downright anti-social hobby. The antennas, the tvi, the noise from bedroom-shacks and poorly soundproofed garden ones at ungodly hours—well, the pressure on any minor to give it up in favour of some other branch of electronics is going to be unbearable!

In the 'fifties/early 'sixties we learned about the radio techniques of the era from equipment bought secondhand for prices typically up to one sixth of the adult weekly wage. Remember the "19 set" for £3.50 and the RF24 hf bank receive converter added for 72½p? The only transceivers representing this sort of value today are those originally intended for cb. These are what the youngsters have, and unless the Society starts showing interest in these radios you will not be speaking to the young.

Come to think about it, the *RSGB Bulletin* never appealed to the young either. The magazine that did was "Cam's Comic" (No one called it *Practical Wireless*) which was responsible for more 1.8MHz pirate rigs than most of us have hot dinners. But it certainly got us interested, and it **was** amateur radio, far more so than anything that is done while seated at the Yaesu-cum-Kenwood, licence or no!! That is what fired the enthusiasm of most of the middle-call-book.

Let he who never built a rig designed by F G Rayer cast the first stone!

Stephen Dyke, G3ROZ

Must admit that our first-ever transmitter was Mr Rayer's self-oscillating 807 with a 6L6 modulator and 6J5 mic amp with carbon mic in cathode .... happy days. Is Mr Dyke right?

MORE SATISFIED CUSTOMERS

Sir—It is so pleasant to find a company which is not only friendly and helpful but one that also offers a superb service, that I would like, if I may, to pass on a recent experience to the rest of the amateur radio fraternity.

My husband had shown more than an interest in 50MHz, and since the recent allocation to Class B licensees, and with his birthday coming up I decided to get him something appropriate. I looked at transverters and transceivers, waded through advertisements in magazines and spent a fruitless afternoon on the telephone. I only wanted information and advice! I had so many replies of "If you tell us what you want we'll send you some catalogues". I didn't know what I wanted!

Finally I found a very friendly gentleman who was very helpful, with advice not only about his own products but others as well, great. The company was Icom UK. I decided to settle for the IC551 and phoned the gentleman back with my decision. Within two weeks of my initial enquiry we had the radio in the shack.

I would recommend anyone considering a new radio to contact them—moreover my husband is more than pleased with his birthday present!

Mrs J Wall, GM1KHV

Sir—Following recently receiving your reminder for next year's dues, please find enclosed a cheque for £30. I would be grateful if the difference be used for the benefit of the RSGB. I have found your organisation to be most helpful and prompt in providing books, information and photostats of previous articles in *Rad Com* a very worthwhile study.

My best regards to your activities.

A R Patrick, G0GGW

AS EVER WAS

Sir—In 1965 I gave up amateur radio in digust at the way amateurs were operating; the inane way they carried on disgusted me.

I have now come back to amateur radio again, having had to give up my preferred interest of shooting, because of ill-health. I have joined the RSGB and find its magazine still as stimulating, but I find myself a little behind the times equipment wise.

Guess what, in your letter pages you still have the same "groaners and moaners". Its about time people (especially certain Class A licensees) realised that this is a hobby, and not a search for the Holy Grail.

What hope have we "born again" radio amateurs got of remaining with this **HOBBY**.

R Barker, RS90989

SPECIAL EVENT STATIONS

Sir – In reply to the letter concerning special event callsigns, I wish to put forward the opinion that there does not have to be a specific connection with radio, Marconi or technical matters to merit a special event callsign. The special event station is a wonderful way to promote interest in amateur radio, and, in the case of charities, shows that radio amateurs are prepared to use their hobby to benefit the community and thus generate plenty of goodwill and publicity for us.

I ran a special event station with others for the BBC Children in Need appeal in November 1985, GB0KID, and also organised a special station in November 1986, on Ascension Island, ZD8BBC, which operated for 24 hours. I would have done something here in Oman but the current ban on visitors' licences. This ban may soon cease and, if so, I will try to play my part in the next Children in Need appeal.

Special event stations, whether for dustbins, kittens or any other event, show amateur radio to the community in the best possible way and show that we have hearts and are not weird creatures twiddling knobs in a loft, as is often imagined.

D J Plater, G4MZY
Masirah Island, Sultanate of Oman

Sir – May I, as an interested non-member of the amateur radio fraternity, comment on the letter regarding special event stations in your December issue. During the Christmas holiday period, Stamford Museum presented an exhibition called "From Marconi to Microwaves" which featured a special event station, GB5SM, operated by members of the Stamford & District Amateur Radio Society. The exhibition gave members of the general public an insight to the early days of wireless and of some modern developments, also the chances to see amateur radio in action.

It is our policy to encourage local groups and societies to take part in the work of the museum, groups such as S&DARS for example. This has the double benefit of bringing into the museum people who might otherwise not come, and of bringing together people with similar interests. These are serious aims, but there is the equally important point of showing that such activities can be enjoyed by everyone.

Nearly a thousand people saw the displays and demonstrations in our exhibition, some were enthusiasts who came to talk shop, but most were seeing amateur radio for the first time. Some of those were hooked and probably will become members of the Society.

The success of the exhibition was due in no small measure to the efforts of the radio amateurs, and I take this opportunity to thank all those who contacted GB5SM either by radio or in person. I suggest that any event which brings people together in an enjoyable activity should be encouraged even if the reasons for staging it may seem frivolous to some.

Michael Key,
Museum Assistant, Stamford Museum

PHONETIQUETTE

Sir – As a newcomer to swl and the RSGB, I hope I am not covering old ground – though I probably am! I try to keep an accurate log, but am bound to say that I find it excessively difficult, not only because some ssb operators gabble their callsigns, but more particularly because many seem unaware that many letters sound very similar. As an example, "XNS" was misread by me as "HJS" and by his contact as "SJN"! B, C, D, E, G, P, T and V can all be confused, as can A, F, H, K, L, M, N, S and X, and Q and U.

The history of the phonetic alphabet is interesting. From the first world war right up to the middle of the second one, it remained substantially the same – Ack, Beer, Charlie, etc. It was not well thought out, as Eddie sounded like Freddie, and Don like Tock. On the squadron in 1944 we were woken at an unearthly hour (except after we had been on ops) by being reminded over the Tannoy that the phonetic alphabet had been changed to Able, Baker, Charlie, Dog etc. About this time also, the RAF cw preliminary call was changed from VE (Vick Eddie) to CT.

The present phonetic alphabet (with variations!) is accepted worldwide, and seems set to stay for a long time. Please use it, folks.

John Allison, RSGB91114

Yes indeed, but there are people who would argue that the current NATO phonetic alphabet isn't perfect either. "Oscar", "Sierra" and "Foxtrot", for example, are often confused with each other, and we've also hear European stations frequently mistake "Sierra" for "X-ray". Any other comments on this topic?

STUDENT LICENCE

Sir – I am writing to you on behalf of the West Bromwich Central Radio Club, regarding the student licence discussed at your recent agm.

We discussed this subject at our club night last Sunday. Our feelings on this subject are unanimous: in our opinion unrestricted access to the amateur bands will reduce them to the state of cb. This would undoubtedly cause many radio amateurs to give up the hobby completely, and lead to a reduction in value of much expensive equipment.

However, we also realise that there is a need to encourage more people to take up amateur radio and ensure its future. Towards this end, we would offer to your council and to the readership of *Rad Com* the following suggestions, which we feel would be beneficial to both the RSGB, radio clubs and amateur radio in general.

1. The Student Licence holder must be a member of the RSGB.
2. The Student Licence holder must be a member of a radio club, within five miles of the licensee's QTH.
3. The signatures of the chairperson and six members of the licensee's radio club would be required before a licence is issued.
4. The same seven signatories could by letter to the RSGB cause the licence to be revoked, if the licensee was not complying with the rules and regulations.

W J Oakes, G1YQY
Vice-secretary WBCRC

The Society's Training & Education Committee, the three spectrum committees (HF, VHF and Microwaves) and the Licensing Advisory Committee, are looking in depth at all aspects of the proposed student licence. It is envisaged that students will have very limited access to parts of a few amateur bands with powers in the order of, say, 2W. The objective is to allow people to participate in the transmitting side of amateur radio with the minimum of disruption to other band users. Obviously, bands which are heavily populated are not being considered.

YOUTH IN AMATEUR RADIO

Sir–I refer to David Evans's leader in your November issue, with reference to the "Youth in amateur radio".

I wish to mention that within the Sea Cadet

Corps, a large proportion of the communications instructors tend to be hams, and furthermore, many of those are RNARS members!

The SCC syllabus specifically mentions training towards "amateur radio", thereby introducing members of at least one youth organisation directly to the hobby – and we teach 'em morse!

Lt(SCC) Peter Greenhalgh, RNR, G3XGE

SUBS THEN, AND NOW

Sir – David Evans' "Secretary's Office" in the January issue was interesting – because that 10s 6d in 1913 doesn't equate with a sub of £18.50 today! Something nearer £50 is needed for equality with that sub.

Doesn't this show yet again that subs are too low?

P E Chadwick, G3RZP

THANKS, MIKE . . .

Sir – May I thank the Northumberland station responsible for the RSGB slow morse broadcasts, G3GMS (Mike), for his dedication and expertise.

I feel sure many other stations in our region will join with me in wishing him every success with his work on behalf of the RSGB.

Henry H Harrison, G0IVX

Treasure books from the junk stalls and shops

Richard Q Marris, G2BZQ

THERE IS nothing new in this world, as has been discovered from the collecting of old books on wireless, radio, electronics, engineering and general scientific subjects. The sources of these old books are charity shops, junk shops, junk stalls, country market stalls and flea markets (which are often billed as antique shows!). Prices paid vary from the usual 10p to £2. This latter £2 book was an excellent copy of a book offered, by a well-known bookshop, for £21 in "fair" condition.

In charity shops the asking price is always paid. They are doing a good job and prices are usually more than reasonable. In junk shops, and on junk stalls, you are expected to haggle—well, the proprietor will gladly take your money if you are mug enough to pay the asking price. He/she expects you to haggle and has pre-marked-up the price to cover this anyway. Country market-day street stalls, and charity shops, have proved to be the most exciting sources of old books.

Be prepared to get your hands dirty, and have carrier bags handy. The books are there if you search for them. The following are some examples of old books which have come to hand, over the last 3 or 4 years, with sources of supply, purchase price, condition and content summary:

Handbook for Radio Operators, 1961 edition (issued by HM Postmaster General).

This cost 10p in a junk shop. It was among some old children's books. Condition very good.

It covers all aspects of the requirements for operating licensed radio equipment in ships and coastal stations. That is, the rules and regulations; frequencies; procedures; distress procedures and radio navigational services. There are 18 pages of Q codes! The morse code, with derivations, takes up three pages!

Handbook of Technical Instruction for Wireless Telegraphists.

This is the favourite real treasure book. For the sum of 10p an excellent copy was bought from a market-day street stall in Dorset. An enquiry to a well-known bookshop offered a "well used" copy for £25!

The content is marine wireless equipment from about 1918 to the late 'thirties; 664 pages with 618 circuits; diagrams and excellent glossy equipment photographs. It concerns itself with hf-mf-lf-vlf, covering basic theory plus antennas; receiver circuits from the primititive, then the crystal set, right up to the multistage superhet; spark to valve transmitters of several kilowatts; marine direction finders; depth sounders; distress call apparatus; lifeboat transceivers and trawler apparatus. It has been read several times, from cover to cover, and is still most fascinating and full of ideas just screaming out to be re-invented.

News Chronicle Encylopaedia of Popular Mechanics, **F J Camm.**

This excellent copy cost 20p in a charity shop. F J Camm became a legend in his own lifetime, being the long-serving editor of *Practical Wireless* and *Practical Mechanics*, and author of many wireless textbooks.

392 pages with 627 illustrations covering a multitude of subjects from aircraft to motor cars/cycles; cements, glues, inks and polishes; model boats and railroad engines; astronomy, microscopes, electricity and photography; electro-plating and tools *and* wireless and television. Television is described as "Seeing by wireless" using scanning discs and mirrors on drums, ie before the cathode ray tube. There is a very simple home-constructed coil-winder design just waiting to be re-invented. This book is undated, but the contents indicate up towards the mid-'thirties.

Radio Servicing (1960), **G N Patchett and B Fozard.** (Originally published in three parts in 1956/7/8).

In very good condition, and bought in a flea market for 15p. Its title belies its contents; because, in fact, this most excellent book covers basic receiver circuitry at the time of the valve/transistor transition. The actual basic useful servicing content is 50 pages out of a content of 287 pages, and all very useful information. Excellent clear trf, superhet and fm valve/transistor circuits with chapters on ac power units and antennas.

A very useful book, with useful info/circuits/ideas written by people who had that rare gift of translating their knowledge/thoughts into understandable English.

ARRL Radio Amateurs Handbook 1955.

Any issue of the ARRL *Handbook* is useful, whether old or new. This one was found hidden away, beneath a heap of books, on a market-day street stall. The asking price was £2—the price paid was 50p! Good condition and almost exclusively concerned with amateur radio transmit/receive valve circuits and designs to the usual ARRL high standards. A useful book for anyone going into valve transmit/receive designs.

Kempe's Engineers Year Book for 1929.

Described as "A Compendium of the Modern Practice of Civil, Mechanical, Electrical, Gas, Marine with Mine & Metallurgical Engineering". Which just about sums it up. 3,289 pages and over 3,000 engraved illustrations! A monster book 7·25 by 5 by 4·25in thick.

Purchased with an old copy of Mrs Beetons Cook Book for a grand total of 25p (asking price was £1). Dirty, filthy and with a tatty cover—and yet the between-cover contents are in perfect condition, and fascinating, with excellent engineering drawings, including a multitude of engineering tables and formulas.

A reader amateur, with this book, will find most of what he needs to carry out the mechanical aspects of our hobby; plus diy around the home. They do not publish many monster books like this now!

Radio Designers Handbook, **4th edition 1953, F Langford Smith.**

"This book has been written as a comphrehensive, self-explaining reference handbook for the benefit of all who have an interest in the design and application of radio receivers and audio amplifiers" (extract from the preface—and very true).

Having already a copy of the previous 1940 edition, this 1953 edition of the valve radio designer's bible was immediately recognised at the bottom of a carton of tatty weirdo books on the pavement under a market-day street stall. The asking price was "£5 the lot" beaten down to £2—taken back to the car—the book extracted from the carton—and the carton of remaining books taken to another stall and sold for £1. This copy is in perfect condition with 1,482 pages with hundreds of illustrations, drawings and circuits.

For anyone interested in designing/building valve radios and amplifiers, this book cannot be beaten. Much of the information is useful anyway, as it takes you through the theory of valves; components; networks and the theory and practice of the design of every stage of a receiver, plus the theory and design of transformers and iron-cored inductors; tuned circuits and inductances. To this must be added a multitude of tables, charts, sundry data and mathematics. Nothing is skimped—it is all there to be read, whether your interest is a domestic a.m/fm or communications valve radio. Absolutely "not for sale" now or ever!

Conclusion

The above treasure book review covers a very useful selection of books. Many of these books have been located, often purchased, and sometimes thrown away as useless, because to get a real bargain it is necessary to show little interest in the targetted book, and make a quick decision, whether right or wrong. Spend 10min looking through a book, and the price goes up like a mileometer—minute by minute! I should add I am just an amateur collector of old books on any subject which looks interesting, including wireless and radio.

It is a lot of fun and an excellent way of improving one's knowledge and finding some old "new inventions". □

WIND LOADING

D J REYNOLDS, G3ZPF*

An overview of the forces presented to antennas and masts, plus hints on foundations, mast location and insurance

(PART 1)

CHOOSING AN ANTENNA, and a mast to carry it, can be a confusing business. This stems from the fact that the loads presented to the set-up by wind forces vary across the country in general, and within a locality depending on the surrounding topography. Advertisements for towers relate the strength of the various models to the headload they can carry at a particular design speed, but unfortunately they do not always refer to the same wind speed, which makes direct comparison difficult. Antennas themselves (which present the headload to a mast) can be seen quoted either as an effective wind area, or as a headload at one given wind speed. Often this is a different wind speed to those quoted for the towers. In the case of trap verticals very little information is ever given, but occasionally a "maximum survival velocity" is given, or a statement to the effect that guys will not be needed under normal circumstances, whatever those might be.

It would obviously be useful to determine what wind speed is appropriate to any given QTH, but remember that the derivation of wind speeds is only the first step in the design of towers. Due to their physical proportions they are especially sensitive to wind excited oscillations which magnify normal working stresses, and to ice formation which surcharges deadloads and increases wind areas.

WHAT FOLLOWS IS NOT INTENDED TO BE A DESIGN GUIDE BUT GENERAL GUIDANCE PRIOR TO SEEKING THE DETAILED ADVICE OF THE MANUFACTURER.

All tower advertisements appear to quote CP3 Chap 5 part 2 as the basis for their wind loads, both for lattice masts and tubular/square "solid" masts. In actual fact, for the specific case of unguyed lattice masts, BS8100 should now be used. This is a more recently introduced publication, and although it adopts a somewhat different approach to determination of wind speeds than CP3 Chap 5, both methods of determining wind speed agree to within 10 per cent. With that in mind, and as I am more familiar with CP3 Chap 5, I shall use that as a basis to enable readers to obtain estimates of the wind speed appropriate to their particular QTH. Incidentally, the various tower manufacturers do use the latest code of practice but are unwilling to change the reference to CP3 Chap 5 in their advertisements in case it causes confusion, especially since the values of wind speed from either code are compatible.

Design wind speeds

The British Standards Institution publishes a code of practice for determination of wind loads, referred to as CP3 Chap 5 part 2. In addition to determination of design wind speeds, it also gives guidance on the conversion of wind speed into wind force for all manner of structures, although only a small part of the latter sections are relevant here. To determine the design wind speed for a given QTH, three items of information need to be determined:

(1) Basic wind speed (V).
(2) Topography factor (S1).
(3) Ground roughness and height above ground factor (S2).
(4) Years of exposure factor (S3).
(5) Wind direction factor (S4).

Basic wind speed is determined from the map of the UK given in the code, and reproduced in Fig 1. It represents the 3s gust speed estimated to be exceeded on average once in 50 years. Values are those at 10m above ground in an open situation.

Topography factor will have a value in the range $1{\cdot}0 < S1 < 1{\cdot}36$ and is to allow for the variation in wind speed around hills, cliffs and valleys. CP3 Chap V classifies topography into three basic groups, depending on the upwind slope, and gives detailed formulas for precise calculation of S1 for sites at various points around significant topographical features. For modest amateur set-ups it will be simpler to take the maximum figure of 1·36 for all locations in the vicinity of major changes in landscape. A value of unity is appropriate to level ground, but if in doubt use 1·36.

Ground roughness and height above ground factor takes account of the combined effect of ground roughness, the variation of wind speed with height above ground, and the size of the building under consideration. Values are tabulated in CP3 Chap V for a variety of locations from

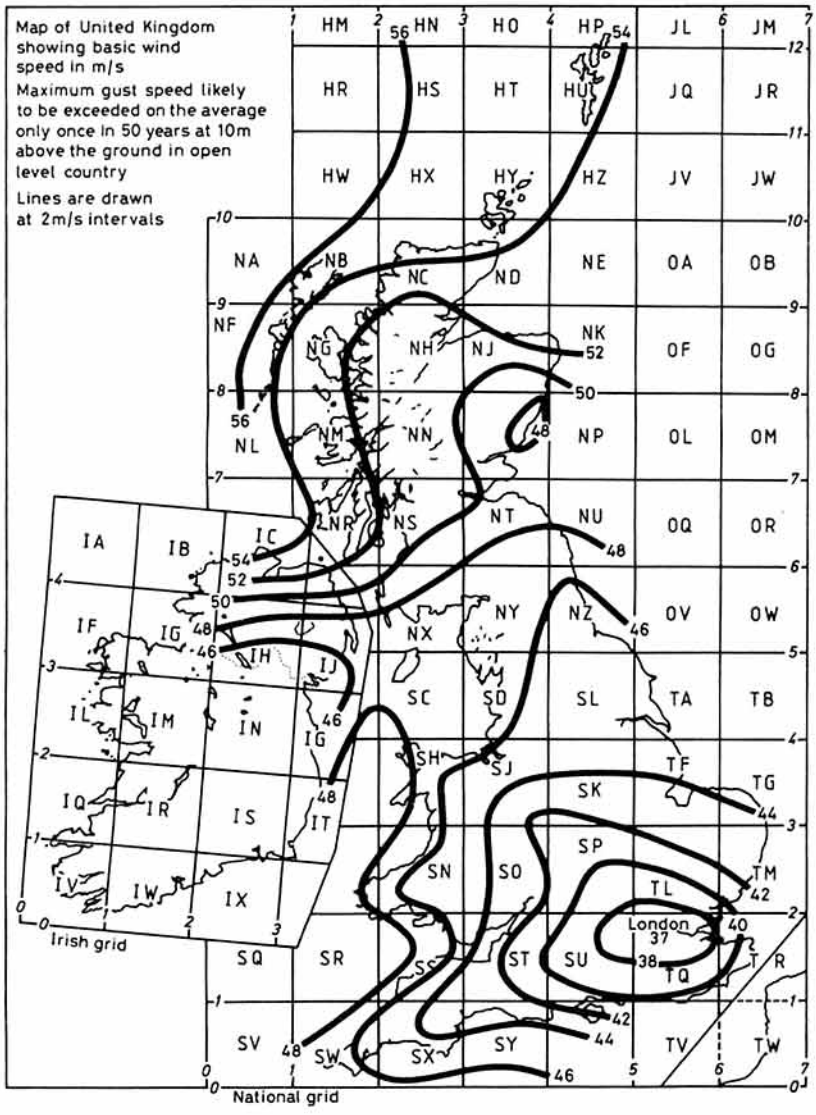


Fig 1. Basic wind speed map for the UK reproduced from CP3 Chap 5 Part 2

*502 Lapwood Avenue, Kingswinford, West Midlands, DY6 8SG

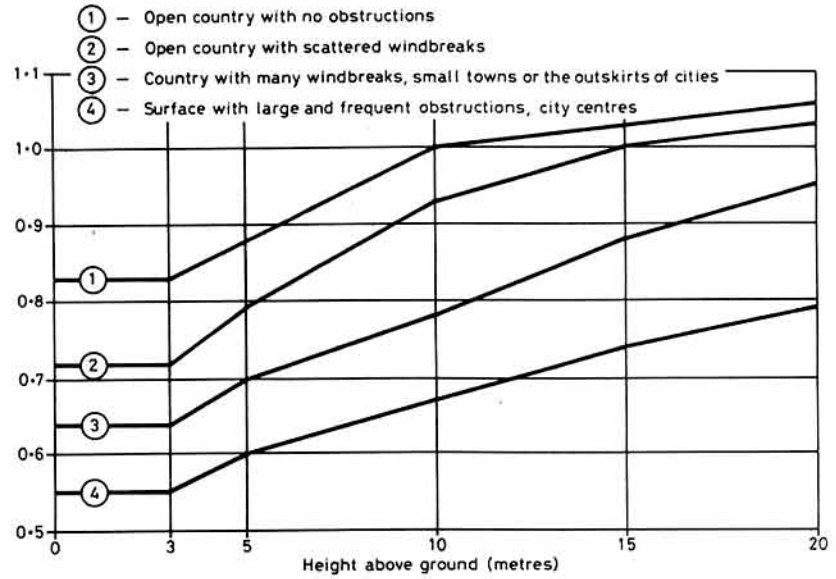


Fig 2. Calculation of S2. The graph is derived from charts within the code of practice. Use the curve appropriate to the local terrain

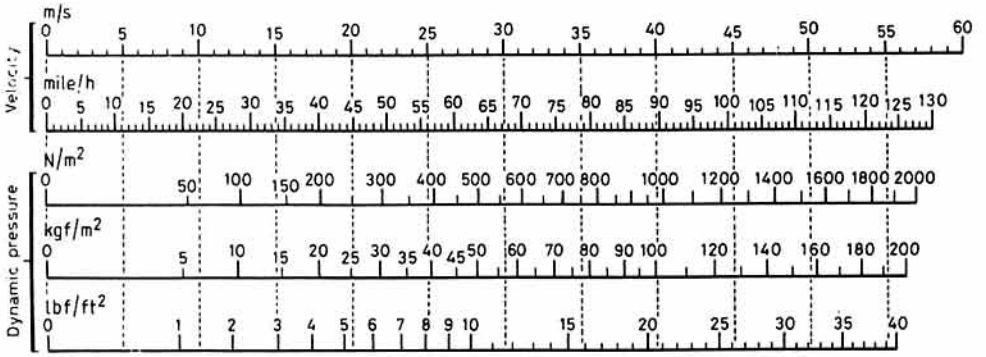


Fig 3. Conversion chart for wind speed and dynamic pressure. Imperial units are included for the benefit of those readers not yet familiar with the metric system

exposed moorland to city centres, and for varying heights and building sizes. For amateur applications up to 20m the factor varies from 0·64 to 1·06, and a graph derived from that table is shown in Fig 2.

Years of exposure factor is generally taken as unity.

Wind direction factor. The basic wind speed may be adjusted to ensure that the risk of it being exceeded is the same for all directions. A table is given in CP3 Chap V for all wind directions, but in almost all circumstances this will inevitably be unity and is best assumed as such.

All of this leads directly to the design wind speed Vs being derived from:

$$Vs = V \times S1 \times S2 \text{ (since S3 and S4 are both unity)}$$

This will give readers an idea of the wind speed that towers and antennas should be capable of withstanding at their particular location, and the simplifications used should ensure that the value errs on the side of safety. Using this figure as a guide, it is possible to assess the suitability of beams or verticals, if a survival velocity is quoted. In addition, most advertisements quote tower headloads at a given wind speed, so it is possible to gain a "ballpark" estimate of the model of tower required, bearing in mind that the allowable headload will reduce as the wind speed on a given tower is increased.

Having never been in a position to erect a tower, I wrote to the main tower manufacturers and asked what information they gave out as standard to potential radio amateur customers, and what information they would require from customers so that a precise headload for each location could be given. The difference in replies was somewhat surprising, with one manufacturer forbidding me to mention its products in any context. Generally speaking, the norm seems to be to provide a typical headload at one wind speed only, and rely on the customer making more detailed enquiries. At the other end of the scale, SMC sent literature with typical headloads quoted for several wind speeds. In addition to headloads for masts, SMC informed me that they keep the wind loads for most antennas on file and can interpolate the loadings to those of any wind speed.

All the major tower manufacturers, regadless of their replies to my letter, earn their keep predominantly from commercial installations. At amateur radio prices there is no way they can do individual site surveys, but they will obviously try to be as helpful as possible. I can only suggest that readers take the typical headload values quoted in trade literature as just that, and get precise advice from the manufacturers for their particular QTH. In the end though, it all comes down to following their advice to the letter, not just "sort of". It might save in the long run to have a headload capacity in excess of immediate needs to allow for future antennas to be erected, or a larger version of the current one once the neighbours have got use to it.

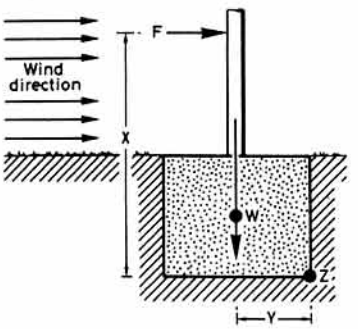


Fig 4. Simplified diagram showing the overturning and restoring forces present at the base of a self-supporting tower

Calculating wind pressure

Having derived the wind speed appropriate to a location, it is possible to relate that directly to the pressure exerted by the wind (Fig 3). Using this chart, it is possible to estimate the wind load of an antenna at any wind speed from a value given for one specific wind speed. This will not, unfortunately, be suitable for interpolating the headloads at any wind speed for a tower because of the complications introduced by the wind load on the profile of the tower itself.

Consider the hypothetical case of an amateur living in the highlands of Scotland who is contemplating a new vhf array. Trade leaflets state that the array has a wind load of 22·5lb at 80mph and a maximum survival velocity of 160mph. What will be the wind load at his QTH, and will the survival velocity be exceeded?

The first step is to determine the basic wind speed for the map, and a figure of, say 52m/s seems appropriate. In rugged terrain the value of S1 should be taken as 1·36. For a suitably bleak moor and a mast height of 10m S2 can be taken as 1·00, giving a design wind speed of 52 x 1·36 x 1 = 70·72m/s. Converting this to Imperial, for those who cannot relate to metric, can be done by reference to Fig 3; although, since it is off the top end of the scale, look up half the value (35·36m/s) giving 78mph and then double that, giving 156mph. So it seems that the antenna should not fall apart in the wind, but what of the load it presents to the tower at this speed?

Looking again at Fig 3, it can be seen that 80mph coincides with a pressure of 16·5lb/ft^2, and since the proposed antenna has a wind load of 22·5lb at that speed, it must have an effective wind area of 22·5/16·5 = 1·36ft^2. A speed of 156mph coincides with a dynamic pressure of about 33·5lb/ft^2. Multiplying this by the wind area of the array gives an expected headload of 33·5 x 1·36 = 45·56lb. Provided the intended mast can cope with this head load, all should be well and it is worthwhile seeking more detailed advice from the makers.

Although in this example a doubling of the windspeed produced a doubling of the headload this is not always the case. Looking at Fig 3, it can be seen that some scales are non-linear, so at lower speeds a 50 per cent increase in wind speed can more than double the headload of a given array.

Maximum survival velocities should be interpreted with some care, depending on the material used. Aluminium is very susceptible to fatigue in conditions of cyclic loading and, basically, the longer it is required to function then the less strength it can be assumed to have. Most antennas are made from aluminium, and their long term survivability will depend on what service life was assumed for its design. This will also apply to self-supporting masts fabricated in aluminium, and explains why major tower suppliers use steel.

Foundations

However strong a tower is, it will not stay vertical for very long unless some care is given to the construction of a suitable foundation. Generally speaking, this consists of nothing more than a hole filled with concrete into which a suitable mounting post is cast, but there are some pitfalls to be avoided. Base sizes will depend on the bearing capacity of the soil at each QTH. In commercial circles a trial hole would be dug to determine the soil characteristics at the bottom of the base. However light the loadings, the bottom of all bases should be at least 900mm below the general ground level to ensure that it is below the ground movements caused by the annual freeze/thaw cycle. The fact that ground can be affected to such a depth may come as a surprise to some, but house foundations go down to a similar depth for exactly the same reason.

As well as providing a stable footing for the tower, in the case of unguyed towers the foundation also prevents the tower falling over. Fig 4 shows how this happens. With the wind blowing in the direction shown, the tower and base will attempt to overturn by rotating about "z". The force "F" is the result of wind pressure on the tower and antenna array, and so . . .

$$\text{Overturning moment} = F \times X$$

Acting against this will be the combined weight of the antennas, tower and base.

$$\text{Restoring moment} = W \times Y$$

Where W is the total weight of the system. The restoring moment should be at least twice the overturning moment to give a factor of safety.

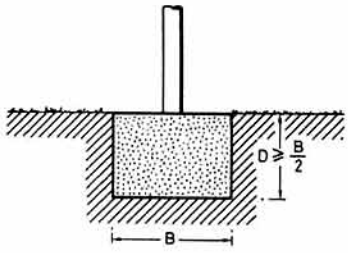


Fig 5. Unless reinforcement is used in a concrete base, the ratio of height:width should be 1:2 or greater

Obviously since "Y" is half the size of the base, increasing the size of the base will increase the restoring moment because both "W" and "Y" will be greater. To ensure that an unreinforced concrete base will not crack under load, the depth should always be more than half the width (Fig 5). Given a normal depth of 900m m, the maximum size of an unreinforced base will be 1,800mm square.

It is extremely unlikely that most amateurs will need anything like this, but if a larger base were needed, either the depth would need increasing to maintain the same proportions, or the base would need steel reinforcement. Reinforced bases are beyond the scope of this article, because anyone erecting a tower sufficiently "man-sized" to require one would obviously be using professionals in any case.

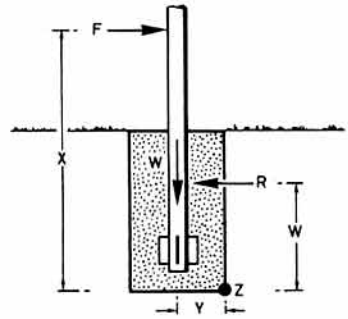


Fig 6. With deep narrow bases, the passive resistance of the soil has to be relied upon to prevent overturning. With X so large and Y so small, F × X is greater than W × Y. The soil resistance (R × W) is used to prevent overturning. This method is not tolerant of "corner-cutting". See text for comments

While on the topic of base proportions, I would like to mention a couple of base types which I have seen described in the amateur press over the years. The first type (Fig 6) almost certainly relies on sidewall pressures to assist the restoring moment. Although this can be made to work in certain soil types by professionals, it is not at all tolerant of corner-cutting. There are (to my mind) two problems with the diy brigade relying on sidewall pressures from the soil. First, the soil around the base will almost certainly have been disturbed by the hole digging operation. Unless the soil is properly compacted, sidewall pressures cannot fully develop. Secondly, to develop passive sidewall pressures the base has to "rock" ever so slightly to bear on the soil. Wind loads are cyclic in nature, so the base will move imperceptibly back and forth. If the soil is not properly compacted to begin with, this can open up a small gap around the base into which rainwater will gleefully percolate. This softens the soil, so the base would have to move just that tiny bit further to develop sidewall pressures as high as before. That would open up the gap around the base just a little more, allowing more rain to enter (Fig 7). The eventual effects of this process should be obvious.

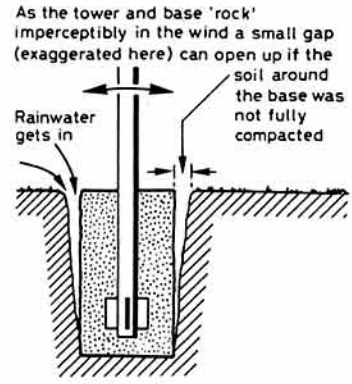


Fig 7. If the ground around the base in Fig 6 is disturbed, then the movement under wind loading may open up a small crack around the base. See text

The second type of base I have seen described is what I can only refer to as a "backfill" base (Fig 8). After the hole is dug and the ground post positioned, the earth is replaced gradually, compacting it in layers. Then a concrete "polo-mint" is cast on the surface to prevent the ingress of rainwater. Again, success hinges on correct compaction of the fill material, and in my opinion amateurs would probably do better to use concrete to refill the hole. One magazine published a "refinement" of this

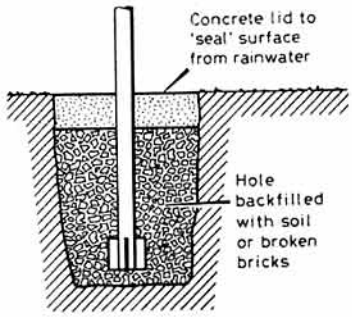


Fig 8. Although this type of base could be made to work in certain soil types, it does require the compaction of the backfill to be expertly done. Personally I would consider the mass concrete base to be more tolerant of corner cutting

type of base, where the hole was refilled with broken bricks. This unfortunately introduces two further problems. Apart from the fact that compacting broken bricks properly is even harder work than compacting soil, certain types of brick will deterorate rapidly if used below ground. In addition, the crushed bricks, being pourous, will attract groundwater. They will almost certainly have damaged the galvanising on the groundpost as they were rammed down, so the groundpost will rust away prematurely.

The construction of a concrete base is not without pitfalls either. First, the hole must be dug, but then it is useful to cast about 75mm of concrete at the bottom of the hole to provide a stable working surface. Corrosion of any metalwork imbedded in concrete is dependant upon the amount of "cover" of concrete. Providing that at least 50mm of cover is available, the strongly alkaline nature of the concrete will prevent corrosion of the ground post. It pays to allow for about double that, to allow for things moving around as the concrete is placed in the hole. Fig 9 shows the set-up prior to placing the concrete. Remember that concrete is very heavy and that the post will need to be secured to avoid any movement. The amount of concrete needed will probably be beyond the realms of mixing it by shovel, a bag at a time. There are two possible alternatives. Either hire a small cement mixer, of the type often used by small builders and landscape gardeners, or purchase ready-mixed concrete. The latter, while more expensive, will provide a more consistent mix. A phone call to the local supplier might pay dividends even for small amounts. I know of at least one amateur who had a surplus part-load off an adjacent road construction site for free, after workmen saw him digging a hole for his tower.

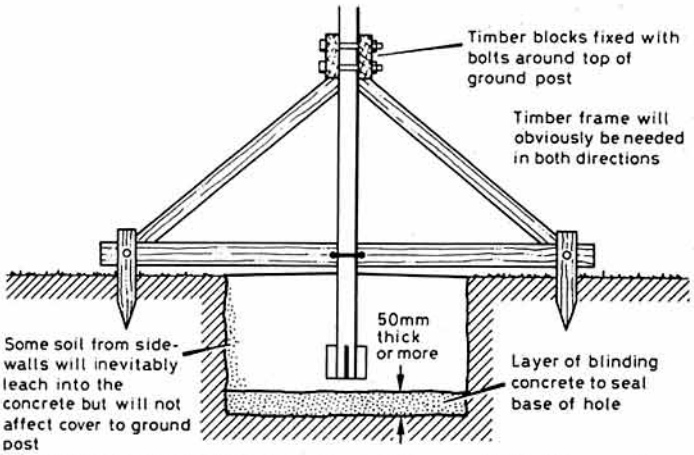


Fig 9. Wet concrete is extremely heavy and it is essential that the ground post is securely held in position. The layer of blinding concrete across the base of the hold prevents loose soil being drawn up into the base, thus reducing the protection against corrosion of the ground post. Some soil will inevitably work loose from the sidewalls too, but this will not be a problem provided the quantities are small

Before arranging for concrete to be delivered, pay some attention to the method of transporting it from the truck to the hole. As far as I know, drivers allow a 15min unloading time, but it would be best to check this when ordering. Concrete will undergo an initial "set" after a few minutes, and should be in its final compacted position before this occurs. Thereafter it will attain roughly two-thirds of its final strength after seven days, and full strength after 28 days. Obviously it is not a good idea to put up the tower before the concrete has hardened, but at least it gives ample time to recover from all the physical effort.

The concrete will only provide protection against the ingress of water, and consequently against corrosion of the ground post, if it is properly compacted. This cannot be done by stamping around in wellies, and the best way is to hire a concrete vibrator. This consists of a sealed tube which vibrates mechanically when fed with compressed air, and being physically undemanding is the ideal job for the xyl if she feels enthusiastic! Using a concrete vibrator will save a tremendous amount of time and effort and ensure that the concrete is free from voids.

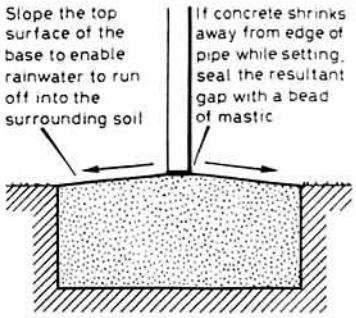


Fig 10. Given the amount of rain we seem to get in this country, it would seem a sensible precaution to slope the top of the base to prevent water "ponding" around the ground post

Given the amount of rain that seems to fall in this country, it is an idea to ensure that the top of the base is slightly higher in the centre so that the rainwater will run off and prevent "ponding" around the ground post (Fig 10). If it is desired to keep the top surface below ground for aesthetic reasons, cast a concrete raising piece around the post (Fig 11) because it is obviously a good idea to have the points at which corrosion can occur clearly visible.

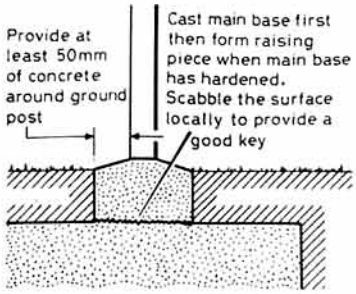


Fig 11. Large bases might be considered unsightly if exposed on the top. The top of the base can be below ground, but it is advisable to cast a raising piece around the ground post; the idea being to ensure that all possible sites of corrosion are above ground where they can be seen before it is too late

TO BE CONCLUDED

David Reynolds was born in Dudley in 1951. Classmates introduced him to electronics in his early teens, and the unbiquitious HAC one valve receiver kit introduced him to the short waves. He obtained his ticket in September 1970, and coincidentally the first contact turned out to be with the father of one of his old classmates although this was not realised until some time later. After a year on 1·8MHz getting his feet wet, attention was turned to hf. Initially ssb was used exclusively, but a bad case of laryngitis prompted a few days on the key, and nowadays cw is the main interest. Although having successfully designed and built electronic keyers from ttl logic in the early 'seventies, he has now reverted to a straight key again. Last year a five-band DXCC plaque, which was accomplished

using only dipole antennas, appeared on the shack wall. Inbetween ragchews, the WITU award is now the background interest, along with a partly-completed sci-fi novel.

"THE PARASITE"

An unobtrusive 144MHz portable colinear antenna

John Crawley, GM3LBX*

THE PROBLEM was to devise a portable antenna which could hang from some kind host such as a tree or any nice high support, a friendly kite or even a balloon. More specifically, it was to be used to hang from the yard-arm or spreader of the yachts which I sail, and which are always of the class known as OPs (Other People's) hence the name of the antenna which became the final choice, and which is to be described below.

First, then, here are the desired attributes:

1. It must be portable and easily stowed away.
2. It must be highly robust.
3. It must be wind and water-proof (salt and fresh).
4. It must be "smooth", that is, it mustn't look ugly or unseaman-like, or in any way spoil the flow of wind into the sails, and it must not on any account have sharp places that could do untold damage to expensive sails.
5. It must be broadband and need no atu.
6. It must be fed from the bottom, since it is to be hauled up on a halyard, and the feeder is best arranged if it can come down alongside the downhaul.
7. It must have very low-angle radiation to reach the repeaters and the other vessels just over the horizon.
8. For obvious reasons it must be omni-directional.
9. It must be cheap.

Verticals fed against a groundplane were "out", because any such groundplane would involve radials from the base which might easily damage sails and rigging. Those 19·25in spikes round the base of a ⅞ whip would prove even worse than the ancient radar-reflectors, whose sharp corners must have been invented by sail-makers to keep them in business.

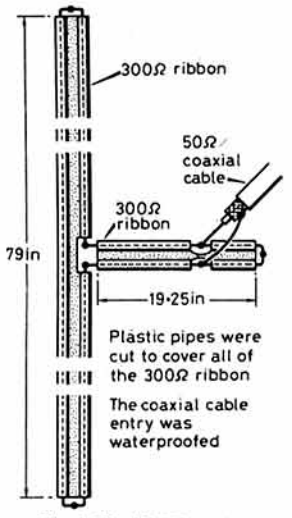


Fig 1. The Mk1 Parasite

So the next thought was for a vertical dipole, or better still a vertical colinear, for example the excellent ribbon feeder colinear (Fig 1). This became Mk1 and it was waterproofed by enclosing the whole thing in plastic piping. Performance was satisfactory but the feedpoint in the centre was a nuisance and the lateral pipe got in the way when hoisting, also it was a very difficult thing to get 7ft of plastic pipe into one's kitbag.

The final choice was a straightforward two half-wave colinear array with the phasing stub fed from a coaxial feeder which was led up through the lower element so that the feedpoint was at the bottom. Electrically the antenna is old-hat (Fig 2).

In order to achieve all our aims, the stub in the centre is coiled round the axis of the vertical elements, and the feedpoint is found which matches the 50Ω feeder which has been led up the centre of the lower element. The whole antenna can be coiled away, because the two 38·5in

*Cove, Tarbert, Argyll PA29 6SX.

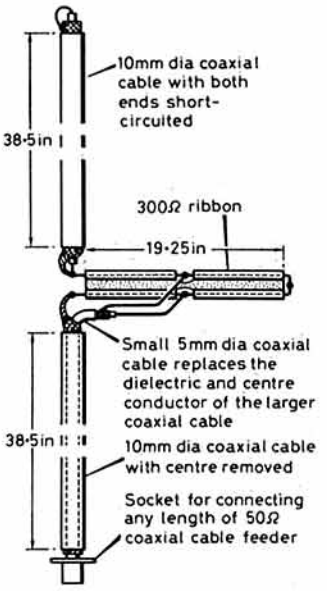


Fig 2. The electrical arrangement

lengths of the elements are made from the big-diameter coaxial cable such as Uniradio 67. The top element is used intact with the outer and inner conductors shorted top and bottom, while the lower element has its inner conductor and the dielectric carefully removed and replaced by a length of small-diameter coaxial cable which forms the feeder. This latter is soldered at the bottom to an SO239 socket, while at its top end it connects to the optimum match feedpoint. The ribbon feeder stub is cut to exactly 19·75in. The outside end of this is, of course, shorted (See Fig 3).

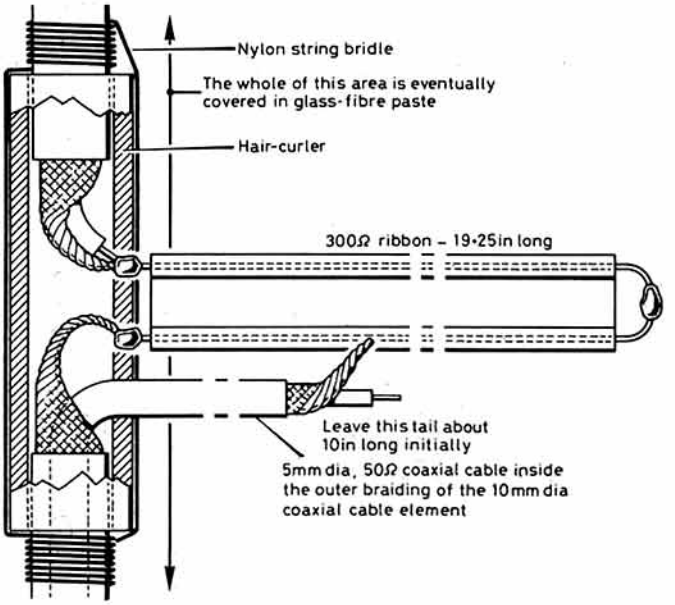


Fig 3. Construction at centre

The constructor will need a few other items before starting the job. A tin of glass-fibre paste and the necessary hardener (as supplied for mending motor cars), and two further items which can be obtained from pretty-well any lady once she understands what is required, namely: two of those (usually blue or pink) rollers for winding hair onto to make it

permanently wavy. They must be 1in in diameter and about 3in long. They have holes all over them and little spikes to grip the hair. Ask for the kind that have shorter spikes because they make an excellent base for the glass-fibre construction.

To understand the construction, refer to the Figs 3, 4, 5 and 6. Having cut the two lengths of big coaxial cable, each exactly 38·5in from the top element, form the top element by trimming back the insulation and the dielectric and twist inner and outer conductors together and solder the resulting pigtail.

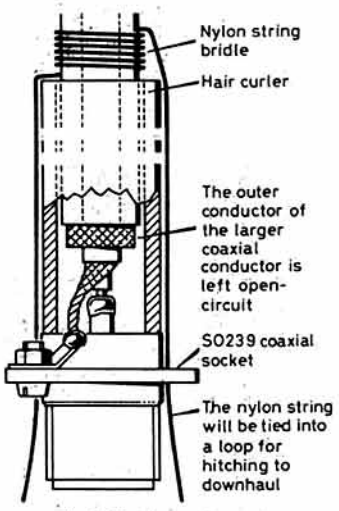


Fig 4. The base connector

The lower piece of big coaxial cable has its centre and the dielectric removed very carefully so as to preserve the cylindrical cavity, which is then filled by passing a length of smaller 50Ω coaxial cable up the tube, having first wound plastic tape round the smaller coaxial cable until it fits snugly in the space available. Pull about 10in of this cable through the braid of the lower element at its top end (about 1in down). Form the braid above this point into another pigtail, and solder. The bottom of the top element and the top of the bottom element, together with the small coaxial feeder, are then inserted into the opposite ends of a curler, and the pigtails bent through a right-angle and brought out together with the little coaxial feeder through the sides of the curler. The coaxial cable needs a larger hole to be made for it. It should be brought out just below the lower pigtail. The open end of the ribbon feeder is now soldered to the exposed pigtails.

The next important step is to provide longitudinal strength to the whole construction (it is to be hauled up and down by brawny seamen) so strong nylon string is used to form a bridle with a rolling hitch above and below the hair curler. These must be pulled very tight and are located in small nicks previously made in the plastic covering of the coaxial cable.

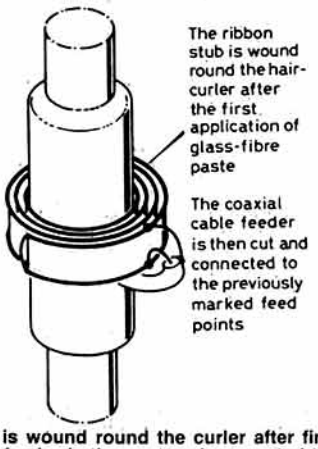


Fig 5. The ribbon stub is wound round the curler after first application of glass-fibre. The coaxial feeder is then cut and connected to the previously-marked feedpoint

At this stage mix the first dollop of glass-fibre paste. Stuff it liberally up the hair curler and smooth it down the sides. Cover the string bridle and spread the paste up and down the coaxial elements for 1–2in. Leave the ribbon stub and the tail of the coaxial feeder hanging free while the paste you have applied is setting. The whole thing should be hanging up under a light tension while this first setting is going on.

Next fit the second curler on the bottom end; here the bridle will form a loop on to which the downhaul is fastened. You will need to remember to push the hair curler over the bottom end of the lower element before soldering the inner (feeder) coaxial cable onto the SO239 socket. Mix more glass-fibre and fill the hair curler before pushing the socket into the base of the curler. Again smooth more paste over the outside and leave it to set.

Now hang the antenna in an open space and discover the optimum feedpoint on the ribbon. This is easily done with two pins (same source as the curlers) which are soldered to the conductors of the feeder coaxial cable. These you push through the top and bottom of the ribbon to make contact with the conductor. Start at about 4in from the shorted end and move inwards in little steps until you find the place where the swr meter between your transmitter, or other low power source of 145MHz, and the socket on the base of the antenna shows an swr of 1:1. Note this point and then coil the stub round the centre line of the antenna and fix temporarily with sticky tape while you make further adjustments to the pin positions since the coiling will have altered the optimum position somewhat. Mark the spot and remove pins. Cut the ribbon here and clean off the plastic so as to solder the coaxial feeder, now trimmed to suit, to the point on the ribbon previously marked.

Now mix a final lot of paste and cover the stub coil and the whole centre unit liberally. Give the thing a nice mysterious profile as shown in the figure.

The top of the whole is now fitted with a further nylon string bridle which will form a loop for hitching on the halyard. This bridle also is covered with glass-fibre to secure it and to waterproof the top of the coaxial cable. All three glass-fibre areas are now lacquered to waterproof them thoroughly. And there is your perfect Parasite. Hang it on something high and call CQ.

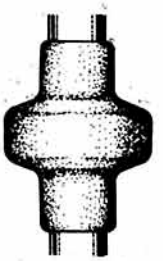


Fig 6. The coiled stub and the feeder are thoroughly waterproofed with glass-fibre paste

With a bow and arrow tied to a fishing line you can get it really high up a suitable tree (look on the other side of the tree first!). But the main use is for the signal halyard of your friend's yacht. If the mast is metal, choose the halyard as far away from it as you can. If the correct feedpoint has been found to give a 1:1 swr at 145MHz, the swr at the band edges will be found to be about 1:2. For fm working in the top half of the band, the constructor may prefer to tune it initially to 145·5MHz. This would give swr readings below 1:1·5 for the frequencies of interest.

The antenna has been tested over a whole season of sailing. It has met all the requirements outlined at the start, and has shown no signs of being affected by the weather. No detuning of the stub was detectable when tested after the "potting" of the coiled stub, and there was no appreciable change in the swr figures at the conclusion of an extensive cruise along the south coast of Ireland in some fairly wild weather.

On a wooden mast it can be hauled to the peak and forgotten about so far as the sailing is concerned; however, in the case of a metal mast this puts it too close to the mast, and the best place for it then is hanging from one of the spreaders. There is usually a signal halyard which can be pressed into service.

The Parasite was tested against a 5/8 vertical; at deck level the Parasite was generally better, probably owing to the difficulty in providing a good groundplane for the whip, but once the Parasite was hauled up into its proper place high in the rigging, there was no comparison. Reports from distant stations were pleasingly unanimous. The little creature does all that we asked of it.

