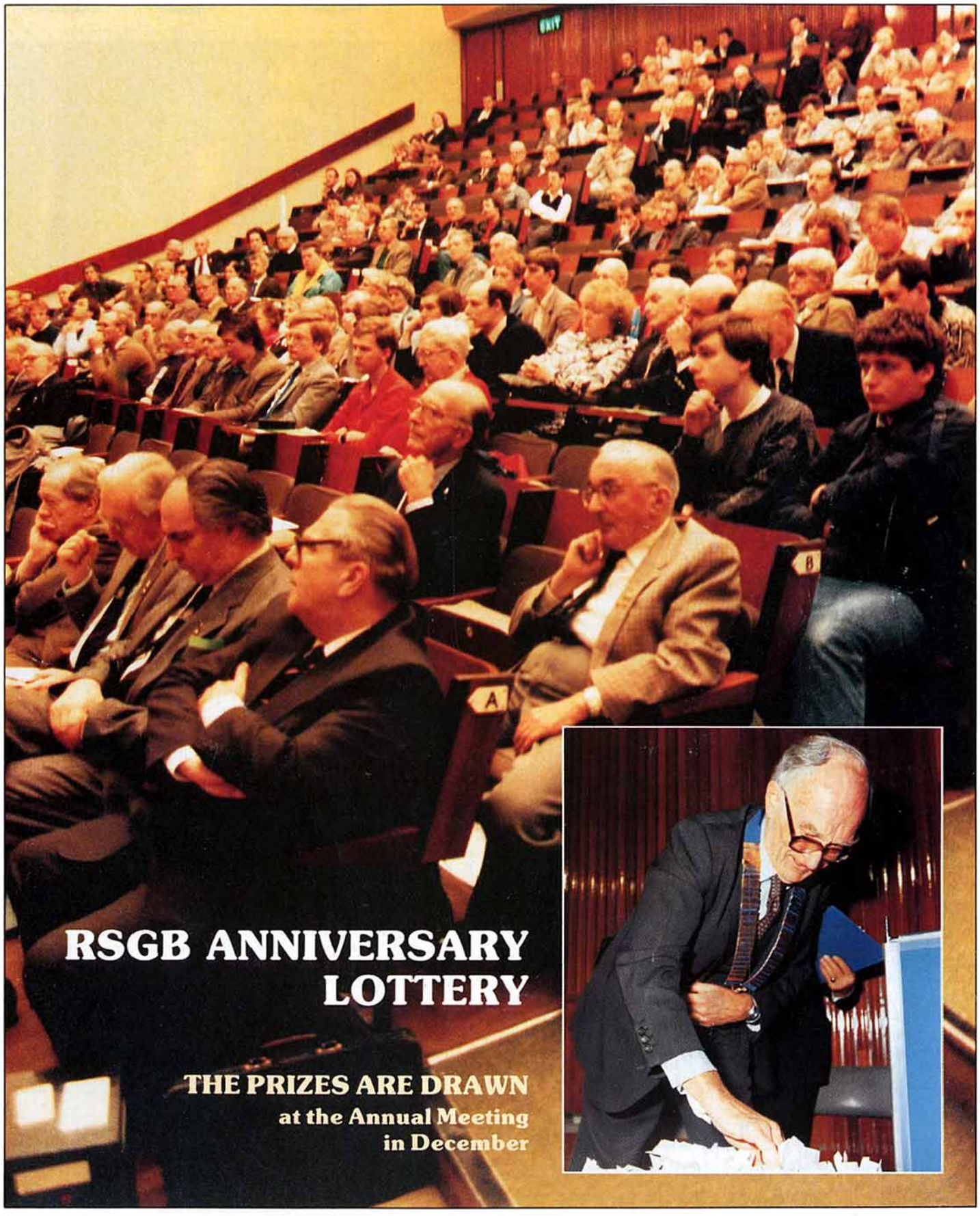
Radio Communication

February 1989



RSGB ANNIVERSARY LOTTERY

THE PRIZES ARE DRAWN
at the Annual Meeting in December

KENWOOD

Every once in a while, something comes along which marks a true turning point in amateur radio equipment. Such was the case when Trio-Kenwood introduced the TS-120 series; the first of the small solid state HF transceivers to appear.

Following the trends of the last few years towards more "sophisticated" equipment (really meaning more and more complicated), we have seen Kenwood engineering directed more towards better performance, particularly in HF transceivers; performance which has become a standard of excellence for others to try and match.

The culmination of Kenwood design thinking is a new transceiver which I think is another turning point in HF equipment. This is the TS-140S, and I can tell you that reading the enthusiastic comments coming from happy owners, I can confidently say that the TS-140S is the "HF transceiver of the year."

The TS-140S continues the successful "1" series, which began with the TS-120S, developed into the TS-130S and has now reached what I consider to be that new direction in amateur radio equipment. In the TS-140S, Kenwood designers have given the user a receiver section with real performance which matches today's expectations, and remember that Kenwood have consistently set the standards for many years.

It is almost impossible for any manufacturer to give every potential customer everything that the customer wants, but there is little doubt that many people have been asking for "simplicity". However, it is also possible to carry the "simplicity" concept too far, resulting in a transceiver which is certainly low priced but lacks facilities which many users see as essential. I happen to believe that Kenwood have achieved the right balance in the TS-140S.

In my opinion, the TS-140S in combining performance with simplicity at an attractive cost is giving real satisfaction to the radio amateur who wants to enjoy his hobby of communicating, rather than counting the buttons on the front panel.

73.
John Wilson
G3PCY/5N2AAC

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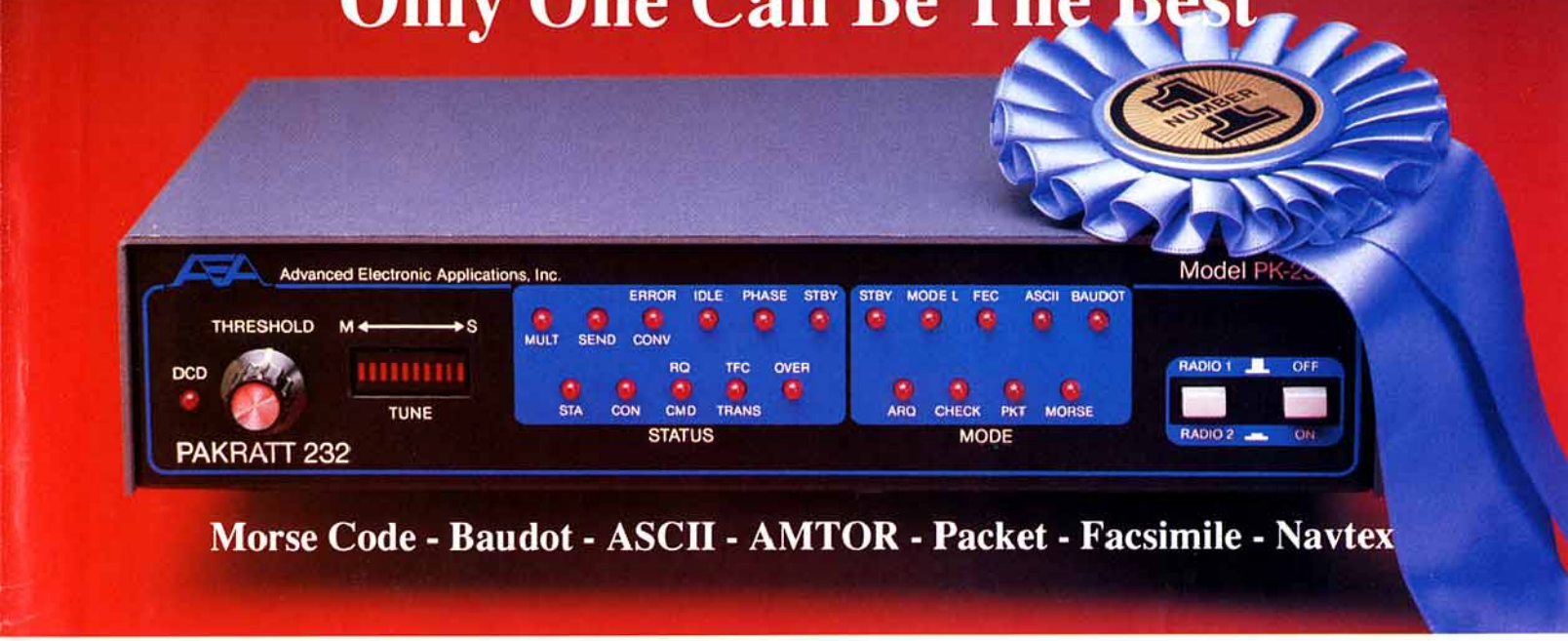
Only One Can Be The Best



Morse Code - Baudot - ASCII - AMTOR - Packet - Facsimile - Navtex

It's a lesson you learn very early in life. Many can be good, some may be better, but only one can be the best. The PK-232 is the best multi-mode data controller you can buy.

1 Versatility

The PK-232 should be listed in the amateur radio dictionary under the word Versatile. One data controller that can transmit and receive in six digital modes, and can be used with almost every computer or data terminal. You can even monitor Navtex, the new marine weather and navigational system. Don't forget two radio ports for both VHF and HF, and a no compromise VHF/HF/CW internal modem with an eight pole bandpass filter followed by a limiter discriminator with automatic threshold control.

The internal decoding program (SIAM[tm]) feature can even identify different types of signals for you, including some simple types of RTTY encryption. The only software your computer needs is a terminal program.

PC Pakratt Packet TX/RX Display

Facsimile Screen Display

2 Software Support

While you can use most modem or communications programs with the PK-232, AEA has two very special packages available exclusively for the PK-232....PC Pakratt with Fax for IBM PC and compatible computers, and Com Pakratt with Fax for the Commodore 64 and 128.

Each package includes a terminal program with split screen display, QSO buffer, disk storage of received data, and printer operation, and a second program for transmission/reception and screen display of facsimile signals. The IBM programs are on 5-1/4" disk and the Commodore programs are plug-in ROM cartridges.

3 Proven Winner

No matter what computer or terminal you plan to use, the PK-232 is the best choice for a multi-mode data controller. Over 20,000 amateurs around the world have on-air tested the PK-232 for you. They, along with most major U.S. amateur magazines, have reviewed the PK-232 and found it to be a good value and excellent addition to the ham station.

No other multi-mode controller offers the features and performance of the PK-232. Don't be fooled by imitations. Ask your friends, or call the local amateur radio store. We're confident the PK-232 reputation will convince you that it's time to order your very own PK-232.

Call an authorized AEA dealer today. You deserve the best you can buy, you deserve the PK- 232.

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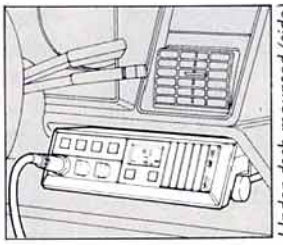
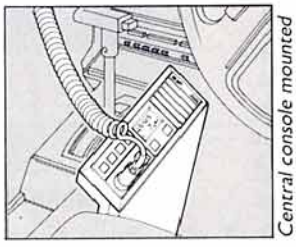
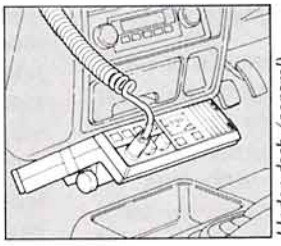
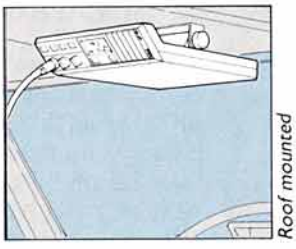

Under dash mounted (side)


Central console mounted


Under dash (central)


Roof mounted

Whichever way you look at it, the Navico AMR1000/S sets new standards in 2m mobile transceivers.

The angled, reversible control panel, together with a range of inexpensive optional mounting brackets enables installation in any vehicle, whether under or on top of the dash, either side of a central console or even from the roof.

This means the display will always face you giving total access to the controls which are spaced to allow simple, safe, mobile operation. The front mounted loudspeaker will also face you, projecting the sound toward you and not at your feet or into the dashboard.

Combine this with the most sensitive and selective receiver, an audio response tailored for today's busy band and the unique, fully automatic repeater/simplex operating facilities and you have a truly remarkable mobile radio.

There is also a choice of models to suit your exact needs. In the words of Chris Lorek of HRT about the Navico AMR1000/S "Not only does it out-perform its competition on technical grounds but it offers many very useful operating features not found on other rigs, and sells at what appears to be a very competitive price".

Check it out for yourself, prices start at just £247.25 (incl. VAT). For more details and to arrange a personal demonstration clip the coupon today.

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FEBRUARY 1988

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Radio Communication

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FRONT COVER
Prizes being drawn for the RSGB Anniversary Lottery by Society's President Sir Richard Davis, G2XM, at the annual meeting in December.

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36,070 copies per issue average circulation in 1987

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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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The TS-940S. A hard act to follow?

Well, it has to be said by someone, so it may as well be me: "All these transceivers look the same". I'm prompted to say this because I have just seen a photograph of the new FT-1020, and I can't believe my eyes. As you know, Kenwood introduced the TS-940S at the end of 1985, and it immediately set new standards for HF transceivers (Yes, I know every manufacturer says this, but in the case of the TS-940S you need only look at the lists of contest winners, or simply listen around to know that it really did set standards which everyone else had to try and match).

Earlier this year I commented on the external similarity between the established TS-940S and the new IC-761; a comment which caused one of my friends (and we have known each other for years) at Herne Bay to write and tell me that in the same way all hatchback cars look the same, it necessarily follows that all transceivers will end up looking the same. In retrospect that was a considerable prophecy, because it is certainly true that the latest FT-1020 follows the "Let's make it look like a TS-940S" syndrome, and we now have top line HF transceivers from the three major suppliers of such equipment which all look pretty much the same."

Now if what I have written here raises blood pressures in the offices of the other suppliers, there is no need for that to happen; I am just honest enough to state what is blindingly obvious to all our customers, and I will repeat my opening statement; "All these transceivers look the same".

How then are you, dear reader, going to make a choice should you be in the fortunate position of considering purchasing one of these transceivers. Well, the first thing to do is ask around, and I mean ask those who actually own one of the transceivers. Secondly, read the reviews and see what they say, but remember that there is an art in reading reviews, and it has to be said that some of the more esoteric measurements will only appeal to those carrying a good engineering degree in their knapsack. Thirdly, for goodness sake get some "hands-on" experience by going to a reputable dealere and sitting down with the transceiver for a morning. You will soon be able to tell if the equipment appeals to you, and if the dealer in question is truly reputable and has genuine product knowledge, he will be able to answer any queries you wish to raise.

There is considerable evidence to suggest that Kenwood HF equipment leads the world markets, and I believe that this is due to Kenwood's unequalled ability to design and produce receivers and transceivers which not only lead in sheer performance, but are above all easy to use and understand. The Kenwood range of TS-940S, TS-440S, and TS-140S transceivers all demonstrate this ability, and it is rare indeed to find someone who is not immediately at home with them, whether in use chatting on 80 or in the heat of battle in the World Wide CW contest.

It should be remembered however, that these easy to use (hate the term "user friendly") transceivers are actually very complex pieces of electrickery and servicing them should anything go wrong is best entrusted to trained engineers in a properly equipped workshop. This level of service is, and always has been available from Lowe Electronics, and our customers over the last 25 years will (I hope) tell you that we try to make our service second to none. I make no apology for repeating my observation that any dealer or importer without proper connections to the factory approved network cannot possibly offer this necessary level of service. The lure of the discount offer at the moment you buy may turn out to be a bitter pill to swallow when you realise that there is no service to back up the purchase; no factory training for the "engineers"; no spare parts stock; and no product knowledge to help you.

The transceiver you may contemplate buying may well be a lifetime investment, so have a think about what I have said. For satisfaction in use, there is no substitute for Kenwood; for peace of mind over the years of ownership, there can be no substitute for the support of an approved dealer. If you want to know who is your nearest approved dealer for the Kenwood range, simply ask us for a list. For complete details of the Kenwood transceivers, why not send off £1 to cover the postage and we will send back the complete catalogue and detailed brochures on any model you mention.

The TS-940S? It is still the transceiver which everyone would like to own one day.

73

John Wilson

G3PCY/5N2AAC

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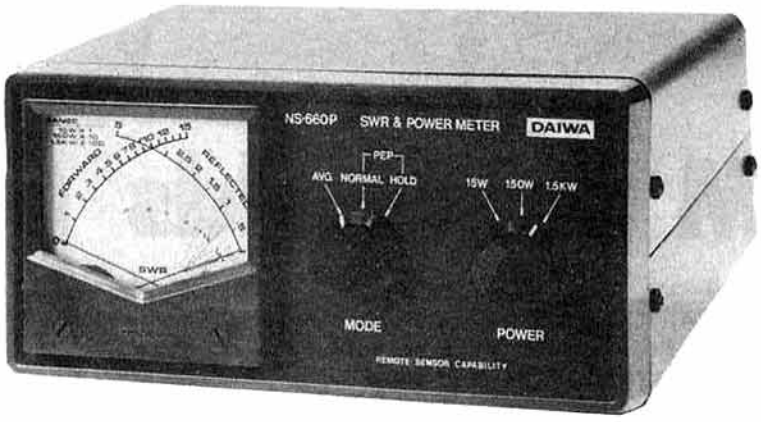
DAIWA RF POWER METERS



NS-660P P.E.P. METER

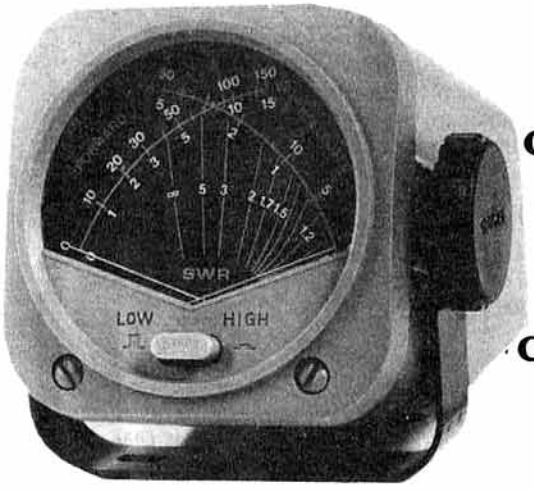
What's so special about "cross needle" R.F. power metering? Well, it's typically Daiwa to go direct to the heart of the matter and develop a system which will give you the true value of forward power, reflected power, and SWR all at a single glance. The elegant simplicity of the idea hides a great deal of thought, which of course is the hallmark of Daiwa products.

You will see from the photographs that the meter displays have two scales, one reading forward power, the other reflected power. Since SWR is calculated using these two values, Daiwa have arranged the meter pointers so that SWR is shown at the crossing point of the two meter needles.

Why don't other makers use the idea? Basically it's a question of power meter accuracy. The usual type of single or twin meter "SWR/power meter" uses a simple strip line to measure the VSWR on the transmission line. You will note that I have said "VSWR", and this is important. These so-called power meters are in fact ony measuring the voltage standing wave and in order to display power, you need to monitor both voltage and current in the line. Daiwa meters of course, do just that, and consequently are very accurate indeed. The cheaper so-called power meters depend for their accuracy in being terminated in a resistive load, and exhibit wild inaccuracy when terminated in a reactive load. In other words, when the indicated VSWR on the meter is other than 1:1, their accuracy is quite badly affected.

To summarise; the Daiwa cross needle power meters give you easy, unambiguous readings at a glance, and what's more those readings are accurate even in lines displaying high SWR, and since Daiwa meters measure true power, they are accurate at any point in the feedline from transmitter to aerial.

As with all Daiwa products, their meters show the Daiwa approach to design, combining accuracy, ease of use and interpretation, and that indefinable feel of quality which is the sure sign of a good product. Once owned, never discarded.



CN-460M

CN-410M

CN410M 3.5-150MHz 150W **£61.72**
CN460M 140-450MHz 150W **£65.40**
NS660P 1.8-150MHz 1500W **£115.00**

Note The NS660P measures average power and P.E.P. with a "hold" facility to memorise the actual peak power. Also measures up to 1.5kW forward power.

Frequency counters by OptolEctronics

OptolEctronics specialise in high quality hand held frequency counters for the professional communications and research market, but we think that the radio amateur will appreciate just how useful the counters can be in the station or in the field. The original 1300HC model was an undoubted winner, but OptolEctronics have now introduced a new range with even more performance than before.

2400H 2.4GHz frequency counter

A new addition to the "shirt-pocket" frequency counter range from OptoElectronics. the 2400H features measurement capability from 10MHz to 2.4GHz with eight digit display, internal rechargeable batteries, selectable gate times, and high sensitivity.

Sensitivity is better than 10mV from 27 to 2100 MHz and better than 5 mV from 60 to 1800 MHz. This sensitivity allows the 2400H to be used for "off-air" measurement of even low powered RF sources, using the optional telescopic antenna, and its light weight and small size make the 2400H a real carry round friend.

The 2400H has internal batteries which can be charged from any 9 to 13Volt dc source. The counter can also be powered directly from a nominal 12V dc supply, so it is really versatile.

1300H/A high sensitivity counter

The new 1300H/A counter carries onm where the successful 1300H left off. With a measurement range of 1 MHz to 1300 MHz, the 1300H/A is ready for a wide variety of applications, but the outstanding feature is a sensitivity below 1mV from 30 to 400 MHz thanks to the inclusion of a surface mount pre-amplifier. This makes the 1300H/A usable for off-air measurements at up to 500 feet from a typical 150MHz 1W transmitter.

Power supply is by internal chargeable batteries, and these can be recharged from any 9 to 12 Volt dc source; and indeed the counter can be directly powered from the same source. Weighing only 9 ounces complete with batteries, the 1300H/A can literally be carried in your pocket, and extend accurate frequency measurement to any location you want.

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ICOM

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If you want a handheld with exceptional features, quality built to last, and a wide variety of interchangeable accessories, take a look at the ICOM range of FM transceivers.

All ICOM Amateur handhelds are supplied with a flexible antenna, rechargeable nicad battery pack and an AC wall charger.

IC-2E 2 Metre Thumbwheel Handheld

This popular transceiver from ICOM is still available after eight years of production. If you're looking for a straightforward but effective handheld the IC-2E takes some beating. Frequency selection is by means of thumbwheel switches (with 5KHz up switch), with simplex and repeater operation possible. Power output is 1.5 watts or LOW 150 milliwatts (2.5 watts possible with BP5A battery pack).

MICRO 2E/4E

These micro sized 2 metre and 70 centimetre handhelds give the performance and reliability you expect from ICOM. Measuring only 148 x 50 x 30 the micro fits in your pocket as easily as a cassette tape. The micro features up/down tuning switches for quick frequency changing, 10 programmable memories, LCD readout and 1.5 watts output (2.5 watts possible with BP24 battery pack).

IC-02E/04E Keypad Handheld

These direct frequency entry handhelds utilise a 16 button keypad allowing easy access to frequencies, memories and scan functions. Ten memories store frequency and offset, a front panel LCD readout indicates frequency, signal strength and transmitter output. Power output is 2.5 watts or LOW 0.5 watt. (5 watt is possible with the BP7 battery pack or external 13.8v D.C.)

IC-2GE/4GE

The 'G' series of handhelds fulfills the most important criteria for a handheld transceiver, it is small, rugged and easy to operate. The 20 memory channels can store simplex and repeater frequencies and with the several scan functions there is no need to manually search for activity. The 3 watt output and power saver circuit ensures low battery drain. (7 watts is possible with the BP7 battery pack or external 13.8v D.C.)

IC-12E 23 Centimetres

Similar in style to the 02E/04E this 1296MHz handheld utilizes ICOM's experience in GHz technology, gained by the excellent IC-1271E base station. With the growing number of repeaters on 23cm the IC-12E makes it an ideal band for rag chew contacts. Power output is 1 watt from the standard BP3 battery.

IC-32E Dual Bander

This exciting new handheld offers 2 metres and 70 centimetres in one compact unit. Tough and splash resistant it offers many features including crossband duplex operation, 20 dual band memories and power saver circuit. The IC-32E utilises most existing ICOM accessories, ideal if you are upgrading from an existing ICOM handheld.

Also available for ICOM handhelds are a large range of optional extras including rechargeable nicad battery packs, dry cell battery cases, desk chargers, headset and boom microphones, leatherette cases and mobile mounting brackets. New products just released:- HM46 miniature speaker/microphone and HS51 lightweight headset/microphone complete with PTT and Vox unit.

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IC-751A HF All-Band Transceiver

- **Amateur Bands 160m - 10m.**
- **General Coverage Receiver.**
- **105db Dynamic Range.**
- **100W Output (40w A.M.)**
- **32 Memories.**
- **Electronic Keyer.**
- **CW Semi/Full Break-in.**
- **HM36 Microphone.**

The ICOM IC-751A was created for the ham operator who demands high performance whether entering contests, chasing DX or just simply enjoying the shortwave bands. It is an all mode solid state transceiver with a host of features designed for the crowded HF bands of today.

Additional features include passband tuning, 9MHz notch filter, adjustable AGC, noise blanker, RIT and XIT. A receiver pre-amp and attentuator provides additional control when required. The FL32 9MHz/500Hz CW filter is fitted as standard with CW sidetone on Rx and TX modes. On SSB the new FL80 2.4Khz high shape factor filter is fitted.

The transmitter is rated for full 100% duty cycle with a high performance compressor for better audio clarity. With 32 memory channels and twin VFO's, scanning of frequency and memories is possible from the transceiver or the HM36 microphone supplied.

The IC-751A is supplied for 12v operation but can be used with either internal or external A.C. power supply. It is fully compatible with ICOM auto units such as the IC-2KL linear amplifier and the AT500/100 antenna tuners.

Options available:- PS35 internal AC power supply, PS15 external AC power supply, EX310 voice synthesizer, SM8 and SM10 desk microphones and SP3 external loudspeaker.

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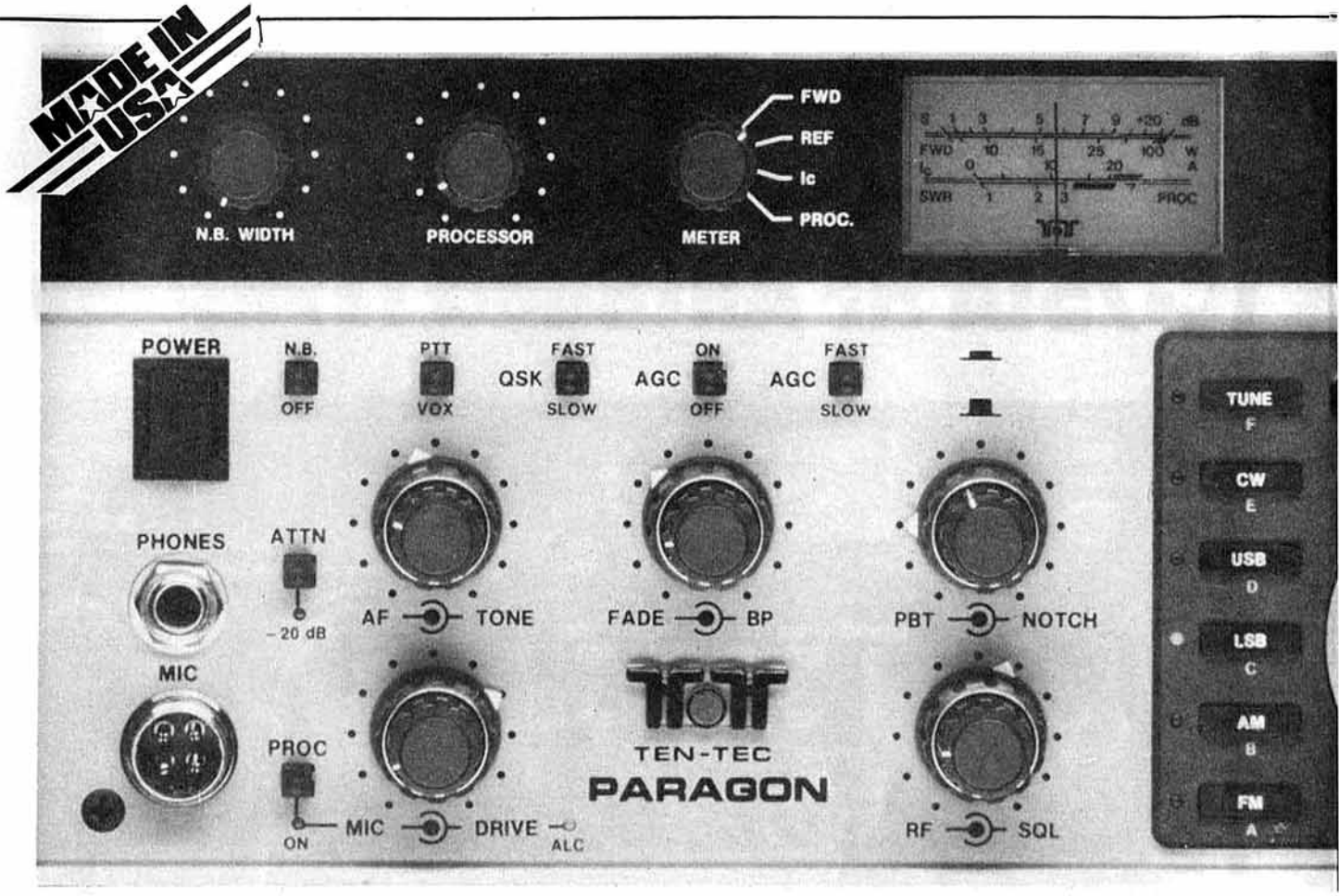

TEN-TEC FOR T

The new Paragon — 100w all band, all-mode H.F. transceiver.

Here's the very latest hi-tech North American state-of-the-art transceiver to reach the U.K.'s HAM Shops. The new Paragon — or should we say Paragon of virtue! Ten-Tec's unique combination of 'in-house' processes ensures their ability to produce equipment of highest quality, reliability and value for money.

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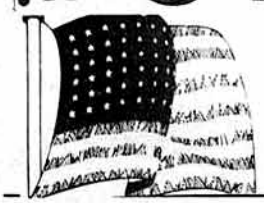

HRS Electronics plc., are pleased to announce that they are now Sole U.K. Agents for the entire range of Ten-Tec products — a few of which are shown here. Ten-Tec offer you the viable alternative when it comes to 'top-end' Amateur Radio — built by renowned, tried and tested U.S. engineering that put men on the moon!

TEN-TEC

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★ 25 watts output. ("HE" model 45 watts)
★ 21 memories & 2 "call" channels.
★ Programmable Scanning & Priority channel
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★ Includes microphone & mobile mount.
★ Bright LCD display
★ Reverse repeater etc.

2m FM Mobile ALR-22E

£249

Order now to beat the price rise

Designed for optimum performance combined with small size, the ALINCO ALR-22E reaches new heights in both technical performance and value for money. We've managed to keep the price down to a level that cannot be matched by any other manufacturer although we believe that a small increase will shortly be made to the price. What better time therefore, than now to purchase one of these super rigs. You won't see prices like this again! Technically it's superb and inside it looks very much like some of its more expensive competitors! Measuring only 5.5" × 6.5" it will fit into most places and if you ask, we will extend the frequency range to cover 140-170MHz on receive. We could bore you with the specification but frankly its just the same as all the others (apart from the price of course). We could tell you about all the various features it has, but again its not much different from the competition. Lets be honest, apart from being scome £100 cheaper than some of its competitors and having an extended receiver coverage, it really is like most other rigs. So if money is no object and you only want 144-146MHz coverage, you probably won't be interested in the ALR-22E. If on the other hand these things are important to you. why not send for the full colour brochure today.

★ 2M FM 144-146MHz
★ RX 140-170MHz!
★ 3 Watts output
★ Battery Saver
★ 10 memories
★ LCD Readout
★ S-meter
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★ Priority
★ 12.5KHz steps
★ 12v DC operation!

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ALD-24E 2m/70cm Dual Band FM
See colour photo on front cover

£449

★ 2m/70cm. Full duplex operation.
★ 25 watts FM on both bands.
★ Single antenna socket output.
★ 21 memories & 2 "call channels".
★ Programmable scanning and priority.
★ 12.5KHz & 25KHz steps.
★ Includes all hardware & microphone.
★ Bright LCD readout.
★ Reverse repeater operation.
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QRP & AERIALS!

We are about to introduce a range of compact single band hf rigs (80/40/20m) for the QRP enthusiast. Each one provides SSB/CW output of 2 watts. Features include VXO tuning, RIT, optional noise blanker and break-in module, built-in Morse key, internal dry cells or external supply, analogue power/S-meter, good dynamic range, excellent IF rejection and ultra stable. Send SAE for further details, prices and availability.

The GLOBAL, LF-80/40 dipole kit is now in stock and gives you a two band antenna for 80 & 40 metres with a total length of 70ft. £29 + £1.50.

GLOBAL Mini G5RV kit. We can now supply a trap kit that will enable you to turn your half-size G5RV into one that covers 80 metres. Total length becomes 66ft approx. (80-10m). £17.95 + 1.00.

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CP22J 2m 6.5dB base antenna	£49.95
M265 2m Mobile 5/6th PL259	£14.95
EL770H 2m/70cm Mobile PL259	£30.00
NR72M 70cm mobile 5.5dB PL259	£27.00
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SX400 140-525MHz 5/20/200w	£79.00
SX600 1.6-525MHz 5/20/200w	£119.00
MS1 Monitor Scope Pep etc	£269.00

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ADONIS AM303G Base mic	£49.95
ADONIS AM503G Base mic	£65.95
ADONIS FX-1 Mobile Goose Neck	£55.00
2m 5/8th BNC telescopic ant	£12.95
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'Limpet' Rubber mag base. It won't move!	£19.00
VHF/UHF Airband Guide 2nd Ed	£5.95
UK Confidential Frequency List	£6.95
Secret of Learning Morse Code	£4.95
Complete Guide To VHF/UHF Frequencies	£5.95
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Heil BM10 Boom/Headset Mic	49.95
Icom SM8 All Icom	79.00
Icom SM10 Table Mic with Equaliser	113.00
Yaesu MD1B8 Table Mic	75.00
Yaesu MH1B8 Hand Mic	21.00

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Yaesu G800SDX Med/HD 450° turn, variable speed	325.00
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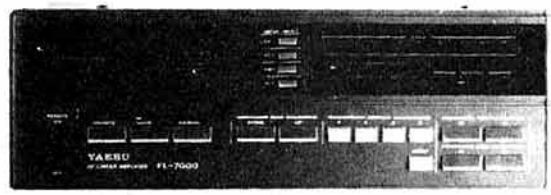

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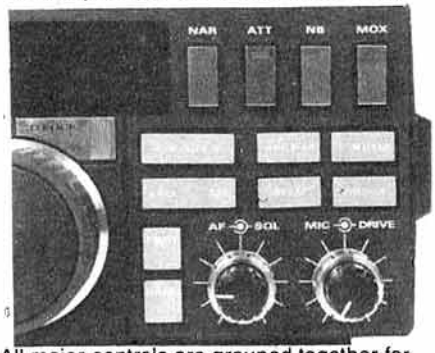
★ Large Clear LCD Display
★ Simple operation (See pic below)



All major controls are grouped together for convenience and ease of operation

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 100kHz to 30MHz. A front panel mounted loudspeaker and clear, unobstructed display and control layout make this set a real joy to use. Convenient features include operator selectable course and fine tuning steps 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 operations. Wideband (6kHz) AM and narrowband (500Hz) CW IF filters are included as standard, along with a clarifier, switchable 20dB 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.

MD-1B8 Base Mic.....**£79.00**
MMB38 Mobile Mount.....**£22.00**
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FP700 Standard P.S.U.....**£195.50**
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FT747GX HF TRANSCEIVER RRP £659.00 inc VAT

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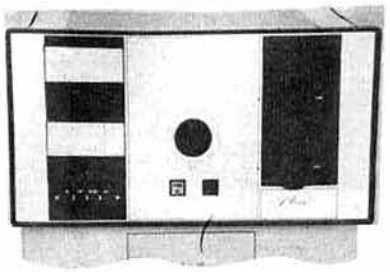

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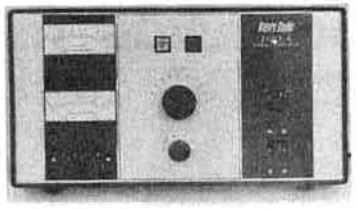

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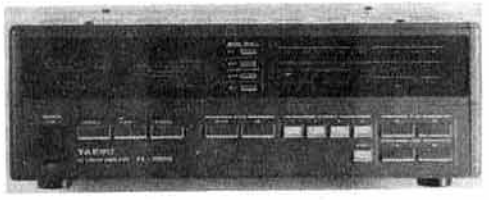

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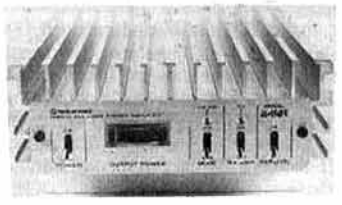

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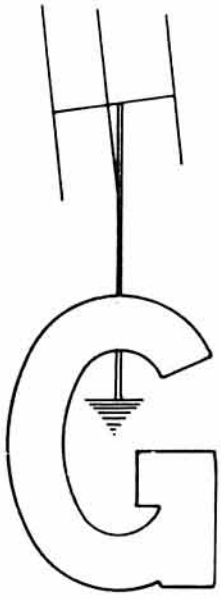

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THE NEW UK LICENCE AND NOTE "AA"

Most members must agree that the new UK licence, which came into effect on 1 January this year is a very positive step forward for amateur radio in this country. The Society does, however, recognise that not everything it set out to achieve was incorporated. This isn't a problem, of course – the licence is a big improvement, and the points which didn't see the light of day will, quite simply, be addressed in the future.

We published the new licence document in the August 1988 issue of Radio Communication, and since then have received a number of letters seeking clarification of various sections of the new licence. This correspondence was passed onto the Licensing Advisory Committee, whose first task was to summarise the points raised by members. Last year we wrote to the DTI and as soon as we have some answers they will be published in RadCom for everyone's benefit.

The majority of members' correspondence queried footnote "aa" to the licence. It read "Amateur apparatus operating only in the frequency band 28·0MHz to 29·7MHz may not be imported, manufactured or assembled in the United Kingdom without specific authority. Requests for such authority should be addressed to the Department of Trade and Industry, Radio Investigation Service, Room 102, Waterloo Bridge Bridge House, Waterloo Road, London SE1 8UA. "Manufacture" includes "conversion"."

This footnote had not actually been discussed during the development of the review; it had been inserted into the licence document purely as a point of information. The Society had earlier agreed to defer discussions with the DTI on the topic of 28MHz equipment until after the licence review had been completed. Such was the demand from the membership for action following the publication of the new licence document, this topic has been brought right to the top of the list of matters for discussion with the DTI.

Good news is that the DTI now plan to publish a special authority for holders of a valid Amateur Radio Licence (A) or (B). The authority will be published as a Gazette Notice. The final wording has not yet been agreed, but in principle we see the authority alleviating most of the problems envisaged by readers of note "aa".

The Society wishes to thank all those members who assisted the Society in bringing about the changes to note "aa". To those who panicked or criticised the Society without first seeking the Society's intentions, perhaps this is an object lesson. The RSGB exists to monitor a wide spectrum of legislation. It exists to maintain and improve the position of the Amateur Radio Service(s) and its Council always acts in what it considers to be the best interests of radio amateurs. Uninformed criticism is negative; informed support is always welcome and much appreciated.

We hope that the anticipated authority with regard to 28MHz equipment will be ready for publication very soon.

DAVID EVANS G3OUF

NEWS
BULLETIN

Four amateurs heavily fined

— RIS swoops on S. London net

Four licensed radio amateurs, apparently members of a regular net, were recently found guilty of a variety of offences (six, in one case) against the 1949 Wireless Telegraphy Act, including:

* Communicating with unlicensed persons
* Failing to maintain a logbook correctly
* Transmitting from a captive helium balloon
* Interfering with US Navy communications
* Inciting others to commit illegalities
* Listening to various frequencies, inciting others to listen to them, publishing lists of them and disclosing information heard on them.

The four involved were Messrs Michael Holland, G6EPF, John Darrington, G1UEP, Anthony Richardson, G3VDZ and Robert Tomalski, G6CQF. All were heavily fined and ordered to pay costs, and equipment worth over £10,000 was ordered to be forfeited. The "unlicensed person", Mr Nigel Toze, almost received a custodial sentence but was eventually fined £1,150 instead. In addition, the class B licensees were each fined £400 plus £140 costs for running a broadcast station on 6 MHz.

In a reference to this case, an article in the 'New Scientist' of 16 December 1988 entitled "Radio Wars" pointed out that "Twenty government inspectors have just spent £50,000 turning five British radio listeners into criminals - for receiving non-government-approved radio signals and then talking about what they heard". It went on to point out some of the anomalies in the law relating to this area, stating that "....Even MI5's own signals have been ludicrously obvious". Which is quite true. Most of the 'cognoscenti' knew perfectly well that they were the cause of a distinctive type of interference on 144 MHz in the London area back in the mid-seventies!

In another case, at Hamilton Sherrif's Court on 13 December a Mr Morgan, GM1ISD, was fined £150 with forfeiture of a transceiver and ancillary equipment. Mr Morgan had been jamming the GB3CS repeater.

THE 1989 RSGB ANNUAL MEETING:

Most of those attending the 1988 Annual Meeting in Manchester on 12 December (see report in last month's issue) judged the experiment to have been a success.

By the time you read this, Council will have held its January meeting and will have decided whether to hold the 1989 Annual Meeting in London or elsewhere. In the light of the response from members who attended the 1988 meeting, it is anticipated that Council might well wish to hold this year's meeting outside London also. In the expectation that Council reached that decision and in order to save some time, Affiliated Groups, Clubs and Societies are invited to propose venues in various parts of the country for consideration at the next Council Meeting, to be held in March.

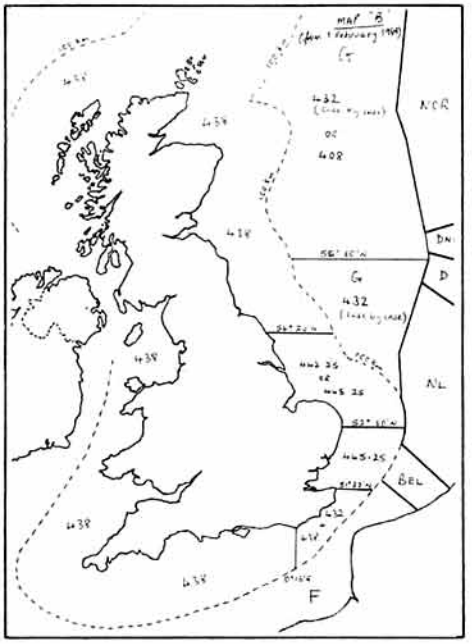
A suitable venue should be able to seat around 500 people, have full audio/visual facilities, be able to provide refreshments both at lunchtime and during the afternoon break, and be easily accessible with ramps for the disabled etc. If you know of a suitable venue for the Society's 1989 Annual Meeting and can provide local assistance with talk-in, building-up the stage display, and breaking-down, please write to "The Secretary - Annual Meeting" no later than 28 February with full details of the proposed venue and any other information which you believe would assist Council to make its choice.