I would like to record my thanks to Geoff Dixon, G8VFX/MM, skipper of the Ocean Youth Club ketch *Greater Manchester Challenge*, who helped with the testing and put up with a first mate who tended to festoon the doghouse with wires at the most awkward times, and to G1HVH/MM who also helped with the testing. □

A simple antenna for 50MHz omnidirectional

W BOOTHMAN, G3SWP*

Wilf Boothman contracted the radio "disease" while still at school, and started with a crystal set followed by one- and two-valve battery sets. Three years in the RAF confirmed the affliction, and upon leaving the service interest continued in the form of receiver construction. Meeting licenced amateurs at the local club and at work soon resulted in passing the RAE and morse test (no "B" licence in those days). The callsign G3SWP was acquired in 1964, and also membership of the RSGB. Did a stint as a RSGB slow morse sender from 1964 to 1986 when a change of job drastically cut into spare time.

HAVING ACQUIRED a 50MHz module for the station FTV901 transverter, the next requirement was for some form of quickly-made antenna. The obvious choice, a beam, would require a rotator which was not readily to hand, while a horizontally-polarised dipole was not really a practical proposition as this brings with it the disadvantage of only "looking" in two directions. So the solution lay in some form of halo, and to this end some preliminary experiments were carried out by bending some 0·5in-bore tube into a nice smooth circle – this ended in a frustrating disaster when ugly kinks manifested themselves, and the resultant piece was rather "floppy".

A visit to a local diy store produced 2m lengths of 5/8in by 1/8in (15 by 3mm) bright aluminium strip at reasonable cost.

It was realised at an early stage that supporting a halo of the required size by the time-honoured method of bolting to the support mast at the zero voltage point would prove difficult from a mechanical point of view, as the whole weight of the antenna is cantilevered out at one side. It was decided, therefore, to support at the centre of two opposite sides (Fig 1). The halo principle is simply a half-wave dipole bent to form a circle or square with a gap at the "outer" ends, and fed with a gamma match via coaxial cable.

Construction

Although sizes and types of material are given as for the prototype, many other combinations of material are possible, the main points to remember are:

(1) Good mechanical stability is essential.

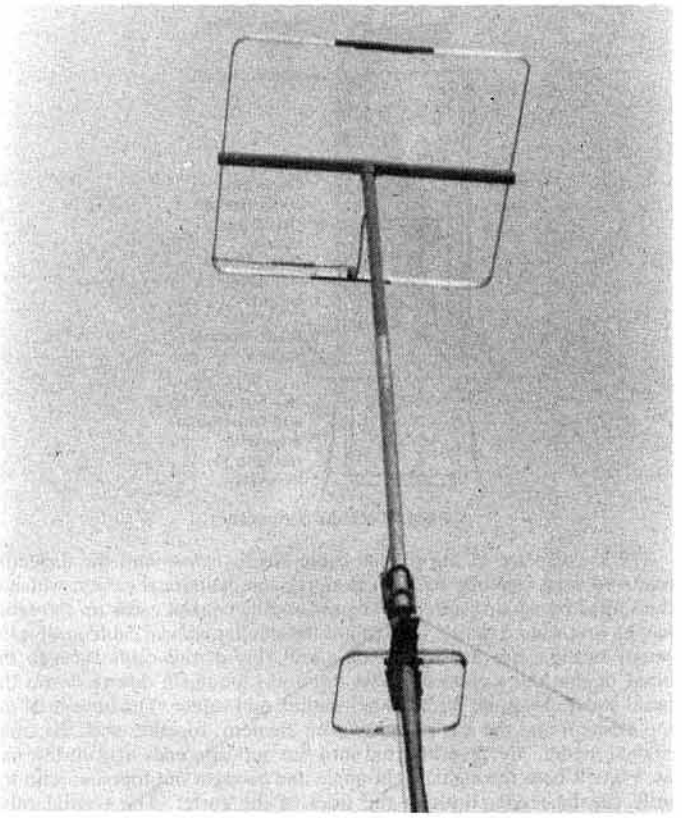
(2) The insulation spacer used in the "gap" must be a good dielectric at rf and must not be brittle.

(3) The support cross beam needs to be entirely of plastic or other insulation material; *not* metal with insulation where the antenna clamps on, as the extra metal cross member would upset the working principle. It may be in order to bring an aluminium mounting mast up vertically to the centre point, provided the cross support is of insulation material. Wood is *not* recommended due to water absorption.

(4) The coaxial socket *must* be bolted on at exactly the centre point of the *total* length of antenna.

The prototype was made from two pieces of equal length strip with a 10in-long clamp strip each side, held with two 4BA screws each side of centre. If a single piece of material 9ft 2in long is available, that would simplify matters. When forming the corners, to end up with a 1·5in radius, use a 2·5 to 2·75in-diameter "former" which will allow a little "spring". All securing screws must be brass, or stainless if available.

The method of securing the antenna to the plastic cross tube may look a little too simple, but it certainly works well in practice and does facilitate removal later if required. The original screws were tapped in 4BA into the aluminium, but if individual constructors do not have the equipment to drill and tap, self-tapping screws would do just as well, but preferably rust-proof.



50MHz on top, 144MHz halo below

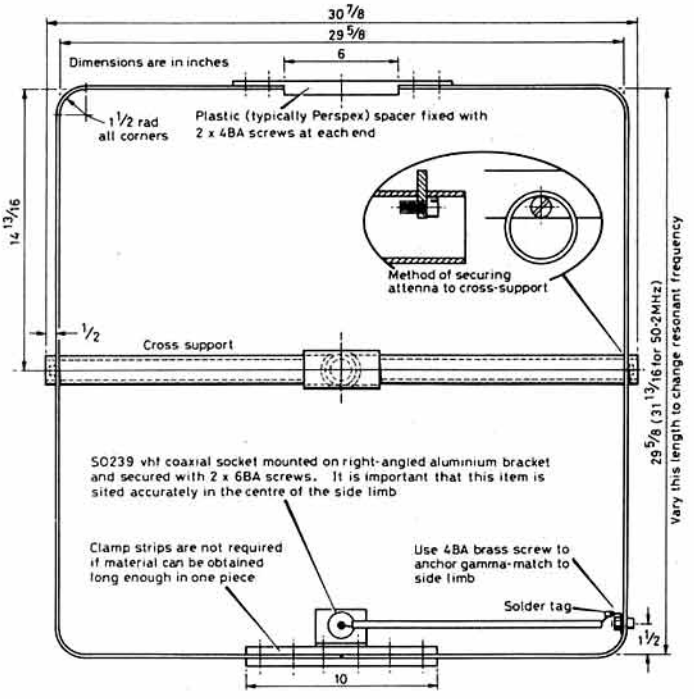


Fig 1. Constructional details of the halo

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The gamma match is made from a length of 75Ω flat twin with one conductor connected to the antenna tap point and the other conductor connected to the coaxial socket at opposite ends, thus forming a capacitor. If 75Ω twin feeder is not available then some other form of twin-core conductor could be tried, preferably with single strand conductors. 300Ω ribbon feeder is *not* suitable as a considerable length would be required to attain the required capacitance; 75Ω twin feeder is rated at approximately 19pF/ft.

The finished antenna was given two coats of yacht varnish to keep the winter weather at bay. I have found by experience that polyeurathane varnish is not suitable for coating aluminium structures, whereas yacht varnish seems to be just a little more elastic when set. The coaxial socket is given a liberal squirt of "Waxoyl" all over, as this prevents the metal and soldered joints oxydising; another spray which can be used is "Supertrol", obtainable from motorists discount shops.

The length of gamma section is best found by experiment. On the original, 23in (584mm) was required which was folded back on itself in the centre and tied with plastic lacing cord to prevent it moving around in the wind. To begin with, both conductors of the gamma section are left full length minus half an inch or so of the core not connected at each end.

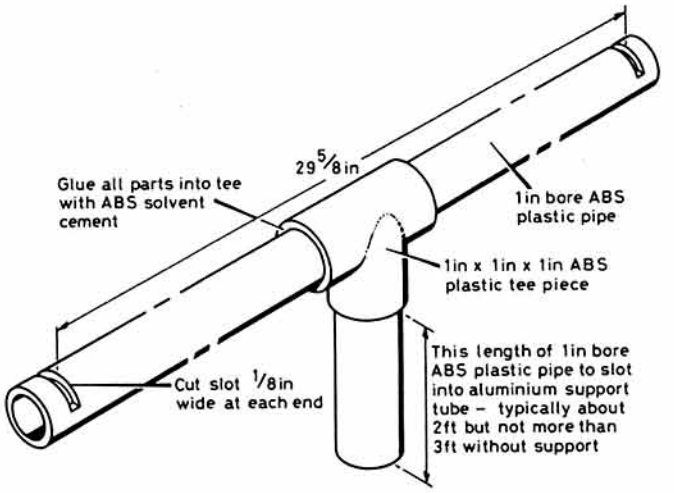


Fig 2. Details of cross support

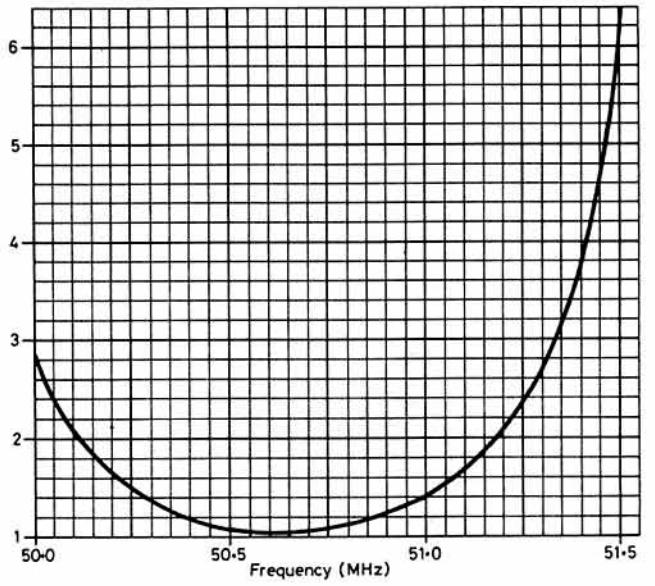
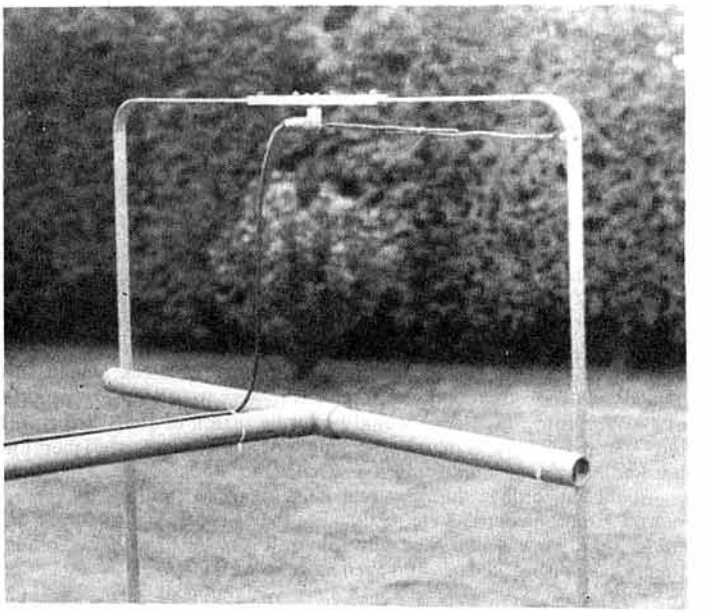


Fig 3. VSWR graph

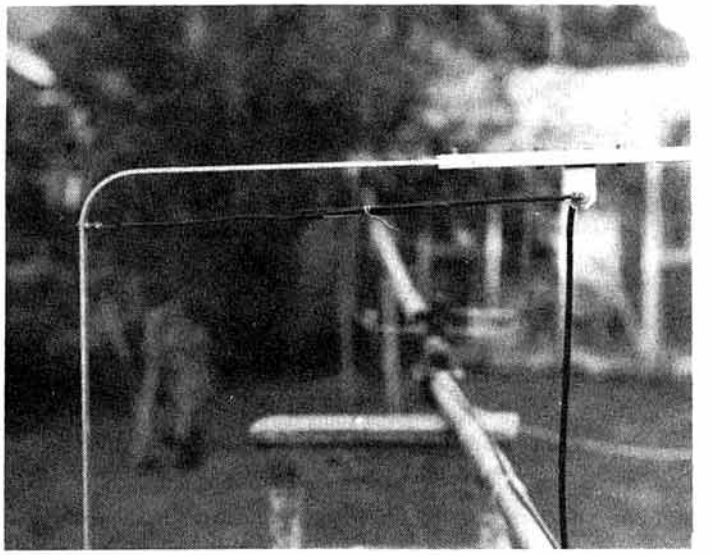
Setting up

This is very simple, as only the gamma match section needs trimming. One word of warning though: before attempting to trim the gamma match, put the antenna in its final working position with the intended coaxial feeder connected. Check for swr with a meter of known accuracy, remembering that this is 50MHz (some cheaper swr meters can be very frequency conscious). Check the reading at 50, 51 and 52MHz; Fig 3 shows that this can vary widely, the reason being that this is a very large band. Assuming the lowest swr reading is in the area of the band of greatest interest, note down the lowest reading obtainable, if this is anything below, say 1·2 leave things well alone.

If an unacceptably high reading is obtained, even at the lowest point, the gamma match needs a little careful pruning. With a sharp knife carefully cut the plastic between the two conductors at either end of the gamma match section (only one end) taking care not to damage the one conductor connected at that end, cut about 0·5in and snip off the "free" conductor, you have now reduced the capacitance of the gamma match by approximately 0·79pF. This may not seem a lot, but do this "pruning" a little at a time and keep a check on the swr each time. If it is found that the swr is rising from the original value, as a result of prining, then the gamma match section is not long enough and a new, longer one must be made. It is essential, however, to secure everything mechanically, as very indifferent results will manifest themselves when the first high winds come along if any part can move about. **Do not** tie the finally-adjusted gamma match bodily to the conveniently near parallel limb of the antenna, or you will completely upset the 1:1 swr you have just struggled to obtain.



Underside view showing gamma match and coaxial socket



Detail of coaxial socket mounting. Also showing how 75Ω twin is folded back on itself and tied

General

The resonant frequency of the antenna is, of course, governed by its physical length and cross-sectional area. The length before bending is found for any particular frequency from the simple formula:

$$\frac{467{\cdot}4}{f} \text{ where f is in MHz}$$

In other words, adding 2in to the total length will put you at the 50MHz end of the band, and taking off 4in will put you at the 52MHz end. The original was intended to resonate around 50·5 and in practice gives 1:1 swr at 50·64MHz and only 1·65:1 at the "centre of ssb activity" of 50·20MHz.

It must be made clear at this point that the resonant frequency is determined purely by the physical length of the antenna, and no amount of juggling and "pruning" of the gamma match will move the resonant frequency; "pruning" is purely an impedance-matching exercise. Another point to watch is that if the overall length is varied, the "gap" must still end up at 6in plus or minus 0·25in, in other words vary the length of the side limbs slightly.

Performance

To keep within the power limits, it is necessary for individual constructors to carry out a check. This becomes a simple matter with the aid of the "Erpogram" (*News Bulletin*, February 1986 and June 1987 p419), which eliminates the "hard-sums" bit. In my case 60ft (approxs 18·3m) of UR 43 is used for the coaxial feeder, which gives a loss figure of approximately 1·46dB (see "Getting Going" *Rad Com* June 1987 p418). The halo (or should it be "Squalo"?) is basically a dipole with the ends bent round, so the gain is zero.

Using the Erpogram, the calculation looks like this, in my case: Place a straight edge between 1·46 on the left hand feeder loss (dB) line and the zero point on the antenna gain (dB) line (ie the top), and make a light pencil dot on the reference line next right. Now place the straight edge across the reference point you have just made and the output power (in watts) of your transmitter (10W in my case) and the answer is shown in the right-hand column marked ERP (dBW), in this case 8·7dBW. Considering the legal limit is 20dBW, that is well inside the requirements.

If a feeder of UR67 had been used, the previous check, would have yielded 9·3dBW. Generally if 25m of UR67 were used with a transmitter of 100W output, the output would be in the region of 19dBW (just in), but bear in mind that if any shorter length of feeder were used (therefore less loss) the power limit would be exceeded.

All this underlines the very real need to tread carefully as regards power output, feeder loss etc, and do use the "Erpogram". Finally, if any transmitter below 30W is used with 25m or less of UR67 with the antenna described, you are well in – and even more so with UR43.

Results

Although there is no gain in any particular direction, this type of antenna is very useful for generally "looking around" and would not be difficult to stow away in most cars for portable use. A really good opening is eagerly awaited to see what dx results can be attained, although results so far have been very encouraging. Analysing the results obtained from swr checks, it appears that the formula for a half-wavelength dipole needs a little correction for halo type antennas, and the "magic" constant works out at $\frac{464{\cdot}3}{f}$. This is probably due to the increased end capacitance induced, hence the need to secure the gap with a good strong insulator.

If individual constructors are considering using round aluminium tube, and the kinking problem can be overcome, the same method of making the gamma match can be used, as it need not follow the curve of the antenna. It would be wise to use the standard dipole formula of $\frac{470}{f}$ as a starting point for the unbent length, as a round halo can be persuaded back into a circle if the overall length is shortened a little and the gap maintained at 6in. A very interesting concept for the more experimentally-adventurous among us is that of "stacking" two or more halos with, of course, a suitable matching harness.

When the original antenna was being "air tested", another unexpected bonus was realised due to the fact that approximately 60ft of coaxial cable is used (mostly low down) this formed a very useful antenna for 1·8MHz with the 50MHz halo forming a top capacity "hat" and the whole lot tuned with an spc homebrew matching unit, the coaxial cable being shorted together at the atu end. Antennas of this kind can usually be coaxed to produce useful results on most of the lower frequency bands with the aid of an atu of some sort. □

A "piggyback" microphone preamp for the Icom IC25

PETER L N NAISH, DPhil, G4OBI*

Introduction

The new Highway Code, while not being legally enforceable, nevertheless represents a strong incentive to abandon the use of a mobile fist microphone. Commercially-available boom microphones, with their ancillary preamplifiers, up-down channel switches and so on, are quite pricey items, and, with this in mind, it was decided the final system, which was designed for an Icom IC25E, but has since been used on other Icom models.

The microphone boom

Other booms have been described [1] and the one which I built incorporated few novel features; it is sufficient to say that it contained a small electret element, housed in a turned aluminium capsule.This was mounted at one end of a length of 4mm outside-diameter aluminium tubing (obtainable from model shops), which carried the microphone cable. The tube was bent to an appropriate shape and fitted to a Perspex headband.

A strip of Perspex is very readily bent, after cautious heating in a gas flame, or over a radiant electric ring. While heating, the plastic should be held at each end and kept on the move. Once it becomes pliable, the strip is bent into a smooth semi-circle, of slightly less than head size, and held in place until sufficiently cool to be firm.

Preamplifier

It was observed that the Icom's own fist mic actually contained a preamp, configured in a way very similar to that used with electrets. In other words, the signal voltage is developed across a resistor in series with the supply, so permitting the use of just two wires. In fact many other connections are made to the mic, for scanning control etc. It appeared that if the external electret could be switched in as an alternative to the internal dynamic microphone, then a number of benefits would follow. Not least important, I would be saved the job of building an amplifier, having instead only to fit a switching jack socket to the first mic. Moreover, the original mic would still be available for static use, its channel-control switches would remain connected, and there would be no need to acquire another multiway plug.

Unfortunately, experiment revealed that the built-in preamp had insufficient gain to produce an adequate signal from an electret. However, even if the construction of a further amplifier could not be avoided, there seemed no reason to abandon the other benefits of keeping the fist mic to hand (excuse the pun!). Consequently, it was decided to adhere to the concept of plugging the boom mic into the Icom microphone, and to build the necessary additional amplifying circuitry into the fist mic case.

Peter Naish has had an interest in radio, ever since schooldays, when he and a friend (wickedly!) managed a brief short-range contact, with a pair of surplus "38 sets". Years later, when he married a Mexican, he and his father (G4MHS) both became licensed, to permit transatlantic contacts independent of the telephone service. G4OBI's father-in-law is holder of the callsign XE2ZQ. After 10 years in the University of Oxford's Department of Experimental Psychology, Peter Naish has taken up a post of principal psychologist at the Royal Aircraft Establishment. A particular interest is research into the nature of hypnosis, and he has published a book on the subject.

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The original Icom microphone, with new boom mic plugged in at the side and t/r switch mounted on top

The circuit employed is shown in Fig 1. No claim is made that the configuration is optimal; only that it works. To ensure that plenty of gain was available, it was decided to use an op-amp. The availability of only a single supply rail, of fairly low voltage, constrained the choice of component somewhat. The 7611, which was selected, is a cmos device, with low current consumption and the ability to work over a wide range of supply voltages. The electret derives its power from the potential divider formed by R3 and R4, via the resistor R2. It is across the latter that the signal is developed and applied to the differential inputs of the op-amp. R1 provides negative feedback, and C1 carries the amplified signal to the existing fist mic circuitry.

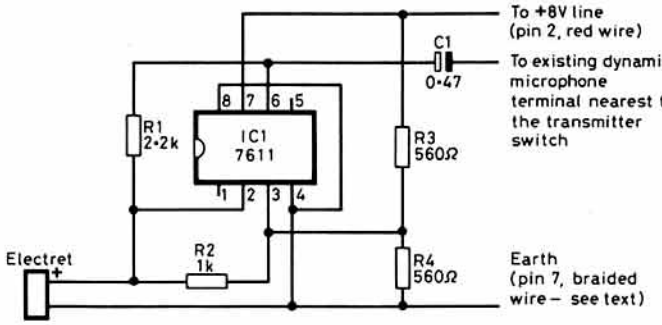


Fig 1. Circuit diagram of the piggyback preamplifier

Components list

R1	2·2kΩ	**C1**	0·47µF
R2	1·0kΩ	**IC1**	7611
R3,4	560Ω		

Electret microphone: Tandy Cat No 270-090.
2·5mm jack plugs and sockets (2 pairs).
Miniature single pole toggle switch.

The complete circuit was built on strip board, and was sufficiently small to fit inside the fist mic casing. It will be found that there is space available at the base of the mic, near the cable entry point. The electret was connected with a miniature jack, the socket being fitted in the side of the mic case, again near the base. Only three internal connections are required, as shown in the diagram. The pin numbers quoted refer to the Icom microphone plug, and the wire colours have been found to apply in all the microphones investigated. The signal, from C1, enters the existing circuit at the same point as the dynamic microphone. Tests revealed that satisfactory modulation resulted from connecting C1 to either of the microphone terminals. However, signal reports suggested that one side sounded better than the other. The better point for signal injection appears to be the terminal closer to the push-to-talk switch, which is the side of the internal microphone remote from the transistor it drives. It should be noted that the original microphone does not have to be disconnected; in fact it is part of the transistor biasing circuit.

Transmit/receive switching

If it had remained necessary to depress the original ptt switch during transmissions, then the whole hands-off concept of the design would have been undermined. It was clearly a simple matter to wire an external switch in parallel with the original and, if the connection were made via a plug, the system could easily be returned to its former state. However, there still remained the question of where the remote switch should be located. It is common for them to be placed on the gear lever, but that site would have required the use of additional connecting wires from the mic body. As has been explained, it was intended that the original channel control switches should remain available, so the old mic would have to be located within easy reach of the driver. It followed that if the t/r switch were also mounted on the fist mic, it too would be accessible. The final arrangements made can be seen in the photograph.

The Icom microphone was clipped to the driver's door, near to the steering wheel, using a normal mobile microphone bracket. A miniature jack socket was mounted in the top of the mic, and wired across the internal ptt switch. The new external switch plugged directly into this socket. A miniature toggle switch was used, mounted by its base on the side of a jack plug. A flat was filed on the side of the plug's plastic cap, and small holes were drilled in this section to take the solder tags of the switch. Short connecting wires were soldered to the jack plug, the cap was screwed on and the wires were poked out of the holes in the side. These were then soldered to the switch, which was finally "Super-glued" onto the flat on the plug cap.

As a finishing touch, the toggle of the switch was extended, with a section of the same aluminium tubing as was used for the electret boom. One end was belled slightly and pressed over the end of the toggle, where it was glued in place. It was found that the other end of the extension could be nicely rounded, by careful cutting. The cutting edges of a pair of pliers, or wire cutters, are squeezed fairly gently across the tubing, at the appropriate length. The tubing is then rotated in the fingers, while gradually increasing the cutting pressure. This procedure pulls the metal into a "waist", before finally cutting through, thus leaving a smooth end. Being mounted on a jack plug, the completed switch, with its extension, is free to rotate in its socket on top of the fist mic. When not in use, the lengthened toggle is swung out of the way, parallel with the door of the car. During QSOs, the toggle is turned through 90°, bringing it to within easy reach of the steering wheel and requiring only an extended finger to operate it.

Returning to hand-held use

It is, of course, a simple matter to unplug the boom mic and external ptt switch, and since the internal dynamic microphone remains connected throughout the modification, one might expect things to return to their original state. Unfortunately, this expectation ignores the presence of the op-amp circuitry connected across the internal microphone. The negative feedback in the additional circuit will act to resist voltage swings at the original transistor base, and tests have shown that the resulting audio output is negligible. An obvious solution would be to place a switch between the old and the new circuits, at the point where C1 links them. However, this would require yet further holes to be drilled in the old mic case, with attempts to accommodate sockets or switches into a space already filled beyond its makers' intentions.

It was clearly preferable to utilise the switched contacts on either the boom mic, or ptt jack sockets. Since neither of these was connected to the output from the add-on preamp, it would not be possible to switch at that location. In fact the only potentially useful connection made to these sockets was the earth line, so the feasibility of switching the op-amp's supply at that point was investigated. Experiment revealed that disconnecting the op-amp earth, leaving it floating on the 8V line, did indeed allow the internal dynamic microphone to become active again. Signal reports were obtained to the effect that there was no discernible difference between the two microphone configurations, so the idea of earth switching was pursued.

Each of the added jack sockets had a connection to earth, but it was decided to make use of the t/r switch, for the modification to be described. There is no strong reason why the microphone socket should

(Continued on page 268)

Technical Topics

Pat Hawker, G3VA

A RECENT CORRESPONDENT in the letters section of *Practical Wireless* (January 1988) admits to having "caught the bug" of amateur radio, agrees that there should be a proper licensing test of operating procedures and the use of appropriate instruments to prevent interference, but "cannot really see the point of everyone having to learn basic electrics and electronics and how the insides of transceivers work . . . it is possible to pass a driving test without having the slightest knowledge of what happens under the bonnet . . . I feel that the present examination system is inappropriate in this respect, given that sets no longer need to be constructed at home from bits and pieces." The *PW* editor added the comment: "Wow! I think we're likely to need some fireproof paper to print the answers to this letter."

Yet, if one puts oneself in the position of a newcomer, there is a perverse logic in these views, heretical though they may seem. Seen through a newcomer's eyes, amateur radio today must seem, at least superficially, to consist almost entirely of blackbox operating in pursuit of awards, QSL cards, squares, prefixes, contests, social activities including conversation on air with known circles of friends. The "technical" interest must seem to be confined, except for a few professional engineers in our ranks, to little more than deciding whether Brand X offers more "goodies" than Brand Y. It is no good blaming cb, a disenchanted younger generation, or even the RSGB. The hobby today is what *we* have made of it. How can we expect newcomers to realise that awards, contests etc were introduced and promoted primarily to add a spice of competition and personal achievement to a hobby founded firmly on scientific and experimental interest in the technology of radio communication, both principles and practice. The fact that most of us today use factory-built equipment should not blind us to the need to have at least a reasonable understanding of the technology and some knowledge of those "bits and pieces" that go into the equipment if the hobby is to survive in a meaningful manner. And how can those interested only in operating be sure their black boxes really are working as their designers intended?

Admittedly we have to recognise that amateur radio and its technology are changing as we lose our links with the pioneering days. Sadly, an increasing number of those who have contributed so much to radio technology – both amateur and professional – are no longer with us. 1987 saw the passing of some great American engineers to whom as amateurs we owe much. Dr George Brown, whose classic work on antennas while with RCA has been featured often in *TT*, died on 11 December. I can personally vouch for the encouragement he gave to many of us. His 1937 paper provided the spur for the development of close-spaced rotary beams (both driven and parasitically excited); he showed the importance of reducing ground losses on monopoles by the use of up to 120 ground radials; he pioneered the elevated groundplane etc – not to mention his work as RCA director of research on the development of colour television.

Arthur Collins, W0CXX, founder of Collins Radio, died in February 1987. He not only popularised the pi-network matching technique among amateurs; his firm, initially founded to build transmitters for amateurs, came to be respected throughout the communications industry for the excellence of its equipment. It was Collins Radio that, with the KWM-1, became the first manufacturer of amateur hf ssb transceivers. Another 1987 loss was Harold Smith who, while with Bell Telephone Laboratories, devised the "Smith Chart" to help solve antenna and transmission line problems. Yet another was Walter Brittain, co-inventor of the transistor.

Home-built low-cost spectrum analyser

Last year (*TT* February 1987, p111), Peter Chadwick, G3RZP, in entering the debate "valve or solidstate" for rf power amplifiers noted that "Homebrewing a solidstate pa is *not* easy if you are going to avoid parasitics . . . Within the professional field nobody now knows how they ever managed in the days before the spectrum analyser". Similarly, Kurt Grey, VE2UG)*TT* August 1987, p586), emphasised that even replacing a transistor in a solidstate transmitter often calls for a $20,000-plus spectrum analyser to trace and cure the parasitic spurii resulting from the minor changes in layout that come about in reinstating all the components that have to be removed to reach the transistor. Even a second-hand professional spectrum analyser can cost far more than an entire factory-built hf amateur station including a rotary antenna array!

But for amateurs already having a reasonably good oscilloscope, the cost of a simple spectrum analyser suitable for a variety of purposes,

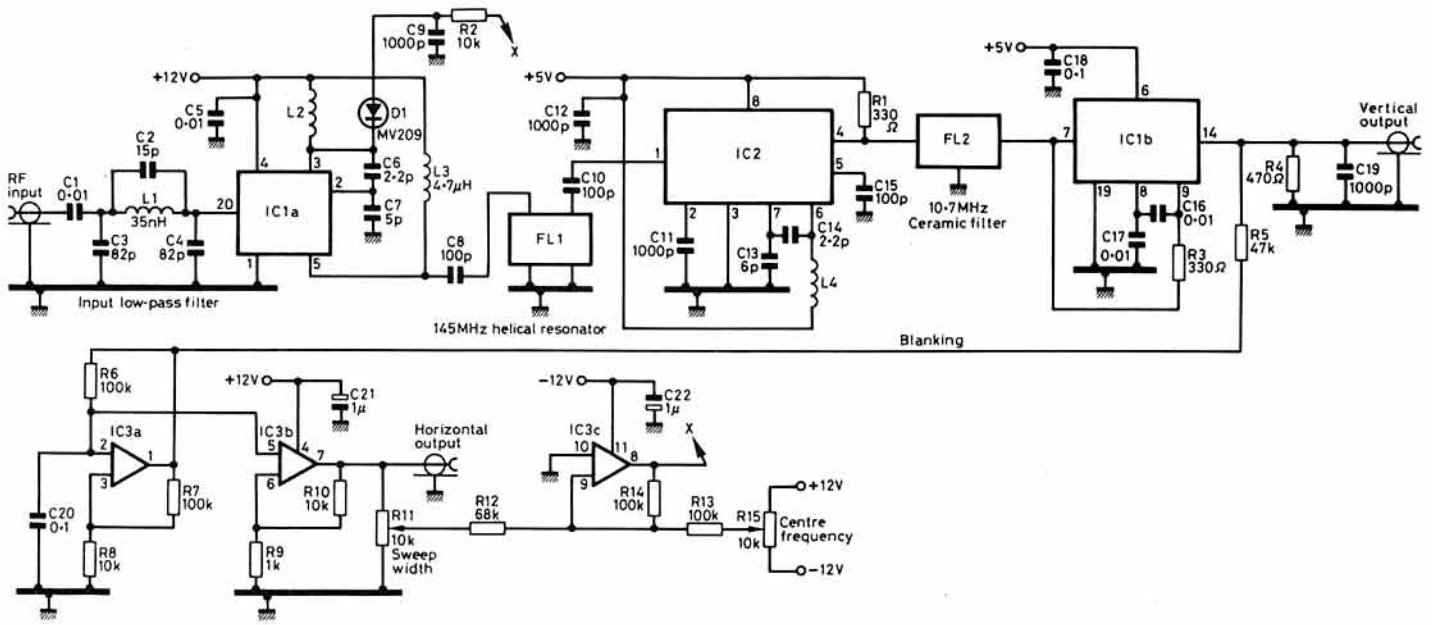


Fig 1. Circuit diagram of the *RF Design* low-cost spectrum analyser for use in conjunction with a general purpose oscilloscope. C1, C5, C16, C17: 0·01μF ceramic. C2: 15pF npo. C3, C4: 82pF npo. C6, C14: 2·2pF npo. C7, C13: 5pF npo. C8, C10, C15: 100pF ceramic. C9, C11, C1: 1,000pF ceramic. C18, C20: 0·1μF ceramic. C21, C22: 1μF electrolytic. FL1: 145MHz helical resonator (Toki CBT or home-made). FL2: 10·7MHz ceramic filter (Murata SFE 10·7). L1: 4·5t, 3/16in id. L2: 3·5t 3/16in id. L3: 4·7μH moulded choke. L4: 5·5t 3/16in id. R11, R15: 10kΩ linear. R1, R2, R3, R4, R8, R10 0·25W

including the tuning and adjustment of solidstate transmitters etc, can be quite modest, even though the resolution and range may not compare with a $20,000 model. Giles Humpston, G4GYO, draws attention to an article in the "rfi/emc corner" of *RF Design* (January 1988): "A simple spectrum analyser – pocket-sized 0 to 100MHz unit uses only three ics", by Albert Helfrick (Doty RF Industries). It is introduced as follows: "here is one of our *RF Design Awards* contest entries, an extremely simple spectrum analyser usable with a general-purpose oscilloscope. It is a valuable tool, allowing detection of rf energy at low levels. In addition to the circuit design and equipment troubleshooting applications noted by the author, this unit should be extremely useful in locating leakage from shielded enclosures, pinpointing sources of radiation in digital circuits, and tracking down sources of interference." The author's suggestions include its use as a low-level signal searching tool for trouble-shooting and developing rf circuits: "Used with a one- or two-turn coil attached to a length of coaxial cable it can 'sniff out' the presence of rf signals . . . it can be used to tune oscillators and amplifiers by placing the pick-up coil near the circuit to be tuned . . . it is invaluable for tuning transmitters since parasitic oscillations often occur when a transmitter is poorly tuned".

The unit as described covers rf inputs from near zero to over 100MHz with a log display range of more than 60dB and a minimum detectable signal of −75dBm. It is claimed that the sweep linearity and the linearity of the log display are excellent. Since it has a first i.f of 145MHz (oscillator sweeps between 145 to 245MHz) it is clearly not intended for adjustment of 144MHz transmitters but should prove suitable for hf and possibly 50MHz equipment. A spectrum analyser needs to be able to detect parasitics at frequencies well above the transmitter frequency, as well as the low-frequency parasitics that occur with solidstate transmitters.

In effect, a spectrum analyser is a crude "receiver" which can be swept (scanned) rapidly and repeatedly across a wide frequency range, in synchronism with the horizontal ("X") axis of a crt display; with the strength of detected signals indicated by the vertical ("Y") trace at the frequency concerned. The *RF Design* article outlines the use and functioning of the unit, providing a circuit diagram (Fig 1) but leaves the construction, pcb layout etc to the reader.

ICIA is the converter section of a Motorola MC3356 fsk receiver chip with its oscillator frequency swept from 145 to 245MHz by the hyperabrupt varactor diode D1 (MV209) under the control of the IC3 (TL084) relaxation oscillator. The first i.f of 145MHz is tuned by the helical resonator (FL1). The author states that FL1 is the most expensive device in the unit if bought (such devices are often used in the front-ends of vhf receivers) but can be home-constructed without undue difficulty. It is not clear whether the resonator he used has only a single section, but it would be advantageous to use a multi-section helical resonator such as described in a number of publications. Fig 2 shows an agc-controlled helical filter as described many years ago in *TT* and *ART*, although agc would not be required in this application. A long, detailed paper on helical (resonator) filters has been published recently in *Journal IERE* (Sept/October 1987). With a second i.f of 10.7MHz it is important that FL1 should provide sufficient selectivity to eliminate (or at least greatly reduce) the "image" signal that will otherwise appear 21·4MHz from the real signal (2 × 10·7MHz), and other unwanted products. A two- or three-section filter would probably be adequate.

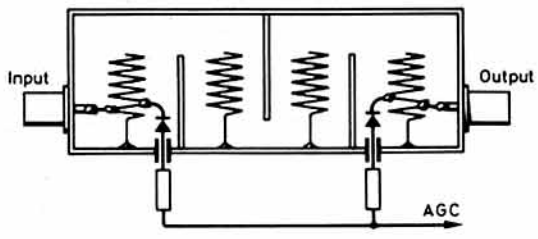


Fig 2. Typical arrangement of a four-section helical resonator filter. This 1972 design included pin-diodes as an agc-controlled attenuator and provided a passband of about ± 2MHz at 100MHz and some 50dB attenuation beyond 5MHz off tune. Attenuator (not needed in this application) had a control range of about 40dB (source "Radio Receivers 1972" conference book). A detailed design article on helical resonator filters appears in *Journal IERE*, September/October 1987

IC2 (Signetics NE602) is an oscillator/mixer chip, with the oscillator adjusted to 155·7MHz by deforming the coil L4. The bandwidth of the second mixer is governed by the 10·7MHz ceramic filter; a filter intended for the i.f amplifier of a standard fm broadcast receiver will provide a bandwidth of about 250kHz. This filter governs the resultion of the analyser, but cannot be too sharp in view of the inherent phase noise etc of the oscillators. The 10·7MHz i.f amplifier uses part of the MC3356 fsk receiver chip (IC1B) and provides an output proportional to the log of the limiter input (the discriminator section of the MC3356 is not used). The buffer/summing amplifier of the time-base chip IC2 provides about ±10V peak output and results in a −2 to −22V bias across the varactor diode, with the negative-going voltage applied to the varactor diode and the opposite polarity applied to the X-axis of the oscilloscope to give the correct relationship between sweep voltage and analyser frequency. The square-wave output of the ramp generator is used as a blanking voltage, the trace being forced off-screen during retrace.

The author suggests that (in the USA) it should not be difficult to replicate the analyser (complete, power supply, case and all) for less than $50 if the helical resonator is home-made. He adds: "it's probably the best $50 tool an rf designer could own".

Universal polarity keyer

James Bryant, G4CLF, noted the dual-polarity relayless keyer arrangement described by Steve Cook, G4ANA, in the December *TT*. He writes: "I have built a relayless keyer which does not need to be switched but operates regardless of the polarity applied to the keyer output terminal.

"The output stage is shown in Fig 3. It uses two VN2222L N-channel vmos fets and a pnp bipolar transistor – almost any general-purpose type having a Vceo of 1·5 times the maximum negative keying voltage should do the job. TR1 may be replaced by a vmos device having a higher breakdown if the positive keying voltage is likely to exceed +50V (the rating of the VN2222L is +60V). R2 is chosen to restrict I_t to 10 per cent more than the maximum negative key current.

"The logic drive signal is greater than 0·5V for logic 0 (key up) and between +3V and +15V for logic 1 (key down). The diodes must carry the key current and have a reverse breakdown of more than the maximum keying voltage."

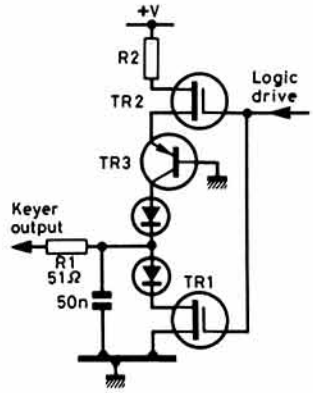


Fig 3. G4CLF's universal polarity relayless keyer arrangement

Thoughts on front-end design

In *TT* (November 1987, p834), in connection with the concept of the simple "super-dc-gainer" type of receiver, I made a fleeting reference to a 1977 "3·5MHz dx receiver" by Jan Hubach (PA0FIN/OH1ZAA and also ZF2KZ, NN0Y, FO0ZA etc) originally described in *Electron No 6, 1977*, and briefly in *TT*, December 1977. Having recently returned from his USA and ZF2KZ trips, OH1ZAA was surprised to find references to his 1977 design in both *Electron* and *Rad Com*, and this provided an ignition spark to provide some additional comments. He writes:

"In the early 'seventies, free-running vfos (combined with crystal-controlled pre-mixers) were still widely used, and the common problem was a lack of sufficient dynamic range before the i.f stages. When double-balanced mixers were introduced, several manufacturers tried to apply the new technology; however, still with poor to mediocre results. This was not at all surprising since their design assumptions were often incorrect:

(1) Still too much emphasis was given to receiver *absolute* sensitivity. Therefore applied amplification was unnecessarily large before the i.f stages; any matched antenna on the hf bands brings in sufficient noise power compared to a dummy load at a temperature of 300K. Therefore extreme sensitivity does not add to snr improvement on reception. Over-sensitivity is still a problem with 'modern' receivers, but is easily cured by inserting an appropriate attenuator.

(2) There was a fixation in thinking that the balanced mixers had to be terminated with a matching impedance for the desired received signal. However, also the driving sources had to represent a correct match to the mixer; in addition, *all* spectral components generated in the mixer (ie *any* frequency) had to see the correct match at *any* port of the device. The most common mistake was to match the mixer just at the intermediate frequency, while ignoring the fact that in real life there were at least a hundred other unmatched signals present at the output of the mixer. These were 'reflected back' into the device, producing a super soup of products (often by new reflection at the other unmatched ports).
(3) The third-order intercept point was only a theoretical value based on a two-tone measurement. Active devices, especially, exhibited very good intercept values but 'collapsed' at much lower levels than some passive devices. However, up to that point their performance was superb, particularly suitable for transmitter applications where only two signals occur at a time (low spurious). High-claimed intercept points encouraged dropping of rf-preselectors, thus allowing peak addition of wideband rf signals and saturation of dynamic range on receive. Any two signals with a frequency-difference equal to the i.f were invited to add to the garbage, especially where the mixer ports were not properly terminated.
(4) The non-linearity of crystal filters was generally severely underestimated, and still represents a limiting factor. Deterioration of performance starts well under 20dBm levels.

OH1ZZA's remarks underline a point made several times in *TT* that while strong-signal performance and a wide dynamic range have become recognised as the hallmarks of good vhf and hf receiver performance, the accepted methods of laboratory measurement usually fail to tell a truly realistic story, opening the way to a high degree of specmanship on the part of manufacturers and retailers. It is, for example, as OH1ZZA notes, conventional practice to make dynamic range measurements using two signal generators with frequencies spaced 20kHz apart or, with synthesisers, now often necessarily spaced 50 or 100kHz apart. This can result in impressive intercept points well above 0dBm and instantaneous dynamic ranges of 90 to over 100dB *on paper*. Yet such measurements are often far from representing the performance of the receiver when connected to a good antenna where, with the limited degree of pre-mixer selectivity found in most modern receivers, there may be dozens of strong signals crowding into the mixer, some much closer than 20, 50 or 100kHz away and having a cumulative effect.

Valve receiver performance

In his introduction to his hybrid "ultimate" front-end, Ray Howgego, G4DTC (*TT* December 1987) singled out the sixties Eddystone 940 as one of the "great" valve receivers. By coincidence, Tim Wright, G1BCR/G9BZW, had been preparing a full-length article on this receiver for

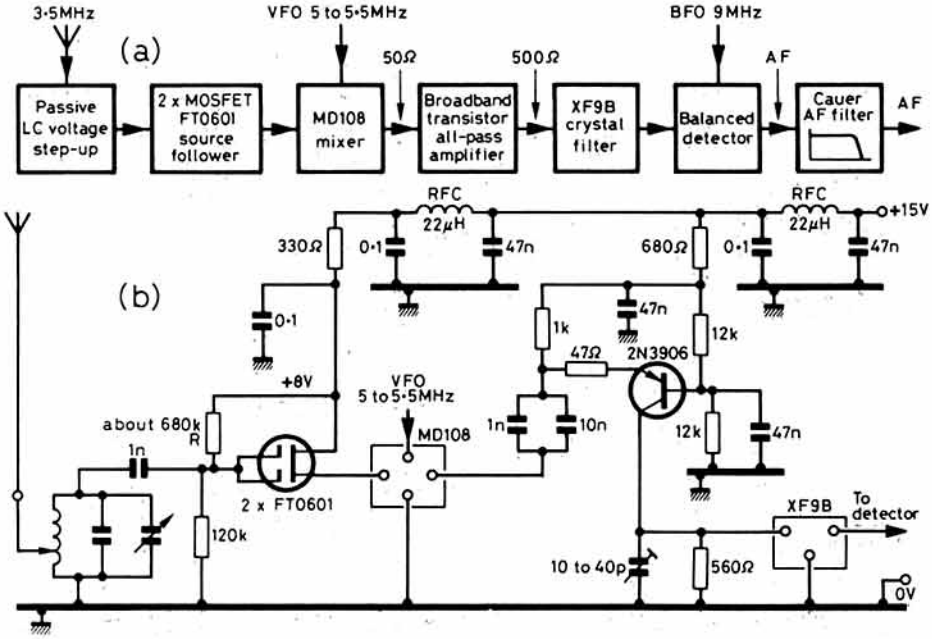


Fig 4. The high-performance 3·5MHz dx "super-dc-gainer" receiver front-end designed by OH1ZAA/PA0FIN in the mid-seventies

"The 3·5MHz dx front-end (Fig 4) was designed several years before its publication in 1977, based on the above viewpoints. Later versions had improvements, such as higher bias currents for improved dynamic range and higher level mixers. Note that emphasis is on near-perfect wide-band matching, passive amplification (using the input resonance), and streamlining for minimum component parasitics by matching circuit configuration to the given 'mainframe' (ie key components: mixer, filter).

"Today, in the 1988 situation, we can look back and realise that a couple of manufacturers have, to a considerable degree, applied correct design procedures for their latest front-ends. However, with the digital trend, frequency synthesisers have spoiled the opportunity for superior reception when they are used in conjunction with these improved front-ends. It is still hard to find equipment providing the ultimate quality in reception that modern technology could easily provide. Once this has been achieved, there is still the problem of having to cope with synthesiser-generated transmitted signals, but it will be an immeasurable pleasure to tune a clear signal, with the synthesised 'high-grass' at a respectable frequency separation. The most elegant solution is to use a variable crystal oscillator (vxo) to tune the dx-slot of an hf cw band. This would be quite easy on, for example, 3·5MHz, using a relatively high i.f (eg 21·4MHz) with the vxo covering 24·9 to 24·925MHz. With a 9MHz i.f, full 10kHz coverage can still be achieved by tuning 12·5 to 12·51MHz on the vxo. A good rule of thumb for a vxo is not to attempt to pull the crystal to provide more than a 0·01 per cent tuning range. At higher deviations the first practical problem is stability rather than phase noise."

Short Wave Magazine including detailed measurements and some modifications. Since such laboratory measurements (misleading or not) have been published only in recent years and usually only for solidstate receivers, it has been difficult to compare, except on-air, modern receivers with the old classics such as the AR88, 75A4 etc. It is thus interesting to see how the 940 measures up in a bench test.

For the record, and with acknowledgement to Dick Ganderton, editor of *Short Wave Magazine*, the following is a summary of G1BCR's findings:

Minimum detectable signal	−129dBm (0·9µV)
Minimum usable signal (12dB snr)	−117dBm
Noise figure	6 or 7DB
IMD instantaneous dynamic range	20kHz 79dB
	100kHz 98dB
	300kHz 117dB
Gain (1dB compression at 50kHz)	95dB
Selectivity	−6dB ±2kHz
	−60dB ±8kHz ±3kHz
Image	−70dB at 10MHz
	−40dB at 20MHz
	better than −110dB at 2MHz

The suggested modifications include: (1) Removal of i.f tertiary windings to improve i.f shape factor; (2) modify rf stage and local oscillator to reduce noise; (3) Modify agc (+ rf gain); (4) Fixed mixer bias to improve linearity and stability; (5) Stenode modification to improve af response when filter is in circuit. (Full details in the *SWM* article).

It seems worth emphasising the value of the pre-mixer selectivity as reflected in the increasing dynamic range of the receiver to signals off-frequency. Additional pre-mixer selectivity would improve image rejection on 14MHz and above, resulting from the low 450kHz i.f (single conversion).

High-power all-solidstate transmitters – progress report

Recently I spent a day at an IEE colloquium "Advances in solidstate technology for broadcast transmitters" that yielded a number of points of interest even to those of us who still prefer tetrode p.a valves in amateur radio transmitters. A series of papers described all-solidstate transmitters: for radio, up to 50kW (a.m) and about 5kW (vhf/fm); for television (vhf and uhf) up to about 30kW rating; bipolar and mosfet devices capable of rf outputs per device of about 100W and 200W; and detailed "cost of ownership" analyses by BBC and IBA engineers.

"Cost of ownership" analyses depend on such factors as initial capital cost and subsequent loss of the interest that would have been received if the money had simply been invested; depreciation of the assets over the estimated operational lifetime; energy-consumption costs (a major factor for high-power transmitters operating for up to 24h/day); maintenance and repair costs, including costs of mobile maintenance teams etc. The detailed "cost of ownership" analyses of both the BBC and IBA engineers showed clear advantages for all-solidstate television installations, compared with tetrode or klystron amplifiers, up to at least 5kW, and possibly even in the range 10 to 15kW, although with BBC and IBA tending to differ in this range, with the BBC urging caution.

A number of the points raised were relevant to amateur radio transmitters, although nothing I heard convinced me that it is time to throw out my 6146Bs or even my aged 813. Within the solidstate field we are still in a state of transition, with general agreement that mosfet devices are tending to replace bipolar devices for linear rf power amplification. At present this is possible only up to about 150MHz (eg Band 2 fm radio) although several speakers seemed convinced that uhf power mosfet devices at comparable power to bipolars will soon be available. Some engineers claim that mosfet devices should prove more reliable than bipolar; the fact that many of them are capable of operating from higher supply votages (50V to 80V) than bipolars (usually 28–32V) helps to ameliorate the problem of high currents. The device's lower sensitivity to supply voltage variation has reduced the need for complex power supply design for some applications; furthermore the major advantage of fet devices is higher gain at uhf. This is in the region of 10dB as opposed to the 6dB typically obtained at uhf from bipolars. As D Drury, of Varian TVT Ltd (formerly Pye TVT), pointed out, the higher gain enables a reduction to be made in the number of driver devices, reducing the total component count and effectively increasing the transmitter efficiency and reliability: "If output powers in excess of 100W are achieved with this level of gain, then solidstate tv transmitters with output powers in excess of 5kW become economically viable to manufacture".

A significant advance has been achieved in bipolar rf power devices by the use of gold metallisation of the internal connections which are subject to extremely high current densities, leading to metal migration and eventual fusing with conventional aluminium-based internal leads. SGS-Thomson Microelectronics, at its plant in the USA, has introduced a series of tv/radio linear gold-metallised high-power bipolar transistors with double and triple the output power of the highest power devices of a few years ago, stemming from development work on devices for solidstate L-band military radar transmitters. For example, a single SD1483 can provide 250W rf output at 100MHz in Class C (for fm radio transmitters) with a gain of 12dB, operating from a 28V rail. The SD1485 at 200MHz for television in Class AB with 32V rail, 11dB gain, two-tone imd −28dB, gives a peak sync rf output of 240W at 1dB compression. For uhf television (470 to 860MHz) the SD1492 in Class AB can give 150W output with a 7dB gain.

N Miki, of Toshiba, stressed that reliability and stability are the ultimate aims of solidstate technology, but achieving them depends on such factors as adequate protective circuits, including protection against lightning surges on the antenna and especially from the spikes and surges induced on mains supplies. Passive components such as resistors are preferably derated by some 50 per cent from their nominal rating at 85°C chassis temperature. Electrolytic capacitors still need to be recognised as having only a limited lifetime, with care needed if this is to exceed 10 years in a high-temperature environment. With many devices used in the modules and sub-modules of high-power transmitters, good dispersion control (ie ensuring equal current/power sharing between the devices) is required, and it is necessary to use combining systems of high efficiency.

For high-power solidstate transmitters, as with valves and klystrons, cooling is a major consideration. Large heatsinks by themselves are inadequate, and forced air cooling is often used in addition. NEC have developed a high-pressure jet air system from small nozzles directed at the transistors, dispensing with heatsinks. Air-cooling is much more attractive than the water or vapour cooling systems used in high-power broadcast transmitters using klystrons or large tetrodes; such cooling can introduce significant reliability problems.