SYLEDIS - SOME CHANGES:

As we reported in the Bulletin last year, the Ministry of Defence announced that as of 1 January 1989 they would not permit the dreaded SYLEDIS - scourge of 430 MHz DX-chasers - to operate within 100 km of the UK coastline. Not surprisingly, the oil and surveying industries didn't like this edict very much: in fact they fought it tooth and nail. Representations were made in High Places, and as a compromise it was decided to find a

(cont. over)

replacement frequency for 432 and 432.5 MHz. Heads were scratched, brows were furrowed and finally it was decided that as of 1 February 1989 the main SYLEDIS frequency around the UK coast would become 438 MHz. In fact, they subsequently discovered that 438 MHz couldn't be used everywhere - so there's a sector between 5230N and 5420N where the frequency will be out of our band entirely and - unfortunately - a sector of the south-east coast where 432 MHz will continue to be used for a while. See our little map for a bit more detail.



In a recent letter the DTI said that it was "...trying to find alternatives to SYLEDIS - so far without success".

PARANOID PSYCHOSIS AT HQ:

All right, tell us - we can take it. There must be fifty thousand people out there who see RadCom - so why have we only had ONE SINGLE SOLITARY SERIOUS ENTRY for the Christmas Quiz? Was it too hard? Doesn't anyone read the Bulletin any more? With all these super prizes to give away as well. No Christmas Quiz for you lot next year, that's for sure.

In a forlorn effort to find homes for what we thought were rather nice prizes, we've decided to swallow our pride and extend the deadline for entries for the Christmas Quiz (which was featured in the December 1988 edition of the Bulletin) until 20 February 1989. If we don't receive any more, we'll just have to dispose of the prizes by a special RSGB Staff Prize Draw....now you wouldn't want that, would you? Come on, have a go and send the answers to David Gough at RSGB HQ.

MORAG & LAWRENCE GO AURORAL

- Charlie Newton tells us what to expect

You'll remember from last month's News Bulletin that Lawrence and Morag Howell, GM4DMA and GM1ILL respectively, are off on their travels again (wasn't our front cover superb, by the way?) to Ward Hunt Island in the Frozen North. If professional radio duties permit, the intrepid duo are hoping to try and get some amateur radio experiments in - and from that latitude, of course, you're talking serious aurora. Now when he hears that word our auroral supremo Charlie Newton, G2FKZ - he of the propagation forecasts in GB2RS and a true radio amateur to his fingertips - starts getting very interested indeed. So much so, in fact, that he quite bowled us over in the course of a recent telephone conversation and we just had to get him to say a few words for the Bulletin. Basically, he thinks that there might be a way to get Ward Hunt Island in the 50 MHz log - over to Charlie:

"During the last expedition which had to be terminated early, some 144 MHz signals may have been heard from Lawrence and Morag but the evidence was not conclusive. However, this time they will be taking 50 MHz equipment and a 4 element antenna. I do not think that anyone will work them via aurora as we normally understand it. However, there is plenty of evidence to show that on 50 MHz very long distances can be worked during what is known as the "Harang Discontinuity" (sounds like a red harang to me - Ed). This is the period during which the ionospheric electric currents are reversing, during the time between the afternoon auroral phase and the midnight auroral phase. So far I do not know of any very long range contacts taking place in Europe during this time, but we have not had the 50 MHz band long enough, together with a good supply of auroras, to give it a fair try.

"Since I hope to keep Laurence and Morag in touch with solar and ionospheric conditions on a day-to-day basis, there seems to be a good chance of trying to see if contacts can be made during the Harang period. It means that some degree of good forecasting of possible auroras will be needed, which will be my responsibility. But - as with all forecasts - there may well be some erors and what is really required is continual vigilance. Normal aurora cannot give forward scatter signals because of its mode of operation; signals are scattered back from ionised columns which are almost vertical. During the Harang period the columnar structure changes and something very akin to a "sporadic E layer effect" occurs, which can carry 50 MHz signals forward very long distances. Coast-to-coast contacts have been made many times by this means in the USA, and there does not seem to be any preferred direction such as east-west or north-south.

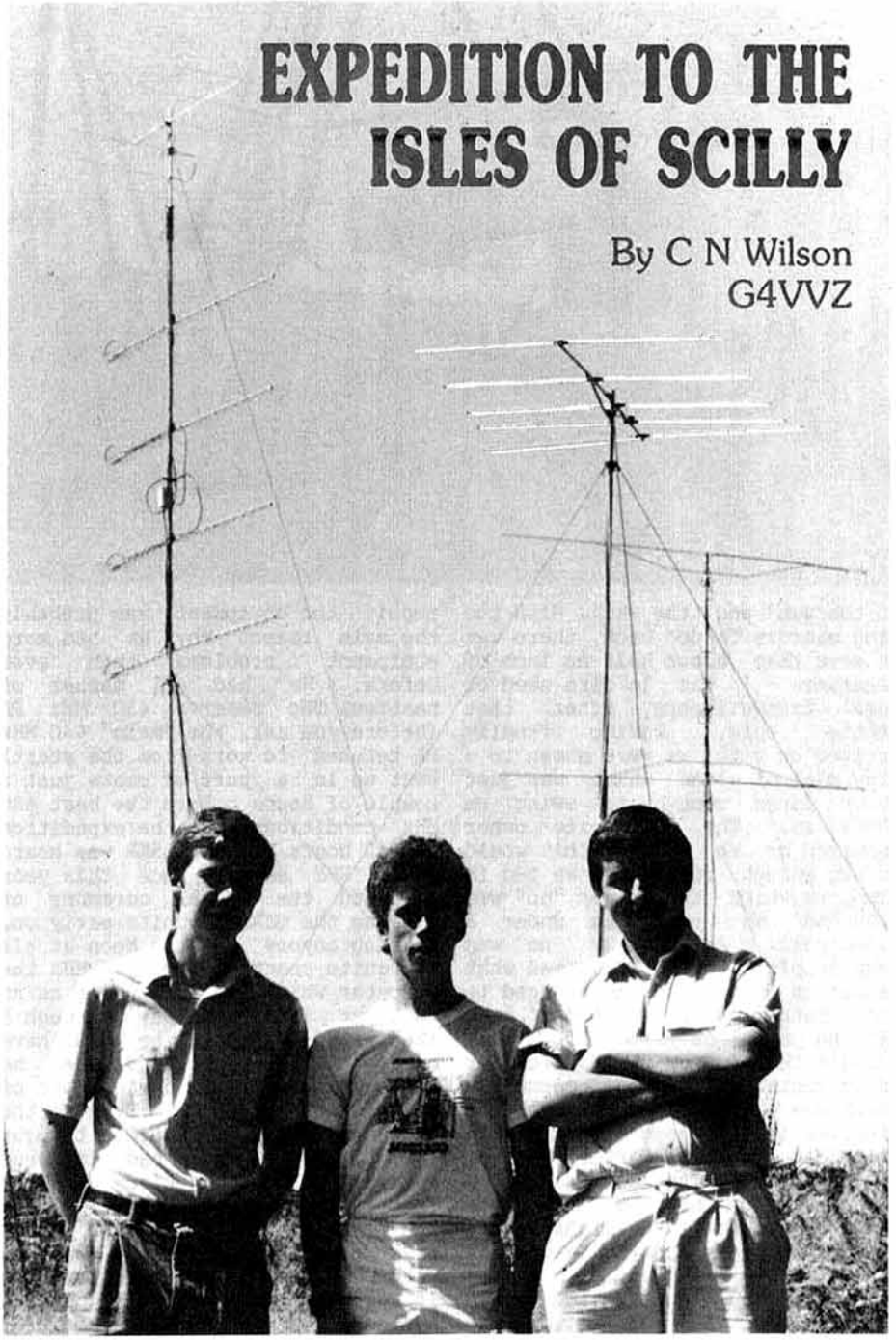
"Ward Hunt Island is well inside the polar cap auroral zone and the UK is outside it, so signals will have to cross the zone. It seems to me that a NON-proton event aurora is required, because the protons cause very severe attenuation inside the pole cap area, but who knows? So if you want a Ward Hunt Island QSL card on 50 MHz, wait until the afternoon phase aurora dies out then turn your beam due north and start looking. I don't know when the optimum time would be but my guess is about 20.00 to 21.00 hours Z. Good luck and concentrate on 50.110 MHz; whatever happens please let us know if you do or do not hear anything".

RSGB 75th ANNIVERSARY LOTTERY - PRIZE WINNERS

Position/Prize	Ticket	Holder	Location
1. Ford Escort	348263	Mrs S Gook	Windsor
2. Holiday	011050	Mrs M Bannister, G0FTY	Lee-on-Solent
3. ICOM IC735	391631	Mr C Taylor	Carmarthen
4. Kenwood TS711E	004998	Mr K Skinner	Deal
5. Yaesu FT770	027329	Mr J Doswell, G3VYE	Stockport
6. Yaesu FT23R	122955	Mrs L Weetch	Rochester
7. SC-1200 Printer	088119	Mr R J J Tyler, G0CFB	Halesworth
8. CMOS Keyer & Key	170730	Mr D Moffat	Stoke-on-Trent
9. 2 Tonna Antennas	167570	Mr P F Woods, RS46352	Reading
10. 2 Software Packages	211987	Mr D Watson, RS33426	Herne Bay

EXPEDITION TO THE ISLES OF SCILLY

By C N Wilson
G4VVZ



A few Bulletins ago we ran the story of the epic 1988 expedition to Gibraltar by the Square Bashers - but there was another very popular DXpedition last year, to the Scilly Isles. Your writer failed to work this one as well - there's about half the mountains in Wales between him and the Scillies! However, personal feelings have been nobly sacrificed in the sacred cause of journalism and we've managed to twist various parts of G4VVZ's anatomy until he came up with the story of how they got on. Here it is:

As has become our custom, the Derbyshire Hills Contest Group mounted an expedition last summer. Some of our members - er - defected to the ZB2IQ DXpedition to Gibraltar, which you may well have read about in the Bulletin. This is the story of what happened to the rest of us!

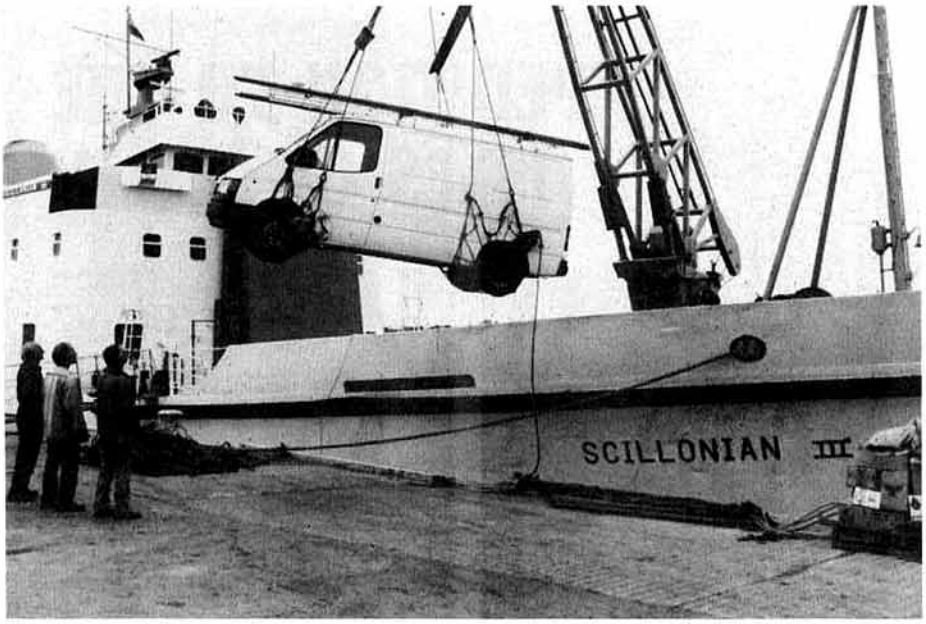
Early planning

Planning for the ZB2 trip began in autumn 1987; it was clear at that stage that, much as I would have liked to go with them, it wasn't going to be possible for me to do so. Martin, G6ABU, was in the same position. As a consolation we decided to mount an expedition in August, which would take in the Perseids meteor shower. We were joined by Richard, G6HKS and plotting began in earnest. We decided that the Isles of Scilly looked a good bet - easy to get to and a probable new square for a lot of people.

The first step was to contact Colin, G0AEA - the resident VHF/UHF man in that part of the world - and seek his advice, which was greatly appreciated. The Scilly Isles are, of course, part of the United Kingdom so whole areas of difficulty (such as how to talk your way past Customs whilst carrying vast amounts of interesting-looking electronic apparatus) don't arise. However, there are some other snags. There are strict regulations governing camping and the erection of tents on the Islands and there's only one approved campsite - on the main island of St Mary's. Fortunately for us this happens to be on top of a hill, known as The Garrison. Permission to stay at the site was obtained and the Isles of Scilly Environmental Trust allowed us to erect our antennas on land just off the camp site. Next, the Isles of Scilly Steam Ship Company had to be persuaded that our van was not a camper, since campers - together with caravans - are banned from the islands. This wasn't a problem, although they were rather bemused by the idea of us transporting assorted scaffolding poles and Yagis on the roof of the said van! Quite apart from this, the logistics of getting mountains of equipment in the right place at the right time are quite something. Here I must extend our thanks to David, G8ROU and Ron, G4NZU for their invaluable assistance in this area both before and after the expedition.

On the Islands

Despite all the arrangements beforehand, all was not plain sailing when we finally arrived in the islands. We had been warned about a low and narrow gateway through the Garrison wall which we would have to pass through on the only road to the site. However, we hadn't appreciated just how narrow it was - if we had, speaking as chief van driver, I wouldn't have bothered going at all! Put it like this - the Garrison wall was built in 1742 and was very nearly demolished in 1988. The said gate was on a steep incline, which didn't help, and the only way was to edge the van through with Martin on one side and Richard on the other looking to see that there was still some light between the side



of the van and the wall. With the wing mirrors folded back, there was no more than about half an inch of clearance - I was in dire need of some tranquilizers after that little epic. Having finally arrived on site, we were shown to a tiny plot of land which was just about large enough to swing an HB9CV in. The camp site owner enquired as to whether this would be big enough for what we had in mind, to which the answer "no" was produced in something under a nanosecond. Fortunately he was very helpful when we explained what we had in mind, and we arranged to use a rather overgrown field' just off the main campsite. The only thing with this was that one corner of it contained the camp cesspit - which was a good 20 over 9 when the wind was in the wrong direction! To complicate matters further, one of the guys needed to be erected on the other side of the pit. This wasn't a problem in daylight, since we could of course navigate our way past it - but it was a bit more hazardous when a gale blew up in the middle of the night (which it did, twice) and a picket-checking and guy-tightening party had perforce to be despatched at around 0300. It gets dark at night and you can't see where you're going...

On the air

We had a pleasant surprise on arrival - Mike, G4YBB, was on holiday in the islands and he gave us a great deal of assistance in mast and tent erection. However, he made a wise move in leaving for home the day before the weather broke!

The weather, together with the fact that this year was the first time that we hadn't got the comfort of a cottage in which to rest and repair the equipment, was probably the main reason why we had more equipment problems than ever before. We had all manner of nasties. The reserve 430 MHz PA (before you ask, the "main" 430 MHz PA refused to work from the start) went up in a puff of smoke just a couple of hours before the best 430 MHz conditions of the expedition and 12 hours before DL9KR was heard on an EME sked. Since this year we'd had the annual ceremony of blowing the GaAsFET quite early on, hearing anyone off the Moon at all was quite something. On 144 MHz the computer which we were using as an MS keyer died half-way through a sked with SM7GWU - he must have been a trifle surprised when he suddenly found SSB coming out of his rig instead of CW! Even so the QSO was completed; spare a thought for Richard, who had to send several 2.5 minute periods chanting "roger roger roger...." In fact, the keyer failure was doubly frustrating since our next sked was with OH2TI and if we could work him it would be the best DX of the expedition. It was time for desperate measures and I wheeled out the old Morse Memory', only to find that the spring in my hand key was broken - so I had to do both the up- and down- strokes. Needless to say the resulting CW wasn't even up to my usual mediocre standard, but somehow OH2TI managed to copy it and the sked was completed.

In spite of persistent equipment problems, G6APZ/P managed to work 50 stations on 430 MHz, including EA1BLA, with 25 watts. 70 MHz was rather quiet, although G4SEU was pleased to work us - he'd taken the week off work to try and catch us. On 50 MHz there were two Es openings to LA and OH. We were very frustrated during the first one in trying to call LA6QBA, since we were obviously on the edge of the opening and couldn't penetrate the pile-up. In the end a station in Devon heard us calling, telephoned his friend - who was in contact with 'QBA at the time - and told him that we were on frequency. He duly listened for us and was pleased to work WJ square. Ironically, we subsequently worked LA6QBA several times and on one occasion he called us to say that we were the loudest G station on the band! It's always the way.

We also worked Rob, PA0RDY, via MS; he was sending slow speed CW whilst we were on SSB. When the first burst happened the operator was still half-way across the field turning the beam - it was so strong that he could peak the beam by ear and still have time to run back to the shack, find a pen and copy both callsigns before it faded out!

Almost at the end of the expedition there was a tropo opening to Spain. There were some extremely strong signals from stations on the Spanish north coast, although activity wasn't very high. Having worked everything we could find on SSB we decided to try some FM - so we tracked down the local Spanish repeater and G4ZAP/P put a call through. Silence - then total chaos! A voice came back in English and started taking a list of stations for us to work. We then QSYed to a simplex frequency on which there was an enormously strong Spanish station: we broke in and the bemused Spaniard, who had been working a friend down the road, gave us 59 + 20 dB. He was smacking our end stop, which wasn't bad for 40W to a colinear. Further calls on S20 only produced a babble of Spanish - one YL sounded very annoyed and seemed convinced that we were English pirates' transmitting from her local beach! Oh well...

So the expedition ended in a very enjoyable fashion. We had some 750 contacts on 144 MHz, 119 of which were via MS: we managed a total of 115 squares in 27 countries. On MS the best DX was OH2TI, with UP1BWR not far behind. Tropo was good for the first couple of days, with many PA and ON stations, a few DLs and 3 OZs; however, the best tropo came later on when I2FAK was worked (we have a full list of stations worked by the expedition; send us an SAE if you'd like a copy - Ed).

The way home

Despite having successfully negotiated the Garrison wall again, we still had to face the ferry journey home. Having seen the van dented whilst it was being hoisted

(cont. p.25 col.3)

NEWS & VIEWS

Talking Point

CEPT Licence - how it works

As of 1 January this year an awful lot of the tedium associated with being allowed to operate in other European countries has been removed at a stroke. At long last the CEPT Licence is a reality, and all that wonderful stuff we published about it when we outlined the provisions of the new licence is now in operation.

What this means is that if you suddenly take it into your head to visit Austria, Belgium, the Federal Republic of Germany, France, Liechtenstein, Luxembourg, Monaco, the Netherlands, Norway, Sweden, Switzerland and/or Turkey, you can do some amateur radio whilst you're there. Basically, the CEPT Licence allows you to operate a mobile or portable station or the station of another amateur licensed in the host country. More countries are likely to become added to the list and the Radio Amateur Licensing Unit at Chesterfield (0246) 217555/217699 will always be happy to advise you of the current situation.

What you absolutely must do at all times is to operate within the terms and conditions of the host country's licence and also within the terms and conditions of the UK ticket. Any breach of the host country's licensing conditions is likely to be construed as ditto as far as your UK licence is concerned - so mind what you do. It's best to write to the licensing authority of the country you plan to visit and get a copy of their terms and conditions before you set up shop and start blazing away. We have a list of addresses, together with phone and telex numbers, but we're a bit short of space to print it here - so if you'd like the info, contact the Membership Services Dept at RSGB HQ. Incidentally, the other big no-no is that you musn't use higher power than your UK licence allows even if the host country's limit is higher. This is the case in Switzerland, for example.

Identifying when operating abroad is very simple. Just use the prefix of the country you're in followed by your home call. Suppose the editor of RadCom beetles off to gay Paree for the weekend and fancies a spot of radio - he'd merely sign F/G3TRP.

What other things do intending travellers need to know? You must take with you on your trip your current UK Licence Validation Document and the BR08 Booklet. Warning - taking these doesn't constitute authority to import or export particular amateur equipment and won't magically get you through any Customs formalities. If in doubt about these, ask before you go. There may be restrictions on how long you can operate for - again, check with the administration concerned.

With the current phenomenal level of interest in 50 MHz, someone's bound to ask whether you can operate on that band from a CEPT country. The answer is only if the host country has a general amateur allocation in that band and also only if you are a Class A licence-holder. The reason is that CEPT Recommendation T/R 61-01 (which in effect makes the CEPT Licence possible) does not permit the use of bands below 144 MHz by Class B licence-holders. In general terms, by the way, Class B licensees can use any frequencies above 144 MHz which are allocated for use by radio amateurs in the UK and also in the country which you're visiting.

The other nice thing about CEPT is that it works the other way round. If PAORDY comes over to the UK and visits one of the British stations he's been working, he can operate it. Visiting amateurs need to bring their own licenses with them. Identification is easy; in our example Rob would simply use the callsign of the station he was visiting. If he went mobile or portable he'd sign G/PAORDY.

So - that's the bare bones of the CEPT licence. As we went to press the DTI was in the throes of getting an Information Sheet together: we're told that it'll be "Amateur Radio Information Sheet No 9 - CEPT Amateurs (UK Licensees)" and it'll contain everything you might wish to know about this super new facility.

Country	National class(es) of licence	
UNITED KINGDOM	A (CEPT Class 1)	B (CEPT Class 2)
Austria	*	*
Belgium	A B C	A B
France	C D	A B
Germany (Fed.Rep.)	B	C
Liechtenstein	*	*
Luxembourg	*	*
Monaco	*	*
Netherlands	A	C
Norway	A B	not available
Sweden	T	T
Switzerland	1 2	3 4
Turkey	*	*

(*) Information not available from DTI at time of going to press.

Table 1: The classes of licence under which conditions UK amateurs must operate when visiting those countries which have, so far, implemented the CEPT agreement.

(cont. from p.24 col.3)

off the ship on the way out, we decided to leave the Steam Ship Company to their own devices whilst we repaired to a neibouring cafe! Apparently this organization has something of a reputation locally for damaging things - and on arrival back in Penzance quite a crowd of holidaymakers were waiting to see the fun. Having seen the Steam Ship Company almost drop a speedboat 30 feet into the ship's hold, the crowd was baying for the van to be next! Fortunately nothing happened, and the crowd was surprised and a little disappointed when we got up from where we had been sitting in their midst, got in the van and drove off!

So that was it for another year - a rare square activated and our thoughts already turning to next year. The only problem now is that the success of these expeditions is making rare squares something of a rarity; perhaps the RSGB should declare them an endangered species!

Helplines

QSLs FROM ACROSS THE BORDER:

Our overworked and underpaid QSL Bureau staff have asked us to publish a little reminder to those who operate outside their normal prefix area - i.e. folks from G who have holidays or other periods in GW or GM, etc and who take a wireless with them. Could all you travellers please remember to send an envelope or two to the sub-manager for the temporary prefix as well as the normal supply to your usual home one? If you don't and cards go uncollected, they're destroyed after three months - which seems rather a shame.

WHERE ARE THEY NOW?:

From time to time we get requests from members who are trying to trace old friends or collegues. Here are a couple more...

Tom, GOCAJ asks, "Can anyone help me? I'm trying to find Clive, S79CW. I will refund any costs on request but don't expect a manhunt!"

Tom can be contacted at home on 01-450 0801.

Peter Burn, GM4PSW writes, "Some time in the late 1940s, either 1948 or 1949, I served as 2nd Mate of a ship called the 'St. Edmund' - one of the Saint Line out of London. The sparks was named O'Brien, I forget his first name, but it was he who first interested me in radio and now that I am licensed I'd like to hear from hin again. He was an amateur then and will probably be in his late sixties now and retired, like me. Does anyone know him?"

Peter can be contacted by writing to him at:-

Dunchattan Cottage
22 Victoria Road
Hunters Quay
Dunoon
Argyll PA23 8JY

STOLEN EQUIPMENT:

It's always sad to receive letters from members who have had equipment stolen and this month we've received two.

The first is from GOECS who had his Yaesu FT290R Mk.1 plus leather case and microphone taken from his car during the early hours of 9 January. The serial number of the rig is 3E270750 and if you're offered this peice of gear, please contact your local police or the Scunthorpe police with details.

The second is from G6ALM who has his Trio TR7850 2m FM mobile rig taken from his car during the early hours of 7 January. The serial number of this peice of gear is 1111314 and any information should be directed to the Oldham police.

BURNDEPT 290:

Does anyone have any information - data sheets, circuit diagrams, details of age - on an old Burndept valve radio model 290? It was made by Erith of East London and has a 'magic-eye' tuning aid. Although Erith is still in existence, the company is unable to help. Various data sheet publishers have also been contacts but without success. If you can help please contact Tony on Mold (North Wales) 55069.

TRANSISTORS FOR U.S. TX DESIGN:

Three years ago G3RRD built a small transistor transmitter which used G.E. D-44C6 transistors in the output stage. Unfortunately, he's been unable to locate a source for the transistors and the transmitter is just lying there unfinished. Anyone out there who knows of a supplier? If so, please write to;

D W Marmont, G3RRD
"Woodcot"
St.Chloe
Amberley
Stroud
Glos. GL5 5AP

WHERE'S MY RADCOM?:

EA7AMW is one of our overseas members who enjoys reading his RadCom each month. If you remember, we had a major postal strike in the UK which caused serious delays in the delivery of the September issue of RadCom and some issues just didn't arrive at all. When this sort of thing happens we at RSGB HQ send out new copies and now we've run out of the September issue altogether. The problem is that EA7AMW never received his copy either and we haven't got one left to send to him. If you've read your copy and feel that you could possibly donate it to EA7AMW we are sure that he would be very grateful indeed. You can send it to him at the address below;

R Martin Giral, EA7AMW
PO Box 2019
Malaga 29080
Spain

WALKERS WANTED:

Malcolm, G1YFT has written to tell us about a 200 mile sponsored walk along the Pennine Way in aid of the Great Ormond Street Children's Hospital. The proposed walk is planned for 1 - 14 July and Malcolm is looking for other amateurs who are willing to take part. Further details and sponsorship forms can be obtained from Malcolm by telephoning 0533 833714 and leaving a message on the answerphone.

QST - NOVEMBER 1984:

Whilst ploughing through the back issues of QST magazine in the RSGB HQ library, we discovered that we're missing a copy of the November 1984 issue. If anyone has one and would like to donate it to the Society please contact Jim Smith, G3HJF, in the Membership Services Department. Jim tells us that he's working his way back through the many other titles held in the library and may come across some other missing months - if so, we'll probably be asking you to help us replace those too!

SPEAKERS WANTED FOR GM CLUB:

The Stirling & DARS meets every Thursday at Bandeath Industrial Estate, Throsk, near Stirling and, like many clubs, finds it difficult to fill arrange events for a weekly programme. The Secretary Brian Mulleady, GM1PVG, would like to heard from anyone who would be interested in giving a talk or lecture on any subject to the club. Brian can be contacted on Falkirk 36235.

CHINESE CONTACTS:

Peter, G3ELH is planning a trip to China sometime this year and would like to know if anyone has any contact with fellow radio amateurs over there who are prepared to receive visitors. Peter can be contacted on Petersfield 64971.

NEWS & VIEWS

Around the Groups

ISWL NEWS:

Mr Jim May relinquished his position as Hon. Secretary of the International Short Wave League on 1 January this year in order to concentrate on the production of the League's journal 'Monitor'. A new Hon.Sec. has been appointed and all correspondance should now be addressed to;

Yvonne Blain
167 Wombridge Road
Trench
Telford TF2 6QA

DERBY & DARS NATIONAL CONTEST:

The Derby & District ARS is pleased to announce that its 3rd annual National 144 MHz Contest will take place on Sunday 12 March between 13 and 17 hours GMT.

Any mode of operation is permitted but band plans must be adhered to. There will be three sections and entrants should specify single- or multi-operator.

1. Full legal power limit.
2. Low power, 30 W max output.
3. Short Wave Listeners.

A full set of rules can be obtained by sending a stamped addressed envelope to;

The Derby & DARS
119 Green Lane
Derby DE1 1RZ

...marking the envelope "144 MHz Contest Rules".

One of the runners up in the RSGB's Families and Activities Day was the Grafton Radio Society from north London. The club ran the special event station GB75GRS from Parliament Hill Fields, one of the best high spots in north London with spectacular views across the City. Despite the constant threat, the rain held off and everyone had an enjoyable day. Visiting amateurs were a bit thin on the ground but a great many Hampstead Heath 'promenaders' showed interest in what was going on. The Grafton RS was active in the HF and 2m bands and much of the HF activity was in the 80m bands using a kite-borne wire vertical antenna. Anyone who has visited the site will know that it is very popular with kite-flyers and great heights can be achieved. (Photo: TNX GOJUZ)

NORTH OF THE BORDER:

In the November issue (p856) we mentioned that the Scottish Tourist Board Radio Amateur Expedition Group had recently been formed and that the group anticipated that it would begin activities early this year. Well, we've just heard from Paddy, GM3MTH (sorry - we got the callsign wrong last time) who tells us that the first event is planned for Easter weekend, 25-27 March, at the World Heritage Site, New Lanark, Lanarkshire.

The station will be opened by Mr Alan Devereux CBE, DL, GM8VJV, Chairman of the Scottish Tourist Board sometime after 11am on Good Friday and he will spend a short time operating on the HF and LF bands. The callsign to listen out for is GB2STB and a special QSL card will be issued for all contacts over the weekend. The proposed frequencies are;

3700 kHz SSB
7065 kHz SSB
14.140 MHz SSB
14.240 MHz SSB
21.250 MHz SSB
28.400-28.600 MHz SSB
CW: +10 kHz up in all bands
RTTY: 14.085 & 21.090 MHz

A number of other events are planned to take place over the following weekends;

29-30 April
27-28 May
24-25 June
29-30 July
26-27 August
23-25 September

...more details on those as we get them or from Paddy, GM3MTH or Robbie, GM4UQG at the address below.

Two special awards will be issued by the group in conjunction with these events. They are the 'Thistle Award' for working four of the events and the 'Supreme Tartan Banner Award' for working six of the events. Both of these awards come in the form of colour certificates and claims should be sent to;

Robbie, GM4UQG
Awards Manager
Scottish Tourist Office
Amateur Radio Expedition Grp
PO Box 59
Hamilton ML3 6QB
Scotland

GB75BCH:

When Dr Brian Mawhinney, Secretary of State for Education in Northern Iteland, visited Ballee High School, Ballymena in November last year he got a much larger audience that he had expected.

Albert Henry, GI4CRL teaches at the school and is a member of the Ballymena ARC (GI3FFF) which is based there. The club was running the special event station GB75BCH to celebrate the 10th anniversary of the school and when Dr Mawhinney arrived in the shack Albert invited him to speak to RSGB Zone F Council Member Terry Barnes, GI3USS, in Bangor, Co.Down.

It was the Education Minister's first direct experience with amateur radio and Terry passed greetings to him from all the Northern Ireland members of RSGB and said, "You will appreciate that the hobby of amateur radio is a very educational one and bridges all creeds, classes, religions and colours; it is a great communications field".

In reply, Dr Mawhinney said that he was enjoying his visit to the school and was greatly impressed by the many activities which were going on there. He said that he had a number of radio 'Hams' in his own constituency of Peterborough and was familiar with their activities but this was the first time that he had spoken via amateur radio.

The photograph (below) shows Dr Mawhinney on the mic, with Albert, GI4CRL looking on.

RNARS NEWSLETTER:

Congratulations to RNARS on a superb job with the new format 'RNARS NewsLetter' which has just dropped on the editorial doormat. We recommend anyone who is thinking of producing a newsletter/booklet for their club or group to take a look, it's an excellent piece of work. Well done lads!

Distinguished visitors to the RAF Wyton ARC, G3MMH shack (1 to r) Mike Farmer, G3VAO, RAFARS Chairman; Joan Heathershaw, G4CHH, representing the RSGB; Gp Capt Bill Tyack, Stn Cdr ot RAF Wyton; John Smith, G4KJJ, RLO for Beds/Cambs; Barry Street, G3MSU, local RAFARS Representative; Colin Curtis, G3MKV, the previous keeper of G3MMH. (Photo: Crown Copyright)

RAF WYTON ARC 30th BIRTHDAY:

In the spring of 1958 the GPO issued an Amateur (Sound) Licence under the Wireless Telegraphy Act 1949, to Plt Off Le Baigue of RAF Wyton, Hunts. This document licensed the RAF Wyton Amateur Radio Club, at an annual fee of £2, to establish and use an amateur radio station with the callsign G3MMH. More than 30 years later, G3MMH is still on the air and in frequent contact with other amateurs around the world.

Throughout the late 50s and 60s the club was quite active, mainly on CW using separate valved transmitter and receiver in heavy steel boxes. Support waxed and waned until a new Japanese transceiver was acquired sometime around 1970. The tranceiver was the FT101 and a later version, the FT101ZD Mk3, is still in use at G3MMD today. The club flourished and took part in a number of Field Day contests but by the late 70s interest was again begining to ebb. Nothing much happened in the early 80s except that a gale destroyed the mast and antennas which finally put the club off the air.

In June 1987, there began a concerted drive to re-activate the now dormant club. Throughout that summer much of the hard work and planning was begining to show results and by October the new constitution was agreed upon, the new shack (a converted Nissen Hut) was completed and antennas had been built. The junk of two decades was exchanged for a UHF radio and G3MMH was back on the air. A proper AGM was held on 25 January 1988 and the aims and aspirations of the club were set out before an enthusiastic audience.

With the club up and running thoughts turned to ways of marking the 30th anniversary of G3MMH. By happy coincidence, 1988 also marked the 75th anniversary of the RSGB and the 50th anniversary of RAFARS and with G3MMH being a long-standing member of both organisations, it was decided to hold a joint celebration on Saturday 29 October 1988.

The day came and the Station Commander declared the new shack officially open and unveiled a commemorative plaque, witnessed by senior representatives from the RSGB and RAFARS. The special callsign GBORAF was 'borrowed' for the dayand greetings messages were exchanged with the RSGB Headquarters in Potters Bar, as well as with many other amateur stations around the UK.

AMSAT-UK NEWS:

Just before we put this issue to bed, Ron Broadbent, G3AAJ, rang to say that he has a number of copies available of a new satellite software catalogue. You can obtain a copy by sending a large stamped addressed envelope and one extra loose 19p stamp to him at AMSAT-UK, London E12 5EQ and marking your envelope "Software Catelogue".

Mr Ron Horrocks, GW2FLP (left) has been licensed for 50 years and on 7 November Dewi Roberts, GW0ABL, Chairman of the Dragon Amateur Radio Club, presented him with a gift from the club members during a meeting held at the Four Crosses, Menai Bridge, Anglesey. Out of interest, we're intrigued to know what Ron has on his head. Is it a traditional Anglesey head dress? (Photo TNX GW6PXF).

MARITIME MOBILE FIRSTS?:

Taking advantage of the new amateur licence conditions which came into effect on 1 January 1989, the South East Kent (YMCA) ARC and a gent from south Wales both took to the water.

South East Kent (YMCA) ARC;

Members of the club - including Ken, GOFAK; Kevin, G4VRB; Paul, G1PJJ; and Des, RS51202 - added the /MM suffix to the callsigns whilst on board the M.V. St.Anselm sailing on the Dover-Calais cross-channel service. All in all, some 43 contacts were made with amateurs in England, Northern Ireland, France, Belgium, the Netherlands, Finland, Russia and Sydney, Australia during the double crossing. The whole operation was made possible by kind permission of Sealink and the Master, Capt. Tom Manton, to whom the club extends grateful thanks. The adjacent photo shows (l to r) Des, RS51202; Paul, G1PJJ; Ken, GOFAK; and Kevin, G4VRB.

10 GHz Maritime Mobile;

At 1320 hours GMT on 1 January 1989, Doug, GW3ATM worked G4DOU/P on 10.37 GHz wideband FM with excellent reports being exchanged. G4DOU/P was at Primrose Hill near Lydney, Gloucestershire, a distance of about 18km. A little later at 1355, Doug worked GW3PPF/P on the Wenallt which is about 8km north of Cardiff, a total distance of 39 km, with equally good signals being exchanged.

During both contacts Doug was anchored over Dunn Sands, which is about 4km south-west of the Severn Bridge in the upper Bristol Channel. Since he was on the English side at the time he signed G3ATM/MM. Could these be new 'firsts' for 10 GHz?

RAFARS NEWS:

At the last RAFARS AGM, the RAFARS QSL Bureau Manager stood down. The post has now been filled by;

Mr D I Wicker, GOHAV
73 Queens Road
Fakenham
Norfolk NR21 8BU

RAFARS members ONLY should note that all cards and envelopes should now be sent to GOHAV at the above address.

DON'T MISS THIS!:

Satellite expert Geoff Perry of the Kettering Group is a well known speaker on the Russian satellite scene and has delighted audiences at the last two AMSAT-UK Colloquiums (should that be Colloquii? - Ed) with his light-hearted but well-informed approach to the subject. If you haven't been lucky enough to catch one of Geoff's lectures, don't miss this opportunity. Geoff will be presenting a lecture on Russian satellites to the Harpenden Amateur Radio Club on Wednesday 22 February starting at 7.30pm. The venue is Aldwickbury School and the admission is a mere 50p at the door. Further details can be obtained from Ian Gurton, GOCPN on 05827-3770.

NEW QSL BUREAU SUB-MANAGERS:

Ted Allen, G3DRN, has just informed us of some new QSL Sub-managers. They are as follows;

For the G3RAA-TZZ series -

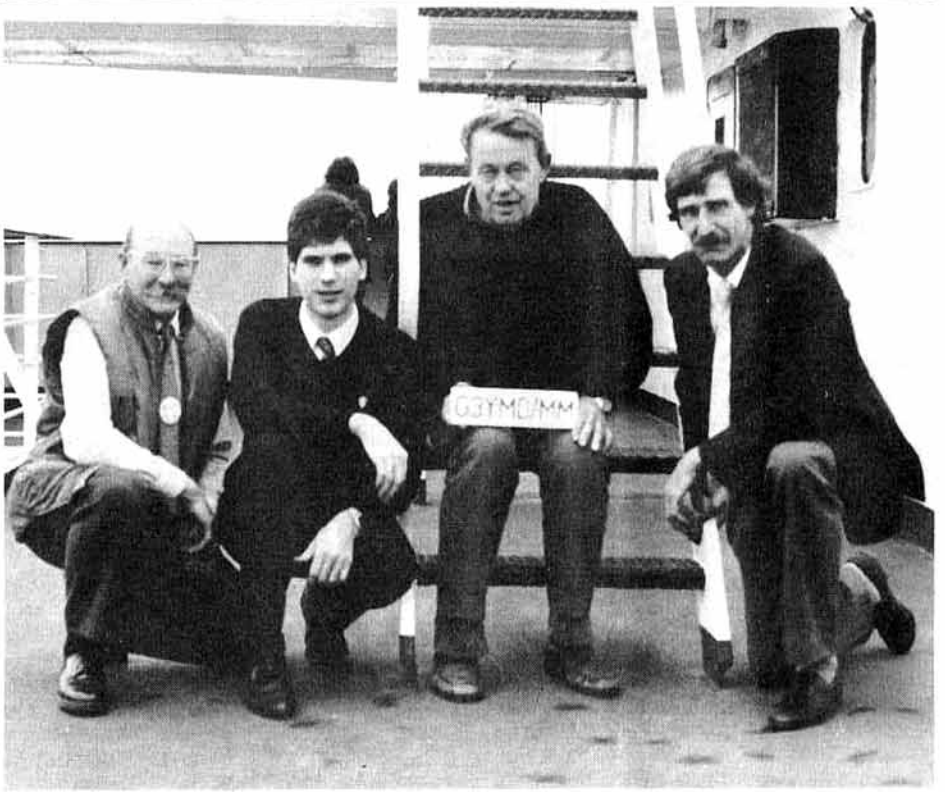
Mr D Buckley, G3VLX
"Little Oaks"
Park Road
Marden
Tonbridge
Kent TN12 9LG

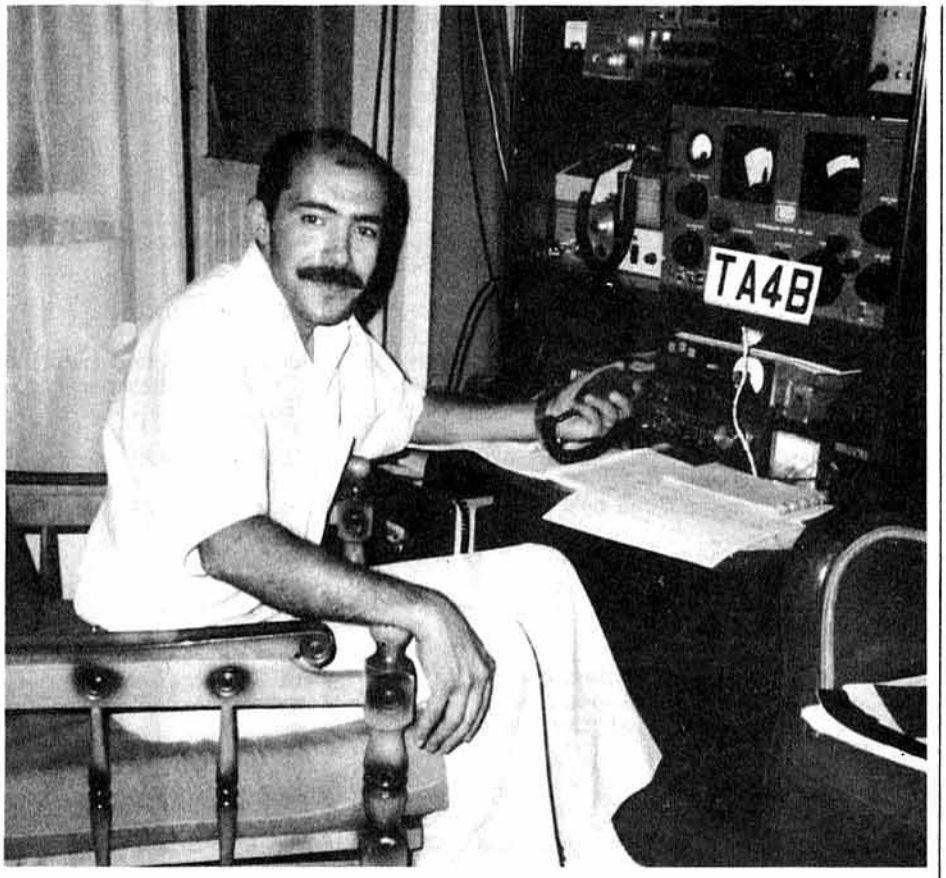
For the G3AA-ZZ, G4AA-ZZ, G5AA-ZZ and G8PAA-RZZ series -

Mr L Adams, G4RKV
2 Reculver Lane
Hillborough
Herne Bay
Kent CT6 6SP

For the GOLAA-LZZ series -

Mr C Lennox, G4LXU
Kyme Cottage
Main Street
Newton Kyme
Tadcaster LS24 9LS





Traditionally, this is the time of year when many people book their summer holidays abroad and many radio amateurs take the opportunity of visiting overseas amateurs during their holidays. Last year, Steve, G4TRA, went to Turkey and was fortunate to have met Selim Sanli, TA4B. Selim runs the local club station in Antalya, callsign TA4KA, but at present he's the only licensed operator at the club. The photo (above) shows Salim at his home station.

The 18F (Wimbledon) Squadron, Air Training Corps recently celebrated its 50th anniversary and paid tribute to founder members who gave their lives in the Royal Air Force during World War II. Here, members of the Corps take time out to practice Morse with G3DWW of the Wimbledon & DARS. G3DWW and G3ESH run the Morse classes and will soon be turning to HF and VHF operating procedures as part of the training.

WAB NEWS:

Contests

This year's series of Worked All Britain contests are listed in the 'Contest Calendar' and the new rules for these contests can be obtained by sending a 9" x 4" stamped addressed envelope and three first class stamps to the new Contest Manager;

Ian Webb, G6TNW
Cornerways
Orchard Road
Eaton Ford
Huntingdon
Cambs PE19 3AN

Firsts

This month's 'firsts' are again balanced between HF and VHF.

G4WZA/M has earned the first Basic and Bronze Acclaim Awards on 80m SSB. This is an award for the real WAB enthusiast and involves activating areas. To obtain the Bronze Award the claimant has to activate 44 large squares, 64 counties, 20 islands and 2,000 areas, all of which must be activated specifically by a mobile and not a portable station.

The first ever VHF Winter Award for 50 MHz goes to G1THC.

Some of the most astonishing claims on VHF - bearing in mind the distance involved - came from OK1DKS who was awarded the WAB Basic, District Class III, Large Squares Class III, Counties Class II and VHF Islands awards, all of which were for contacts in the 144, 430 and 1296 MHz bands using SSB.

Newsletter

The official means of communicating with members of WAB is the Newsletter which is published quarterly in March, June, September and December. It cost £2.00 per annum for fist class mail in the UK and £3.00 for overseas surface mail (airmail rates on application). If you would like to receive the Newsletter regularly, send your remittance to;

Jim Martin, G4ULM
20 Queens Gardens
Eaton Socon
Huntingdon
Cambs PE19 3BY

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The deadline for the APRIL issue is Wednesday 22 FEBRUARY latest, but if you can send items in earlier it would be much appreciated.

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Events Diary

CLUB NEWS

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 - 15, talk on field day organisation.
* Bristol ARC - *NEW SECRETARY* Barry Robbins, GOCFM tel: Bristol 600603.
* Bristol RSGB Group - 27, talk.
* North Bristol ARC - 10, surplus equipment sale; 17, club quiz; 24, SWL evening.
* Shirehampton ARC - 3, talk "French canal boating" by G4DVV.
* South Bristol ARC - 1, photographic equipment rally; 8, CW activity evening; 15, wine & DX Meats? evening; 22, 2-Metre activity evening.
* Thornbury & DARC - 1, talk "Contest working" by Garry G1YOA; 15, project evening.

BEDFORDSHIRE:
* Bedford & DARC - *CHANGE* Meets 1st and 3rd Tuesday of the month. 7, visit to Royal Observer Corp.(meet 7.30pm at Allens Club); 14, Morse procedures No.2 by Charles G4MEW; 21, discussion on contests and special events with Ray GOEYM; 28, Morse procedures No.3 by Charles G4MEW.
* Dunstable Downs RC - 10, AGM.
* Shefford & DARC - 9, talk "HF Propagation" by Nick G4TXG; 16, amateur radio quiz; 23/24, visits to Dixons Colour Labs, Stevenage - Film Processing Plant, 19.30 pm.

BERKSHIRE:
* Burnham Beeches RC - 6, junk sale; 20, talk by G3WGV.
* Reading ARC - *NEW VENUE* Caversham Conservative Club, Mill Road, Caversham, second & fourth Thursdays. Details G7AQJ, tel: 0491-681413.

BUCKINGHAMSHIRE:
* High Wycombe ARC - *NEW* meets every second Thursday of the month at Unit 2, Fryers Works, Abercrombe Avenue, High Wycombe. Details G2DRT.

CENTRAL:
* Falkirk & DRS - *REFORMED* Details Bill Ferguson, GM6VCV tel: 0324-2244.
* Stirling & DARS - *NEW SECRETARY* Brian Mulleady, GM1PVG tel: 0324-36235.

CHANNEL ISLANDS:
* Guernsey ARS - *NEW SECRETARY* Peter Bannier, GU4SXM.

CLWYD:
* Conwy Valley ARC - *TEMPORARY SECRETARY* GW4NNL, tel: 0492-530725. 2, antenna construction and maintenance.
* Delyn RC - 14, Valentines Night; 28, Open night to discuss forthcoming AGM.

DERBYSHIRE:
* Buxton RAs - *NEW VENUE* Leewood Hotel, Buxton. Details G4IHO tel: 0298-5006.
* Derby & DARS - 1, junk sale; 8, talk "Modern Telephone Exchanges" by Martin Byrne of CPT Communications, Beeston; 15, night on the air; 22, talk & films "Vintage Railways" by Mick, GOFVU.

DEVON:
* Exeter ARS - 13, talk "DTI and Interference" by Alan, G4PCB.
* Taunton & DARC - *NEW SECRETARY* Peter Robinson, GOEYR tel: 0823-275973. 3, radio quiz; 17 talk by member of the first class operators club.
* Torbay ARS - 25, film "G6CJ's Aerial Circus".

DORSET:
* Flight Refuelling ARS - *NEW SECRETARY* Graham, G3VMO tel: 0202-886151.
* South Dorset RS - 7, talk "Interference".

ESSEX:
* Chelmsford ARS - 7, talk "History of Marconi - part III by Stan Wood.
* Colchester RAs - 2, talk "2MT Writtle - The Birth of British Broadcasting" by Tim Wander; 16, talk "The Raynet Experience" by Richard G4PPX.
* Loughton & DARS - 10, talk "Power Supplies Revisited" by John Ray G8DZH; 25, 6 metre night on the air using club callsign G4ONP.

GREATER LONDON:
* Crystal Palace & DRC - 18, annual general meeting and club constructional contest.
* Edgware & DARS - 9, talk "Around a Smith Chart" by John Bluff G3SJE; 23, talk "The Hendon Museum" by the Museum Curator.
* Southgate ARC - 9, EGM.
* Wimbledon & DARS - *RECENT NEW SECRETARY* Nick Lawlor G6AJY, tel: 01-330 2703. 10, bring-and-buy book sale; 24, talk "Antenna Matching Units" by Alan Bartle G6HC.

GREATER MANCHESTER:
* South Manchester RC - 3, winter DF; 10, talk & demo "Packet Radio" by D. Chippendale G1ECC; 24, talk "Fault Finding on the TS820 Phase-Locked Loop" by R. Smith, G3SVW.
* Stockport RS - 8, talk "W.A.B." by John Amer GOALQ; 22, discussion night (new licence regulations).

GWENT:
* Chepstow & DARS - *NEW SECRETARY* Dan Taylor GWOECH, tel: 0291-424725.

GWYNEDD:
* Dragon ARC - *NEW SECRETARY* Tony Rees, GWOFMQ tel: 0248-600963. 6, talk & demo "What you always wanted to know about those black boxes" by Technical Software, Llandwrog; 20, video evening.
* Meirion ARS - *NEW SECRETARY* Brian GW4KDP.

HAMPSHIRE:
* Andover RAC - *NEW SECRETARY* G8ALR tel: 0264-23741.
* Basingstoke ARC - *NEW SECRETARY* David Deane, G3ZOI tel: 0734-332777. 6, talk "Packet Radio" by G1WKK.
* Farnborough & DARS - *NEW PRO* GOHNA tel: 0252-519773. 8, talk "Packet Radio" by G3WGV.
* Horndean & DARS - *NEW SECRETARY* Mr F Charrett, G3COO, 8 Mavis Crescent, Havant, Hants, PO9 2AE. 2, talk "The world on low power and at low cost" by G4DIU.
* Itchen Valley ARC - 10, talk "Commercial TV".
* Rowner & DARS - *NEW SECRETARY* G6WGN tel: 0705-261977.
* Southampton ARS - *NEW SECRETARY* Malcolm Troy, G1UWL tel: 0703-701770.
* Three Counties ARC - 1, talk "The Changing Village" by Eric GOBUZ; 15, talk "The Mary Rose" by Mrs Braddock.
* Winchester ARC - 17, talk "EMC" by G4JWS.

HEREFORD & WORCESTER:
* Vale of Evesham ARC - 2, talk "ZB2 Gibraltar DX-pedition" by Tim, G4VXE.

HERTFORDSHIRE:
* Cheshunt DARC - 8, packet radio demonstration by Steve G4TIO; 22, Herts Raynet - Phil G8KLG & Mike G6UBH.
* Welwyn-Hatfield ARC - 6, talk "Sunspots"; 20, talk "Planning for /P, Near and Far".

ISLE OF MAN:
* Isle of Man ARS - *NEW SECRETARY* June Wrigley, 20 Fairy Hill Close, Ballafesson, Port Erin, Isle of Man, tel: 0624-834257.

ISLE OF WIGHT:
* Binstead ARS - *NEW ADDRESS FOR SECRETARY* Mr D.F. Barnes, Flat 17, Rose Court, Melville Street, Ryde PO33 3AT.

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

KENT:
* Edenbridge ARS - 1, net night; 8, talk "Slow Scan TV" by Jack Darby G4TVC; 22, shack visit G8VCH.
* Maidstone (YMCA) ARS - 10, CW evening with G3OHP; 24, video "California in colour" by G4ZXI.
* Sevenoaks & DARS - *NEW* Meetings 7.30pm on 3rd Monday of each month at Emergency Control Centre, Sevenoaks DC Offices. Secretary: Barry Leggett, G7CIC tel: 0732-741222 ext.245. 20, "Morse on a Shoestring".
* SE Kent (YMCA) ARC - 8, talk & demo "Packet Radio"; 23, club winter project update.

LANCASHIRE:
* Central Lancs ARC - 6, AGM and awards presentation; 20, discussion and vote "Yes or No to Contests" - G4OBK speaks for & GOEJK against.
* East Lancs ARC - 7, talk by Tom O'Connor G4UDM (local RLO).
* Fylde ARS - 9, talk "Nuclear Energy" by rep of BNFL; 23, talk "QRP" by Rev.Goerge Dobbs, G3RJV.

LEICESTERSHIRE:
* Leicester RS - 6, HF/VHF night on the air; 13, HF/VHF activity night; 27, HF contest review, HF NFD preliminary planning meeting.
* Melton Mowbray ARS - 17, talk & demo "Video Recorders & Television Magic" by Bert Reeves.

LINCOLNSHIRE:
* Grantham RC - *NEWS SECRETARY* John, G8WWJ tel: 0476-65743. 21, quiz evening with prizes.

MERSEYSIDE:
* Liverpool & DARS - *NEW SECRETARY* Lynn Bromsgrove, G1EXJ tel: 051-486 5745.
* Wirral ARS - *NEW SECRETARY* Alex Seed, G3FOO.

NORFOLK:
* Norfolk ARC - 8, talk "Mast planning problems" by Chas Matthews G8NXU, RSGB Planning Panel; 22, talk "38 Years with Air Traffic Control" by JohnStephens G8LGB.
* Yarmouth RC - 2, "PSE QSL" bring along your favourites; 9, talk "Simple wire antennas" by G3OEP; 23, RSGB video.

NORTH YORKSHIRE:
* Hornsea RC - 1, talk "Morokulien Adventure" by G4YTV; 8, talk "Telegraphic Communication" by G4ICY; 15, talk "SZ4 Kenya" by G1TFT.

NOTTINGHAMSHIRE:
* Mansfield ARS - *NEW VENUE* Westfield Folk House, Westfield Lane, Mansfield, second and fourth Fridays at 7.30pm. 24, open forum.
* Worksop ARS - 14, junk sale.

ORKNEY:
* Orkney Group - 1, video "Construction of the 'Oner 60'".

SHROPSHIRE:
* Telford & DARS - 1, Morse class & club station; 8, VHF NFD planning; 15, junk sale - British Legion Club; 22, mini-talks - SWR bridges, dBs, Stocktake.

SOMERSET:
* Mid-Somerset ARC - 10, visit to BBC Bristol; 24, RAE quiz - Peter G4SFS.
* Yeovil ARC - 9, talk "Space Wave Propagation" by G3MYM; 16, talk "Ground Reflection on Radio Waves" by G3MYM.

SOUTH GLAMORGAN:
* Cardiff RSGB Group - 13, talk "Some interpretations of the New Licence Regulations" by GW4HWR.

SOUTH YORKSHIRE:
* Barnsley & DARC - 13, talk/demo "Satellite TV Homebrew" by Bob G4APB; 27, talk "Home construction" by Bill G4ZVB.
* Rotherham & DARS - *NEW VENUE* The Comedian public house, St.Anns Road, Rotherham. Meets on the first Wednesday of each month.

SUFFOLK:
* Ipswich RC - 8, talk "Steam Engines" by Mr. H1..James; 22 talk "Crime Prevention and Security" by Suffolk Constabulary.

SURREY:
* Reigate ATS - 21, talk "15-ele Yagi for 70cm" by John G8IYS of Surrey RCC.

WARWICKSHIRE:
* Stratford-upon-Avon & DARC - 13, HBSCV construction by G8HJS & GOHWZ; 27, community radio.

WEST GLAMORGAN:
* Swansea ARS - 16, talk "Early Days of TV" by GW4ADL.

WEST MIDLANDS:
* Coventry ARS - 3, morse tuition & night on the air; 10, quiz night; 17, morse tuition & night on the air; 24, Indoor DF contest (Cup Qualifier)
* Sutton Coldfield RS - *NEW SECRETARY* Tony Quy, GOFEO, 17 Fircroft, Kingsbury Park, Kingsbury.
* Wolverhampton ARS - 14, illustrated talk "How Green is the Black Country" by Peter Smith; 21, project night; 28, home-brew competition.

WEST SUSSEX:
* Horsham ARC - 2, home-brew evening.

WEST YORKSHIRE:
* Keighley ARS - 14, talk "Observing Sporadic E" by G3OTE; 28, visit by RLO G3ZXZ.
* Spen Valley ARS - 2, talk "Observing Sporadic E" by G3OTE; 16, talk "TV Cookery" by G8HUA.
* Todmorden & DARS - 6, AGM.
* White Rose ARS - 8, rig check night; 22, 2nd rally briefing.

MOBILE RALLIES

25 FEBRUARY
* Rainham Radio Rally - Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham, Kent. Opens 10am, usual attractions, bring & buy stall, refreshments and bar. Talk-in on 2m and 70cm by G4RRR. Details Bob, G1LKE tel: 0634-362154.

26 FEBRUARY
* 2nd Taw & Torridge Rally - BAAC Halls, The Pill, Bideford, Devon. Opens at 10.30am, trade stands, bring & buy, refreshments, bar, ample car-parking, talk-in on S22. Details G0AYM tel: 02372-76402.

4 MARCH
* The Blue Star Radio Rally - High Gosforth Park (Newcastle Racecourse). Usual attractions, talk-in available. Details Terry, G6VEG tel: 091-264 8196.

5 MARCH
* Barry Rally - Barry Leisure Centre, off Holton Road, Barry. Details Mike GW8CMU tel: 0446-711426.
* Bury Hamfeast - The Castle Leisure Centre, Bolton Street, Bury. Doors open 11am, large bring & buy, refreshments available, talk-in on S22. Venue just 3 mins from M66. Details G4KLT tel: 061-762 9308.

12 MARCH
* Trafford Rally - *NEW VENUE* The G-MEX Centre, Manchester. Opens 11am (10.30 for disabled), RSGB stand, usual traders, bring & buy, refreshments, bar and cash draw. Details Graham G1IJK tel: 061-748 9804.
* Pontefract & DARS 9th Annual Components Fair - Opens 11am, admission free, prize programme, trade stands, QRP stand, bookstall, usual refreshments.Details Colin G0AAO tel: 0977-43101.

19 MARCH
* Wythall RC Rally - Wythall Park, Silver Street, Wythall (south of Birmingham on A435, 2 miles from M42 junc 3). Opens 11.30am, 3 large halls, usual traders, junk & flea markets, bar and snacks. Talk-in available on S22. Details Chris G0EYO tel: 021-430 7267.
* South Essex ARS Mobile Rally - The Paddocks Community Centre, Long Road, Canvey Is. Opens 10am, talk-in on S22 by GB4RSE. Details Ken G0BBN tel: 0268-755350.
* Mid-Devon Rally - Pannier Market, Tiverton. Opens 10am, trade stands, bring & buy, refreshments, talk-in on S22. Details G4TSW, Mid-Devon Rally, PO Box 3, Tiverton, Devon.
* Cambridgeshire Repeater Group Junk Sale & Rally Extravaganza - Philips Catering Centre, St.Andrews Road, Cambridge. Traders, bring & buy, all-day auction. Details G0HEM tel: 0799-23689.

26 MARCH
* Cunninghame District RC Rally - Magnum Leisure Centre, Irvine. *NEW* Opens 10.30am, trade stands, leisure centre facilities for the family. Details Peter GM0FCI tel: 0294-72253.

2 APRIL
* White Rose Rally - Leeds University. Details A.S Kessler, G4DXA, PO Box 73, Leeds, LS1 5AR.
* North Cornwall Radio Rally - Sports Hall, Launceston College. Details Mary tel: 0566-5632.

16 APRIL
* RSGB VHF CONVENTION - Sandown Park Racecourse, Esher, Surrey. Details RSGB HQ.

23 APRIL
* Swansea ARS Rally - Leisure Centre, A4067 Swansea to Mumbles road. Opens 10.30am, trade stands, bring & buy, bookstall, HF demonstration station, bar and refreshments. Talk-in on S22 and via RB6 by GB2SWR. Details Roger GW4HSH tel: 0792-404422.
* Marske-by-the-Sea Rally - Marske Community Centre, High Street, Marske, nr Saltburn. Details Allen G7CBR tel: 0642-480055.

30 APRIL
* BATC Rally - The Crest Hotel, junction 2 of the M6 motorway. Small entrance fee must be charged to comply with local Sunday trading regulations. Opens 10am, trade stands, components stands, everything for the keen ATV enthusiast, lectures and construction displays. Details Trevor, G8CJS tel: 0532-670115.
* 6th Anglo-Scottish Rally - *CHANGE OF DATE* Tait Hall, Kelso. Details Bruce GM4UIB.

IN BRIEF - More details later.

1 MAY
* Mid-Cheshire ARS Rally - Civic Hall, Winsford. Details David, G4XUV tel: 0606-77787.

7 MAY
* Southend & District Mobile Rally - Roachway Youth Centre, Rochford, Essex. Details Ted G4TUO tel: 0702-202129.
* Yeovil QRP Convention - Preston Centre, Monks Dale, Yeovil. Details Dave, G1MNM (QTHR).

14 MAY
* Drayton Manor Mobile Radio Rally - Drayton Manor Park, Tamworth, Staffs. Details Norman G8BHE, tel: 021-422 9787.

21 MAY
* 32nd Northern Mobile Rally - Great Yorkshire Showground, Harrogate, N.Yorks. Details G3COQ
* British Telecom ARS Rally - BT HQ, Coryton, Cardiff. Details Martyn Jenkins, tel: 0222-379634 (office).

28 MAY
* 13th East Suffolk Wireless Revival - Civil Service Sportsground, Bucklesham, nr. Ipswich. Details Jack, G4IFF tel: 0473-464047.
* Maidstone (YMCA) Radio Rally - Sports Centre, Melrose Close, Maidstone. Details G6FZD tel: 0622-50709.
* Plymouth RC Mobile Raly - Plymstock School, Church Road, Plymstick, Plymouth. Details Joe, G1RXR tel: 0752-509855.

29 MAY
* Doncaster Radio Rally - Bircotes Sports Centre, near Bawtry, Doncaster. Details Audrey Wilson tel: 0302-721259 or 0302-857526. Write: 23 Florence Avenue, Balby, Doncaster.

11 JUNE
* Elvaston Castle Mobile Rally - Elvaston Country Park near Derby. Details John G4PZY tel; 0332-767994. Trade G3WFU tel: 0332-700265 (E)
* 29th RNARS Mobile Rally - HMS Mercury, Petersfield, Hants. Details Cliff, G4UJR tel: 0703-557469.

18 JUNE
* Denby Dale ARS Rally - venue to be advised. Details Gerald Edinburgh tel: 0484-602905.

25 JUNE
* 32nd Longleat Mobile Rally - Longleat Park, nr. Warminster, Wilts. Details Shaun, G8VPG tel: 0225-873098.

JULY
* 2nd RSGB DATA SYMPOSIUM - Details RSGB HQ later.

9 JULY
* Worcester & DARC Droitwich Strawberry Rally - High School, Droitwich. Details Derek Batchelor tel: 0905-641733.

16 JULY
* Sussex Amateur Radio & Computer Fair - Brighton Racecourse, Sussex. Details Bob, G1IOS tel: 0243-43841.
* Pontefract Racecourse Rally & Fair - *CHANGE OF DATE* Details Colin G0AAO tel: 0977-43101.

29/30 JULY
* 4th AMSAT-UK Colloquium - University of Surrey, Guildford. Details G3AAJ tel: 01-989 6741.

6 AUGUST
* RSGB NATIONAL MOBILE RALLY - Woburn Abbey, Bedfordshire. Details Norman Miller, G3MVV tel: 0277-225563 daytime.

13 AUGUST
* Flight Refuelling Hamfest '89 - Flight Refuelling Sports Ground, Wimborne, Dorset. Details John G0APJ tel: 0202-691649 or Rob G6DUN tel: 0202-479038.

20 AUGUST
* Red Rose Summer Rally - Bolton Sports & Exhibition Centre. Details Dave, G1IOO tel: 0204-24104 evenings.

27 AUGUST
* Torbay Mobile Rally - STC Social Club, Brixham Road, Paignton, Devon. Details G3KZJ (QTHR). NO APPLICATIONS UNTIL AFTER MAY 1989 PLEASE
* Calashiels & DARS Open Day - Focus Centre, Calashiels. Details John, GM0AMB.
* BARTG Rally - Sandown Park Racecourse, Esher, Surrey. Details Peter, G8VXY tel: 021-453 2676.

3 SEPTEMBER
* 22nd Preston ARS Rally - University of Lancaster. Details Godfrey, G3DWQ tel: 0772-53810.
* Telford Amateur Radio Rally - Telford Exhibition Centre. Details Martyn, G3UKV tel: 0952-255416.

10 SEPTEMBER
* Lincoln Hamfest '89 - Lincolnshire Showground, 4 miles north of Lincoln on A15. Details John G8VGF tel: 0522-25760.
* Vange ARS Rally - Nicholas School, Basildon. Details G4NVT tel: 0268-43025 or Mrs Thompson tel: 0268-552606.
* 6th National Amateur Car Boot Sale - The Shuttleworth Collection, Old Warden Aerodrome, nr Biggleswade, Beds. Details Tony COCOQ tel: 0582-508259 (24hrs). Permission to 'fly-in' tel: Northill 288.

24 SEPTEMBER
* Harlow Mobile Rally - Harlow Sports Centre. Details G4MIS tel: 0279-722622 evenings or G4KVR tel: 0279-22365 daytime.

1 OCTOBER
* Great Lumley ARES Rally - Great Lumley Community Centre, Chester-le-Street, Co.Durham. Details Barry G1JDP tel: 091-388 5936.

8 OCTOBER
* Armagh Rally - Drumsill House Hotel. Details GI8RNX.

19 NOVEMBER
* West Manchester RC Winter Rally - Bolton Sports & Exhibition Centre. Details Dave, G1IOO tel: 0204-24104 evenings.
* Birmingham Mini-Mobile Rally - (Venue to be advised) Details Norman, G8BHE tel: 021-422 9787.

3 DECEMBER
* Verulam ARC Christmas Rally - St.Albans. Details Hilary G4JKS tel: 0727-59318. Trade bookings tel: Watford 52959.

GB CALLS

1 FEBRUARY :
GB0LFG - Low Fell, Gateshead.
GB5GG - Concord, Washington, Tyne & Wear.

4 FEBRUARY
GB0CDX - Grid: SZ 339 879
GB0RMR - Rotherham.

5 FEBRUARY
GB2SBG - St.Bees School, Cumbria.

7 FEBRUARY
GB0SDG - Solihull.

8 FEBRUARY
GB1CDA - Cosport, Hants.

10 FEBRUARY
GB0ABG/GB1BG - Cardiff, S.Glamorgan.
GB2HIC - Mile End Road, London E1.
GB2NGR - Norwich.
GB2RBG - Royton, Lancs.
GB4MGR - Douglas, IoM.

11 FEBRUARY
GB2CTD - Chichester, W.Sussex.
GB2GGW - Wordsley, Stourbridge.

12 FEBRUARY
GB4HMS - HMS Warrior 1860 Hants.

13 FEBRUARY
GB0CDS/GB1CDS - Grid: SU 628 069

14 FEBRUARY
GB1CDY - Grid: SU 617 001

15 FEBRUARY
GB1CDJ - Portsmouth.
GB1CDK - Fort Gilkicker, Hants.
GB1CDM - Fort Monckton, Hants.
GB1CDQ - Portsmouth.
GB1CDS - Fort Southwick, Hants.
GB1CDW - Fort Widley, Hants.
GB2COM - Mirfield, W.Yorks.
GB2PGG - Paisley.

16 FEBRUARY
GB2WRE - Edenbridge, Kent.
GB4CDG - Chalk Pits Museum, Arundel, W.Sussex.

17 FEBRUARY
GB0BGG - Barrowford, Lancs.
GB0BWD - Batley, W.Yorks.
GB0PWG - Petts Wood, Ride, Kent.
GB1CPG - Wrexham, Clwyd.
GB1WWG - Walsall, W.Mids.
GB2EDS - Eastbourne, E.Sussex.
GB2TOD - Todmorden.
GB2WCG - Wigan.
GB2WG - Wingerworth.
GB4ADG - Abington, Northampton.
GB4AGB - Selsdon, Surrey.

18 FEBRUARY
GB0BHB - Bredon, Tewkesbury, Glos.
GB1BGG - Burntwood, Lichfield.
GB2CDT - Grid: SU 662 044
GB2CDW - Fort Wallington.
GB2CGG - Leicester.
GB2MED - Medway Centre, Cambs.
GB2OCD - Ormskirk, Lancs.
GB2SK - Skellingthorpe, Lincs.
GB4SAB - Bolsover, Derbys.

21 FEBRUARY
GB4CG - E.Sussex.

24 FEBRUARY
GB2NSR - Eaton, Norwich.

25 FEBRUARY
GB0BRS - Norbreck Castle Hotel, Blackpool.

26 FEBRUARY
GB2SDD - British Steel, S.Wales.

TECHNICAL TOPICS

PAT HAWKER · G3VA

EMC – A GROWING TECHNICAL PROBLEM

Recent letters in *RadCom* reporting horrendously difficult social problems with neighbours, in which the amateur is cast in the role of a social outcast, have brought home to many the unhappy fact that electromagnetic compatibility (EMC) has once again become a major technical problem that poses a threat to the operation of amateur stations in residential areas.

The problem of causing 'disturbance' (to use the German term) to television receivers reached a peak in the early 1950s and led to a complete and agonising re-appraisal of transmitter shielding and the introduction of low-pass-filters in order to minimise harmonic output. By the 1960s, the threat of harmonic radiation had been largely overcome, and the switch of British television to UHF Bands IV and V in the late 1960s and early 1970s brought further relief, at least to HF operators. It has been the progressive introduction of easily overloaded solid-state devices in TV sets and more recently 24-hour TV that have highlighted the poor 'immunity' of so many sets to strong out-of-band signals or direct audio breakthrough. Although undoubtedly the fault is primarily in the receiver rather than the transmitter, it is often virtually impossible for the amateur himself to convince neighbours of this. The position became much worse when the DTI, in a government cost-cutting exercise, abandoned suddenly its long-established free radio interference service just about the time that many highly-vulnerable video cassette recorders were being installed in so many homes, along with an electronic telephones, microprocessor-operated domestic appliances and the like. Furthermore the public is becoming increasingly concerned with 'radiation hazards', seldom appreciating the important difference between ionizing (nuclear) radiation, the strong magnetic fields immediately under the power lines of the electricity grid and non-ionizing radiation from radio transmitters.

Once again, there is a real danger that the public will come to consider anyone with a transmitter as a social outcast, if not as a social leper. ▶

IMPROVING LINEARITY OF SSB POWER AMPLIFIERS

Tony Preedy, G3LNP believes that there is a real need to improve "some of the grotty signals one hears these days" and points to the IMD specifications for tetrode valves steaming from W1JR (Table 1 in the December *TT*, p960). He considers these indicate a very poor performance for tetrode amplifiers if driven to the specified output powers. He writes:

"Many older valve types are capable of better performance than shown in Table 1. The QY4-400 for example will deliver 600watts PEP at −36dB IMD. (Note that the American method of specifying IMD tends to differ from the system often used in the UK – G3VA).

"I have found that a worthwhile improvement in IMD performance is easily obtainable by using simple negative feedback techniques. NFB makes the amplifier more tolerant of output tuning and loading errors. As an alternative to reducing distortion, NFB can be used as a means of achieving greater output or allowing use of less critical power supply regulations, or lower quiescent current – all for a given level of distortion!

"Fig 1 shows how I obtain simultaneously both 3dB of RF of 3dB of envelope NFB with a pair of QY4-400 tetrodes. To offset the reduction with NFB of voltage gain, it is necessary to increase the value of the grid damping resistance if only a constant amount of drive power is available. The knock-on effect of this is that neutralisation may become necessary. I use the wideband grid input and neutralisation arrangement shown in Fig 2 to achieve a low input-VSWR from 3·5 to 30MHz. Drive power is about 50W for 400W output with 1·8kV on the anodes. An old NCX5 transceiver is used as the driver. Even when using a home-made RF-type speech-clipper I consistently receive complimentary reports on signal quality.

"Incidentally, I find that the best way to test SSB amplifiers is to use white noise at the microphone input. This allows the amplifier to be operated continously at the full PEP output while the average power in the dummy load is similar to that obtained with speech (ie, about one-tenth of the PEP figure). A selective receiver can then be used to inspect the unwanted sideband while making linearity adjustments. A good source of white noise is a VHF receiver with the antenna disconnected."

One point that emerges strongly from recent *TT* items on high-power (legal limit) SSB linear amplifiers is the requirement that these need to be designed, built, set up and operated to good professional standards and with a real understanding of the engineering and technology. It should also go without saying that it is essential to take safety precautions when working with high voltages. The following notes are taken from *QST*, October 1988, p89:

"Working with valve amplifiers involves voltages and currents that can kill you instantly should you come into contact with them. Take proper precautions whenever you work on such equipment.

"Before working on an amplifier: (1) Turn off the amplifier. (2) Unplug the amplifier from the AC line. (3) Wait until the high-voltage meter indicates less than 100V. (4) Use a shorting stick, *in series with a 100-ohm, 24W resistor*, to short-circuit the amplifier B+ (high-voltage bus) to earth to discharge the HV-supply filter capacitors. The resistor protects the amplifer's anode and grid current meters – and their shunt resistors if any – from damage as the capacitors are discharged by the shorting stick.

"*Pulling the plug* and following these steps is the only *safe* way to work on an amplifier. Most interlocks do not disconnect the line voltage from the amplifier when the amplifier lid is removed."

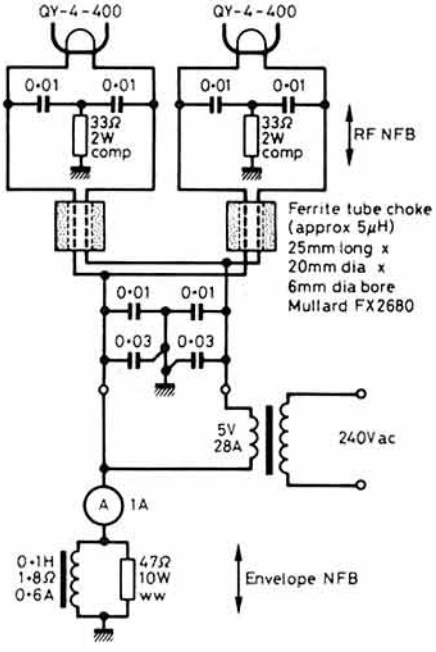


FIG 1. G3LNP's FILAMENT CIRCUIT OF HIS QY4-400 AMPLIFIER SHOWING HIS METHOD OF OBTAINING BOTH ENVELOPE AND RF NEGATIVE FEEDBACK THAT OFFERS A NUMBER OF ADVANTAGES INCLUDING LESS INTERMODULATION DISTORTION.

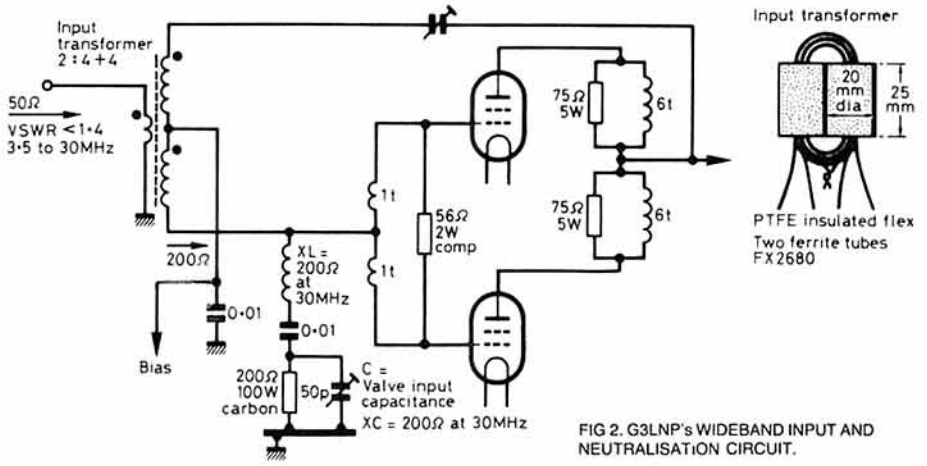


FIG 2. G3LNP's WIDEBAND INPUT AND NEUTRALISATION CIRCUIT.

It is important to ensure that newcomers to our hobby be aware of the problems they are likely to face and be encouraged to acquire the basic technical knowledge needed to understand the many aspects of EMC. This does not mean that an amateur should attempt to modify his neighbour's appliances other, perhaps, than by fitting an add-on filter unit. But he does need to be able to show that he or she knows what they are doing and understands what EMC is all about. Amateur radio has always been primarily a scientific and technical hobby. If we are content to become non-technical 'appliance fun-operators' its long-term future will indeed be at peril.

David Reynolds, G3ZPF is one of several recent *TT* correspondents who are concerned at the increasing number of consumer-electronics appliances with little built-in immunity to strong – and not so strong – local signals. He writes (in early December):

"It will soon be Christmas and I bet I will get the usual procession of neighbours complaining that their brand-new electronic gadget is wilting in the presence of my modest RF.

"I know the problems can be cured, if Joe Public acts rationally, but we have now gone from the stage where each house had just one 'wireless' and maybe one 'TV' to the typical family home with a main colour TV set and VCR, one or two transportable TV sets, possibly with one having a video or used with a microcomputer, a 'tower hifi system', ghetto blasters for the youngsters, computers, radio alarms, radio-controlled toys, electronic and cordless telephones, microprocessors in this, that and the other and so on *ad infinitum*.

"Even with the best will in the world, it may take several weeks sorting that lot out . . . and just when you finally think it safe to go back on the air, it's somebody's birthday and another new gimmick in their home! And I firmly believe that trying to sort it all out by yourself without involving the DTI, is a positive *disservice* to the hobby."

The problem of EMC, spectrum pollution and spectrum management are now at the forefront of professional technology. Unless, as amateurs, we recognise that we too have a real part to play in their solution, then inevitably we shall see our privileges wither away. This is something that involves us all and will *not* be met by regarding amateur radio as purely a fun hobby. We should do well to remember that a general WARC, at which the entire International Frequency Allocation Table will be reviewed, is now almost certain to be held within the next five years, possibly as early as 1992 or 1993. It will once again be necessary to justify the allocation of valuable parts of the radio spectrum to a 'hobby'.

SOLID-STATE RF POWER AMPLIFIERS

There have been several mentions in recent *TT*s of Motorola 'Application Note' publications which give detailed information on the design, construction and setting-up of power amplifiers based on the company's range of solidstate RF power devices. This has prompted Mike Grierson, G3TSO/KD3CL to pass along the information that several of these amplifiers are available in kit form from: Communication Concepts Inc, 121 Brown Street, Dayton, Ohio 45402, USA Tel: (513) 220-9677. US prices for complete kit of parts (less the heatsink) and presumably subject to six per cent import duty and 15 per cent VAT are: AN758 300W $160,70; AN762 140W $93·25 (this design is featured in the *ARRL Handbook* and is ideal for adding to the recently described G3TSO transceiver); AN779 20W $83·79; EB63 140W $88·65; EB27A 300W $139·20; and EB104 600W $448·15. G3TSO states that these kits can be purchased by means

RESONANT ATU WITH PARALLEL INDUCTORS

It is common practice to connect two or more capacitors in parallel in order to obtain a required value of capacitance. It is much less often that one sees the same technique applied to inductors in order to obtain a lower value of inductance, even though this can sometimes provide a useful simplification in band-switching etc.

This is well-illustrated in the article 'A simple resonant ATU' by Doug DeMaw, W1FB (*QST*, September 1988, pp26-28). His design eliminates both roller inductors and tapped inductors and reduces band changing to three simple on-off switches. While his design is for low-power (1 to 15 watts) operation, with the ATU feeding resistive (resonant) loads from 15 to 1000ohms impedance, the basic principle of parallel inductors in such ATUs is equally applicable to high power operation provided that high-voltage components are used.

W1FB justifies his approach as follows:

"Are you weary of looking for expensive roller coils? Do tapped coils in ATUs fail to provide the inductance resolution you need for matching a broad range of impedance? We are kindred souls if your answer to these questions are 'yes'. The roller-coil problem is even more acute for a QRPer: tiny roller inductors that fit the small format of QRP gear are not available. The remaining option is a tapped coil and switch.

"The circuit in this article is by no means new or original. The manner in which I am using it is, however, a bit uncommon. Fig 3 illustrates the circuit. Unlike other Transmatch circuits, this one is resonant at the operating frequency. Most tuners contain elements of L and C, which are used to cancel inductive or capacitive reactance in an antenna circuit. Circuit resonance is not a criterion. The popular T-mat that is used in most commercial Transmatches is an example of a non-resonant ATU. A resonant Transmatch offers the advantage of simplicity and harmonic reduction."

Fig 3 includes the circuit diagram of a simple SWR indicator plus the Transmatch proper, but the SWR-sensing circuit can be eliminated in those

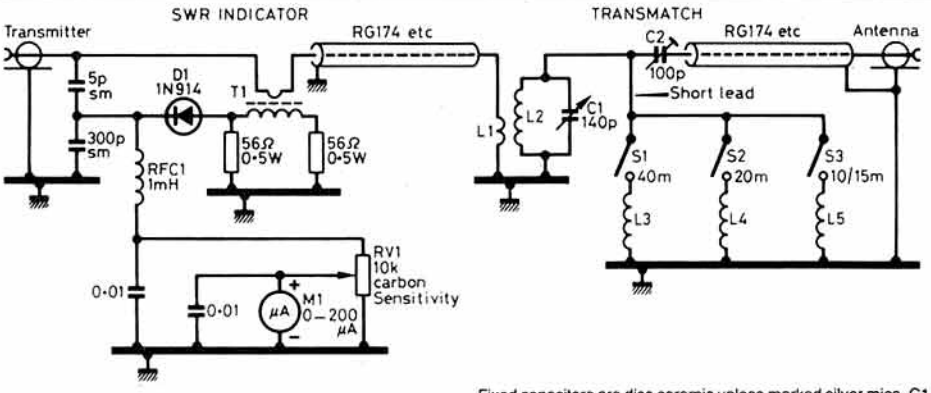


FIG 3. CIRCUIT DIAGRAM OF W1FB'S QRP SWR INDICATOR AND TRANSMATCH SHOWING HIS USE OF PARALLEL INDUCTORS TO ELIMINATE THE NEED FOR ROLLER-INDUCTOR.

Fixed capacitors are disc ceramic unless marked silver mica. C1 miniature 100pF or 140pF air variable capacitor. C2 10-100pF trimmer with shaft. RV1 linear-taper 10-kilohms carbon composition potentiometer. RFC1 miniature 750μH or 1mH RF choke.

cases where there is already available a separate SWR meter to use with the tuner. Since W1FB's concern was to obtain a matched condition between the transmitter and the antenna, the SWR indicator provides only reflected-power information with the ATU adjusted for minimum deflection. A sensitivity control, R1, is included to prevent the meter from reading off scale during adjustments. As shown, a transmitter output of 1W or more should provide full-scale deflection of the meter.

The problem of multiband operation is solved very simply by arranging for L1 and L2 and 3·5MHz (or the lowest band required) and then adding L3, L4 and L5 switched in parallel with L2 by means of either separate single-pole, single-throw switches S1, S2 and S3. The L1/L2 turns ratio remains the same as when only the main coil is being used (L1 could be eliminated by tapping L2 six turns above the earthy end). As described by W1FB L2 has an inductance of 28μH. The effective circuit inductance becomes 7·5μH. when L2 and L3 are in parallel; 2·4μH with L2 + L4; 0·82μH with L2 + L5 (L5 is misprinted as L3 in the original article); and 0·6μH if all four coils are in parallel. Although W1FB's tuner is made from pieces of single- and double-sided printed-circuit board, the unit has connecting wires rather than printed wiring (ie 'ugly' construction).

Coil details for the QRP tuner are as follows: L1 6t of no. 22 insulated wire over earthy end of L2. L2 28μH inductor with 70 close-wound turns of no. 22 enamel wire on a ⅞ by 2in piece of PVC pipe. L3 10μH inductor with 30 turns of no. 26 enamel wire, closely wound, on a ⅝ by 1in piece of PVC pipe. L4 2·6μH inductor with 16 turns of no. 20 enamel wire, closely wound, on a ⅝ by 1in piece of PVC pipe. L5 0·85μH inductor with nine turns of no. 20 enamel wire on ⅝ by 1in piece of PVC pipe. Space turns to occupy ⅝in. For SWR indicator T1 is a toroidal transformer with 35 turns of no. 26 enam wire on an Amidon FT-50-61 ferrite toroid (μ = 125). Primary has one turn of no 26 enam wire. D1 is a silicon high-speed switching diode type 1N914 or equivalent. M1 small edgewise tuning meter in the W1FB tuner (200μA FSD). All RF leads should be kept as short as possible.

Adjust by switching to appropriate band. With RF power applied, adjust C2 for lowest SWR. Next adjust C2 slightly and readjust C1 for minimum SWR, repeating this process until minimum SWR is achieved, preferably using maximum possible value of C2 consistent with low SWR.

of Visa or Mastercharge (Access) cards. The 300W AN758 unit is the bipolar push-pull amplifier forming the basic module of the 1kW four-module power amplifier outlined in the December *TT*.

G3TSO also adds a rider to the December *TT* notes on the DDS (direct digital synthesiser) boards being offered by Digital RF Solutions. He has discovered that these are priced at $895 (ie £492 plus six per cent import duty plus 15 per cent VAT making the cost to a UK purchaser about £500). As G3TSO comments, this must put the DDS "somewhat outside the price bracket of the average homebrewing amateur even if they have a suitable spectrum analyser." While it is possible that the costs of DDS will come down in future, it all bears out my feeling that the problem of excessive phase-noise in amateur-budget synthesised transceivers is likely to be with us for some time to come.