Solidstate is also seen as attractive from the safety point of view, with an absence of high-voltage (hv) power supplies. Voltages up to 72V are classified internationally as "low-voltage" (lv) equipment. It is perhaps worth remembering that the safety regulations of the BBC and IBA do not permit work on hv transmitting equipment by an unaccompanied maintenance engineer, so that the mobile maintenance teams used to maintain the large networks of unattended transmitters must always consist of at least two engineers. I have commented before that it is just as well that amateurs are not obliged to abide by such rules, though it is most advisable that other people in the house know how to switch off all power and deal with any emergency. With valve equipment it is most advisable that all power can be removed by means of a single switch. One of the hazards of the present state of the hobby is that many amateurs have become used to dealing only with low-voltage equipment and forget the dangers of high-voltage valve amplifiers and their associated power supply units.

High-voltage safety

In respect of safety precautions when working on high-voltage equipment, Brian Clowes, GW4HBZ, writes as follows: "Valve amplifiers as used by radio amateurs would never be allowed for use by the BBC, IBA and other organisations on safety grounds. All hv supplies must be interlocked with any access to the interior and a solid earth applied. Even then, the engineers cannot work on such equipment without a second, qualified engineer present. I have a borrowed linear amplifier on the bench here, and there are not even any warning lables. There is no mechanism to discharge quickly the capacitors. With so many newcomers who have grown up on low-voltage solidstate I wonder what should be done about the situation. Should electrical standards similar to domestic equipment be applied?

"On a lighter vain regarding recent valve/semiconductor comparisons, we have at Moel y Parc (BBC North Wales) a klystron that has been used for more than 71,000 hours and is still going strong. It went into use about 1970 and, apart from short breaks, has been in use ever since in a 2kW sound amplifier (now reduced to about 800W in view of the changed vision/sound ratio in the UK). I believe one klystron has topped 100,000 hours (15 years' service at 18 hours a day). With a conversion efficiency of around 25 per cent and vapour phase cooling, it must have accounted for a lot of electricity and generated much steam!"

One of the points made at the IEE colloquium was that modern high-power uhf tetrodes (formerly having average lifetimes of only about 7,000 hours) are now topping 14,000 hours in operation. Thomson in France have been producing very high power tetrodes using a patented Pyrobloc grid that seems to result in appreciably more rugged valves.

Misconceptions in linear valve amplifiers

Whatever may be the situation in a few years' time, there are still large numbers of valve power amplifiers in use in transceivers, linear amplifiers, and the diminishing number of separate transmitters. As Peter Chadwick, G3RZP, puts it: "High-power solidstate linears are not for the beginner – they are more of a major project than an auto-tune valve linear." But, as he points out, there are still a number of misconceptions about the optimum operation of linear valve amplifiers; one reason, perhaps, is that there is still a natural tendency to think of transmitter amplifiers in the Class C mode (biased well beyond cut-off in the absence of drive), suitable for cw, fm and rtty, but not for ssb.

G3RZP lists some of the common myths and misconceptions:

(1) "You'll get longer valve life if you wind back the bias." Actually, you'll splatter more! As the standing current is a small percentage of the peak current, it will make little, if any, difference to valve life.

(2) "You don't need matched pairs." Some advertisers advertise matched pairs with good reason. I tried 14 6146Bs, all new, of different ages, manufacturers and batches. Under a fixed set of screen, bias and anode voltages, anode current varied from 9 to 36mA with an average of 21mA and standard deviation of 7mA. The best way of avoiding the need to select matched valves is to use a separate bias potentiometer for each one. Alternatively, and possibly even better, is adjustable screen grid volts and common adjustable bias as recommended by Collins for the 4CX250

family. Television sweep (line output) valves show even more variation than 6146Bs. Separate bias pots give good life even with sweep valves.

(3) "Thermal runaway means new pa valves." Yaesu rigs incorporating an "anti flash-over diode" in series with the screen grid are prone to thermal runaway. What exactly this diode does is a bit of a mystery, but reverse screen current leads to runaway. By zener-stabilising screen and bias, providing a low-impedance shunt bias return (*not* a series regulator), you can stop it. I had a set of 6146Bs four years old in my FT102, well hammered in a number of major contests. Standing current would rise from 75mA to 200mA in 2min of operating. But after fitting the screen stabiliser, shorting out the series diode, stabilising the bias, the current creep is only about 25mA after 5min of key down and 100W output on 28MHz.

(4) "Don't tune up as heavily as the book says – if it says 'load to 200mA' only load to 150mA." The result of such misguided advice is to increase screen grid dissipation and splatter!

G3RZP advises to stabilise *both* screen and bias voltages – or neither. This is because anode current is affected by both. Stabilisation of only one of these voltages leads to the quiescent point wandering with mains supply variations.

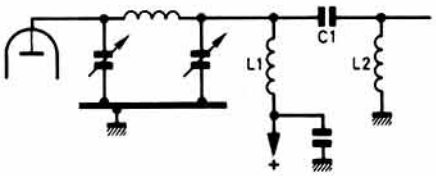


Fig 5. Possible means of avoiding the problem of choke resonances in amplifiers as suggested by G3RZP and based on the ssb textbook by Pappenfus

TT has, in the past, drawn attention to the problem of avoiding resonances on one or more bands of the rf chokes used in conjunction with pi-network output circuitry, a problem significantly intensified with the addition of the 10, 18 and 24MHz bands. G3RZP writes: "I notice several articles on linear amplifiers where problems occurred with rf choke resonance. This is likely to get worse when full power operation is possible on the WARC bands. I wonder if anyone has tried the scheme, outlined in the professional textbook on ssb by Pappenfus, of putting the rf choke at the output end of the pi-network as in Fig 5? By making L1, L2, C1 a highpass filter, L1 and L2 are only about 25µH. C1 is a well-rated capacitor of around 0·01µF capable of carrying several amperes of rf current. The variable capacitors have to be capable of withstanding more volts than in the conventional arrangement, but this could be taken care of by 0·01µF, 5kV series capacitors and two or three 10MΩ resistors in series across the variable capacitors. The highpass filter cut-off should be fairly low, say 500kHz."

VHF/UHF receiver noise figures

Joe Reisert, W1JR, in his regular "vhf/uhf world" column in the February 1988 issue of *Ham Radio*, includes an interesting section on factory-built receivers/transceivers. He writes: "Readers have asked about the noise figures of commercial rigs. The majority of transceivers I've measured were over two or three years' old and in the 6–8dB noise figure region; they often need an external preamplifier for serious dxing.

"Part of the reason for the higher noise figures is input switching, which often uses lossier solidstate switching instead of mechanical relays. Internal convenience switching and small diameter coaxial cable often add additional losses. Dynamic range is a consideration since (to achieve) low noise figures requires moderate-to-high gain ahead of the first stage of selectivity. Then there are those terrible uhf input connectors!

"A problem with many commercial transceivers is that, for economic reasons, they often employ a low first i.f such as 10·7MHz. Additional input filtering is required to effectively suppress images, and this often adds loss. The newer transceivers sport lower noise figures, typically 2–3dB.

"The subject of imd (intermodulation distortion) is seldom given enough attention. Receivers and the later stages must be protected from large signals, even those out of band. This is particularly troublesome where there are large rf emitters such as nearby fm or tv transmitters."

Later on transmitters he notes: "There still seems to be much interest in highpower transmitters. There aren't many to choose from and they are expensive. 8877s (linear amplifier valves) are now well over $500 and prices are rising. Older, more available tubes such as the 7213 and 4CX1000 are of interest, but straightforward designs are still scarce . . ."

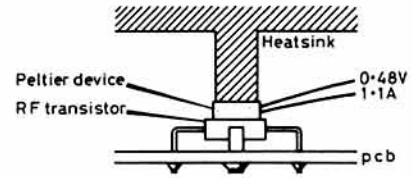


Fig 6. G1MFG's suggested use of a Peltier-device to cool the first stage of a low-noise vhf/uhf receiver. Note that direction of current flow is important. If reversed, it heats rather than cools the transistor. But make sure the device is suitable for use at low temperatures

In connection with vhf/uhf receiver noise figures, Giles Read, G1MFG, wonders if anyone has tried cooling their front-ends akin to the techniques used for many years in professional satellite terminals. Last year, G8VR quoted OH1ZAA as saying that Finnish winter temperatures down to −40°C made the noise figures of masthead preamps go "real low". G1MFG wonders if anyone in the amateur side of things has ever attempted to do this artificially? (Take care, many standard solidstate devices are not intended for low-temperature operation, although military types are often intended for operation down to −40°C – *G3VA*). He suggests using a Peltier-effect heat-pump directly attached to a preamp transistor, and notes that RS and Farnell both supply Peltier devices at reasonable prices (about £6). The RS device can maintain a temperature differential of around 60°C, which would suggest the transistor could be at, say, −30°C or so with ambient temperatures of around 10–20°C. Fig 6 shows his suggested arrangement, but G1MFG emphasises that he has not actually tried such a system. I know that some of the professional 12GHz satellite tvro terminals use Peltier devices to cool their front-end devices, though with modern low-noise semiconductors I suspect that the practical improvement would be limited at vhf, though possibly useful at uhf and shf. Has anybody tried it?

Minimising rfi from digital equipment

It is well recognised that the increasing amount of domestic and business digital equipment, particularly home computers, has become a major source of interference to weak-signal reception. By October 1983, the FCC was insisting that every computer manufacturer in the USA should comply with rules limiting the amount of permissible electromagnetic radiation from their products; but, almost five years later, in the UK we are still waiting for the introduction of enforceable regulations covering information technology equipment, although these are now promised before 1990 in response to the European Community EMC Directive which is expected to cover all electrical and electronic equipment, including information technology, telecommunications, radio, industrial and medical equipment.

Meanwhile many of the home computers sold in the UK would fail the FCC regulations. In this connection, I have been re-reading a 1983 article (*Electronics* 25 August, 1983, pp131-4) "Minimising emi at minimal cost in computing equipment", by Glen Dash (Dash, Straus & Goodhue Inc) which was aimed at showing that complying with FCC rules requires proper earthing, bypassing and shielding procedures but is not costly to the manufacturer if taken into account at the design stage.

The FCC regulations cover both radiated emissions between 30 to 1,000MHz and the signals fed back into the mains-supply lines between 0·45 and 30MHz. High-frequency current transients are produced when logic chips change state and form the basic source of radiated emission; the limited rise-time of ic devices concentrates most energy below 300MHz.

Mains-conducted emissions have two main sources. Above 10MHz the radiated emissions from the logic chips couple into the mains cables; lower-frequency noise tends to come from power rectifiers and switched-mode power supply units. To quote the *Electronics* article: "Rectifier noise comes from rectifier diodes that do not turn off quickly enough during zero crossings of the ac input. Switching supply noise shows up as harmonics of the switching frequencies. For large supplies, the amplitude can be quite high. By and large, computers that use switching supplies need line filters, most of which (for USA mains practice) comprise three capacitors and one two-winding inductor as in Fig 7.

"The line-to-line capacitor, typically 0·01 to 0·47µF value, cancels out differential noise by shorting the two main sides of the line at high frequencies. Bypassing each side, two other capacitors (together with the inductors) filter out common-mode signals. Leakage specs limit the size of these capacitors to between 0·001 and 0·01µF, so they are not large enough to filter out most common-mode noise signals, especially those from switching power supplies.

"The job calls for a series inductor, which generally ranges from 1 to

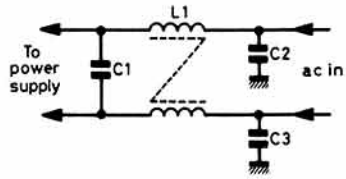


Fig 7. Typical mains filter to prevent noise from power rectifiers and switch-mode power supplies etc being injected into the ac power leads. An alternative form of filter is to wind the power cable around a suitable ferrite toroid

7mH. The bifilar-wound series inductor can operate only on common-mode signals, ignoring differential currents passing through the inductor and therefore avoiding saturation. So the inductor limits common-mode noise but avoids saturation by the 60Hz (USA) current."

The article stresses that it is more difficult to meet the FCC limits on radiated emission, and discusses such questions as radiation resulting from the clock driver's earthing pin which may excite the whole earthing system of the pcb so that common-mode noise appears on all points, including the I/O cables, whose earth return is often tied to logic earth so that any wire connected to this will tend to radiate. Capacitive bypassing, the shielding effect of metal or metallised cabinets and enclosures, as well as the finite rise time of the device, can combine to reduce radiation. Designers have, in effect, three main choices: "One is to lay out the pcb to cut the supply-line impedance, preferably to a value below 10Ω at 100MHz. Proper use of bypassing, multilayer boards, or bus-bars can help. If good layout does not achieve compliance (with the regulations), by shielding or filtering the 'antennas', the cabling attached to the pcb or back plate may have to be shielded, too. In some cases, even the pcb and the internal wiring may have to be shielded."

Proper layout, use of ferroceramic (ferrite) sleeves and filters etc, can all be put into effect by designers, though more difficult to introduce later into that confounded computer next door!

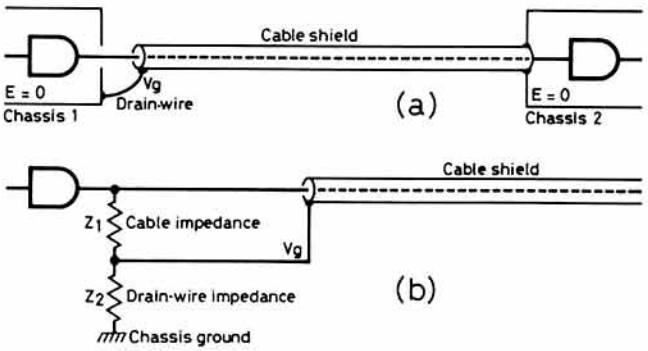


Fig 8. A screened cable can still radiate rfi when the cable-boot design is poor. The inductance of the drain wire can cause much of the rf noise to appear on the outside of the shield – a tip having wide application apart from its use in rfi problems. Equivalent circuit

Worrying flicker and over-investigated radiation hazards

In *TT* November 1987, p835, I was bold enough to advance as "my own theory for what it is worth" an opinion that the medical symptoms of stress, migraine headaches, nausea etc often ascribed to ionised or non-ionised radiation from visual display units, transmitters etc, were more likely to be caused by relatively high-frequency (25, 30, 50 or 60Hz) flicker in conjunction with the enhanced photo-sensitivity of the eye/brain system of a small but significant minority of the population. These views were based on dealing for over a decade with occasional complaints from viewers of tv-induced epileptic convulsions and migraine headaches.

It was thus interesting to read (*The Observer*, 10 January 1988) that Dr Arnold Wilkins of the Applied Psychology Unit, Cambridge, has found that even the imperceptible 100Hz flicker from fluorescent strip lighting (which does not have the thermal inertia of filament lamps) on 50Hz mains supplies appears to be a major cause of stress and illness among office workers. This has been observed and quantified by the Cambridge team with a detailed study due to be presented at a National Lighting Conference in Cambridge during March.

Dr Wilkins is quoted as follows: "Our results clearly show that normal fluorescent lighting has a detrimental effect on office workers' health. But not everyone is affected. Most of our cases were made up of a minority of people who suffered considerably . . . A new non-flicker type of fluorescent lighting mimics daylight more exactly, which is why it seems to produce less illness". Some scientists suggest that flicker may cause nerve impulses from parts of the visual pathways to oscillate at the same rate, causing abnormal responses in the brain.

Independently of *The Observer* report, Jeff Jeffrey, VK6AJ, writes: "For many years I suffered from the odd migraine and headaches at work. I put it down to the stress of split-second timing and public exposure as I was a radio announcer and television newsreader. Studio areas are isolated from the outside world with air-conditioning and artificial lighting. Some years ago the lighting was changed in the duty supervisor's office where I spent many hours of the working day. Fluorescent tubes were taken out and filament bulbs installed. From then on I had no more migraine attacks, although I was still affected if I stayed for long in supermarkets where there was no daylight but scores of fluorescent tubes. If there is also daylight present the effect is delayed longer . . . The last time I went to my optician for reading glasses, she said she had heard of the effect from other clients."

The conventional fluorescent tube "strikes" twice in every cycle of the ac mains, ie "undetectable" 100Hz flicker on 50Hz mains supplies. Dr Arnold Wilkins points out, in *The Observer* report, that a new type of "non-flicker" fluorescent tube powered by switched-mode units at up to 15kHz (30kHz strikes) mimic daylight more exactly "which is why it seems to produce less illness." Visual display tubes with longer persistence phosphors similarly have less flicker and seem beneficial for those who suffer from photo-sensitivity effects.

B Carter, GW8AAG, on the other hand, points out that an attractive proposition for the shack, workshop or where lights may be left on for hours, is the Philips "SL" high luminous output lamps. For example, the Philips SL9 consumes only 9W of electricity yet provides the light output of a conventional 40W bulb. He points out that for safety reasons it is most advisable to change the lampholder, since this is likely to have been weakened by the heat of the incandescent bulb which weighs only a couple of ounces, whereas SL lamps weigh almost a pound (425g) of miscellaneous glassware, starter gear and plastic cap. I have no idea of the extent of flicker with these lamps but, since they are basically fluorescent lamps, they could provide a source of problems for anyone with enhanced photosensitivity, though economical for the majority.

Two American university scientists – Kenneth Foster and William Pickard – have written a trenchant article (*Nature* 10 December 1987) highlighting the need to establish guidelines for *halting* some of the protracted and inconclusive research into possible biological effects of low-level non-ionised radiation (at the sort of levels that would be found in the vicinity of amateur radio transmitting antennas). They claim that after 40 years of investigating the possible hazards, the field is still littered with inconclusive, ambiguous and controversial reports, impossible to evaluate fully. Many of the reports remain unconfirmed and have not proved repeatable.

The problem, it would seem, is not, as often suggested, that too little is known about the biological effects of microwave, uhf, vhf or lower-frequency energy. Many of the thousands of papers are concerned with heating of tissue, which, when excessive, is clearly hazardous. Yet, fundamental questions are still being raised about the very existence of hazards associated with low levels of exposure, and significant public concern remains.

The American authors do not argue that low-level radiation is hazardous, or take issues with the 1982 ANSI standard (discussed in *TT* November 1986), but rather they underline the difficulties involved in demonstrating the safety of environmental agents of all sorts, adding: "Granted, society must search for hazards of its technologies. But how to cope with the scientific noise that these studies produce? Such searches for hazards can go on too long, and guidelines for ending them must be established." They note that there is now an enormous literature on biological effects, some at energy levels below the ANSI standard, some of which might be considered harmful: "Many of these reports are too brief to evaluate, while others have obvious technical flaws. Much of the controversy surrounding microwave energy has arisen from different interpretations of them".

The authors discuss in detail three effects which have been reported to occur under exposure conditions permissible under the ANSI standard: the microwave auditory effect first reported in 1947 by an observer who, when standing in a beam of a pulsed radar antenna, could hear "clicks" at the repetition rate of the microwave pulses. This has been confirmed but is not now considered a hazard, being due to acoustic transients arising from thermal expansion in tissues subject to rapid microwave heating. Heart-rate effects of which there are conflicting reports and of which they conclude: "There the matter stands. Which of the reported effects were

due to the experimental error and which of the negative follow-up studies were inadequate to have confirmed an earlier positive finding is still, in some quarters, a contentious issue."

Of blood-brain barrier effects they conclude: "Few investigators would now claim that the blood-brain barrier is greatly affected by microwave irradiation at levels anywhere near those allowed by past or present ANSI exposure standards. The effects illustrate how easy it is to collect evidence which neither demonstrates a hazard nor provides assurance that no hazard is present."

Crystal oscillators at uhf

For many years, piezo-electric quartz crystals based on mechanical lapping and polishing were restricted to fundamental modes below about 20MHz and overtone frequencies below about 150MHz. In 1986, STC announced a range of crystals operating in fundamental mode to 75MHz and in third-overtone mode to over 200MHz. Recently, in *Electronic Letters* 3 December 1987, G Gonzalez and B Avanic of Miami University described an oscillator design using a crystal with a fundamental frequency of 842·911MHz provided to them by Piezo Technology Inc. They note that "using chemical polishing methods for quartz has resulted in AT-cut crystal resonators with fundamental frequencies up to 1·6GHz . . . The manufacturing of these crystals is still in the infancy stage and production in large quantities is still years away. Yet the potential of this technology in the area of communications is immense. For example, these crystal oscillators can be used as reference oscillators in the microwave region and as voltage-controlled oscillators with excellent spectral characteristics".

Tips and topics

C J Chapman adds eleventh and twelfth commandments when using petrol-electric generators (*TT* November 1987): "When you *have* spilled fuel over the generator, allow it to dry thoroughly *before* starting it up! Petrol/oil mixtures take quite a while to dry thoroughly. The twelfth commandment is to check the output voltage *before* connecting your radio equipment. Governors have been known to go wrong."

On the question of operating 12V equipment from 24V vehicle supplies (*TT* November) he adds: "Use a zener and some power transistors, or an LM317HV adjustable ic regulator. They are designed for vehicle use with a maximum input of 57V and have 'safe area' operating characteristics. The data sheet gives circuits using bypass transistors for higher currents, and the device may also be used as a switching regulator. If you are using a couple of hundred pounds worth of radio, it doesn't make sense to risk blowing it to save a tenner.

B Carter, GW8AAG, notes that may circuit diagrams, including those in *TT*, often depict mains-connected apparatus having a double-pole single throw switch: "All good and proper – but the mains is shown connected to the moving contact. It is often proper and suitable to use a double-pole, double-throw switch if one is to hand. This means that if the circuit diagram is followed the mains is not 'switched off' but is switched to two exposed connection points. All circuit diagrams and wiring up should be on the principle of the moving contact being connected to the apparatus.

Harry Neff, W3JN (*QST* December 1987), draws attention to a useful source of those fast-vanishing air-dielectric variable capacitors – old, broken-down domestic radios, which also yield other still-useful components such as resistors, knobs etc. *QST*'s column editor, N1FB, adds "don't overlook old transmitters, surplus military gear etc at flea markets etc. Though the item may not be useable or worth repairing for its original purpose, the value of the components inside may far outweigh its apparent worth . . . but you may need some muscle to carry away heavy items."

Bob Baird, W7CSD in *QST* December 1987 writes: "Many cities and towns (in the USA) have an electric razor repair shop that replaces nicad batteries in rechargeable electric razors. The razors I've seen contain two nicad cells. Often, only one of these cells has failed, but both cells are replaced when repair time comes. I talked a razor repair person out of a box of such rejects and got 40 cells; 20 of these charged perfectly on the first try! Brief application of heavy overcharging current (safer to use a charged high-capacitance electrolytic capacitor – *G3VA*) to the rest of them netted another dozen useable cells. Free nicad cells? Check your friendly electric razor repair shop."

Gordon Crayford, VE6EI (*QST* December 1987), recalls an old tip when he writes: "You can find the resonant frequency of an inductor/capacitor combination (or an unknown crystal frequency – *G3VA*) if it falls within the tuning range of your receiver. Connect the components as a parallel tuned circuit in series with the antenna lead as shown in Fig 9.

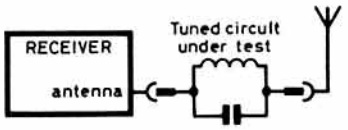


Fig 9. Simple method of determining the resonate frequency of a tuned circuit where a gdo is ineffective or not available. In effect the old-fashioned "wavetrap" of yesteryear

With the receiver tuned for minimum signal or noise response, the receiver frequency display shows the approximate resonant frequency of this tuned circuit. This technique can be used in situations where a dip meter is impractical, such as when the tuned circuit under test is inside a shield can or inaccessible because of its position. There is often no need to remove or otherwise isolate the tuned circuit from the associated circuitry."

Feedback

Last month's single 3·5/7MHz cw transmitter. Although *Radio ZF* gave the value of the cathode resistor connected to the keying jack as 220kΩ 1W (Fig 12, March *TT*) this must be an error for 220Ω 1W. □

A "PIGGYBACK" MICROPHONE PREAMP FOR THE ICOM IC25

(Continued from page 261)

not have been used, but the modification results in the centre conductor of the jack being at earth potential – rather an unusual arrangement for a microphone plug. The explanation for this enforced reversal from normal practice is that it is the centre conductor which operates the switching contacts in a jack socket. Since it was required to use the add-on preamp when the external ptt switch was plugged in, it was necessary to change the contact system in a conventional socket.

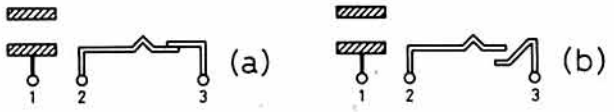


Fig 2. (a) Conventional n/c switched jack socket. (b) modified n/o switched jack socket

Fig 2 shows schematically how the usual normally-closed arrangement is converted into a normally-open system. To do this, the fixed contact has to be bent carefully, to the other side of the moving sprung conductor. Inserting a jack plug will show whether the positioning is correct, as the contact should be made with the plug in place. With the modification made, Contact 3 (in Fig 2) is connected to the preamp earth line, with Contacts 1 and 2 connected in parallel with the internal ptt switch. It is Contact 2 which must go to the earthy side of the switch, the side which generally seems to carry a black wire (the other is blue), running to a point just below the internal mic.

Final comments

Circuit layout is clearly non-critical. The most important factor to bear in mind is size, since the space available inside the body of the fist mic is very limited. Obviously the smallest available components should be used, and it may still be necessary to cut away a little of the inside of the plastic moulding of the mic case. Naturally, it is essential to make connections with the intended points in the original circuitry. If in doubt, it is wise to check the earth and power lines, with the fist mic plugged in and the rig turned on. This precaution even applies to the earthed points, since, for example, the earthy side of the ptt switch does not show as being connected to the earth braid of the microphone cable, unless the rig is attached.

Three of the systems described have now been built, and performance is entirely satisfactory. Since many of the Icom mobile range employ dynamic microphones, with built-in preamps, this piggyback design is likely to be a useful solution to the hands-free problem for many operators.

Reference

[1] "A neck boom microphone for mobile use", D Maciver, G1SJU. *Rad Com* December 1986, pp 845-847. □

NEWS BULLETIN

50 MHz LA-VK OPENING

– *how did it happen?*

At about 0900 GMT on 21 February 1988 LA6QBA and LA4LN both heard the Perth beacon VK6RTV on 52.300 MHz. Signals were apparently quite strong and lasted for a considerable time. Before this Frans, LA6QBA, had heard the Cyprus beacon 5B4CI for about an hour. To our knowledge this is the first time that anyone's reported an opening like this, and we asked propagation wizard Charlie Newton, G2FKZ, for his thoughts about it and whether it could possibly have been connected with the aurora which took place the following day. Here's what he said;

"I can offer a guess as to why such an opening occurs although I cannot prove it at the moment because the data we require, the Dst ring current, is not published for about 4 or 5 months.....

"It is a fact of life that, prior to "big" auroras (not coronal hole types), the Dst equatorial ring current goes positive. IT ALWAYS GOES NEGATIVE DURING THE ACTUAL STORM. Now when it goes positive the ionosphere is squeezed, so we get a sharper F2 refraction edge and it becomes a narrower and more concentrated layer.

"The time was correct for an opening to Perth anyway and the normal predictions show this for 28 MHz, so we only needed a bit more F2 ionisation to get the 50 MHz signals through. The most ionospheric concentration would be around the Magnetic Equator where the ring current would be the greatest. The path from LA to VK6 crosses the magnetic equator near Colombo/Southern India where the time was 15.00 hours and we would expect quite high F2 levels anyway at that time. So if we can squeeze the ionosphere a bit, and the effects are not local but would spread well either side of Colombo, we could well have had a dense ionised patch at a critical part of the path. If the 50 MHz signal from Perth could have got into that patch then it could have been deflected to virtually a grazing angle incidence at the F2 layer, which was at or very nearly at its best for the time along the path. So it could under these conditions carry the signal. At our end the Appleton F2 critical frequencies were:

08.00 - 5.1 MHz
09.00 - 6.3 MHz
10.00 - 7.8 MHz the highest level of the day.

At South Uist:

08.00 - 3.9 MHz
09.00 - 5.7 MHz
10.00 - 7.3 MHz the highest level of the day.

"Of course LA6QBA would have been looking at the ionosphere well to the south-east of him, so levels would be much higher than these.

"So we had an ionosphere that was very rapidly climbing to high F2 levels at the time in question; this together with the fact that the path from LA was rapidly going into areas of much higher ionospheric intensity ie. higher F2 critical frequencies. Then running into the denser Dst patch, to my mind it's all possible. To add to the

(cont p.270 col.1)

COVER STORY:

NATIONAL FIELD DAY:

"The most popular outdoor event in the RSGB Calendar is National Field Day. It has been ever since it started, in spite of protests about rules, attempts to outwit the organising committee and suggestions from time to time that it had outlived its original motive. The first NFD took place during the first weekend in June 1933 and except for the war years it has continued as an annual event ever since....."

"The original purpose of NFD was to demonstrate that low power portable stations set up at short notice out of doors were capable of maintaining reliable communications with other low power portable stations in different parts of the British Isles. The results showed 'that if the necessity arose the amateur radio movement in the UK could place into operation an emergency network of stations ar short notice'. The report on the first NFD suggested that 'such a necessity is hardly likely to arise in this country but it is reassuring to know our capabilities in this direction'. Six years later, at the start of World War II, many radio amateurs, who were the first of many thousands of RAF reservists to go abroad, were grateful for the experience they

(cont p.270 col.1)

(cont from p.269 col.2)

story, between 09.05 and 10.00 hours on the 21st I understand that G3JVL heard on 28 MHz, beacons in Z21ANB, ZS5VHF, ZS6PY, VK6RG, 5B4CY, and numerous UA4,6 UM8, stations and the very rarely heard beacon 5Z4ERR. Also, top band was wide open to the States from about 01.00 hours (am) until about 10.00 hours before the aurora on the 22nd. I am not sure of the time but the Greenland beacon OX3VHF was heard by GW3LDH after the main aurora was over, and by Scottish stations when the aurora was on. That is the real interesting one - how does it happen?

"In terms of the aurora it was a classic example of auroral H.F. band enhancement, it is just that this time it went to 50 MHz, and a bit further than usual"

So now we know - it'll be interesting to see what happens the day before the next major aurora. Charlie adds that sometimes 50 MHz may well be open even though 28 MHz isn't, and he reminded us that there are many instances on record of coast-to-coast contacts taking place on 50 MHz in the USA prior to an auroral opening.

Incidentally, as far as we could find out prior to press time, LA6QBA was the only station yet to work a PA0 on 50 MHz when the Dutch got access to the band as of 1 March. Despite lots of asking, we hadn't found a single solutary G station who'd worked a Dutchman on "Six" - and, come to that, has anyone worked into F-land on 50 MHz yet? We've had not a single report of anyone working La Belle France on this band, and we're wondering whether it's all a great big hoax....

(cont from p.269 col.3)
had gained from NFD operation". ("World at Their Fingertips" - John Clarricoats, G6CL, pp 158-159).

The bunch of reprobates on this month's front cover are taking part in the 1949 Field Day. Apart from that, we know absolutely nothing about them! If anyone knows who, when, where and possibly why, please let us know. The funny thing is that, although it clearly says "Field Day 1949" on the back of the original pic, there isn't a wireless or an antenna in sight - only clue to there being the slightest whiff of amateur radio about the event is the nice headphones worn by the gentleman on the extreme left.

MORSE TESTS

The following list shows the dates and locations of all the available test centres from early May to mid-June, as we went to press. Because of space limitations, we cannot print a complete list of all the test centres notified to us, but these can be found on the application form itself.

Morse tests will be carried out in groups of three and will be of half an hour's duration. Details of the test, the venue and how to get there will be sent to you as soon as your application has been processed and your place confirmed.

COUNTY	TOWN OR LOCATION	DATE
Grampian	Aberdeen	04/05/88
Dyfed	Carmarthen	05/05/88
Greater London	Eltham, London SE9	06/05/88
Greater London	Wanstead, London E11	06/05/88
Lothian	Edinburgh	07/05/88
Mid Glamorgan	Rhydyfelin, Pontypridd	08/05/88
Central	Stirling	10/05/88
South Yorkshire	Sheffield	12/05/88
Norfolk	Norwich	14/05/88
Surrey	Guildford	14/05/88
Tayside	Kirriemuir, Angus	14/05/88
Isle of Wight	Binstead, Ryde	14/05/88
Lincolnshire	Grantham	14/05/88
Lancashire	Fleetwood	14/05/88
Greater London	Wood Lane, London W12	14/05/88
West Sussex	Horsham	15/05/88
Strathclyde	Glasgow	16/05/88
Merseyside	Liverpool 15	17/05/88
Berkshire	Reading	18/05/88
Bedfordshire	Luton	19/05/88
Jersey	St.Clement	19/05/88
Powys	Montgomery	20/05/88
Dorset	Dorchester	21/05/88
Co.Antrim	Ballymena	21/05/88
North Yorkshire	York	21/05/88
Buckinghamshire	Bletchley, Milton Keynes	22/05/88
Gloucestershire	Gloucester	22/05/88
Shropshire	Telford	24/05/88
Hertfordshire	Watford	27/05/88
Cambridgeshire	Haslingfield, Cambridge	27/05/88
Kent	Tunbridge Wells	28/05/88
West Midlands	Coventry	28/05/88
Greater London	Croydon	30/05/88
Guernsey	Guernsey ARS, St.Martins	02/06/88
Wiltshire	Swindon	04/06/88
Dumfries & Galloway	Stranraer	04/06/88
Staffordshire	Stafford	05/06/88
Somerset	Yeovil	05/06/88
Derbyshire	Derby & DARS	06/06/88
Gwent	Newport	06/06/88
Cleveland	Billingham	08/06/88
Co.Tyrone	Dungannon	09/06/88
Northamptonshire	Tiffield, Northampton	09/06/88
Suffolk	Ipswich	09/06/88
Hampshire	Winchester	11/06/88
East Sussex	Hailsham	11/06/88
Strathclyde	Mid-Lanark ARS Rally	12/06/88
Greater Manchester	Cliofton, Manchester	13/06/88
Cornwall	Liskeard	14/06/88

We receive notification of new centres almost daily and the application form gives a full list of those currently taking advance bookings for Morse tests.

"REVISION" OF W.T. LICENCE FEES:

With effect from 1 March 1988, fees for 25 of the current 47 standard types of wireless telegraphy licence have been "revised" (PR-speak for "increased"), although we're happy to be able to tell you that those for Class A and B amateur radio licenses haven't gone up and remain at £12. Fees for beacon and repeater licenses, which the RSGB pays for, are also unchanged. Interestingly, the DTI says that "Fees are set generally to recover the direct costs of licensing plus a proportion of the other costs involved in managing the radio spectrum. The fees now set are expected to produce an overall increase in income of approximately 14% (in value terms and in a full year) on the product of the previous levels set about 20 months ago. However, for several individual licence types whose fees are now changing, the increases are higher than the average, reflecting changes in requirements and the deployment of resources.

DISCONES - AGAIN:

Back in the January 1988 edition of the Bulletin we did a feeling-sorry-for-ourselves piece about blowing up a 430 MHz PA by transmitting into a discone. Several kind souls wrote in to point out why this was a Bad Idea, and we've now got the message that there's a good deal more to discones than meets the eye. Mr T J Wright mentioned some sources of proper discones and said that adding a 3 dB pad to flatten the response would be a good move for transmitting. Oh, and apparently the Hokushin GDX-2 is "....flat as makes no matter between 70 and 430 MHz" (G3JKV).

However, here's part of a letter from Mr P Swallow, G8EZE, which more or less says it all:

> "There is no fundamental reason why a broadband antenna should be inherently matched to 50 ohms over any part of its useful radiating or radiation pattern bandwidth. Many broadband radiating structures have input impedances between 100 and 400 ohms, and their VSWR bandwidth is often limited by the performance of the matching network required to transform the terminal impedance to a value more suited to the user's needs.
>
> "However, the discone antenna does not fall into this category, as the input impedance of the structure can be designed to be close to 50 ohms over several octaves, by choosing appropriate cone angles and disc diameters, and also by careful design of the feedpoint. Many of the units sold to amateurs suffer from too few radials to make up an effective cone, in which case the input impedance can vary greatly with small changes of frequency because of interaction between the standing waves on the cone radials. This does not occur if a sheet-metal cone is used, but wind loading considerations usually preclude this type of construction for antennas working down to, and below, 144 MHz. The low-frequency VSWR cutoff of a skeleton discone can often be extended by 10% or so by joining the tips of the cone radials together with a ring, or even wire. Joining the tips of the disc radials, or using a continuous sheet for the disc, has a similar but smaller effect.
>
> "The design of the feedpoint, and the transition from coaxial cable to the disc, affects the input impedance of the antenna at high frequencies, and usually defines the HF cutoff. In many designs a solid dielectric insulator encapsulates the feed and secures the disc to the cone. Much higher cutoff frequencies can be obtained by using a thin-walled insulating cylinder at some radial distance from the feed point - or a few insulating struts between disc and cone. This reduces excess capacitance at the feed whilst providing a mechanically stronger structure than the smaller diameter solid dielectric support often used.
>
> "The included angle of the cone affects the radiation pattern in the elevation plane. Too small an angle leads to downward tilting patterns, and too large an angle causes pattern breakup and low gain towards the horizon at higher frequencies. This deceptively simple antenna does require careful consideration in design!"

Amen to that, and Mr Swallow draws our attention to two published items - "Designing discone antennas" by J J Nail, published in Electronics (USA) August 1953, pp 167-169 and "The design of an omnidirectional aerial system for the frequency range 225-400 Mc/s" by F A Kitchen, Proc IEEE, Volume 98 Part iii, November 1951 pp 409-415. Incidentally, our friends in the Royal Air Force tell us that the elegant-looking antennas we've been mistaking for discones all these years aren't at all - they're "biconical monopoles", which apparently are meant to work over a frequency range of only about 2 to 1 at UHF.

50 MHz BEACON - TNX YAESU & SMC:

A new 50 MHz beacon in Iceland, signing TF3VHF and running 50W ERP on 50.057 MHz from HP94CC square, is expected to come on the air in April. The beacon itself was built by Mike Walters, G3JVL, and has been donated by South Midlands Communications; the power supply is a Yaesu unit donated by Hljodtaekni Radio Supply. Richard Diamond, G4CVI, and Jonas Bjarnson, TF3JB, of their respective emporia worked together to obtain the licence and to get the beacon on the air.

DUTCH ON 50 MHz - LATE NEWS:

The well-known 50 MHz operator, Paul Turner, G4IJE, may well be the first G station to have worked PA0 on 50 MHz. Paul worked PA0RDY on 50.150 MHz CW at 1928 hours Greenwich Mean Time last Tuesday, the 1st of March. PA0RDY was running just 4 watts to a 3 element yagi and although his signals were weak, they held up just long enough to complete the contact.

The following morning, PA0RDY worked LA6QBA on CW meteor scatter, using the same 4 watts and 3 element beam.

Paul informed us that according to sources in the Netherlands, around eighty-five 50 MHz permits have already been applied for.

LATE LATE FLASH.....

We can see it now - letters to all the amateur radio magazines, everyone moaning and complaining on the air, questions in Parliament, etc, etc.

Yes, we know we said we'd have the AGM report in this month. Yes, we know we said "without fail". You won't believe it, but a production problem at the very last minute meant that we had to leave it out this month - we did our level best but it was a toss-up between delaying the entire magazine by a week or more to get the report in or going to press without it. Well, what would you have done? It's what they call "being over a barrel".

Unless the sky falls in, Headquarters goes up in flames, the staff jointly win £10,000,000 and QSY to the Bahamas or some such astonishing and highly unlikely event occurs, it'll be in next month.

ANY OTHER PHENOMENA

– a special propagation feature

Regular listeners to the GB2RS broadcasts will know that we have a weekly item on what's happening on the sun and in the ionosphere to affect HF propagation. Recently we've had a few reports of phenomena which can't be classified - so we thought we'd ask Charlie Newton, G2FKZ, who produces this feature for us, to tell us what's going on. Here's his outline of what's new "up there".

"Each week in the GB2RS news broadcast we give details of the ionosphere in terms of the F2 critical frequency. This is the highest frequency which the ionosphere will reflect when a signal is sent up vertically. Until relatively recently the plot from the analogue-type ionosonde was recorded by cathode-ray tube on to film and the operator had to interpret the readings. The most important feature was the precise frequency at which the signal passed through the ionosphere, which was seen as an "up-turn" on the trace. Fig 1 shows an ideal ionogram. In practice there is usually a double trace due to the phenomenon of "magneto-ionic splitting", and the result is usually referred to as the "ordinary" and "extraordinary" ray. The overall effect of all these things was that at times it was difficult to say at precisely what the critical frequency was because the turn-up point was ill-defined. Interpreting the plot depended on the operators' skill and experience.

"Actually, there are many reasons why the turn-up point can be ill-defined, and not all are necessarily to do with the ionosphere. There may be attenuation of the signal causing poor echo returns, or simple interference from a nearby or distant station, or getting a proper reading may be beyond the equipment's capability when the ionosphere is in bad shape due to severe spread echoes etc.

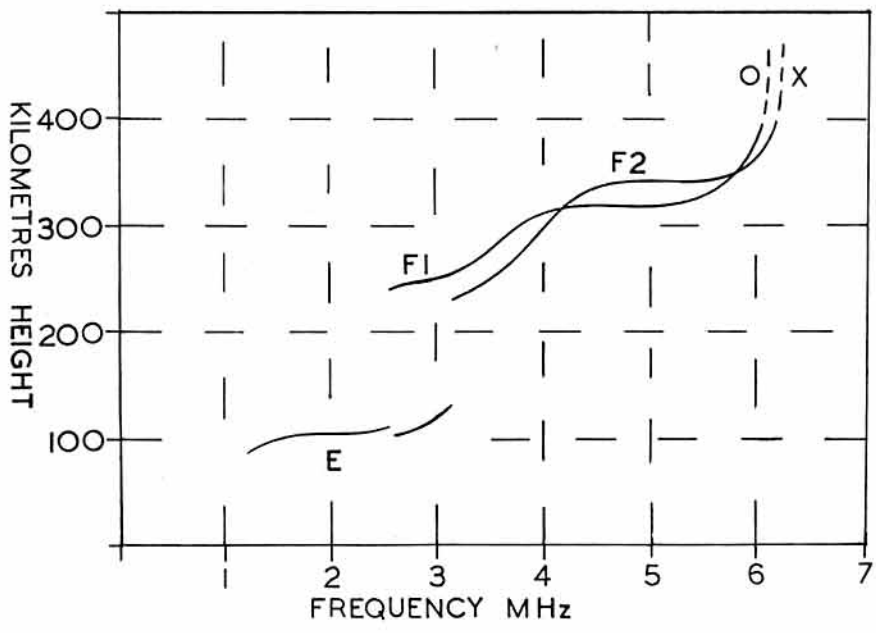
"The modern ionosonde is not an analogue or continuously varying frequency recorder - it works digitally in very fine steps. This, of course, lends itself to computer recording, with all the usual advantages. Also, the receiver side of the modern ionosonde is very much superior to those of earlier vintage, so weaker or less well defined echo signals can be handled. With this and computerisation, modern ionosondes can produce a cleaner and better-defined trace; however, this has led to a problem insofar as we now get what are reeferred to as "other phenomena".

"Ionospheric interpretation is classified by ten parameters. These are;

1) Blanketing E.
2) Complete absorption.
3) Equipment trouble.
4) Frequency higher than equipment limit.
5) Frequency lower than equipment limit.
6) Spread echoes.
7) FoF2 = FoF1 reported.
8) Smoothed or interpolated value.
9) Measurement influenced by, or impossible because of, attenuation in the vicinity of the critical frequency.
0) Any other phenomena.

"Since the new ionosondes have come into use we are seeing many more "0"s being reported, meaning that the cause cannot be clearly classified as one of the other nine parameters. This may be because of odd ionospheric effects, or it could simply be interference, but the computer has picked it up so it is recorded. The most interesting aspect of all this is whether we are seeing a real effect, possibly one due to the present poor state of the ionosphere. Alternatively, is it simply interference that in time we will learn to ignore? At present we do not know, so it is being reported and watched with interest. In time with more experience the computer may be able to tell us more, but for now it's 'Other Phenomena'. One clue we do have, is that it tends to be about when spread echoes are prevalent".

Sounds very intriguing - no doubt there'll be more on this later. Anyone working amateur life forms elsewhere in the Galaxy, be sure to let us know about it.....



This shows an ideal ionogram with the E, F1, and F2 layers marked, the dotted line is where most difficulty occurs in precisely determing what the frequency is.

Helplines

Remember a few months ago when we asked for volunteers to help the Royal Free Hospital in Hampstead, north London? Well, we had a call from Alan Charles, G4ORE, at the hospital to say that he had about half-a-dozen replies and has now appointed two or three helpers. He asked us to say a big "Thank You" to our readers on behalf of the Royal Free Hospital.

WHERE WERE YOU ON 30 JUNE 1987 - 2:

You remember we recently published a request on behalf of TV weatherman Jim Bacon, G3YLA, for information on any 144 MHz sporadic E contacts which you might have had on this date? Jim asks us on his behalf to thank all those who sent data to him and he's wondering now whether anyone had a contact via sporadic E on ANY frequency on that day. If you worked anyone on 30 June 1987 via what you think might have been Es, please let Jim know - his address is:

Mr J D Bacon, G3YLA
East Tuddenham
Dereham
Norfolk NR20 3AH

REFRESHING THE MEMORY:

Ray Williams, RS6072, and his wife worked on equipment for the Combined Services during the war years. They have been trying for some time to track down a book entitled "Instruments of Darkness" by Alfred Price, published by William Kimber, ISBN 0.586.048340. They've tried advertising and book search facilities through libraries with no success. Can anyone help Ray and his wife refresh their memories by lending them a copy? If so, please contact Ray at:-

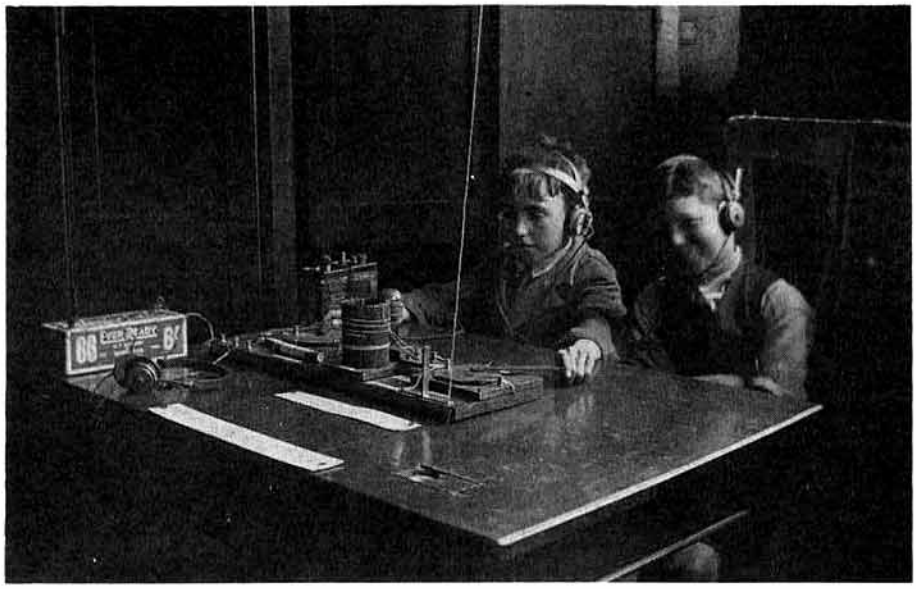
62 Kingscliffe Road
Grantham
Lincs. NG31 8ET
tel: 0476 66047

VHF CONTESTS COMMITTEE - VACANCY:

The VHF Contests Committee is charged with the organisation of RSGB contests in all bands above 30 MHz, and recommends the award of a number of RSGB trophies and certificates. A vacancy has arisen on the committee for someone with a keen interest in VHF/UHF contests who has time available to attend committee meetings and adjudicate about three contests per year. The committee meets on one Wednesday a month from 6.30pm to 9.30pm in London WC1 to discuss policy, set rules and ratify results. The bulk of adjudication is done at home and may take from four to forty hours per event, depending on the size of the entry. Access to a home computer would be useful for checking purposes.

If you are interested in this opportunity of making a contribution to the work of the Society, please write to:-

The Chairman, VHFCC
12 Chestnut Close
Rushmere St Andrew
Ipswich IP5 7ED



Young Amateurs of the Year? As you'll all know by now, the Society's Y.E.A.R. '88 Project will be launched in July with the aim of introducing the youth into electronics via amateur radio. We came across the photo above whilst searching through the RSGB library and wondered if the two youngsters pictured had ever taken up an interest in amateur radio or electronics. The photograph was taken at the Blackfriars LCC Senior Boy's School (London SE1) Exhibition in 1932 and shows the two youngsters listening on a 21m receiver. Does anyone know who they were and whether they did become amateur radio operators?

COMPUTER NOISE:

Mr Scadden, G3TFM, is having problems with computer noise in his packet station. He wonders if anyone has cured a similar problem and can give him some advice.

The station consists of a TS430S transceiver, PK232 TNC and an Amstrad PC1640 HD20. On the HF bands, especially 80m and 20m, the system is unusable except for strong signals. The RS232 in/out port of the PK232 appears to be emitting a couple of 'S' points of whistles whilst the PC1640 pushes the 'S' meter up to S8-9 with general noise. He is using the an RS232/FAX lead supplied by ICS.

Both mains and DC filters (the PK232 is run from the 'aux' output of the PS430) have been tried together with screening the RS232 plugs and aerial lead, all without success. Can anyone help? If so, please contact G3TFM on 0458-73967 (home) or 0458-72622 ext 251 (work). If you'ld like to write, Mr Scadden is QTHR in the latest callbook.

INFORMATION PLEASE:

De Moor Marc from Belgium has written asking for any information on miniature receivers built by prisoners of war, miniature receivers made in occupied countries during the war and electronic components made in the early days of radio. He's not a collector of historical documents so photocopies of any relevent information will be welcome and postage, etc, will be paid. If you can help out, please write to:-

De Moor Marc
Vredestraat 13
B-9720 De Pinte
Belgium

(cont over)

DO YOU HAVE THE GIFT OF THE GAB?:

ASBAH, the Association for Spina Bifida and Hydrocephalus, has organised the 'Conversationalist of the Year' competition in conjuction with LBC Radio and Dewhurst Your Master Butcher, to root out true conversationalists from mere wafflers. The competition will take place over the weekend of 23/24 April at Glaziers Hall, London Bridge, London SE1 to raise money for ASBAH.

On the first day, pairs known for their ability to talk the hind leg off a donkey will strive to out-talk each other in a war of wit and words. They will have to converse intelligibly and wittily for 8 hours (with breaks) on given topics. Money will be raised in support of ASBAH by means of sponsorship and each contestant is asked to raise £100. The quarter finals and finals will take place on the following day with the finals being broadcast live on LBC Radio. The overall winner will be awarded the coveted title of 'Conversationalist of the Year' and there will be an attractive selection of prizes.

Seems tailor-made for your average radio amateur doesn't it? (we certainly know a few we could suggest - Ed). If you'd like to put your money where your mouth is, please contact:-

Stuart Morrison
ASBAH
22 Upper Woburn Place
London WC1H 0EO

WHAT'S THE FORMULA?:

John Allen is having problems with the maths and formulae for constructing a 144 MHz ZL8 or ZL12. He's seen two versions from the same designer differ in size considerably, even though a 1% tolerance on sizes is advocated. He's also looking to homebrew a stainless steel 144 MHz 5/8 over 5/8 colinear using a J match stub and would like dimensions for this too. He also asks "Is the correction factor 95% for stainless steel?". John can be contacted by writing to him at:-

479 Wordsworth Avenue
Sheffield S5 9JE

RAFARS OVERSEAS:

Over the past few years in the amateur radio press there has been a number of requests for details of the current locations of overseas stations, presumably in the quest for QSL cards.