Returning to the subject of solid-state power amplifiers, it is clear that Motorola have become one of the main American suppliers of state-of-the-art RF power devices, both bipolar junction transistors and field effect transistors. A review of some interesting, if still costly, devices was given by Barry Manz in "Tap real power with solid-state RF designs" (*Electronic Design*, 12 May, 1988). He highlights the introduction in 1985 of the Motorola MRF154 MOSFET (capable of 600W output up to 100MHz) as a 'milestone', being the first device that made it possible for just two solidstate modules to be paralleled to provide an amplifier capable of delivering 1kW continuous-wave output with up to 16dB gain. But he believes that bipolar devices will also continue to improve, using such techniques as gold-metallisation and the inclusion of input and output impedance matching *within* the package, so lowering the *Q* and enabling devices to deliver bandwidths of the order of 10%. A Motorola example of integral matching is the MRF898 which can provide 60W output at 850 to 960MHz with 8dB gain, 65% per cent efficiency and input and output impedances of 10ohms. A state-of-the-art UHF device is the SGS-Thomson gold-metalized SD1492 bipolar transistor capable of 150W CW output between 470 and 870MHz with 7dB gain and collector efficiency of 40%, as noted in *TT*, April 1988. p265.

Barry Manz, in looking to the future, calls attention to the little-known 'static induction transistor (SIT)'. This type of device was first discovered almost 40 years ago by J Nishizzwa, Tohku University, Japan and has been the subject of long-term development by a number of companies including GTE Laboratories. Such devices, it is anticipated, will permit the use of DC supply voltages up to 150V and promise lower noise figures and higher gain than bipolar devices, plus better forward-bias current distribution, absence of secondary breakdown and greater tolerance to VSWR. The triode-type characteristics should also reduce design problems. Barry Manz suggests that a 350W SIT device might have a load impedance of 8ohms and 70V supply, whereas a comparable 28V bipolar device would have a load impedance of only 2-3ohms. While there are no SIT devices yet on the market, GTE have developed an experimental, water-cooled SIT delivering 280W CW at 400MHz with 8dB gain and 70% efficiency.

MORE ON PHASING-TYPE D-C RECEIVERS

Last September, *TT* in the item 'Phasing-type SSB' (pp877-879) described recent ideas on SSB demodulation based on all-pass-filters in direct-conversion receivers designed to reject the unwanted sideband. This included some details of a *QST* design by Gary Breed, K9AY (who, incidentally, is editor of *RF Design* for professional engineers) and also referred to the earlier Signetics/Philips Application Note AN1981 written by Bob Zavrek, W7SX.

In *QST*'s *Technical Correspondence* column (September 1988, pp46-47), W7SX comments most usefully on K9AY's design w hich he regards as capable of achieving close to the optimum performance that can be expected from a D-C receiver. He writes:

"Gary obviously went through laborious considerations of op-amp performance, because the op-amps (NE5534s) largely determine the receiver noise figure . . . The NE5534 is an outstanding op-amp for its price. It is used in expensive professional audio-recording equipment because of its low noise and excellent linearity. Many people don't know that it is available in a quad version, the NE5514, which is preferable to the TLO84s used in the all-pass networks. There is also a low-noise version of the NE5534, the NE5534A, available from Signetics. K9AY's receiver can be improved by replacing the NE5534s, with NE5534As the TLO81 with an NE5534 and the TLO84s with NE5514s . . . contributing to low-noise and wider dynamic range."

W7SX suggests that it is possible to eliminate the major problem of phasing-type D-C receivers: insufficient rejection of the unwanted sideband. He introduces an arrangement he calls a 'doubly-nulled D-C receiver, in which, by adding another quad op-amp to K9AY's receiver, it should be possible to achieve over 50dB of rejection of the unwanted sideband. He emphasises a point that has been made a number of times in *TT*, (stemming from the original article 'Synchronous Communications' by J P Costas, W2CRR in *ProcIRE*, Decem- ▶

EMC AND PACEMAKERS

From time to time, *TT* has referred to the uncertainty that has long surrounded the use of implanted cardiac pacemakers in close proximity to medium- and high-power transmitters and their associated antennas. There can be no doubt that early designs of these vital life-saving devices were often vulnerable to strong RF fields. It is only within the past decade or so that the problems of electromagnetic compatibility (EMC) have begun to be taken seriously in some segments of the electronics industry.

To improve what has now been recognised as an extremely unsatisfactory situation, attempts are being made to establish standards covering immunity and RF radiation. For implanted cardiac pacemakers, draft standards were issued in the Federal Republic of Germany in 1985 (DIN VDE 0750 Part 9) and in an European context by CENELAC (pr EN50 061 'Safety of implantable cardiac pacemakers').

However, at the 1988 'Sixth International Conference on Electromagnetic Compatibility', a paper "Hazards from electromagnetic fields; influence on cardiac pacemakers by powerful radio transmitters" by T Bossart and M Dahme of the German broadcast research institute (IRT) revealed that tests on 34 different cardiac pacemakers showed a difference of about 40dB RF voltage compatibility between the best and worst of these designs: Fig 4. They also showed that even the least susceptible of these models to RF fields could be improved by a further 32dB voltage compatibility by means of relatively simple, low-cost modifications. Were such techniques to be universally adopted it would ensure that patients fitted with pacemakers could be assured that these would not be affected in any way by exposure to electromagnetic fields at levels right up to the ANSI limits for normal healthy persons not having an implanted pacemaker. Such reassurance is clearly not possible with most, if not all, current models (or at least those tested in Germany).

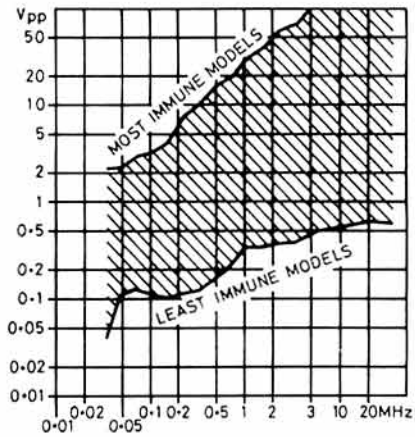


FIG 4. ENVELOPES OF THE IMMUNITY TO VOLTAGES PRODUCED BY PULSED AM SIGNALS OF 34 DIFFERENT PACEMAKER MODELS TESTED BY IRT IN GERMANY SHOWING THE WIDE DIFFERENCE OF UP TO 40dB BETWEEN THE MOST AND LEAST IMMUNE DESIGNS.

The paper suggests that external RF signals (particularly those of pulsed, amplitude-modulated form) can have two effects on pacemakers: (1) they may cause an inhibited pacemaker to begin stimulation (this would normally present no severe danger); and (2) they may cause a stimulating pacemaker to return to its inhibited state; this could be most dangerous for the user and is likely to occur at lower RF levels than (1). It is thus the second effect that is the critical design factor.

The paper shows how susceptibility can be reduced by shunting the input/output leads with 1nF RF-type capacitors; inserting a passive low-pass filter between the input/output leads and the high-sensitivity amplifier; and by avoiding non-linearities by choosing adequate clipping levels of about 10 to 20V. Of course, I do not suggest that anybody other than the original pacemaker designer could do anything to modify such devices, but the techniques listed above are applicable to most consumer electronics etc. It is also hoped that by giving further publicity to this problem (which should be understood by all involved in the operation of broadcast, communications and radar transmitters), it may help to underline that EMC remains an important topic in many branches of electronics other than communications.

Meanwhile, it seems reasonable to suggest that persons depending on implanted cardiac pacemakers should avoid areas subject to strong electromagnetic fields, either as operators or as visitors, or as members of the family, unless they are certain that their particular device is guaranteed not be affected up to the range of levels involved.

ber 1956, pp1713-1718) that D-C phasing-type receivers offer freedom from spurious responses, simplify design and can be configured to detect USB and LSB simultaneously. He writes: "There is no reason why D-C receivers cannot be built to achieve performance levels approaching – or even exceeding – that of superhets."

He adds: "A block diagram/circuit diagram is shown in Fig 5 of the doubly-nulled technique. By adding another quad op-amp to K9AY's existing circuit, unwanted sideband rejection of over 50dB is possible. LSB and USB are detected simultaneously using the traditional phasing method. For additional sideband rejection, the undesired sideband signal is attenuated (about 30dB), phase inverted and used as a second cancellation signal in a second summing amplifier. (As shown in Fig 5 the second summing amplifiers are actually difference amplifiers.)

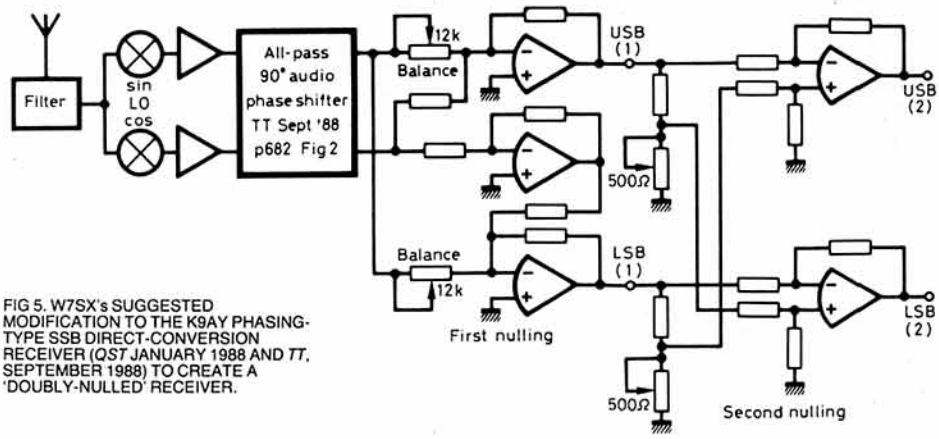


FIG 5. W7SX's SUGGESTED MODIFICATION TO THE K9AY PHASING-TYPE SSB DIRECT-CONVERSION RECEIVER (*QST* JANUARY 1988 AND *TT*, SEPTEMBER 1988) TO CREATE A 'DOUBLY-NULLED' RECEIVER.

"K9AY tried this technique but got only an additional 6dB of sideband rejection. This limited improvement is caused by the bandpass ripple of the all-pass sections . . . attributable largely to gain variations resulting primarily from the feedback resistors in the all-pass sections. Much better filter gain linearity is possible if 0·1% integrated resistors are used instead of the specified 1% 10ohm resistors. A single integrated multi-resistor would (also) reduce the component count of the filter section. Alternatively, trimmer potentiometers could replace some, or all, of the feedback resistors. The additional nulling stages could be added to achieve outstanding unwanted-sideband rejection."

BINAURAL RECEPTION

The suggestion by W7SX in his comments on improved phasing-type direct-conversion receivers of using simultaneous demodulation of both upper and lower sidebands, while tuning, in order to spread out the band subjectively as a form of binaural pseudo-stereo is one that has arisen before, with particular reference to the reception of double-sideband AM signals (with or without carrier suppression) and also for CW reception. The basic idea (Fig 6) is to take advantage of the 'cocktail-party effect' (the ability we have with two ears to concentrate on just a single speaker in a crowded noisy environment) by moving unwanted interference 'away' from the wanted signal. This topic was discussed at some length in *TT*, August 1973, pp549-550 and October 1973, pp694-695, and especially by 'Dud' Charman, G6CJ and Richard Harris, G3OTK in 'Subjective selectivity and stereocode' *Rad Com*. September 1975, pp674-681 which described fully the construction of their stereocoder unit for CW reception. *TT* August 1973 also included details of an improved AM detector investigated by the CCIR for broadcast reception (Fig 7) and the 'Frequencieschaar' (ie 'frequency scissors') system developed in 1958 by Hans Evers, PA0CX. PA0CK used phasing techniques to cut the wanted double-sideband signal into two halves to give a pseudo-stereo presentation which helped overcome selective fading and interference: Fig 8. It won for him a prize from the Dutch 'Veder Scientific Radio Fund' normally awarded only to professional engineers. Dick Rollema, PA0SE who attended a demonstration wrote: "On reception under normal conditions one observes nothing unusual; both sidebands provide exactly similar interference. But if one sideband suffers interference from an adjacent channel then this is heard predominantly in one ear. . . . One has the feeling of sitting on a 'band' with the other signals to the right and left".

It is perhaps relevant to note that in the long-banned *Spycatcher*, Peter Wright describes how binaural techniques have been used for many years by MI-5 phone-tap transcribers to improve the intelligibility of noisy tapes. It is a technique that could prove capable of further development.

FIG 6 A BASIC METHOD OF OBTAINING A PSEUDO-STEREO EFFECT FOR BINAURAL RECEPTION OF A CW SIGNAL AS SUGGESTED BY G3OTK IN *TT*, AUGUST 1973.

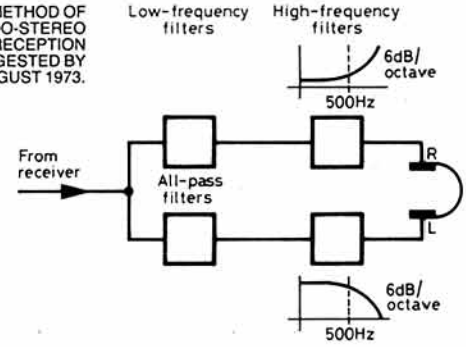


FIG 7. THE FLEXIBLE BINAURAL SYNCHROPHONE EXALTED-CARRIER BROADCAST-RECEIVER DETECTOR INVESTIGATED BY THE CCIR IN THE EARLY 1970s. THIS SHOWED SIGNIFICANT ADVANTAGES OVER CONVENTIONAL DETECTION.

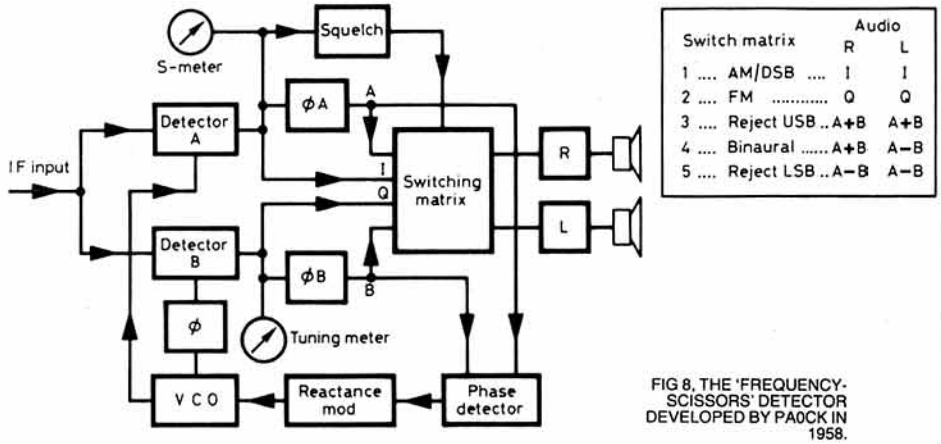
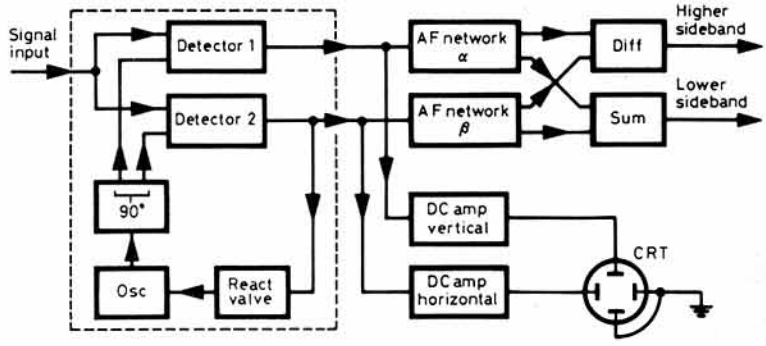


FIG 8, THE 'FREQUENCY-SCISSORS' DETECTOR DEVELOPED BY PA0CK IN 1958.



W7SX notes that for CW reception it would be possible to optimise rejection across only the CW passband, so achieving greater rejection than for SSB bandwidths. He also notes that simultaneous LSB and USB detection can be used with dual-channel audio stages and headphones so as to listen to the LSB channel in one ear, USB in the other, while tuning across the band: (see the item 'Binaural Reception').

TELEPHONE INTERFERENCE FOLLOW-UP

Personally, I feel that British Telecom over-reacted to my comments (*TT*, August 1988) on the varying susceptibility of various 'approved' telephone instruments to RFI but the Society appears to take the view that anything published in *RadCom* is liable to be interpreted as representing official Society policy!

Many of the early, RFI-vulnerable electronic telephones are, unfortunately, still in use, and some apparently are still being installed. It is perhaps fortunate for radio amateurs that the main problem tends to be the breakthrough of broadcast programmes. It was this that appears to have led to BT setting up their special EMC field team. One reader telephoned me to say how useful a *BT engineer* had found the *TT* item when curing his telephone-interference problem. Another, who had also better remain unidentified, put it thus: "I was dismayed to note that BT were quicker to criticise *TT* than they are to sort out their telephones. I am still waiting, after 4½ years, for them to come back to sort mine out, which is why I did it myself. Incidentally, the Audioline 201 telephone, which retails from about £15, appears to be completely RF-proof and makes a good checking telephone. The 'works' are all mounted in the handset and, as a result, do not pick up RF on the cable from the base unit."

Occasionally, interference to telephones arises from coupling of RF through the AC power lines and can be eliminated without touching the telephone. Dave Zinder, W7PMD, in *QST*'s *Hints and Kinks* column (April 1988, p44) writes: "WA6BSJ in April 1984 *QST* p43, suggested the addition of line filters to eliminate telephone interference. Each of WA6BSJ's filters contained four RF chokes and three capacitors. After experiencing telephone RFI with my Yaesu FT-101EE transceiver, I found a simpler – and possibly more universal – cure. First I installed an AC-line filter in the transceiver power cord *within two inches* of the rig. Next, I connected the filter case to a cold water pipe earth by means of heavy wire. This simple solution entirely eliminated my interference problem". An editorial note pointed out that the use of plastic pipe fittings in modern plumbing makes the cold water pipe earth an increasingly unsure option: "Before depending on cold-water plumbing for electrical earthing of *any* kind, be sure that the system is conductive between your intended earth point and the main water inlet to the house." It also seems appropriate to remind readers of the potential hazards of separate earthing in premises where PME (protective mains earthing) is used (see *TT*, April 1987 and *RadCom* "Killing ground, earth your station safely' by Peter Chadwick, G3RZP, June 1987).

MAKING PCBS – THE SIMPLEST WAY?

R. G. EVANS, G4XAT has taught some 300 youngsters (12/13-year-olds) how to make printed circuit boards and believes that the method described below is the simplest, quickest and cheapest method to implement. He considers that while John Case, GW4HWR in 'Making printed circuit boards – a different view' (*Rad Com* March 1988, pp176-179) has done a very good job of simplifying photographic reproduction of published board designs, for the beginner the investment required, even as a group, may put him or her off for good. He writes:

"The method I have been using for years and which I teach to youngsters at my school is as follows:

"Take a photocopy of the desired board layout or design and lightly glue it on the copper side to a piece of copper clad board using 'Pritt-Stick' or similar. Next drill all the holes as marked. By leaving the photocopy on the board you can (a) see what size to drill the holes; and (b) check that you have indeed drilled them all simply by holding the drilled board up to the light.

"After drilling the holes, carefully peel off the photocopy (try to do this immediately after drilling and before the glue really dries hard) and then clean the board thoroughly. Take care to remove burrs from around the drill holes as they can tear the nib; I have found that 400-grade wet or dry paper is the best, coarser materials cause the ink to run by capillary action. Next, using a 'Dalo Etch Resist Pen' copy the board layout using the holes already drilled as aiming points. In this fashion, board layouts from simple to very complicated have been made; some of my pupils have even successfully made double-sided boards. In the event of two tracks touching, it is best to leave the ink to dry and *then* to scratch the ink away with a scriber; the best tool in my opinion for this. There seem to be several etchpens on the market; the genuine 'Dalo' seems best although the RS version is a close second, the main problem is that the nib dries up too quickly. I have found that the Staedler Lumocolour 218, although finer and less prone to drying up, cannot resist hot agitated ferric chloride long enough for a good board to be etched; since it was designed as an OHP pen this is not surprising!

"Although this may seem only a variation on the theme of 'mark the holes with a centre-punch' approach, I feel the above method offers many advantages. Since printed circuit boards provide such a reliable and repeatable method of circuit construction, I feel that this simple method of board manufacture would allow many more beginners to experience the joy of their first constructional project. Finally, two other tips: (1) Use SRBP board for maximum drill life – GRP will ruin even good drills after about 50 holes; and (2) Cheap drills can be bought from J & N Bull, 250 Portland Road, Hove, Sussex, BN3 5QT (Telephone 0273 734648 and 0273 203500)."

SOLAR FLARE DETECTOR

In his VHF/VHF column, Ken Willis, G8VR has referred to the technique of monitoring VLF transmissions in order to detect the sudden enhancement of signals that denotes a solar flare. This has prompted John Power, W2AXU to send him details of a simple monitoring receiver (Fig 9) suitable for operation between about 15 and 100kHz with three sets of coils. G8VR has kindly passed along the circuit information for inclusion in *TT* although he will be commenting himself on its use as a solar flare detector.

W2AXU considers that optimum results can be achieved when monitoring the most distant possible station along an East-West path at the lower frequency end of VLF, ie about 15 to 40kHz. The effect of a solar flare is to produce D-layer enhancement with the monitoring receiver showing a sudden enhancement of the signal.

He warns that, with an automatic strip recorder, paper costs tend to be about four times that of a magnetometer with the receiver using about one roll of paper per month, whereas a roll can last about four months with a magnetometer. However since solar flares occur *only* in daylight it is possible to reduce paper costs by switching off the strip recorder during darkness. W2AXU points out that while a strip recorder is a great convenience, the receiver could almost certainly be connected to a computer printer.

Components details: L1-C1 and L2-C2 are tuned to the required frequency. For 15 to 25kHz, L1 and L2 are 45 to 215mH, spaced 2in. centre to centre (Miller 6330). For 25 to 50kHz 8 to 60mH spaced 1¾in. centre to centre (Miller 6319). For 50 to 100kHz 0·5 to 5mH spaced ¾ to ⅝in. (Miller 6313). C1 and C2 will depend on frequency and the value of L1-L2 in the range 240 to 1000pF (capacitance of the coaxial feeder will appear across L1). T1 miniature audio transformer 2k to 20k or so. L1-C1, L2-C2 and TR1 to TR3 can be mounted at the antenna. Use two-wire shielded cable from TR3 to 2·2k potentiometer. Should greater signal voltage be required, another amplifying stage can be inserted before or after TR4.

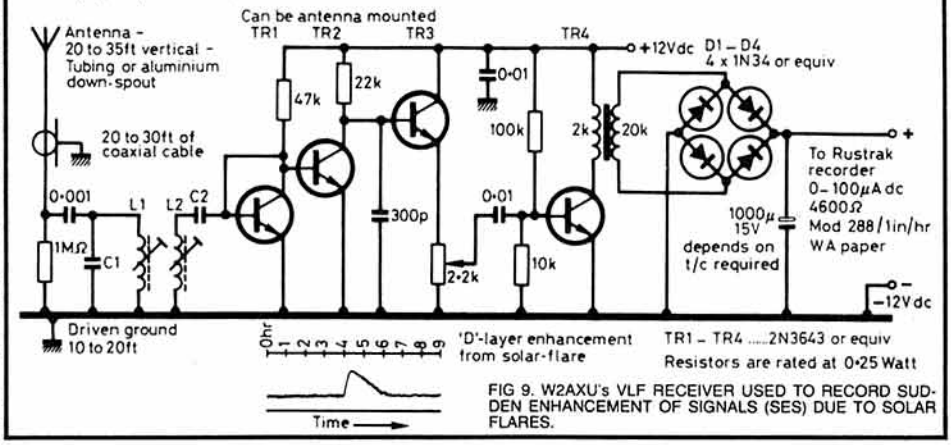
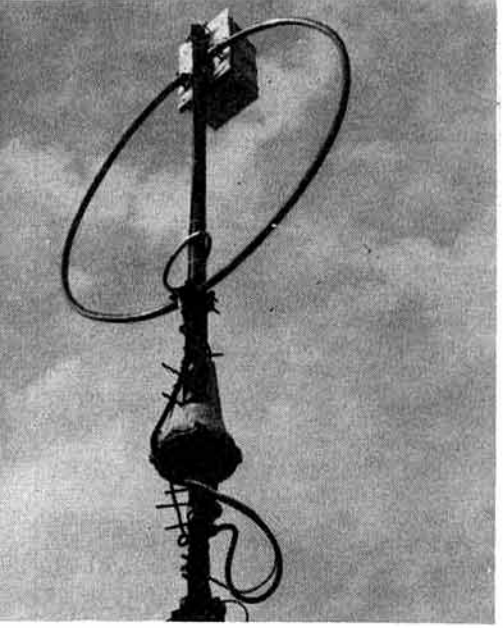


FIG 9. W2AXU's VLF RECEIVER USED TO RECORD SUDDEN ENHANCEMENT OF SIGNALS (SES) DUE TO SOLAR FLARES.

TIPS AND TOPICS

My apologies for giving (*TT*, October 1988) incorrectly the name of that great broadcaster and raconteur, the late Wynford Vaughan Thomas. No excuse is possible since I once had the great pleasure of hearing some of his anecdotes at an HTV dinner in Cardiff which he hosted in the style that made his broadcasts so memorable. ■

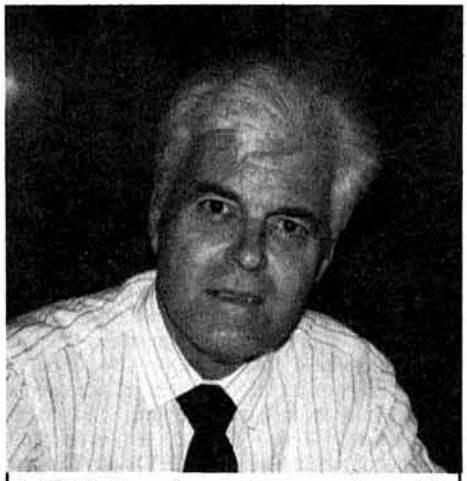


A CLOSE VIEW OF THE LOOP IN THE DEFINITIVE INSTALLATION. NOTE THE SMALL COAX FEEDING LOOP AND THE SHIELDED WIRE FIXED ALONG THE PLASTIC MAST FOR FEEDING THE TUNING MOTOR.

PLUMBING NORMALLY IS CONFINED TO MICROWAVES. NOW YOU NEED TO BEND 22MM COPPER TUBE FOR THE HF BANDS

ELECTRICALLY TUNABLE HF LOOP

BY ROBERTO CRAIGHERO I1ARZ



Robert Craighero, born in 1929, was interested in radio since he was a high school student in the immediate post-war period. In 1949 he started his merchant navy career, obtaining his ship's master certificate in 1955. During that period he operated occasionally as "mobile marine". In 1959 he was licencsed as 11ARZ and from that year his radio amateur activity has been regular, having left the sea for a shore job in the shipping field. He is more inclined to experimentation and homebrewing. His interest in radio is still as high as in the early days. Since 1971 he has beeen a member of the managerial staff of one of the major state owned shipping companies in Italy.

The compact HF transmitting loop antenna – and the active receiving loop – are now widely used in professional and military communications but still only rarely by radio amateurs. This is despite many articles (Ref 1-8) and even a booklet (9) on this interesting form of antenna. I began experimenting with small transmitting loops in 1985 and can confirm that they offer useful advantages to those amateurs unable to erect high dipoles or beam arrays. In this article I present the experience of myself and others, including a detailed description of the electrical and mechanical aspects of a loop antenna with a diameter of one metre, tunable over the range 14 to 29MHz.

HISTORY

Although compact loop antennas have been used for many years for reception, particularly in connection with direction-finding, the first significant attempt to overcome the transmission problem of their very low radiation resistance, typically well under one-ohm, appears to have been the octagonal loop with 5ft sides developed at the US Army Limited War Laboratory for use in the jungles of south-east Asia. This was described in *Electronics* (21 August 1967) and first brought to the notice of radio amateurs in the November 1967 issue of the *RSGB Bulletin (Technical Topics)*. In *QST* (March 1968) Lewis McCoy, W1ICP of ARRL described his attempt to duplicate this design but reported only modest success, possibly due to the ohmic resistance of the plumber's connectors used with the straight tubing. The original transportable US Army loop used 0·5in diameter tubing and a low-loss capacitive matching/tuning network, though it was recognised that it would be advantageous to reduce RF ohmic losses still further by increasing the surface area of the tubing by the use of 3, 4 or even 6-in diameter tubing!

The next few years saw the publication in the amateur-radio journals of various ideas including that of "Spenny" (G6NA) of using "0·5in" coaxial cable to form a 1·8MHz loop, with an overall efficiency of about 8% at 4MHz. In *QST* (November 1968) W20ZH described a fixed-frequency 3·9MHz "Mobiloop" using coaxial cable for a loop tuned to resonance by a high-voltage capacitor formed from a 13ft 7in length of 300-ohm tubular television twin-lead.

The 1970s and 1980s have seen the development of professional single and multiple-turn transmitting loops for such applications as low-profile HF embassy and marine installations, incorporating remote tuning. In 1983, DL2FA presented in *cq-DL* a comprehensive review of matching networks for transmitting loops including the use of a second inductive coupling loop, a technique also successfully used by a Swedish amateur for a three-turn, silver-plated loop for marine use (IERE Conference Proceedings No 50 reported in *TT*, September 1981). In 1985, Ted Hart, W5QJR published a useful booklet on the principles and practice of transmitting loop antennas.

GENERAL COMMENTS ON SHORT LOOP ANTENNAS

It may seem strange that an antenna capable of working efficiently at ground level should be so little used by amateurs. However, it must be recognised that good efficiency can be achieved only by taking into account the requirement that the loop should exhibit extremely low RF ohmic resistance. Additionally its high-Q characteristic results in a narrow effective bandwidth, requiring accurate retuning for even a small change in frequency; this can be overcome by the use of complex and expensive automatic tuning systems or, more realistically for amateurs, by remote control of the tuning capacitor forming part of the loop. Another disadvantage is that even on low-power, there will be very high RF voltage across the tuning capacitor, resulting in the need for either a high-cost vacuum capacitor or a good-quality, wide-spaced transmitting capacitor.

Against these disadvantages should be set the fact that a well-constructed loop at ground level can have a radiation efficiency close to that of a dipole antenna a half-wave above ground, and significantly better than a dipole less than a half-wave above ground. Furthermore, the short loop utilises the near-field magnetic component of the electromagnetic wave resulting in much less absorption in nearby objects: this means that a short loop can be

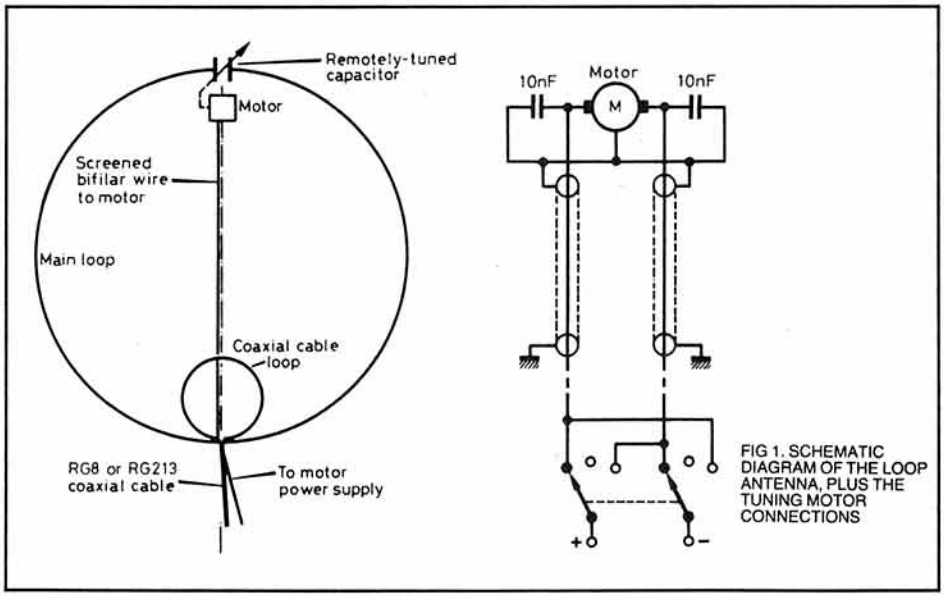


FIG 1. SCHEMATIC DIAGRAM OF THE LOOP ANTENNA, PLUS THE TUNING MOTOR CONNECTIONS

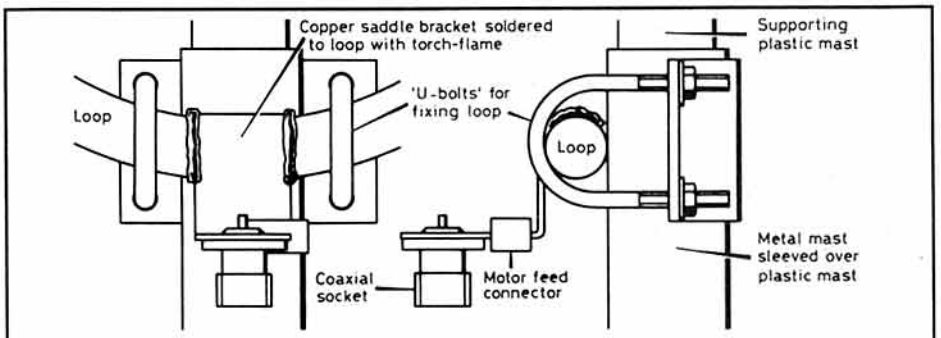


FIG 2. DETAILS OF THE BOTTOM OF THE LOOP – FROM THE FRONT.

used successfully indoors or on a balcony. For reception a 'magnetic' antenna is virtually immune to the electric component of nearby interference sources. The reduction of man-made noise is particularly important on the lower-frequency bands, and is further enhanced by the directional properties of a rotatable loop. The loop can work effectively without an artificial ground plane.

The high-Q characteristics of a low-loss loop also means that it forms an excellent filter in front of a receiver, reducing splatter and cross-modulation from strong signals. On transmission, these filtering properties dramatically reduce harmonic radiation and hence some forms of TVI and BCI.

BASICS

To achieve good radiation efficiency in a small transmitting loop it is essential to minimise the ratio of RF ohmic losses to radiation resistance. In a small resonant loop the RF ohmic losses are made up of the resistance of the loop and that of the tuning capacitor (which will have much lower resistive loss than a loading coil). The tendency of HF current to flow only along the surface of a conductor ('skin effect') means that large diameter continous copper tubing (or even silver-plated copper) should be used to achieve a maximum high-conductivity surface area.

Provided that the circumference of a loop is between 0·125λ and 0·25λ, it can be tuned to resonance by series capacitance; if the loop is longer than 0·25λ it will lose its predominant "magnetic" characteristic and become an "electric" antenna of the quad or delta type but, unless approaching 1λ in circumference, will still have relatively low radiation resistance.

The radiation resistance of a small loop is governed by the total area enclosed and is a maximum for circular loop. It is possible to build a transmitting loop antenna with a circumference less than 0·125λ but in these circumstances the bandwidth becomes so small that it becomes practically impossible to tune the loop accurately enough. It is thus advisable to restrict the operating range of a transmitting loop to a ratio of 1:2, that is to say 3·5 to 7, 7 to 14, or 14 to 28MHz. Extending the tuning range will tend to result in a rapid falling off in efficiency. The most convenient solution for complete HF coverage is to use two loops; one for the higher frequency bands (14, 18, 21, 24 and 28MHz), the other for 3·5 and 7MHz or 7 and 10·1MHz. For 1·8MHz it is advisable to use a loop designed for this band, or for 1·8 and 3·5MHz.

A 14 TO 29MHz LOOP

The main physical characteristics of this antenna are:

Dimensions: Circular loop, 1m diameter made from copper pipe of 22mm OD. Circumference 3·14m.

Capacitor: Split-stator or 'butterfly' type, about 120pF per section. Minimum capacitance (for 28MHz) 16pF. A single-section capacitor can be used provided that it is of high quality with an effective, low-resistance connection to the rotary plates. (It is possible to reduce such losses by soldering a large flexible copper braid between the rotor shaft and frame. Half the above capacitances for a single section capacitor, viz about 60pF maximum and not more than 8pF minimum.) CapCo produce a suitable capacitor for their commercial pattern of the loop antenna.

Feed: Inductive coupling with a small loop made from co-axial cable.

Maximum power: This is governed primarily by the spacing of the capacitor vanes. Suggested rating 100W maximum.

Tuning method: Remote control of capacitor by means of electric DC motor and reduction gear. Rotation speed not faster than one turn per minute.

The electrical characteristics, calculated from the formulae given by W5QJR in *QST* (June 1986), are ▶

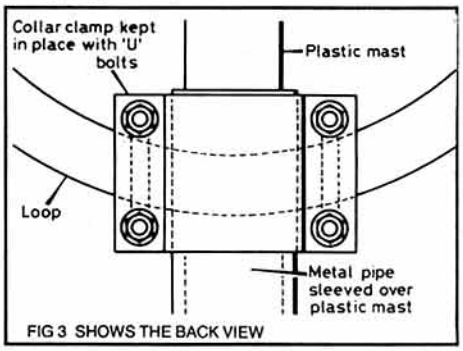


FIG 3 SHOWS THE BACK VIEW

TABLE 1 – ELECTRICAL CHARACTERISTICS OF A TRANSMITTING LOOP ANTENNA, 1m in diameter, made from 22mm copper tubing (calculated)

	14MHz	21MHz	28MHz
Radiation resistance, ohms	0·09	0·46	1·68
Conductor losses, ohms	0·04	0·05	0·06
Efficiency (%)	67·3	89·5	93·3
Loop inductance, HH	2·4	2·4	2·4
Inductive reactance, ohms	214	321	443
Q factor	789	311	127
Theoretical bandwidth, kHz	17·7	67·5	228
Voltage across tuning capacitor (100W), kV	4·1	3·1	2·3
Tuning capacitance, pF	53	23	12

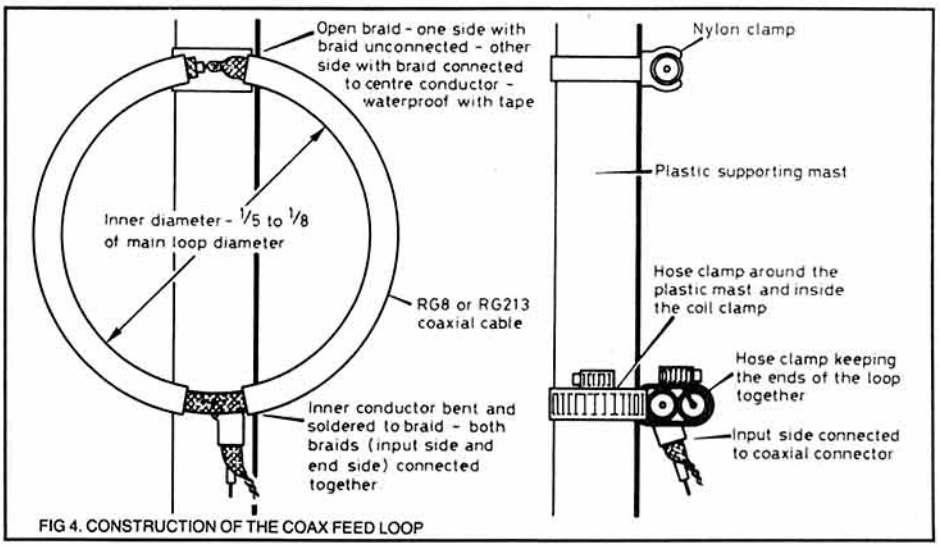


FIG 4. CONSTRUCTION OF THE COAX FEED LOOP

COMPUTER BASIC PROGRAM FOR LOOP CALCULATIONS

```
 5 CLS
10 PRINT "CALCULATION OF MAIN PARAMETERS
   OF A COPPER TUBING"
20 PRINT CIRCULAR SHAPED SHORT LOOP ANTENNA"
30 PRINT
40 PRINT
50 PRINT "Conductor Length          METERS:";: INPUT SS
60 S=SS*3·281
70 PRINT
80 PRINT "Conductor Diameter  MILLIMETERS:";: INPUT DD
90 D=DD*.03937
100 PRINT
110 PRINT "Frequency                MHz:";: INPUT F
120 PRINT
130 PRINT "Power                    WATT:";: INPUT P
140 PRINT
150 CLS
160 A=7·900001E-02*S^2
170 PRINT "LOOP AREA          SQ. METERS:";: B=A*·0929:
    PRINT B
180 PRINT
190 RR=3·38 *10^-8*F^4*Â2
200 PRINT "Radiation Resistance     OHMS:";RR
210 RL=9·96*10^-4*SQR(F)*(S/D)
220 PRINT "Conductor Loss           OHMS:";RL
230 E=RR/(RR+RL)*100
240 PRINT "Efficiency in percentage      %:";E
250 DB=LOG(E/100)/LOG(10)*10
260 PRINT "Efficiency in dB             dB:";DB
270 L=1·9*10^-8*S*(7·353*LOG(96*S/3·1418/D)/LOG(10)-6·386)
280 PRINT "Loop Inductance          HENRY:";L
290 XL=2*3·1418*F*L*10^6
300 PRINT "Inductive Reactance      OHMS:";XL
310 Q=XL/(RR+RL)/2
320 PRINT "Quality Factor                Q:";Q
330 DF=2*(RR+RL)/XL*F*1000
340 PRINT "Bandwidth                   KHz:";DF
360 VC=SQR (P*XL*Q)
365 PRINT "Capacitor Voltage         VOLTS:";VC
370 CT=1/(2*3·1418*F*XL)*10^6
380 PRINT "Tuning Capacitor             PFd:";CT
```

set out in Table 1. I inserted these formulae in a short Basic computer program which makes it possible to calculate quickly all main parameters for different sized loops, comparing the solutions and optimising the antenna. The Basic adopted is IBM PC but can be easily adapted to any basic computer. My program is set out. Factors have been incorporated for conversion from feet and inches to metric measures.

THE LOOP

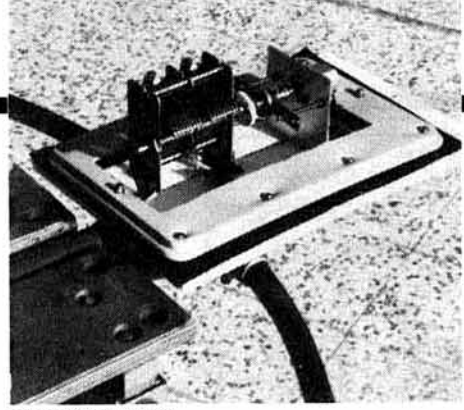
Copper pipe of 22mm OD is generally sold in straight lengths 5m long. In some cases it may be possible to obtain such pipe already coiled into circular shape; in such cases it is relatively easy to change this to the required diameter of 1m. The procedure I adopted with circular pipe was to make a chalk mark on the floor of the correct 1m diameter and then manually adjusting the pipe to this diameter; this requires two people, one keeping the pipe on the floor and the second slowly enlarging its diameter.