On behalf of RAFARS, G3VAO has been compiling a list of callsigns held by RAFARS members. The list contains details of over 190 calls in 59 different countries and the RAFARS committee has agreed to make the list available to other amateurs to help them with direct QSLing as some of the calls are quite rare. If you'd like a copy of the list, please write, enclosing a stamped addressed envelope to:-

Sqn Ldr M J Farmer, G3VAO
15a Butlers Drive
Carterton
Oxon OX8 3QX

EXETER ARS HISTORY:

G3TDW has written asking for help in tracing the history of the Exeter ARS, formerly the Exeter & District Wireless Society. He has recently come across an old letter head which he belives dates from pre-1939 but only one name and callsign is familiar to him, that of the late H.A.Bartlett, G5QA, who later became a President of RSGB. The other names are as follows:-

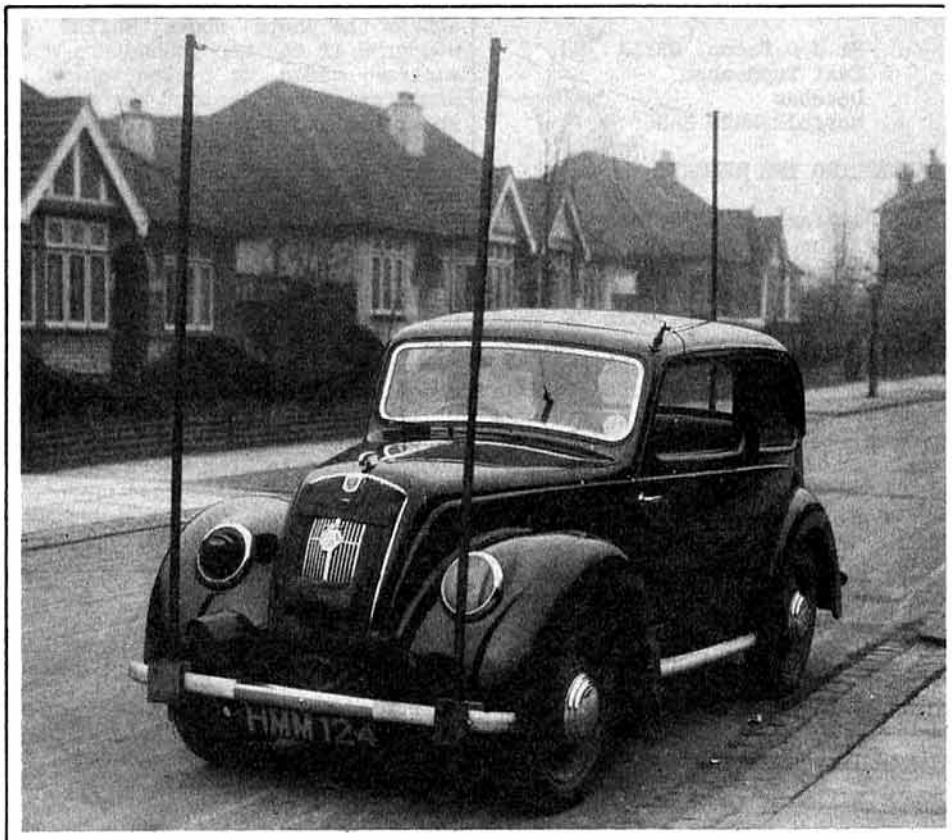
D.R Barber, BSc. FRAS
J.W Fearnsides
Rev A.B Trewin, G2AT
F.S Rumble
G.J Poulter
F.D Newcombe
A.H Pratt
F.W Saunders, G3MU
W.J Ching
S. Hack
E.H Ware
F.J Thorn
L.A Underhill

If any of those names ring a bell with you or you have any information about the history of the Exeter club, please contact:-

Mr W.G Western, G3TDW
Chairman Exeter ARS
"Sandye Place"
181 Topsham Road
Exeter EX2 4SQ
tel: 0392-70936

BEARCAT WITH SORE HEAD:

GOCRB has a Bearcat 300 scanner which is in need of slight attention. He's tried quite a few people and places but has not been able to get it repaired. Does anyone have any cct. diagrams or knowledge of the scanner and can give GOCRB some help?. If so, make his day and give him a bell on 0926 497497 - or he's QTHR.



GREAT INVENTIONS OF OUR TIME: Number 17 - the mobile wireless station.

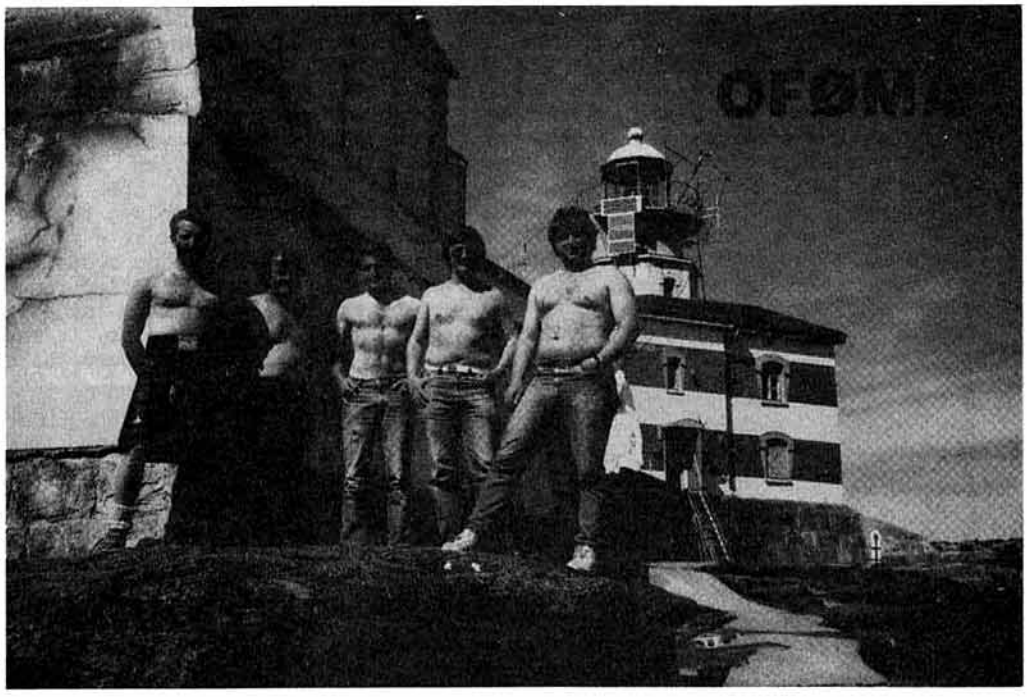
Whilst searching through the archives in the RSGB's library, we came across this photograph of a typical (?) pre-war mobile station. We understand that the vehicle belonged to 'Eddy' Edwards, G8TL who was the Chairman of the Mobile Committee. Does anyone have any more information on this or other similar installations? (Eat your hearts out, VHF and UHF mobile ops and G3TSO...)

The 1987 DX-pedition to Market Reef OF0MA

by Steve Telenius-Lowe G4JVG

Steve is one of those dedicated HF DX men whose idea of a good holiday would probably be a month in some remote corner of the world operating 20 hours a day whilst being eaten alive by bugs unknown to science. He's radiated HF from all sorts of unlikely places and is threatening to go to Cocos-Keeling later this year: this is his account of a DXpedition from a little closer to home.

Have you ever heard of Market Reef? It's about 310 by 85 metres in size and lies off the coast of Scandinavia; HF DXers will know all about it, but for VHF men the locator is JP90NH. It used to be permanently manned by teams of lighthouse keepers, but in 1975 the light was made fully automatic and the island has been uninhabited since then apart from occasional visiting yachtsmen and intrepid DXpeditions. From the DXCC point of view it's a rare "country". In 1983 I was fortunate enough to go on one of the more-or-less annual DXpedition to Market Reef (or Markets Fyr in Swedish) and operated as OJ0MA and also under my own callsign as G4JVG/OH0/OJ0.



Finding myself in the middle of Scandinavia again in 1986-7 I began enquiring as to the possibility of revisiting it; the obvious thing to do was to contact Kee, OH0NA to put the idea to him. The reason is that he was one of the former lighthouse keepers on Market Reef and therefore one of the very few people who could obtain the necessary permission to use the buildings there. He was also the holder of the OJ0MA callsign which we used in 1983.

As far as I'm aware I was the only Briton ever to have landed on Market Reef - and certainly the only British radio amateur to have operated from there - so I thought it would be a good idea to try and assemble a British team to put Market Reef on the air in 1987. Kee was keen to encourage operators from other DXCC countries to participate, and in the past there had been plenty of Finns and Americans and a few Swedes, Germans and others but no other Britons. Having thought about this I contacted Drew, GM3YOR, with whom I had been on a contest expedition to Montserrat and who I knew to be an excellent operator - especially on CW. Drew acepted immediately but this left two vacancies for other operators; after some thought about how to stem the tide of would-be Market Reef operators I decided to put an advertisment in the DX News Sheet along the lines of "Wanted - DXpedition operators" and sat back expected to be trampled to death in the rush. In the event I was underwhelmed with replies insofar as there was only one - from Steve, G4EDG. In passing, it would have been nice to have had some replies from Manxmen, Guernseymen and the like in order to satiate Kee's desire for operators from other countries! However, he was delighted to have a genuine Scotsman along on the trip, especially when he met Drew resplendent in his kilt and with bright red hair and beard - just what an Alander expects a Scotsman to look like!

So that made a team of four so far, and the fifth man was Hawk,

(cont over)

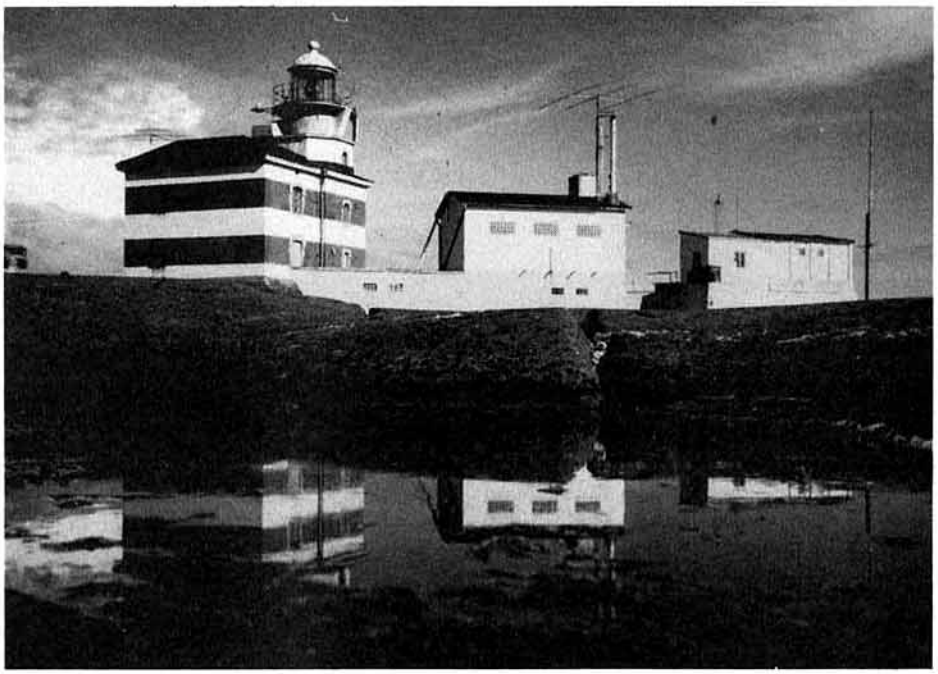
SM5AQD, a good friend of mine from the Stockholm area. Quite apart from other good reasons, as the owner of a capacious Volvo, Hawk's presence was vital to the success of the DXpedition; with two rigs, a big HF linear, rotators, cables, sleeping bags, rucksacks, four large operators and a TH3 beam to take with us, anything smaller would just not have been sufficient.

The great day eventually dawned, and Hawk and I drove out to Stockholm's Arlanda Airport to meet Steve and Drew. Ridiculously early the next morning we packed all the gear into Hawk's aforementioned car and we drove the 110 km to the port of Kappelskar, from where we took the ferry across the Aland Sea to Mariehamn, the capital of Aland. Here we met Kee, who was doing the last-minute shopping and buying all the fresh food we would require. He was optimistic about the weather; the wind was not too strong and was coming from the correct direction, so he felt sure that we could be on Market Reef the following day.

I'm not sure whether it was the anticipation of a DXpedition to come or sharing a bedroom with a particularly voracious species of Scandinavian mosquito, but none of us slept that night. It was a thoroughly bleary-eyed crew which turned up at the tiny harbour of Storby the next morning in order to load the boat which was to take us to the island. Kee had arranged the charter of a sturdy local fishing-boat skippered by a recently retired Aland seafaring type called Ingo - as was his boat. Fortunately there was a large hold in "Ingo" and all the sensitive gear was stowed well below decks; just as well since once we left the protection of Storby harbour, copious quantities of sea spray and the occasional rogue wave sloshed over the deck. The operators were drenched, but at least the beer stayed cool!

Two hours later we arrived at Market Reef, but it was clearly too rough to land. Waves were breaking over the rocks at the only place on the island where the water is deep enough to allow boats as large as "Ingo" anywhere near the shore. This is a common problem, though, and Kee had anticipated it - "Ingo" had towed a small rowing boat from Storby and, after we'd sailed round to the sheltered southern side of the Reef and dropped anchor, it was a case of off-loading everything into the rowing boat and bringing it (and us) ashore that way. After several journeys the job was done and we waved farewell to Ingo.

The first job was to put a station together, consisting of a TS830 and an Alpha 374 linear with a TH3 beam mounted on top of a convenient concrete mast which used to support a huge foghorn. Kee wound up the diesel generator and we were in business; 'EDG plugged in the keyer and in no time at all was running a huge pile-up on 14 MHz. The rest of us put together a second station in the lighthouse itself, so as to be separated as much as possible from the other station. This was also a TS830 but with a Drake L4B amplifier. We had brought a second TH3 with us but by this time it was too late to put it up - we were all extremely tired after the sleepless night, the boat journey and the off-loading. However, even in out shattered state we noticed that 28 MHz was wide open, so a more-or-less-28 MHz dipole was knocked up from odd bits of wire and co-ax left lying around and - without benefit of insulators or even being cut properly to size - dangled outside the lighthouse and plugged into the rig. Within a matter of seconds we had a monster pile-up on 28 MHz too! Stations were queueing up ten deep to work us; with hindsight we suspect that there hadn't been any 28 MHz propagation when DXpeditions had visited the Reef in previous years and so, whilst most operators who'd been licensed any length of time had worked it on one band or another, very few had done so on 28 MHz. Indeed, all the OFOMA operators (especially when on 14 MHz) were plagued with questions like "when are you QRV on 10



metres?" throughout the period of the DXpedition, even when we were already on that band and dishing out contacts as fast as we could!

Next day we got down to some serious station-building, with the second TH3 going on top of a 50 ft tower. We added a 3.5 MHz inverted-Vee dipole to both stations, a pair of 7 MHz half-wave slopers (one looking at Japan short path and the other towards the west for the States, Caribbean and South America) and a 1.8 MHz inverted-L base-fed like a vertical with four quarter-wave radials. All of these were actually in the sea for much of their length. The final antenna to go up was a 3.5 MHz inverted-L right on the water's edge, again with radials in the sea. With two completely independent stations (both with beams) available, we were really in business. Operating rotas were made out, with one main operator who could choose which station to use and its band and mode and a second operator who could choose anything else. Every three hours there was a cofee break and operator change. At first we kept both stations on the air for 24 hours per day, but after a few days conditions deteriorated somewhat and there was a period around 0200-0500 GMT when only one band was open. In these circumstances the second operator earned an extra few hours in the pit, but as soon as 14 and 21 MHz opened both stations were on the air again.

This set the pattern for the next nine days of operations. Kee kept us well fed and watered throughout, doing a superb job with very limited facilities. One of his "specialities de la maison" was pea soup with beans, which was delicious but had rather unfortunate and anti-social side-effects. He also entertained us throughout with his endless repertoire of good humour and funny stories, delivered at a QRO bellow in Aland English! Kee knew nothing about either amateur radio or English until 1969, when his lighthouse was "invaded" for the first time by a group of Finnish DXers who had just discovered that its strange location gave it separate DXCC country status. He quickly realised what a marvellous hobby amateur radio was, especially for lighthouse keepers on uninhabited lumps of rock, so he taught himself radio, Morse and English in that order, got himself the OJOMA callsign and the rest is history.

With almost twelve months having elapsed since Market Reef had last been on the air, there were always large pile-ups no matter which band or mode we went on. Drew and Steve operated almost exclusively on CW whilst Hawk, Kee and myself used SSB. It proved difficult to work the USA: at that latitude in summer 14 MHz sounds more like 7 MHz in the UK (although thankfully without the broadcast QRM), with strong European stations audible almost 24 hours a day. It is much easier to work Japan on the lower frequency bands, however, and the 7 MHz half-wave sloper worked extremely well towards JA - probably because of its location over the sea. It was decidedly better than the other 7 MHz antenna. Hawk is something of a 40 metre specialist, and at home he has a full-size three-element beam at 80 feet; he was invaluable for knowing the best times for propagation to JA on that band. Page after page of JA stations were worked, mainly on CW but quite a few on SSB. Despite the typically high summer QRN level 3.5 MHz was quite a success too, with a few of the better-equipped JAs and East Coast Ws and VEs making it into the OFOMA log on that band. One evening I was working a European pile-up on 3.5 MHz SSB using the half-wave dipole and decided to swop over to the inverted-L to see whether any DX was around. The result was dramatic; almost immediately I was called by ZS1MH, head and shoulders above the Europeans in strength, followed by ZS5, A22 and TR8 - probably most of the active DXers in Africa! On other occasions the difference between the 3.5 MHz dipole and the inverted-L did not seem to be so marked, but for that occasion alone it was well worth putting up the antenna.

The wind started getting up the day before we left, but we didn't pay much attention to it; conditions remained good on the bands and we were too busy handing out QSOs to worry very much, especially since it was nice and cosy in the shack (not to say positively hot, with a kilowatt linear doing its stuff all day long!). By that evening, however, it had become impossible to ignore the storm and we were having to wind up the AF gain in order to hear stations calling over the sound of the wind - even with headphones on. For the first time Kee had a very long face: he told some stories of how sudden summer storms such as this one had made it impossible to leave for days or sometimes weeks. This was somewhat worrying insofar as the three UK operators had APEX return flights to Heathrow booked a couple of days later and if they were missed it would mean an extra outlay of about £200 apiece. There was no immediate shortage of food and absolutely nothing we could do about our position, so we carried on operating. The next day the wind had got wose, and at one point an enormous gust nearly brought down the mast carrying the TH3 but somehow it survived. By this time the sea was extremely rough and at times was washing over the centre of the Reef, splitting it into two separate islands. However, by the evening the storm was beginning to blow itself out, and if the sea calmed down quickly we could still make our flights - just! Next morning Kee contacted Ingo via radio- telephone and asked him what the chances were. Ingo reported that the forecast was now good and that, although the sea was still rough, he would set out from Storby to us.

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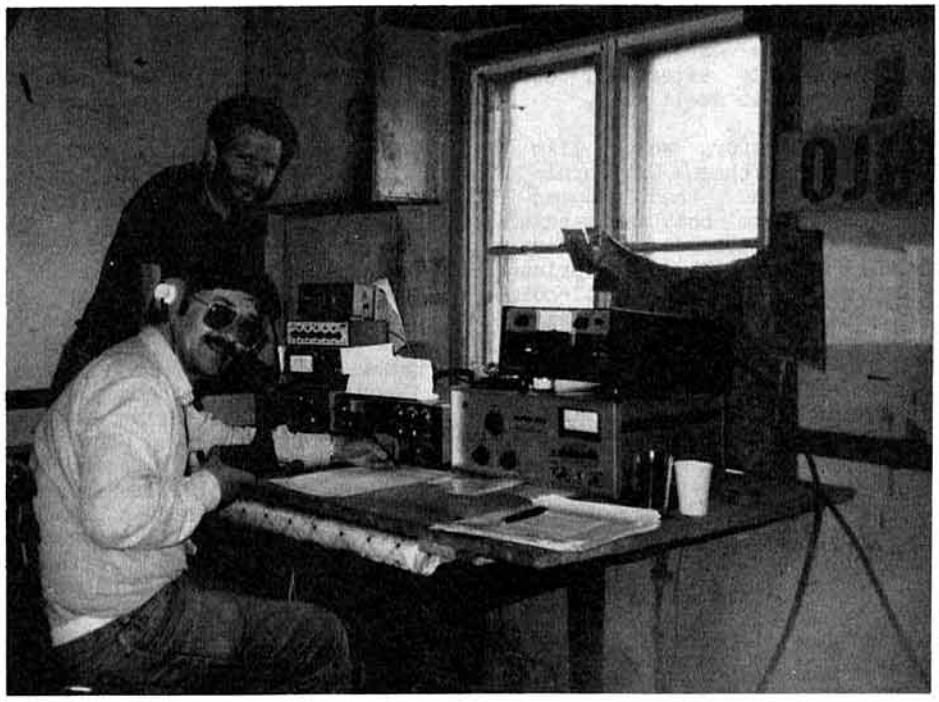

Knowing that we were now nearing the end of the expedition, we had counted the number of QSOs and countries worked. On the car ferry from Sweden to Aland we had set a target of 10,000 contacts, but on checking and re-counting we discovered that we had already made 19,000 - with a few hours' operating still possible. Even after more than a week's continuous operation, the pile-ups didn't seem to be any smaller and Hawk was still handing out QSOs to the tune of three or four per minute when "Ingo" was actually tying up against the rocks! He had reached 19,900 QSOs when he had to be virtually dragged away from the rig by the scruff of his neck - or be stranded on the Reef for another week!

Although it had proved possible to tie "Ingo" up against the rocks on the north side of the reef, the sea became very rough as soon as we had left the shelter afforded by the island. Although no-one was actually sea-sick, at least one member of the team looked decidedly green by the time Storby hove into view. The remainder of the journey back to England passed almost without being noticed, and after having arived back home it seemed incredible to think that less than 48 hours earlier we were sitting on a rock in the Baltic Sea handing out QSOs like there was no tomorrow.

Full-colour QSLs have been printed, showing the intrepid (?) five operators on one of the calmer and sunnier days on the Reef, and Kee is handling all QSLing. QSLs sent to him will be answered direct, providing return postage is enclosed. His address is Kee Eriksson, OH0NA, SF-22430 SALTVIK, Aland, Finland. QSLs sent via the bureau will be answered the same way, but only after all direct cards have been dealt with.

All the operators would like to thank the Northern California DX Foundation and the European DX Foundation, who both assisted with contributions towards the cost of getting colour QSL cards printed. Incidentally, beautiful full-colour versions of any of the splendid photographs shown in the article can be purchased "blown-up" to poster size for £10 from the author - part of the proceeds to the RSGB HF DXpedition Fund.

GB75AC

"Anniversary Convention"

9 - 17 July 1988

WHAT DOES 'USE' MEAN?

– *RIS replies*

You might recall that in the January 1988 Bulletin we ran a "Talking Point" item entitled "What does use mean?". This looked at the meaning of the word "use" in the context of the Wireless Telegraphy Act 1949 and mentioned a couple of legal cases which had a bearing on the matter. Seems as though the upper echelons of the Radio Investigation Service read the Bulletin, because towards the back end of February we received a letter from John Ketchell, Head of the Policy & Legislation Section of the RIS, expanding on some points we made. Here's what he says:

"The case of D (a minor) v Yates is a useful piece of case law, but our interpretation of its use as a precedent is limited to some restricted circumstances. The judgment in the case of Rudd, if read in full, does not in fact make the D v Yates judgment invalid in our eyes, but it does restrict its use to particular circumstances which we already felt were correct. Neither, as you recognise, does the Rudd case itself have any great bearing on the amateur's circumstances. It is in fact more constructive and less confusing to look at the wording of the Wireless Telegraphy Act 1949.

"Section 1(i) of the Act makes it an offence to instal or use Wireless Telegraphy apparatus or a station for Wireless Telegraphy except under and in accordance with a licence issued by the Secretary of State. The term instal' is not defined but in our experience a court would accept that it covers equipment that is out of its packing, has the appropriate plugs and is ready to operate. Courts have in fact accepted the placing of batteries in a handportable as part of installation. At present the offence of installation is not a continuous one and a summons must be served within six months of the alleged offence. Installation may, however, become a continuous offence if Parliament agrees the sort of changes to legislation we are examining in the context of the Home Office broadcasting bill, which will establish a new regime for radio broadcasting. We also then hope to close the loophole exposed by R v Rudd, as the point is of significance in unlicensed broadcasting cases.

"'Use' is perhaps easier to deal with. We could regard 'use' as the operation of the equipment in any way. Thus, speaking into the microphone is just as much 'use' as tuning up the transmitter into an aerial and pressing the PTT switch. Courts have always accepted this.

"To look at your example, a Class B licensee may in fact be committing an offence of installation if he has an HF transceiver in the shack, if it is ready to transmit on the HF bands and if he put it there less than six months ago. It's somewhat unlikely to say the least that RIS officers are going to pick up that kind of offence unless they are investigating something more serious. However, if you are a Class B and you have an HF transceiver for listening only, then you don't need a microphone and key plugged in, do you? On the other hand we see nothing wrong with using an HF transceiver into a transverter for VHF providing the transceiver is installed and used only as part of a system for generating a VHF signal.

"I hope that makes matters a bit clearer: what it boils down to is that even if there is no proof that apparatus is used there may still be proof of installation within the previous six months".

J F C Ketchell

So there you have it - the Word from the Top. The point about not needing a mic and key plugged into a Class B-owned HF rig seems totally valid to us - our advice would be to keep 'em locked up until the paperwork bearing your name and address and a Class A callsign crashes through the letterbox.....

NEWS & VIEWS

Around the Groups

Beginning last month this section of the Bulletin was expanded to include more items of interesting news from clubs, groups and societies. We are looking for the kind of news which will be of interest to other amateurs and clubs - such as special awards, DXpeditions, user groups, special interest groups, etc. In addition, we'd like to know if your club has an interesting project on the go or is doing something to encourage youngsters into amateur radio. Basically, we'd like to hear about anything which might inspire fellow amateurs and clubs to do something similar. Have a look at the items below for examples of what we have in mind.

If you have any interesting items of news, with good black & white photographs if possible, please send them direct to HQ marked "Around the Groups - Bulletin". We may not be able to use all items sent in because of space limitations but we'll try and fit in as many as possible.

The deadline for the JUNE issue is Monday 25 April, but if you can send items in earlier it would be much appreciated.

RAYNET NEWS:

On Sunday 1 May there will be a meeting at the Freedom Inn, Aviemore Centre, Aviemore, Scotland. The aim of the meeting will be to promote Raynet in Scotland and to meet representatives of the User Services. The meeting is open to all amateurs and Raynet members and its theme will be 'Emergency - Which Service'. The programme is as follows:-

1000 - Coffee
1030 - Raynet
. Mr G Griffiths G3STG
Chairman RSGB Raynet
Committee
1130 - Local Authorities
Mr G Milligan
Highland Regional
Emergency Planning
Officer
1230 - Lunch
1400 - Fire
Mr E Weighman
Asst Div Officer
Highland & Islands
Fire Brigade
1500 - Mountain Rescue
Flt Sgt T Taylor
Mountain Rescue Team
Leader, RAF Kinloss
1600 - Coffee
1645 - Raynet Open Forum

Only one valid nomination was received for the new Raynet Zonal Representative for Zone 3, East Midland:-

Mr D Hocking, G4FSS
10 Garfit Road
Kirby Muxloe
Leicester LE9 9DE

Therefore Mr Hocking is elected unopposed and replaces Geoff Griffiths as Zone 3 Representative with immediate effect.

BARTG NEWS:

BARTG has a new manager for its GB2ATG news service which is transmitted on the first & third Sunday of the month on 3,590 kHz, 14.090 MHz and 144.600 MHz. Items of interest to data enthusiasts should be sent to:-

Mr Bob Andrews, G1JZJ
5 Queens Road
Erdington
Birmingham B23 7JP

ALIVE & WELL:

We've received a plea from the Ballymena Radio Club in Northern Ireland to let members in Co.Antrim know that the club is alive and well and living at 70 Nursery Road, Gracehill, Ballymena. The club meets on Thursdays at 8pm and has Morse classes and an HF station, callsign GI3FFF, on the air at each meeting. They are putting a programme together and the details will be listed each month in the 'Club News' section of the 'Events Diary' as soon as we have them.

GB2BHS:

Balshaw's High School was established over 200 years ago by Sir Richard Balshaw and the school's annual Spring Fair will be held on Saturday 7 May. As part of the day's events, GB2BHS will operate from the grounds of the school, situated on Church Road, Leyland. The station will operate mainly on 80m SSB, 20m SSB and 2m FM from 11am to 4pm and will be looking particularly for contacts with ex-pupils, ex-staff or anyone with previous connections with the school (formerly known as Balshaw's Grammar School). All contacts and accurate short wave listener reports will be confirmed with a special QSL card which will be sent via the bureau.

Further information can be obtained from Ray Banister, G4BEE, on 0254-831605 (evenings please).

WAB NEWS:

The first 1988 WAB contest was the 160m Mixed Mode which took place on Sunday 6 February. The rest of the contests are as follows:-

LF Phone	- 22 May, 1400-2100 GMT
144 MHz QRO SSB	- 19 June, 0900-1600 GMT
144 MHz QRP SSB	- 10 July, 0900-1300 GMT
430 MHz SSB	- 10 July, 1400-1800 GMT
50 MHz SSB	- 9 October, 0900-1200 GMT
3.5 MHz CW	- 6 November, 0930-1230 GMT

Further details concerning WAB contests can be obtained from:-

Laurie Segal, G6XLL
21 Blackstone Road
Cricklewood
London NW2 6DA

...and please remember to send a 9"x4" stamped addressed envelope and 3 first class stamps.

Incidentally, we gave Brian Morris's callsign as G4SKQ in the February issue. It should have read G4KSQ. Sorry Brian, and apologies to G4SKQ for any inconvenience we may have caused.

Activity on WAB nets remains high although the Winter Awards came to an end on February 29, but there are some more 'firsts' to be recorded.

G4SEU receives the first 70 MHz Islands Award for working 10 islands on 70 MHz SSB.

SWL Chris Gibbs has been busy and receives two awards for logging bookholders on 3.5 MHz. Some stations have more than one book for collecting on different bands or for different modes. Gordon, G4SKQ had 70 books at the last count, so he is well worth finding if you are collecting for one of the book-holder awards.

The most popular awards since the AGM last May are the Decade Award, for working or hearing 100 areas from 00 to 99 in any calendar year; the Book-holders' Award, for working or hearing bookholders in

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multiples of 100; and the Counties Award Class II, for working or hearing 55 counties. Incidentally, all WAB awards are available on a "heard" basis for short wave listeners.

The WAB Group will be represented at many rallies this year and also provides speakers for club meetings. If you would like someone to come along and give a talk at your club, please contact John Fitzgerald, G8XTJ for more details. John can also help anyone in your club who may be giving a talk of their own.

On 22 May, the Guernsey ARS will be active from the island of Alderney on the usual 80m and 40m WAB SSB net frequencies. The group will be active for the first three hours of the WAB contest, but they'll have to leave the island afterwards to catch the flight to Guernsey. However, it is possible that there will be some activity in the afternoon from rare parishes on Guernsey.

ARIEL RADIO GROUP SUMMER FESTIVAL:

The BBC Club's Ariel Radio Group will be joining in with this year's special celebration of the RSGB's 75th Anniversary.

At its annual Summer Festival in Motspur Park, Surrey on 9 July, the group will have a display of the history of amateur radio and will be using a special-event callsign (GB75BBC applied for) in an attempt to contact as many 'Old-Timers' as possible who can remember and chat about the early days of the hobby. The group also hopes to have a number of distinguished and special guests calling in to join in the fun and make this a day to remember. The Ariel Group is affiliated to the RSGB and wants to do all it can to celebrate the 75th anniversary with a 'party over the airwaves'. All of which will be a good practice run for the 'Families & Activities Day' on 24 July, when we hope that as many RSGB affiliated clubs as possible will organise similar events and get themselves on the air - and don't forget, they'll be a prize for the most unusual or meritorious event organised on that day (see special pull-out).

ROTARIANS OF AMATEUR RADIO:

Members of the Rotaians of Amateur Radio (ROAR) will be holding their annual get-together on Friday and Saturday 15/16 July to coincide with the RSGB's 75th Anniversary Convention. Many of the members stay for the weekend but any who may not be staying will be most welcome to attend the dinner, with their wives, at the Chesford Grange Hotel, Kenilworth (12 miles from NEC) at 7pm on the Saturday. The cost will be about £7.50 per head. The Annual General Meeting of ROAR will take place on Sunday at 10.30am at the same venue. Bookings and enquiries should be made with Reg Leigh, G4EWY, QTHR.

Retiring President, Mrs Joan Heathershaw, G4CHH, presenting the 'Chain of Office' to Sir Richard Davies, KCVO, CBE, CEng, FIEE, G2XM, at his recent installation as the RSGB's 54th President.

ANNUAL REUNION DINNER:

The Annual Reunion Dinner of the Cambridge University Wireless Society and the Oxford Universuty Radio Society will be held at Selwyn College, Cambridge on Saturday 23 April at 7pm.

All ex-members of both societies will be very welcome and further details can be obtained from:-

Mr C J Carr, G6OQA
Chairman of CUWS
Selwyn College
Cambridge CB3 9DQ

The cost will be £16.00 and applications must be received by Saturday 16 April latest. A limited amount of overnight accommodation is available.

FASTEST CONSTRUCTOR IN THE WEST:

The Blackwood ARS has organised a competition which is believed to be the first of its kind. It is called "The Fastest Constructor in the West" and will take place on 13 May (do you take part with soldering irons and flux remover at twenty paces at dawn? - Ed)

Every entrant will have to construct the same small project in the shortest possible time, but time penalties will be added for sloppy workmanship. Both individual and club team entries will be allowed and there will be a prize for the fastest beginner and the fastest club; the latter being decided on the sum of the times of the fastest three constructors from a club team. Every entrant will receive a certificate showing their placing.

The project chosen for the competition is the Maplin 'Live Wire Detector'. It has been chosen for three reasons - a) it is simpple to build, b) it comes complete with all components and case (no battery though), c) it is

the kind of project which will be of use to all participants. The entrance fee is £4.50 (which covers the cost of the kit) and every entrant can keep the completed project.

The Blackwood ARS would like to invite anyone interested in taking part in this fun event and every construtor is asked to bring along some moral and vocal support. Refreshments will be available and it is hoped to have a mini-bring & buy sale. It should be a lot of fun and the more people who turn up the better it will be.

If you think you might be the 'Fastest Constructor in the West', don't delay, the closing date for individual and team entries is 1 May and further details can be obtained from Terry John, GW4XCU (QTHR) tel: 0495-222573.

RAIBC NEWS:

The Bournmouth & District RAIBC will be running its annual special event station from the Southern Electricity Museum, Bargates, Christchurch over the weekend 14/15 May. The museum was previously known as the Wedgewood Electricity Collection and the callsign GB2WEC has been used in the past. This year, the callsign GB75SEM will be used and the station will be active in the HF, VHF and UHF bands. Visitors will be welcome at the museum between 10am and 4pm each day and talk-in will be available on VHF. A special QSL card for all contacts will be sent either via the RSGB Bureau or direct from:-

Bob Burrows, G6DUN
40 Fairmile Road
Christchurch
Dorset BH23 2LL

The 1988 RAIBC Romsey picnic will be held on Sunday 22 May at the Fairground, Broadlands, Romsey. As in previous years, there will be a splendid junk sale, a grand draw and excellent refreshments. All RAIBC members, supporters, and their families and friends will be welcome. Further details can be obtained from John, G4COM, on 0703-693017.

BEYOND THE ULTRA SECRET:

The Dundee ARC (formerly known as the Kingsway Technical College ARC) has organised a lecture entitled "Beyond the Ultra Secret" by Dr Peter Waddell, which will take place on Friday 13 May at 7.30pm in the Tower Block lecture theatre, Dundee University. The lecture will describe Baird's early experiments on TV and Radar undertaken during the 1930s. It is one of a series of events planned to celebrate the 50th anniversary of Baird's TV development. All are welcome to attend the lecture and the theatre seats about 200. Further details can be obtained from Alf, GM4UZP, on Dundee 644597.

QSL BUREAU NEWS:

Another address change this month for one of the QSL Sub-managers.

The G8TAA-TZZ, G4KAA-KZZ & the forthcoming GOKAA-KZZ series Sub-manager, Mr Keith Draycott, G3UQT, has recently moved. Envelopes for the receipt of cards for any of the above callsign series should now be sent to:-

28 Ladywood Road
Kirk Hallam
Ilkeston
Derbyshire DE7 4NE

ARMADA 400 - PREVIEW:

The Plymouth Radio Club will be running the special callsign GB400A throughout July to mark the 400th anniversary of the routing of the EA Armada by Sir Francis Drake (no such thing as maritime mobile in those days - pity really, all those nice halyards and whatnot....). We'll have more details of the event nearer the date but, in the meantime, the Plymouth RC will be on the air each Monday from now until 23 October using the club callsigns G3PRC and G8PRC. Operation will be between 7.30pm and 9.00pm local time.

1988 POLAR BRIDGE DIPLOMA:

The Canadian Radio Relay League (CRRL) has just announced the '1988 Polar Bridge Diploma' to commemorate the joint Canadian-Soviet Union Trans-Polar Ski Trek (reported previously in the News Bulletin). The "attractive, oversize bilingual commemorative diploma" (their words, not ours) will be awarded to amateurs and short wave listeners who fulfill the following requirements:-

1) 3 different calls from Canadian NW Territory (usually VE8)
2) 3 different calls from Asiatic RSFSR, USSR (usually UA9 or UA0)
3) 1 base camp call from either USSR or Canada
4) 1 station from national capital region of Ottawa, Canada
5) 1 station from national capital region of Moscow, USSR

....making a grand total of nine 2-way QSOs or loggings which must be made between 15 February and 15 June 1988. It sounds a pretty tall order to us, but no doubt some indefatigable souls will make it. If you do manage to get all the contacts, you should send your application together with a certified log extract and 10 IRCs to:-

CRRL National Awards Manager
Mr G V Hammond VE3XN/VE8XN
5 McLaren Avenue
Listowel
Ontario
Canada N4W 3K1

FOR SALE:

Yes folks - it's the grand Headquarters Surplus Sale; well, more like a junk sale actually but we've got to get your attention somehow. We have the following items for sale "surplus to requirements", as they say - they're all Heathkit units apart from the last couple and quite honestly we don't know whether or not they work!

FET Multimeter IM25 - £10

dB Power Meter IM38 - £5

Frequency Counter IM4110 - £20

Sine/Square Generator IG18 - £25

Valve Voltmeter IM13U - £15

AC Voltmeter IM5238 - £10

Electronic Switch ID4101 - £5

Grid Dip Meter HD1250 (no coils, alas) - £10

Ferrograph degaussing coil - 50p

Sony U-Matic video cassette player Type VP1210UK - we think it/s PAL/NTSC but it doesn't seem to work awfully well - £ make-an-offer-we-can't-refuse

Buyer collects all items, and please don't trample the residents of Cranborne Road in the rush! Seriously, if you're interested come and see us and ask for the Headquarters Manager.

1988 RSGB AGM VENUE

In a break with tradition, the 1988 Annual Meeting of the Society will take place outside London.

The date for your diaries is 10 December 1988 and the venue will be the University of Manchester Institute of Science & Technology.

More details later.....

Events Diary

CLUB NEWS

Beginning last month, the "Events Dairy" was expanded to include Club News and in an attempt to reduce the number of pages previously used for Club News, we are using a more abbreviated format listing clubs alphabetically under counties and giving the date and subject of the meeting. As in GB2RS, natter nights and committee meetings are not listed. The full details of when and where clubs meet, the frequency of meetings, the contact person and telephone number will be published twice yearly in the UK Callbook and News Bulletin. However, any changes to these details or details of any new clubs, will be included in the list below. If news is received by the published deadline, it will appear in the listing. It is your responsibility to ensure that items are sent to HQ in good time, either direct or via your RLO. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

AVON:
* Bath & DARC - 13, AGM; 27, talk "50 MHz Band".
* Bristol ARC - 7, discussion "Fund Raising"; 14, talk "G8VPG Avon RLO"; 21, on-air; 28, talk on photography "Where's Your Monkey?".
* Bristol FM TV Group - 24, stand at BATC Rally.
* Bristol RSGB Group - 25, RF Test Equipment Evening.
* North Bristol ARC - 2, preparation for home-brew contest; 9, home-brew contest; 16, talk "Raynet"; 23, home-brew wine tasting.
* South Bristol ARC - 6, practice Morse tests; 13, top-band activity; 20, 2m CW activity; 27, ATV activity.
* Thornbury & DARC - 12, visit "BBC Evesham".
* Weston-super-Mare ARS - 11, talk "The Communications Dept of the BBC"; 25, construction.

BEDFORDSHIRE:
* Dunstable Downs RC - 15, talk "Lightning"; 25/26, at Watford Gmmr School, talks & GB75WCG.

BERKSHIRE:
* Burnham Beeches RC - 4, Easter Monday Family Fox-Hunt (no evening meeting); 19, Quiz v Maidenhead ARC (away leg); 30-2, Spring DX Picnic.
* Reading & DARC - 12, talk "Contest Operating"; 26, HF HFD arrangements + RSGB videos.

BORDERS:
* Kelso ARS - 4, on air; 11, project "Wavemeter"; 18, talk "144 MHz DF Hunting"; 25, DF Hunt.

CAMBRIDGESHIRE:
* Cambridge & DARC - 8, talk "Measuring Power Output"; 15, visit to Anglia TV; 22, talk "Magnetic Resonance".

CHESHIRE:
* Chester & DARS - 12, talk "A Simple Piece of Wire?"; 26, talk "Avionics".
* Ellsmere Port & DARS - **CORRECTION** meets alternate Mondays.
* Mid-Cheshire ARS - 6, on air; 13, RSGB video; 20, construction contest; 27, rally planning.

CORNWALL:
* Cornish RAC - 7, AGM; 21, activities; 23, Marconi Event at Poldhu Cove.
* Cornish RAC Computer Section - 11, talk "Computers in College Administration".

DERBYSHIRE:
* Derby & DARC - 6, junk sale; 27, talk & demo "Microwave Modules".

DEVON:
* Axe Vale ARC - 1, junk sale.
* Exeter ARS - 11, quiz.
* Plymouth RC - 25, talk "Photography".
* Torbay ARS - 23, AGM.

Co DOWN:
* Bangor & DARS - 1, visit to Meteorological station at Lisburn.

EAST SUSSEX:
* Brighton & DARS - 6, open night (free refreshments).
* Hastings E&RC - 16, all-day bring & buy junk auction at Zodiac Centre, Priory Rd, Hastings.
* Southdown ARS - 11, illustrated talk "Photography from Space".

ESSEX:
* Braintree & DARS - 18, talk "Packet Radio".
* Chelmsford ARS - 5, visit to BBC Essex.
* Colchester RAs - 14, talk "Military Signals Equipment"; 28, talk "Short Waves & Beams".
* Loughton & DARS - 8, AGM; 22, club project building.
* Southend & DRS - 8, talk "From CB to Top-Band"; 15, talk "Radio Navigation"; 29, talk "Herbs and Their Many Uses"

Co FERMANAGH:
* Lough Erne ARC - 20, talk "Secure Your Rig".

GREATER LONDON:
* Acton, Brentford & Chiswick ARC - 19, discussion "Test Instruments".
* Clifton ARS - **NEW SECRETARY** Mr M E Brown GODCG, tel: 01-691 2341.
* Ealing & DARS - 5, Morse training; 12, talk "The Radio Investigation Service"; 26, talk "Operating New Equipment".
* Edgware & DARS - 14, talk "Digital Transmission for Amateurs - What Does the Future Hold?"; 28, scanner demontrations.
* Harrow RS - 8, activities; 15, talk "Cables"; 22, activities; 29, talk "Impedance Matching". **CHANGE** new Programme Manager Gerald G0GXM tel: 01-863 2780.
* Southgate ARC - 14, surplus equipment sale.
* Sutton & Cheam RS - 11, inter-club quiz v CATS (away leg); 15, junk sale.
* Wibledon & DARS - 8, talk "Film Editing at the BBC"; 29, activities.

GREATER MANCHESTER:
* Eccles & DARS - 5, talk "Workshop Practice".
* South Manchester RC - 8, talk "An Introduction to Digital Techniques pt 2"; 15, talk "Insulation"; 22, home-brew contest; 29, spring DF contest 8.15pm.
* Stockport RS - 13, surplus equipment sale; 27, talk "Antennas in Small Gardens"/club project.

GWENT:
* Blackwood ARS - 29, talk "Home Construction - How to Get Started".

HAMPSHIRE:
* Fareham & DARC - **NEW SECRETARY** Bob Reeves, G8VOI.
* Horndean & DARS - 7, Rowner Club visit.

HEREFORD & WORCESTER:
* Kidderminster & DARC - 15, surplus sale at Aggborough Community Centre 7.30pm; 26, talk "50 Years of Amateur Radio" usual venue.
* Malvern Hills ARC - 12, talk "In-between Bands, 50/70 MHz".
* Vale of Evesham ARC - 7, packet radio.
* Wythall RC - 12, visit to BBC Pebble Mill; 19, talk "Safety in the Shack"; 26, construction.

HERTFORDSHIRE:
* Cheshunt & DARC - 13, talk "Satellite TV"; 27, construction contest.
* Harpenden ARS - 19, talk "Clandestine Communications".
* Stevenage & DARS - 5, test equipment forum; 19, talk "Cellular Radio".
* Verulam ARC - 12, on air; 26, talk "The RSGB into the 21st Century" by David Evans, G3OUF, RSGB.
* Welwyn-Hatfield ARC - 4, talk "Repeaters"; 18, discussion "Tools for Construction".

JERSEY:
* Jersey ARS - **NEW SECRETARY** David Reid, GJ0BZF.

KENT:
* East Kent RS - 7, talk by Kent Repeater Group; 21, video/talk/demonstration.
* Meopham Parish RC - 10, AGM.
* SE Kent (YMCA) ARC - 6, AGM; 27, film show.

LANCASHIRE:
* Bury RS - 14, visit.
* Central Lancs ARC - 4, social; 18, humourous talk "He Said What?".
* East Lancs ARC - 5, on air; 26, talk/film "Microlighting".
* Fylde ARS - 1, visit to Preston Fire Brigade HQ
* Thornton Cleveleys ARS - 18, talk "The Solar System".

LINCOLNSHIRE:
* Lincoln SWC - 6, on air/RAE/CW tuition; 13, DTI videos; 20, on air/RAE/CW tuition; 27, talk "Fire & Smoke" by Lincoln Fire Brigade.

LOTHIAN:
* Lothians RS - 13, talk "Packet Radio"; 27, construction competition/DF tune-up.

MERSEYSIDE:
* Liverpool & DARS - 5, talk "Computer Maths Functions"; 19, talk "On-Air Etiquette".
* Wirral & DARC - 13, film show; 27, "The Great Egg Race".

NORFOLK:
* Norfolk ARC - **NEW VENUE** Red Roofs Club, Fifers Lane, Norwich. Meetings on Wednesdays, 7.30pm.

NORTH YORKSHIRE:
* Hambleton ARS - 11, RAE; 18, talk "Conversion Techniques"; 25, RAE.
* York ARS - 15, junk sale.
* York RC - 6, on air; 13, talk "QRP"; 27, talk/demonstration "Microwave Modules".

OXFORDSHIRE:
* Harwell ARS - 19, talk by G3OSS.

POWYS:
* South Powys ARC - 5, talk "Practical Satellite TV, pt 1".

SHROPSHIRE:
* Salop ARS - 7, construction contest; 21, video "4-Components"; 28, talk "Weather & Propagation".
* Telford & DARS - 6, AGM; 13, contest planning; 20, quiz; 27, talk "SWRs".

SOMERSET:
* Mid-Somerset ARC - 8, talk "Computerisation in Amateur Radio"; 22, talk "Maritime Mobile".
* Yeovil ARC - 14, talk "Simple HF Antenna"; 21, AGM.

SOUTH YORKSHIRE:
* Maltby ARS - 1, on air; 8, AGM; 15, talk "Special Interest Groups"; 22, on air; 29, junk sale.
* Sheffield ARC - 4, practical; 11, talk "The RSGB"; 18, "Eric's Testing Time"; 25, talk "Lightning".

STAFFORDSHIRE:
* Cannock Chase ARS - 21, junk sale; 28, talk "Geneology, Tracing Your Roots". **NEW VENUE/NEW SECRETARY** - Victoria WMC, Church Hill, Hednesford, 8pm/Tony G0HKF tel: 05436-75301.

SUFFOLK:
* Felixstowe & DARS - 18, talk "Preamplifiers & Noise".
* Ipswich RC - 13, talk "HF Aerials for Small Gardens"; 27, AGM.

WARWICKSHIRE:
* Atherstone ARC - 11, talks "VHF Then & Now" and "The RSGB VHF Awards"; 25, on air.
* Mid-Warwickshire ARS - 12, "Norman's Night"; 26, radio sale & auction.
* Rugby ATS - 12, AGM; 19, construction competition judging.
* Stratford-upon-Avon & DARC - 11, visit to BBC Pebble Mill; 25, talk "Computing".

WEST GLAMORGAN:
* Swansea ARS - 21, final rally preparations.

WEST MIDLANDS:
* Coventry ARS - 1, on air; 8, Morse tuition; 15, mini lectures; 22, on air; 29, indoor DF contest.
* Midlands ARS - 18, talk "Chassis Bashing".
* Midlands Electricity Board RS - 1, special event station; 12, 2m on air.
* South Birmingham RS - 6, C.Howes kits. **NEW SECRETARY** Winston G1WNZ tel: 021-444 1681.
* Willenhall ARS - 13, project discussion.
* Wolverhampton ARS - 12, visit to Rugeley Generating Station; 19, on air; 26, club project.

WEST SUSSEX:
* Chichester & DARC - 5, AGM.
* Horsham ARC - 7, photo quiz.
* Mid-Sussex ARS - 14, junk auction/bring & buy; 21, on air; 28, talk "Mechanical Television".

WEST YORKSHIRE:
* Halifax & DARS - Club Dinner, check date.
* Keighley ARS - 12, junk sale; 26, talk "Weather FAX Interpretation".
* North Wakefield RC - 7, talk "Cavity Wavemeters in 3 Easy Lessons"; 14, on air; 21, visit to Leeds Polytechnic Computer.
* Todmorden & DARS - 18, talk "Acid Rain" by CEGB.
* Wakefield & DRS - 5, on air; 12, AGM;

WILTSHIRE:
* Chippenham & DARC - 12, talk "Colour Slow-scan TV"; 19, AGM. **NEW SECRETARY** J Barrington G4ZUV.
* Trowbridge & DARC - 27, surprise talk.

Events Diary

CLUB NEWS - cont.

Items for inclusion in the JUNE issue must be sent to HQ marked "Club News - Bulletin", and be received by Thursday 21 April latest.

MOBILE RALLIES

This is a list of all rallies, exhibitions and conventions notified to HQ **(as at press date)**. Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Bulletin'.

10 APRIL
* North Cornwall Radio Rally - Launceston Town Hall. Opens 10.30am, talk-in on S22 by Launceston ARC. Details Maggie, RS90696 tel: Launceston 5632.
* Lough Erne ARC Rally - Killihevlin Hotel, Enniskillen. Details Billy, tel: 0365-24905.

17 APRIL
* Trafford Rally & Components Fair - Lancashire County Cricket Ground (Old Trafford), Talbot Road, Old Trafford, Manchester. Opens 11am (10.30am for disabled visitors). Usual traders and attractions, bring & buy stall, refreshmants, cash draw, talk-in on S22. Details Graham G1IJK, tel: 061-748 9804.

24 APRIL
* BATC Rally - Rugby Post House Hotel, Crick, Northants, (M1 junc 18). All the usual traders situated in a marquee. Lecture programme and demonstrations including satellite TV in the hotel. Details Trevor G8CJS, tel: 0532-670115.
* Swansea ARS Rally - ***NEW VENUE*** Swansea Leisure Centre. Opens 10.30am. Trade stands, bring & buy, bookstall, refreshments, HF demonstration station, video show, talk-in on S22 and via RB6. Details Roger GW4HSH, tel: 0792-404422 evenings.
* Marske-by-the-Sea Rally - Marske Community Centre, High Street, Marske, nr Saltburn, E.Cleveland. Details Jimmy G1VLC, tel: 0642-219586.

1 MAY
* **RSGB VHF CONVENTION** - Sandown Park Racecourse, Esher, Surrey. Usual traders, comprehensive lecture programme, large RSGB bookstall, RSGB Committee stands. Details G3FZL. Trade - Les, G5HD tel: 040 928-342.
* 5th Anglo-Scottish Rally - Tait Hall, Kelso. Opens at 11am, all the usual attractions. Details Bruce GM4UIB, tel: 0573-24654 (evenings).