If you are unable to obtain a coiled pipe, it is possible to bend a straight pipe around a circular object of correct size; for example a round table or a large truck tyre. Before starting to bend the pipe, this should be filled with dry sand and the ends sealed. Sand must be pressed firmly inside while continously shaking the pipe. This prevents buckling of the pipe during bending or the formation of sharp bends. An alternative would be to find a workshop with a pipe bending machine, but this may be difficult to locate and would be more expensive.

Both ends of the loop must be cut longitudinally along the vertical diameter of the pipe for about 5cm, then cutting one half away. The remaining half is flattened to form strip that can later be inserted through the insulated board used to support the tuning capacitor and connected to the stator plates. In this way only one joint will be necessary for each stator, reducing the soldering losses. At the bottom of the loop, opposite the tuning capacitor, a small copper bracket should be soldered to the loop. On this bracket will be fixed the coaxial connector and the connector for the twin lead for powering the tuning motor. The bracket should be soldered to the loop with a torch-flame solder to ensure good electrical contact.

THE SUPPORTING MAST

Where a loop is to be used outside the house, it is imperative to provide a supporting mast across the loop; otherwise there is the risk that high winds will deform or break the loop. This can happen for two main reasons: the combined weight of the motor, tuning capacitor, plastic board and watertight cover is considerable; additionally 22mm copper tubing is not sufficiently strong to remain rigid in the presence of high dynamic stress unless supported. A thick PVC pipe of about 40-50mm diameter can be used for this support. Alternatively a glass fibre tube (lighter but more expensive) or a wooden mast waterproofed with plastic compound may be used. The length of this mast should be about1·50m, with about 20cm used at the top for fixing the plastic board carrying the tuning capacitor; the remaining length is used at the base for fixing the loop to a rotor or another short mast. For obvious reasons, never use a metallic pipe across the loop but a short piece of metallic pipe should be inserted at the base over the plastic pipe in order to have the loop grounded at the centre point where the loop



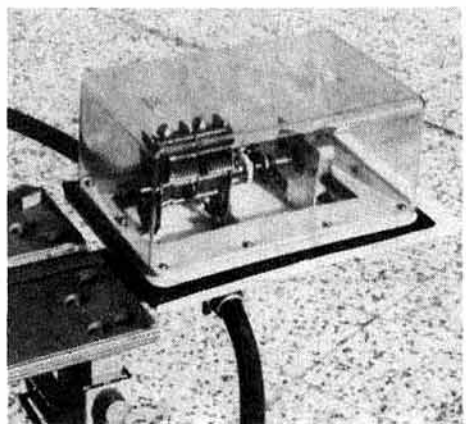
THE TUNING BOARD.

itself is kept against the supporting mast.

To fix the loop to the mast, I used at the base two U-bolts intended for fixing television antennas. In the top part, the loop ends are kept in place by means of two collar-clamps taken from cross joints in cast aluminium as normally used to connect the boom of television antennas to the mast. These clamps are connected with nuts and bolts (stainless steel) to the back of the plastic board supporting the capacitor. The bolts should be of sufficient length to act as adjustable spacers in order to have the loop completely upright. The plastic supporting mast is fixed to the back of the board by means of two semicircular clamps with stainless steel nuts and bolts of sufficient length to reach the front side of the plastic board. The two copper strips of the loop must be bent at 90° and inserted in suitable cuts in the board to reach the stators of the capacitor on the front side of the board. The cuts should later be waterproofed with silicone compound.

TUNING BOARD AND COVER

The size of the tuning board depends upon the dimensions of the variable capacitor and motor. The best material for high-power operation is Teflon 10mm thick; alternatively Plexiglass of the same thickness. When calculating the size of the board, allow space for fixing the clamps of the loop and for a waterproof cover to protect the complete tuning unit. For protection, I used a plastic watertight box of the type used for food in a refrigerator. The original cover was cut in the centre with an opening just wide enough to permit the entry of the capacitor and motor. Between the surface of the supporting board and the cover, I inserted a layer of soft rubber to act as a seal. The cover was then fixed in place with several small stainless nuts and bolts, fastened tightly so that the seal was compressed between the board surface and cover to make it watertight. The plastic box can now be put against its cover, keeping it in place with a tight nylon lashing. Silicone compound should now be applied all round to ensure that there can be no ingress of moisture. To prevent gradual deterioration of the plastic box it is advisable to use white self-adhesive plastic sheet to protect it against ultraviolet radiation from the sun.



THE WATERPROOF COVER IN PLACE – NOTE THE SEAL AROUND THE BOX COVER

THE TUNING CAPACITOR

It is most important to use a very good quality transmitting-type variable capacitor; otherwise the efficiency of the antenna will be much reduced. Owing to the high Q of this antenna, the RF voltage across the capacitor is very high (directly proportional to the power). With 100W power, this voltage will be between 4 and 5kV; with 500W it can be as high as 28kV!

It is most advisable to use a split-stator (or "butteRFly") capacitor of about 120pF per section; this has the advantage of the two sections being connected in series and eliminates losses due to the rotor (pigtail) contact. Assuming the loop is intended for use with a transmitter power of not more than 100W, the spacing between the vanes should be at least 1·5/2mm (ie 0·75mm). The "surplus" market remains a good source of excellent transmitting-type split-stator capacitors and it is worth taking time to locate a source rather than attempt to use a cheap capacitor which will almost certainly result in reduced efficiency of the loop antenna.

THE TUNING MOTOR

The motor forms an important part of the system; it calls for a DC motor with a reduction gear capable of providing very fine control, with the capacitor shaft rotating at only about one turn per minute or even less. An optimum solution is to use a motor having a wide range of working voltage – for example 3 to 12V to provide slow rotation at the lowest voltage for accurate tuning but a faster rate when changing bands. Again, it is the surplus market that may provide such a motor. Should you be unable to find a motor incorporating a suitable reduction gear it is possible to use a receiver-type slow-motion tuning drive; for my antenna I used a Bulgin gear with a reduction drive ratio of 25:1. Unfortunately in this unit the 25:1 ratio operates only for a fraction of a turn of the control shaft and then reverts to a ratio of 5:1. It proved possible to overcome this problem by cutting very carefully a stop tooth on the main shaft. When the capacitor reaches the stop positions at 0° and 180° the Bulgin gear acts as a friction clutch, permitting the motor rotation to continue without unduly forcing the shaft. Without such an arrangement it is necessary to provide a microswitch system inverting the rotation sense or to use a variable capacitor that is designed to rotate through 360° without stops.

For the motor, I used a 'surplus' one made by Bühler of Germany; this is a well-made, solid unit with a high-quality reduction gear; however the reduction is only to about five turns per minute so I was obliged to use the Bulgin drive. It is possible to buy Bühler motors in the UK from John and Johnston Ltd, Franklin Suite, The Priory, Haywards Heath, West Sussex, RH16 3LS (telephone 0444-441057). If you are prepared to buy a new motor, I would suggest their model coded 1·61·013·310·6. This operates with DC voltages from 6 to 3 volts, has a maximum turning speed of 1·3 turns per minute and a minimum of 0·5 turns per minute. There is a similar 12V motor, coded 1·61·013·330·0, with similar turning rates which would also be ideal for this application.

CONSTRUCTION OF THE TUNING SYSTEM

Construction of the tuning system calls for great care and attention to detail, otherwise there is the risk of damaging the various components unless they are accurately aligned.

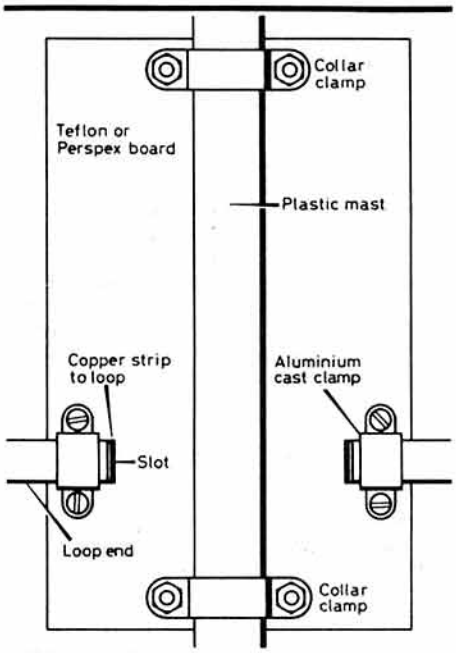
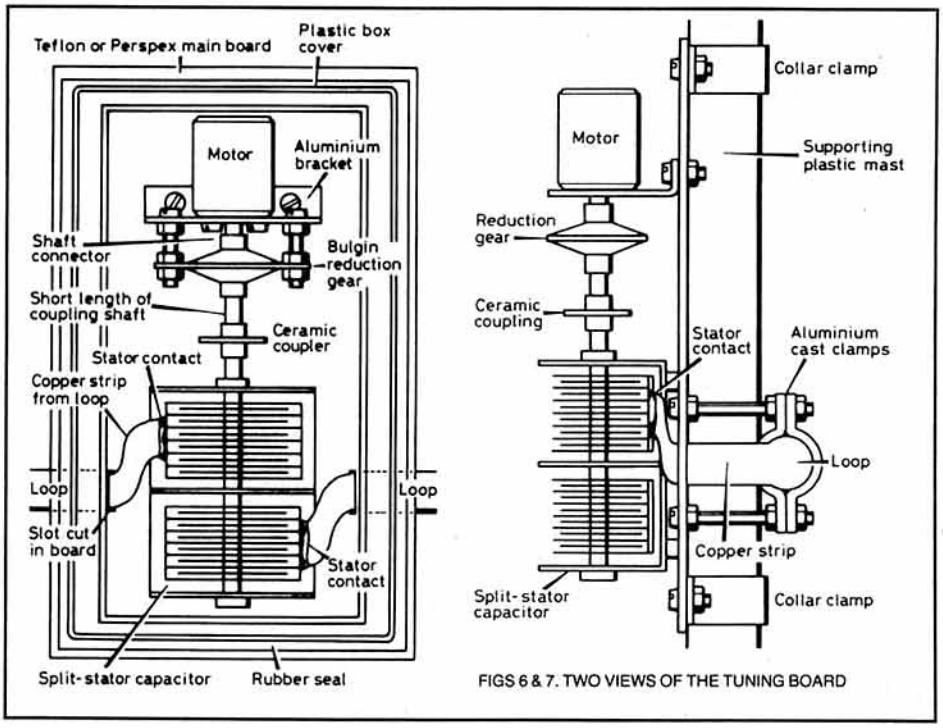


FIG 5. BACK VIEW OF THE TUNING BOARD SHOWING MOUNTINGS

After estimating the dimensions of the insulated supporting board as already described, keep also in mind the space required for the watertight cover, aluminium bracket for mounting the motor, and, if necessary, the external reduction gearing, together with the various couplings between the capacitor spindle and the motor. The first step is to mark with a pen the centre line of the board (ie major axis). Bolt the capacitor to the board, taking great care to ensure that the shaft is aligned with the centre line marked on the board. A split-stator capacitor must be placed with the respective stator contacts symmetrically in the vertical plane so that the copper strips coming from the back of the board on either side of the capacitor have the same length (one being bent upwards, the other downwards). With a "butteRFly" or conventional capacitor, the copper strips must be bent horizontally as both contacts are the same height. Once the capacitor has been bolted to the board, measure, with calipers or dividers, the exact distance of the board from the centre of the capacitor shaft. Transfer this dimension to the centre line of the vertical side of the L-shaped aluminium bracket to be used for supporting the motor and any external reduction gear. Now point drill a small hole just large enough to take the motor shaft. It is important that this operation is carried out carefully since it is vital to the accurate alignment of the system.

Once it has been determined that motor and capacitor shafts are in accurate alignment, the motor may be fixed permanently to the bracket, enlarging the preliminary hole and drilling holes for the motor-fixing bolts, but do not yet fix the bracket to the board.

The next step is to adapt the motor shaft to a shaft extension (as normally used for lengthening potentiometer shafts) taking care not to introduce any eccentricity. If your motor does not require external reduction-gear, you can insert the motor shaft into a ceramic coupler (circular shape with ceramic ring and flexible central bush), again making sure there is no eccentricity. The lower flange of the aluminium bracket can now be fixed to the board by means of two nuts and bolts. If the motor requires an external reduction gear, it is necessary, for a Bulgin drive, to drill two holes (4mm diameter) in the bracket, one in each side of the motor at the same distance as the mechanical connections of the gear and at the same level as the centre of the motor shaft. If the size of the motor is wider, it is necessary to join to the Bulgin gear two short strips of brass or aluminium so as to obtain an extension of the fixing points of the drive. Two long brass bolts (4mm diameter) should be inserted in the holes to hold the gear in place with the nuts. The Bulgin gear can now be fixed to the motor shaft, with the other side of the gear connected to the ceramic coupler by means of a very short piece of potentiometer-type shaft. Make a provisional check of the tuning system by temporarily connecting the power supply; ensure that everything is working smoothly without any forcing. The copper strips of the loop can now be soldered to the stator capacitor vanes. This requires the use of a large soldering iron, taking care that the best possible electrical contact is achieved.



FIGS 6 & 7. TWO VIEWS OF THE TUNING BOARD

MOTOR FEEDLINE

The feed line should consist of twin screened cable as normally used with high-fidelity audio amplifiers etc. The braid should be connected through a soldering lug to the aluminium bracket or to the motor casing. The motor must be bypassed for RF, using two 10nF ceramic capacitors connected to the braid. The cable is kept in place by means of nylon clamps along the supporting plastic mast. At the base of the loop the cable should be soldered to the connector on the small copper bracket, with the braid soldered to the bracket. From there to the operating position, normal electrical twin cable can be used. Some authors have suggested inserting the feed line inside the loop pipe but this reduces the efficiency of the antenna and their advice should not be followed. A small box containing the DC power supply and switch for reversing polarity of the supply can conveniently be placed on the operating desk.

COUPLING LOOP AND MATCHING PROCEDURE

A variety of methods for feeding the loop are available as outlined in *TT* (October 1986 p706) based on a survey by DL2FA. The most satisfactory method, however, is the use of a small, single-turn (Faraday) coupling loop formed from a length of coaxial cable (RG8 or RG213) with a diameter one-eighth of the main loop. In practice, the optimum diameter of the coupling loop will vary slightly from this figure and it may prove worthwhile to experiment with slightly different size loops in order to achieve maximum efficiency and lowest SWR over a wide frequency range; this is not difficult since it is easy to construct several coupling coils. In my case, the optimum diameter proved to be 18cm rather than the theoretical 12·5cm. The coil should have the braid open at top-centre; at this point one side is connected to the inner conductor of the coaxial cable. At the base of the loop, inner conductor and braid are connected together and jointed to the braid on the input side of the coil. To fasten the small loop I used a stainless hose clamp around the plastic mast, at 90° to another smaller hose clamp fixed across the joints of the braids at the base of the loop. This provides a very simple method of fixing, with quick release, and with the possibility of sliding the small loop up or down the mast to find the best SWR position. The upper opening should be protected with tape and, to avoid any subsequent movement of the coil, then fixed to the mast by means of nylon clamps mounted in the same way as for the hose clamps at the base. Final matching of the antenna has to be carried out after determining the final position of the installation. An SWR bridge is connected at the base of the loop close to the input coax connector. If your transmitter covers 18MHz make your adjustments on this band; othwerwise use 21MHz. Apply minimum power, just sufficient to deflect the SWR meter. After finding loop resonance, move the coupling coil up and down, or deform it slightly to check how the SWR varies. The coupling coil must be maintained in the same plane as the loop. After ▶

finding the lowest SWR, tighten the hose clamps and nylon clamps to keep the coil in position. Coax line and tuning motor power line must be kept vertical for about 1m or more from respective connectors at the base of the loop to avoid undesirable coupling with the loop itself and subsequent difficulty to achieve a proper matching. With my loop I obtained the following SWR measurements: 14MHz 1:1·3; 21MHz 1:1; 28MHz 1:1·6. Do not attempt to use an ATU.

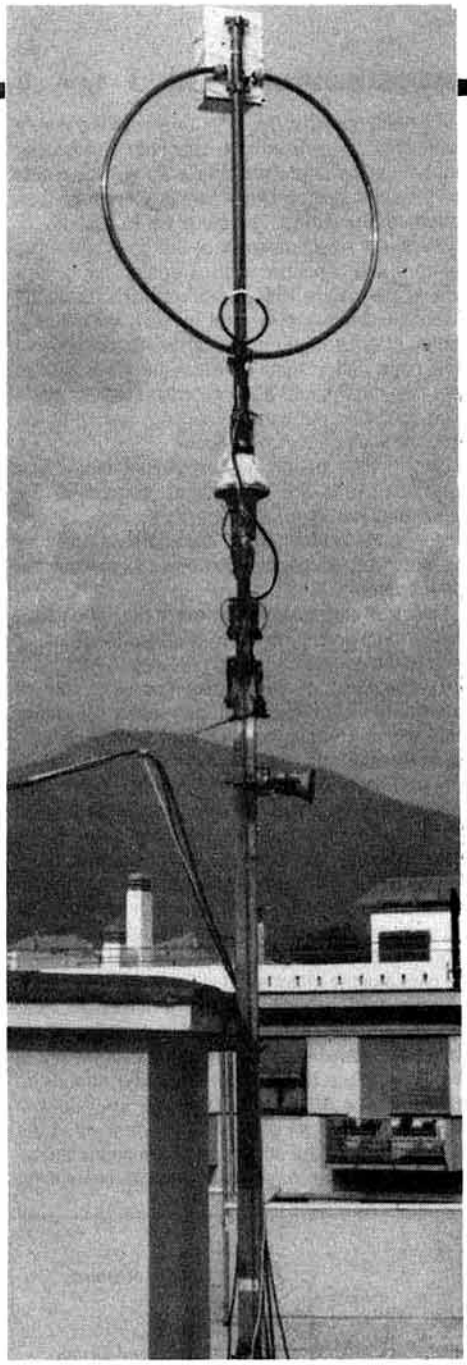
INSTALLING AND USING THE LOOP

The loop can conveniently be installed on a terrace or concrete floor or roof. One method is to use as a base or pedestal the type of plastic supports that can be filled with water or sand and often used for large sun umbrellas. Light nylon guys can be used to minimise the risk of the loop falling over in high winds. Remember that a transmitting loop operates effectively at heights of 1 to 1·5m above ground, and nothing will be gained by raising it any higher than say 2 or 3m at most. I tested my loop using a telescopic mast at heights up to 9m above ground but found little difference; normally I use it with the mast fully retracted to about 3m high. With a garden, the loop could be fixed directly to a short metallic mast driven into the ground. A small TV rotator could be used but this is not essential; maximum radiation is in the plane of the loop; minimum off the sides of the loop. Large metallic masses like fences, steelplates, pipes etc reduce the efficiency of the antenna if in proximity in the direction of the plane of the loop. The radiation is vertically polarized at all vertical angles making the loop suitable for DX, medium and short range contacts. The loop could be used in the horizontal plane, providing an omnidirectional radiation pattern, but in this case the loop must, as for a conventional horizontal element, be raised well above ground to obtain good efficiency at the low vertical angles of radiation needed for DX operation.

There is nothing particularly complicated about operating with a small loop antenna other than the need to tune it to resonance at the operating frequency. Load the transmitter in the normal way, then, looking at the SWR meter, tune carefully with the aid of the polarity reversing switch to the precise point where minimum reflected power is achieved. To avoid keeping the transmitter too long in the 'tune' position and to minimise the radiated interference to other band users, it is most advisable to tune initially in the 'receiving' mode; this will bring you close to the tuning point for transmission. The 'receiving-mode' procedure should always be used when changing bands.

USE OF AN INDOOR LOOP

A transmitting loop performs well indoors and there is a temptation to have the loop alongside the operating desk since it can then be tested with manual, rather than remote, tuning. I would advise against this unless you use only very low power. With full power, the RF voltages developed on the bare copper tubing are very high, with the risk of severe RF burns. There is also the potential hazard of prolonged exposure to strong magnetic RF fields, although the degree of risk remains controversial. It seems safer, if you or any of your family or neighbours beyond a party wall could be within a few feet of the loop, to use only QRP.



THE SHORT LOOP IN THE DEFINITIVE INSTALLATION. THE SUPPORTING MAST IS A TELESCOPIC MAST KEPT IN RETRACTED POSITION. THE HEIGHT OF THE ANTENNA FROM FLOOR IS ABOUT 3 METERS.

CONCLUSION AND FINAL COMMENTS

When I began experimenting with transmitting loops of small diameter in 1985, I was sceptical of the results likely to be achieved and was motivated by curiosity rather than conviction. It did not take long to discover that the loop antenna is very different from the many classical designs that I have tried in over 40 years of amateur activity. I began by collecting as much information as possible. I am now entirely convinced that the earlier claims are accurate and that the loop is a first-class, thoroughly practical antenna that should not be written off as either a compromise or emergency antenna. Its performance, provided the RF ohmic losses are kept very low, is outstanding. For several months I made comparative tests against a monoband half-wave dipole a half-wavelength above ground. I obtained better or the same results with the loop fixed at 1m height on top of a Black & Decker work-table on the roof terrace of my house. With a home-made QRP (2W) transceiver I was able to contact a number of US stations receiving reports better than S7. With my normal transceiver (maximum power 50W), results have been excellent, commonly resulting in S9 reports; similarly with stations in the Far East. From European stations, a report of S9 + 10dB is customary.

I would, however, stress that to achieve such results, it is essential to use components of high quality and to take care over the construction. Alternatively, it is possible to buy amateur-band antennas professionally constructed (10). Whichever approach you adopt, the transmitting loop has a unique fascination for anyone more used to conventional HF antennas. Try one and become hooked!

SELECTED REFERENCES AND FURTHER READING

The following are English-text references; useful additional information has also appeared in *cq-DL* (German text) and *Radio Rivista* (Italian text) etc.

(1) Kenneth H Patterson, *"Down-to-earth Army Antenna", Electronics,* August 21, 1967, pp111-113. See also letter from Richard Silberstein, *Electronics,* October 16, 1967.

(2) Pat Hawker, G3VA, *"Technical Topics" RSGB Bulletin/Radio Communication*; (a) *US Army Loop*, November 1967; (b) *WB2PWU's octagonal loop*, March 1968; (c) *W2OZH's low-cost balanced loop*, June 1971; (d) *TCI Model 629 professional transmitting loop*, December 1980; (e) *Sven Ramstroms SVI multi-turn transmitting loop*, September 1981; (f) *Professional "Miniloop"* by Antenna Research Associates, July 1984; (g) J. H. Dunlavy's *"Miniloop" patents*, June 1986; (h) *W5QJR's loop design and booklet together with DL2FA's survey of loop matching techniques*, October 1986.

(3) Lewis G McCoy, W1ICP *"The Army Loop in Ham Communications", QST*, March 1968.

(4) *'Spenny'* G6NA, *"Loop Aerials", Radio Communication*, September 1968.

(5) James Taylor, W2OZH *"The Mobiloop" QST*, November 1968.

(6) Joseph Boyer, *"Surprising Miniature Low Band Antenna", 73 Magazine*, August (Part 1), September (Part 2), 1975.

(7) Sven Ramstrom, *"HF Loop for Transmitting and Receiving"*, IERE Conference Proceedings No 50 *"Radio Receivers and Associated Systems"*, 1981, pp455-487.

(8) J. R. Killeen, G3KPV *"A compact HF antenna for portable or base operation" Radio Communications*, September 1983.

(9) Ted Hart, W5QJR *"Small high-efficiency antennas – alias the loop"*, 100-page booklet published by Ted Hart, W5QJR Antenna Products, PO Box 334, Melbourne, Florida 32902, USA ($11·95 plus $3·30 overseas air mail). Note that in an exchange of "Technical Correspondence" (*QST*, July and December 1985,) Walter Maxwell, W2DU rebuts W5QJR's claim that his loop antenna has a gain figure that considerably exceeds that of a dipole; W2DU contends that it would be more correct to claim only that the loop gain *approaches* that of a dipole.

(10) Cap Co Electronics Ltd, Unit 6, Peel Road Industrial Centre, West Pimbo Road, Skelmersdale, Lancs. WN8 9PT.

During the preparation of this article, Cap Co did offer to make a suitable butterfly capacitor available to constructors. ■

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PORTABILITY

DESIGN FOR A 3-BAND PORTABLE HF TRANSCEIVER RUNNING UP TO 15W

BY G3TXQ

Modular assembly dramatically facilitates construction of sophisticated amateur rigs. This approach is embodied in the SSB/CW transceiver described here, which was designed primarily for portable operation on the 1·8, 3·5 and 14MHz bands. It has a power output of 10-15W pep – enough to ensure that contacts are readily made, without incurring excessive battery drain.

The transceiver comprises eight separate printed-circuit boards interconnected with cables and PCB headers. The modular approach allows easy replacement of boards during the development phase of the project. It also means that would-be constructors can tackle the project piece-by-piece without becoming disillusioned by apparent lack of progress.

A major section of the circuitry is contained on the IF/Audio board which follows a design originated by G4CLF, and later used to good effect by several authors including G3OGQ [1] and G3TSO [2]. A number of important changes were made to the board, however, particularly in the AGC circuitry which is known to have been troublesome in some earlier designs. The opportunity was also taken to include a microphone preamplifier and a tone generator for CW/Tune-up.

Construction is simplified by using the excellent broad-band HF PA originally described in *Radio & Electronics World* [3], and now marketed as a kit by Cirkit Ltd (Stock No. 41-00903). The author has used this PA successfully in a number of constructional projects – it gives a 'trouble-free' 10/15watts output for only 1mW drive over the range 1·8-30MHz.

Much of the remaining circuitry is adapted from Ten-Tec designs, particularly the Corsair and Argosy transceivers. While it could not be recommended as a project for the novice, the widespread use of broad-band, 'no-tune' circuitry results in very few 'setting up' problems.

THE BLOCK DIAGRAM

Received signals pass through the SWR detector to one of three low-pass filters selected by a panel-mounted rotary switch. The primary function of these filters is to reduce the harmonic output of the PA during transmission; however, their inclusion in the received signal path gives a worthwhile increase in intermodulation protection and introduces little loss.

From the low-pass filter, signals pass through a Transmit/Receive switch to the Driver/Preamp board where they are routed to one of three band-pass filters selected by the mechanical bandswitch. Back on the Driver/Preamp board, signals pass through either a 3dB attenuator, or a 12dB gain preamplifier, to the IF/Audio board. The attenuator and preamp are selected by diode switches under control of the front-panel ATT/AMP toggle switch.

On the IF/Audio board signals are mixed with the VFO output to produce an IF centred on 9MHz. The mixer is followed by an FET preamp, an 8-pole crystal filter and two stages of IF amplification. The gain of the IF amplifiers is controlled by a 'hang' AGC system driven by audio from the output of the product detector. There is one stage of audio

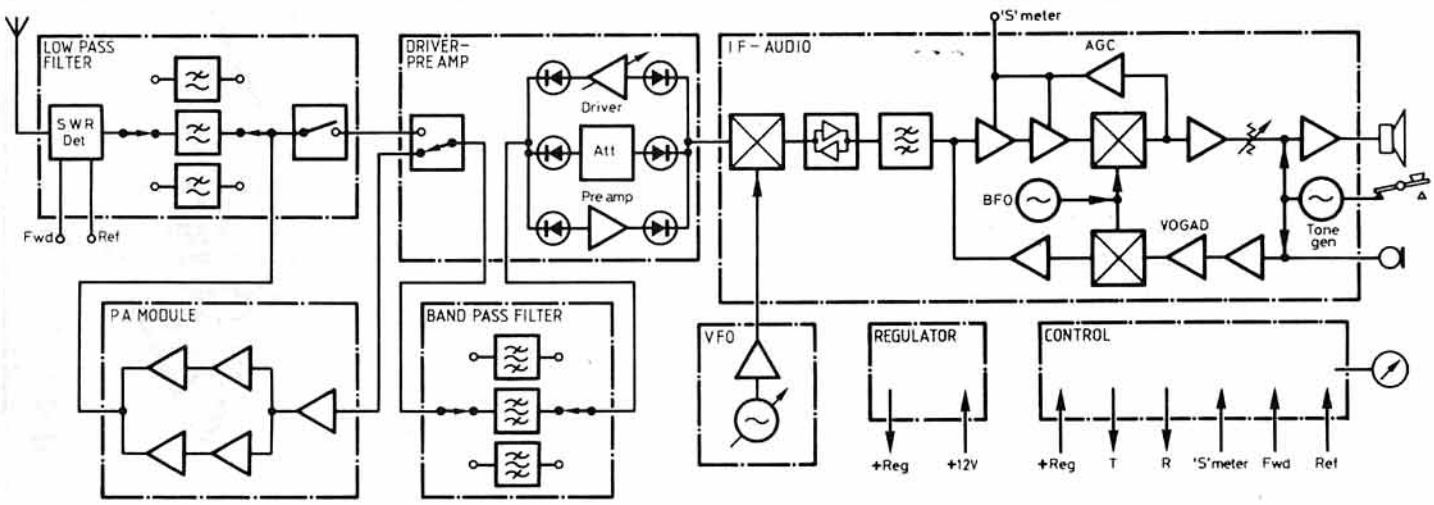


FIG 1. BLOCK DIAGRAM.

preamplification before the 2W audio output stage.

On transmit, signals from the microphone pass through an FET preamp to a Voice-Operated Gain Adjusting Device (VOGAD) which maintains a substantially constant output level for a wide range of input levels. This eliminates the need for a mic. gain control and allows control of the output power to be effected 'downstream' of the balanced modulator. Signals pass from the VOGAD to the balanced modulator where a 9MHz DSB signal is produced. This DSB signal is amplified before passing through the crystal filter which selects the wanted sideband. The SSB signal is then amplified before being mixed with the VFO output.

The output of the mixer is routed from the IF/Audio board to the Driver/Preamp board where it is amplified in a driver stage whose gain can be varied by the front-panel DRIVE control. The output of the driver is routed off-board to the band-pass filter which selects the wanted output frequency from the mixing products generated on the IF/Audio board.

The transmit signal then passes through the PA module to the low-pass filter board and from there to the antenna.

The VFO provides a +7dBm signal to the mixer and covers the frequency range 5·20-5·40MHz. With a 9MHz IF this gives a final frequency coverage of 14·20-14·40MHz, and 3·60-3·80MHz. On 1·8MHz an additional inductor is switched in parallel with the main tank circuit, thereby modifying the VFO range to 6·95-7·24MHz, giving 1·76-2·05MHz final frequency coverage.

The primary function of the control board is to generate the 'T' and 'R' signals which control the transmit/receive switching. In addition it combines the S meter signal with the FWD/REV SWR-detector signal into a signal which drives the front-panel meter.

The regulator board provides the 9·5V regulated voltage which powers the majority of the transceiver low-power stages.

IF/AUDIO BOARD

The circuit of the IF/Audio stages (Fig 2) follows closely that developed by G4CLF and used successfully by a number of authors [1], [2], [4]. Readers should consult these references for a detailed circuit description; I will only describe here the circuit changes that I have made.

Many people (the author included) have experienced problems with AGC 'pumping' when using the original G4CLF layout, so the opportunity was taken on this project to produce a new PCB layout along the lines recommended by G3TSO [2] which, it was hoped, would cure the problem. Double-sided PCB material was used to provide a continuous ground-plane on the component side of the board: in addition the carrier oscillators were positioned in a corner of the board with sufficient space to allow them to be screened completely. After etching the PCB and loading the components I was very disappointed to find that there was no improvement in the AGC problem!

I spent many tens of hours investigating the 'dynamics' of the AGC circuitry but never could effect any real improvement. In desperation I removed the Plessey SL1621 AGC generator chip and replaced it with 'hang' AGC circuitry of the type used in my TenTec Corsair. This resulted in an immediate improvement, and after careful optimi-

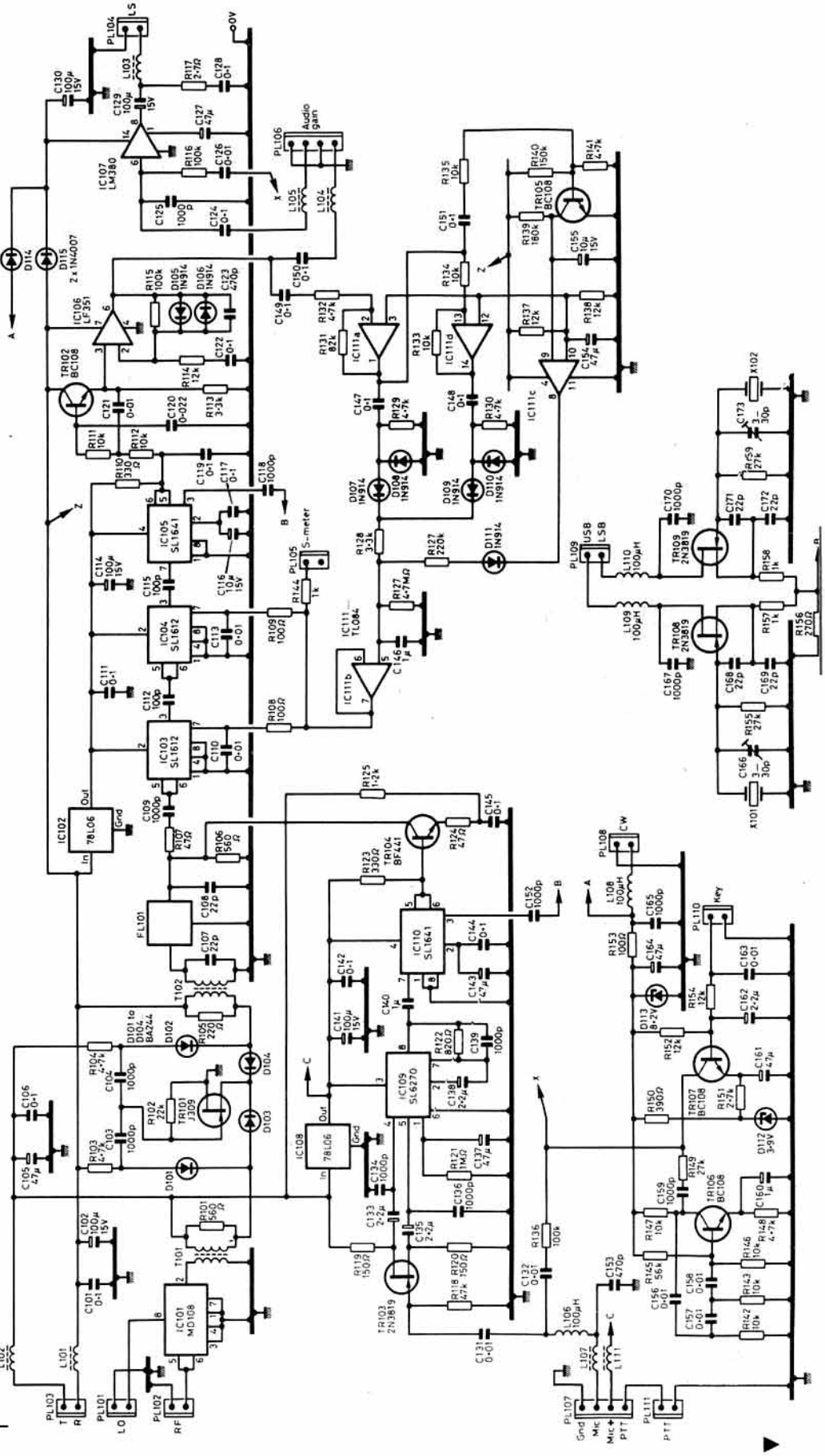
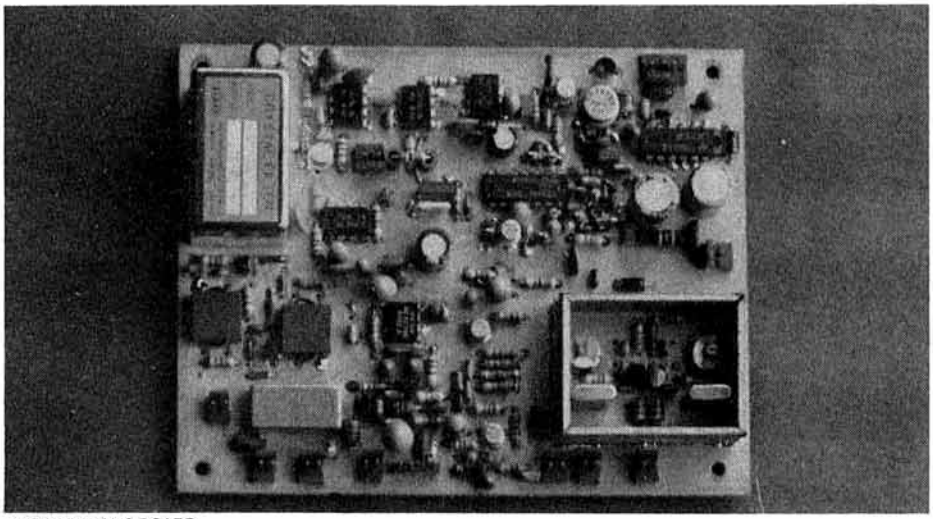
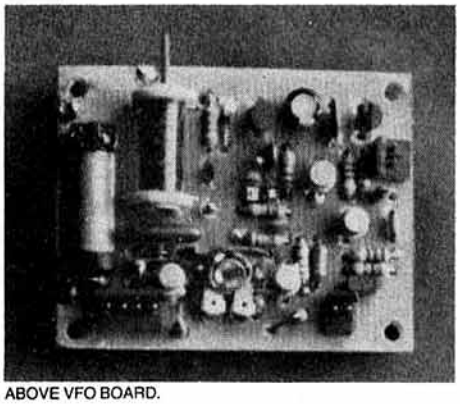


FIG 2. CIRCUIT DIAGRAM OF THE IF/AUDIO STAGES.



ABOVE IF/AUDIO BOARD.



ABOVE VFO BOARD.

sation I obtained a performance very close to that achieved in the Corsair. I don't claim that it is perfect – in fact I tend to agree with those who believe that even the best audio-derived AGC systems will be inferior to a good IF-derived system. However, the performance is such that the AGC responds within 2mS to a suddenly-applied 500V signal (S9+20dB) – a performance I could never achieve with the SL1621.

Audio from the audio preamplifier, IC106, is amplified in IC111a and rectified by D107 and D108. The output of IC111a is inverted by IC111d and the signal is then rectified by D109 and D110. Together, IC111a and IC111d form a full-wave rectifier and ensure a fast response to a suddenly-applied signal, no matter whether it occurs on a positive or negative-going audio cycle. The output of the full-wave rectifier charges C146. The presence of R128 slows up the response time somewhat, but is necessary to give some protection against the AGC 'hanging' on short noise spikes. IC111b is configured as a unity-gain buffer which drives the AGC line and the S meter circuitry. The input impedance of IC111b is very high and hence the only discharge path for C146 is via the 47M0hm resistor R126. The time-constant C146/R126 is chosen such that the AGC voltage can follow slow changes in signal level caused by fading, for instance.

As long as audio signals are present at the output of IC111a, TR105 will conduct on positive half-cycles, thereby discharging C155 and maintaining the output of IC111c high. This reverse-biases D111 and prevents C146 discharging through R127. When the audio signal disappears, C155 charges via R139. Once the voltage on C155 exceeds the voltage on pin 10 of IC111c, pin 8 goes low and C146 is discharged rapidly via R127 and D111. Thus the time-constant R139/C155 determines the 'hang time' of the system.

Since the PCB was laid-out a further improvement has been made by the circuit change detailed in Fig 3. The addition of D1 and D2 maintains the AGC line ≈1·5V above the voltage on C146 and effectively eliminates the 'dead-time' associated with the 2V AGC threshold of the IF amplifier ICs. These changes effect a worthwhile improvement, but you must be prepared to cut track and add the components.

TR106 is a phase-shift audio oscillator which provides a tone for CW operation. Because of the difficulty of keying this oscillator successfully a separate keying stage, TR107, is used [2]. The output from TR107 is applied to the microphone preamplifier and to the audio output stage as a side-tone signal.

TR103 is a microphone preamplifier which provides a balanced output to the SL6270 VOGAD IC109.

The IF/Audio board is the most densely packed of all the PCBs, so care should be taken when mounting components, particularly around IC111. No provision is made on the PCB for mounting D105, D106 and C123 – these components should be soldered across R115 before it is mounted on the board. A screen should be built around the carrier oscillator circuitry (TR108, TR109) by soldering PCB material both above and below the board. Wide ground tracks are provided on the underside of the board for this purpose.

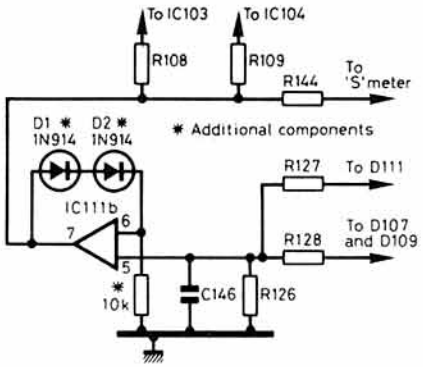


FIG 3. CIRCUIT CHANGE SHOWING ADDITION OF DI AND D2.

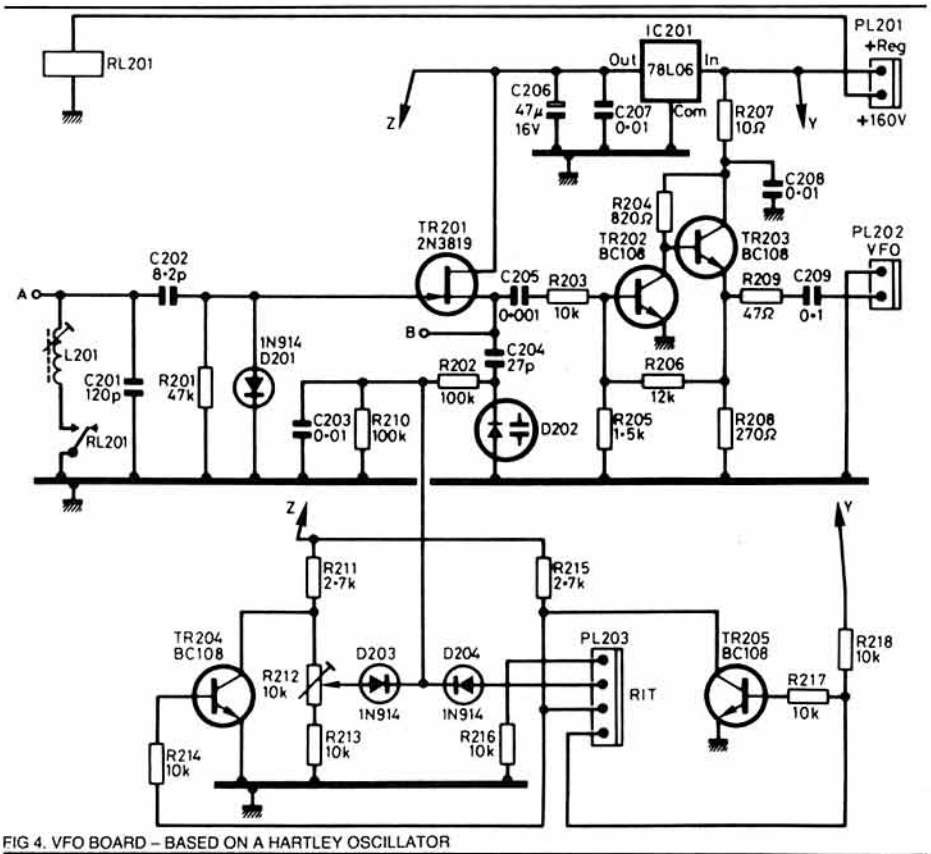


FIG 4. VFO BOARD – BASED ON A HARTLEY OSCILLATOR

To align, set the carrier oscillators to 8·9985MHz and 9·0015MHz using trimmers C166 and C173 respectively. The value of R116 can be adjusted to set the side-tone to the desired level.

VFO BOARD

TR201, together with the chassis-mounted tank-circuit components in Fig 4 (L1 and C1) form a Hartley oscillator covering the frequency range 5·2MHz to 5·4MHz. With the bandswitch in the 1·8MHz position, relay RL201 closes thereby placing L201 in parallel with L1 (chassis) and changing the oscillator range to 6·95MHz to 7·24MHz. These ranges were chosen as a compromise between providing adequate coverage of the 3·5 and 14MHz bands, while not excessively 'cramping' the band-spread on 1·8MHz. Readers may wish to modify these ranges to suit their operating preferences. TR202 and TR203 buffer the oscillator and raise the output level to +7dBm.

RIT is provided by varying the voltage on varactor diode D202. When the front-panel RIT control is in the OFF position, or the transceiver is in Transmit, TR205 is ON, TR204 is OFF, and D203 conducts – thus trimmer R212 sets the VFO frequency. When RIT is selected and the transceiver is in Receive, TR204 is ON, TR205 is OFF and D204 conducts, allowing the frequency to be varied by the front-panel RIT potentiometer, RV3.

D202 was an unmarked component from the junkbox, but almost any varactor diode can be used here; C204 can be changed to give the desired RIT range. To align the board, set C1 to its mid-range position and adjust L1 for an output frequency of 5·3MHz. Check that the VFO range is approximately 5·2MHz to 5·4MHz. Set C1 back to mid-range and switch to 1·8MHz. Adjust L201 for a frequency of 7·1MHz. To adjust R212, switch on the RIT and set RV3 to mid-position; note the VFO frequency. Switch off the RIT and adjust R212 for this frequency.

DRIVER/PREAMP BOARD

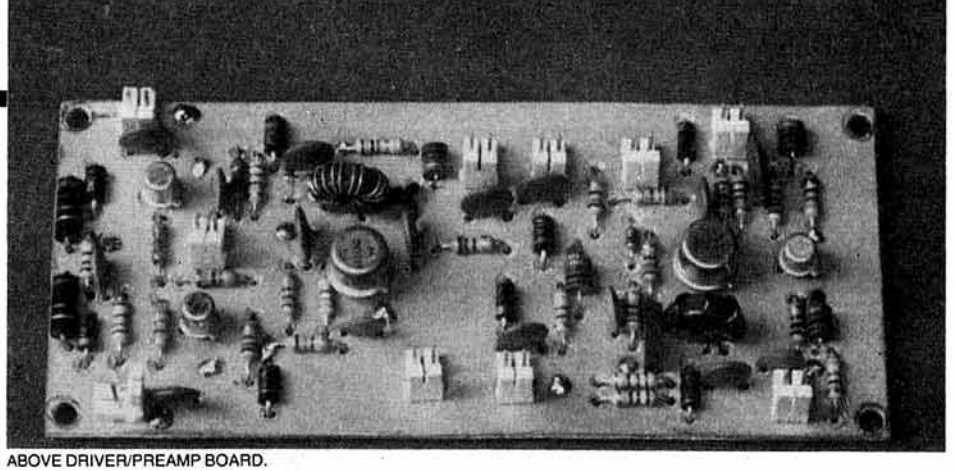
This board in Fig 5 contains the receiver front-end attenuator and preamplifier, and the transmit pre-driver stage which is necessary to raise signals to the 0dBm level needed to drive the PA.

Received signals from the band-pass filter board enter at PL305. If the front-panel ATT/AMP switch is in the ATT position, TR301 is ON and TR302 is OFF, D301 and D302 conduct and signals are routed via the attenuator (R301, R302, R303) to PL301 and the IF/Audio board. If the front-panel switch is in the AMP position, TR301 is OFF, TR302 is ON, power is applied to the 'noiseless feedback' amplifier stage (TR303) and signals are routed via D303 and D304.

On Transmit, signals from the IF/Audio board pass via PL301 and D306 to the driver stage (TR304) and from there via D305 and PL305 to the band-pass filter board. The gain of the driver can be reduced using the front-panel DRIVE control which reduces the base current into TR305 and thus increases the undecoupled emitter resistance of TR304. This arrangement is used in the TenTec Argosy and provides smooth control of the drive level without sacrificing intermodulation performance.

D307 and D308 together form a 'steering' circuit which connects the band-pass filter board either to the PA (on Transmit) or to the low-pass filter board (on Receive).

There are no setting-up adjustments to make on this board.



ABOVE DRIVER/PREAMP BOARD.

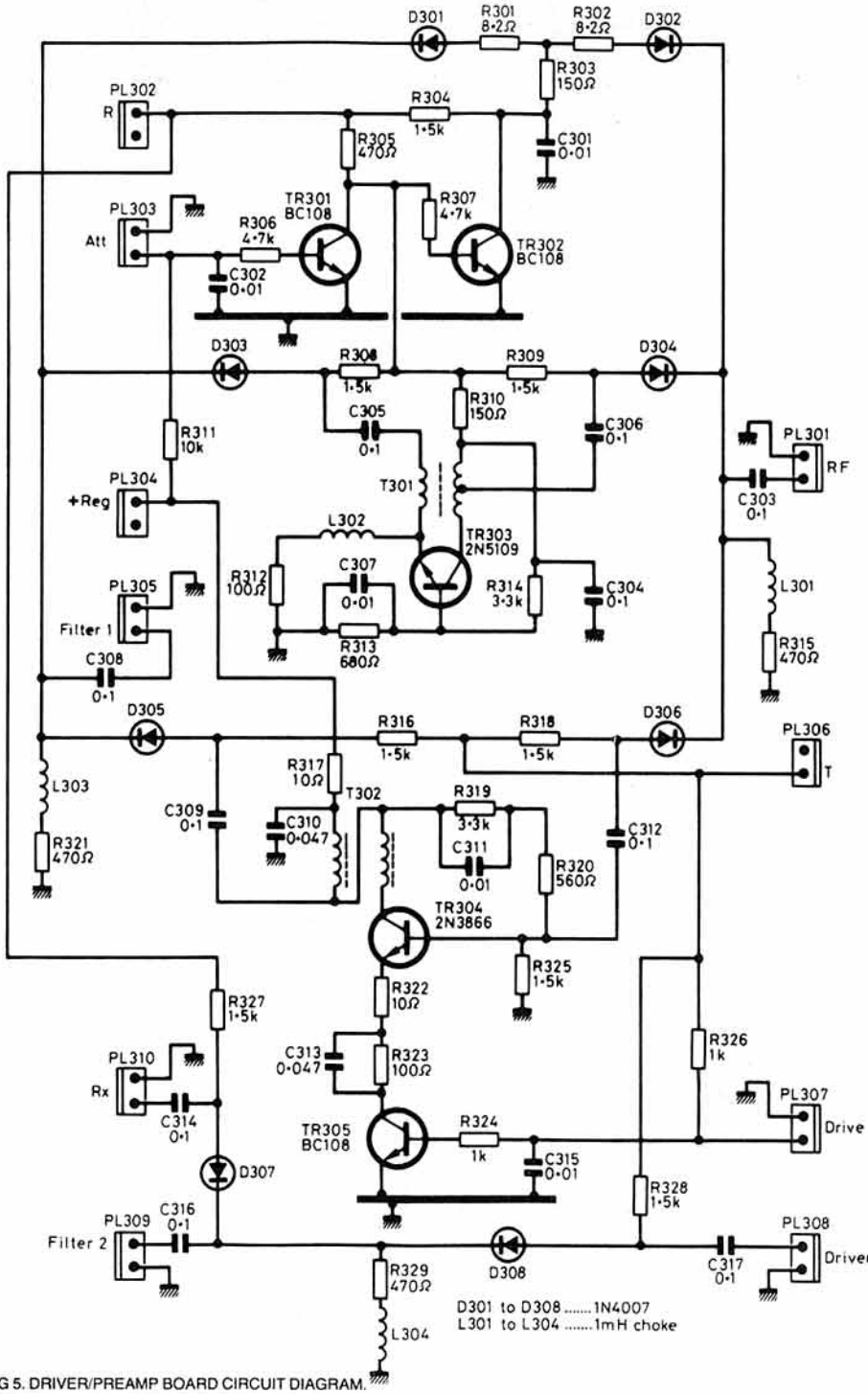
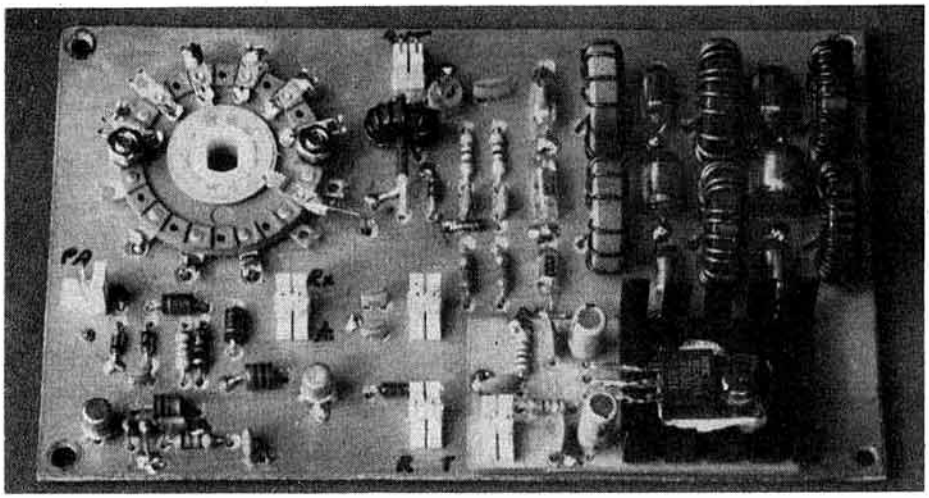


FIG 5. DRIVER/PREAMP BOARD CIRCUIT DIAGRAM.



ABOVE LOW PASS FILTER BOARD.

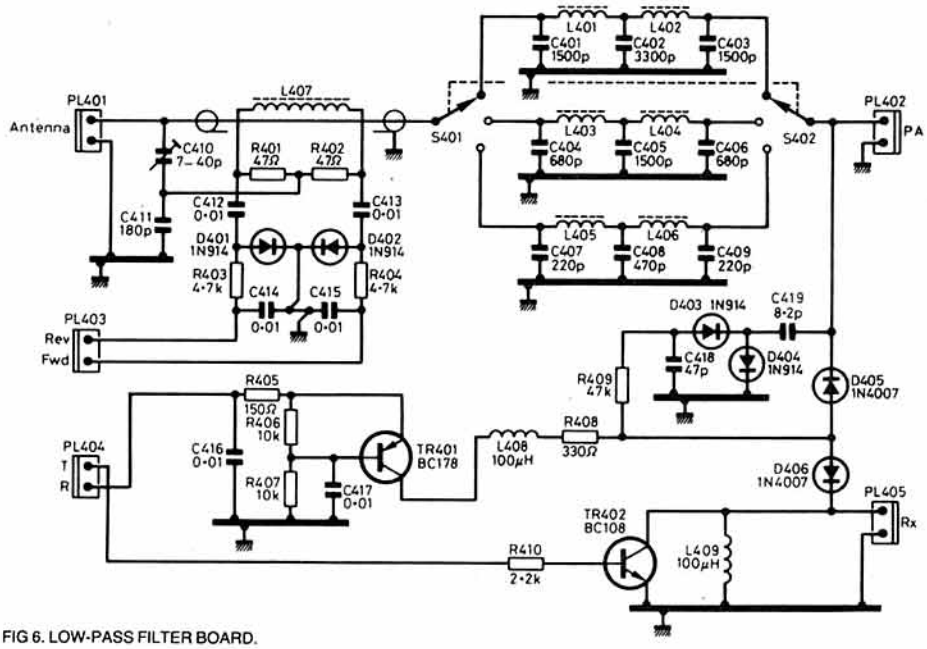
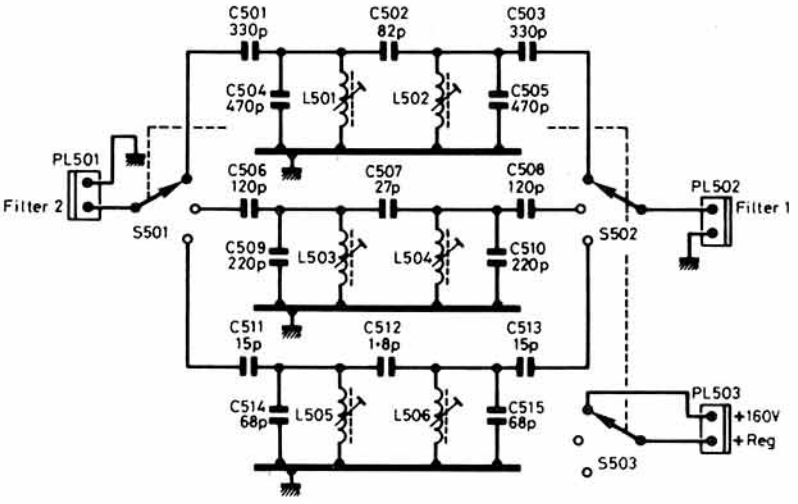


FIG 6. LOW-PASS FILTER BOARD.

FIG 7. BAND-PASS FILTER BOARD.



BELOW RIGHT BAND PASS FILTER BOARD.

LOW-PASS FILTER BOARD

The low-pass filter board (Fig 6) contains three low-pass filters designed to attenuate harmonics generated in the PA, the SWR detection circuitry, and the Transmit/Receive changeover switch.

On Receive, signals from the antenna pass through the appropriate low-pass filter selected by the rotary band switch S401/S402, through diodes D405/D406, and then via PL405 to the band-pass filter board. Diodes D405 and D406 are forward biased by current from TR401 – the ground return being L409 for D406 and the PA output transformer secondary for D405. the PA is permanently connected to S402 but has no effect during Receive provided that the output transformer secondary winding has a reactance of >250ohms at 1·8MHz.

On Transmit, signals from the PA pass through the selected low-pass filter to the SWR detector and the antenna. TR402 is ON, thereby shunting the receiver input to ground, and D405 and D406 are held OFF by a negative voltage on their anodes derived by rectifying and voltage-doubling the transmitted signal (D403, D404, C419, C418).

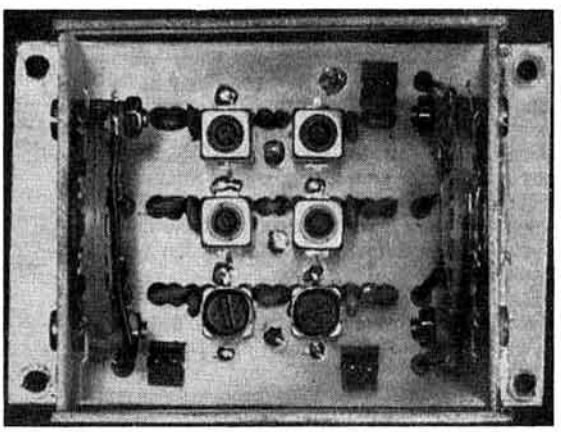
The SWR detector is of conventional design. C410 and C411 form a potential divider which applies a voltage in phase with the output voltage to the junction of R401/R402. Current transformer L407 generates voltages across R401 and R402 which are in phase with the output current. The vector sum and difference of these voltage and current-derived signals are rectified by D401 and D402 to produce DC voltages representing the forward and reflected power.

BAND-PASS FILTER BOARD

The band-pass filter board (Fig 7) contains three 2-resonator, top-coupled filters which are selected by wafers of the rotary band-change switch S501, S502. Ideally these filters would be aligned using a spectrum analyser and tracking generator. Failing that, they can be aligned once the transceiver is assembled by adjusting the inductors for a peak in received signal level on the appropriate band. A final adjustment can be made while observing the CW output power across the band; once adjusted correctly the output should remain substantially constant with perhaps a very slight reduction at mid-band.

Switch wafers S501, S502 are mounted on PC material soldered at right angles to the filter board and connected with wire links as shown in the accompanying photographs.

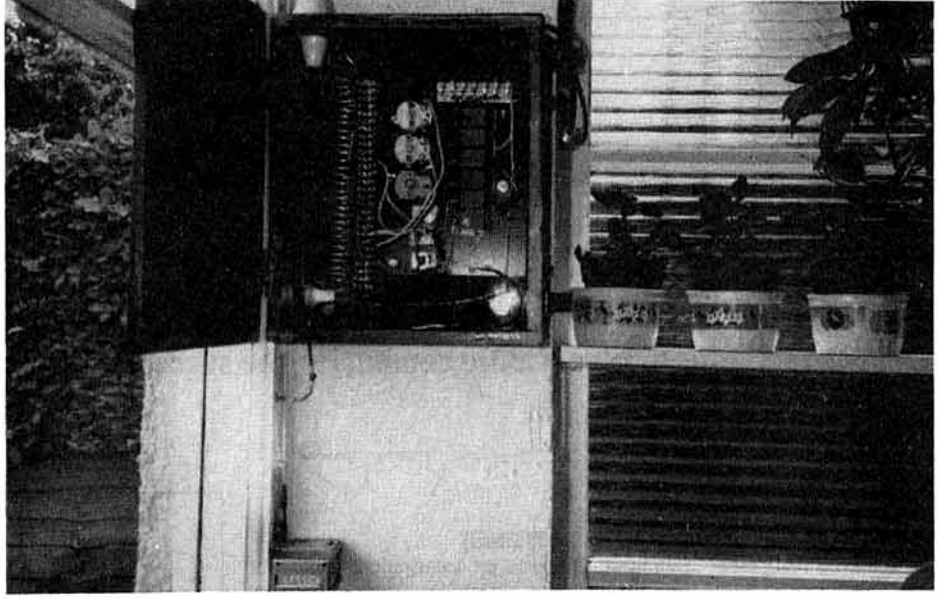
TO BE CONTINUED NEXT MONTH



BRING BACK THE END-FED

GUIDELINES ON BUILDING A REMOTE-CONTROLLED ATU FOR YOUR END-FED ANTENNA

BY L B UPHILL G3UCE



How many newly licensed amateurs putting up their first antenna, with a conventional pole at one end of the garden and perhaps a chimney at the other end, have been frustrated at having to take the feeder half-way down the garden to the centre of the antenna? It is so much more convenient to connect to one end of the antenna. Logically, we call this an end-fed antenna.

End-fed long-wire antennas currently seem to be out of fashion, which is a pity considering the neatness of the feeding arrangements. We all know the disadvantages of end-feeding where the aerial comes into the shack, but if the ATU can be placed about 20ft or more away, preferably directly underneath one end of the antenna, then the end-fed becomes attractive again.

My station has used such a remote controlled ATU with a 130ft end-fed antenna for over a year, and it has proved highly satisfactory on the six bands from 160 to 10metres. It sits in a rear porch and connects to the shack with 30ft of coaxial cable, plus an 8-way multicore cable for remote control of the relays. Other suitable places to house an ATU can be dreamed up, such as the garage, outside shed, conservatory or greenhouse. Even mounting it on a post in the garden is feasible, provided the assembly is weather-proofed. A good RF earth or a counterpoise close to it is necessary and this can generally be arranged much more easily than inside the shack, especially if the shack is upstairs.

This ATU is simple in design and easy to construct. It provides a high degree of safety with respect to static discharges, as it is permanently earthed through the inductor.

It will, however, need several hours to set up and so should be sited in a very accessible position. The construction follows similar lines to the one described in my article 'Two Antennas in the Space of One' in September 1986 *RadCom* and is a logical development of it.

I experimented with several different lengths of antenna from 60ft to 200ft. Some were more difficult than others to get all six bands working, and the best turned out to be 100ft and 132ft. The latter is easiest of all as it presents a high impedance on all bands except 160metres. There seems to be a close relationship between the length of antenna and number of turns on the inductor. I found that about 40 turns were required if 160m was required. If 80m is the lowest frequency then 20-25 turns are sufficient.

The capacitors used are 100pF air spaced types for 10m, 15m, and 20m, and 500pF 500V working mica presets for the lower bands. A direct connection may be required for 160m, cutting the capacitor out. These capacitors take the output from the station 400watt linear.

A suitable container should be found to house the ATU, weather-proofed if outside, and the circuit built on a plastic or mica sheet to fit inside the container.

A suitable coil may be on hand, a provision being that the turns should be of a reasonably heavy copper wire, spaced so that an instrument-type croc clip with narrow jaws can be clipped to any turn during setting-up, without shorting an adjacent turn. If this should happen then completely false readings will result. A 40-turn coil can be wound on a 7·5" length of plumber's plastic pipe 1·75" diameter using 14 to 16SWG tinned copper wire. Fasten one end to a 2BA nut and bolt, and wind tightly using a similar thickness of string as spacing until 40 turns are wound on. Anchor the other end to a 2BA nut and bolt and carefully remove the string spacers. Now apply 3 or 4 strings of cement across the turns to hold them in place.

The relays are 12volt types and are not critical, provided the contacts can carry about 5amps AC. A small control box with a 2p 6w Yaxley switch controls the relay switching in the shack. One pole switches the relays and the other pole switches small LED indicator lamps to show which band is selected. An 8-core miniature screened cable connects the ATU to the shack. With six bands to select this will leave two wires spare and these are used to switch the TX on and off via the CW socket during adjustments.

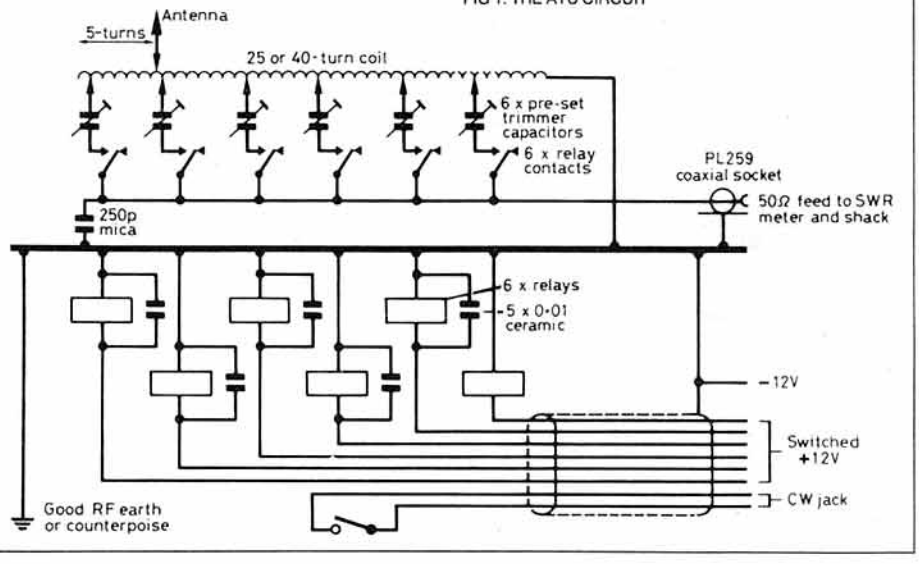
SETTING UP

Starting with the lowest frequency, tune up the transmitter on a dummy load to the centre of the band, connect the feeder, energise the appropriate relay, and pass a small amount of RF to the ATU. An SWR meter must be inserted at each end of the feeder. Find a tapping on the coil, working from the aerial tap where the SWR reduces, and adjust the appropriate capacitor until a combination is found which gives the lowest SWR. The shack SWR meter is now checked and if both are similar readings the top can be soldered permanently in place on the coil. Now carry on to the next lowest frequency remembering to switch in the appropriate relay. On the highest frequencies, ie 15 and 10metres, the tap should not need to be more than 4 or 5 turns from the antenna.

When all the bands have been satisfactorily set up, no further alterations must be made to the aerial earth system or all adjustments will need to be repeated.

If a solid state transceiver is used with no tuning, switching bands takes just a few seconds. ■

FIG 1. THE ATU CIRCUIT



RADIO AMATEURS' EXAMINATION MAY 1988

A report of the performance of candidates who sat the May 1988 City & Guilds Radio Amateurs' Examination, plus a table comparing the success rate with previous examinations.

PAPER 765-1-01

LICENSING CONDITIONS (57% OF ITEMS)

The performance of most candidates with items on licensing conditions was very satisfactory. Items on qualifications, purposes, operators, non-interference, log keeping and recorded messages were well answered.

One item on where a station may be established was omitted from the scoring as there was more than one possible correct answer.

In the item on the use of a station, over a third of the candidates thought that a licensee could transmit to amateur station in general.

There continues to be much confusion between alternative premises, temporary premises and temporary location. Only 32% of all candidates knew the correct suffix to use when a station is operated from a temporary location. Hopefully, the new licence issued from January 1989 will help to overcome some of this confusion.

TRANSMITTER INTERFERENCE (57% OF ITEMS)

There was a lot of misunderstanding of the difference between over-modulation and the effects of an excessive range of modulating audio frequencies. Many candidates thought that over-modulation was avoided by limiting the audio modulating bandwidth. A disappointing number of candidates recognised that the effect of using a microphone with restricted frequency response would limit the bandwidth of a telephony transmission. In another item on over-modulation a quarter of the candidates wrongly thought that it was caused by excessive RF driving power to the PA stage.

A question on the frequency response of an AF amplifier was very badly answered, only 26% of candidates making the correct choice.

A large number of candidates did not understand that second-channel interference was caused by a feature of the receiver rather than of the transmitter.

There was much misunderstanding of parasitic oscillations. Only 23% of all candidates answered correctly the question on the cure.

The item on a filter for preventing mains-borne interference was not well answered.

The design features of pi-section filters are well understood and the two items in the paper attracted good results.

GENERAL COMMENTS ON PAPER -01

Candidates for Paper -01 were generally well prepared for the items on licensing conditions. Many badly-answered items on transmitter interference will have resulted in some candidates not being successful in the paper. A better understanding of transmitter interference is essential and courses of instruction should cater for this.

COMPONENT RESULTS FOR THE MAY 1988 EXAMINATION

Paper	Components	No. of Candidates	Distinction %	Credit %	Pass %	Fail %
-01	Licensing conditions and transmitter interference	2328	6·3	26·0	36·9	30·8
-02	Operating procedures, practices and theory	2322	6·6	29·4	41·4	22·6

Overall Results	Examination Completing Exam	No. of Candidates Number	Candidates Qualifying for RAE Certificate %
May 1986	3611	2374	65·7
Dec 1986	1338	858	64·1
May 1987	3017	1959	64·9
Dec 1987	1233	857	69·5
May 1988	2453	1550	63·2

PAPER 765-1-02

OPERATING PROCEDURES (18% OF ITEMS)

Items on operating procedures were well answered by most candidates. Some candidates did not understand the practice of adjusting one's morse sending speed to that of the station in communication. The need to operate in accordance with band plans was not fully understood.

ELECTRICAL THEORY (11% OF ITEMS)

The calculation of resistance in a potential divider circuit was very badly answered, as was also an item on the calculation of the frequency range of a tuned circuit.

SOLID-STATE DEVICES (13% OF ITEMS)

Quite well answered by most candidates. The purpose of a blocking capacitor used to couple one stage to another was not understood by all candidates. Many candidates answered incorrectly an item on the output of a common-base amplifier.

RECEIVERS (14·5% OF ITEMS)

An item on the image frequency of a receiver was not well answered, and 75% of candidates were unable to calculate the frequency on which a 1900kHz signal could cause interference. Other items on receivers attracted goo scores.

TRANSMITTERS (14·% OF ITEMS)

Most items on transmitters were well answered, but some candidates did not know the advantages of frequency modulation over amplitude modulation. Many candidates did not select the most practical method of keying a transmitter and a third of the candidates incorrectly chose the base of the oscillator stage.

PROPAGATION AND ANTENNAS (14·5% OF ITEMS)

Very well answered by most candidates. Te only items causing some difficulty was one which asked the resonant frequency of the traps in a multi-band dipole.

MEASUREMENTS (14·% OF ITEMS)

Very well answered by most candidates, although only a quarter of the candidates recognised that a station receiver was the best instrument to check a suspect unstable CW transmitter.

GENERAL COMMENTS ON PAPER -02

In general, candidates for Paper -02 were well prepared. Those areas causing difficulty are indicated above. 77[d]4% of all candidates who took the paper were successful.

A new syllabus for the examination comes in to force commencing with the May 1989 papers. Candidates studying for this and subsequent examinations should ensure that they are working to the new syllabus.

HF NEWS AND VIEWS

JOHN ALLAWAY G3FKM

10 KNIGHTLOW ROAD, BIRMINGHAM B17 8QB

LYNN – DU1AUJ – IS A KEEN RTTY AND PACKET USER. SHE ALSO ACTS AS NET CONTROLLER OF THE ASIAN YL NET AT 0700 ON SUNDAYS ON 21·188MHz.

In my report as HF Manager in last November's magazine I mentioned interference to the 28MHz beacon system. Martin Harrison, G3USF, who has a special interest in the beacons, has written to say that the real problems arise from stations using SSB below 28·3MHz. Some of the beacons are obliterated for long periods – particularly those on 28·270, 28·285, 28·295, and 28·300kHz. A number of the stations are illegal (and are mostly to be heard in the mornings and early afternoons) but the rest are licensed amateurs. Most seem to be VEs and to a lesser extent there are some from the Caribbean and S.America. All of them are trying to escape the QRM caused by the USA stations above 28·300kHz; they have in turn attracted a number of Europeans and some Gs who enjoy the quietness of that part of the band. G3USF thinks that this may be the reason for the absence of US novices who find the SSB interference too much! This QRM was particularly bad during the phone section of the CQWWDX Contest. How about having some contest-free segments on 28MHz?

OY7ML

For quite a long time Martin, OY7ML, has been having his callsign pirated by a station in southern England. The pirate behaves extremely badly and for this reason Martin is now receiving abusive letters. The warped individual who causes the trouble uses a Vibroplex keyer and so should be distinguishable from the real OY7ML who is a long time member of FOC and behaves in an exemplary manner. If you come across the pirate operator please ignore him and if possible contact *DX News Sheet* immediately on 0734 732393.

MALYJ VYSOTSKIJ IS

A news release from ARRL, dated 17 November 1988, says that the ARRL Awards Committee has accepted unanimously the DX Advisory Committee majority recommendation to add Malyj Vysotskij Is to the DXCC Countries list by virtue of a commitment ARRL made in 1970. Additionally, the Awards Committee endorsed unanimously the DXAC finding that the 4J1FS operation of July 1988 met the published accreditation criteria. M-V Is, located in the Bay of Viborg, was found in 1970 to qualify as a separate country under Point 3(b) of the Countries List Criteria, and was awaiting activation. The island, leased by Finland from the USSR, is separated from Finland by intervening Soviet territory. In reviewing the accreditation of the 4J1FS operation, both the DXAC and the Awards Committee were troubled by the callsign prefix. In the course of discussion, however, it was the sense of the Awards Committee that M-V Island may well have qualified under the now defunct 'separate administration' clause of the country criteria. (This clause was in effect when ARRL first approved M-V Island in 1970). DXCC credit will be given for contacts made with M-V Island commencing with the July 1988 4J1FS operation. DXCC credit will be issued starting 1 March 1989. QSLs submitted before that date will be returned without credit.

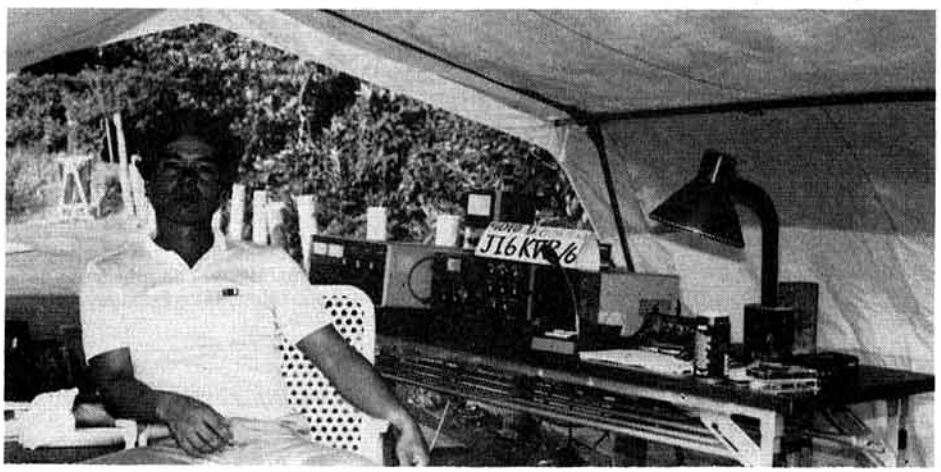
CONTESTS

ARRL International DX Contest

0000 18 February – 2400 19 February (CW)
0000 4 March – 2400 5 March (Phone)

Single and all-band (single-operator) and multi-operator single, two-transmitter and multi transmitter sections. There is also a QRP section – it is all-band only and power output must not exceed 5W. USA and Canadian stations send signal report plus state or province. Others send report and a three figure number indicating their transmitter power output. Each QSO counts three points. The multipliers are the sum of USA states (excluding KH6 and KL7 but including DC) and VE1-VE8, VY1, and VO (but not St Paul Is or Sable Is) worked on each band added together – a maximum of 59 on each band. A station may be worked once on each band. Logs must show date, time, band, and exchanges, and multipliers must be marked the first time they are claimed. Logs must be mailed not more than 30 days after 5 April. It is best to use ARRL log forms and a supply is available from ARRL HQ, 221 Main Street, Newington, Conn, 06111, USA, in exchange for three IRCS. Unfortunately I do not have any of these forms available but I can supply copies of the rules in exchange for an SASE.

JI6KVR, WHO AS JI6KVR/P ACTIVATES MANY OF THE! OFFSHORE ISLANDS FOR IOTA CHASERS. *(Photo G3AAE)*



Results of the **1987 CQWW DX Contest (CW section)** have appeared and UK scores are as follows:

SINGLE OPERATOR

G3MXJ	**All-Band 2,233,868**	**G4CP**	**28**	**92,105**
G4BUO	**1,935,810**	G3VMY		15,960
G3UFY	717,060	**G3HCT**	**21**	**375,310**
GM3RAO	**550,824**	**G4CNY**		**323,520**
G4ODV	410,913	**GM4CXM**		**209,253**
GW4RHW	**387,276**	G3YDV		146,902
G3NKS	380,205	GM0IIO		21,268
GW3JI	**380,014**	GM4ENF	14	10,752
G3ESF	304,410	**G3IGW**	**7**	**94,570**
GM4VJV	250,860	G4UOL		58,650
G3XVR	212,676	**G4OBK**	**3.5**	**104,120**
GI4BBV	**185,922**	G4ARI		14,880
GM3CFS	184,576	G3DYY		12,349
G3GGS	142,680	G4XTM		10,947
G6QQ	111,941	**G3XTT**	**1.8**	**47,808**
G6NK	6,802	**GM3VLB**		**8,695**
G4ZME	6,683	GW3GWX		1,125

G3MXJ was fourth European in the All-Band list and G4BUO eighth. **G4CP** was top European on 28MHz and **G3HCT** and **G4CNY** were fourth and fifth Europeans on 21MHz respectively. In the **QRP Section** (All-band) **G4ELZ** came world fourth with 359,883 points. G4ETJ scored 59,520 and G3HLU 13,176. G3CWL scored 5,611 points on 21MHz, and G3DOP 4,806 on 14MHz. Certificate winners are listed in bold type.

Vermont QSO Party

0001 4 February to 2400 5 February

A good opportunity to work a not very easy state. Activity will be centred around 3,540, 3,720, 7,040, 14,040, 21,040, 21,140, and 28,040kHz, as well as in the first 25kHz up from the beginning of the USA General class bands. There are 14 different counties to work. I can supply photocopies of rules (SASE please).

Results of the 1988 **HA-DX Contest** have been received. In the single-operator multi-band cat- ▶

egory G3ESF came seventh with 83,028 points, G4ODV scored 25,239, and G6NK 10,350 points, and GB8NR scored 6,900 points on 14MHz.

The Bermuda Contest

0000 18 March – 2400 19 March

This is a contest where the winners are rewarded with a visit to Bermuda to collect their certificates. Full rules were not available at the time of writing but will be published next month.

Results of the 1988 **CQ WW 160 Metre Contest (CW section)** have arrived. UK scores are as follows: **G4BYG/A** 187,492 points, G3XTT 171,963, G4OBK 150,336, **GM3PPE** 47,481, **GW4RHW** 43,316, GM3CFS 38,171, **GI4BBV** 37,485, GW3JI 31,560, and G3ESF 9,975 points. **GM3IGW** scored 240,394 and **G3FVA** 71,995 in the multi-operator section.

In the **Phone section G0FDX** scored 19,968 points and appears to have been the only UK entrant.

YL-OM Contest

1400 11 February – 0200 13 February (Phone)
1400 25 February – 0200 27 February (CW)

Sponsored by the YLRL. Only 24 hours operation allowed. YLs QSO OMs and vice-versa. I can supply photocopies of the rules to anyone interested.

DX NEWS

JH7EAY/JD1 will remain on **Ogasawara Is** for several more months and is active in the 28·530 – 28·540MHz area. *DX News Sheet* reports that EP2MKN and EP2HZ are frequently to be found on 14·256MHz around 1500. I have received a number of QSL cards for these stations from the USSR but am certainly not their QSL manager! Neither station is valid for DXCC credit. NIAR has requested permission to operate again from the **Laccadive Is** and if this has not already taken place it may do so before the end of next month. KG6SL is active again from the **Mariana Is** and according to *DX News Sheet* has 14 full-wave delta loops on 14MHz and 12 of the same on 28MHz. He should have a good signal.

An interesting question now is the position of the **Marquesas Is** with respect to DXCC credit. Should Rotuma be accepted then it seems distinctly possible that they could count under the same criteria because they appear to be more than 225 miles from any other part of French Polynesia.

JARL News No.5 reports that on 12 September two directors of JARL were in Beijing to take part in the official opening of China's 28th amateur radio station. This is BY1BJ and is the station of the Beijing section of CRSA.

WA6OWU now has an **Egyptian** callsign – SU1EK, and WA9INK has another new callsign – SU1EE. He is said to be very active around 0500 near 14·040MHz. Ezzat, SU1ER, now has a TS940, TL922, and a new beam. PA0GAM/ST2 promises to be more active this year. Tom, K3TW, should have a **Tanzanian** call soon. In the meantime he sometimes operates from 5H3GW. ZD9BV is on the air again from **Tristan da Cunha.**

Jim Smith, VK9NS, has sent me some information about 5X5GK for whom he used to act as QSL manager. There have been problems in communication and Jim had the cards printed on behalf of the HIDXA membership. However, Gerry was forcibly evicted from Uganda and was lucky to escape alive. He had to leave almost everything behind him and in November Jim had not yet received any logs. He is therefore not able to confirm contacts but sends those claiming contacts a sample QSL only. However, Jim is able to confirm QSOs which took place on his 14·220/14·222MHz net as he keeps a net record for reference.

There is now a YL operator on the air from **Antarctica**. This is 4K2YL, whose home callsign is RA3AM. She often operates on 14·205MHz from 1700. Another lady operator is Robin, VK0AE (or VK0AK?), who is on **Macquarie Is**, and Graham, VK0GC, is on the island again. Also on Macquarie is Graeme, VK0DS. FR5ZB was due to leave **Amsterdam Is** early in November and his place was to be taken my FT4ZE. *The Long Island DX Bulletin* says that LU5EAS/Z is on the **S.Orkney Is.** EA4YW was scheduled to be at the Spanish

HF F-LAYER PROPAGATION PREDICTIONS FOR FEBRUARY 1989

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	....58985...	....79997...	....999993..	...2988896..	1..677778931	652754456887	986422224688	++4.....4++
MALTA	....688771..	....899983..	....999997..	...19888992.	22.687778983	884854457898	998631124799	+++3.....4++
GIBRALTAR	....177652..	....388884..	....6999971.	....8988993.	.1..87778982	663475556898	998852223699	+++52....3++
ICELAND	.....1564...	.....37861..	.....69995..	....1899971.	....5888895.	441.76567895	887553334688	+++52...235+
** ASIA								
OSAKA	....43.....	....65.....	....871.....	...1872.....	...2753233.1	1...42124754	....1...1573	.........24.
HONGKONG	....8971....	...18983....	...278761...	...1676642..	....3535662.	2....2124775	1.......1576	243
BANGKOK	...18++95...	...279997...	...2587881..	...1376784..	1....4347822	4....1.14777	2.......1577	245
SINGAPORE	...278885...	...378897...	...3587892..	...1376784..	1....4347832	3....1.14787	1.......1576	243
NEW DELHI	...28997....	...378981...	...457784...	...335676...	2....2347332	73.....14788	72......1578	4.........245
TEHERAN	...3+++96...	...588997...	...7667883..	...7436785..	311411346844	8641....14788	862.....1577	+3........244
COLOMBO	...3+++97...	...4789981..	...3467894..	...21467871.	2....1346854	62.....14788	61......1578	3.........245
BAHRAIN	...3++996..	...5778982..	...6557895..	1..532578721	5213..247875	973....14798	861.....1577	+3........244
CYPRUS	...2+++982..	...4999994..	...78889971.	1..877789941	642754567986	996521235899	8852...12688	++2......355
ADEN	...3++8983..	...5778995..	...644689831	2..521378963	7322..146897	984....14788	872.....1576	+4........244
** OCEANIA								
SUVA/S	.....2451...	.....4672...	.....67862..	....277774..	....5545671.	...2421245..	...12...12..	.....
SUVA/L	....432..152	11..6531.273	22..87532673	111186545752	..146423672.	...341..34..	...11...12..	.....
WELLINGTON/S	.....5632...	....27764...	....587771..	....776782..	...27545761.	...24212441.	....1...12..	.....
WELLINGTON/L	....1.....	1...21....11	22..63...133	221.742..343	..1274213631	...241..341.	....1...11..	.....
SYDNEY/S	....86564...	...298786...	...3987881..	...4876783..	...26535771.	....3212474.	....1...152.	.........2..
SYDNEY/L	.....1.....	....231...21	....4631..53	76421274	65334662	....42..363.	....1....31.	.....
PERTH	...388654...	...4888761..	...4687884..	...24767861.	2...14346853	1....1.14785	1573	.........24.
HONOLULU	.........1..	.........2..	.........51.	.........172.	.11.222.461.	..33421133..	...252...11..	...2........
** AFRICA								
SEYCHELLES	...3557743..	...4567865..	...534688831	2..312468963	741...136898	962....14789	84......1567	+.........244
MAURITIUS	...2788984..	...46789961.	1..434689941	31.311468974	841...146998	951....14799	73......1578	5.........245
NAIROBI	...28788851.	...477789831	1..644479973	42.512268996	8723...36899	995.....4798	872.....1577	+4........244
HARARE	...15778873.	...266789952	31.444469985	64.521248998	9833...16899	985.....3799	872.....1578	54........245
CAPETOWN	66889851	1...76779974	42.254458997	75.432237999	9944....5899	9862....2689	873......378	54........4+
LAGOS	....9++++852	11..97779974	53.185448998	761362126999	99563...4899	89951....1689	6783.....378	355.......45
ASCENSION Is	78667752	11..88667874	43..85445897	762.83112799	99746....589	99973....279	7785.....58	5452......2+
DAKAR	....6++8+951	1...88778973	33..97546997	662.85224899	997272..1699	98974....379	76861....158	43+3......2+
LAS PALMAS	....5++9982.	....7999995.	99889983	221.98778996	775286556899	999763223689	888731..1378	+5+4......4+
** S. AMERICA								
8th SHETLAND	14678851	1...26788873	33..57776676	652.77554567	786274221236	566541....13	23441.....	.....
FALKLAND Is	....1688+851	37877863	22..68755576	552.87532367	8872742...36	788641.....3	46751.....1	.442.....
R DE JANEIRO	7755751	18756773	21..38543586	542.57311378	987164....58	999641....27	88851.....4	+5+2.....
BUENOS AIRES	15867851	37877762	11..68744565	442.87522257	8871742...26	899641.....4	68862.....1	35+3.....
LIMA	......9++84.	987751	....1.754444	111.32631125	566.643....5	799552.....2	48862.....	.553.....
BOGOTA	......9++84.	987651	754353	111..2631135	566.243....6	798542.....3	58762.....1	2543.....
** N. AMERICA								
BARBADOS	.....3++884.	5977761	7754574	111..7621266	666.153...38	998542....16	88662.....3	+533.....
JAMAICA	......8+884.	887751	764453	111..1652245	555.3432..16	798442.....3	58762.....1	2543.....
BERMUDA	......8+884.	.....288786.	5765673	111..6643476	555.2531.157	888442....26	78762.....3	5543.....
NEW YORK	......69872.	......79885.	1786672	11...2664575	554.14341257	88844211..25	68762.....2	3553.....
MEXICO	.......8872.	.......8863.	186431	11....264223	454.31341..2	48844211....	26862.....	.453.....
MONTREAL	......58872.	......79884.	1787772	11...3665674	554.15342357	88834211..25	68762.....3	3553.....
DENVER	.......1761.	.......3872.	58641	1.....67442	443.2..44124	4783411111..1	26852.....	.353.....
LOS ANGELES	.........55..	.........762.	.......1863.	27531	342.21.352.1	368342.12...	.4752.....	..53.....
VANCOUVER	.........3..	.........151.	.........473.	6741	342.2..26543	367341.13211	13652...1...	..42.....
FAIRBANKS	....	....	.........2..	.......1242.	23..32235752	344342114543	12452...1211	...2.....