2 MAY
* Mid Cheshire ARS Rally - Civic Hall, Winsford, Cheshire. Opens at 11am. Details Mrs Fraser G1SIB, tel: 0606-553401.
* Doncaster Radio Rally - Bircotes Sports Centre, nr Bawtry, Doncaster. Talk-in on S22 by G4YRD. Details Audrey Wilson, tel: 0302-721259.
* Dartmoor Radio Club Mobile Rally - Princetown Town Hall. Opens 10.30am, all the usual traders, display stands from Raynet and local repeater groups, bring & buy stand, refreshments. Talk-in on S22. Details Dave G1YPD, tel: 0572-551955.

8 MAY
* Drayton Manor Rally - Drayton Manor Park, nr Tamworth, Staffs., on A4091 1 mile from A5 junction. Opens at 11am, usual traders, flea market etc. Talk-in on S22 & 7cm. Details Norman, tel: 021-422 9787 or Tom G8CAZ, tel: 021-357 1924.
* Yeovil QRP Convention - Preston Centre, Monks Dale, Yeovil. Opens at 9am. Trade stands, junk sale, lecture programme, old & new QRP rigs (GB2LOW), component stands, home-brew equipment display, refreshments. Talk-in on S22 from 9.30am. Details Dave G1MNM, tel: Yeovil 79804.

15 MAY
* 31st Northern Mobile Rally - Great Yorkshire Showground, Harrogate. Opens at 10.45am. More traders, *RSGB stand*, children's show, raffles, bar & refreshments. Talk-in on S22 by GB0NMR. General parking and entry is from Railway Road, off the Wetherby to Harrogate road. Arrangements for disabled visitors are as last year and entry in the vacinity of the Golf Club in Hookstone Wood Road. Details Harry G3CQQ, tel: 0943-602118.
* Cambridge & DARC Rally & Car-boot Sale - Coleridge Community College, Radegund Road, Cambridge. Opens at 10.30am (10am for disabled), trade stands, bring & buy, car-boot pitches, refreshmants. Talk-in on S22 by G2XV. Details Brian G4TRO, tel: 0223-353664.
* Mid-Ulster ARC Mobile Rally - ***NEW VENUE*** The Silverwood Hotel, just off the Lurgan/M1 roundabout. All the usual activities and more, traders, bring & buy, bookstall, RSGB Bureau, demonstration stands. Talk-in on S22 and HF. Oxford Island recreation area nearby. Details G1JWEM, QTHR.

22 MAY
* Swindon & DARC Radio, Electronics & Model Engineering Fair ***CHANGE OF DATE*** - Science Museum, Wroughton, nr Swindon, Wilts, signposted from M4 junc 16. Opens 10am, all the usual amateur radio attractions plus museum, model railway swap-meet, model aircraft flying display, radio controlled boats and cars, model steam engine rally, helicopter rides, vintage vehicles, traction engines and many other attractions for the whole family. Talk-in on S22 by GB2SMW and 70cm by GB3TD. Details Ken G8SFM, tel: 066689-307.

29 MAY
* 12th East Suffolk Wireless Revival - Civil Service Sportsground, Bucklesham, nr Ipswich. Opens at 10am, all the usual attractions, children's play area, model flying display, good family day out. Details Jack G4IFF, tel: 0473-464047.
* Plymouth RC Mobile Rally - Plymstock School, Plymstock, Plymouth. Opens at 10am, usual trade stands, demonstrations, raffles, refreshments. Talk-in on S22. Details Joe G1RXR, tel: 0752-662511.

5 JUNE
* Southend Mobile Rally - Rochway Centre, Rochford, Essex. Details G8EFG, tel: 0268-755331.
* Spalding & DARS Mobile Rally - Springfields Arena, next to Springfields Gardens, Spalding. Free entry to the gardens for all rally visitors. Talk-in on S22 and SU8. Details G4TWR tel: 0775-2940.
* Bolton ARC Mobile Rally - The Deane Sports Complex, New York, Junction Road, Bolton. All the usual trade stands, bring & buy, refreshments & bar, £100 free draw. Details Kenneth G6ZJL, tel: 0204-696906.

12 JUNE
* Elvaston Castle Mobile Radio Rally - Elvaston Castle Country Park, nr Derby. Usual traders, bring & buy, flea market, bookstall, arena activities, craft marquee, children's entertainment, full on-site catering. Family day out. Talk-in on 2m and 70cm. Details John G4PZY, tel: 0332-767994. Trade enquiries, Peter, G3WFU tel: 0332-700265 (evenings).
* RNARS Annual Mobile Rally - HMS Mercury, nr Petersfield, Hants. All the usual trade and display stands, attractions for the whole family. Details G4UJR tel: 0703-557469.
* Mid-Lanark ARS Open Day - ***NEW VENUE*** The Community Centre, Newarthill, by Motherwell (approx 1/2 mile from Wrangholme Hall). All the usual traders, bring & buy stall, demonstrations of packet radio & RTTY, lectures, EHI Trophy presentation, full catering. Talk-in on S22. Details David GM1SSA, tel: 0698-732403.

18 JUNE
* RAFARS Golden Jubilee Radio Rally - RAF Halton Air Show, Wendover, nr Aylesbury, Bucks. Signposted from A41 between Tring & Aylesbury. Opens at 10am, *RSGB stand*, usual traders, many attractions for the whole family, air show. Talk-in on S22 by G1RAF. Details Terry G4PSH, tel: 0296-85760.

19 JUNE
* Denby Dale Mobile Rally - Shelley High School, 5 miles SE of Huddersfield, W.Yorks. Opens at 11am (10.30 for disabled), usual traders, sideshows for the family, good food. Talk-in on S8, SU22 and 10m FM Details G3SDY tel: 0484-602905.

26 JUNE
* 31st Longleat Mobile Rally - Longleat House, Warminster, Wilts. All the usual traders and attractions. *RSGB STAND*. Details Brian G4FRG, tel: Portishead 848140.

IN BRIEF - More details later.

10 JULY
* Worcester & DARC Strawberry Rally - Droitwich High School. Details Steve, tel: 0905-424151.
* Sussex Mobile Rally - Brighton Racecourse. Details Bob G1IOS, tel: 0798-43841.

24 JULY
* McMichael 88 Rally - Haymill Centre, Burnham, nr Slough. Details Bob G0BTY.
* Anglian Mobile Rally - High Woods Sports & Leisure Centre, Severalls Lane, Colchester. ***CHANGE OF DATE*** Details G6HQI, tel: 0206-862403.

30 JULY
* Hilderstone Radio Rally - Hilderstone College, St.Peters Road, Broadstairs, Kent. Details David, G1YOR, tel: 0843-587170.

15/16/17 JULY
RSGB 75 - NATIONAL CONVENTION: National Exhibition Centre, Birmingham. Details RSGB HQ. Trade - Norman, G3MVV tel: 0277-225563
This year's event will be the largest ever and will include an exhibition of amateur radio equipment from the last 75 years. Social events will be held on Friday and Saturday evenings.
A special 75th anniversary luncheon will be held on Friday.
GB75AC (75th Anniversary Convention) will be active from 9-17 July.

18 JULY
RSGB HEADQUARTERS CLOSED FOR ONE DAY

19/20/21 JULY
RSGB 75 - HQ OPEN DAYS: Visitors welcome from 10am to 4pm each day.
Please use booking form (see centre pages) or send SSAE with request giving preferred day and second choice, am or pm and number of tickets required.

22/23 JULY
RSGB 75 - DATA SYMPOSIUM: Harrow School, Harrow-on-the-Hill. 2-day symposium covering all aspects of data communication.

24 JULY
RSGB 75 - FAMILIES' & ACTIVITIES DAY
An opportunity for all clubs, groups and societies to celebrate the RSGB's 75th anniversary in their own way. Almost anything goes but the event should involve the whole family and, if possible, the public.
Please run an amateur radio demonstration. A prize will be awarded for the most original idea.

28 JULY
RSGB 75 - INTERNATIONAL SATELLITE SEMINAR: Near Guildford. By invitation only. Details RSGB HQ.

29/30/31 JULY
RSGB 75 - AMSAT UK COLLOQUIUM: University of Surrey, Guildford. First day special technical meeting by invitation only. Last two days full lecture programme and social events for all delegates. Details Ron G3AAJ tel: 01-989 6741 (social hours please)

FULL DETAILS AND BOOKING FORM FOR ALL EVENTS ARE PUBLISHED IN THE CENTRE OF THIS MONTH'S ISSUE

31 JULY
* Scarborough ARS Rally - The Spa, Scarborough. Details Ian G4UQP, tel: 0723-376847.

7 AUGUST
* **RSGB MOBILE RALLY** - Woburn Abbey, Bedfordshire. Details RSGB HQ. Trade - Norman, G3MVV tel: 0277-225563.

14 AUGUST
* Derby Rally - Lower Bemrose School, Derby. Details Jack G3KQF, tel: 0332-772361.
* Flight Refuelling Hamfest '88 & Craft Fair - Merley, near Wimborne, Dorset. ***CHANGE OF DATE*** Details John GOAPI, tel: 0202-691649.

21 AUGUST
* Red Rose Rally - Bolton Sports & Leisure centre, Silverwell Street, Bolton. Details David G1IOO, tel: 0204-24104, evenings.

28 AUGUST
* Torbay ARS Rally - STC Social Club, Brixham Road, Paignton, Devon. Details G3KZJ.

4 SEPTEMBER
* 21st Preston ARS Rally - University of Lancaster. Details Godfrey G3DWQ.
* Telford Radio Rally & Exhibition - Details Martyn G3UKV tel: 0952-55416.
* 5th National Amateur Radio Car Boot Sale - The Shuttleworth Collection, Old Warden Aerodrome, nr Biggleswade, Beds. Details Tony GOCOQ.

Events Diary

11 SEPTEMBER
* Lincoln Hamfest '88 - Lincolnshire Showground, 4 miles N of Lincoln on A15. *RSGB stand*. Details John G8VGF, tel: 0522-25760.
* Vange ARS Rally - Nicholas School, Leinster Road, Basildon. Details Alan G4OJN, tel: 0277-624386.

17 SEPTEMBER
* Scottish Amateur Radio Convention - Aberdeen Exhibition & Conference Centre, Bridge of Don, Aberdeen. Details Graham GM8FFX, tel: 0224-630526.

18 SEPTEMBER
* Bristol Radio Rally - Brunel's Great Train Shed, Temple Meads Station, Bristol. Details Dave G4WUB, tel: 0272-839855.
* Peterborough E&RS Rally - Wirrina Sports Stadium, Bishops Road, Peterborough. Details Fred G4NOG, tel: 0733-77032.

25 SEPTEMBER
* RSGB HF CONVENTION - Belfry Hotel, nr Oxford. Details RSGB.
* Harlow Mobile Rally - Harlow Sports Centre. Details G4KVR tel: 0279-22365 (daytime) or G4MIS tel: 0279-722622 (evenings).

2 OCTOBER
* Great Lumley AR & ES Rally - Community Centre, Great Lumley, Chester-le-Street, Co.Durham.
* Wakefield Mobile Rally - Details Steve G4RCH, QTHR.
* Welsh Amateur Radio Convention - Oakdale Community College, Blackwood, Gwent. Details B.Davies GW3KYA, tel: 0495-225825.

8 OCTOBER (Provisional)
* Midlands VHF Convention - Details Peter G3UBX.

9 OCTOBER
* Armagh Rally - Drumshill House Hotel, Armagh. Details GI8RNX.

28/29 OCTOBER
* Leicester Amateur Radio Show - Granby Halls, Leicester. Details Frank tel: 0533-553293 daytime.

13 NOVEMBER
* Bishop Auckland Radio Rally - Venue to be advised. Details Morris, tel: 0525-314638.
* West Kent ARS Tonbridge Rally - Angel Centre, Tonbridge. Details Nigel G4KIU, tel: 0892-515321 or 515432.
* Red Rose Winter Rally - Bolton Sports & Leisure centre, Silverwell Street, Bolton. Details David G1100, tel: 0204-24104, evenings.

27 NOVEMBER
* Verulam ARC Christmas Rally - St.Albans City Hall. Details G4JKS tel: St.Albans 59318. Trade - Watford 52959.

OTHER EVENTS

15 MAY
* Newport ARS Grand Surplus Equipments & Junk Sale - Brynglas House, Newport, Gwent. Opens 11am (10.30 for disabled visitors), junk & flea market stalls only. Snacks & refreshments. Talk-in on S22 by GW1NRS. Details Bob GW4IED, tel: 0633-280958.

22 MAY
* RAIBC Romsey Picnic - The Fairground, Broadlands, Romsey. Details John G4COM, tel: 0703-693017.

14/15/16 JUNE
* Three Counties Show - Malvern, Worcs. Gloucester, Worcester & Hereford Radio clubs putting on combined demonstration station.

28 AUGUST
* Galashiels & DARS Open Day - Focus Centre, Livingston Place, Galashiels. Details John GM0AMB, tel: 0835-22686.

GB CALLS

The list below shows ALL the special event stations licensed for operation during February **(as at press date)**

It is taken direct from the GB Calls file on the HQ computer. These callsigns are valid for use from the date given but the period of operation may vary from 1 to 28 days. There's now no need to send details direct to the editorial office.

NOTE: This list is taken from the Headquarters' database during the first week of the month prior to publication. If you have an event which is taking place during the latter part of the month of issue, you must send your form in to Headquarters at least 10 weeks in advance to ensure that it can be processed ready for the listing, otherwise it will miss the copy date.

THROUGHOUT 1988:
GB75RS - 75 (ANNIVERSARY) RADIO SOCIETY (GB): RSGB HQ, Lambda House, Potters Bar, Herts. *Watch out for GB75HQ later in the year*

1 APRIL:
GB0RFC - ROYAL FLYING CORPS: Sleights, Whitby, N.Yorks. Details G3DAV.
GB1OVA - (WAB SQUARE) OSCAR VICTOR ACTIVATED: Coastline between Whitby & Scarborough. Details G1SGB.
GB1RFC - ROYAL FLYING CORPS: Bilton, Alnwick, Northumberland. Details G1YAA.
GB2EC - EISTEDDFOD CASNEWYEDD: Fairwater, Cwmbran, Gwent. Details GW0BNP.
GB2MWS - MACCLESFIELD WIRELESS SOC: Macclesfield, Cheshire. Details G0AMU.
GB2RFC - ROYAL FLYING CORPS: Marske-by-the-Sea, Cleveland. Details G0BIA.
GB4RFC - ROYAL FLYING CORPS: North Shields, Tyne & Wear. Details G4PUI.
GB500 - PAISLEY 500 CENTENARY: Town Hall, Paisley. Details GM0BLX.
GB6RFC - ROYAL FLYING CORPS: Peterlee, Co.Durham. Details G1WOU.
GB6RRA - RED ROSE AWARD: Hindley, nr Wigan. Details G1TAR.
GB8DDP - DENBY DALE PIE: Huddersfield, W.Yorks. Details G1FBC.
GB8NR - NUNSFIELD RADIO: Spondon, Derby. Details G3OCA.
GB8RFC - ROYAL FLYING CORPS: Barnard Castle, Co.Durham. Details G1WST.

2 APRIL:
GB1CDP - COASTAL DEFENCE "P": Portchester Castle. Grid: SU 624 046. Details G6MWY.
GB2UBB - ULSTER BOYS' BRIGADE: Ulsterville Presbyterian Church, Belfast. Details GI3YS.
GB4CMT - CONTINUOUS MODULATE TONE: Parachute Descent, Grindale Parachute Centre near Bridlington. Details G4CMT.
GB4SDC - ST DUNSTANS COLLEGE: Sidcup, Kent. Details G4OHX.
GB4SG - SAINT GEORGE: Lancing, W.Sussex. Details G3LQI.
GB75CTA - CHRISTCHURCH TWINNING ASSOCIATION: Ballon Theatre, Christchurch, Dorset. Details G3MDH.

4 APRIL:
GB0CDX - COASTAL DEFENCE "X": Golden Hill Fort, Freshwater, IOW. Details G3RJK.

5 APRIL:
GB2WFC - WALSALL FOOTBALL CENTENARY: Saddlers Club, Walsall, W.Mids. Details G4FAJ.
GB75WFI - WAKEMAN FOOTBALL INTERNATIONAL: Wakeman School, Abbey Foregate, Shrewsbury. Details G0IGM.

7 APRIL:
GB4RRS - RED ROSE SILVER: Bolton. Details G0FRL.

8 APRIL:
GB0AC/GB8AC - AILSA CRAIG: Grid: NS 03 00. Details GM3ITN/GM4FDM.
GB1CDY - COASTAL DEFENCE "Y": St.George Bks., Gosport. Grid: SU 617 001. Details G1WSL.

11 APRIL:
GB75GB - GUTERSLOH/BEESTON: The Square/St.Johns, Beeston, Notts. Details G2SP.

18 APRIL:
GB75SCP - STRATHCLYDE COUNTRY PARIL: Water Sports Centre, Motherwell. Details GM3MXN.

20 APRIL:
GB2FFR - FFESTINIOG RAILWAY: Porthmadog, Gwynedd. Details GW2HCJ.
GB4BSF - BLUECOATS SCHOOL FAIR: Details G4ZEP.

22 APRIL:
GB0IRM - INGERSOLL RAND MARATHON: Hindley Green, Wigan. Details G3BSA.
GB2EYC - EUROPEAN YOUTH CLUB: Devonshire Hall, Atherton, Manchester. Details G4HZJ.
GB2OSH - OLD SWINFORD HOSPITAL (SCHOOL): Hagley Road, Stourbridge, W.Mids. Details G4IEB.
GB4BKA - BEEKEEPERS ASSOCIATION: National Agricultural Centre, Stoneleigh, Warks. Details G4BCY.
GB4IMD - INTERNATIONAL MARCONI DAY: Poldhu Cove, Mullion, Cornwall. Details G4ZKH.
GB4SGD - ST. GEORGE'S DAY: Wisbech, Cambs. Details G4ODH.

23 APRIL:
GB0ACF/GB1ACF - ARMY CADET FORCE: 195 Co 'Queens' Army Cadet Force, Drill Hall, Leacroft, Staines, Middx. Details G4XEX.

24 APRIL:
GB1CDJ - COASTAL DEFENCE "J": Round Tower, Portsmouth. Grid: SZ 631 993. Details G6MWY.
GB1CDK - COASTAL DEFENCE "K": Fort Cilkicker. Grid: SZ 607 975. Details G1BHG.
GB1CDM - COASTAL DEFENCE "M": Fort Monkton. Grid: SZ 612 978. Details G1BHG.
GB1CDQ - COASTAL DEFENCE "Q": Square Tower, Portsmouth. Grid: SZ 631 993. Details G6MWY.
GB1CDV - COASTAL DEFENCE "V": Spit Bank Fort. Grid: SZ 636 972. Details G6MWY.

25 APRIL:
GB0CDK - COASTAL DEFENCE "K": Fort Cilkicker. Grid: SZ 607 975. Details G4WGY.
GB0CDM - COASTAL DEFENCE "M": Fort Monkton. Grid: SZ 612 978. Details G4WGY.
GB2BPR - BANGOR PIER RE-OPENING: Bangor Pier, Bangor, Gwynedd.
GB75WGG - WATFORD GRAMMAR (SCHOOL) GIRLS: Ladys Close, Watford. Details G0COQ.

26 APRIL:
GB0RRS - RED ROSE SILVER: Atherton, Manchester. Details G4NRN.

29 APRIL:
GB0IOS - ISLE OF SARK: Details G5LP.
GB500 - PAISLEY 500 CENTENARY: Town Hall, Paisley. Details GM0BLX.
GB6RRA - RED ROSE AWARD: Hindley, nr Wigan. Details G1TAR.

30 APRIL:
GB0FMF/GB8FMF - FOXBURY MAY FAIR: Foxbury School, Bridgemary, Gosport. Details G0DHZ/G1TOS.
GB1CDP - COASTAL DEFENCE "P": Portchester Castle. Grid: SU 624 046. Details G6MWY.
GB4LF - LLANTRISANT FESTIVAL: Town Hall, Llantrisant, Mid-Glamorgan. Details GW0DIV.
GB75LRA - LAND ROVER ANNIVERSARY: Solihull, W.Mids. Details G1RMJ.

1 MAY:
GB2HPR - HIGH PEAK RAILWAY: Matlock, Derbys. Details G0FWI.
GB2SME - SPEN MODEL ENGINEERS: Royds Park, Cleckheaton, W.Yorks. Details G4PHR.
GB4LAC - LYDNEY AIR CADETS: ATC HQ, Whitecross School, Lydney, Glos. Details G4ZFN.
GB5DP - DENBY (DALE) PIE: Shelley, Huddersfield, W.Yorks. Details G0BWB.
GB6BH - BARLBOROUGH HALL: Chesterfield. Details G0DAG.
GB75WAB - WORKED ALL BRITAIN: WAB stand, RSGB VHF Convention, Sandown Park, Esher. Details G6CSY.
GB8ATC - AIR TRAINING CORPS: 293 Cowbridge Squadron ATC. Details GW8XAN.
GB8RRR - RED ROSE RALLY: Bolton. Details G1100.

2 MAY:
GB75LRS - LOUGHTON RADIO SOCIETY: Loughton Hall, Essex. Details G3OPA.

4 MAY:
GB0CDX - COASTAL DEFENCE "X": Golden Hill Fort, Freshwater, IOW. Details G3RJK.
GB2AVR - ANGLESEY VINTAGE RALLY: Plas Coch Fields LlanfairPG, Gwynedd. Details GW0IQZ.
GB2HPR - HIGH PEAK RAILWAY: Rangers Office, Peak District National Park, Parsley Hay, Derbys. Details G0FWI.

6 MAY:
GB1CDY - COASTAL DEFENCE "Y": St.George Bks., Gosport. Grid: SU 617 001. Details G1WSL.
GB4RRA - RED ROSE AWARD: Bolton. Details G0FRL.

NEWS AND VIEWS

HF

*John Allaway, G3FKM**

AN INTERESTING LETTER from F8RU — who used to be involved with the administrative side of the ITU. In it, Ted draws attention to the widespread abuse of fake callsigns on the bands — mostly by dxpeditions who visit areas which do not yet have an official ITU prefix allocation. Examples quoted include the recent S0 and A1 activities. It's a pity that the correct procedure isn't followed, because it's very simple — it should be the operator's home callsign followed by /A; as, for example, ET3ZU/A which was adopted by an earlier expedition to Abu Ail. This is both legal and unlikely to annony the ITU!

Ex-G Radio Club

As mentioned before, there have been changes in the organisation of the Ex-G Radio Club, and I have received a letter from GM2CWL, who is now the UK secretary/treasurer. In this he says "The Ex-G Radio Club" was founded in 1959 by Reg Cherrill, W3HQO, a native of Kidderminster, along with others of similar background with a love of, and respect for, Great Britain and its citizens. Full membership is open to amateurs born in Britain and now domiciled abroad, although present citizenship is not important. Associate membership is open to amateurs living abroad, not British born but whose spouse or parents were.

Frank Fletcher, G2FUX, has, after many years of service, had to give up his post as UK sec/treasurer and we thank him for a job well done. Ken Haswell, GM2CWL, an active member since the club's foundation – both in the UK and the USA – has taken on Frank's task and is also handling the distribution of the *Ex-G Bulletin* in the UK. Ken will be happy to supply membership details, application forms etc on receipt of an sae at 6 Cameron Av, Balloch by Inverness, IV1 2JT. The general secretary/treasurer is now Ern Poole, WA8TGA, 5834 Mirando Drive, Fort Wayne, Indiana, 46815, USA.

The licence for the club callsign G4EXG is being transferred to G4OIS, George Reid. Club nets of interest to Europeans take place on Saturdays at 1830 on 14,065kHz (CW net), Sundays at 1730 on 14,105kHz (Canadian net) and at 1900 on 14,346kHz (Worldwide net), and every day at 1230 on 14,333, 21,410 or 28,850kHz (the Family net) depending on band conditions. There is also an informal net daily at 1200 on 7,090kHz, and all are invited to join in. The editor of the *Ex-G Bulletin* is George Nixon, G13OEN/W6,1140 Sherman Av, Menlo Park, Cal, 94025, USA. He is always looking for articles of interest, preferably with a UK or Commonwealth flavour, and if you can help please drop him a line.

Ron Meachen, 9H1R, in his shack at St Lucia, near Valletta, Malta

*10 Knightlow Road, Birmingham B17 8QB.

USSR/Canada Skitrek expedition

Planning for the amateur radio communications network in support of this expedition was in its final stages at the end of January, and CRRL president Tom Atkins, VE3CDM/VE8UA, and chief Canadian operator Barry Garratt, VE3CDX/VE8CDX, were on their way to Moscow to finalise the arrangements with Leo Labutin, UA3CR, and the Soviet amateur group. The skiers were scheduled to leave Cape Artichesky (on Severnaya Zemlya) about 1 March on their 1,750km journey over the North Pole to Cape Columbia on Ellesmere Is.

For the more than three months journey, daily radio contact will be maintained between the expedition and the teams of Canadian and USSR radio amateur operators at base stations in Severnaya Zemlya and Resolute Bay, as well as with Moscow, Dikson, Ottawa and Toronto. The special callsign for the main Canadian base station is CI8C. The amateur radio equipment used by the Canadian operators is provided by Icom, and includes hf and vhf base stations and amplifiers as well as handie-talkies for 144MHz and communication with the supply-drop aircraft.

Using the facilities of Sarsat/Cospas – the search and rescue satellites – together with Uosat 11 with its "store and forward" facility, it will be possible for the expedition to hear their location read to them over the 144MHz hand-held radios as Uosat passes over about every 100min.

N California DX Foundation

The NCDXF 20 January press release reports that KA6W and W6OSP have been elected to the board of directors. Ted, KA6W, is currently president of the N California DX Club, and Bruce, W6OSP, vice-president of the Redwood Empire DX Ass'n. The other members are W6RJ, W6OAT, W6DU, WB6UOM, N6HR, K6UD,K6TMB, W6SZN and W6QHS.

The NCDXF has donated a triband beam and transceiver to Robert, 3B9FR, on Rodrigues Is, and a transceiver to Abdul, YK1AO. Abdul's wife Siham, YK1YL, hopes to operate mostly on cw. These moves are in support of the objectives for promoting amateur radio in rare DXCC locations by assisting indigenous operators to get on the air or improve their stations.

US $4,000 has been committed to assisting the dxpedition to Kingman Reef and Palmyra Is planned by DJ8NK, F6EXV, W0RLX and others. US $2,000 had also been committed in support of the March expedition to Baker and Howland Is being led by Jim and Kirsty Smith, VK9NS and VK9NL.

The *Nella Dan*

The *Nella Dan*, which worked in the area of the Australian Antartic Territories, and was the transport which took and brought home nearly every VK0 operator heard in the past few years, is no more. G8PG has forwarded part of a letter from NM7M, who was on Macquarie in 1961 and 1963. This says "She was anchored close inshore for unloading (at Macquarie) when the weather got worse so they stopped unloading. Some time later she began to drag her anchors and was on the rocks in about 90 seconds. They didn't even have time to start the main engine. She was badly holed and stuck fast and they had a very hurried rescue operation using the LARCs to get the passengers and crew off. About 10 days later a salvage vessel arrived carrying some navy divers. They inspected the hull and reported severe damage. The salvage vessel nevertheless managed to haul the *Nell* off the rocks on a high tide and there was hope that she could be towed back to port for repairs. However, the salvage captain decided that he would not risk leaving people on board for the long tow through the roaring forties, as she could sink at any time. So the decision was made to tow her out to sea and scuttle her. On the way out the rising water engulfed a generator which caught fire, which spread and it became impossible to recover a lot of very expensive salvage gear . . . a sad story, but at least no one was killed or seriously hurt and she was almost at the end of her working life. . . ."

Bill Bennett, W7PHO

Morris Shepherd, W7LVI, RSGB member and trustee of the Western Washington DX Club has sent the following:

"On 23 December 1987 dxing lost one of its giants. Bill passed away at the operating position during one of his many turns on the 'W7PHO Family Hour' which has met daily on 14,236kHz for years. Bill founded the Family Hour and made it into an institution known around the world. DXers involved with it collected used equipment and shipped it to rare countries where amateurs were short of equipment. Bill co-ordinated the shipment with the help of several other dxers. The Family Hour had a "hat fund" and provided customised monogrammed caps that have been shipped around the world.

QTH CORNER

A15AA	B Drobnica, D6SI, Zedernweg 6, D-5010 Bergheim, FR Germany.
A15AB	Harry Jacob, DL8CM, Pfarrer Theisstr 4, D-6605 Friedrichstal, FR Germany.
KP4HL/KP5	
NJ7D/KP5	R L Burns, NG7X, Box 32, McKenzie Bridge, Oreg, 97413, USA.
P40P	Naoki Akiyama, PO Box 855, Newington, Conn, 06111, USA (not via WA6AHF).
P40V	
P4/AI6V	Carl Cook, AI6V, 11407 Tower hill Rd, Nevada City, Cal, 95959, USA.
REF	QSL Bureau, BP 2129, F-37021 Tours Cedex, France.
VK9LF	
VK9LM	DJ5QQ, R Muller, Alter Main 23, D-8601 Ebing, FR Germany.
ZC4NC	(Correction) ZC4 Bureau, JSB, BFPO 53, London.
ZL9AMO	R Wright, 28 Chorley Av, Massey Henderson, Auckland 8, New Zealand.
ZL9BQD	R Runciman, 36 Cardiff Rd, Pakuranga, New Zealand.
3D6AK	via R Unsworth, Spurs Lodge, Sagars Rd, Styal, Wilmslow, Cheshire SK9 4HE.
4S7QL	Yasme Foundation, PO Box 2025, Castro Valley, Cal, 94546, USA.
6W100ME	BP 3204, Dakar, Senegal.
7S8AAA	PO Box 441, Taby, S-18324 Sweden.
SX1RAAG	RAAG, PO Box 3564, GR-10210 Athens, Greece. (a)
ex-9v1TL	Peter Carbutt, G2AFV, 2 Cloudberry Way, Mapplewell, Barnsley S75 6EA, S Yorks. (b)

The group which activated BV0RY – the first to use rtty from Taiwan. L. to r: JH8KJW, JH8PNE, JA1UT and JG1RVN

"More than all the material things was the international goodwill he brought through his activities. He is now a silent key but his efforts will be carried on by many who recognise their enormous contribution to international goodwill.

"The Western Washington DX Club – which Bill helped to found – has established a scholarship in his name through the ARRL Foundation. The annual scholarship in international studies will go to a qualified amateur student. The cost of administration will be borne by the foundation, and the scholarship funded from the interest and the principal remains. Contributions to the 'Bill Bennett, W7PHO Scholarship Fund' may be sent to ARRL Foundation, 225 Main St, Newington, Conn, 06111, USA."

DX News Sheet

A reminder about *DX News Sheet*, which is an RSGB publication edited by Brendan McCartney, G4DYO, containing all the latest news on dxpeditions, operating habits of rare dx stations, QSL managers, propagation predictions, awards and much more. Mailed weekly from RSGB HQ by first-class post, the UK subscription is £18.50 per annum to Society members, £21.77 to non-members; an annual subscription covers 48 – 50 issues depending on the author's holidays etc. A sample copy is available by sending a foolscap or A5 size stamped addressed envelope to G3XTT, QTHR, but subscriptions must be sent to Mr T Charles at RSGB HQ.

Dxpeditions

A group consisting of DJ8NK, F6EXV, W0RLX and others is due to leave Christmas Is on 20 April for a seven-day period of activity from Palmyra Is beginning 22 or 23 April. After this, half-a-day's sailing should take them to Kingman Reef where they hope to be on the air during the first week of May.

The HIDXA visit to Baker and Howland Is was due to finish about 8 April.

Three very well-known Norfolk Is amateurs: (l to r) Bruce, VK9AD; Kirsti VK9NL, and Jim, VK9NS

DX news

In a note received a few weeks ago, G4KJV, QSL sub-manager for the G4Zs, said that he has received two cards for VP8 – one for VP8BFP sent via G4ZGM, and the other for VP8VOP sent to G4ZHK. It seems that neither G4ZGM nor G4ZHK keep envelopes to collect incoming cards.

Dave, K8MN, is in **Guinea-Bissau** for two years and using the callsign J25US. He seems to frequent 21.270kHz around 1800, and says that he will be on all bands and modes, including rtty.

3D6AK was due to leave **Swaziland** on 9 February, and is returning to the UK. QSL manager G3WPF says that logs for the periods 28 October 1985 to 22 March 1986 and 30 December 1986 onwards have been lost in the mail. However, copies will be available on Paul's return.

FR0EH has been supplied with a generator by the INDEXA to help him with likely visits to **Tromelin** and **Glorioso.** He is to be found sometimes in the INDEXA net on 14.236kHz at 1800. *Long Island DX Bulletin* reports ZD9BU on **Tristan da Cunha** on 21.334kHz from 1600. FH5EF was previously TL8RC and he will be in **Mayotte** for about two years.

Two conflicting reports about **Thailand.** One says that HS0A has now been given permission to operate at any time and that HS0B is still restricted to contest times. The other says just the opposite – good news for one of them anyway!

BY9GA, located in *CQ* zone 23, seems to like being on or near 14.030kHz from 1400. According to *DX News Sheet*, two stations were to be active from the highest mountain in China beginning on 19 February. Their callsigns were to be BT0ZML and BT0LS. Nothing is known about how long they may be there, but the QSL route seems to be via BY1PK.

VP8BNC is rumoured to be on the S Orkney Is and likely to be there until June.

There should be a yl operator on the air from **Wake Is** by now. This will be KH9AD, who was previously KX6AZ; her name is Annabel. Another lady operator in the Pacific area is Irma, VR6ID. She is believed to keep a schedule with her QSL manager KB6ISL on 21.305kHz at 1700 on Mondays and Thursdays. After this she will work other stations. Alternative frequencies to look for her are between 21.280 and 21.295kHz.

G3MCN should be on the air from the **Cook Islands** between 12 March and 20 April. His callsign was not known at the time this was being written. He hopes to be on from **Aitutaki** and **Raratonga**, and maybe other islands in the group. 5W1FT and 5W1FM have closed down and returned to New Zealand – all QSLs should now be sent to ZL1CAD.

Alan, ZL2BKM, will be at **Scott Base, Antarctica,** until October this year. He should be on the air with the callsign ZL5BKM. Quite a lot of Antarctic activity has been reported, with HD0AE being the first Ecuadorian callsign from the area. Others include the Italian IA0PS, located at Terra Nova Bay, and two Japanese stations – JH1QKN/LU-Z and JA7AFP/LU-Z – both at Marambio Base.

The Radio Amateur Association of Greece will be operating a special event station to celebrate its 30th anniversary. The callsign will be SX1RAAG and it will be on between 30 April and June.

An *Amateur Radio News Release* from ARRL dated 12 February said: "By unanimous vote (7-0), the ARRL Awards Committee has accepted the recommendation of the ARRL DX Advisory Committee to add Western Sahara, (S0), to the ARRL DXCC Countries List. However, whether Western Sahara is considered a brand-new listing or a reactivation of the deleted Rio de Oro (Spanish Sahara) listing was left to be

resolved by further consultation with the DXAC. Thus, pending resolution of that question, no details are yet available regarding submission of cards. However, the recent and continuing operation by S0RASD has been accredited and will be acceptable for DXCC credit."

LA DX Group weekend

This was mentioned in an earlier column but more information is now available. It will take place at Geilo Hotel og Turistsenter — less than four hours by car or train from Oslo in the Bergen direction. ON4UN will talk about low-band dxing and computer techniques, OH1RY will discuss lowband dxing from the Pacific area into Europe, OH2BH will have the S0RASD story, OH4NRC/OH7RS will describe the new contest station OH7AB, and W6KPC may also be present to talk about big antennas. The Peter 1 Is video will be shown, and LA5NM and LA4LN will talk about the Artic. There will be other attractions, including a dx forum and a dx dinner. Information is available from Bjorn-Henning Bergheim, LA4DCA, Nebbejordet 34, N-1266 Oslo 12, Norway (tel: +47 2 617385). Registration must be completed by 1 May.

Awards

Worked Scandinavia on CW
Issued by the Scandinavian CW Activity Group. Non-European stations need to work 50 cw stations from at least five of these countries: LA, OH, OY, OZ, SM and TF, and at least three must have been SCAG members. Europeans need 75 from five countries, and in this case five must have been SCAG members. All QSOs must have been since 1 January 1988. Send a list, certified by two other amateurs, of the calls worked, showing date, band, QTH, name and, in the case of SCAG members, their membership numbers. No QSLs are needed. The fee is US $7 or 17 ircs, and applications should be sent to R Meilstrup, OZ5RM, Bavnestein 6, DK-2850 Naerum, Denmark.

Worked All USA Award
This is a new HIDXA award and requires confirmed contacts with at least one HIDXA member in each of the 50 US states. It is also available to listeners. QSLs must be in the possession of the applicant, and a list (on a special form of which I can supply a photocopy) plus US $2 to defray postage and handling costs, should be sent to the HIDXA Award Manager, PO Box 90, Norfolk Is, Australia 2899. A list of HIDXA members is available from the award manager in exchange for US $2.

Polar Bridge Diploma
Issued by CRRL to mark the joint Canadian–Soviet Transpolar Ski Expedition. It is an oversize certificate in English and Russian, and to obtain it three QSOs with NWT (VE8), three with Asiatic USSR (UA9 or UA0), one contact with a base camp (in either Canada or the USSR), and one QSO each with Moscow and Ottawa – a total of eight – are needed. Listeners may apply. All contacts must be made between 15 February and 15 June, and certified log details plus US $5 or 10 ircs should be sent to Garry Hammond, VE3XN, 5 McLaren Av. Listowel, Ont. N4W 3K1, Canada.

Worked All Gozo Award
European stations must work eight different 9H4 calls, others five. Any modes and any bands, but all QSOs must have been made since 1 August 1972. Send certified log extracts to George Galea, 9H4F, St Josepf, St Lucis St, Kercem, Gozo, Malta. The fee is US$3, 12 ircs, or a crossed cheque for £2 payable to GARS. There is a "Gozo Net" every Sunday from 0700 to 0830 (winter) or 0600 to 0730 (summer) on 14,280kHz.

Contests

First of all, an apology to my good friend Jan Galicia, ON6JG, whose callsign unfortunately appeared as ON6JB in the January column in connection with the UBA Contest. He is of course the donor of the special plaque and not ON6JB.

SP DX Contest
1500 2 April to 2400 3 April
Rules for this were published last month. Since then the official rules for the 1988 event have been received from SP9ZD. The only point to note (if this reaches

HF F-layer propagation predictions for April 1988

The time is presented vertically at two-hour intervals 00(00)gmt for each band, ie 00=0000, 02=0200, 04=0400 etc.
The probability of signals being heard is given on a 0 (indicated by a dot) to a 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.

Time / / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	.....	....111...	....233333..	...24556662.	..1666677861	435544445797	864221123578	+4.....25+
MALTA	.....	.....11111..	....3344441.	...25666673.	1.1677778983	766755556898	997422223589	+++4.....2++
GIBRALTAR	.....	.....	....1111131.	....3344463.	...277777882	433765556797	997643223589	+++3.....2++
ICELAND	.....	.....	.....	.....111121.	24555651	2..355556786	765543233567	++52.....235
** ASIA								
OSAKA	.....	.....	....1221....	...13442l...	...25433323.	....21.13562	251	.....2.
HONGKONG	.....	....1111.....	....1344431..	...24555531.	..1134345751	1....11.13584	363	.....3.
BANGKOK	.....111.....	...1122221...	...2355543..	...34555662.	..1123336762	3....1.13587	1.....366	33
SINGAPORE	.....1111....	...1232221...	...3455554..	...34656762.	..1123336772	3....1.13587	1.....366	33
NEW DELHI	....1111.....	...123332...	...3455551..	..134556631.	1.2123336663	52.....13588	51.....368	2.....35
TEHERAN	....12221....	...2343332..	...44556651.	..154556773.	2143223368?4	853....13688	841.....368	5.....35
COLOMBO	....12221....	...2343332..	...34666651.	..134556773.	212113336884	62.....13688	51.....368	2.....35
BAHRAIN	...112222....	...2344442..	...45566752.	..2544567741	424322336886	863....13689	841.....368	+.....35
CYPRUS	...1222222...	...2345454..	...56777773.	1.2777778862	536665667897	986432334789	8731...11478	+4.....4+
ADEN	...1234432..	...2456664..	...456678731	1.1544567863	644311236898	973....13589	851.....368	+2.....35
** OCEANIA								
SUVA/S	.....	.....	.....11....	....1122221.	...13333463.	..1431.1252.	...2.....2..	.....
SUVA/L	.....2.	.....4.	1..11.....71	21.4311..173	222752211563	..2521..253.	...2.....2..	.....
WELLINGTON/S	.....	.....	.....111....	....223311..	...34333443.	..2431.12541	...2.....21.	.....
WELLINGTON/L	.....	.....	21	12.21.....43	333641...164	123521...342	..12.....21.	.....
SYDNEY/S	.....	....11.....	....234211...	...4553232..	..1554335641	...321.13572	341	.....2.
SYDNEY/L	.....	.....	....1.....2	....4.....24	2112521...65	1.1331..1263	...1.....241	.....
PERTH	....121.....	...2342.....	...46651....	..1576521...	11235333343.	31..21.13575	1.....365	32
HONOLULU	.....	.....	.....1..	.....1..221.	23114521	..1321.122..	..12.....	.....
** AFRICA								
SEYCHELLES	...1234432..	...24566641.	...456778731	2.1444667863	644211336898	963....13589	84.....368	+2.....35
MAURITIUS	...1234443..	...24566651.	...456778841	2.1545667864	734322335898	973.....3589	851.....368	+2.....35
NAIROBI	...1235554..	...24567761.	1..556678841	311644568974	864411235898	9851.....3589	872.....368	+5.....35
HARARE	....2466651.	...14577872.	1..466778952	421655568985	874522235799	9962....2589	884.....268	++.....35
CAPETOWN	....236774..	...14578871.	...376778852	2..675567975	73.743235799	98441...2589	8862.....268	++3.....35
LAGOS	....2367762.	....4577884.	11.266678972	43.565457995	884742125799	99751...2589	7862.....268	5+3.....35
ASCENSION Is	....2234662.	....4445785.	66567982	22..75446894	774253113798	99853....489	8862.....168	5+3.....35
DAKAR	....1245562.	....3456785.	66667881	22.175445894	774563212698	99853....379	8862.....157	5+3.....25
LAS PALMAS	.....122231.	....2344463.	56677861	...277778883	543676666898	998753333589	997421111368	++4.....3+
** S. AMERICA								
Sth SHETLAND	......35552.	......57775.	1678871	1....3567884	621123335778	886421..2457	7862.....125	4+3.....2
FALKLAND Is	......34552.	.....156775.	3678871	12.1.5567884	664534334578	998531..1247	8862.....25	++3.....2
R DE JANEIRO	.....233352.	.....455575.	6666872	11.116545784	664544322478	998531...159	8862.....27	++3.....4
BUENOS AIRES	.....123342.	.....345565.	5676772	11.1.6565684	664424332368	998531...137	8862.....15	++3.....2
LIMA	......11122.	......23343.	454562	1...21554464	532242332236	887531.....4	6863.....1	3+3.....;
BOGOTA	.......1111.	......12233.	1444552	1....2544454	521133321136	886431.....4	68631.....1	3+3.....;
** N. AMERICA								
BARBADOS	......11121.	.....222343.	4444562	1...16544474	532234321257	987531....26	8863.....3	5+3.....
JAMAICA	.....11.	......11122.	333441	1444454	41..13331126	775321.....3	58631.....1	2+3.....
BERMUDA	.....11.	......11122.	2333451	3444464	41..14322256	875321....25	68631.....2	3+3.....
NEW YORK	.....	.....111.	222341	1333453	31...3332346	763221....14	58631.....1	253.....
MEXICO	.....	.....111.	122331	243332	31..1.232113	453221.....1	26621.....	.33.....
MONTREAL	.....	.....11.	122231	1333453	3....3332356	653221....24	58621.....1	253.....
DENVER	.....	.....	.....1.	11121	2.....123223	3422....1..1	15521.....	.23.....
LOS ANGELES	.....	.....	.....11.	12221	1.....24222	23221....2...	.3521.....	..3.....
VANCOUVER	.....	.....	.....	.....1.	1.....12222	22221...121.1	.252.....	..2.....
FAIRBANKS	.....	.....	.....	.....	21112211	111321.12211	.122.....	.....

The provisional mean sunspot number for January 1988, issued by the Sunspot Index Data Centre, Brussels, was 59·6. The maximum daily sunspot number was 97 on 14 January and the minimum was 25 on 3 January. The predicted smoothed sunspot numbers for April, May, June and July are respectively: (classical method) 46, 48, 50 and 51; (SIDC adjusted values) 47, 49, 54 and 60.

readers before 2 April) is that on 3·5 and 14MHz the contest preferred segments should be used. These are 3·6 to 3·65MHz, 3·7 to 3·8MHz, and 14·125 to 14·3MHz.

Helvetia Contest
1300 23 April to 1300 24 April
CW and ssb but no ssb on 1·8MHz. Mixed mode only. Single, multi-operator and listener sections. Work Swiss stations and send RS/T plus serial number (from 001); Swiss stations will also send two letters indicating their canton. These are AG, AI, AR, BE, BL, BS, FR, GE, GL,GR, JU, LU, NE, NW, OW, SG, SH, SO, SZ, TG, TI, UR, VD, VS, ZG and ZH. Each QSO counts three points, and a station may only be worked once on each band. The multipliers are the cantons on each band added together. Use separate log sheets for each band and note that logs with more than one per cent of duplicates will be disqualified. Enclose summary sheet listing total QSOs and a list of cantons worked on each band, category, usual signed declaration and name and QTH. Mail to reach Walter Schmutz, HB9AGA, Gantrisweg 1, CH—3114 Oberwichtrach, Switzerland, no later than 31 May.

As I always point out, this contest is an excellent way in which to make contacts with the rarer cantons for the very attractive Helvetia Award.

G QRP Club Winter Sports 1987
Not a forthcoming attraction, but of interest in retrospect. G8PG reports that this year the sports provided an outstanding feast of QRP dx working, together with massive European activity. At least 33 countries were active. On 3·5MHz the 2W signal from AA2U provided two-way QRP contacts with G and GM, and he also worked several QRO Europeans. G3PDL worked VP2IM who was running 2W. On hf, GM4HBG worked QRP stations in AP, VK, VU and ZL. VS6VT put Hong Kong on the QRP map, working GM4YLN, GM3OXX/A, G3PDL and G8PG, and perhaps others. Transatlantic QRP/QRP contacts were so numerous that space does not permit listing them. There was massive European activity from northern Norway to Romania and including the USSR. It was good to note that many of the stations working the rarer dx were using simple "back-garden" antennas of moderate height, and of course power not exceeding 3W. Such activity not only represents the true spirit of amateur radio,, it also means that those who practice it are doing their bit to reduce the amount of self-generated pollution on our bands. *(How much I agree!)*

Results of the **2nd IARU World Championship** have appeared in February *QST*. UK scores are as follows. Single-operator, mixed-mode: GW4RHW (21,141 points), G4VGO (4,970). Single-operator phone: G0AEV (130,220), GB6AR (99,432), GW4BLE (55,067), GM4WEW (13,975), GM4HQF (10,120) and G0/DL2DN (1,664). Single-operator cw: G3ESF (120,225), GM3CFS (58,024), G0/KB4GID (49,068), G3DFV (33,920), G3TXF (24,440), and G0/WC6U (3,822). In the multi-operator single-transmitter class, GB4DX scored 851,072 points.

G2BUJ and G6ZY at the 1987 RSGB HF Convention. This was Stanley and Percy's first meeting since they were both in Gibraltar in 1941 and both founder members of the Gibraltar ARS

1988 28MHz COUNTRIES TABLE

G4JBR	50	
G4MUW	50	(ssb)
G4XAH	35	(ssb)
G0DNV	34	
G4OBK	11	
G4NXG/M	5	

10MHz COUNTRIES TABLE

	All-time	1988	
G3PJT	101	—	
G4VDX	71	—	
G4YWG	64	—	
G4OBK	57	—	
G4XRV	19	18	
G4YSN	1	—	

Band reports

A little better this time, as *Rad Com* reached some of the regular contributors a few days before the deadline, and the following managed to send in their reports: G2HKU, G5JL, G8PB, GM3CSM, G3s GVV, KSH, YRM, GM4CHX, GM4ELV, GW4KGR, G4s MUW, NXG/M, OBK, ULS, XAH, G0DNV and GW0IER.

As always, stations listed in italics were using cw.

1·8MHz. 0000 *LZ9A*. **0100** 5B4OA, *7X5AB*. **0200** *KP2A, SV1NA*. **0400** *UL7MU*. **0600** *W2GD/OH0, W1–5, W8–9*. **0700** CP8HD. **1900** *OH0MB/OJ0*. **2200** *K5NA, PA3AXU/SU, UL7ACI*. **2300** *EA9EU, J25US, OY9JD, UD6DC, 9M2AX*.

3·5MHz. 0600 *UZ0BWF, VP5CPU*. **0700** N2EDF/NP1. **1800** OH0MB/OJ0. **2300** J56AS, *OY7ML, VS6DO*.

7MHz. 0000 *K2SG/NP1, VP2MT, VU2SU*. **0100** 8P9AF. **0600** HK0HEU. **0700** *ZL2–3, W6KG/4S7*. **0800** *K0HJ/HP1, JA, PZ1AZ, ZL0AFZ/9*. **0900** *VK2–3*. **1500** RA9XB, *VU2FOT, W7MB, YC3HCM*. **1600** UZ9AWZ. **1900** *4X1FC*. **2200** *TK5IU, ZP2CA*. **2300** *C X8BHH, VU2FOT, YC3HCM, 5H1HK, ON7VB/5N6*.

10MHz. 0800 *VK5FE*. **0900** *AH2BA, HV1CN, N5V V, VK2–4, W0, ZL1*. **1600** *W6OV*. **1800** *JE1DLJ, ZC4JV*.

14MHz. 0800 BY4SZ, *FK8FG*, FO0AQ, J56AS, JD1AMA, KX6AO, ZL7AA, *4K1F*. **0900** DU9RG, JA, *NY6M/KH2*, VK2ETT/LH, P29DS, VI88ABC/P, *VS6DO, ZL0AFZ* (LP). **1000** BV2B, VK9LF, ZL9BQD. **1100** *K7SLI, VS6VT*. **1300** J73JM, 4U1VIC. **1500** FT5ZB, *VK6LW, W6OV* (Idaho). **1600** FR0EH, FT5ZA, *KL7PJ, VQ9KR*. **1700** KH6IJ, VX6OCO. **1800** W6–7. **1900** J52US, *PY0FZ*, S0RASD, ZC4BX, *9L1GG*. **2000** FJ5AB. **2100** *K2SG/NP1, PJ2/W1BIH*. **2300** *K7SS*, NJ7D/KP5, W7.

18MHz. 1400 *VE1–3, 5B4OG*. **1500** *DJ0FX/CT3*. **1600** *VE3, VE7AKI*.

21MHz. 0800 HL0B, JA. **0900** BV2DA, BV2FA, *BY8AC*, VK, *VK9YA*, ZL, 3C1MB. **1000** TA3D, VK9LM, ZL3AFT. **1100** FY5EM, *HS1HK*, VK, *VS6DO, ZL*. **1200** *F2JD/A6*, A71BJ, J52US, PZ1AV, PA3AXU/SU, 4S7PVR. **1300** *N4PWICE3*, HK0HEU, 6W7OG. **1400** HH7PV, *K2SG/NP1*, PY0FZ, *VP5CPU*, XE1HOS, ZF2FH/ZF8, 5V6WD, *9Q5DA*. **1500** *A15AA*, OD5AS, *NW7B* (Nev), TA1AF/3. **1600** FM4EB, J56AS, W6–7. **1700** *K2SG/NP1*, V31PC, ZD9BV.

24MHz. 1000 *KV4AD, VK6AHG*.

28MHz 0900 *J28SI*, VU2SMT. **1000** JY9LC, PA3AXU/P/SU. **1100** *CT3CU*, VK6CF. **1200** S0RASD. **1300** FR5DX, TJ1DL. **1400.** FH8CB, WP6BDI, 5H1HK. **1500** PY0FC, 6W7OG. **1600** CE4DLG, VP8BKK, 3B8FP.

The following are thanked for news items extracted: *DX'press* (PA3CXC), *CQ Magazine* (WIWY), *DXNL* (DL3RK), *Long Island DX Bulletin* (W21YX), *DX News Sheet* (G4DYO), *The Ex-G Radio Club Bulletin* (GI3OEN/W6), *Long Skip* (VE3IPR), *Lynx DX Group Bulletin* (EA2JGO), *DX Report* (VK9NS), and the *DX Family Newsletter* (JH1KRC).

Closing date for receipt of material for **June** issue is 9 April. □

DX LISTENERS' CENTURY CLUB AWARD

The DX Listeners' Century Club Award offers swls an award equivalent to the ARRLS's DXCC. Applicants require confirmation of having heard amateur stations in at least 100 DXCC countries. Endorsement stickers are available for every additional 25 countries confirmed.

A five-band endorsement is also available for the DXLCCA for confirmed reception of at least 100 countries on each of five bands. The same countries do not have to be heard on each band.

ISLANDS ON THE AIR AWARDS PROGRAMME

The Islands On The Air awards programme, first introduced in the mid-sixties by Geoff Watts, founder of *DX News Sheet*, has since 1985, been administered by the RSGB.

The IOTA programme is based on working (or hearing, in the case of swls) and confirming offshore islands and island groups, irrespective of DXCC status. Thus, for example, the Orkneys and the Inner Hebrides would qualify separately for the various awards, whereas Jersey and Guernsey both count for the Channel Islands. One of the features of IOTA is that new islands and island groups are constantly being added to the list as and when they are activated, so there is always something new to chase. For most IOTA enthusiasts, the starting point is the IOTA Century Club Award, for 100 confirmed island groups. However, there are 15 separate awards available as follows:

IOTA ASIA	IOTA BRITISH ISLES
IOTA EUROPE	IOTA NORTH AMERICA
IOTA OCEANIA	IOTA SOUTH AMERICA
IOTA WEST INDIES	IOTA WORLD DIPLOMA
IOTA CENTURY CLUB 100	IOTA CENTURY CLUB 200
IOTA CENTURY CLUB 300	IOTA CENTURY CLUB 400

Another feature of the programme is that an Honour Roll is published twice a year in *DX News Sheet* – the latest included scores from almost 130 IOTA enthusiasts worldwide.

The best way to get involved in IOTA is to send for a copy of the *IOTA Directory*, which gives full details of all the IOTA awards and lists all island groups currently recognised for the IOTA programme. The directories are available from G3KMA, who is the awards manager for IOTA, at a cost of £1.50. All IOTA claims, enquiries etc, should also go to G3KMA, whose address is La Quinta, Mimbridge, Chobham, Woking, Surrey GU24 8AR.

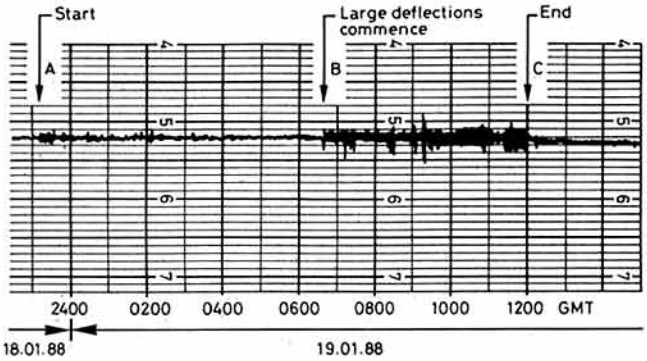
VHF/UHF

*Ken Willis, G8VR**

Aurora

Last March I mentioned a home-brew magnetometer of a type used by members of the Aurora Section of the British Astronomical Association to give indications of changes in the earth's magnetic field which often signify the onset of an aurora. Nearly 100 readers requested information on this instrument, and subsequently several were constructed by radio amateurs. The weakness of this simple "Jamjar" magnetometer is that it achieves its sensitivity by the use of a long "optical lever", so it is important that the instrument remains rigidly in a fixed position and that the observer always positions himself exactly in the same place when taking a reading. It also requires a large floor space if it is to be permanently mounted, and is subject to deflection by stray magnetic fields.

Doug Smillie, GM4DJS (Strathclyde), overcame some of these limitations by adapting his instrument to include a photo-multiplier tube as the light detector, following it by a signal amplifier driving a pen recorder. The illustration shows just how successful was this modification. It is a pen-recorder trace of geomagnetic activity observed to commence at 2300 on 18 January and continuing until 1600gmt the following day. Doug comments: "RSGB News on Sunday 17 January made reference to predicted auroral activity. My recorder indicated trace variation on 19 January (as shown on the chart)". While Doug is of course well-placed to



observe such effects, this is nevertheless a very fine example of a record obtained from a simple instrument, which should encourage others to use the technique. Russ Wicker, W4WD/7, is another who built one of these instruments, and when I last heard he was planning to use a laser beam as his light source, hoping to adapt a unit used for providing lighting effects in discotheques. Anyone still wanting details of the magnetometer should send me a large sae plus 30p in stamps for a photocopy of Ron Livesey's article.

Ron is director of BAA Aurora Section and a regular contributor to this column. In return he receives information on radio auroras, and in his last report dated 17 January he commented that "the new auroral cycle is building up again". He also noted that during last December there were seven days in the month when solar activity was at "storm" or "very unsettled" levels, and nine days when it was "unsettled". Radio auroras were reported on 21 and 22 December, and on 2, 3, 7, 8, 14 and 16 January, though not all were observed in more southerly latitudes. John, GM8DFX (Sutherland), observed auroras on "several days" in January, the events of 2 and 14 January being strong ones. In the 2 January event, G4IJE worked into GM on 50MHz, and he found another aurora on the band on 6 January. The 14 January event he described as a major one which started at 1715gmt and went on into the small hours, with several operators making calls towards the USA on 50·110MHz since USA stations were being copied on 28MHz at the time. GI8YDZ heard beacon OX3VHF during the same event. In a final comment, Paul said he "heard a lot of solar noise on 50MHz on 19 January – in the past sun noise has meant an impending aurora – but as far as I know nothing happened". This was when GM4DJS was recording magnetic activity with his jamjar magnetometer.

*6 Lerryn Gardens, Broadstairs, Kent CT10 3BH.

Reports received suggest that the aurora of 2 January was the best for some quite some time. For Ron Adams, GM4ILS (Elgin), it was a two-phase event lasting from around noon until 1900gmt, with a gap between 1440 and 1840 on 144MHz; he made more than 40 contacts with G, GM, GI, PA, Y, LA, D, SM4,7, OH and UP. The most southerly station worked appears to have been G6GN (Avon). Ron commented that at his location, beacons SK4MPI and GB3LER are often heard aurorally but never seem to appear together. He also noted that in this event G4ASR's signal exhibited considerable droppler shift, perhaps as much as 2kHz negative.

Bill Stirling, GM4DGT, was another Scottish station to take advantage of this event, operating on 50MHz. It started with him at about 1500 but in the early stages "dipped and rose frequently", so he was unable to raise anyone except GM0FWV in Glasgow. He resorted to the telephone to alert G4UPS and GW3LDH, subsequently working them both, followed by several contacts with G, GI, GW and GJ. He was called by an LA but no contact resulted, though he understood that GM3WYL worked LA6OJ at around 1530. The aurora lasted until after 1900, and in four separate contacts with GW3LDH, the optimum antenna heading was different on each occasion, varying from 25° to 315°.

An interesting letter from Kjell, SM4GVF, who is at university in Gothenburg, said that while at home on 2 January, he noticed the aurora at 1400 and made his first contact at 1525gmt, after which he had 62 contacts in 25 squares. He worked F6FLB, and nearly made it with ON4AUR; he has heard that he was repeatedly called by EI5FK and EI4DQ. Kjell made several useful comments about operating in an aurora, which I will try to include next month, but it was interesting that he also mentioned the high droppler shift in this event, saying that most G stations were at least 1kHz down. Most of his contacts were made on a beam heading of 290°.

Some 70MHz indicators

A letter from Steve Scanlon, G8HQY, should be of interest to all 70MHz operators. He says that by the end of this year the allocation 97·6 to 102·1MHz, currently used by the police and fire services, will be cleared to make way for fm sound broadcasting. The 70MHz amateur band was reduced in the 'eighties to open up the slot 70·5 to 71·5MHz, which will in future be used by the fire services. The police are understood to be moving to the bands 152-153MHz and 154-156MHz.

Steve goes on to say that several counties have already moved their fire service communications into the new band, where the transmitters provide excellent 70MHz "beacons" which eventually will cover the entire country. Since the stations are, or will be, sited mainly at vantage points such as hilltop locations, the signals should generally be good, and Steve feels that the amount of traffic they will carry should make these transmitters very useful as indicators of conditions from about 0800 to midnight throughout the year.

Most counties tend to abbreviate their callsigns and use only the last two letters; for example, M2VI would announce as "Vee Eye". The first of these two letters identifies the appropriate location of the station as follows:

H	Home Counties	V	Eastern England
K	South East	W	Wales
L	North of England	X	Yorkshire
N	East Midlands	Y	West Midlands
Q	South West	Z	Scotland

Steve has already copied several stations, as listed below, all on an indoor whip antenna at his Birmingham location:

M2NZ	70·5375MHz	Notts	M2VI	70·9000MHz	Herts
M2YS	70·600MHz	Warks	M2HI	71·1000MHz	Oxon
M2NK	70·6625MHz	Leics	M2VM	71·1125MHz	Beds
M2VF	70·7000MHz	Norfolk	M2WK	70·1625MHz	Denbigh
M2ND	70·7125MHz	Derbys			

Meanwhile, if any readers have heard stations other than these, perhaps they would send in the details. Steve feels, however, that because commercial companies provide and install the equipments, an RSGB member somewhere is probably involved professionally and able to provide a full list of frequency allocations and callsigns of all stations which eventually will be in operation. If so, perhaps he or she would send us the information for publication because this potential "beacon" coverage of the UK near to our 70MHz band can only be both of interest and value to those who operate in this part of the spectrum. In the past we have had good value from Polish fm broadcasting stations close to 70MHz, but while these are good for sporadic-E or meteor scatter, they are less effective as tropo or extended ground-wave propagation indicators, so for once an extension of commercial communications into what once were the realms of the amateur is likely to be a distinct advantage.

Officially, of course, monitoring communications from any of the essential services is not permitted in this country.

Activity from IO78 (XS) square

John Lincoln, GM8DFX, was prompted to write after reading the report of an expedition to Sutherland in the January column. He is resident in IO78 (XS) square at Bettyhill, and after being re-licensed last August, is now active on 144MHz. He says that his location is far from ideal, with Ben Hope (927m), Ben Loyal (736m) and Foinaven (908m) all within 3 or 4km, towards the west, while the land rises about 150m in all other directions except to the north. This means that his path to the south is by no means easy, but he has heard stations in Central Scotland. Auroras provide his best chance of working 144MHz dx, and the score so far is 14 squares and four countries, but as yet no contact with anyone in his own square.

John says that as far as he knows there are no other resident Class B operators in the square; indeed, the only other amateur in the area is thought to be GM4NGY who prefers the hf bands. For those who like to look these things up on the map, John is located at Lat 58° 31'N and long 4° 13'W, the locator being IO78VM or XS49d. When a GM is pleased to hear other GMs on 144MHz it gives some idea of both the terrain and the low population density in the region. Imagine someone in the south being over the moon at working another G! The only time I have worked the square, in more years of operation than I care to remember, was by meteor scatter, and I recommend this mode to John since he will then be much in demand by Continentals wanting the square. If he were to go Class A and operate cw ms I am sure that his score would soon show a mighty increase.

Meteor scatter

The great potential which meteor scatter offers for working long distances on the 50MHz band is not being realised because too few operators use the technique. Paul Turner, G4IJE, has produced a first-class guide to meteor scatter operation, with particular reference to the 50MHz band, which he will send to anyone who sends him an sae. His address is 61 Primley Lane, Sheering, Bishop Stortford, Herts CM22 7NH. Operators need not be put off if their equipment for 50MHz is simple, for antennas such as dipoles will often out-perform the more "gainy" Yagis over the medium distance meteor scatter paths to GM, GI etc because their radiation patterns provide the higher angles of radiation needed for these ranges. As a further means of encouraging ms operation, Paul has provided the following list of showers for the remainder of the year together with suggested best times for inter-UK or UK-LA contacts.

Sat	7 May	(Piscids)	06-08 and 12-16gmt
Wed	8 June	(Arietids)	06-08 and 11-15gmt
Sun	26 June	(June Perseids)	06-08 and 12-16gmt
Tues	12 July	(Nu Geminids)	06-08 and 12-16gmt
Fri	12 Aug	(Perseids)	21-01gmt
Sat	13 Aug	(Perseids)	09-13gmt
Tues	13 Dec	(Geminids)	06-08 and 20-24gmt

The frequency for random contacts is 50·350MHz plus/minus 5kHz, using ssb.

The *ZS6WB VHF Newsletter* recently reported a new 50MHz meteor scatter distance record when, on 21 November, ZS2NR worked A22KZ by this mode.

Moonbounce

Readers have asked why I do not write about moonbounce. The reason is that since only a handful of operators are authorised to use the necessary power for this mode, I have to assume that the topic is of limited interest to the bulk of the readership, and must be omitted unless and until more space is made available for vhf/uhf reporting. However, I am planning to include a short piece on this subject soon.

Meanwhile, Ray, K5ZMS, writing in *World Radio* February 1988, describes some 50MHz eme operation by K6MYC, WA4NJP and W6JKV, who have "been bouncing 50MHz signals back and forth off the moon at each other for several months". Before you rush out to try this, note that Jimmy, W6JKV, uses two antennas with 50ft booms, mounted side by side and horizontally polarised, while Ray, WA4NJP, has four large antennas. It is true that Mike, K6MYC, has had contacts using a single antenna, though I bet it is a big one. Other stations using single antennas have reported hearing 50MHz signals off the moon, so if you have the backyard space to erect something with a 50ft boom, maybe you will hear some of these signals too. Be careful about using it for transmitting though, because you won't need much power into such an antenna to reach *our* authorised erp! Ray and Jimmy had their first 50MHz eme contact on 23 November 1987 at 0100gmt, which they think may be a "first". They chose a time when their antennas could be at high elevations, and signals were said to be "strong and very consistent".

French amateurs get 50MHz

As announced in March "News Bulletin", French amateurs can now apply to operate on the 50MHz band, subject to quite stringent restrictions, namely:

- No activity within a radius of 150km around a Channel 2 tv transmitter, transmitter, or within the service area of Channel 3 or 4 transmitters.
- Activity permitted with eirp limited to 3W within a radius of 150 to 200km from a Channel 1 transmitter. Beyond 200km, 10W eirp.
- Band to be 50-51-MHz, with operation from a fixed station only using cw, ssb, rtty or packet. A formal application must be made to the licensing authority to operate on the band.

As F/G8TPF says; it is a start, though unfortunately he is in one of the unauthorised areas. Using a home-brew transverter, he has so far heard only meteor pings from some UK beacons. It is a pity that Corsican amateurs cannot use the frequency, since this would have been an excellent QRB for sporadic-E and meteor scatter modes.

Expedition

Dave, G4GLT, passed on some information from Bud Weisberg, K2YOF, relating to a proposed expedition this summer to Saba Island, part of the Netherlands Antilles group with prefix PJ6. Some 6 Metre DX Society members, notably WB2CZB, N3AHI and W1EXC, plan to go there between 7 and 14 July. Although the trip is primarily to provide a rare prefix for 50MHz, they will operate on all bands 3·5 to 50MHz using ssb and cw. Particular attention will be paid to exploring 50MHz multi-hop paths to the UK and Europe, while WB2CZB will "actively solicit QRP contacts". Bud said in a covering note that propagation northward from PJ6 should be much better than from PJ7 (St Maarten) where mountains form a block to the north. The square is FK87, some 4,125 miles from London. A special call, PJ6M, has been issued. More information later when received, but make a note in your diary now. Should you be one of the lucky ones, QSLs should go to K2MUB with saes and a few ircs, which would be a small price to pay for such a card.

RSGB National VHF Convention

The 1988 VHF Convention will be held at Sandown Park on 1 May. Full details appear in the March issue.

As usual there will be a full turnout of traders offering a very wide selection of equipment and components. The afternoon programe of six lectures has been arranged with a view to minimising the risk of schizophrenia brought on by a desire to attend all sessions simultaneously; the new format also providing slots for two forums (morse and vhf contests) and two general meetings.

This is a great opportunity to meet fellow vhf/uhf addicts, keep abreast of the latest developments in equipment and techniques, and to find those elusive components. If the weather is good, the grounds of Sandown Park are excellent for family picnics or simply for lying in the sun while describing that rare prefix which got away on 144MHz. If wet, there is plenty of space inside the halls. Parking facilities are also very good.

From here and there

Edmund Ramm, DK3UZ, reminds us that the *Dubus*-sponsored vhf/uhf dx contests are held during the first full weekends of March, May, July, September and October, from 1400gmt Saturday until 1400 on Sunday, so the next one comes up on 7/8 May. Anyone wanting details of the scoring system etc please send me an sae plus a 10p stamp to cover photocopying. Contest logs go to DL4EA for 432MHz and higher bands, and to DK3UZ for 144MHz entries.

Maureen, GW8ZCP, wants it to be known that the agm of the 6 Metre Group will be held at the VHF Convention at Sandown Park at 11.30am on 1 May 1988. Issue No 17 of *Six News* edited by Maureen contains a lot of fascinating operational information covering the events of last summer and reads more like a hf band news-sheet with all the exotic prefixes worked on 50MHz.

Another agm scheduled to take place at the VHF Convention is that of the Remote Imaging Group, starting at 3.15pm. Henry Neale, G3REH, is one of the driving forces behind this group, and I have asked him to provide a summary of what can be done in this field to reproduce here in a future issue, since several readers have expressed an interest but are unsure how to proceed.

Angus MacKenzie, G3OSS, who is chairman of the Radio Amatuers Invalid and Blind Club, has asked me to mention that he holds a net for RAIBC members in the London and home counties area every Friday night on 145·350MHz, starting at 10pm. He says that it often continues for as long as two hours, and there is no set time for it to wind up: those wishing to call in will be made very welcome.

Another net, notified by Jack Hum, G5UM, is the East Midland fm net on 50MHz. It convenes every Friday evening at 7.30pm on 51·41MHz (100kHz below the fm calling channel). The frequency was previously 50·40MHz, so note the change. Anyone is welcome to call in, especially from outside the East Midlands area, since one of the aims is to increase activity on the band.

G5UM also reports the first-ever award to a Class B licensee of a 70MHz Standard certificate. It went to Gordon Emmerson, G8PNN, of Northumberland, who, in the seven months following the release of the band to Class B operators, worked four countries and 30 counties — and got the QSLs — to qualify. The only other Class B operator in his list of stations worked was a near-neighbour, G6BIA. It is good to learn that there are still as many as 30 counties with amateurs QRV on 70MHz. See elsewhere in this column for details of transmission to monitor to indicate propagation conditions on the band.

Subscriptions for the four issues of *Dubus* for 1988 are now due. The price is £8.50, and the UK distributor is Ken Hatton, G4IZW, Hamilton House, Casrleton, Carlisle, Cumbria CA4 0AD. Ken says that the magazine is distributed free to some amateurs in countries where money cannot be sent abroad. Among these recipients are some very respected vhf operators who are thus able to keep in touch with events on the vhf/uhf bands. *Dubus* is not permitted to accept advertisements, and so depends entirely on subscriptions. If you are keen on vhf/uhf dx working you will find this publication both interesting and useful. Don't forget, also, the RSGB *VHF/UHF Newsletter* edited by Dave, G4ASR, available on subscription from hedquarters. The publishers of *Dubus* are always interested in technical articles in English language for possible publication. These should be sent to Ken, G4IZW, or to Claus Neie, DL7QY. □

WHEN AWARDING CAN BE REWARDING

or

"A Day in the Life of an Awards Manager"

JACK HUM, G5UM*

"Now that really *was* quite a claim", said Grace as she smoothed out the form on the table. It was indeed, I thought as I began to pack the cards to return them to the sender, with a sad little note telling him that his claim for an RSGB certificate was not valid.

For one thing, the applicant had claimed several squares twice. For another, he had included a number of cards addressed to him as "Stroke P" which, as any member who has studied the vhf awards claim form well knows, is quite a different station from the one at home. Even more confusing, there were cards indicating through-repeater contacts.

"Why do people send cards to other people when they talk to them through repeaters?" asked Grace, "They're not real QSOs at all". She was right: they are not. Marvellous though repeaters are with the extension of range they permit, they don't give you QSOs, only exchanges. If you *must* send a QSL, send it to the repeater: it did the work!

Hence the note "Not valid", but with a sentence added, saying why.

By now my wife and I had been processing the input from that morning's mail for the last couple of hours. "Time to go and get us some coffee to remove the haze over our senses," said Grace, and she did.

Ten minutes later: "Here's a nice slim envelope with no cards in it. Probably somebody asking for a claim form." Quite the reverse: it was somebody making a claim on *us*. It was the gas bill. The next slim envelope did indeed carry a request from a member for the full set of RSGB claim forms: vhf, uhf and microwave. Truly, he must be a well-rounded operator, was the thought.

"I can't find a stamped addressed envelope in it," reported Grace.

"Ah, well," I sighed, resignedly, "let's send him the claim forms for free and hope he observes Rule 6 when he makes his claims ('for the return of your cards send adequate postage stamps'. Most of them do, bless them".)

Next business was a typed claim so well ordered that we were able to check the QSL cards against the form in a quarter of an hour.

But the next business took longer: it was a claim for a Microwave Distance Award.

"You'd better handle this one . . . you'll need to check the distances on the map," advised Grace. I did. It turned our to be more than correct, with Little Wychwood to Obercranbornspiel showing up as well over the 600km required for a 23cm "first".

We left the rest until after lunch, hoping to "clear the hook" before teatime loomed up. But 'twas not to be. The afternoon post brought a sheaf of *pro formae* from the VHF Contest Committee asking me to prepare and despatch about 20 certificates for that major contest of not so long ago.

"When I see you getting that lot I'm thankful that only a small proportion of the membership go in for contests," murmured Grace.

"Thank goodness that we have to prepare them only for winners and runners-up," I replied.

"You can't have looked at this one properly," remarked Grace. "If you had you would have seen that you've got to send certificates to winners and runners-up in every RSGB zone. That'll make about a couple of dozen more."

I took another look; she was right. Decision: leave them to the morrow and finish off today's claims, to attempt to give same-day service if at all possible.

By now that haze over the senses was becoming almost opaque.

"You'd better go upstairs and have a relaxing session on the air," counselled Grace. I needed no further prompting, and went. Besides, it was Monday Night Seventy Centimetre Night and there might be a few stations on the band in search of other chums.

Soon it was time to activate the greatest invention in radio (though not perhaps in amateur radio), the on-off switch, and go downstairs for a last nightcapping drink.

I wondered what the next day would bring in the way of awards claims and correspondence,. In the event, nothing! When dawn cracked that next morning, all that clicked through the letterbox was a circular about double-glazing, a highly coloured brochure inviting him to go to the Canary Islands for his holiday, and a slim envelope containing — an electricity bill! □

*27 Ingarsby Lane, Houghton-on-the-Hill, Leicester LE7 9JJ.

MICROWAVES

*Mike Dixon, G3PFR**

Operating news and awards

Following the January column, Cyril, G3VVB, wrote to express his interest in the subject of personal beacons and to say that he has a beacon running at home in St Austell (XK67h/IO70OF), frequency 1,296·860MHz. It consists of a 10W 432MHz driver into a Microwave Modules tripler, followed by an interdigital filter with output sensing. All the modules are "triple-boxed" to avoid radiation of drive frequencies and other unwanted harmonics, final output being 4W to a single 15/15 at 10ft. Because his QTH is badly screened to the north, the beacon beams east and has been heard in PA, GU and F — **any** reports will be most welcome.

The beacon was built for GB3CTC but has been pressed into service using Cyril's ca tsign while awaiting DTI approval — now nearly three years since it was conceived! He wishes to thank Wood & Douglas for supplying the 432MHz modules, the South Birmingham Radio Society for a donation of LDF550, G4FRE for the keyer design, and the Farnborough RS for supplying and programming the eprom for the keyer.

He describes the activity level in Cornwall as being generally "low.

*"Woodstock", Gaze Bank, Norley, Warrington, Cheshire WA6 8LL.

except when conditions open to Europe, then there is no doubt that 'XK' are the magic words"! He mentioned that Dave, G6LEU, had worked two SP stations on 1.3GHz, these QSOs being claimed as SP distance records. Cyril now has an LMW Electronics transverter on 2·3GHz followed by a 2C39 p.a. has just built a 36-element loop-quad Yagi and now awaits fine weather to erect it — to become "the lone voice on 13cm in XK".

Jack, G5UM (microwave awards manager) has recently notified a number of new awards including, I'm pleased to say, the first-ever 24GHz distance awards. No-one has yet succeeded in reaching the 150km mark, but I'm pleased to report that Intermediate Certificate No 1 went to Dennis, G(W)3FNQ/P, and No 2 to Ray, G3NKL/P, for a WB contact between Anglesey and Cumbria which, at 126km, handsomely exceeded the 75km-plus mark. They were unable to complete a 150km path but, knowing their persistence and skills, it will only be a matter of time before they hit the right conditions to make it. Well done!

Bob, G1KDF (Ormskirk), received a single card for a 1·3GHz contact into France enabling him to claim the Distance Award (No 122), the FMD Standard Award (No 76) and the Gold-Leaf FMD Supreme Award (No 70), adding the 1·3GHz "Standard" to his 144/432 "Senior" awards. Bob is only the second G1 operator to attain the Supreme, the first being G1GHJ at the end of 1985. Bob started in December 1985 with a TR9130, LT23S transverter and single 55-element Tonna, added a masthead preamp in mid-'86, changed to 4 by 23 elements in January '87 and added a 35W P.A. in September 1987. These progressive improvements have yielded, so far, 31 squares, 10 countries and 42 counties, all, remember, from the "wrong" (west) side and "end" (north) of the country! He is always ready to hold evening skeds on 432MHz/1·3GHz, tel 0695 74868 or QTHR.

John, G4BYV (Norfolk) gained his (No 2) 5·7GHz distance award for a 464km contact with DC0DA, using 10W from a TWTA to a 2m dish, and also qualified for the Five Squares award (No 1) on the same band.

Another East Anglian operator, Mike, G0BPU, also gained two awards: 40 Squares (No 13) on 1·3GHz and 15 Squares (No 5) on 2·3GHz.

Sam, G4DDK, had a letter from Hans, PA3AGS, outlining increasing 10GHz narrowband activity in Holland following introduction of band multipliers in the Veron contests. On 3·4GHz the multiplier is 1·5, on 5·7GHz, 2·5, and on 10GHz 4·5. The score consists of distance times multiplier times number of contacts. Those reported regularly active are PAs 0EZ, 0DOL, 0EHG, 0ASH, 0MJK, 0PLY, 0GUS, 2HJS, 2DRV, 3AGS and PEs 0MAR, 1GHG, 1CM0 and (soon) 1DCY. Do readers have any views on the use of multipliers in UK contests? In the same letter it was said that an internal Dutch record had been set by a 200km 10GHz narrowband contact between PA3AGS and PE1GHG, signals being 5/3-4 each way, equipment and power unstated.

Apologies

The Shrewsbury-based Salop ARS is due my apologies reference the GB3CLE beacon, as was pointed out last month. In fact the whole project was the "brain-child" of Don, G3UQH, whose callsign I confused with Martyn, G3UKV. I suppose through association of the Telford Group's use of Brown Clee for its 10GHz contest activities. The Salop ARS is also responsible for the repeaters GB3CW, PW and LH in addition to CLE.

Assistance please

Alan, G8BJG, of the NW Kent Beacon Group, wrote to say that following the saga reported last month, the small (three operators) group's slender funds are totally depleted. It proved necessary to replace antennas, feeders and connectors after the hurricane damage. On the group's behalf, can I appeal to microwave users — remember this is a purely voluntary activity, apart from the licence — to send any donations to him, QTHR. Incidentally, Alan and his colleagues will be addressing the subject (and problems) of beacon building and maintenance at the Sandown VHF Convention on 1 May, a date for your diary. Donations will be gratefully received there too!

Other component sources

When the present stocks of Avantek MMICs held by the components service are exhausted, they will be withdrawn from the list. This is because they are now available ex-stock from Messrs Bonex of 102 Churchfield Road, Acton, London W3 6DH. There is little point in the service continuing to supply items when they are readily available elsewhere, and the funds released can be better used for other, less easily obtainable, items. □

SWL

*Bob Treacher, BRS32525**

Awards corner

The vhf awards manager, G5UM, reports an impressive 144MHz topping-up operation by BRS31976, Michael Toms, of Rayleigh, Essex. His claim was for the 125 squares and 20 countries award. Many of the cards which Michael turned in showed reception of stations using meteor scatter, often on high-speed cw. He now sits at No 2 in this category. No 1 went almost four years ago to yours truly. There is scope for much more activity by swls in the vhf region, particularly on 432 and 70MHz, and of course now on 50MHz, where it is a rare experience for a transmitting member to receive a listener's report. Claim forms for the awards can be obtained from G5UM, QTHR.

G5UM has suggested that the following comment from him be reproduced "as is" in order to save me blushes: "It was a real pleasure to receive a triple claim from the Treacher family of Eltham in southeast London. Bob himself topped up earlier claims and now has a 40/10 sticker for 432MHz and a 175/20 sticker for 144MHz. Both claims included some fine cards, especially the 144MHz claim which included such impressive exotica as Sardinia, Corsica and remotest Russia. His wife, Joan, who is BRS62088, made her first claim and now has 144MHz certificate 292, probably by now displayed next to the multitude of parchments which her OM has won down the years both for sending always-useful reports on vhf, plus many contest awards as well." Thanks for those kind words, Jack.

TV dx

A tv set which will receive signals in Band 1 is extremely useful to serious vhf dxers. There are various ways of getting one: looking for a secondhand one at bring and buy or jumble sales, buying a new one from a dealer, or obtaining a Labgear Televerta which will allow you to tune for Band 1 signals on your uhf tv set.

If you choose this latter method, the most suitable domestic sets are those with a rotary tuner. You will also not be able to hear any sound with the pictures. If you want to listen to the sound, you will have to find a set which is set up for use on the Continent. A suitable model would be the Yoko F1, which is priced under £90 and is available from a number of stores, including Aerial Techniques, 11 Kent Road, Parkstone, Poole, Dorset BH12 2EH.

The tv dx season normally starts in April, and openings can occur at any time. No one has the time just to sit watching a blank screen, but if you want an early warning of sporadic-E it is worth committing the tv to either channel E2 (48·25MHz) or R1 (49·75MHz) and leaving the set running while you are otherwise engaged in the shack.

Openings can be quite spectacular. With a really good one, you can watch signals from many European countries fighting with each other for prominence on a particular channel. In 1987, good pictures were seen from Germany, Iceland, Italy, Poland, Portugal, Spain, USSR and Yugoslavia.

Hopefully, this short piece might encourage swls to obtain a dx tv set, especially if there is an interest in Sporadic-E at vhf. I am always pleased to record details of stations heard in the column.

Cray Valley contest results

CVRS has released the results of its 16th swl contest held last September. Participation was poor, with only five entries for the ssb section and one log, from Don Piccirillo, BRS52868, for the cw leg. As an experiment the contest was held on weekends when there were no transmitting contests, but it does not appear to have been a success. However, the ssb leg was closely fought, with Jean-Jacques Yerganian, ONL383, holding off a determined challenge from Norman Henbrey, BRS28198. CVRS is to hold a further contest this September, but both legs will coincide with a transmitting contest in the hope of attracting more entries.

The hf tables

The final tables for 1987 are reproduced with this column. Unfortunately, the new format did not encourage many new listeners to submit scores, but the number of entries was fair enough. I have already announced that

*93 Elibank Road, Eltham, London SE9 1QJ.

HF TABLE

Posn	Station	DXCC	28MHz	21MHz	14MHz	Total
1	BRS8841	246	130	191	234	555
2	ORS45992	200	109	135	165	409
3	BRS25429	208	70	130	198	398
4	BRS32525	164	86	89	123	298
5	BRS1066	154	53	89	144	286
6	F11ATZ	130	87	105	91	283
7	BRS20249	110	36	65	80	181
8	BRS87677	97	18	54	87	159
9	G1XEO	73	7	21	66	94
10	RS44984	–	15	26	38	79
11	BRS31976	55	55	–	–	55

LF TABLE

Posn	Station	DXCC	7MHz	3·5MHz	1·8MHz	Total
1	BRS8841	208	175	157	62	394
2	BRS25429	176	150	146	69	365
3	BRS32525	175	157	127	64	348
4	BRS52543	–	108	120	76	304
5	BRS87156	121	97	99	45	241
6	BRS1066	113	103	63	52	218
7	BRS31976	–	–	72	56	128
8	BRS20249	81	57	53	12	122
9	BRS87677	76	50	57	2	109
10	ORS45592	75	67	30	5	102
11	F11ATZ	–	23	40	3	66
12	G1XEO	35	28	12	–	40
13	RS44984	–	13	11	–	24

the table will revert to its original format for 1988. I hope that swls will support it, otherwise I may decide not to continue it in 1989, to the benefit of more news. It's up to **you!** The rules are simple: send me a letter with your band scores and add them up, and let me know the number of DXCC countries heard too – that's all you need to do to register a score.

However, congratulations to Robert Small, BRS8841, for winning both the hf and lf sections of the table with a fine combined score of 949. It is the sixth year running that he has come home first, but it is somewhat disappointing that several well-placed stations failed to send in a final score.

The vhf table

This has suffered far more than the hf versions during 1987, having only appeared once. There are four scores to mention as we conclude last year's tables. I managed to score quite heavily on 50MHz, thanks to some Es to GM, CT and LA, together with one State-side opening. The 144MHz score was helped thanks to some useful stations heard by meteor scatter. Michel Monteil, F11ATZ, and Mick Toms both scored 123 points, Michel's score including one GM on 50MHz. Martin Parry, BRS52543, picked up 104 points. My records also show a score of 126 for David Whitaker, BRS25429. This, however, was an early score and would obviously have been higher given some of the dx logged by David in 1987.

Other news

Alan Wright is now ex-BRS90338. He has passed the RAE, but intends to carry on with swling and receiving contests.

Dean Allison, BRS88384, has heard his first VK in the shape of VK6AY. He had received a card from V2ACH who was apparently to use the call V21CH from 1 January. To answer a query, T77 is the prefix used by San Marino.

Colin Watson, BRS46598, sent a list of dx heard. He too had taken a listen to 24MHz and had been rewarded with a number of USA stations and several Europeans. On 3·5MHz, he had logged J50AS for a new country and had copied some JAs at good strength. BRS8841 brings his usual fine list of dx to our attention. Robert had found January to be quite rewarding, but with much less quality dx on the lower bands. The 1·8MHz band was particularly disappointing. Plenty of dx was logged, with the best being ZL9BQD (Auckland Is) and VK3ETT/VK9L on 14MHz, while VK0HI was heard on 7MHz. He has *DXNS* to thank for JA4LXY on 1·8MHz. He did not realise that the JAs transit around 1,910kHz cw. The 7MHz band had been noisy, with not too much good dx on offer. On the QSL front, he had received his 4M0ARV cards for the last trip to Aves Island. He had no difficulty obtaining cards direct from F6FNU for FR/G/FH4EC, FT8ZA, OX3KM and 6W6JX.

Finally, we catch up with Stan Porter, ORS45592, now that he is back at his QTH in Malawi before retiring to CT1 in 1989. Although not so active in 1987 because of two holidays abroad, he has put in a good score for the year. Stan now has an SWL neighbour, albeit 30km "up the road". Gordon Tyson has applied to join the Society and is using a Kenwood receiver and a 14AVQ antenna.

Finale

The HF Challenge results will be in next month's issue. I will publish the All-Time List in June to reflect activity to the end of March if I get sufficient updates. Other news and table scores for the June issue should be with me no later than 6 April, with late copy to be received by 15 April. □

QRP

*George Dobbs, G3RJV**

How much can you build in a square inch?

I wonder which amateur radio design for the home constructor has been built more than any other? I guess the main contender must be the ONER transmitter designed by George Burt, GM3OXX. Originally published in *Sprat*, the journal of the G-QRP Club, the ONER has been the most popular design in a succession of what the club likes to call "fun rigs". Apart from the versions which have been built by constructors using their own printed circuit boards, the club has now sold over 500 kits for the little transmitter.

A photograph of my version of the ONER transmitter appeared in this column in Rad Com, December 1985. The ONER is a complete hf band transmitter which fits on to a 1in square pcb. The transmitter is crystal controlled, although by adding a variable capacitor it becomes a vxo (variable crystal oscillator) circuit capable of a little frequency shift on the chosen channel. The basic transmitter can deliver at least 2W of rf output on 1.8 or 3.5MHz and is usable, at reduced power, up to 14MHz. Used alongside a station receiver, or the receiver portion of a transceiver, it can provide a viable little QRP station. With the kit selling at £4, it could represent the cheapest way to put a signal on the hf bands, and certainly many operators have have their first taste of QRP work with the ONER.

Obviously a crystal-controlled transmitter does present limitations on the hf bands. On a vist to Ian Keyser, G3ROO, last year we built up a ONER kit for amusement. We did not beat the record for ONER building: it stands at 13min from a pile of components to the first QSO, but we quickly got it going on 3.5MHz. The experiments we began that day resulted in G3ROO producing a VFO on a 1in square pcb. This fet oscillator with two stages of buffering appeared in *Sprat*, winter 1987, backed up with a kit from Kanga Products. With this oscillator board and the ONER board and some careful placement, it is possible to produce a vfo-controlled transmitter for in a 1in cube.

Having the mini-transmitter and mini-vfo, the next obvious stage is to produce a compact direct-conversion receive board to facilitate a complete transceiver. I thought about a possible circuit on a board measuring 2 by 1in, but G3ROO has completely upstaged my ideas by producing the full receiver on yet another 1in square pcb. The receiver includes a fet rf stage, a twin-diode mixer and four stages of audio amplification all packed into the square inch. It is tight, but everything except the volume control goes on the board. My prototype receiver board with the ONER vfo worked very well, but adding the ONER transmitter requires a change-over switch, and so far there is no sidetone to monitor the transmissions.

The final touch is the G3ROO "ONER semi-QSK and sidetone board", naturally on a 1in square pcb. This board contains a key-operated change-over relay with variable delay and a 1kHz audio oscillator to monitor the keying on transmission. The board also holds the relay, the preset dalay control and a preset volume control for the sidetone. So it is possible to build up a vfo-controlled transceiver for 3.5MHz which runs about 2W output with the four 1in square pcbs.

The circuits and layouts all have or will appear in *Sprat*. All the boards are available in kit form from Kanga Products; for details, send a large sae to Kanga Products, 3 Limes Road, Folkestone, Kent CT19 4AU.

The *History of QRP*, a new book

Many radio amateurs in the UK will know Adrian Weiss, W0RSP, from his writings on QRP in *CQ* magazine and from his fine book *The joy of QRP*, which is available from RSGB Publications (Sales). Ade has recently produced another book with the mammoth title *History of QRP in the US, 1924–1960*.

* St Aidan's Vicarage, 498 Manchester Road, Rochdale OL11 3HE

The book traces the history of low-power communications from spark transmission to early solidstate designs. It contains well-documented accounts of the major advances in QRP communication with special reference to work in the USA. It is well illustrated with photographs and circuit diagrams of the equipment of these pioneers of amateur radio. The book is a nice blend of good scholarship (W0RSP lectures on Shakespearean literature at the University of South Dakota) and the "folksy" style we have come to know from Ade.

The first chapter, "The K8EEG Story", describes his own early dabblings in amateur radio and the enthusiasm which has remained with him to the present day. This is a little gem in amateur radio writing! It shot me straight back to my own early introductions to the hobby and rehearsed the motivations and pleasures that have kept me active in the hobby for so many years. Throughout the rest of the book, I enjoyed reliving the early trials and joys of keen amateurs; experimenters often working against the odds and with little theoretical knowledge. This book is a must for those who enjoy finding out more about the pioneers of our hobby.

The History of QRP is a well-bound paper-backed book of 200pp and is available in the UK from David Aizlewood, G4WZV, 36 King Street, Winterton, South Humberside DN15 9TP, for £7.20 plus £1 postage. Cheques should be made out to "G QRP CLUB".

AGCW–DL QRP/QRP PARTY 1988

1300–1900 gmt, 1 May
3,510–3,560kHz and 7,010–7040kHz cw only.
Classes: A up to 5W output, B up to 10W output. Call: "CQ QRP". Exchange RST plus QSO number (from 001). Scoring: one point per QSO with own country, two points with QSO out of own country. Each QSO with Class A stations scores twice. Each station may only be worked once per band. Multipliers: each DXCC country = one multiplier. Band result = QSO points × multipliers. Total score is the sum of band scores. Logs must be submitted to Fritz Bach, DK1OU, Eichendorffstr.15, D-4787 Geseke, West Germany. Enclose an sae and irc for a copy of the results. □

Instant fax QSL card received on a PK-232 all-mode data comms controller at GM3UTQ, showing the high quality that can be achieved on a very crowded band (14MHz). Scanning at 120lines/min, this took about 7min to transmit; with the 100 per cent duty cycle on fax, the transmitter power level has to be carefully set up to avoid overheating

DATA COMMS

*Ian Wade, G3NRW**

SINCE WRITING in February's column about packet groups in the UK, several more have come to light. First of these is the Sheffield Group, with Phil Green, G4PHL, reporting that it meets every Tuesday night at the Castle Inn, Bolsterstone (about seven miles northwest of Sheffield). Total group membership is around 15 stations at present, with G4PHL, G4MRU, G8ZMB, G6ANN and BT club station G8POT being particularly active.

Another new Yorkshire group is "YAXPAK", based in the Wakefield area. Details from David Lockwood, G4CLI. Still in the north, Neil Mercer, G3UVQ, in Lancaster, says he is the contact point for the "LADS", the Lancashire Amateur Digital Society. His telephone number is 0254 770188, and the local mailbox is at GB3CD. And just around the corner, in Eccles near Manchester, Phil Chapman, G4LXH, mentions the existence of the unpronounceable "NWPUG", otherwise known as the North West Packet Users Group. Phil can be reached on 061-707 3193.

Next to report is Ian, G8XZD, who says that the Mendip Repeater Group has applied for a packet repeater to be sited at Bath University alongside GB3UB and GB3UT. It is hoped that the repeater will become a NET/ROM node, thus providing an east–west link for that part of the country. The group has more than 500 members, and while a formal packet group doesn't exist, there is a strong contingent of packeteers active within the membership. The contact man is the secretary of the Mendip Repeater Group, Steve Gardner, G4PSP, and the address is Mendip Repeater Group, PO Box 73, Radstock, Bath.

"LINPAX" is the name of the new Lincolnshire & South Humberside Packet Repeater Group, formed to fill the AX.25 gap between Norfolk and Yorkshire. Ian, G6JIK, says that it already has a digipeater in place on the Belmont tv mast, and is awaiting arrival of the licence. Future plans include a 50MHz version at the same site, with southern orientation, and beyond that they are looking to 1·3GHz to link with the Emley Moor group. Contact person for the group is Ray Taylor, G6TNZ.

A little further to the west, Jonathan Naylor, G4KLX, in Derbyshire, announces the intention to form a packet group in the north Midlands, more specifically to cover Derbyshire and Nottinghamshire, within the catchment area of GB3RP and G4KLX. With GB3RP going to go NET/ROM this year and many local users voicing their support for a formal group of packeteers, the hope is that this will lead to some financial support for GB3RP.

Until fairly recently, most of the news concerning packet in the UK has come from the Midlands, the south and the southwest, and so it is especially encouraging to hear about these new groups in other parts of the country. Keep the news coming.

Amigan amateurs

Bob Wellbeloved, G3LMH, recently sent me a copy of the January 1988 issue of the Amigan Amateur User Group newsletter published by Kathy Wehr, WB3KRN. Bob says that the group is really beginning to take off now, and is looking for an increase in its European membership. The newsletter covers many aspects of the Amiga, and includes: details of a public domain disc (containing morse code training, muf calculation, satellite tracking, contest logging and packet BBS software); information on the Amiga version of the W0RLI packet bulletin board system; digitised picture transmission; fax transmission; and requests for information about Amiga software for use with radios having RS232 interfaces (like the Icom 761 and Kenwood 940). Bob's address is 8 Orchard Close, South Wonston, Winchester SO21 3EY, and he will be pleased to hear from any other Amiga users.

Talking of fax

In a very interesting letter, Ian Balloch, GM3UTQ, tells of his experiments with fax, using a PK-232. Towards the end of last year he received from ICS Electronics a fax evaluation package which runs on an IBM PC (or compatible), and which allows the received image to be displayed direct on the screen and saved to disc for later printout. This results in a great saving of fax paper, as you don't have to print everything as it is received. Ian will be happy to supply more information to anyone interested; his evening telephone number is 041-881 0547.

The new BSX2 tnc

Pieter Meiring, G0BSX, moved house last autumn to Plymouth, and in his "spare time" managed to complete development of the new BSX2 tnc. Totally different from his earlier GLB clone, the BSX2 is a TNC-2 "workalike". He hesitates to call it a clone, as it features a number of

*7 Daubeney Close, Harlington, Dunstable, Bedfordshire LU5 6NF.

significant improvements on the original TNC-2 (particularly in power supply filtering), making his design much less susceptible to noise and overload problems on the audio input.

However, because of the demands of his new job in Plymouth, Pieter asks that any enquiries about the BSX2 be directed to Dave Lockwood, G4CLI, who has agreed to take an active part in marketing it. Dave will supply the basic pcb for the tnc, and has plans to offer kits and partial kits later. The pcb is 6·25 by 5in (about two-thirds of a TNC-2), and will cost about £60 to populate with all new components.

Pieter stresses that this is a non-profit making venture, and all pcbs will be made available at cost, plus a few pence for postage, handling and a small donation to the local repeater fund. For more details, send an sae to Dave, at 3 Westfield Court, Horbury, Wakefield, West Yorkshire WF4 6EU, or phone him on 0924 275191.

Spacecraft data

The University of Surrey continues to receive many enquiries from listeners regarding the formats of Uosat spacecraft data transmissions, calibration equations and experiment details. So here is a brief reminder that they have published a 60-page offering entitled *Uosat Spacecraft Data Booklet* describing these topics in detail, for both Uosat 1 and 2. Copies are available at £3.75 including packing and UK postage from Amsat UK, 94 Heronsgate Road, Wanstead Park, London E12 5EQ.

More Amsat news: the group is holding its third annual colloquium at the University of Surrey from 29 to 31 July. The organisers are now inviting papers for submission at the colloquium, on all aspects of the satellite programme, including data communications. Contributions should reach Dr Martin Sweeting, G3YJO, Uosat Spacecraft Engineering Research Unit, University of Surrey, Guildford, Surrey GU2 5XH, by 2 May.

And yet more news: the DCE packet groundstation for South Africa, ZS6IT, is now operational. However, in common with all DCE communications nowadays, it is not necessary to mention this callsign, as the ground station at GB3UP will automatically select it for traffic addressed to SA. So if you have a message to send to, say, ZS1ABC, whose nearest mailbox is ZS2XYZ, simply connect to your local mailbox and then give the command "S ZS1ABC @ ZS2XYZ". The UK mail network and GB3UP will do the rest.

Digital signal processing

James Miller, G3RUH, writes to say that he expects to receive a TMS32010 digital signal processing (dsp) card for his IBM PC very soon, so that he can participate in the TAPR/Amsat dsp experimentation programme (mentioned in last December's column). His Beeb's fast fourier transform rom executes its machine code at a mere 1MHz, so he is looking forward to running the TMS code at 25mips (million instructions per second). He says we should expect the first transatlantic 1bps data QSO via eme using 100W to a simple antenna "real soon now"! □

Contest News

28MHz Phone Cumulative Contest 1987 results

Entries were received from 20 single-operators, one multi-operator and one listener; there were also six check logs. After thorough checking and ruthless marking, GW4HSH emerged as a well-deserving winner in a very close contest, not by making the highest claimed score, but by losing only one point, which could have been lost due to another operator's mistake. His entry was otherwise perfect, strictly according to the rules and very clearly and correctly presented.

The contest was not won or lost during the operating periods, three other entrants could have finished up as winners had they taken as much care with their entries. Six to ten hours are spent operating, possibly two writing up the logs and in many cases that is probably it. All logs except one contained a few errors that could not have been eliminated but the vast majority of points lost were thrown away for the sake of an extra quarter of an hour or so needed to read the rules or check the logs to avoid major blunders. The one station that did not lose any points should have claimed more than he did. No points have been added where they have not been claimed, as this would be unfair to those who lost points for making similar errors. Of the two entries that lost the most points, one had an unmarked duplicate and the other left out all the times on one session apart from the first one.

Points were not deducted for wrong dates, failure to put the county code on the cover sheet where it was shown in the log, or having the column headings in the wrong order. Seven entrants failed to include a separate list of counties, but they were not disqualified.

The 347 callsigns appearing in the logs representing 337 stations, about five of the extra10 were due to transcription errors, also quite a common error seemed to be logging "E" for X-Ray in the other five. G0BIR made the only Continental contact with DF1JC; apart from that there were 44 counties but nothing further north than YSN.

Judging by the comments, or lack of them, most operators enjoyed themselves and will be back next year. Friday night is not very well supported and, certainly in the south-east, conditions seemed to be falling off from week to week. Only two comments were made about scoring; one to keep it as it is, and the other to bring in a bonus for distance.

Hope to see you all next year; please try to claim all your points and keep them, the adjudicator cannot turn a blind eye just because these are practice sessions – it would serve no useful purpose for competition experience.

G3MCX

Posn	Callsign	County	SINGLE-OPERATOR 2 Nov	10 Nov	18 Nov	26 Nov	4 Dec	Claimed score	Checked score
1	GW4HSH*	GNW	232	178	205	ck	ck	616	615
2	G4XAH*	SOM	224	188	201	–	–	617	613
3	G0CEI*	OFE	212	ck	199	198	ck	614	609
4	G0BIR	HWR	257	190	113	ck	–	663	560
5	G4WEY	DOR	215	198	–	139	ck	554	552
6	G8JM	LDN	154	ck	159	169	ck	497	482
7	G0BWV/P	SRY	–	167	165	–	134	478	466
8	G4RCG	YSW	–	–	119	133	171	444	423
9	G2HLU	BRK	136	110	139	ck	–	386	385
10	G3WBM/A	ESX	172	110	–	ck	89	380	371
	G4MET	HWR	100	138	–	133	ck	387	371
12	G4WFS	NHM	144	118	–	–	105	377	367
13	G3BXS	BRK	–	113	126	78	–	321	317
14	G3MCX	LDN	114	109	87	ck	ck	311	310
15	G0EVQ	NOR	150	ck	ck	59	73	290	282
16	G4XKC	YSW	96	47	–	–	55	204	198
17	G3BPM	SOM	45	59	–	64	ck	179	168
18	G3CWL†	SRY	–	33	44	46	ck	140	123

Posn	Callsign	County	SINGLE-OPERATOR 2 Nov	10 Nov	18 Nov	26 Nov	4 Dec	Claimed score	Checked score
19	G0HGL	YSW	56	–	8	54	–	180	118
20	G3EPO	DVN	22	39	–	–	27	88	88
			MULTI-OPERATOR						
1	GW4EZW	GWT	212	191	ck	ck	118	532	521
			LISTENER						
1	BRS28198	SXE	79	25	–	–	42	159	146

Checklogs received with thanks from G6LX, G3OTE, G4LRS, G4ODV, G4SBD and RS587949.
* Certificate winners.
† QRP 5W.

VHF/UHF Listeners Championship 1987 results

This year's championship may only have had five entrants, but the competition was quite fierce for the No 1 spot. It was not until the results of the September 70MHz Contest were available that the overall winner was decided. Once again the scoring was based on the "normalisation" system used in multiband contests, with 1,000 points allocated to the leading station on each band in each contest, and the other entrants scores being calculated as a proportion of the winning score.

Bob Treacher, BRS32525, was the winner, first in every contest he entered, and it was his first success in the championship since 1982. Second was Norman Henbrey, BRS28198, who entered all eight events and won two of them. Third was David Whitaker, BRS25429, who came first in the 144MHz August Contest.

There are a similar number of events having listener sections in 1988. The VHF Contests Committee hopes that there will be an increase in the number of listeners submitting logs so that there may be more competition for the regular entrants.

Once again, thanks to those listeners who supported the events in 1987. If you think that the listener events can be improved please write to G3XDY, QTHR.