The provisional mean sunspot number for November 1988, issued by the Sunspot Index Data Centre, Brussels, was 125·6. The maximum daily sunspot number was 196 on 17 November and the minimum was 69, on 27 November. The predicted smoothed sunspot number for February, March, April and May are respectively: (classical method) 144, 150, 157 and 161; (SIDC adjusted values) 142, 149, 156 and 160.

Antarctic Base 'Juan Carlos 1' on Livingstone Is in the **S.Shetland Is** for three months commencing in January using the callsign EA0BAE. Working frequencies are given as 7·007, 7·043, 14·007, 14·233, 21·007 and 21·245MHz and operating times between 1830 and 1930.

Good news from the USSR via G3FXB who has recently visited Leningrad. He reports that there may be an International DX Convention in July this year. More news of this will be given when it becomes available. Al also says that any visiting amateur may operate from a club station provided that he (or she !) has a copy of his (or her) licence and obtains permission from the chief of the club. A small gift may be appreciated.

Carl, AI6V, reported that P40V set a new world record in the CQWWDX Contest (Phone). The 'raw' score was over 58 million points from over 21,000 QSOs. All contacts will be QSL'd via the bureaux and special certificates will be sent to those who made contact on four or more bands.

EXPEDITIONS

The expedition to North Yemen which has been planned by the Lynx DX Group has finally had to be abandoned. This is very sad as a very large amount of work had been done on the project but the documentation was never all in order at the same time. Contributions received from supporters will be returned.

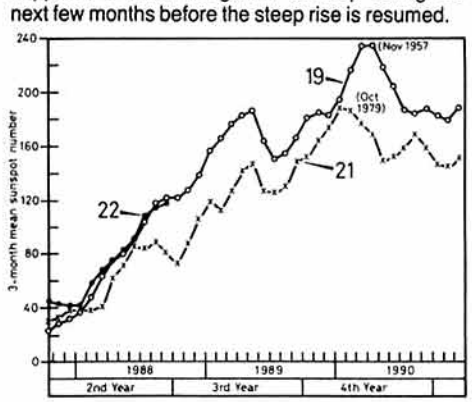
More bad news – 3B8DA reports that his projected visit to **Agalega Is** has been cancelled.

The latest rumour concerning **Marion Is** is that ZS6PT is said to be likely to be on the island for one year starting in April and using the callsign ZS8MI.

Steve, G4UOL, reports that his visit to the Isle of Man was a great success. He made 3,620 QSOs in 89 countries, with his G5RV antenna at 20ft and a long-wire for LF. All contacts were on CW, including 1,431 in the CQWW DX Contest. He will be returning this year, probably in November – more details nearer the time.

PROPAGATION

A very comprehensive report this month from G8KG, accompanied by a graph. He says "Regular readers may remember a mention in the December issue of the possibility of a pause in the solar indices after the most recent steep rise which started in June. At the time of writing (9 December) there were some signs that such a pause was developing, the monthly solar flux for November being only 157 SFU. However, the provisional monthly sunspot number from SIDC Brussels was 125·6, the highest of the cycle, so as yet there is only a moderate slowing of the rate of increase and it remains to be seen whether, as sometimes happens, a minor trough will develop during the next few months before the steep rise is resumed.



Nonetheless, mean solar indices remain relatively high – not very different from those during the *cycle peaks* of 1937, and 1968/69 – and HF band conditions in November were often very good, particularly in the second half of the month when the geomagnetic field was mostly quiet with the A-index often below 10. Unfortunately, things got just a little unsettled for the CQWW CW Contest – but might have been a great deal worse !

The diagram on this page compares the position of Cycle 22 with those of Cycles 19 and 21 at the same age ie, with their starting minima aligned. In order to filter out the shorter term variations while preserving the significant trends, the three-month sunspot number is used. This is the average of the monthly numbers for three successive months, plotted against the middle month. The next point on the curve (average of September to November) is 123·6, putting Cycle 22 just ahead of 19.

It seems to be not generally known that until the middle of 1988 the average solar indices for Cycle 22 were consistently above all previous cycles in the record. It can be seen from the diagram that, at the end of its second year, the present cycle was well above the position of the last one at the same age and continues to shadow Cycle 19. The comparison also shows that the pause mentioned above is happening at the same relative time as it did in Cycles 19 and 21, both of which then went on to climb to a high subsidiary peak at two years and eight months. In our case this would be in May 1989, but there is no certainty that the present cycle will conform to the same pattern – but it will probably be rising again by the time that this appears in print."

BAND REPORTS

This month, readers have reported first class DX on all bands from 1·8 to 28MHz. The most unusual was a log of stations worked on 1·8MHz sent by GW3YDX. Most of this is included in the listings.

Excellent reports also came from G2HKU, G4QK, G8KG, G3AAK, GM3CSM, GJ3EML, G3GVV, G3KSH, G3YRM, G4EHQ, GW4KGR, G4s MUW, NXG/M, OBK, SJG, UZN, XAH, and XRV, and G0s CBY and CKP. As usual stations using A1A are listed in italics:

1·8MHz 0000 *PY1RO, VP2VI.* **0500** *VP2MW, 8P9HT.* **0600** *PJ1B.* **0700** *EA9EA, FY5YE, HD8EX, KV0Q (Colo), KX6DC, OH0XX.* **0800** *KP2A, ZL1AIZ.* **2000** *TA2BK.* **2100** *JA1CGM, JA1FNA, VK6HD.* **2200** *D44BC, EA6CE, EL7U, HB0HTB, JA0DGT, JA3EMU, JA4LXY, JR6PGB, RL7PDV, VE1ZZ, YB8AXI0, 9M2AX.* **2300** *HZ1HZ, P40V, U0AG, UM8MBA, VS6DO, 3W8CW.*

3·5MHz 0000 *NP4A.* **0100** *V47NXX.*

7MHz 2000 *PY0FC, VU2ASH, 3W8CW.* **2100** *KP2A, P40V, TA1AZ.* **2300** *DL1EK/CT3, SU1AH, U0AL, K3IPK/VP5.*

10MHz 0700 *N6QR.* **0800** *FO8, LA2LX, TV6YEU, VK2, VK3, W1,3,4, W7EXR.* **1200** *VK2DHF, VU2-ZAP.* **1500** *CV2BV.* **1800** *W1, W3.* **2000** *UG7GWO, VE3GTF, VK5FE, VQ9QM, W2, W9.* **2200** *PZ1DV, W1-5, W8-9.*

14MHz 0000 ZL4OD. **0800** AL7HX, FO0SSJ, ZL. **0900** *A35KK.* **1200** P40V. **1300** *3D2XX.* **1500** *ZL2IL.* **1600** 8Q7ZL. **1700** *OX3AB, OY7ML.* **1800** AL7FG, JY7YJ. **1900** *KN7K (Idaho),* PY0FZ, VP8VK, 3W8DX, *3W8CW.* **2000** *W3ML/KL7.* **2100** C56/F2CW.

21MHz 0800 BY1BH, BY5RT, HL0K, VK, YI0BIF. **0900** BYs 4AOM, 7HY, 8AC, JA, PY0FZ, VS6WB. **1000** BY4AY, *F2JD/J7,* ZL. **1300** TL8HW. **1400** VE8RCS, VP5SL. **1500** *W7, XE2AQ.* **1600** *N6RL/HC8.* **1700** 3B9FR. **1800** C9MKT. **1900** *HD8EX, P40V, PY0GO,* VP8QP, *VQ9QM, 9Y4VU.* **2200** ZL3FW.

28MHz 0700 *PA0GAM/ST2.* **0800** BV2FA, BY4AA, *FH5EF,* HL, JA, JT1BG, VK, YI1BGD, ZL7TZ, *5H1HK.* **0900** *AT0Z,* BY8AC, *KH0/JE1CKA, KD7P/NH2, UA0YO,* VK3DF, YJ8NJS, ZL, 3W8DX, 9N1RN. **1000** *FM5EQ, HS0A, HZ1HZ, TA2/G3UIN,* VK6, *3W8CW,* 3X1SG, 8Q7ZL. **1100** *BV6A, D44BC,* KY0T/D68, FK8GB, FR4FA/J, *ZB2/GW3NYY,* 3W8DX, TU4BR/5U7. **1200** AP2P, *HD8EX, J52US,* P29KM, PY0FZ, SZ2COT, *K3IPK/VP5,* VU2JAC, ZF8SB, DF9FA/4S7. **1300** A4XND, *HS1SK,* P40I, YI0BIF, ZF2ME/ZF8. **1400** TA3F, G4LJF/V2A, 5U7WD. **1500** *KG4XO,* KP2AH, *LX8A, P40GO,* V31PC, V44KI, *VP2MW.* **1800** P40ZZ. **1900** J3/K8CV, P40MA. **2100** CE0ICD.

Thanks to all who wrote to me this month and also to the editors of the following for information : *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO), the *Ex-G Radio Club Bulletin* (W6/GI3OEN), *DX Report* (VK9NS), the *Lynx DX Group Bulletin* (EA2KL), *DX'press* (PA3CXC), and *CQ Magazine* (W1WY).

Closing date for April issue is **15 February**. The first of the 1989 28MHz tables will appear in April. ■

10MHz COUNTRIES TABLE

	All-time	1988
G4XRV	43	43
G3PJT	106	36
G3SED	71	32
G3JJG	102	18
G3AAK	111	-
G4VDX	71	-
G4YWG	64	-
G4OBK	57	-

1988 28MHz COUNTRIES TABLE

G3VOF	214	GM4ELV(QRP)	139
G4XAH(SSB)	191	G0CKP	130
G4MUW(SSB)	173	G3PXT/M	115
G4ZYQ	171	G4DXW	114
G4NXG/M	160	GM4CHX	77
G4OBK	158	GW4TEJ	57
G4SJG	155	G4JBR	50
G0DNV	150	G0FYD	38
GD0ELY	148	G4OUT(CW)	34
GD4XTT	142		

1988 ALL BAND TABLE No 4

	1.8	3.5	7	14	21	28	Total
G4OBK	63	73	111	148	155	145	695
G3SXW	41	58	84	142	122	122	569(CW)
G3TXF	40	29	62	174	71	102	478(CW)
GM4ELV	-	6	20	42	38	31	137(QRP)
G4FVK	9	6	10	22	17	2	66

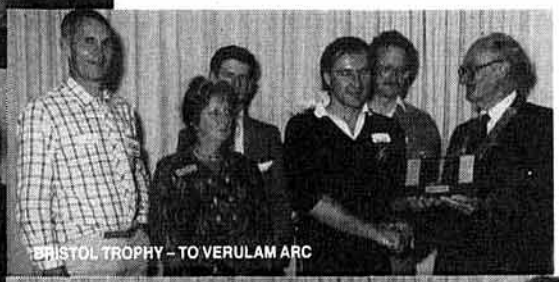
QTH CORNER

BY1BH	PO Box 1656, Beijing, PR China.
CT3FT	Cedric Rourke, Box 86, Porto Santo Is, Madeira P9400.
FR4FA/J	via F6FNU, A.Baldek, BP 14, F-91291 Arpajon Cedex, France.
HD8EX	Association DX-EX, PO Box DX, Cuenca, Ecuador.
P40I	via K7RIE, PO Box 6549, Bellevue, Wash, 98008 USA
P40MA	via WJ7X, M·Allen, POB 3306, Bellevue, Wash, 98009, USA
PY0FZ	(Nov. 1988 QSOs only) via HIDXA, Box 90, Norfolk Is 2899, Australia.
G4LJF/V2	Ian Shepherd, Hutts Farm, Blagrove Lane, Wokingham, RG11 4AX.
YJ8NJS	G0CGL, E.D.Carling, 46 Jubilee Gardens, Ensbury Park, Bournemouth, BH10 4ET.
ZF2ME/ZF8	via WB3CQN, R.Pearson, 3120 Alta Vista, Dover, PA, 17315, USA
5V7WD	via WB4LFM, Paul Greaves, 122 Swinton Dr Rt 10, Greenville, SC, 29607, USA

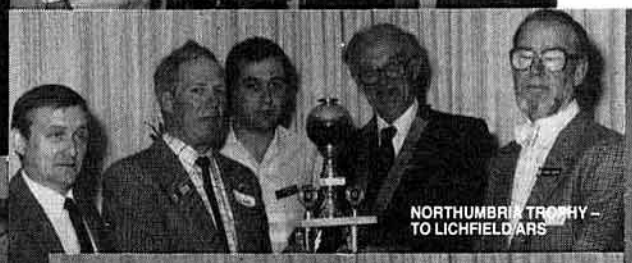
HF CONVENTION

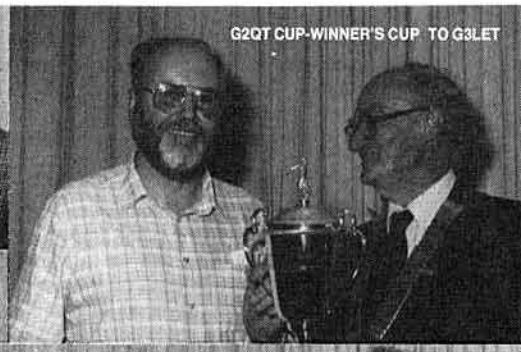
Over 300 people attended the RSGB 1988 HF Convention held at the Belfry Hotel near Oxford. This has become one of the foremost gatherings of the year for anyone interested in HF operating or constructing. It attracts a large contingent of foreign visitors, which this year included a dozen from Belgium alone. The good natured and relaxed atmosphere here makes a very welcome change from the hurly burly of a big trade show such as the NEC or Leicester.


D SHIELD – TO MARPLE


BRISTOL TROPHY – TO VERULAM ARC


WDITCH TX TROPHY
O G6LX


NORTHUMBRIA TROPHY – TO LICHFIELD ARS


G2QT CUP-WINNER'S CUP TO G3LET


GWARE TROPHY TO "A"s CONTEST GROUP


SOMERSET TROPHY TO G4BUO


G6ZR TROPHY – TO ADDISCOMBE ARC


SOUTHGATE TROPHY – TO BREDHURST RC


GEOFF WATTS DX NEWS SHEET TO G4YLO


ROTAB TROPHY – TO G3GIQ


GRAVESEND TROPHY – TO GRAVESEND ARS


AATEN TROPHY – TO G3FXB


HOUSTON


VERULAM SILVER JUBILEE TROPHY, T. E. WILSON TROPHY and WHITWORTH TROPHY TO G4BWP

1988

KEN WILLIS G8VR

6 LERRYN GARDENS, BROADSTAIRS, KENT CT10 3BH

Activities began on Saturday evening with a very welcome and impromptu after dinner programme of Islands on the Air DXpedition slideshows which ran well into the small hours of Sunday morning. In the lecture programme on Sunday, Dan Bernard and Alan Dearlove of the Society's EMC Committee discussed the European Community plans for imposing immunity standards on manufacturers, and stressed the need for amateurs generally to have a much higher awareness of EMC matters in this area.

Angus McKenzie, author of the Society's 'Buyer's Guide to Amateur Radio', gave an account of the ins and outs of choosing gear for the shack whether new or second hand. The audience was taken through the intricacies of intercept points, blocking performance, ergonomics, and much else only to discover that the rig which scores top marks in every aspect has yet to be produced. In some respects, equipment produced 20 years ago may well outshine the modern gear, but at the end of the day the choice lies with the buyer. However, Angus certainly gave his audience plenty of information on which to base that decision. The Q&A session also brought out some robust opinions of specific rigs but this is no place to repeat them!

During the afternoon Norman Field G4LQF surveyed the QRP scene from the earliest days of amateur radio when every amateur was a 'reluctant pioneer'. Old QSLs and equipment were on display and the first trans-Atlantic QSOs were discussed. Peter Linsley, G3PDL, took the topic up to the present with a review of the designs available from the G-QRP Club. The most successful, GM3OXX's "Oner" transmitter, has sold over 700 kits.

In the DX Forum, the Rev. Paul Bittner W0AIH described how to assemble a contest super-station without being a millionaire. The recipe is a great deal of time, a willingness and ability to take on welding and machining jobs oneself, plus of course a steady supply of unwanted commercial towers available free to anyone willing to dismantle them.

For DXers present, the highlight was F6EXV's presentation of the 1988 DXpedition to Kingman Reef & Palmyra. Paul was invited to join this trip when, after watching slides from a previous DXpedition which had made few European QSOs, he captioned a photograph of sleeping operators 'The Big Opening to Europe'. Paul's presence was readily appreciated on the 1988 expedition and many people present had gained two new DXCC countries from him. However, a few intending expeditioners may have been deterred by his revelations of carnivorous crabs and trying to sleep under a makeshift plastic tent snapping to and fro in a continuous howling gale.

In the exhibition area the Society's bookstall did a roaring trade and visitors were able to try their hand at a CW pile-up competition, the 'Dr DX' contest simulation (courtesy of G4UOL), and G4DYO's DX Quiz. The latter was won by Jean-Michel Duthilleul F6AJA who pipped Ghis Penny ON5NT into second place for the first time in four years. Ghis subsequently appealed for a recount and the adjudicator admitted the strain of organising the event had left him unable to add up but allowed the result to stand on the grounds that it was time someone else won!

The HF Committee is currently planning the 1989 event around Sunday 1st October.

Although the 144 and 432MHz bands remained rather quiet throughout November and during the early part of December until we went to press, nearly 200 letters, covering a variety of topics, dropped onto my doormat during the month. This is very encouraging, because I have always believed that VHF/UHF operation is much more rewarding if allied interests are pursued when there is little on the bands to work.

Perhaps this is an appropriate time to mention deadlines. I seldom do because usually I need the space for other topics, but generally it can be assumed that my copy goes to the editor around the end of the first week in the month for publication in the next-but-one issue of *Radcom*. In other words, if you were to write to me before 10-12 February, the earliest that this material could appear would be in the April issue.

During the next few months this lead-time will be reduced, through the introduction of new editorial routines and typesetting techniques, but meanwhile six or seven weeks elapse before material received can get into print. This is one reason why I believe that listing stations worked in an event is of limited interest because this information would refer to an event which occurred two months previously. I prefer to report events in a more general way for statistical reasons (eg, the upkeep of 27-day auroral charts, Es prediction etc), and to illustrate what can be worked by typical stations on the VHF/UHF bands, but if readers feel that it is more important to list the 15 Hungarians in the same square worked by G9XYZ, this can be done. Write and tell me what you want.

The mention of writing reminds me that some readers are still sending letters to an address which I vacated four years ago (they must be using very old call-books). Fortunately this mail is still being passed on to me, but the delay can be some weeks since the new occupier does not always re-address letters immediately. A recent near-miss was when Nelson, G1PAM (Shropshire) posted to my old address, the QSL card sent to him by LU7D7 to confirm the first-ever contact on 50MHz between G and LU last September. It would have been a tragedy if this had gone astray. My current address appears in the margin alongside the title at the head of this column, 90 degrees out of phase with the rest of the text!

Meanwhile, Jack, G3JMB (W. Sussex) summed up the feelings of many 144MHz operators when he commented "Whatever has happened to conditions on Two? I monitor almost daily but here, nothing, not even the Paris and Brittany beacons which used to come in all the time." It was surprising that the development of one or two high-pressure systems, which had looked promising enough for our local TV weatherman to warn of possible continental interference, resulted in no 'lift' of any significance, which goes to show that a weather map depicting isobars of apparently the right shape and pressure levels is not always a guide to extended VHF/UHF propagation.

Reports of 432MHz operation are few these days, but Gerald, GW8TIX Mid-Glam recently qualified for a VUCC award for working 70 squares on this band. That may not seem too unusual, but in fact Gerald's home location is poor, so for this band he goes to a portable site in Gwent (IO81) where from a /P spot which was always the same to within 32 feet, he worked the 70 squares in 16 countries with two more, GM and OE, awaiting confirmation.

It is an interesting comment on the activity on 70cm that in his claim, Gerald was unable to list a single GW station, not even one in his own square, although he made ten contacts over distances in excess of 1000km (SP and OK). Also, he listed 19 French squares, all confirmed, though it is writ large in the folklore of VHF that French stations seldom QSL. Note that awards can be gained from portable operation provided the same site is always used.

Another 432MHz report came from Peter, G4YPC who, with Roger, G4NZA, and Mike, G4XBF, mounted a 'mini expedition' to the Lizard, IN79, from 17 to 24 September last year. They managed 83 contacts on the band, and to very good effect since their list showed 10 countries and 29 squares worked. The best were a couple of FA1's in IN53. They were fortunate to choose a period of good conditions until 21 September, that is, when the weather broke forcing them to spend the rest of the trip under canvas in high winds. The 430MHz transmitter produced just 8watts (from a transverter) into 2 × 21 element Tonnas at 40 feet. They also operated on 144MHz, working 18 countries and 85 squares in the same period which is perhaps an indication of the relative levels of activity on the two bands.

Operation from different locations leads to another thorny question. Is it fair to ask someone forced to move house to start counting squares, counties and countries all over again? Should it matter whether you worked that UP2 from Dorset or from Durham? Must G1PAM ignore his historic contact with LU7D7 over that very long path if he should move to another location a mere 50-100 miles away? This subject was raised recently by Dave, G4YTL who for professional reasons has had to move frequently, and so I asked Malcolm Appleby, G3ZNU, to raise this matter formally at a meeting of the VHF Committee which he chairs. I have outlined the committee's decisions in the paragraph headed 'awards'.

If you are thinking of visiting Gibraltar and would like to operate from there, here's some information from Dick, G1CWP, on reciprocal licensing on the Rock. The first step should be a letter to The Wireless Officer, The Post Office, 104 Main Street, Gibraltar, giving details (and a photocopy?) of your current licence, the address where you will be staying in Gibraltar and the duration of the licence required. No fee is payable, but at least one month's notice is needed. Class A licensees will be granted callsign ZB2/G-call while Class R's will sign ZBOP/G-call. Some 144MHz operation from the Rock during this Es season would surely be much appreciated. Expedition station ZB2IQ showed the possibilities of operating in that area.

For the more affluent who aspire to a real DX location, Hal, ZS6WB recommends the Okavanga swamps of Northern Botswana, square KH10, where there is "an outstanding natural wildlife area and a camp with accommodation available in March and April 1989 at attractive rates". Hal suggests that the callsign A25/G?XYZ has a nice ring about it. Contact Hal for further information. A small pool of equipment is available to South African amateurs who wish to activate rare ▶

squares, an excellent idea. Incidentally, I have never given it much thought, but the ZS sporadic O season is December to February, this of course being their summer months.

Thanks to Ronnie, G2RX (Dulwich) for sending a copy of the Radio Australia English service guide giving times, frequencies and program details of all transmissions beamed towards the UK. Copies of this can be obtained by writing to Australian Broadcasting Service, 54 Portland Place, London, W1N4DY, or by telephoning 01-631 4456. The main interest for VHF operators is the daily propagation report by Mike Bird mentioned several times previously in this column. Readers may not know, however, that a program entitled "Communicator" is transmitted each Sunday at 0730GMT on 9655kHz which reports on developments in the amateur radio world and summarises the week's solar activity. By the way, I was in error when I said that Mike Bird's afternoon propagation forecasts on 7205kHz were at 1730. This was BST, so in fact he issues them a couple of minutes before 1630GMT.

On the subject of solar numbers Roger, G4IDE, would like to get access to records of the daily figures for solar flux and A-index going back as far as possible so that he can compare the current cycle with earlier ones. Anyone with an interest in applying home computers to satellites, RTTY, etc, will probably know Roger as a software specialist. Among the many programs he has written for the radio amateur is one which stores and displays solar data in graphical form, in colour, using his IBM compatible system. The high resolution obtainable from his system is illustrated, and of course the program could be used for other purposes such as beacon or sporadic E monitoring. If you can help Roger by supplying the required figures, will you please write to him QTHR.

Mike G4XPE, announced that the date of the third annual 144MHz contest arranged by the Derby & District ARS is Sunday 12 March between 1300 and 1700GMT. There are three sections. Full Legal Power, QRP (30watts or less) and SWL. Any mode is permitted, and an exchange of call, report, serial number and county will be required. Contacts with club station G3ERD will gain 10 points, other contacts 2 points, with a multiplier representing the number of counties worked. Rules can be obtained by sending a sae to DADARS, 119 Green Lane, Derby, DE1 1RZ.

BEACON NOTES

A letter from Stelio, SV10I, confirmed that the Radio Amateur Association of Greece (RAAG) received approval from their licensing authority to establish a beacon on 50,040MHz, callsign SV1-SIX. The site was to be a hilltop, some 1100 metres ASL, near Athens, where a 25watt transmitter would feed an omni-directional antenna. Stelio requested information on circuits, antennas, etc, for typical beacon installations, so it is presumed that the project was in the planning stage when he wrote. Nevertheless he expected it to be QRV "within the first few months of 1989".

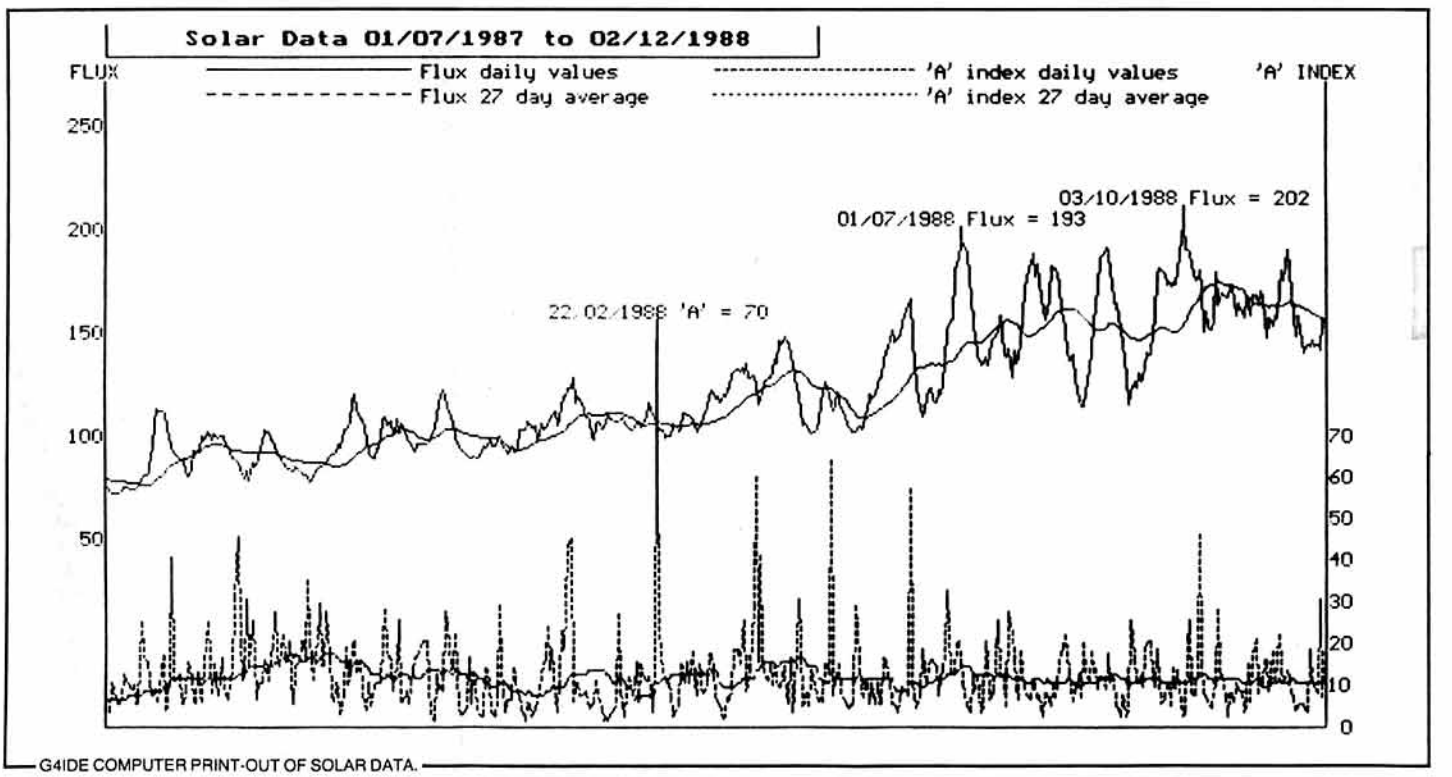
I was interested to read a report by Lewis, W1GXT, which appeared last year in the American newsletter, Northeastern VHF News. It referred to a request by ARRL to change the frequency bands allocated to unmanned beacons in the USA. In the 2m band, the existing USA allocation (144·05 to 144·06MHz) fell squarely in the weak-signal part of the band, in fact right in the part used by EME operators. Since American operators played such a major role in the development of amateur EME communication, it was surprising to me that ARRL could ever have contemplated establishing beacons in this part of the spectrum. Their new proposal might, however, seem just as strange to UK and European operators, since it called for a new beacon band of 144·275 to 144·300MHz, just where much of our own 144MHz DX activity takes place. The proposals for 432MHz were very similar. It was suggested that the existing allocation of 432·07 to 432·08MHz, again in the weak signal part of the band, be changed to 442·300 to 432·400MHz. I operated for some years in the USA and I think these proposals illustrate very clearly the way in which the VHF and UHF bands are perceived and operated in the USA. The level of activity we take for granted is seldom matched there except during contest times, so band planning assumes much less significance.

If you operate in the 28MHz band or use this part of the spectrum to monitor conditions, you have probably noticed how beacons are often obliterated by stations holding QSOs. Quite a lot of them seem unaware that a beacon service exists at all. The satellite frequencies at the top end of the band are also flattened by FM operators who presumably keep on moving up the band until they hear a nice quiet spot. Solar maxima may provide good propagation, but they bring their problems too!

JAMJARS, RAILWAYS AND VLF

John, G4BTV (Fareham) wrote for further information about the use of VLF receivers for solar flare detection (see VHF/UHF for October 1988). Having built a jamjar magnetometer John was aggrieved to find that it recorded not only the earth's magnetic field, but also the passage of traffic and neighbours' cars, not to mention the smallest movement of anything ferrous in the house. He wondered whether the instrument had to be set up in the middle of a field!

In a way he was too successful, having obviously built a very sensitive instrument. It is a fact that to use a magnetometer capable of responding to small changes in the earth's field, it must be established in a magnetically stable environment, which is not always easy in typical home situations. I believe that Cdr. Hatfield of the BAA, one of the pioneers of the DIY home magnetometer, became adept at recording the passage of trains on a line running past the bottom of his garden when first he set up his instrument.



G4IDE COMPUTER PRINT-OUT OF SOLAR DATA.

The anatomy of an event 30 November, 1988

The morning propagation forecast from Mike Bird for the previous day, 29 November, giving the solar flux as 143 and an A-index of 7, did not suggest that anything spectacular was likely to occur.

It shows how wrong you can be. Here is a timetable of events of the day gleaned from 50MHz logs supplied by G3JVL, G4ASR, G41JE, G4UPS and G8VR.

1310GMT: Mike, G3JVL on 28885kHz reported that he was copying the French Guiana beacon FY7THE, on 50·039MHz.

1330GMT: FY7THE at strength 599 in southern England. All UK 50MHz beacons audible, presumably by backscatter since GB3SIX and GB3RMK were both strong signals on a beam heading of 240 degrees.

1340GMT: Beacons CT0WW and 9H1SIX now audible, G4IJE, G8VR worked PAOs off back of beam.

1345GMT: G4IJE worked CT4KQ, QTF 240°

1347GMT: G8VR heard "HC---" weakly on CW, but assumed it couldn't really be Ecuador (but read on').

1348GMT: HC2FG (FI07) Ecuador worked G41JE, 54/55, on SSB, 50.110, for the first HC-G contact on the band followed a few minutes later by G4ASR 54/53.

1409GMT: VP5D (FL41), Turks & Caicos, worked G8VR 57/58 for first VP5-G on 50MHz, 57-58.

During the remainder of the afternoon VP5D worked numerous UK stations and for long periods was S9. The propagation penetrated well to the north in the UK since G2ADR (York) worked the VP5, who also worked GJ and GU, and received a report via 28885 from OK3CM, By ***1420GMT***, VE1YX was S9, working strings of UK and European stations (44 in all). K1JRW appeared and worked several stations though his signals were much weaker than VE1YX. Excitement was intense when when P43AS (Aruba, FK52) was heard working a pile-up of W stations. As far as it is known, G4JCC was the only UK station to work P43AS.

Towards the end of this event, several W stations were audible, including W90EH (Indiana), W400 (Fla), worked by G3COJ and W8BKC/WB5. By ***1530*** the event had ended, but an aurora then started, which though not very intense, lasted about half an hour.

1830 to 1945GMT: Several UK stations worked into 9H1 with signals S8/9 both ways on a direct beam heading.

So what caused it all? The timing of Mike Bird's reports plus the fact that he gives figures for the previous day meant that no mention was made of a major solar flare which occurred at ***2226GMT*** on 27 November. This produced storm conditions 1½ to 2 days later when streams of high-energy particles ejected by the sun reached the earth.

At ***1200GMT*** on 30 November, the day of the opening, the WWV broadcast that the K index had risen to a value of 6, corresponding to an A index of 30 and reported the next day, 1 December, by Radio Australia. This level of K index indicated magstorm conditions, produced by a particle shower from the flare some 30 to 48 hours after it occurred on the sun.

There is evidence that at the onset of a magstorm the maximum usable frequency (MUF) can be enhanced by the injection of high-energy particles into the ionosphere, particularly along more southerly (in latitude) paths. In fact 30 November was in the middle of the optimum season for northern hemisphere MUFs and in the weeks prior to this event, both Gs and Ws had reported hearing Central American signals in the 40-45MHz range. The predicted medium MUF for the Caribbean for the time of the opening was in the low 40s, so enhancement to 50MHz was quite feasible. This is supported by the fact that K1JRW beamed 110 degrees throughout, aiming at the mid-point in the UK-VP5 or UK-P43 path. The moral is don't rely too slavishly on daily solar indices. The ionosphere is slow to react to solar flux variations but reacts rapidly to geomagnetic changes which themselves occur very quickly. Also, it should not go unnoticed that G8KG's HF band forecasts in *RadCom* predicted F-layer propagation in November in the Caribbean "around 1400GMT". Smithy said that as a matter of interest, MC was one of the first to show up in the autumn of 1979 (Cycle 21).

In the meantime, G4BTV decided to look into the application of a VLF receiver for solar flare detection. Since I first mentioned this technique, John Power, W2AXU (Trenton, NJ) has provided details of a home-brew VLF receiver which appears to be very simple and a straightforward home-brew project. John had two such receivers running during solar Cycle 21. I have passed this on to Pat Hawker, G3VA, for possible inclusion in *Technical Topics*. Meanwhile I can supply a package comprising this (and more) circuit information. It is quite bulky, so please send a SAE plus 60p in stamps to cover the necessary photocopying.

SCANDINAVIAN VHF-UHF MEETING

Soeren Pedersan, O71FTU, has notified us of the date of the Scandinavian VHF-UHF-SHF meeting this year. It will be held over the weekend of 9/11 June in the lake district of Silkeborg, Denmark. The progra m will comprise lectures on many VHF/UHF related topics, and of course those who have attended these and similar Scandinavian meetings will know that there is an active social side to the event, during which attempts will doubtless be made to determine which is (probably) the best lager in the world. UK operators, hardened by their expedition experiences at home and abroad, are renowned for their performances.

Anyone wishing to contribute to the lecture program should contact OZ1FTU, Krumstien 10A,DK-2730 Herlev, Denmark. He should also be consulted by those wishing to attend the meeting. A provisional program was promised for March. This meeting is sponsored by the Horsens division of Experimenting Danish Radioamateurs (EDR) and Danish Activity Group VHF-UHF-SHF (DAVUS). It sounds like a good idea for a vacation this summer.

CONTEST COMMENTS

Jochen Fischer, DH2NAF, drew attention to the 'All Europe VHF-UHF-SHF Contest' calendar, now available. This is the fourth year in which this useful guide has been published, and it lists more than 450 European contests in VHF/UHF/SHF bands which are scheduled to take place in 1989. Written in both German and English, it provides all information needed such as dates, times, frequencies, contest title, rules and addresses to which entries should be sent. Copies of the guide can be purchased from Ham-Press Verlag, Jochen Fischer, DH2NAF, PO Box 1101, D-8078 Eichstatt, W. Germany. The price is two dollars USA or the equivalent in IRCs.

Wearing his VHF Contest Committee hat Tony, G4NBS, put some meat on the bones of the report of the September 1988 70MHz Trophy which appeared in *RadCom*, December 1988. This event, won by GM4THB/P, attracted great interest as evidenced by the fact that no fewer than 230 calls were listed in the logs submitted, 70 of them being Class B operators. All eight UK call areas were represented, with 60 counties activated. Missing counties were Bedford, Cumbria, N. Yorks and IoW, GW4MGR/P, who finished in third place in the Open section, missed only two possible multipliers. Two sought-after stations were G13TCU/P (Antrim) and G8KQW/A (Scillies). This level of activity should encourage more of us to use the 70MHz band, but what a pity it is that the antennas, like those for 50MHz, are too large for many urban locations. Anyone who can design an antenna which does not stand out on the skyline among its TV counterparts will have a winner.

G4NBS makes a plea to contest groups planning to operate from portable locations in future contests. He asks them to check whether the site has previously been discovered and used by another group which thus would (in the eyes of the VHF Contests Committee), establish a prior claim. Tony says that by studying past contest results, or simply talking to known contest operators, it should be possible to avoid situations where two groups turn up intending to use the same site.

AWARDS

Ian Cornes, G4OUT, who is now the RSGB VHF Awards Manager, says that he is very pleased by the number of claims being submitted. He mentions, too, that Jack Hum, G5UM, has recently been rather unwell. I am certain that there are hundreds, if not thousands, of radio amateurs who wish Jack a speedy return to full health. Get well soon, Jack.

The VHF Committee discussed the situation in which an operator who is forced to change QTH wishes to apply for an award. The committee made the following decisions:

1) VHF/UHF fixed station awards will in future be available to operators who for any reason have changed QTH during the period covered by the claim.

2) Where a change of location has been made, the certificate issued will be suitably endorsed as representing 'operation from more than one location'.

3) The requirements for an award involving more than one QTH will be the same as for single QTH awards. In future, all claims must bear a declaration by the claimant that all contacts have been made from a single QTH, unless a 'more than one location' award is being claimed.

At the time of writing I have no information whether this new procedure is retrospective, but I see no reason why it should not be. The new rules are interesting for portable operators activating multiple sites!

One award most of us will want to steer clear of is depicted in the RF Byrne cartoon in the December *RadCom*. It is the 'Worked 100 Countries on TVI' award – though I know a few who will have no trouble qualifying. ■

MICROWAVES

MIKE DIXON G3PFR

"WOODSTOCK", GAZEBANK, NORLEY, WARRINGTON, CHESHIRE WA6 8LL

APOLOGIA

In my December column there was, alas, a transposition error at the paste-up stage of production. Three paragraphs of the 'From here and there' section somehow got inserted into the middle of the 'Whither on 10GHz' section. The paragraph starting "In what may well be his last awards update Jack, G5UM....." and the next two paragraphs should come at the end of the "From here and there" section, then both sections will make more sense!

A second, factual mistake was mine, again a transpositional error: The beacons GB3LET and GB3LEV were transposed. Both are to be vision beacons, GB3LET on 2·3GHz and GB3LEV on 10GHz. Apologies to the Leicester Group.

BANDPLANNING

At the November meeting of the Microwave Committee, there was considerable discussion on bandplanning to accommodate the new licence facilities which, by the time you read this, will have come into force. I mentioned that it was felt that a degree of co-ordination of action on the matter of beacons and telemetry/telecommand would be needed in order to avoid unnecessary clashes of interest. The response to the suggestions made then was minimal, the only positive response coming from one or two of the country's leading microwave DXers in East Anglia (where else?), and that was "avoid the international calling frequencies". The outcome of our discussion follows – and here we really would like positive feedback. Remember these are only, at this stage, recommendations for UK operation, but likely to form part of IARU Region 1 bandplans when ratified.

Personal beacons are those devices attended or, where allowed, unattended, using the operator's own callsign. Formal beacons are those set up and operated with an officially allocated callsign, frequency, site and closedown procedure and which, all things being equal, are expected to provide continuous service over a wide coverage area. IARU Region 1 beacon bands are given in brackets. Either type of beacon may operate at a maximum of 25W peak or carrier.

Telemetry and telecommand for the purposes of local station command or control is allowed at a maximum power of 10mW (-20dBW) 'within the curtilage' of the licensee's location: this will need very careful use and interpretation! Recognising that such use will probably be very intermittent and likely to be of a digital nature, we don't see any clash between the interests of packet link operation and the very low power telemetry operation. If there are to be any mutual interference problems, it's likely to be from fixed links to telemetry, not the other way round. Anyway, such problems are usually quite easily resolvable. So you will see that control sub-bands are either close to, or share the sub-bands nominated for fixed data links.