Subject to Council approval, Bob Treacher, BRS32525, will receive the Hansen Trophy.

G3XDY

Posn	Station	Mar 2/70	Apr 2/4	May 70	VHF NFD	Aug 2	Aug 70	Sept 2	Sept 4	Total
1	BRS32525	–	2,000	1,000	2,445	–	–	1,000	1,000	7,445
2	BRS28198	2,000	1,492	156	627	118	1,000	306	657	6,356
3	BRS25429	–	–	593	1,525	1,000	–	594	–	3,712
4	BRS52543	–	–	–	2,073	–	–	–	–	2,073
5	BRS31976	–	–	–	–	746	–	–	–	746

Second 1·8MHz Contest 1987 results

As has been previously reported, the UK Transmitting section of this event has been declared null and void. This was as the result of an unprecedented number of written complaints to the HF Contests Committee of persistent and flagrant disregard for the rules and spirit of the event by a substantial number of participants. This is a problem which has been with us for many years, but it appears that only now has it reached a level which is intolerable to the rank and file of Top Band contesters. It is worthy of note that UK entries were 30 per cent down on the 1986 event, with most of the callsigns missing being from the middle and lower orders. It may be that a further group of discouraged operators has "voted with its feet".

It was considered unfair to disqualify the small number of alleged offenders who

were specifically identified in the complaints, as it was obvious from the tone of the letters, and from personal observations of members of the HF Contests Committee who were active at the time, that others were involved. It was with great regret the Committee felt obliged to declare "No Contest", and it is hoped that those who laboured hard and honestly will not be discouraged from entering future events. It now remains only for those concerned to consider their future conduct, and to remember that forthcoming 1.8MHz contests will be most carefully monitored.

In the Overseas Transmitting section, Klaus Behrndt, DJ4SO, with 70 scoring contacts and 38 bonuses lost only a single point in checking. ON4XG had 351 points from 66 QSOs and 31 bonuses, and LA2UA scored 326 points from 54 QSOs with 32 bonuses. Almost all the entrants commented on the level of QRM from the OK contest running simultaneously, and this undoubtedly does cause more problems for the Continental operators than for stations in the UK.

Disappointingly there was only one entry for the UK Receiving section, from BRS1066, who improved slightly over his score in the previous event. There were, however, four entries for the Overseas Receiving section – all from the USSR.

Check logs were received with thanks from: G3JKS/A, G3MCX, G3JJ, G4KKZ, G4ODY, G4UOL, G4WZY, DF4PD and UA3XBB.

G3UFY

OVERSEAS TRANSMITTING SECTION

Posn	Callsign	QSOs	Points
1	DJ4SO*	70	399
2	ON4XG*	66	351
3	LA2UA*	54	326
4	E19FK*	57	310
5	SP1PEA*	53	291
6	PA3AMA*	46	261
7	DJ10J	38	255
8	OZ1W*	53	252
9	Y33VL*	42	237
10	OE3HCS	33	191
11	ON6TJ	29	178
12	UA9FAR	25	168
13	OL5BPH	30	161
14	LA1IE	21	141
15	OK1CZ	22	136
16	Y31MB	16	118
17	UC1WXD	17	112
18	OF5OZ	15	110
19	UA1TCO	17	102
	UC2OCH	14	102
	UQ2GMB	17	102
22	Y27YO	14	89
23	UA6HMX	14	75
24	UO5OAL	9	72
25	UA9CBO	10	69
26	SP5GH	8	64
27	UO5OGB	9	57
28	Y23KF	5	29

OVERSEAS RECEIVING SECTION

1	UC2-006-43*	29	166
2	UA3-155-28	22	143
3	UB5-059-447	22	138
4	UA3-121-3118	7	46

UK RECEIVING SECTION

1	BRS1066	83	489

*=Certificate winner.

First 28MHz Cumulatives 1988

The HF Contests Committee has received a number of comments regarding the format of the 28MHz Cumulative events. It seems that a number of entrants feel that they are too drawn out and that two hours a session is too long. There have also been requests to revive the spring sessions which were discontinued several years ago. To meet these suggestions, a series of 28MHz sessions will be run on an experimental basis during May 1988. Each session will include a cw and phone period of one-hour duration with a break of 30min between modes. The sum of the points made on both modes will be the score for the session. The multi-operator and swl sections, which have only received minimal support in the past, will not be included in this limited experiment. The HFCC would welcome comments from entrants, as this could form the basis for all future 28MHz cumulative events.

1. General rules: Except where modified by the specific contest rules below, the general rules published in "Contest News", *Rad Com* January 1988, will apply.
2. Elegible entrants: All entrants must be fully paid-up members of the RSGB.
3. Dates and times:
1st session: Monday 2 May, cw, 1900-2000, phone 2030-2130.
2nd session: Tuesday 10 May, phone 1900-2000, cw 2030-2130.
3rd session: Wednesday 18 May, cw 1900-2000, phone 2030-2130.
4th session: Thursday 26 May, phone 1900-2000, cw 2030-2130.
All times are gmt.
4. Sections: Single-operator transmitting only. If desired, entrants may use a portable location, but this must be the same site for all sessions.
5. Contest exchange: RS(T), serial number and RSGB county code. The serial number (commencing with 001 for each day) is to be continued for both the cw and phone periods of each session, eg if the last number in the first period is (say) 038, then the first number in the second period is 039. All reports/serial numbers and county codes sent and received are to be logged. Incomplete logs will be treated as checklogs and not scored. Entrants may work stations worldwide. The same station may be contacted on both modes during the same evening. Each day is treated as a separate event (except for scoring – see 6 below).
6. Scoring: Three points per completed contact, plus 10 points bonus for each county worked (including entrants own county). The score made on each of the modes during an evening session is the sum of the points (QSO plus county bonus). The scores for each mode are added together. The final score is the total of the points made during any three of the four sessions (as selected by the entrant). A check log for the non-scoring session will be welcomed.
7. Logs: Standard RSGB format in accordance with the general rules. A dupe sheet is not required, but all entries must include the standard declaration and a list of the counties worked on each mode in each of the sessions.
8. Entries: Must be postmarked not later than Monday 6 June 1988 and sent to the HF Contests Committee, c/o John Kennedy, G3MCX, 22 Croham Park Ave, South Croydon CR2 7HH.
9. Awards: Certificates of Merit will be awarded to the three entrants who have the highest total checked scores.

Region Round-up CW Contest rules

TRANSMITTING SECTION
1. The general rules for RSGB hf contests, published in "Contest News", *Rad Com* January 1988, will apply.
2. Eligible entrants. All paid-up members of the RSGB resident in the British Isles (G, GD, GI, GJ, GM, GU and GW) holding a Class A licence. Single-operator entries only.
3. When. 0700-1000 Sunday 15 May 1988.
4. Contacts. CW only in the 3·5 and 7MHz bands. Entrants are requested to confine their 3·5MHz operation within the IARU Region 1 contest-preferred segment 3,510-3,560kHz. RST and serial number (starting from 001) must be exchanged, followed by R and the number indicating the operator's RSGB region – eg 579001 R03.
5. Sections. (a) Up to 150W input, **(b)** QRP – up to 10W input.
6. Scoring. Three points for each contact with a station within the British Isles. Each station may be contacted for points only once on each band. The final score is the total points on each band, added together and then multiplied by the total number of RSGB regions worked on each band added together.
7. Entries. Separate log sheets must be used for each band. It would greatly help the adjudicator if standard log sheets (form HFC1) were used. A cover sheet and signed declaration (Form HFC2) must accompany the logs, which must be sent to RSGB HF Contests Committee, c/o DF Beattie, G3OZF, "Mayerin", Church Way, Stone, Aylesbury, Bucks HP17 8RG, and postmarked no later than 1 June 1988.
8. Awards. Certificates of merit will be awarded to each of the three leading stations in each section.

CONTESTS CALENDAR

RSGB HF CONTESTS

3 April	Ropoco 1 (Rules in January issue)
17 Apr	Low Power Fixed (Rules in March issue)
17 Apr	G T Peck Memorial Trophy DF Event (Details in April issue)
24 Apr	DF Qualifying Event Oxford (Details in April issue)
2, 10, 18, 25 May	28MHz Cumulatives (Rules in April issue)
15 May	DF Qualifying Event Salisbury
15 May	Region Round-up (Rules in April issue)
4, 5 Jun	NFD (IARU CW) (Rules in February issue)
12 Jun	DF Qualifying Event Northampton
25, 26 Jun	Summer 1·8MHz
26 Jun	DF Qualifying Event Coventry
9, 10 Jul	SWL
10 Jul	DF Qualifying Event South Manchester
24 Jul	Low Power FD **(Note date change)**
31 Jul	DF Qualifying Event Mid-Thames
14 Aug	DF Qualifying Event Dartford Heath
7 Aug	Hopscotch **(Note date change)**
28 Aug	Ropoco 2
Sep-Oct	28MHz Cumulative CW
3, 4 Sep	SSB FD
4 Sep	DF Qualifying Event Grimsby
20 Sep	DF National Final Colchester/Chelmsford
9 Oct	21/28MHz SSB
16 Oct	21MHz CW
22 Oct	Df Treble Night Event Mid-Thames
12, 13 Nov	Second 1·8MHz
Nov-Dec	28MHz Cumulative Phone

RSGB VHF CONTESTS

2 Apr	50MHz Fixed (Rules in January issue) (Note: time is 1800-2200gmt)
3 Apr	70MHz Fixed (Rules in January issue)
9, 10 Apr	144MHz and SWL (Rules in January issue)
17 Apr	10GHz Cumulative (Rules in January issue)
7, 8 May	432MHz–24GHz (Rules in March issue)
15 May	10GHz Cumulative (Rules in January issue)
29 May	432MHz Trophy and SWL (Rules in March issue)
12 Jun	432MHz FM (Rules in March issue)
19 Jun	10GHz Cumulative (Rules in January issue)
2, 3 Jul	Jubilee VHF NFD (Rules in March issue)
10 Jul	10GHz Cumulative (Rules in January issue)
30 Jul	144MHz Low Power and SWL
31 Jul	432MHz Low Power and SWL
7 Aug	10GHz Cumulative (Rules in January issue)
14 Aug	1,296MHz Trophy and 2320MHz Trophy
3, 4 Sep	144MHz Trophy/IARU VHF and SWL
11 Sept	10GHz Cumulative (Rules in January issue)
18 Sept	70MHz Trophy and SWL
1, 2 Oct	432MHz–24GHz/IARU UHF/SHF
6 Oct	432MHz Cumulative
14 Oct	1·3/2·3GHz Cumulative
22 Oct	432MHz Cumulative
23 Oct	50MHz Trophy
30 Oct	1·3/2·3GHz Cumulative
5, 6 Nov	144MHz CW
7 Nov	432MHz Cumulative
15 Nov	1·3/2·3GHz Cumulative
23 Nov	432MHz Cumulative
1 Dec	1·3/2·3GHz Cumulative
4 Dec	144MHz Fixed and AFS and SWL
9 Dec	432MHz Cumulative
11 Dec	70MHz CW
17 Dec	1·3/2·3GHz Cumulative

OTHER CONTESTS

Jan-Dec	UBA SWL (Rules in December *HF*)
2, 3 April	SP DX (Rules in March and April *HF*)
9 April	Israel 40th Anniversary International (Rules in February *HF*)
16, 17 Apr	Spring VHF/UHF RTTY (Rules from G6LZB, QTHR)
23-24 Apr	Helvetia (Rules in April *HF*)
1 May	AGCW-DL QRP/QRP Party (Rules in April *QRP*)
28, 29 May	CQWW WPX (CW) (Rules in March *HF*)

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Members' Ads

The Conditions of Acceptance are published below the Member's Ad form circulated with every issue of *Radio Communication*.

The current rate is £2.30 for 40 words or less: advertisements containing more than 40 words will cost an additional £2.30 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.

FOR SALE . . . .

TB3 TRIBAND BEAM, £130. Kenpro KR400RC rotator, £60. Capco 3000 atu, £150. FDK700E 25W fm, £100. 30' - 3x10' h/b tower, £50. Tel: Bedford 44506, (evenings/weekends).

REVCONE DISCONE: Antenna, 50-500MHz, Revcone PA3 inline masthead preamp with mains psu. Cost new today, £82, accept £40 for them both or will exchange for swl hf atu. Tel: (Carlisle) 0228-35177 (after 6 pm).

30' VERSATOWER (with planning permission), 3-ele tribander, dipole, 2m colinear, plus 3/4 bedroom semi. Large secluded rear garden. Garage + pkg for 2 add. vehicles. Easy access M25/M11, £125,000 Details on request. G4MIE, QTHR.

J-BEAM 144MHz 10XY antenna. Unused, £25. J-beam vhf broadcast receiving antenna FM-95 6-ele unused £35. Tel: 0962-822249 (day) Winchester, 0703-36943 (evenings).

FT101E+FV101B (o/b vfo). Spare PA valve, vgc, £400. AR22 rotator + c/u (carry TA33 beam). Old but reliable, £25. Four brass sheets 24"x48"x 3/16", £6 ea. (4=£20). Non-working Plessey PLL transistorised PR155B 0-30MHz rx, handbook, offers! G3UXH, QTHR. Tel: Medway 250562.

STRUMECH P60 TOWER, 60' ground post needs welding, c/w winches and Moseley triband antenna, £325. Buyer inspects/collects. WANTED: FTV107 tsvtr, will pay up to £130 for mint unit. G0HKF. Tel: (Burtwood) 05436-75301.

FT7 MOBILE HF TCVR, 80-10AB 15W, manual, boxed, ex wkg order, £250 ono. G1LCI, QTHR. Tel: (Bourne End, Bucks) 26493.

FT101 HF 80-10ABCD 230/12v mint condx, manual, £280. FT480R 2m 10w multimode, vgc, £280. G1LCI, QTHR. Tel: Bourne End, Bucks, 26493.

A MINE OF OLD STYLE COMPONENTS, 150W 5-band home brewed valve tx, 813 in final, with power-packs & modulator. WW2 ex-RAF wavemeters W1191; W1646. Antique morse paper-tape recorder, clockwork driven, in oak case, made in Paris, circa 1880's. AC mains recorder, murday system, Evershed & Vignoles Ltd. Creed printer model 75RP, RK4M, with original metal desk and power supplies. WW2 Japanese test instruments, dc voltmeter 10/100v; dc. multimeter ohms/v/a/. Solartron double-beam oscilloscope CD711, 7-day clockwork temperature recorder, in case. List of old radio books of 50 years ago, some earlier. Journal IERE bound volumes No.18-48. Condition as received from binder. Offers. Buyer arranges collection. G3CUC, QTHR. Tel:09304-576.

PACKET SYSTEM. G4BMK modem and cartridge c/w Dragon 32 + Phillips monitor. With all orig pkg £165. G6JNS, tel: 0905-620041, or write QTHR in any callbook.

RTTY ST5MC unused. Fitted Hamtel clock board plus 444 with 50 and 75 band gears. Wayne Kerr rf bridge, B601. G4PIP, QTHR. Tel: 056-42-3200.

TS700 MULTIMODE tcvr, am/fm/ssb/cw, £350 ono. TF2304 am/fm mod meter, 8-1300MHz auto, £300. Advance uhf millivolt meter VM79 £40. LF osc/ctcss HEI, £45. PSU 10a/13.8v, £50. Marconi 2950/5 mobile am/fm test set, vgc, 65-84-108-140-180MHz 420-470MHz, £950. Eddystone 840A rx vgc, 300KHz/ 30MHz, £70. Pye 10CH base, £25. FM 351 AM clear-tone £80. Pye P5001 h/h + car kit adapt. £90. W15 AM xtal vgc, £25. Airmec 201, 500KHz/70MHz am/cw, £35. Tel: 01-570-4422 (9-5.30pm).

YAESU YD844 micr £12. Antexer remote antenna changer, £25. Low pass filter, £8. Monacor swr meter, £10. HFV5 5-band antenna, £50. WANTED: Bencher paddle, or similar. Also for sale, Brother EP44 personal printer, £170. Dave, G4DGG, QTHR. Tel: 0235-20230.

BENCHER PADDLE KEY. Few months old, and virtually unused, £40. G4BMK rtty/cw transceive cartridge, currently £35 new, selling £15. PNP Communications data terminal unit for Dragon computer to rig £20. All plus p&p. Paul, G4XTA, QTHR. Tel: 09313-359.

FT208R SCANNING 2m fm portable. Little used, case, spare battery, manual, homemade charger, original box. Offers £130? G1VNU, Tel: (Witney) 0993-75365.

TRIO 9130 2m multimode, with quick release mobile mounting bracket and MB55 mobile boom mike and switch box. Mint condx £350. G0IFS. Tel: 022779-2867.

FT107M plus FP107E/PS solid state hf tcvr. Warc, ssb/cw/am/fsk, extra cw filter, memory unit, scanning mic, digital readout, manual. Any test. Ex condx, £550. GM3TBV, QTHR. Tel: 0250-2520.

TEMPO 2004A LINEAR for 432MHz. The ultimate in qro for this band with clean and narrow signal, £1150 ono. No timewasters or silly offers please. Tel: G6JNS on 0905-620041, or write QTHR in any callbook.

STANDARD P60 VERSATOWER, electric winch, 250/110 transformer, head unit, ground post and set of 6 guy wires c/w bottle screws etc all in good condx. JC Mathers, GM4CNF, QTHR.

TRIO TS130S hf tcvr, 200W. Original packing + mobile mounting bracket, £425. WANTED: 12v power supply, 20a min. G4VSJ, not QTHR. Tel: (Coventry) 0203-681590.

RADIO TECHNICAL BOOKS pre-war and post-war. QRO power transformers. 525m reel 4mm rope. 36' steel mast 6' sections, all guys etc new. Marconi lab type vhf, uhf power meters c/w dummy load. Lists available. G4VJK, QTHR, Tel: 0293-783556.

AR88D MAINS TRANSFORMER QTY2. Original h/book QTY2 Attenuators, Marconi TF2162 DC-1MHz. Solartron AT201 0-5dB, 0-25dB, 0-30dB. Telonic vhf BNC 6dB 20W. Telonic uhf N 30dB 15W. Telonic vhf BNC rotary 0-10dB. All items good condx. Offers. G4VJK QTHR. Tel: 0293-783556.

TOWER (STRUMECH) two-section 40' crank up tilt over with ground post, c.w EMOTO 502SAX heavy duty rotator and controller; DX33 tribander, 100' control cable, 100' coax. Full instructions, £325 ono G5CO. Tel: (Sussex) 0273-455499.

SRG8600-DX by S/kamp, same as 9600 by Yaesu. C/w HF converter, external, psu, manual, etc. Covers 100KHz-905MHz as new, boxed, £295 ono. G1ELK, Peter, QTHR. Tel: 01-804-4565 (after 6pm weekdays, anytime weekends).

YAESU FT101ZD 9-bands inc all new bands. As new fan mike. Instructions, orig. pkg. Prefer buyer inspects/collects, £450 ovno. GM2BGH, QTHR. Tel: 0292-41682.

ALTRON MINI-BEAM 4-ele 6-20m as new, £100. Yaesu 767GX with 6,2,70cm modules, matching speaker, desk mike, all manuals, in boxes as new, £1550 or offer. G0IYF. Tel: 0488-72424 (evenings).

RACAL 17 with manual, £130. Yaesu FRG7 with hand/ book, £100. Buyer collects, evenings, G4BIH, QTHR. Manchester area.

ICOM 730 hf tcvr, ssb/cw/am, 100W. Very good condx, with two mic's and mobile mounting brkt. £400. G0/K1400. Tel: (Bracknell) 0344-488847.

EDDYSTONE Model 906 speaker, £15. Matching S200 speaker for Hammarlund receivers, £25. National Panasonic DR28 rx, £100. Heathkit S33H amp and FM4U tuner, £20. Tel: 0875-52317.

YAESU FT1 hf tcvr, fitted all extras, fm keyer, memory NB cw narrow/wide filters hand scan mic with all manuals. As new, £1050 to inc Securicor delivery. GW4RLP, QTHR. Tel: 0286-3567 (evenings).

HOWES AUDIO FILTER module ASL5, cw/ssb £16. "Secrets of Ham Radio Dxing" £4; "History of Railways" 22 issues, £5. "Understanding Science" 12 issues, £5. Yaesu FT101Z, mint condx, orig.pkg. £575. G4ICP. Tel: 0376-84478 (evenings).

FT703, 70cm h/h, new, boxed, with charger, spare battery case, £145. Datong ASP mint, boxed, £45. Carr extra. G3FQJ, QTHR. Tel: (Sheffield) 0742-666431.

ICOM 751A TCVR. With am narrow filter. Heavy duty PS35 pwr sply. RC10 freq controller. AT100 auto, antenna tuner. Workshop manual, orig.pkg. As new. Disposal due to possible QTH change. £1500. G3SSQ, QTHR. Tel:0727-51518.

AMSTRAD 6128 c/w green monitor + second Amstrad external disk drive (FD1). Also included are many software packages, inc DR Graph, supercalc3, word processor, accountancy, toolkit plus other utility programs. Approx 28 discs. £360. G4LTM, QTHR. Tel: 061-338-3787.

HY-GAIN ANTENNA TH5, 5-ele tribander, vgc c/w bencher balun + manual, £200. G4ZEK. Tel: (Colchester) 0206-851343.

MICROWAVE MODULES 1296MHz tsvr, £120, or swap 50MHz tsvr 2m IF. Electronic Developments 70cm linear amplifier (2C39) etc, £15. 78v, 6a, transformer £5. FT902DM tcvr, £500. FT102 tsvr with 2m £110. G6OYL, QTHR. Tel: 0709-816700 (after 5pm).

VERTICAL. Diamond CP5 5-band with trap radials, mint condx, used once for tuning purposes, £95. G4UNM, QTHR. Tel: 0983-402273.

KENWOOD TS430; mint condx, only 3 months' old, £650. G4YSN, QTHR. Tel: 0257-793872.

"SELMER" TREBLE AND BASS 100W audio amplifier (valves) also matching 18" 100W Celestion loudspeaker in 'Goliath' cabinet. £100 each or £160 the pair. Buyer collects or pays carriage. GW4LYK, QTHR. Tel: 0792- 892513.

RETIRED PHOTOGRAPHER disposing of Contax 137 outfit, lenses, TLA30 flashgun, cables, etc. Bought new in 1986 for £679. All mint in orig boxes with manuals. Will exchange for FT101ZD, FT77, or equivalent, plus atu. Details from GW0AGA, QTHR. Tel: Barry 736260.

FL7000 SOLID STATE LINEAR amplifier 1200W PEP input power. Automatic tuner. Full protection circuitry. Auto band change. Reason for sale overspent! £1100 ono. Howard, G0HZH. Tel: 0394-460-474.

MEMORY KEYER, 400 characters (8x50) battery or mains (integral stabilised psu) sidetone, manual keying provision, all the trimmings, £75. SEM iambic keyer, unwanted gift, £30. FT101ZD Mk3, £450. All carriage extra. WANTED; DG5. G3RB, QTHR (Tyneside). Tel: 091-2530504.

TS830S, BOXED, manual, vgc, £700 ono. Sony WA55, vgc, £60. G3XLL. QTHR. Mellis 596.

YAESU FT203R 2m handheld, mint condx. With MH18 spkr/mic, NC9 charger, PA3 12v car adaptor and FNB3 3W battery pack. Sell complete, practically unused. Must be seen. Offers? Halbar 2m 7-ele, £10. G4IZL, Mr. Brookes, Tamworth 282607, work 021-328-5455 (Ext 413).

SOMMERKAMP FL200B/tx, FR100B/rx. Good working order, inc some spare valves. Uncomplicated starter rig, £185. G4JOC, QTHR (Dorset). Tel: (Stalbridge) 0963-62082.

ICOM 24G 2M MOBILE, 1/10W o/p 25/12.5KHz. Handbook vgc, £125 ono. Pye Westminster 70cm 6-chan (5 fitted) tonoburst control box, cable, mic/spkr, £40 ono. SEM rx converter 2-80m, £5. Buyer

inspects/collects. Barry, G4LKF, QTHR. Tel: 0536-60598.

FT101ZD WITH CW filter and fan, £395. FT690 Mk11 £220. Both mint. FRG7 gen coverage rx, £75. G8VR, QTHR. Tel: 0843-601845.

FT480R vgc. One careful owner. Mic, mobile mounting bracket etc, £300 ono. Also 10m multi-mode (conv cb), £65 ono. PFS on 433.2 5-batts, charger, £35 ono. G3SMU, QTHR. Tel: 061-747-3882 (evenings).

PACKET RADIO. Complete G4BMK system inc Modem and Dragon 32 computer with Philips green monitor. All in orig pkg with leads and manuals, £145. G6JNS, QTHR. Tel: 0905-620041.

BYGONES. Kokusai mechanical filter 1F455-10CK. FT241 crystals 2x455.05 457-950 and 458-150KHz. Toyo filters 10M1E3(2). HRO dial and gearbox 0.25" shaft. Vacuum mounted crystals 2x5MHz, 40MHz, 100KHz (octal). 27.0MHz, 27.5MHz (FT101ZD type). Offers. G3INU, QTHR. Tel: 0438-369128 (Stevenage).

FT200+FP200, hf tcvr, £150. DL600 dummy load, £25. YM38 base mic, £12. AR22R rotator, £25. Hanson SWR3S, £12. AR30 3W/30W, 144MHz linear, £25. Dragon 32 + BMK, cw/rtty software and interface pcb, £70. Delivery can be arranged. G6BFS, not QTHR. Tel: 0228-31033.

SPECTRUM TRANSCEIVE converter TRX6-2i plus 6m HB9CV, £110. Andy, Lymington 73476 (after 6pm).

70CM HANDHELD. FT708R with speaker mike, mobile charger, headset, quick charger, spare nicad pack, mobile antenna on mag mount. All you need for mobile and portable 70cm operation, £155. Paul, G4YFY, QTHR. Tel: 0403-87-404.

DAIWA SEARCH-9 marine band receiver, 156-162MHz, 12-chan with crystals fitted for channels 6,8,12, 16. Internal vfo on 12th channel. With power unit, £65. Realistic DX160 receiver, 150KHz-30MHz in 5 bands, £50. G1YFL. Tel: 043-871-5083.

HP8555A, £3000. Adret 740A, £5000. WANTED: B40D, BRT400K/N, AR88D, HROMX, HR05T, £100 offered each if good. G8JFJ, QTHR. Tel: Horndean 591216.

FT221 2M MULTIMODE, £275 ono. SEM 100W 2m linear with preamp, £50. G3KIP, not QTHR. Tel: 0892-47643 (after 5pm).

DRAKE TR7, PS7, MS7, MH2700, DL300, WH7 manual, mike, DP-CP5 antenna, £1200. GM8ZAK. Tel: 041-954-7394 (after 7pm).

TR10 9130 2M MULTIMODE. Ex condx, boxed, used only as base station. Buyer collects. £375 ovno. Dave, GM1NDP. Tel: 0324-86-506.

2M 14-ELE PARABEAM, £35. 3-ele 20m monoband beam. Home brewed will also tune 10-15-80 meters with atu and warc bands, £60. Buyer collects. G0CEM, QTHR. Tel: (Bristol) 0272-642867.

MICROFICHE READER, free if you collect from Leicester. Michael, G4SDZ, QTHR. Tel: 0533-387259 (evenings).

RBK13 (?S27S36) new spares, sealed packing, inc power transformer and 34 valves, £25. 3-APR4 tuning units, £15. B28 (CR100) £10. Canadian tx/rx 58 Mk1 plus vib.pu. £10. All untested. Buyer collects. J Ayres, 9 Park Road, Kingston-on-Thames Surrey.

HEATH SB104 all solid state tcvr, 100W digital readout, provision for linear amp, second, vfo, etc. One owner, original manuals. Nice performer, needs 12v 20a suitable ps available. £350 ono. Tel: (Southampton area) 0703-260584.

CODAR T28 rx. Codar AT5 tx, matching Codar power supply 160-80m am/cw. Sold complete, no splits. £85. Buyer inspects and collects. G0BPO, QTHR. Tel: (Blackburn) 0254-40802.

DATONG MK Morse keyboard, mint, £60 ono. Howes QRP boards for 40m, tx, rx, sidetone built in case, £35 ono. Also tx, vfo. Both 40m, £10 and £6. Trio/Kenwood TS440S HF trans. Mint. £790. G4OWY. Tel: (Weymouth) 0305-813202.

YAESU FT727R, 2m/70cm dual hand portable, charger, spare unused nicad, seven months' old. Cost £483, offers to GW8RNK. Tel: (Swansea area) 0639-730237.

TR10 TS180S, solid state tcvr, 160-10, 100W, 2x vfo, ex audio, twin IF rx, digital readout +4 memories, £450. Racal remote control atu 160-20m. Suitable for inverted L antennas c/w psu, £50. Tel: Ian, 0734-788032.

ALINCO ALM203E handheld tcvr, spkr/mic, 30W linear amplifier, soft case, charger. Mint condx, hardly used, £175. G0DMJ, QTHR. Tel: Sleaford 60492.

NEC PC8201 64k computer. LCD screen, lap portable microsoft basic. Text editor, comms port, RS232. Centronic interface, tape cassette interface, CMOS memory protected. Ideal as terminal for TNC. £125 ono. G4ANP, not QTHR. Tel: 0302-722450, or 0302-787353.

HYGAIN TH3JNR Stolle rotator and controller, control cable, coax, etc. £150. G4FZA. Tel: (Milton Keynes) 0908-510570.

TS520S, £350. AT230, £130. R2000 with vhf converter, £400. FRC965, £400. Microwave modules, MMT70/28 70MHz transverter, £50. MM4001 rtty tcvr, £100. G4CXA, QTHR. Tel: 061-223-7716.

TEMPO 2002 2m linear, 1kW o/p, £850. Mutek TVVF 144A 2m trvtr, 10m i.f. superb performance, £220. G0CYB, QTHR. Tel: (Mansfield) 0623-657472.

TR10 9000, PS20, B09, systems base, SP120 used base station only, mint, £375. BNOS LPM144-10-100 linear, £120. Mint condx. J-beam 14-ele parabeam only 6 months' old, £35. Sell all for £450 cash. GW4WJO, QTHR. Tel: 0407-2330.

FT101ZD MK111 FM, fan, manual, £600. FTV901 tvtr 2m fitted, as new, never used, £250. FRG7 unmodified, £150. All A1 condx with orig pkg. Also 8-ele x 2m beam and rotator, £65. G4ZMG. Tel: (Lincoln) 0522-680872.

DAIWA AUTOMATIC ATU CNA1001, 200W, boxed, as new, £100. G3OOO, QTHR. Tel: 0788-72219.

YAESU FT726R fitted 2m/70cm board, manual, YM48 mike. As new condx. orig box, £650. G8MKG, QTHR. Tel: (Halifax) 0422-43122.

WESTERN DX6V 6-band vert antenna, unused, new Jan. This is a no trap antenna cost, £126, accept £100 to inc Securicor delivery. Also TET 3-band vert with trapped radials, £30. Very little use. GW4RLP, QTHR. Tel: 0286-3567 (evenings).

YAESU FT726R 70/2/SAT exc condx, 6 months' old. Superb multimode base station, £750. May take 2m mobile in p/ex. G8EKZ. Tel: (Bristol) 0272-793296.

KW1000 LINEAR, good condx, £200. Antenna systems 30' telescopic mast with head unit, TB2 10/15/20 beam. Including Alinco EMR400 rotator, £250. Cost £570 one year ago. Ex condx, moving QTH. Will dismantle, buyer collects. G3HNT, QTHR. Tel: 061-794-2807.

DRESSLER D200 2m linear. Max 500W PEP/ssb or 320W fm. Provision for preamp switching via antenna feeder. Little used. Too powerful for present location, offers around £400. Roger, GOIZH. Tel: (Birmingham) 021-308-5875.

TAPE/SLIDE synchronisers, new. Will sync any tape to slide projector (remote). Very pro, cost £50 to make only £11.50 inc post. GJ4ICD, QTHR, or tel: 0534-77067.

YAESU FT1 tcvr, mint, all options fitted, £1,050. Trio AT230 atu, 4 months' old £160. Noda Tushin 427H swr/pwr meter, £40. Western DX6V 6-band vert hf ant. New unused, £105. TET 3-band vert ant, £35. GW4RLP, QTHR. Tel: 0286-3567.

KW2000 c/w power pack and speaker. Needs overhaul and re-alignment. Buyer collects. £75. G0DKH. Tel: (Cornwall) 0579-42384.

TS711E TR10 multimode base station, superb, like new condx. Boxed, complete in every detail. Tel: David, (Matlock) 0629-55365.

TS811E TR10 multimode base station. Superb, like new condx, boxed, complete in every detail. Tel: David (Matlock) 0629-55365.

40' STRUMECH VERSATOWER. Complete with wall mounting kit, two winches, cable, and head assembly with alignment bearing. £300. G4CXJ, QTHR.

YAESU FT101B cw filter, handmic, spare pa valves, £275. Standard C58 multimode portable, case, charger, £225. MM144/28 transverter, £80. All equipment good condx, with manuals and ono. WANTED HF linear amp, FT2100Z, any condx. G4EZK, QTHR. Tel: Dave, (Chelmsford) 0245-380945.

FL2100Z LINEAR AMP. Manual. Very little used. Unmarked, £590 ono. Howard, G0HZH. Tel: 0394-460-474 (between 5-9pm please).

FRG7700, FRT7700, general coverage rx and ant. tuner. Ex condx. Exchange for hf beam, heavy duty rotator, or FT726R 70cm, 50MHz module or WHY? Tel: Jim, (High Wycombe) 0494-39201.

PK232-6 WITH CBM64 software pack and extras, £300. Latest Kenwood portable, TH205E with extras, £165. Commodore 64 with 1541 disk drive, MPS803 printer, £275 inc some software. ATV trcvr with monitor, £75. G4NMP, QTHR (1986 on). Tel: (Rotherham) 0709-554665.

ICOM IC225 2m, fm mobile tcvr, boxed, £100. Marconi signal generator, type TF144G, good order, offers. G3BXI, QTHR. Tel: (Trowbridge, Wilts) 0373-830804.

TILT OVER TOWER approx 50' in 5 sections, £100. J-beam TB3 tribander, never assembled owing to illness, £250. G4LNE. Tel: 0706-873839.

FT101ZD FM, FAN, mic, warc, £515. Shure 444 mic £28. WANTED: MC60 mic. G3VOF, QTHR. Tel: 04023-73366.

MICROWAVE MODULES 28/144 tsvtr, 10W o/p, £25. Homebrew pw Tamar 28MHz cw/ssb tcvr 1W o/p c/w sep psu, £60, or £75 the pair. Crge extra. G4SUO, QTHR. Tel: (West London) 0784-256935.

FT901DM, FC902, FV901DM, inc leads & spare valves, £830 ono. 1987 Int Callbook £12. 81 USA £6, 82 & 85 Int, £4 ea. 79 USA £3. Steve, GOHMN. Buyer pays delivery or collects. Tel: 0482-707965.

TS430S mint condx, fm/cw/ssb/am filters fitted, orig pkg, manual, £725. BNOS 12/25A psu, ex condx boxed, £115. GOEOL, QTHR. Tel: (Cheshire) 0606-554857.

FT730R, 70cm, 10W/1W fm, twin vfo's, 10 memories, scan etc. with spk/mic, mobile mount, box, manual. Mint condx £195 post extra. GOEOL, QTHR. Tel: (Cheshire) 0606-554857.

WEATHER SATELLITE rcvr, with scan facility and five crystals fitted for NOAA's and meteor satellites, 137MHz preamp. Framestore with 4 pic store, x4 zoom, rev video plus other mods, colour board, agc board with psu ready for fitting. Also two books on NOAA's from USA, £250. Meteosat down converter (1700-137.5MHz), 1700MHz preamp, 4' dish and 3 ESA meteosat info books and colour posters. Can be seen working. Tel: John, Uttoxeter 565836.

R209 RECEIVER 1-20MHz, £25. Marconi sig/gen TF995A 1.5-220MHz am/fm with manual and case £75. Garex "2-mobile" tcvr needs xtals, £10. Various psu's and transformers. 'Phone for details. G4UFQ, QTHR. Tel: 0922-33979.

"Q" MAX GDO mains 1.5-300MHz, £10. Cossor valve voltmeter, dc volts, ac, ohms, dB's etc, £35. Balun 2-40MHz, 50ohm, 1-1, £5. Meter 0.500, MA, thermo, 2" £3. Megger L.Case 500v, £35. Mullard new, 00V06.40A, boxed £20. Yaesu handmic, 500ohms new, 4-pin, £10. All items + p&p. G3JNY, QTHR. Tel: (Leeds) 863058.

FT290 MUTEK, nicads, case, mains psu, mobile headset, ex condx £250. Microwave modules MML144/40 linear amp, £50. Harry, GODOL, not QTHR. Tel: 0274-634084 (weekdays), 0388-834270 (weekends).

KW2000B good clean wkg condx. c/w power pack, inc loudspeaker, also mic. Many spare valves inc PA's and two special drivers, £130 ono. G3AIU, QTHR. Tel: (Swindon) 0793-814280.

IC451E MINT, £400. MET432-17X, £20. Kenpro KR400RC £100. MM432/50 linear, £100. Welz SP400 meter 130-500MHz £30. 13.8v 15a psu metered, £20. 5-18'x2' ali poles, £5 each. Radio & TV Servicing 27 vols, 1-1979, £50. Buyer collects. Tel: Skegness 5940. G8VXC.

IDEAL FOR 70MHz group quick start. 14 dashmount am cambridges, all gwo. One remote mount. One mains base station, £5 each. £60 the lot. Buyers collect. Last one gets free spares and manual. G8IDL, QTHR. Tel: 0638-76230.

YAESU FT101E mint condx. Literally as new with mic and spare Toshiba tubes. FM fitted, £375. KW1000 linear amp, latest transformer and choke. Without doubt, cheap 1kW for £375. Have gone singin' dancing. WANTED: 100' tower or higher. Tel: 0704-73255.

YAESU FT77, fitted fm board, FC700 atu, FTU707 10/2m tsvtr, £600 ono/split? Kantronic KAM all mode tnc, new £225. Megasat K band LMBs, £50. Tel: Len, 01-628-6773 (office hours).

HONDA CD200 benly motorcycle, Y reg. 33,000 miles. Full fairing, top box, ideal commuter, 100+ mpg. 70 mph, vgc, £395, or good gen/cov rx plus cash adjustment. G8CTO, QTHR. Tel: (Reigate) 0737-244792.

YAESU FT208R 2m handheld + NC9C charger. Yaesu FT480R 2m multimode. FDK Palm 4 70cm handheld xtalled for SU8, SU18, SU20, RB0, RB6, RB14 with several other xtals available, slight damage. What offers? G8MRO, QTHR. Tel: (Lowestoft) 0502-731640.

LOUDSPEAKERS, B and W, DM14, £150. Prefer buyer collects. Datong AD270 active antenna indoor version with mains psu, £25. Technics SLDL1 direct drive linear tracking turntable, £65. CDR TR44 rotator, £65. Post extra. 00V0640, £15. G3WZT, QTHR, Tel: 0403-710565.

KENWOOD TS520SE, £325. Icom IC202S, £125. Microwave module MML144/25 preamp amplifier, £35.

Alinco ELH730G amplifier, £50. New YM40 mic, £10. New power supply 5v 20a, 15v 4a, 12v 4a, £25. FT227, £125. Hundreds of valves. G3IDW, QTHR. Tel: (Swindon) 0793-822055.

M588 ON 10M. Spectrum conversion 28.410 to 29.700. am/fm/ssb. K40 mic. F50 freq counter. 70W Bremi linear, £100 the lot. TS830S, AT230, SP230, MC60, cost new £1400. First offer over £800. G4PFR, not QTHR. Tel: (Wendover, Bucks) 0296-623802.

RCA 16mm SOUND PROJECTOR working and c/w spares. Exchange for computer suitable for rtty or good hf atu. WHY? G3YJJ. Tel: (Southampton) 0703-894200.

TRIO 2600 HANDHELD. Soft case, chgr, spare nicad matching battery case, hardly used by present owner. £195. Would consider 2300 in p/ex. Scarab MPT1 tu, £40 (free Pet software). Pet Computer, £50. GOFDR, QTHR. Tel: Ted, 0629-823207 (evenings)

FT101E, £350. FT220 2m base multimode, £150. Sony ICF-7600D, £110. All ex condx, complete and boxed. BC221M, charts, psu, £15. Orig manuals for Eddystone 770R, 940, £5 each. A888D, £10. G2AQJ, QTHR. Tel: 0722-25929.

UK101 COMPUKIT computer, 6502, basic, 8k, good experimenter's machine, £25. Tape recorder, ex-language lab. reel/reel, desk (no legs), working, three PAPST motors, £25. 24/28v Toroidal mains transformers, £1 each. Buyer collects or arrange transport. G4GCC, QTHR. Tel: (Suffolk) 0787-71842.

ICOM R70 receiver with fm. Good condx £410 ono. Heathkit SB620 monitor analyser, working, £40. R70 service manual, £8. Bremi 12v psu £7. Buyers collect. G8HNN, QTHR. Tel: 0905-58306.

YAESU FT757GX, Daiwa PS300 psu, Daiwa CNA1001 auto atu, £850 ono; also Yaesu FT290 with muTek, £210. ST5C rtty terminal unit, £50. Yaesu MD1 desk mic, £35. Collection or courier at cost. GM0AVV, QTHR. Tel: 041-641-1570.

"PW TEME" modules, Practical Wireless project. Includes 2-band tx and rx for 7 & 14MHz vfo, atu, swr meter and power supply. Ideal QRP station. Professionally constructed, £60 or ex for good AR88 rx. GW0FPY, QTHR.

YAESU FT290R Mk1 2m multimode. No muTek f/end, carrying case, charger, nicads, helical manual, good condx. £225 ono. Mike, G1YQH. Tel: (Herne Bay) 0227-365819 (after 7pm).

MMT144/28 2M tsvtr 10W out; MML144/100S 100W linear, 10W input. Both near new condx. £105 each. Prefer sell together at slight reduction. Tricky harness to connect with TS430S included. G4FAS, QTHR. Tel: (Stockport) 061-437-7784.

ALTRON AQ6/20 2-ele 4-band minibeam. £40. Buyer collects. G4KEL, QTHR. Tel: 01-330-0695.

FT77 FITTED FM and narrow cw filter, £400 ono. IC505 6m tcvr, ssb/cw, £300 ono. Contact Alex, GM0HNX, not QTHR. Tel: 0890-83-294 (6-9pm).

ICOM IC202 2m ssb psu and matching 10W linear, £150. Valve linear, £50. WANTED: Hustler hf mobile antenna 10/80, also SP230 speaker, also matching linear for TS120v Trio or Yaesu (10W in 50/100 out). Tel: Cerry, 0952-79792 (after 7pm).

£120 ONO. KW2000A working order. Manual and spare set of valves. G8KJP, QTHR. Tel: 0223-210989.

WELZ SP220 swr power PEP meter, £45. WPO parametric equaliser for variable mic response. Checked by Cirkit. With xtal mic, £45. D70 morse tutor, £30. WANTED: KW Vespa Mk1, non-working unit considered. G3RHM, QTHR. Tel: 01-423-2329.

FT102 TCVR with fm and cw filter, also ext vfo and matching atu, £725 ovno. G4VSW, QTHR. Tel: 061-456-7384 (after 6.30pm).

TAIT 25W base station high band. 10W Motorola Maxar uhf mobile. RS V23 Modem. S100 micro, 64k memory card, floppy card, Shugart 8" drive. Storno 500 and 600 modules. Offers? G8EEM, QTHR. Tel: 0532-872050.

RACAL RA117 Receiver with MIL-SPEC valves. Plus RA63G sideband converter and RA178A receiver terminal. All technical manuals included. Tel: 0224-636828 (after 6pm or weekends).

FT290R C/W NICADS, soft case, Alinco ELH2300 II tx/rx amp helical, vgc, £260. G1KCT. Tel: (Telford area) 0952-618110.

IC251E, £400. J-beam 10-ele xy, £25. 2m Tono 100W linear, £80. Trio PS30 HD/PS, £85. KW2000A LS/PS and spare valves, £185. Yaesu YD844 table mic, £18. Leson TW232 table mic, £20. All mint or near. GW3VFZ. QTHR.

TRIO R1000 RECEIVER, £200 ono. Brian, G8DIU, QTHR. Tel: 01-330-0092 (after 8pm). Buyer to collect.

FDK750 + EXPANDER 430 recently serviced by UK agent, £350. 30' tower 2-section tel-tilt over, no ground post, £30. Buyer collect. Honeywell L32 dotmatrix printer, Centronics, £75. Kevin, G0CHI, QTHR. Tel: (Bognor Regis) 0243-820363 (after 5pm please).

MICROWAVE MODULES MML144/100S 2m, amplifier 10W in 100W out with preamp, new last August, £85. Sephton, 16 Bloemfontein Ave, Shepherds Bush, London, W12 7BL. Tel: 01-749-1454.

TRIO 2200GX case, charger, two sets nicads, manual, £70 or p/ex with cash adjustment for FRG7. Contact G0FEX, Ken, QTHR. Tel: Leics 785091.

HRO ALL COILS, £20. BC342 c/w powerpack, needs attention, £12. VHF receiver 1132A, £15. Auto-transformer 240-120 1kW, £5. Cossor 339A DB scope, £15. Pye Trimeasy sig/gen, £20. Buyers collect. G5XB, QTHR. Tel: Reading 722195 (anytime).

60' LATTICE TOWER, 4 months' old, c/w winches, £475. G1OJJ, QTHR. Tel: 0822-613411.

BLOWER 1. Airmax 115/240v 85x120mm axial. Blower 2. Airmax 230v 50Hz. Can be used as motor with tangential fan removed. 120x110mm overall. FRACMO motor 110v DC torque 30oz ins. Right angle 0.25" drive shaft, 75 rpm. Offers. G3INU, QTHR. Tel: 0438-369128.

TS711E 2M MULTIMODE base station, £650. FT757GX hf tcvr + FP700 power supply, £650. FRU7700 converter 118-150MHz to 28/30MHz, £60. CT1600 2m fm thumbwheel handheld, £150. All ex condx. G4VEW, QTHR. Tel: (Kidsgrove) 07816-5020.

TS530SP, £595. As new. W Gibson, 180 Castlemilk Road, Glasgow, G44 4NS.

HEATHKIT HW100 hf tcvr. 3.5-30MHz, psu, manual, some spare valves, good condx, buyer collects, £90. GM0CBC, QTHR. Tel: Ecclefechan 302.

COMPUTER MTX512, OS5.25 disc, £85. J-beam LW16/2m £25. Rotator, Channelmaster, HD9508 £30. CRT Rectangular face D13/33 mumetal screen transformer data, £25. BLW78 transistors, £10. 10GHz gunn module, dish waveguide flanges, IF strip etc, £50. G4IOK, QTHR. Tel: Witney 4867.

AR2002 26MHz-1.3GHz. Tape socket. FF output for ssb. £425. Kenwood TS430S 0.15MHz-30MHz. FM. All filters fitted. £715. Both boxed. Tel: 0639-882708 (between 6-8pm).

ICOM IC251E fitted with muTek front end, also inc desk mic IC-SM5, superb 2m multimode, £550, inc shipping charges. Loss of interest in 2m reason for sale. Roy, GU8TGP, QTHR Guernsey, Channel Islands. Tel: 0481-47918.

UNIQUE OPPORTUNITY - Yaesu FT200. Early 1970's S-band hf little used. Mint condx. Still covered original plastic wrapping! New valves. Four spare PA's/drivers. Worked 40 countries since complete overhaul (2 months). £300+. Also 726R 2m/70cm/sat £750. Robert, G4XDD. Tel: 01-221-4399.

YAESU FT102 hf tcvr. Mint condx c/w manual and box, £575. G4YSN, QTHR. Tel: 0257-793872, or 02572-76881 (daytime).

FT726R COMPLETE, 2m/70cm SAT-unit. Narrow cw-crystal, £925. Rotator KRC400RC, £95. Aerials, 2m 17-ele MET. £15, 9-ele £7. 70cm 17-ele crossed, £15. 9-ele, £5. G6UJI, QTHR. Tel:0242-584696.

6M TVTR SPECTRUM comms TRX6-2, £75. 25W boxed kit, £30. MMT432/144R tvtr, £95. Welz SP400 vhf swr/power meter, £35. G8ATA, QTHR. Tel:04484-4671.

SILENT KEY SALE: Yaesu FT290R tx/rx. £300 ono. Tel: 061-339-1930.

FAST OR SLOW scan TV? Sony C7 Betamax video recorder with remote control, camera input, audio dubbing plus numerous other facilities, £90 ono. David, G4JLU, QTHR. Tel: 01-954-9180.

SILENT KEY SALE: Super transmatch atu, £150. Yaesu FT1, ram fm/cw 300 filter, am filter, converter, £1000. Yaesu linear FW1002, £550, dc atu transmitter, £100. Furtop TUD100, £10, Microwave modules amp 144/30W £70. Yaesu MD1 mic £40. Kenpro 200 memory key £100. SX400 scanning monitor £450. Amtor terminal unit ICS £200. All in ex condx. Tel: 0782-310427 (Stoke on Trent).

YAESU FTV901 tvtr, fitted 6m, 2m, 70cm, unused. FV901 vfo, little used. £375 for both. Mike Green GM4MPU. Tel: (Stirling) 0786-72862 (after 6pm).

"WIRELESS WORLD" dolby processor for any r/r recorder: circuits/data and calibration tape, £25. "Neal" transcription tape-deck model 302, £185. Synchrocorder cassette deck with auto slide change £75. Both latter scarcely used. Genuine reason for sale. G0HTP. Tel:051-355-2833.

SHURE 444D desk mic, £28. Icom speaker unit SP2 £12. Yaesu world clock, model QTR24, £10. Tel: 0740-51938 (evenings).

VHF 14-ELE PARABEAM c/w coax cable, best quality. Also mast, 12' section with stub mast. Lashing cable and wall mounts. vgc. £80 only. No time wasters please.Tel: Chris, (North Wales) Deeside 822798.

HAVE FOR EXCHANGE Olympus OM10 SLR camera, f1.8 lens, motor drive, Hoya wide angle lens, 2x converter, ERC, multi-dedicated bounce flash, gadget bag. All in absolute mint condx. Swap for good 2m rig, good atu, rtty set up. WHY? Tel: David Linnell, Northampton, 0604-711647.

DRAKE 2B+2BQ vgc, £130. Collins SM2 £65. Comdel speech processor (collectors item) offers. Spectrum 48k in saga elite keyboard (IBM standard), WP (2) spreadsheet and YU file software, Brother M1009 DM printer and interface £170. G3ONU, QTHR. Tel:0923-676344.

6M VALVE LINEAR £150. Plus answers to two basic questions on valves. SB220 station monitor, £325. G3NOH, QTHR. Tel:01-997-4756.

FT290 MUTEK front end, soft case, nicads, charger, ex condx. £199. No offers. G0CDD. Tel:01-958-1164.

HP150 MSDOS PC, Thinkjet printer, 15m byte hard disc, twin 3.5" floppy. HP110 portable MSDOS PC, + portable 3.5" floppy and Thinkjet. HP laserjet printer. All with manuals, cables & software. Together, £2000 or will split. G8KJI/DD5CU, QTHR or tel: 0483-755306 (Welch). Exchange or WHY?

WANTED . . . .

ANY INFO, CIRCUIT, h/book, alignment instruction or manual on Codar receiver type CR70A. Can photocopy and return if required. All replies acknowledged. G3TZV, QTHR.

SENSIBLE PRICE PAID for good condx hy-gain beam TH3JR or J-beam minimax MM3 or similar. Will collect North England or reasonable distance from QTHR. G4LDE. Tel: 0254-53662.

TRIO TS120V TRANSCEIVER. Also mobile antenna. Tel: Bill, (Blackpool) 0253-791699.

APPLE 2E RTTY. If you use an Apple 2E on rtty or amtor, or with the AMT2 or PK232, I would be interested to hear from you. G2FUD, QTHR. Tel: 061-928-1321.

EARLY WIRELESS AND XTAL SETS WANTED: Particularly WW1 equipment or parts, early valves, horn spkrs, old radio books, magazines, catalogues, pre-war tv; keen collector pays well for anything associated with early wireless. James, G4ERU, 5 Luther Road, Winton, Bournemouth. Tel: 0202-510400.

WARTIME SUITCASE TYPE RADIOS. A Mk3 (B2 minor), Mk 123, or any other clandestine and resistance type radios including modern for collection. Any condx welcome. Manuals and accss are of interest. G4OFO, QTHR. Tel: 01-949-2317.

AS LIGHT AS POSS TCVR. For hf/p backpacking. cw/ssb multiband, or 80m. Prefer minimum 40W. Consider poor condx, damaged, dropped, scratched, but must be cheap as may attempt to lighten further! G4YSS, QTHR. Tel: 0723-863137 (evenings/weekends).

POWER TRANSFORMER for WW2 AR88 receiver. Advertiser will pay transportation. Tel: (Stevenage) 0438-353636 (anytime).

SM220 STATION MONITOR with pan. SLP820 extension speaker. SW200A swr power meter. Pair 572B/T160 valves. HC10 digital world clock. Tel: 0394-460-474. Howard, G0HZH (between 5-9pm please).

HF ATU REQUIRED by school radio club. "KW" type preferred. G4LUO, Tel: Newington 842127.

EDDYSTONE EA12 rcvr with service manual wanted. E Jackson, Thule, Gidleigh, Chagford, Devon, TQ13 8HT.

CIRCUIT AND/OR service data for BCC vhf am t/r type 146 (ex-army). Your price for originals or photocopies. G0DPX, QTHR. Tel:(Yorks) 0274-878888.

M12UHO 2 M.SSB tx/rx. Cash or exchange for part built G2DAF Mk11 rx. G8CKM, QTHR. Tel:0939-250679.

CLEAN COPY OF "Amateur Radio Techniques" seventh edition, also ARRL "Radio Amateur's Handbook" around 1975. GW3DIX, QTHR.

HW101. NON-WORKING or part-built kit considered. Details to G4BSS, QTHR. Write or tel: 0943-862125.

FAS14R, G3DKO, QTHR. Tel: 0760-23897.

OPERATING SYSTEM DISK CPM. Manual or any information for future FX20 computer. G60SO, QTHR. Tel: 07982-2872.

FDK EXPANDER 430 uhf cross-band transverter for 70cm use with multi 750X 2m transceiver. G0EVL, QTHR. 9 St Stephen's Gardens, Northallerton, North Yorks, DL7 8XN. Tel: Mr LC Walshe, 0609-71636.

CODAR PR30 RF preselector HRO bandspread coil packs for 80-40-20-15 and 10m amateur bands. G2VF, QTHR. Tel: 0703-775064.

DRAKE TUNING UNIT MN2000, and L4B linear, to complete my 4C outfit. Interested in working or non-working units. Can rebuild if general condx is still reasonable. G3RUG, QTHR. Tel: Ted, 061-491-3814.

GOOD QUALITY semi-professional portable audio cassette recorder in perfect working order, mono and manual recording level with 600 ohm mic input. Brian, G4SPQ, QTHR. Tel: 0453-46632 (evenings).

YAESU FT726R plus modules etc. Must be in good condx. Bob, G1ZNX, not QTHR. Tel: Toddington (Beds) 2933 (after 6.30pm) Reverse charges.

KW202 or Eddystone 888A receiver in good working order. G4IZM, QTHR. Tel: Rugby 811295.

TS120V FOR WAB portable use, must be vgc. For sale WWII commercial copy of Vibroplex black crackle finish, offers. Also 1938 Admiralty handbooks, as new, offers. G3OCA. Tel: (Derby) 0332-662818.

INFORMATION, programs, frequencies, equipment for fax transmission of weather maps please. G3OOQ, QTHR. Tel: 0789-205973.

ALAS! Old Joe emits blue smoke - Eddystone 440 mains transformer replacement wanted. G4NDF, QTHR. Tel: 0454-415768.

ICOM IC202S good price paid for clean model, cash waiting. G4TCO, QTHR. Tel:(Worcester) 0905-641328.

YC7B DIGITAL READOUT for FT7B. Must be good wkg order. Also Trio PS10 pwr supply. Datong ASP for Yaesu 4-pin mike. Tel: (Northumberland) 0670-855953.

FT7 or FT7B or Atlas 210X. G3ZLJ, QTHR. Tel: 0902-761339.

CUSHCRAFT 14-ele 144MHz yagi in good condx. FOR SALE: converted Pye rack mount base station linear amp gives 80W+ on 144MHz ssb or cw, offers or swap vhf/uhf. WHY? G0EVT, QTHR. Tel: 0924-825443 (evenings/weekends).

YAESU FV102 ext vfo. Also FC102 atu. Yaesu FTV50 50MHz module for FTV series transverters. G4YXS, QTHR. Tel: 0373-88678.

PRI-1950 ARRL Handbooks. Also for spares, your old Heathkit RA1 and RG1 rx's, also Codar AT5 tx's with acpu's. Details and prices to Richard Marris, 35 Kingswood House, Farnham Road, Slough, Berks, SL2 1DA.

CCT's FOR SPEECH processors. VHF linears and pre-amps. Rotator and support bearing with control unit and cable. 18v transformer suitable for PW Marchwood. G7ARB. Tel: Roy, 0664-500814.

MARCONI EXCITER H1540 with synth type H32440001 or synth alone in good condx. Also filter H322797. G3YFK. Tel: 0743-884858.

ENTHUSIAST TO complete two radio ancillary kits. Tel: (Sunderland) 091-5280080 (after 5pm).

EXTERNAL VFO VF30G for Trio TR2200GX. G4KEL, QTHR. Tel: 01-330-0695.

YK88C 500Hz FILTER (Kenwood) wanted, will also consider YK88CN or YK88SN. Tony, G4ZYQ, QTHR. Tel: (Preston) 0772-742823.

ICOM IC202S cw/ssb tcvr 144.0/144.6MHz. Details to Norman, GM0ELL, QTHR. Tel: 041-339-4552 (evenings)

DETAILS OF INTER board and panel control connexions for Yaesu FRG7000, or look inside one to copy. G8KDO, QTHR. Tel: Paul, 01-651-2889.

OLD TYPE COLD CATHODE x-ray tube. G3OEP, QTHR.

JRC NDH518 MEMORY UNIT, NVA515 speaker, NSD505 tx unit. Tel: (Havant) 0705-455591.

R1475 TO COMPLETE rebuild orig AP's 2883G Vol 1, Vol 2 pts 1 and 2, Vol 3. Also mounting trays type 656 10A 17535, type 657 10A 17536, any condx. Also guard units or other bits! G4CCW, QTHR. Tel: 01-651-1410.

MICROWAVE MODULES MML144/200S linear, 432MHz linear 10W i/p. Must be in good condx with manual. Will inspect/collect Southern England. Peter, G1CEI, QTHR (latest callbook). Tel: 0962-882602 (evenings).

CONTEST NEWS - CONTINUED FROM PAGE 296

9. Entry into this contest will count towards the HF Contests Championship 1987-88.

RECEIVING SECTION

1. Transmitting section rules 1, 2, 3, 6 and 7 will apply, with the addition that holders of British Class B licences may enter.

2. A station may only appear once in the column headed "Station heard". The callsign of the station being worked may only repeat once in every three contacts logged, except when the station is a new multiplier. Entrants should log the time, callsign of the station heard, RST, serial number and region given by that station, and the callsign of the station being worked.

3. Awards. Certificates of merit will be awarded to the leading three receiving stations.

RSGB top band df events

Details of rules etc for RSGB Top Band df events may be obtained from E L Mollart, G6AGE, 17 Spinfield Mount, Marlow, Bucks SL7 2JU.

DF Qualifying Event – Oxford

Date: 24 April 1988.
Map: OS Sheet 164 1:50,000 series, Oxford.
Assembly: 1300 bst for start at 1320 bst.
Location: Shotover Plain NGR 565063. Please approach from the west.

Competitors requiring tea should notify Mr R Pearce-Boby, College Farm, Pinchgate, Bletchington, Oxford OX5 3DY; tel 0869 50767, not later than 17 April 1988.

G T Peck Memorial Trophy DF event

Date: 17 April 1988.

Start details are not yet available for this event and should be obtained from the organiser, Mr Colin Boyce, Coombe Bank, Hatches Lane, Great Kingshill, High Wycombe, Bucks; tel 0494 712083.

IN MEMORIUM

Because of the amount of space taken up by the increasing number of obituary notices being received, it has been decided that, in future, only those of people who have given exemplary service to the RSGB will be published. The deaths of radio amateurs notified to us will instead be published as one-line entries under the heading – "In Memorium".

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

Mr A Bruce, G5BB, on 19/10/87, aged 82.
Mr A Barker, G8JGV, on 20/12/87.
Mr W A R Bedward, on G1WOZ, on 13/8/87.
Mr D Butcher, G6LBN, on 21/4/87.
Mr J Blenkey, G4CPU, on 6/12/86.
Mr M Brownfield, G0EMZ, on 10/11/87, aged 25.
Mr A E T Bosten, G3BIN.
Rev Fr T Brennan, EI5A, on 28/11/87.
Mr C Bull, G1RXS, in December 1987.
Mr R L Burgoyne, G6CFI, in April 1987.
Mr R J Burr, G3NBT.
Mr J H Cant, G6FU, on 4/10/87, aged 83.
Mr R Cantarini, G1LHP, on 15/12/87.
Dr W P Cargill, G5LR, on 18/11/87.
Mr P J Coleson, G4VAZ, on 5/11/87.
Mr J O Conway, G4HXB.
Mr G Coward, G4CED, on 20/11/87.
Mr W A Crute, G3JEY, on 19/11/87.
Mr E K Damczyk, G1DXE, in May 1987.
Dr S Darbishire, G3REO, on 27/1/88.
Mr A Daykin, G8JCA.
Mr C L Deakin, RS41365, on 4/12/87.
Mr K N Dexter, G1NXG, in December, 1986.
Mr F Dilworth, G4IAV, on 17/12/87, aged 92.
Mr L Eastman, G8UUE, on 12/1/88.
Dr D Edwards, RS88489, on 18/10/87.
Mr H Eustace, G4JPR.
Mr E E Evans, GW3CDH, on 16/10/87, aged 65.
Mr J Goodenough, G4SLM, on 30/1/88.
Mr J W Gray, G1NOT, on 23/1/87.
Mr G Green, RS38743, on 8/11/87.
Mr L J Halford, G3ILH, on 24/11/87.
Mr K F Hall, RS606, on 20/7/87.
Mr A Handyside, GM3CJN, on 4/10/87.
Mr D W Harries, G3RF, on 5/11/87.
Mr J Hawker, G3GMJ, on 2/1/88.
Mr J Haydon, G3BLP, on 30/11/87.
Mr J G Hawkins, G4ILD, on 29/10/87.
Mr J L Hobden, RS37923.
Mr W Hodgson, G3WHH, on 30/1/88.
Mr R N Hodson, G3PXR, on 25/10/87, aged 73.
Mr N Horrocks, G2CUZ, on 6/1/88, aged 67.
Mr F G Hunting, RS38868, in October 1987.
Mr G Hurst, G3RTK, on 1/11/87.
Mr F Knowles, G3DBF, on 22/7/87, aged 65.
Mr F Kosarski, RS220.
Mr P J Lawler, G4CMD, on 11/11/87.
Mr A D Lamb, GM2UU, on 28/10/87.
Mr A Leaman, G3POP, on 20/9/87, aged 83.
Mr L Lear, G3FIH, on 5/11/87.
Mr W Leonard, G5KV, on 3/1/88.
Mr C G Lewis, G4YOL, in September 1987.
Mr E P Mansfield, G3BOV, on 27/1/88, aged 74.
Mr M Marcantonio, G3TLC, on 3/8/87, aged 72.
Mr P A Marsh, G1LDB, on 29/11/87.
Mr C H Marshall, G6YDB, on 17/10/87, aged 57.
Mr J Marson, G1MWN.
Mr F Mellon, G3IFM, on 27/11/87, aged 65.
Maj I C Millar, 5H3AP, on 7/10/87.
Mr H E Mappin, G4FLO, on 30/12/87.
Mr H V Moore, G6USB, on 21/12/87.
Mr E F Moore, G3JFM, on 11/12/87.
Mr J C Muggleton, G6EOV, in August 1987.
Mr R Muir, GM3DWJ, on 20/12/87.
Mr T Neill, GI1BNF; on 30/12/86.
Mr R Newman, G4WYB, on 26/11/87.
Mr J A Nicholls, G4ECN, on 5/1/88.
Mr H Parkinson, RS12087, on 6/1/88.
Mr B Pashley, G6PJ, on 21/1/88.
Mr N W Pattinson, G3RHX, on 1/2/87.
Mr J Paul, GI4AOD, on 14/1/88.
Mr E J Pearson, G4OMC, in July 1987.
Mr L Phillips, G1SCC, on 8/11/87.
Mr F Rayner, G3XRG, on 10/12/87, aged 57.
Mr B Roberts, G4RLG, on 9/12/87.
Mr N P Sadwick, G4PWW, on 28/8/87.
Mr C V Sallows, G3EZG, on 3/12/87.
Mr R Savage, EI2AD.
Mr P A Saytch, G0DVX.
Mr M Sharp, RS85590.
Mr C Scroggs, G0CNC, on 17/12/87.
Mr R K Sheargold, G6RS, on 25/1/88.
Mr R Simmons, G3PNS, on 6/2/88.
Mr H Smith, G4UOK, in May 1987.
Mr T Spears, GM30WI.
Mr J Sumner, G4FVH, on 3/12/87.
Col H W Thuiller, GM4NGO, in January 1988.
Mr C Toogood, G3TND, on 27/12/87, aged 71.
Mr P H Townhill, G5XL, on 1/6/87, aged 83.
Mr J H Treadwell, G8LQQ, on 31/12/87.
Mr K Waddingham, G3PJS, on 30/11/87, aged 60.
Mr J A Ward, G4EDI, on 30/10/87.
Mr B Warren, G6CI, on 20/10/87, aged 82.
Mr C A Warkentin, WB0WVQ.
Mr J Walker, G2DCF.
Mr D Wilde, G3EBA, on 12/1/88.
Mr W Winter, RS88398, on 2/6/87.
Mr E T Wood, RS90659, on 11/10/87.
Mr P Woodhouse, G2BQY, on 17/1/88, aged 68.
Mr E G Woolacott, G6TXE, on 22/10/87.

ELEMENTARY MATHEMATICS!

The problem:

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2m FM transceiver	£300.00
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The above are based on typical market prices.

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- ★ 25 Watts
- ★ Full Duplex
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- ★ Small size/21 memories

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What can you say about this transceiver other than praise? The new ALINCO ALD-24E has bought the cost of dual banders down to a price that makes it a serious option to the 2 metre only rig. Just think of the pleasure of being able to select 2m or 70cms at the press of a button. No aerial switching (duplexer built in) and full duplex operation. The ALINCO actually has two completely separate transceivers built into its small case measuring 5.5" x 2" x 6.5". It has all the features of the ALR-22E (see below) at a huge saving over its competitors. We could mention the extended receiver coverage of 138-174 MHz & 420-454MHz at no extra charge, but then everybody would want one! So we thought that we'd simply invite you to send for the full colour brochure instead.

ALR-22E 2M FM MOBILE

THE RADIO COSTS £249 THE SCANNER COMES FREE!

- ★ 25 Watts FM
- ★ RX 138-174 MHz (option)
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- ★ Mini-size

ALINCO products are hitting the market in a big way. And the ALR-22E must rank as today's best buy. When you buy the ALR-22E you don't just purchase a 2 metre mobile, you purchase a vhf scanner as well. For no extra cost we will extend the frequency coverage to 138-174MHz. All this for a price that puts the competition in the shade! Features include 21 memory channels, programmable scan, priorty channel options, programmable splits, reverse repeater button, dual speed scanningk optional delay, back-lighted LCD display, dual vfo, lithium battery back-up, 25/125kHz steps, mini size measuring 5.5" x 1.5" x 6.5", up/down microphone control, quick release mobile bracket plus mounting hardware, superb sensitivity, 5 watt low power position, manual or electrical tuning, 12 months parts and labour warranty etc. With a specification like this we suggest you phone for colour brochure, today.

2M MICRO HANDHELD

- ★ 3 Watts FM
- ★ Memory Channel
- ★ Battery Save
- ★ Smallest in World

£189!

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The ALX-2E is a truly pocket transceiver. Capable of 3 watts output it covers the full 140-150MHz using the familiar thumbwheel dial. Features include memory channel, scanning, priority, battery saver, tone-burst, 600KHz shift etc. Supplied complete with ni-cad pack, AC charger, 12v DC charger, and helical. Accessories available include case, car cigar adaptor, headphone/mic, various batt. packs etc.

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The new ALINCO amplfiers are great value. Compact, reliable and low priced. Now you can boost the power of your hand-held without boosting your overdraft!

ELH 230D$_2$	ELH260D
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Vox or PTT	Vox or PTT
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- ★ RMS/PEP
- ★ 0-200 Watts

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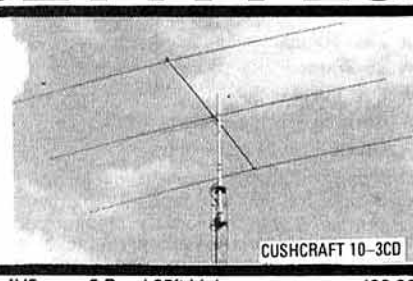
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HF6V	6 Band 26ft high	159.00
HF2V	80/40M 32ft high	142.00
A18-24	HF6V 17/12M add on kit	30.99
STR11	HF6V Stub Tuned Radial Kit	33.49
MPS	HF6V Mounting Post Sleeve	5.99
20MRK	HF2V 20M add-on Kit	33.49
30MRK	HF2V 30M add-on Kit	33.49
TLK	HF2V Top-Loading Kit	13.84
RMK-11	HF2/6V Roof Mounting Kit (includes radials and tripod tower)	51.49
T2	Tripod Tower 2ft Roof Mounting	14.79
TBR-160S	HF2/6V 160M add-on Kit	53.99
SC3000	30-512 MHZ Scanner Ant	63.99
2MCV	2M Colinear 9.8ft 3db gain	53.99
2MCV-5	2M Colinear 15.75ft 5db gain	63.99
Compact HF Beam		
HF5B	10-12-15-20M Butterfly (wingspan 12'6" Boom 6')	235.00

CUSHCRAFT ANTENNAS

Multiband Beams		
A3	3 Element 20-15-10M	262.99
A3SK	Stainless Steel Hardware Kit for A3	35.51
A4	4 Element 20-15-10M	353.35
A4SK	Stainless Steel Hardware Kit for A4	42.64
A743	Add-on Kit for A3 giving 40M or 30M	90.39
A744	Add-on Kit for A4 giving 40M or 30M	90.39
Monoband Beams		
10-3CD	3el 10M	115.04
10-4CD	4el 10M	131.48
15-3CD	3el 15M	139.70
15-4CD	4el 15M	147.92
20-3CD	3el 20M	238.31
20-4CD	4el 20M	328.71
40-2CD	2el 40M	349.95
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AP8	8 Band 25ft high	164.35
AV3	3 band 14, 21, 28 MHz	56.02
AV4	4 band 7, 14, 21, 28 MHz	104.58
AV5	5 Band 25ft high	123.26
VHF Antennas		
124WB	4el 2M w/Band Beam	36.98
ARX450B	435-450MHz Vertical	42.73
ARX2B	134-164MHz Vertical	42.95
4218XL	18EL 2M Boomer	106.59
215WB	15EL 2M Boomer	85.26
A50-6	6 element 50 MHz	116.54
A561-SK	Stacking kit for A50-6	33.62
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LAC1	PL259 to SO239	6.58
LAC2	PL259 to PL259	6.58
LAC4H	Lightning Arrestors 2KW PL 259 to PL 259	22.73

MFJ ENTERPRISES

Antenna Tuners		
MFJ989B	3KW Roller Inductor built-in dummy load. Cross needle SWR/PWR meter, 6 way antenna switch and built-in balun	368.16
MFJ962B	1.5KW Versatuner MK III. Cross Needle SWR/PWR Meter, Built-in balun	241.95
MFJ949C	300W Deluxe Versatuner built-in dummy load, cross needle SWR/PWR meter, 6-way switch and balun	157.75
MFJ941D	300W Built-in SWR/PWR Meter, 6 way switch and balun	105.13
MFJ901B	200W Versatuner	63.07
MFJ16010	Random Wire Tuner	42.02
MFJ1701	6-way Antenna Switch 2KW SSB	30.72
MFJ910	Mobile Antenna Matcher	20.42
Accessories		
MFJ250	1KW Dummy Load (Less Oil)	50.66
MFJ260	300W Dummy Load	28.35
MFJ1040	All Band Receiver Preselector	99.40
MFJ931	Artificial RF Ground	79.53
MFJ1274	Packet Radio Terminal (with tuning indicator)	203.73
MFJ1224	RTTY/ASCII/AMTOR/CW computer interface Vic 20, TRS80, apple, CBM 64	111.82
MFJ1225	Universal Receiver only version of above	78.25
MFJ752C	Dual Tunable SSB/CW Filter with peak/North	104.16
MFJ723	CW Filter Switchable 80 to 180Hz	52.04
Noise Bridges		
MFJ204B	Built-in RF Generator up to 30MHz and 500 ohms impedance	84.12
MFJ202B	RF Noise Bridge measures resonance and reactance to 100MHz	63.10
Wattmeters/SWR Meters		
MFJ815	2KW Cross Needle SWR/PWR Meter	57.32
MFJ840	2M Power Meter 5W, 50 Ohms Load built-in (BNC Connector)	20.97
MFJ841	2M In Line 5W BNC Conn. Switchable SWR/PWR	42.02

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TH5 Mk2	5 Element 20-15-10 M	575.00
EXP 14	4 Element 20-15-10 M	449.00
QK710	Add on kit for EXP 14 giving 40M or 30M	115.00
TH2 Mk 3	2 Element 20-15-10M	249.00
DISC 7-2	2 Element 40M	486.62
DISC 7-3	Yagi Director Element 40M	305.70
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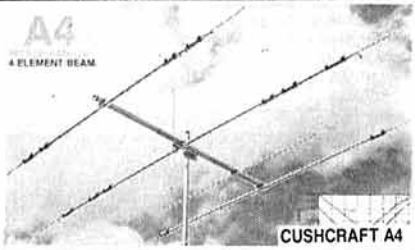
155BAS	5 Element 15M	288.00
205BAS	5 Element 20M	524.17
204BAS	4 Element 20M	357.00
BN86	Balun	30.05
18AVT	5 Band Vertical	146.00
Rotators		
T2X	Heavy Duty Rotator	399.00
HAM4	Rotator	329.00
AR40	Lightweight Rotator	168.72
CD4511	Rotator	219.00
Antenna Accessories		
CC1 518	8 core rotator cable	.50p/m
CC1 6285	Coax cable sealant	2.50 each

ALL PRODUCTS AVAILABLE FROM AUTHORISED STOCKISTS



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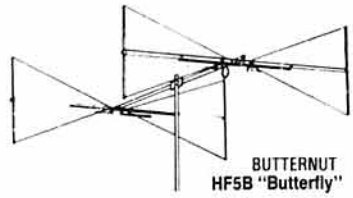
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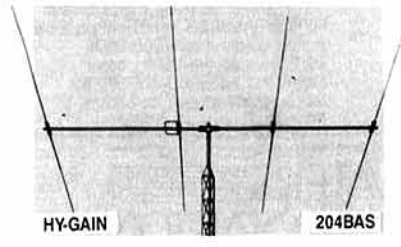
HY-GAIN 204BAS

ICS PK-232

THE WORLD STANDARD MULTI-MODE DATA CONTROLLER

The PK-232 was the first intelligent multi-mode amateur data controller to combine **Packet, Amtor, CW, ASCII and RTTY** and with over 20,000 units in use worldwide, it can truly be considered a "World Standard". However, in these fast moving times, one might ask: **"Is an 18 month old product still competitive?"**

In some ways the product was ahead of its time in offering a **'Host Mode'** which is actually a rather difficult facility to use directly. It permits very intimate control of the terminal unit from the host computer, giving instant feedback of its internal status, such as: Which front panel lights are on? What CW speed is being received? etc. The advantage to the user is that precise on screen status display and instant interactive control of the PK-232 are both possible. **This same capability is also a feature of our PK-87 packet only controller.**

It has taken some time to develop professional quality **Host Mode** applications programs for the PK-232, but due to the use of **Host Mode,** those that we do offer are unmatched in user friendliness and capability. We can now even offer a send/receive **facsimile** program for the IBM-PC, which can bring the Fax image onto the screen, zoom it, put it on disc, re-transmit it, etc. Images can be prepared with a mouse under PC PAINT and transmitted. They can also be entered with a hand scanner.

AEA have so far resisted the temptation to bring out a replacement to the PK-232 and leave all existing users in the lurch. Instead, they have carefully orchestrated the growth of a family of excellent applications programs, whilst slowly improving the performance of the unit and adding features with new firmware revisions. In fact **we can update the very first PK-232 which we ever sold to the latest standard by simply changing two E-PROMS.** There have been no hardware changes!

Along the way, fascimile transceive has been added to the PK-232, as well as **SIAM** – AEA's unique signal aquisition and analysis mode. This allows one to determine exactly what data mode and speed is being copied at the time. It is amazing how many of the funny noises on the HF bands can be identified, and then copied. The most recent firmware revision now incorporates **Navtex** receive. Navtex is an important weather and navigation warning system which operates on 518 kHz. It brings to **seven** the number of basic data modes that the PK-232 is equipped for.

As well as specification improvements, a few obscure firmware 'bugs' have also been fixed. As far as we know, since September the product has been completely bug free. With a product as complex as this, we feel sure that some of our newer competitors will take quite a while to reach this bug free status.

If you already own a PK-232 and would like your E-PROMS updates to the latest specification, together with all the additional features which are now included, please return them to us (wrapped in baking foil), together with £10 and return postage. They will be updated and sent back to you together with the latest manual addendum. If you would prefer us to fit the E-PROMs fo you, we will, of course, do this. This offer does not apply if you do not already have facsimile fitted to your unit. Facsimile is now supplied as standard on the PK-232, but to upgrade older units, a new interface cable and manual are required: See the price listed below.

What of the PK-232 hardware? Well, that has not changed at all since the beginning. The active audio filter based demodulator, with level detection and a superb tuning indicator, have a far better dynamic range than the lower cost switched capacitor filters used by some other manufacturers. In addition, smaller packaging would not permit all the status indicators that are so essential to normal operation to be mounted on the front panel. **The hardware does a superb job, so why change it?**

Finally, if you do not already own a PK-232, **why choose a multi-mode unit at all?** Why not go for a cheap and cheerful, no frills packet radio TNC? The answer is that you will loose a lot if you do. In most areas, **packet is completely useless for ragchewing.** It is only useful for sending and receiving non real time messages via mailboxes which have strong signals – good enough for a voice contact, in fact! **Amtor is far the superior mode for good old fashioned live QSOs.** It is also the mode for low power error free QSOs on the HF bands. **Amtor will often work reliably when you can't hear a CW signal within a normal SSB bandwidth.**

A multi-mode terminal permits you to choose the right mode for the job, without stretching the capabilities of one mode or another, and among multi-mode terminal units **we believe that the PK-232 has become more competitive with age, rather than less.**

PK-232

For more information on the PK-232 or its various application programs, drop us a line with a stamped addressed envelope, or simply give us a call. We are happy to advise you at any time.

PK-232 FEATURES

- Packet Radio using the AX.25 international packet protocol
- Packet Host Mode
- Link and terminal data rates to 9600 bits per second
- AMTOR operation using Mode A (ARQ), Mode B (FEC), Model (ARQ "Listen") and SELFEC (selective FEC)
- Baudot RTTY at standard speeds 45, 50, 75 and 100 Bauds
- Facsimile send/receive at all common radio IOC, RPM rates
- Baudot RTTY unshift-on-space (USOS)
- ASCII RTTY at 110, 150 and 300 Bauds
- NAVTEX reception
- SIAM™ (Signal Identification and Acquisition) mode
- Tuning oscilloscope output
- Time-of-day clock
- Automatic Morse operation from 5 to 99 WPM (words per minute)
- Morse code idle character
- Farnsworth Morse operation below 15 WPM
- Morse speed lock
- Selectable dual transceiver connector ports
- LED discriminator-type tuning display
- "Autobaud" selection: 300, 1200, 2400, 4800 and 9600 BPS.

OTHER PRODUCTS

Although the PK-232 is still our fastest selling product, we also have a full range of complimentary products available. The **PK-87** is a packet only TNC, which also has Host Mode, and therefore an excellent family of support programs. We have a full family of low cost, professionally built computer **printers,** which we import direct from Japan. The value for money is unbeatable, and they are ideal for printing facsimile.

Then we have our own **FAX-1** receive only terminal unit for Fax, RTTY and Navtex. It is designed for those who don't like lots of buttons to press. Operation is fully automatic and the resulting facsimile printout is superior to the PK-232. It doesn't need a computer to make it work!

Finally, we have our antenna range. We are again importing AEA's excellent **Isopole** antennas. These are omnidirectional, for use on 2m and 70 cms. A patented screen de-coupling method gives a zero degree radiation angle, as well as cutting down computer hash pick up that might be fed to the antenna from the screen of the coax.

We have products to meet all the needs of data transmission by radio – including a number of professional level products which are not listed here.

PRICE LIST

Prices include 12 months parts and labour warranty, but may vary according to prevailing exchange rates.
We have recently moved to larger premises, so please note our new telephone number:

Product Code	Description	Price (inc VAT)	P&P (UK)
PK-87	Amateur Packet Radio TNC	£149.00	£4.00
PM-1	HF Packet Modem	£149.50	£4.00
PK-90	Commercial Packet Radio TNC	£368.40	£4.00
2400 Baud	Internal PSK Modem for the PK-90	£129.95	£1.50
PK-232	7 mode Intelligent Terminal Unit	£269.95	£4.00
HR1	144 MHz Handheld Antenna	£14.95	£1.00
HR3	150 MHz Marine Handheld Antenna	£14.95	£1.00
HR4	440 MHz Handheld Antenna	£14.95	£1.00
ISOPOLE 144	2 Metre Base Station Vertical Antenna	£39.95	£3.00
ISOPOLE 440	70 cms Base Station Vertical Antenna	£59.95	£3.00
PC-PAKRATT	IBM-PC Software for the PK-232	£39.00	£2.50
PK-FAX	IBM-PC Facsimile Software for the PK-232	£39.00	£2.50
COMM PAKRATT	Commodore 64/120 Software for the PK-232	£69.00	£1.50
PK-232/BBC	BBC Software for the PK-232	£35.00	£1.50
PK-87/CBM	Commodore Software for the PK-87	£69.00	£1.50
PK-87/BBC	BBC Software for the PK-87	£35.00	£1.50
FAX OPTION	Manual, Cable, ROM for PK-232	£49.95	£2.00
NEW FIRMWARE	Upgrade for PK-232 (i)	£15.00	£1.50
FAX-1	Weather Map/RTTY/Navtex Decoder	£279.95	£4.00
FAX-1/N	As above, but with internal Navtex Receiver	£399.95	£5.00
ANT-1/N	Active Antenna for Navtex Reception	£69.00	£2.00
FAXPACK	FAX-1, SC-1200, AC Power Supply, Leads, Paper	£399.95	£9.50
SC-1200	120 cps 80 Column Printer. No NLQ	£114.94	£9.50
SC-1500	180 cps 80 Column Printer. With NLQ	£172.44	£9.50
SC-5500	180 cps 132 Column Printer. With NLQ	£229.94	£9.50
	Technical Manual: PK-232	£25.00	£2.50
	User Manual: PK-232	£15.00	£2.50

Notes:- (i) If PK-232 E-PROMS are returned in advance, Update fee is £10.

Applications assistance – always. Send large SAE for further details.
Visitors by appointment. Prices may vary according to prevailing exchange rates.
Prices include VAT at 15%

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Antenna Tuning Units

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TH41E 70cm Micro Transceiver	£218.00
TH25 2m FM Handheld Transceiver	£258.00
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MFJ Accessories Range

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MFJ300 watt dummy load	£28.35
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MFJ 815 2KW Cross needle SWR/Power meter	£57.32

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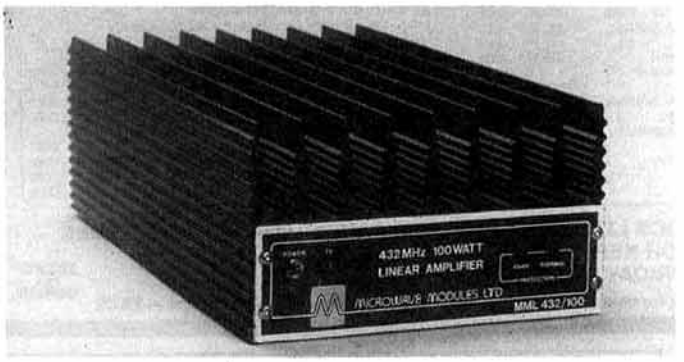

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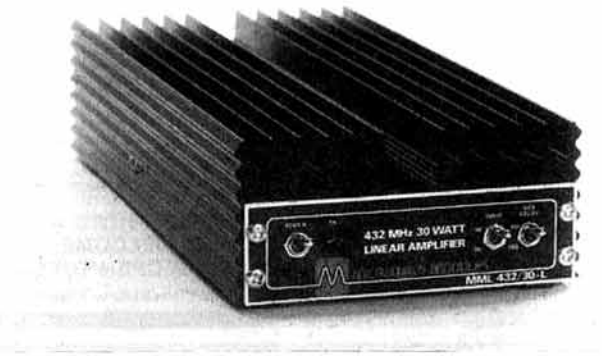

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MTV435	70cm ATC 20W Transmitter	215.00	B
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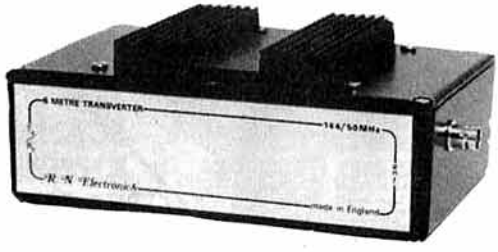

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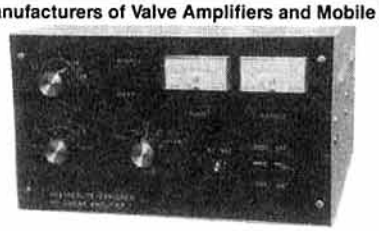

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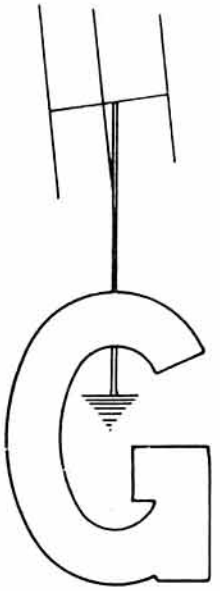

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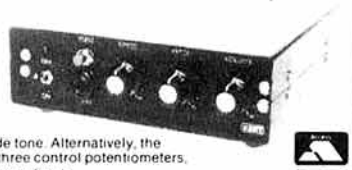

The Electronic Keyer Kit is supplied with an assembled and tested printed circuit board, together with a steel case and hardware. It provides iambic operation for squeeze keying at speeds of 5-40 w.p.m. with fully adjustable side tone. Alternatively, the assembled PCB, together with the three control potentiometers, is available to enable the constructor to finish.

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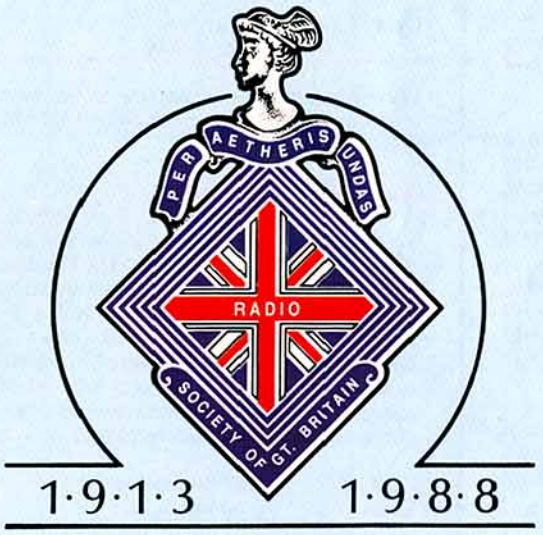


Radio Society of Great Britain
75th Anniversary Year 1988

The RSGB extends a warm invitation to you to join in the special celebrations to mark the occasion of our 75th Anniversary.

Our main event will be a three-day convention at the National Exhibition Centre, near Birmingham on 15/16/17 July.

His Royal Highness
The Prince Philip, Duke of Edinburgh, KG
the Patron of the Radio Society of Great Britain
has been invited as Guest of Honour
to perform the official opening ceremony and to attend a special anniversary luncheon.
Details of this, and the other 75th Anniversary events, are given overleaf.

15-17 July

RSGB NATIONAL CONVENTION

The National Exhibition Centre, near to Birmingham in the heart of England, is the venue for the RSGB's 75th Anniversary Convention which, for the first time, will be held over three days.

The Convention will be open from 10am to 6pm on Friday and Saturday and from 10am to 5pm on Sunday. It will comprise of the largest trade exhibition of amateur radio equipment in the UK and a display covering the development of radio over the last 75 years. The trade exhibition will be held in Hall 3a and the "75 Years of Radio" display will be in the Lucas Centre. Social evenings will be held on Friday and Saturday. It is hoped that these will be in the form of barbecues on the lakeside opposite the Exhibition Centre. However, in the event of bad weather, they will be held indoors.

Friday 15 July:

10am — Convention opens
12 noon — Official Opening Ceremony followed by the presentation of the "Young Amateur of the Year Award" (both by invitation only) in the Lucas Centre.
1pm — Anniversary Luncheon in the Pendigo Suite.
2.30pm — "75 years of Radio" exhibition in the Lucas Centre opens to the public.
6pm — Convention Closes
7.30pm — Social Evening (to be held indoors in the event of bad weather). Bar open from 6pm.

Saturday 16 July:

10am — Convention Opens
6pm — Convention Closes
7.30pm — Social Evening (to be held indoors in the event of bad weather) Bar open from 6pm.

Sunday 17 July:

10am — Convention Opens
5pm — Convention Closes

Amateur Television links will be provided by the British Amateur TV Club (BATC) to relay the Opening Ceremony, presentation of the "Young Amateur of the Year Award" and the Anniversary Luncheon speeches to the main Exhibition Hall.

GB2RS News will be on the air each day and will carry the Opening Ceremony live on the Friday, repeated with commentary on Saturday and Sunday.

GB75AC, the official demonstration station for the event, will be on the air 24hours a day from 9-17 July. Operation will be on all bands using all modes, if possible, including SSTV pictures from the convention and packet bulletins.

Convention Admission

Admission to the convention will be by ticket only, available on the door each day or in advance (using the booking form). A special 3‡ ay reduced price ticket is available in advance only.

Cost — £2.80 per day
— £5.60 for 3-days

Half price admission is available on the door to disabled visitors and children under 14 (if accompanied by an adult).

Anniversary Luncheon

The Anniversary Luncheon, on the first day of the convention will be held in the Pendigo Suite, above the Piazza area of the Exhibition Centre. The Society's Patron, His Royal Highness The Prince Phillip, Duke of Edinburgh, KG., has been invited to attend as Guest of Honour. Advance tickets will be available on a first-come first-served basis, subject to space (see booking form).

Cost — £17.50 per head
Dress — Lounge Suits

Accommodation

Special reduced-price accommodation has been arranged at the Birmingham Metropole Hotel, which is situated within the NEC complex - just a few minutes' walk from the main entrance to the Exhibition Halls. Bookings will be accepted on a first-come first served basis, subject to availability (see booking form).

Cost — £16.95 per person per night including breakfast.

Caravan & Camping Sites

Woodlands Farm
Beck Lane
Meriden
Tel: 0676 22317
*3 miles from NEC
*Caravan Club Members only

Maxstoke Hall Farm
Fillongley Road
Maxstoke
Coleshill
Warwickshire
Tel: 0675 63237
*2 miles from NEC
*Caravan Club Members only

Drayton Manor Park
Fazeley
Tamworth
Staffordshire
Tel: 0827 287979
*15 miles from NEC
*Caravan Site
(no unaccompanied juveniles)

Holt Farm
Southam
Leamington Spa
Warwickshire
Tel: 0926 81 2225
*12 miles from NEC
*Caravan and Camping

Programme of Events
July-August 1988

15-17 July

RSGB National Convention
National Exhibition Centre, near Birmingham.

19-21 July

RSGB Headquarters Open Days
Lambda House, Potters Bar
Hertfordshire
Open to visitors between 10am and 4pm each day.

22-23 July

1st RSGB Data Symposium
at the famous Harrow School, London.

28 July

International Satellite Seminar
hosted by RSGB at a venue near Guildford, Surrey.

29-31 July

AMSAT-UK Colloquium
University of Surrey, Guildford.
(Details from AMSAT-UK, London E12 5EQ)

7 August

RSGB National Mobile Rally
Traditional mobile rally at Woburn Abbey
in Bedfordshire.

19-21 July

RSGB HQ Open Days

The Headquarters of the RSGB will be open to visitors on the above dates from 10am until 4pm. Tours of the HQ building will be conducted in parties of 10 or less and visitors will be able to see the workings of the Society. There will be a display of the archive material held in the Society's library and, if licensed, visitors will have the opportunity of operating the Headquarters special station GB75HQ.

Free tickets will be issued on a first-come first-served basis and applicants are asked to indicate on the booking form the preferred day (with second choice if possible), morning or afternoon, and total number of tickets required. If you are applying for Open Day tickets only, please send a stamped addressed envelope for their return. Tickets will be issued for the morning or afternoon and will indicate the time at which your tour of the building will commence. Those travelling from further away will be allocated a late morning or early afternoon slot. It is expected that the tour of the building will last no more than about half an hour, leaving you time to browse the display and/or operate the station. There will be a maximum of 150 tickets issued per day and no tours will be available at lunchtime (1pm -2pm).

22-23 July

RSGB DATA SYMPOSIUM

The First RSGB Data Symposium will be held at the historic Harrow School situated in north-west London. The two-day symposium will cater for all those interested in amateur data communication and will cover all modes currently in use by radio amateurs as well as looking at developments for the future. This will be the first time that all types of data communicators have had the opportunity of meeting together in one place. There will be a series of lectures, open forums and demonstrations covering a wide range of data orientated topics. The lectures will be held in the Speech Room, which seats about 800 people and has audio visual facilities. There will be a bookstall and information and registration desk just off the main entrance hall.

Visitors can choose between day tickets (including tea, coffee and lunch), a two-day package (including tea, coffee and lunch on both days and dinner on Friday at a nearby hotel) or the full two-day package (including tea, coffee and lunch on both days, overnight accomodation with breakfast at a nearby hotel and dinner on the Friday evening). Some day tickets will be available on the door but these will include tea/coffee only. However, there are many good restaurants close by which offer reasonable lunchtime menus. Ample car-parking facilities are available in the grounds of the school (follow the signposts).

Cost — 2-day all inclusive, £45.00
— 2-day as above but excluding accomodation, £28.50
— 1-day in advance including tea, coffee and lunch, £7.50 per day
— 1-day on the door including tea and coffee, £3.50 per day

24 July

FAMILIES & ACTIVITIES DAY

Because not all members will be able to attend all the events, the Society has decided to designate Sunday, 24 July as "Families & Activities Day". This provides an opportunity for all affiliated clubs, groups and societies to celebrate the 75th Anniversary in their own particular way. The Society will offer a prize of a case of champagne to the group which holds the most unusual or meritable event. The event must involve the family and include an amateur radio station demonstrating the hobby to the general public. The prize is open to affiliated clubs, groups and societies only and, to qualify, a written report with photographs of the event must be submitted to RSGB Headquarters by Monday, 15 August 1988. The winning entry may be used as a feature in the News Bulletin section of *Radio Communication*, together with photographs from some of the other events.

28 July

INTERNATIONAL SATELLITE SEMINAR

The Society will host a meeting of amateur satellite administrators with the aim of co-ordinating all amateur satellite activities worldwide. Delegates will be invited to submit proposals in order to channel the amateur satellite activities into one positive direction,u tilising the various skills and resources from each IARU region.

29-31 July

AMSAT-UK COLLOQUIUM

The third AMSAT-UK Colloquium will be held in Guildford at the University of Surrey. Although it is presented here under the umbrella of the 75th Anniversary celebrations, it will be organised by AMSAT-UK as in previous years. The colloquium is a focal point for all satellite enthusiasts providing a comprehensive lecture programme, open forums and social events. It has already proved to be a very popular and successful event with delegates gaining as much from each other's personal experiences as from the lectures themselves. The social evenings provide a relaxed atmosphere for impromptu discussions, the swapping of anecdotes and the very popular fund-raising auction. Registration will commence on the Friday evening.

Delegates can choose from day-only tickets to the full three-day package (including all meals and accomodation at the university).

Full details and an application form can be obtained from:

AMSAT-UK
London E12 5EQ
Tel: 01-989 6741 (social hours)

Please enclose a stamped addressed envelope or (in the case of overseas enquiries) a self-addressed envelope and three IRCs.

7 August

RSGB NATIONAL MOBILE RALLY

The RSGB's National Mobile Rally will be held in the grounds of Woburn Abbey in Bedfordshire. It takes the form of a traditional mobile rally being held in several large marquees adjacent to the home of the Marquis of Tavistock. Most of the UK's major amateur radio and component dealers attend the event and there are many attractions for the whole family including the Abbey, grounds and Wildlife Park. There is no charge for entrance to the rally itself but there is a small charge (£1.50 per car including passengers) for entrance to the grounds.

VISITORS' CALLSIGNS

Licensed amateurs from overseas who will be attending any of the events and who wish to operate in the UK should check with their licensing authority whether there is a reciprocal agreement with the UK. If there is simply apply via your national society or send for a form from:

Radio Amateur Licensing Unit
Post Office Headquarters
Chetwynd House
Chesterfield
Derbyshire
S49 1PF
England

If no reciprocal agreement exists between your country and the UK it may be possible for you to be issued with a special short-term visitor's licence. These will be valid for a maximum of 28 days. If you would like further details, please contact:

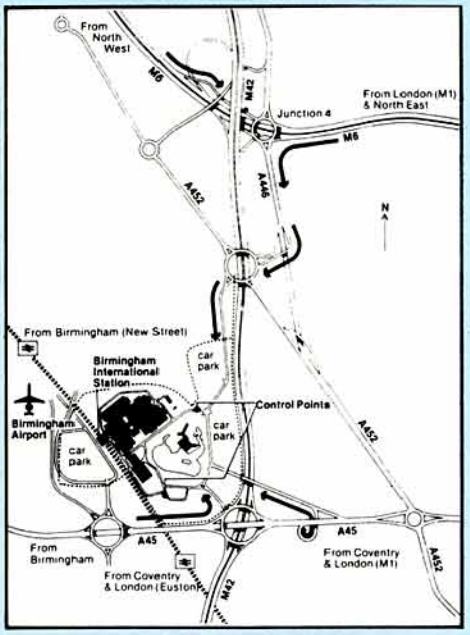
Mr D Evans, G3OUF
RSGB Secretary
Radio Society of Great Britain
Lambda House
Cranborne Road
Potters Bar
EN6 3JE
England

... giving your full name and home address together with details of the dates you will be in the UK and a photocopy of your current amateur licence.

TRAVEL INFORMATION:

The National Exhibition Centre:

The National Exhibition Centre is just a few minutes' walk from Birmingham International BR station and Birmingham International Airport. Frequent trains run from London Euston station and Birmingham New Street station with connections from various parts of the country. Birmingham International Airport has frequent flights from many European countries and can accept special charter flights, helicopters and private aircraft. Travel by road is simple as the NEC is situated at the hub of the UK motorway network adjacent to the M42 with quick and easy access from the M1, M5, M6 and M45. Talk-in will be provided by the Solihull & Chelmsly Wood Raynet Group on 2m and 70cm.



RSGB Headquarters:

Potters Bar is situated close to the A1/M25 interchange and a few miles from the M1/M25 interchange. If coming from the north, head east at the M25 towards Dartford Tunnel and take junction 24 to Potters Bar. If coming from any other direction, head for the M25 north section and junction 24. Cross the first set of traffic lights (adjacent to Canada Life building) and continue north over another set of traffic lights (filling station on corner). Cross the lights and continue along Mutton Lane. Cross two pedestrian crossings (widely spaced) and immediately after turn right into Cranborne Road (bus-stop on right and signposted "Cranborne Industrial Estate"). Follow the road to the end of the houses and RSGB HQ can be found on the right as you enter the industrial estate.

Harrow School:

Harrow School was founded in 1572 by John Lyon of Preston, Middlesex, under a Royal Charter granted by Queen Elizabeth I. Situated about 10 miles from central London, the school occupies some 300 acres of grounds at Harrow-on-the-Hill. It is about 10 mins walk from Harrow-on-the-Hill Underground station, on the Metropolitan Line and about 20 mins from Heathrow Airport, by car. It is easily reached from the M25 north-west section or from the North Circular Road off the Hanger Lane gyratory system.

University of Surrey:

The University of Surrey is located just off the main A3 trunk road. It has easy access from both Heathrow and Gatwick airports via the M25 motorway (about 45 mins by car). If travelling by car using the A25 (Dorking), A322 (Bagshot), A320 (Woking) or A323 (Aldershot) roads, it's best to aim for the A3 following signs to Portsmouth in order to avoid the town centre. There are half-hourly fast trains from London Waterloo station (about 35 mins). A slower service runs via Cobham (about 55 mins). Other trains run from Aldershot, Dorking, Farnborough, Reading, Redhill and Tonbridge. Green Line Coaches run from Oxford Circus or Victoria via Hammersmith (routes 715 or 740).

Woburn Abbey:

Woburn Abbey is situated near to the M1 motorway. If using the M1, leave at junction 13 and follow the signposts through Husborne Crawley to Woburn Abbey. If travelling on the A5 from the north, turn left at the A418, five miles south of Fenny Stratford, and follow signs to Woburn. If travelling on the A5 from the south, turn left at Hockliffe and follow the A50 to Woburn. Avoid routes signposted to "The Wildlife Kingdom" or "Game Reserve", the correct routes are signposted "Woburn Park" or "Woburn Abbey". Talk-in will be provided on 2m and 70cm by the Dunstable Downs Radio Club.

Green Line Coaches run a service from Victoria (London) to Woburn and the cost includes the entrance fee.

Full details from:
Green Line Coach Station
Eccleston Bridge
Victoria
London SW1
Tel: 01-668 7261

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IC-761, HF Transceiver

- **Built-in AC power supply**
- **Built-in automatic antenna tuner**
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- **160-10M/general coverage receiver**
- **Direct keyboard entry**
- **Passband tuning plus IF shift**
- **QSK up to 60 wpm**
- **CI-V communications interface**

The ICOM IC-761 has many features included in a single unit and operates on all the HF bands with general coverage reception from 100kHz to 30MHz. A 105dB dynamic range receiver, high RF sensitivity and steep skirted IF selectivity makes the IC-761 ideal for Dx'ing, contesting and shortwave listening.

Additional features include 32 fully tunable memories, variable RF output power to 100 watts, passband tuning and IF shift plus tunable IF notch, RF speech processor, noise blanker, RF pre-amp and 20dB attentuator.

Direct frequency entry is via the front panel keypad or by the main smooth action tuning knob. For the CW operator a built-in electronic keyer, semi or full break-in operation up to 60 wpm is possible.

Accessories to complement this exciting new transceiver include the SM10 graphic equalised microphone. SP20 external loudspeaker with selectable filters, EX310 voice synthesizer and HP2 headphones.

For more information on the IC-761 and other ICOM Amateur equipment contact your nearest authorised ICOM dealer or phone us direct.

Icom (UK) Ltd.

Dept RC, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.

Helpline: Telephone us free-of-charge on 0800 521145, Mon-Fri 09.00-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.
Datapost: Despatch on same day whenever possible.
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Why just dream of talking beyond earth?

With Yaesu's new FT-736R VHF/UHF base station, you can discover some of the best DX happening in ham radio. Via moonbounce. Tropo. Aurora. Meteor scatter. Or satellites.

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The FT-736R delivers 25 watts RF output on 2 meters, 220-MHz, and 70 cm. And 10 watts on 6 meters and 1.2-GHz. Store frequency, mode and repeater shift in each of the 100 memories.

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And to custom design your FT-736R station, choose from these popular optional accessories: Iambic keyer module. FTS-8 CTCSS encode/decode unit. FVS-1 voice synthesizer. FMP-1 AQS digital message display unit. 1.2-GHz ATV module. MD-1B8 desk microphone. E-736 DC cable. And CAT (Computer Aided Transceiver) system software.

Discover the FT-736R at your Yaesu dealer today. But first make plenty of room for exotic QSL cards. Because you *never* know who's listening.

YAESU

*CW narrow optional

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