1·3GHz BAND

Attended (personal) beacons 1296.3 to 1296.4MHz.

Unattended personal beacons not permitted anywhere in the band.

Formal beacons, no change (1296.800 to 1296.990MHz).

Telemetry/telecommand for station control 1298·00 to 1298·975MHz.

Note that 1298·00 to 1300·00MHz is the sub-band which the DTI have agreed for fixed data links and that the lowest 'channel' in use, with speech bandwidths (nominal 25kHz), is 1299·00MHz 'dead'.

2·3GHZ BAND

Attended or unattended personal beacons 2320·3 to 2320·4MHz.

Formal beacons, no change (2320·800 to 2320·990MHz).

Telemetry/telecommand in the sub-band 2310·05 to 2319·95MHz, again 'shared' with the recommended data link frequencies, using the same logical argument.

3·4GHZ BAND

Attended or unattended personal beacons 3456·3 to 3456·4MHz.

Formal beacons, no change (3456·80 to 3456·990MHz).

Telemetry/telecommand, 3457 to 3458MHz (multimode area).

5·7GHZ BAND

Attended or unattended personal beacons 5760·3 to 5760·4MHz.

Formal beacons, no change (5760.80 to 5760.990MHz). The DTI are now prepared to consider formal applications.

Telemetry/telecommand, 5761 to 5762MHz (multimode area).

10GHZ BAND

Attended narrowband personal beacons, 10368·00 to 10368·990MHz.

Unattended operation not permitted between 10250 and 10400MHz.

Formal narrowband beacons, no change (10368·80 to 10368·990MHz).

Attended or unattended wideband personal beacons, 10410·0 to 10420·0MHz.

Formal wideband beacons, no change (10400·0MHz nominal).

Existing wideband beacon (10100MHz nominal) licences unchanged, although frequencies just above 10400MHz preferred for future applications.

Telemetry/telecommand, in the sub-band 10025 to 10075MHz, again shared with the recommended fixed link frequencies which in this band have not been strictly 'channelised'.

24GHZ BAND

Attended and unattended personal wideband beacons anywhere in the primary part of the band 24000 to 24050MHz.

Formal narrowband beacons and operation, no change (operation 24192·00 to 24194MHz with beacons at 24192·80 to 24192·990MHz). Written permission from DTI required.

Telemetry/telecommand, anywhere in the primary section, no preference.

The Microwave Committee will be pleased to receive any views on these initial proposals and recommendations, at the same time pointing out that they have been formulated using the best licensing information available via LAC. In other words, they are seen to be the most likely to be acceptable to the DTI, bearing in mind the current secondary status of all our allocations below 47GHz!

WHITHER ON 10GHz? – FINAL ODDS AND ENDS AND SOME ALTERNATIVE TECHNOLOGY IDEAS

Reference was made to injection locking of a high powered Gunn to a low powered crystal controlled source, using a circulator. I haven't tried it yet, but can see no reason why a waveguide 'T' junction or 'Magic T' could not be used to lock the two oscillators. This would almost certainly need an isolator between the crystal source and its input to the T junction, but as isolators are quite easy to find on the surplus market, the idea is offered as a possible alternative. Isolators and circulators will both provide 20 to 30dB isolation between the two sources: the aim should be to 'protect' the narrowband source from the wideband oscillator.

Mention was also made of high stability DROs. Besides being useful in receivers and transmitters they offer the possibility of frequency measurement at 10GHz by using mixing techniques and, say, a 500MHz frequency counter. The stability is such that if the oscillator is set accurately enough in the first place (eg, at a Round Table) and is then coupled into a mixer via a cross coupler (a cross coupler, together with a calibrated variable attenuator, detector and load will enable you to make meaningful measurements as you develop and align your narrowband gear!) to prevent pulling and to obtain the right level of mixing. If a few mV of signal are required to operate the counter the output of the mixer could be fed to any form of broadband amplifier, eg a Modamp, and then into the frequency counter. Using these methods it should be possible to measure frequency a good deal more closely than by using a cavity absorption wavemeter. The initial accuracy of frequency setting of the DRO will determine the accuracy of the final measurement. The stability will be the stability of the DRO (which, as we have seen is within 1MHz over a wide range of temperature) and the resolution will be that of the counter. Even disregarding the least significant digits, the accuracy of measurement should be well within a MHz which is more than an order of magnitude better than that offered by a high Q wavemeter. Without rearranging the counter timebase, a degree of mental agility will be required to interpret the reading, but this won't be any worse than reading the micrometer of a cavity wavemeter!

Other alternatives for a receiver and demodulator to follow your front end could be either a scanning RX or one of the modern high performance TV converters designed for satellite TV first IF, followed by a low final IF (10·7MHz) using a narrow filter.

Talking of TV, have you thought of using the wideband gear for ATV? There is much useful information (and circuits) published in 'CQ-TV', the journal of the British Amateur Television Club – that is, if you haven't decided to build some of the old wideband gear into your midi-tech narrow band gear!

Has anyone tried adapting Ku band LNB's (ie, cheap satellite TV low noise block first converters) to use on 10GHz? There is a high probability that this can be done, at least into the top end of the band, 10400 to 10500MHz, where the preamps should still have plenty of gain and good NF. You may need to 'fiddle' the local oscillator and, for a lower IF than 900 to 1400MHz, the post-mixer filtering. I'd be pleased to hear from anyone experimenting in this field. The first-generation LNB's with NF of about 2·5dB are being replaced with LNB's of NF 1·5dB or better in order to use smaller dishes; the older ones may be available cheaply as they are phased out.

Finally, by using some of the techniques suggested above, many of the ideas about spectrum analysis described in recent issues of 'Technical Topics' could well be extended high into our microwave bands. ■

SATELLITES

94 HERONGATE ROAD, WANSTEAD PARK, LONDON E12 5EQ 01-989 6741

RON BROADBENT G3AAJ

During the past couple of weeks I have been taken to task by a few readers who have said that I failed to give notice that Oscar 10 was going to be in operation, and with such a good signal. Furthermore, they pointed out that as it was my *job* to keep RSGB members up to date would I put in what **all** the satellites were to be doing every monhth? One chappie wanted to know the bands and modes that RSGB would be on nine weeks hence, as he was away from home running another station for six months of the year. The answer's **NO**, for the simple reason that I don't consult my crystal ball anymore! It's at the pawn shop. . . .

It would be prognostic, and very brave, of me to stick words into a magazine being printed nearly two months hence, and to pontificate over where, and what, any amateur radio satellite will be doing by the time an average reader gets interested. We can, of course, predict when a satellite is going to be in orbit at a date in the future, with fingers crossed, and no decay. Satellite folk know where to go for exact up-to-date information anyway.

A case in point is Oscar 13. I have only just been informed what the schedule is after Christmas (see below), but what we do not know at this date is whether the satellite Modes will change because of Engineering and Sun Angle/Battery Current problems. Take for example the predicted and planned use in November/December, it didn't stick to schedule even though times were believed firm as we went to press for the December issue. Mode S has had to be curtailed because of depletion of the battery current that powers that transponder.

Incidentally, anyone who has geared him/herself for mode L on AO-13 is having a ball from what I can gather. I cannot wait to get my antennas up over Christmas. Some 200 – yes 200 – stations have been logged on 23cm Model to December 1989. A list is available from me to encourage use of this mode.

OSCAR-13 SCHEDULE PLANNINGS

From 1 January 1989 it is planned to re-orientate the spacecraft back to 180° – longitude and 0° latitude, since sun-angle is even better than in the past months. This gives optimum squint angle (direction of the satellite antennas from your view) around apogee, which results in a new schedule mainly modified for the Mode-L operation.

The following transponder schedule will be in use from January 6 until March 15:

Mode-B	from	MA 3	until	MA	100
Mode-JL	from	MA 100	until	MA	150
Mode-B	from	MA 150	until	MA	240
OFF	from	MA 240	until	MA	3

Oscar-13 will again be reorientated in early March 1989 owing to decreasing sun angles and additional long eclipses. (Part of a message from DB2OS, AMSAT-DL to all AMSAT Command Stations.) Mode S was curtailed for nearly the whole of December.

It is again emphasised that those who require up to the minute information about Oscar-13 should invest in a PSK demodulator and a computer (any type with RS232) and listen to the on-board PSK information messages which are put on regularly by all command stations. Those with RTTY and CW capabilities can also share this information flow without demanding my neck on the block for not being able to publish. Again, you could listen into the AMSAT Nets. My policy on that score is well known among satellite folk. The 80 net, under the call G0AUK, does not give out hearsay on any satellite matters. Some of us waffle a bit (*yep – Ed*), but even that is kept to a minimum when G0AUK is being used.

You may get the information from another source a few hours quicker, or even later, but when you hear if from G0AUK it will have been checked from the command stations themselves (either by yours truly or one of my henchmen; no names, no pack-drill, as they say).

On that subject I also include Oscar 10, JAS-1, UOSAT 1 and 2, RS10/11 and MIR are different kettles of beans. I make no comment, if only because information flow from RS3A does not always match the words of the various routes by which it gets into the AMSAT-UK office.

Talking about Oscar 10 at this date in December, it has once again been shown just what a marvellous piece of internal engineering the old gal is up there. After months of supposed failure on all chips, and most of the amateur world giving up in favour of Oscar 13, this six year old sprang a surprise during the week of 10 December. I decided to listen around the band during the early afternoon, and was most surprised to hear a very loud CW beacon on 145·009MHz. It was so strong that it was knocking my calibrated 'S' meter up to the S8. At 6dB per S point that's some signal. I hoped that it was Oscar 10, and so went up the band to see if anyone was about. I found one signal only – also loud and very clear. It was an EA about the same strength as the Beacon. A quick call returned "5 and 9 dear old man," and we were in business. I beamed at the horizon, but the bird was climbing quickly. In half an hour about ten other stations had twigged to what was going on, and the bandpass got very noisy. Funny thing though – that beacon on 145·809 was still going strong when I left. It pays to have a listen to the band sometimes.

This also brings me nicely to another old satellite, RS 1 (yes, RS 1). Despite no transponder working now (or is it?) this satellite still gives a few devotees a lot of listening pleasure. Most of us call it the "65" because that is the Morse signal that it now gives out from time to time. Obviously the battery is defunct, but the transmitter is still functioning even if only via the solar cells when it gets some daylight hours up there.

THE OSCAR 13 OPERATIONS HANDBOOK

This 60-page part of the AMSAT-UK Technical Handbook will have been published and available from AMSAT-UK at £4.50 to members of AMSAT, or £5.50 for non-members by early February. Request a copy from the address at top of this page. Also from this address you can obtain a copy of the New Satellite Software Catalogue for the courtesy of a 9" × 6" envelope with a 19p postage stamp attached. Mark the left-hand corner 'Sufficient please', and you will get one in the next post (Post Office willing).

MIR

By the time you read this the shouting may be over, with no radio amateurs still on board that spacecraft. As readers who actually listen to GB2RS and G0AUK will be aware, there has been an amateur radio station on MIR – established since 13 November. At the time of writing this we are told that three out of six crew will be returning to earth on 21 December. One of the six is a Frenchman, who will persist in sending wild mating calls in English to his wife (or girlfriend)! (On another Band I hasten to add.) It has been suggested that the three who return to earth will be the radio amateurs U1MIR, U2MIR, and U3MIR. It is not known at this time if the up-going, or remaining crew are able to use the ICOM equipment for contacts with us on 145·550MHz. Certainly there has been a lot of air time wasted in calling U2MIR when MIR is belting across this island of ours. I have yet to hear of anyone who has made a meaningful QSO with U2MIR. By that I mean at least the exchange of signal reports, name, equipment details, etc ("And what the weather is like in Tokyo" — Hancock).

No doubt a meaningful QSO or two have been made over USSR. Of course I do understand that there is a language problem when three inexperienced newly licensed radio amateurs are given a Japanese black box and told to "Press this button for transmit and the world will be your oyster." What I suspect has happened is they have been overwhelmed with the volume of RF being pumped up to them, especially over USA and Europe, that they have not been able to share personal details in a foreign tongue. No doubt we will see the act get together shortly, and speaking to MIR will be as mundane, to some people, as using Oscar 13.

For those who wish to try their luck at this FM spacecraft 'manned transponder' I offer a few tips. Get accurate pass times. Remember that 9pm UK time is midnight in Moscow, and they go to bed at that hour. Do not give the usual L-o-n-g ten times gabble gabble callsigns you use on your local repeater. Send "U2MIR de Gx123" *once* , and then repeat this about every ten seconds. Use a wide beam antenna, and remember you do not need a lot of power. Non-satellite folk should note that your words of wisdom are going UP into free space. There are no vertical half-wave length objects to dampen your signals as there is on your normal repeater comms. Think about that one – it could make a good club discussion night question.

AMSAT COLLOQUIUM

Now a plug, for which I offer no apologies. Some readers have complained in mail to me that they 'Would have gone to the AMSAT-UK Annual Bash, The Colloquium, if they had been given warning of date,' and 'The Wife said we are going on holiday that weekend,' or 'I had to take the mother-in-law hang-gliding at midnight on the Saturday'. Well, take not, come hail, shine, or me dropping dead, the AMSAT-UK Colloquium is the last weekend in July this year. Papers from speakers have already been requested. It is an event you should not miss if you are at all interested in satellites. Information from RSGB and AMSAT. Booking forms available in April 1989.

Finally, thank you to the few folk who did write and told me what they required of this column every month. I will do my best to please. One letter said, 'More technical articles on satellites,' and another, 'Orbital times of all satellites every month.' The problem with both requests is space. I only have one page allocated to me. The AMSAT-UK Orbital Calendar for all satellites runs to 20 pages every two months. I will, however, get the programme that Bob Phillips, G4IQQ, used for for Phase 3 type orbits wheh he was your scribe, and print that every month. Mind you, *anyone* can have a regular copy of the A-UK Orbital Calendar on a regular order if they wish. Ask for details. Cheers, Ron B, G3AAJ. ■

SWL

BOB TREACHER BRS32525

93 ELIBANK ROAD, ELTHAM, LONDON SE9 1QJ.

QSL CARD COMPETITION – WITH £500 WORTH OF PRIZES

Do you think that the information provided on your QSL card is what the amateur transmitting fraternity want to receive? Are your reports useful to the recipient? Do you provide the right sort of information?

Here is a competition which is open to any short wave listener, anywhere in the world, and which aims to find out which SWL provides the best report.

Simply complete one of your QSL cards in just the way you would if you were preparing a report for a station you had heard on the air, and send it to me to be judged. Closing date is 28 February, 1989.

The judges will be your scribe, G3XWK and G8GFF. The decision will be final, and the cards cannot be returned. The two amateurs have been chosen because both have been active from GW and GM respectively until quite recently and are known to myself as amateurs who take an interest in the SWL reports they receive.

Most importantly, there will be valuable prizes. 'C'ontact Cards of Blackpool have very generously agreed to provide personalised QSL cards to the senders of the best *THREE* entries. to a total value of about £500. Hopefully the results will be available in time for May's *RadCom*.

For those who are unaware of the service which 'C'ontact Cards provide, let me add that, in my opinion, they have the best selection of sample QSL cards on the market at the present time, and at a very reasonable cost. Cards can be produced on good quality white card or glossy art board, and they can also feature the raised print styles popular in the United States. There's a full studio available with camera and graphic facilities, plus a team of talented graphic artists who can create special designs for every requirement. Delivery is normally within 21 days. For those interested in getting a new QSL card with a design which stands out, drop "C"ontact Cards (11 Winchcombe Road, Bispham, Blackpool, BY5 3HJ) a line with an SAE and they will send you a set of up to the minute samples by return. See for yourself what they can offer.

50 MHz

Ted, G4UPS, provided news that the UK 50MHz Group are running a series of contests on the band this year, each of which has an SWL section. We have already missed the first one, but the rest will be held on the first Sunday in each month through the year between 0600 and 1800. The Turner Cup will be awarded to the best SWL log submitted during the year. Full rules can be obtained from G4UPS by sending an SAE to 27 Parklands, Hemyock, Devon, EX15 3RY.

He also mentioned that membership of the Group only costs £5 per year (payment to G4IIL, QTHR). There are no SWL members at present, but the Group is keen that this should change.

TECHNICAL SLOT – FEEDBACK

GW8IH was interested to note that the method of antenna coupling to transistor radios mentioned in my November column, as he used the method in yachts for some years, mainly in the West Indies.

There are two main problems with yachts, the first being the impossibility of using radios below decks in aluminium or steel vessels, and the second being that in any vessel, alterations of course mean nulls, with the result that the crew tend to prop up the radio in some unconventional way where it inevitably falls and gets smashed.

His less elegant solution was to wind half a dozen turns of wire around the whole set, ground one end, lead the other end out through a vent, and capaitively couple it to one of the shrouds by tightly winding the end a dozen times round and taping it secure.

If the appearance was offensive to the vessel owner, a ferrite rod was similarly wound and taped to the back of the set, with the position adjusted for best coupling. These methods have always proved far more satisfactory than any attempt to capacitively couple anything direct to the mixer gang capacitor, as this tended to result in some cross modulation and seriously affected the HF end tracking. There are still quite a number of ocean-going yachts which could employ this crude but effective arrangement.

DERBY AND DISTRICT CONTEST

Mike Sharp, Chairman of this Society's Contest Sub-Committee, has notified me that his Society's contest on Sunday 12 March once again has an SWL section. Disappointed that no SWL entries were received in 1988, they are hopeful that 1989 will see a change.

It is only a four hour event, from 1300-1700, with a county multiplier. Full rules are available by sending an SAE to 119 Green Lane, Derby, DE1 1RZ.

While on the subject of society contests, here's a further reminder that the White Rose Society is looking for another Society, or individual, to take over the running of its popular LF SWL Contest. If *your* Society can help, please write to G3ZGA at the address quoted in December's column.

HF CHAT

Ted, G3DCC, provided a note about difficulties in obtaining QSL cards from stations in India. The difficulty arises because many do not belong to their Bureau and only QSL direct. VU2BK, Poona, who is often heard on 21MHz CW says that he will always QSL SWL reports direct immediately he receives a card with two IRCs and a self addressed envelope. It seems that he is a stamp collector, so always try to use commemorative stamps on your envelope!

Let me start the band reports with the offering from Robert Small, BRS8841, for a change. He managed the 3W8 on all five bands and was disappointed that the rumoured trip to XW8 did not materialise. Conditions for the CW leg of the CQWW contest were apparently good, but not as good as those for the SSB event. Only 84 countries were heard – a little on the low side, perhaps, but Robert was hunting mainly for new countries. PJ1B gave him a new one on 1·8MHz. Outside the contest, 7MHz produced some interesting DX in the early mornings and evenings, with 9M8PV perhaps the best on offer. Once again 28MHz was the star band, and CW produced four new countries – 6W, PY0F, KG4 and VP5. Recent confirmations included CX0XY (South Shetland), C9MKT, PT7BZ (1·8MHz), S01A, TN4NW, 9V1WK and G4LJF/VP9.

David Whitaker, BRS25429, provided another detailed report of happenings during November on HF, which again showed how good 28MHz had been. However, his main news was that cards from VP8BRR and G3UML/J6 on 21MHz and J87CD on 28MHz gave him 200 countries confirmed on each band. Starting from 28MHz his confirmed totals stand at 200/200/250/264/248/117. Congratu-

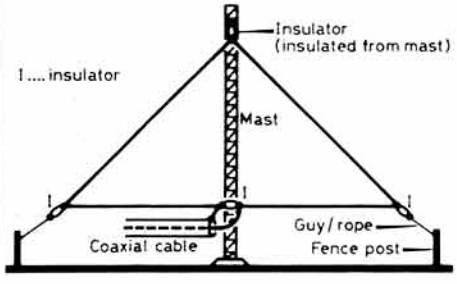
ANTENNA SLOT – THE DELTA LOOP

SWL's rarely have the room or the inclination to erect a beam antenna for the amateur bands. A good alternative is the Delta Loop which provides excellent performance, is easy to erect and is good at receiving low angle signals.

You will see from the diagram that the apex of the loop is at the top of a supporting mast. It is not the feed point, but must be insulated from any metal. The co-ax can be fed in at a number of places, but is shown at the bottom in the diagram.

The centre of the full wave wire is attached at the top of the mast and the two legs fan out forming a triangle, which are brought together through an insulator at the bottom from where it is attached to the co-ax.

You will see from the diagram that it is necessary to pass two insulators through the wire (for guying purposes and for making the triangle) before soldering the co-ax. Pull the loop out to the two guying points to obtain the triangle shape. You will find that the loop is a very rigid antenna.



A DELTA LOOP ANTENNA

The loop antenna has a maximum directivity broadside to its plane. Although it is directive, it has good omnidirectional properties too. Its directivity can be changed by moving the side supports around the garden.

The equation for calculating the lengths of wire required for amateur bands use is:

$$\frac{984}{f} \text{ feet}$$

when f is in Megahertz

Examples of lengths of wire using this equation for some spot frequencies in the six main amateur bands are:
28·500=34·5 feet; 21·295=46·2 feet; 14·195=69·3 feet; 7·045=139·7 feet; 3·795=259·3 feet; 1·840=534·8 feet.

Although you will need a big garden or understanding neighbours to erect a delta for the LF bands, I have seen them work well at these frequencies and would recommend one if the space is available.

Next month I will look at Long Wire antennas.

lations. His threat of not chasing any more DX on the HF bands is not to be believed! David was off to CT3 for a winter break and was taking along a Sony ICF7600DS receiver. No doubt we will hear about BRS25429/CT3 in due course.

Numerous reports have been received during the last few months of HL88 stations which had been active during last year's Summer Olympics. If any SWL is still short of an HL88 QSL, this list might help with QSL routes:

HL callsign	QSL route
HL88BFM	HL5BFM
HL88BOQ	HL5BOQ
HL88CHH	HL4CHH
HL88VP	HL4VP
HL88CB	HL0CBD
HL88DBV	HL2DBV
HL88ITV	HL2ITV
HL88FKA	HL5FKA
HL88IUA	HL1IUA
HL88KAT	HL2KAT
HL88CII	HL4CII
HL88DFE	HL2DFE

All HL88 stations may be QSLed via KARL, CPO Box 162, Seoul 100, Korea.

How many SWLs have a valid QSL card from XZ? Not many, I would guess, because the last legitimate operation was in January 1964. It is worth noting, however, that the current unrest in the country might eventually lead to some amateur activity. This is because if the Karen National Union, which occupies large parts of the country near its border with HS, and encourages amateur radio, is successful in ousting the Burma Socialist Party which has ruled the country for 25 years, SWL's and DXers alike can look forward to a return of amateur operations. Indeed, 1Z9B is regularly active from the Karen State, but does not count as XZ for DXCC or for most other Awards.

ODDS 'n ENDS

Reg Akehurst, BRS25209, has indicated that he has been interested in SWLing ever since the 1930s when he built a Telsen receiver which required no soldering because all of the components were held together with nuts and bolts!

Another 'new old boy' is Albert Tideswell, BRS48462. He has been an SWL since 1927, but didn't join the Society until 1982. He has 312/317 of the countries on the current DXCC list and particularly likes DXing on 3·5MHz where his country score is 250/270. He actively participates in Raynet exercises in the Stoke-on-Trent area and is the 'Grandad' of the local Society. Also keen on HAB, Albert has claimed the HAB Diamond Award for 3500 areas and had 3742 areas heard at the time of his letter.

Finally, G0KPZ has asked that I make a brief mention of the new Civil Service Award which we hope will soon be featured in this magazine. David was keen to point out that the Award was available to Listeners. If any SWL would like the full rules and a list of Civil Service members to listen out for, they are invited to write to David c/o G3CSR whose address is in the call book.

FINALE

Here's yet another reminder about the North Pole expedition mentioned in December's cloumn. Next month, as well as the Long Wire Antenna Slot, I hope to include an in-depth look at SWLing in Belgium, as well as looking at this year's events on VHF for the SWL and a first look this year at DX-TV. Please help me fill the rest of the space by providing your news, views, and photos by 6 February. ■

1988 HF COUNTRIES TABLE

Station	DXCC	28	21	14	7	3·5	1.8	Tot
BRS25429	256	194	203	209	173	141	70	990
BRS8841	258	188	215	230	148	140	58	979
BRS52543	220	156	160	174	133	134	53	810
BRS32525	197	171	123	131	122	131	57	735
BRS90400	206	123	139	174	77	95	35	643
BRS88969	154	111	93	86	71	45	53	551
BRS1066	158	80	112	121	92	49	45	499
BRS91397	140	54	101	93	52	45	15	360
ORS45992	172	95	100	115	21	20	0	351
BRS90808	143	21	59	109	43	52	12	296
F11ATZ	124	76	87	55	25	15	0	258

Still very tight at the top. Will '25429 stay on top? Will he reach the magic four figures? watch this space!

This month's shack belongs to Harold Moss, BRS18529, who now lives in East Sussex. The photo shows the Drake R4C and Trio 1000 and an ATU which serves both receivers.

RSGB COUNCIL BRIEFS

SALIENT POINTS FROM THE MEETING OF COUNCIL WHICH TOOK PLACE ON 29 SEPTEMBER 1988

The Honorary Treasurer presented the audited accounts, together with his report. In noting the deficit, after tax, of some £8,000 Council acknowledged that this was an improvement on the previous year's accounts. At the conclusion of much discussion, Council unanimously passed the resolution that the 1987/88 accounts be approved.

During his report, the Secretary outlined the problems which had been caused by the national postal strike. The potential problems of delivery of Council nominations was addressed and special arrangements agreed. The Secretary also reported on progress with Project YEAR. It was hoped that a planned television programme would assist in its promotion.

Council recommended Mr B O'Brien, G2AMV, as a director of Lambda Investments Ltd and RSGB Raynet Ltd. Lambda was to be retained as a shell company. Proceeds would be transferred to a bank account and kept for the few debenture holders who had not yet come forward or been identified.

Approval was given to committee recommendations regarding annual awards and budgets for the ARDF Working Group and the RLO scheme.

Affiliations were granted to The Delyn Radio Club; IBM S. Hants Amateur Radio Club; Paisley (YMCA) Amateur Radio Club, and The City University Amateur Radio Society.

The President's Advisory Group's review of committee chairmens' reports was discussed and actions agreed. Council ratified the appointment of Mr G Dover, G4AFJ, as chairman of the Repeater Management Group. Mr Dover had carried out this task temporarily, since the employment at HQ of the former chairman, Mr M Dennison, G3XDV.

The appointment of Mr G Jessop, G6JP, as Society Historian, was agreed.

Drafts of an up-dated copy of the Green Book were circulated to Council for comment.

Council reviewed the 75th Anniversary celebrations, acknowledging the hard work of those involved. It was agreed that no National Convention should be held during 1989. However, a Data Symposium would take place on 8/9 July, in Harrow-on-the-Hill.

It was decided that the Presidential Installation would be held in Manchester as an experiment, to coincide with the Annual Meeting in December.

CONTEST NEWS

SPRING VHF/UHF RTTY CONTEST 1989

Duration: 1800 GMT Saturday 15 April to 1200 GMT Sunday 16 April 1989. A four-hour rest period must be taken and declared during this period.

Bands: 144MHz, 432MHz and 1296MHz bands, contacts via repeater or satellite will not be valid.

Operators: Licensed amateur radio stations within zones 14 and 15 who are permitted to use RTTY as a mode of communication. Portable operation is allowed but must be from one location or within 1km, for the whole of the contest. Contest logs from SWL's will be very welcome.

Contacts: Stations may not be contacted more than once on any ONE band during the period of the contest.

Messages: Messages shall consist of the following:

(a) Time of start of contact in GMT, to consist of a full four-figure group. This information must be passed in both directions and logged. Expressions like 'same' or 'same as yours' are not permitted.

(b) RST report, normal three-figure group.

(c) Message number, this will consist of a three-figure number starting from 001 for the first contact made on the band in use and running consecutively from this number.

(d) Locator, Maidenhead system is prefered, or QTH given either as a town or as a bearing and distance in km, from a town (MAX 25km). The town must be identifiable on a 1:500,000 tourist or route map.

Logs: Logs for each band shall be entered on a separate A4 size log sheets, preferably BARTG type and be accompanied by a cover sheet similar to the RSGB form 427, giving an address for correspondence, site and equipment details, comments and signature of responsible person etc. The log shall contain: Date – time of start of contact – RST report sent – Message number (These may be combined eg 599001) – Maidenhead locator or QTH received – estimated distance and points claimed. It will be helpful to include your own locator at the top of every log sheet. Copies of forms and log sheets are available from the Contest Manager G6LZB.

Scoring: All two-way RTTY contacts will score in accordance with the distance chart given for 144 and 432MHz. 1 point per kilometre will be used for 1296MHz. Proof of contact may be required in certain cases where the station worked does not appear in any other contest log received.

DISTANCE: Score as follows:

0-50km scores 1 point	250-300km scores 11 points
50-100km scores 3 points	300-350km scores 13 points
100-150km scores 5 points	350-400km scores 15 points
150-200km scores 7 points	400-450km scores 17 points
200-250km scores 9 points	450-500km scores 19 points

and pro-rata on 50km radial increments.

Awards: Certificates will be awarded to the top scorers and runners up in each section for each band. Each band is regarded as a separate contest so single band entries will count.

1 Single operator stations UK and Europe
2 Multiple operator stations UK & Europe – see note*
3 Short wave listeners UK & Europe

The judge's decision will be final and no correspondence can be entered into in respect of entries or logs received after the closing date for entries.

All logs must be postmarked no later than: Saturday 27 May 1989 to qualify.

Send your logs to: BARTG Contest Manager, c/o Mr J Alderman, 38 Greenacres, Shoreham-by-Sea, Sussex, England BN43 5WY.

*Single operator stations may be fixed or portable but must be set up and operated by one operator only, otherwise entry must be made under the multiple operator section.

BARTG SPRING RTTY CONTEST 1989

When: 0200 GMT Saturday 18 March until 0200 GMT Monday 20 March 1989.

The total contest period is 48 hours but not more than 30 hours of operation is permitted. Time spent as listening periods count as operating time. The 18 hours of non operating time can be taken at any time during the contest period, but off periods may not be less than three hours at a time. Times on the air must be summarised on the summary sheet.

Who: There will be separate categories for single operator multi operator and short-wave listener stations.

Bands: 3·5, 7·0, 14·0, 21·0 and 28MHz AMATEUR BANDS.

Stations: Stations may not be contacted more than once on any one band but additional contacts may be made with the same station if a different band is used.

Countries: The ARRL DX Countries list will be used, and in addition, each W/K, VE/VO and VK CALL area will be counted as a separate country.

Note: W/K, VE/VO and VK count once each only for QCA purposes.

Messages: Messages will consist of:

(a) TIME GMT. This must consist of a full four-figure group and the use of the expression 'same' or 'same as yours' are not permitted.

(b) RST and messages number. The number must consist of a three-figure group and start with 001 for the first contact made.

Points: Points can be claimed as follows:

(a) All two-way rtty contacts with other stations within one's own country will score two points.

(b) All two-way contacts with other stations outside one's own country will score 10 points.

(c) All stations can claim a bonus of 200 points for each country worked, including their own. Note that any one country may be counted again if worked on a different band but continents are counted once only.

Note: Proof of contact will be required in cases where the station worked does not appear in any other contest log received or the station worked does not submit a check log.

Scoring:

(a) Two-way contact points times the total of countries worked.

(b) Total country points times 200 times the number of continents worked (max 6)

(c) Add (a) and (b) together to obtain the final score.

Sample calculation:

Exchange points (302) × countries (10)	= 3020
Country Points (10) × 200 × continents (3)	= 6000
(a) and (b) added together to give a score	9020

Log and score sheets: Use a separate sheet for each band and indicate all times on the air. **Logs to contain:** Date, time GMT, Callsign of each station worked, RST and MESSAGE number sent, TIME, RST and message number received and the points claimed.

NOTE: Logs received from short wave listeners must contain callsign of station heard, report sent by that station and callsign of the station being worked. Also date and time GMT that the QSO was logged. Incomplete loggings are not eligible for scoring and will be classified as check logs. The summary sheet should show the full scoring, the times on the air, address for correspondence, and in the case of multi-operator stations, the names and callsigns of all operators involved with the operation of the station during the contest.

All logs must be received by 27 May 1989 in order to qualify.

Summary and log sheets: Are available from the contest manager at the address shown below, in the UK on receipt of a large (A4) sae. All other countries outside the UK require no envelope but will need six IRC's to cover the cost of postage.

Send your contest or check log to: Peter Adams G6LZB, 464 Whippendell Road, Watford, Herts, England WD1 7PT.

The judge's decision will be final and no correspondence can be entered into in respect of incorrect or late entries. All logs submitted shall remain the property of the British Amateur Radio Teleprinter Group.

Certificates will be awarded to the leading stations in each of the three groups, the top station in each continent and to the top station in each W/K, VE/VO and VK call area.

Additional notes: If a contestant manages to contact 25 or more different countries on two-way RTTY during the contest, a claim may be made for the quarter century award (QCA) issued by BARTG and for which a charge of 4 dollars US or 18 IRC's is made. Holders of existing QCA Awards should indicate and list new countries to be added to their existing records. Make your claim at the same time you send in your log.

However, in view of the high volume of work which the contest manager will have to deal with, it will not be possible to prepare and dispatch any new awards or to up-date any existing records until the final results of the contest have been evaluated and published. Additionally, if any contestant manages to contact stations on two-way RTTY within each of the six continents and the BARTG contest manager receives either a contest log or a check log from each of the six stations concerned, a claim may be made for the WAC Award issued by the *American RTTY Journal*.

The necessary information will be sent to the journal after the contest results have been evaluated and despatched, the journal will issue the WAC Award, a charge is now made for this award.

LOW POWER CONTEST 1989 RULES

1 The general rules for RSGB HF Contests, as published in Contest News *RadCom* January 1988 will apply.

2 Date and Time. 0700 – 11.00 GMT Sunday 16 April 1989.

3 Sections. (a) 10W RF output maximum (b) 3W RF output maximum. RSGB members resident in the British Isles. Single-operator stations only. Overseas entries will be accepted and included in the listings. The section entered must be clearly stated.

4 Frequencies. 3·510 – 3·560MHz and 7·010 – 7·040MHz (IARU Region 1 contest preferred segments) CW only.

5 Exchange. RST and serial number starting at 001, plus output power (eg 579001, 3W).

6 Scoring. Fifteen points for each completed contact with another QRP station. Five points for all other contacts. Points can be claimed for contacts made with stations on both bands and outside the UK.

7 Documentation. Standard RSGB HF contest log sheets should be used. Dupicates must be marked without claim for points. Unmarked duplicates will be penalised at the rate of 10 times number of points claimed plus claimed score. Each entry must be accompanied by a cover sheet (HFC2) or a standard RSGB declaration signed by the operator responsible for the entry.

8 Equipment. The transmitter or outboard power amplifier stage should not be capable of RF power output in excess of 15W.

9 Address for entries. Logs should be sent to: 'HF Contents Committee' c/o Mrs H Claytonsmith G4JKS, 115 Marshalswick Lane, St Albans, Herts AL1 4UU.

10 Date of entries. Logs must be postmarked not later than 15 days after the end of the contest.

11 Awards. The 1930 Committee Cup will be awarded to the leading station in section (b). Certificates of merit will be sent to the first three stations in each section and to the highest placed entrant using a completely 'home brew' station.

LISTENER CHAMPIONSHIP 1989

1 As usual, there will be an HF Listener Championship for 1989.

2 However, with the HF Contest Committee planning a fresh contest to take the place of 7MHz Phone, the disappearance of the Town and County event and the Region Round Up rules being revamped, a full list of those contests which will count toward the championship cannot yet be published.

3 It is suggested that Listeners enter events in the usual way. The contests which make up the championship and the points available will be announced as quickly as possible.

BRS32525

70MHZ FIXED STATION CONTEST RULES

0900 – 1400gmt, 23 April 1989

The general rules published in *Rad Com* January 1989 will apply. There will be two sections, section F for single operator fixed stations, and section O for all other fixed stations. County and country multipliers will be used (general rule 14).

All entries and checklogs to: VHF Contests Committee, c/o J Pilage, G8HHI, 43 Bartons Drive, Yateley, Camberley, Surrey, GU17 7DW.

THE SOUTH MANCHESTER QUAD NIGHT DF CONTEST

Date: 11 March 1989
Map: O.S. Sheet 109 1:50,000 series, Manchester.
Assembly: 1900 GMT for start at 1920 GMT.
Location: Lay-by on A57 ¼-mile south of junction with M63 NGR748972.

Competitors requiring supper notify Mr D Yorke, 40 Edgefold Road, Worsley, Manchester. Tel: (home) 061 790 4749 or (office) 061 998 5329 not later than 6 March.

HF NFD 1989 RULES

1 Site notification. Each group intending to compete must send details of the site to be used to: RSGB HF Contests Committee, c/o J C Burbanks G3SJJ, Southlands, 16 Cotgrave Road, Plumtree, Nottingham NG12 5NX, to arrive not later than Saturday 22 April 1989. Details must include the name of the person responsible for the entry; the address to which contest stationery should be sent; section to be entered; name of group; callsign(s) to be used; national grid reference and sufficient access information for an inspector to be able to locate the site.

2 Date and time. From 1500GMT Saturday 3 June to 1500GMT Sunday 4 June 1989.

3 Sections.

(a) Open Section. One transmitter and one receiver (or one transceiver). There is no restriction on the number or type of antennas, but the maximum height must not exceed 65ft (20m).

(b) Restricted Section. One transmitter and one receiver (or one transceiver) with one antenna which must be a single element such as a dipole, vertical, long wire etc, having not more than two elevated support points and not exceeding 35ft (10·7m) above ground at its highest point.

Notes. (i) Stand-by equipment is allowed, but it may not be connected to the power source when the main equipment is in use. (ii) It is not permitted to use permanent buildings or structures as support points for antennas. (iii) Each portable station must operate from the same site for the duration of the contest and may not be located in permanent buildings or use the public mains supply. (iv) Power for all equipment may only be derived from a portable generator on the site, or from solar cells, accumulators or batteries. Float charging must only be from a portable generator. (v) No equipment or antennas may be installed or erected on the site prior to 24 hours before the start of the contest. This does not apply to storage of equipment. (vi) All stations are subject to inspection by representatives of the HF Contests Committee. The inspector's brief will be to ensure that the rules and spirit of the contest are being observed. Should the inspector be unable to locate the site due to inadequate or incorrect information, the entry will be disallowed. In the event of a last minute change of site, it is the responsibility of the members of the group to make suitable arrangements for the inspector to find the new site. The inspector must be given immediate access to all parts of the site with the right to stay as long as desired, and the ability to return at any time during the contest. The inspector may also visit during the 24 hours before the start of the contest. The presence on site of any amplifier or modified commercial equipment capable of excess power will result in the entry being disallowed, and in the event of such an infringement being proven, all operators listed as being associated with the group in operation of the station will be barred from entering any RSGB contest organised by the HF Contests Committee for five years.

4 Frequencies and mode. CW (A1A) only in the 1·8, 3·5, 7, 14, 21 and 28MHz bands. Contest preferred segments as recommended by the IARU should be used ie 3510-3560 and 14010-14070kHz.

5 Exchange. RST and serial number starting from 001.

6 Scoring. Each station may be worked once on each band, but points must not be claimed for contacts made by a competing station with members of its own group. Points will be scored as follows:

Fixed stations in Europe (including the British Isles)	2 points
Fixed stations outside Europe	3 points
Portable and mobile stations in Europe (including the British Isles)	4 points
Portable and mobile stations outside Europe	6 points

The contacts on 1·8MHz and 28MHz should be scored as above and the totals multiplied by two to obtain the band score for the RSGB listing. An IARU Region 1 listing will be collated by the Region 1 contest manager, and the totals in this list will not include the above factor.

7 Documentation: Packs of contest stationery will be sent in May to the person making the notification under rule two. Separate logs must be used for each band, each with a band cover sheet. A cover sheet, form HFC2, summarising the overall entry, must be included. Duplicate contacts must be marked as such without any claim for points. Unmarked duplicates for which points have been claimed will be penalised at the rate of 10 times the number of points claimed plus the claimed score and logs containing in excess of five, regardless of band, may be disqualified.

8 Name and address for entries. Address logs to 'HF Contests Committee' as follows: British Isles entrants to J C Burbanks, G3SJJ, 'Southlands' 16 Cotgrave Road, Plumtree, Nottingham NG12 5NX. Overseas check logs should be sent to PO Box 73, Lichfield, Staffs WS13 6UJ, England.

9 Closing date for entries. Logs must be postmarked no later than Monday 19 June 1989.

10 Trophies

(a) The National Field Day Trophy to the station having the highest checked score, regardless of section.
(b) The Bristol Trophy to the station having the highest checked score in the other section.
(c) The Gravesend Trophy to the station having the highest checked score in the section having the highest number of entries.
(d) Certificates of merit to the stations having the three highest checked scores in each section.
(e) The Scottish NFD Trophy to the Scottish station having the highest checked score.
(f) The Frank Hoosen G3YF Trophy to the station having the highest checked score on the 14MHz band.
(g) Certificates of merit to the groups in each section with the highest checked scores on each band.

11 Check logs. While overseas stations are not eligible to enter NFD, check logs are very welcome. A certificate will be awarded to the overseas station in each continent whose check log shows the most points contributed to competitors.

12 Data Protection Act. Entrants should note that the Contest adjudicator may enter information from their logs into a micro-computer for the sole purpose of checking for duplicate contacts and preparing tabulations. If any entrant objects to this they must clearly state their objection on the cover sheet.

SWL Section

1 Holders of UK Class B transmitting licences may enter the receiving section.

2 Rules 1, 3, 5, 9, 10 from the transmitting section will apply.

3 Logging. Only portable or mobile stations may be logged, and each such stations may only appear once in the column headed 'station heard' on each band. The callsign of the stations being worked may only be repeated once in every five contacts logged. Entrants should log the callsign of the station heard, RST and serial number given by that station, and the callsign of the station being worked. Points should be claimed as in the transmitting section.

4 Awards. Subject to a minimum of 10 entries, certificates of merit will be awarded to the leading three entries. If less than 10 entries are received, awards will be at the discretion of the HFCC Contests Committee.

CLUB CALLS CONTEST 'CCC' RESULTS 1988

Transmitting Section

Pos	Call	Pts	Pos	Call	Pts
1	G2BBC	983 C*	17	GB75RS	583**
2	G3WAS	966 C	18	GW4CC	581 C
3	G4HTD	916 M*	19	G3ASR	512 C
4	GW4UZL	885 M	20	G4MET	467 M
5	G4SSS/A	817 C	21	G4VRS/A	448 C
6	G4SUP	792 M	22	G0ACK	420 M
7	G3RR	786 C	23	G3JJZ	408 M
8	G3SJJ	764 M	24	G3OLB	396 M
9	G4PDQ	739 M	25	G3NKS	393 M
	G4GOU	739 M	26	GM3HAM	378 C
11	G3VER/P	737 C	27	G4MBC	291 C
12	G5BK	711 C	28	G0DAY	264 M
13	G4CDD/A	662 C	29	G3NLY	247 M
14	G3LET	635 M	30	G3KDB	181 M
15	G3SRC	609 C	31	G4BWP	144 M
16	G4RFR	587 C			

Receiving Section

1	BRS28198	564 M*	2	G7AOU	388 M

* = Certificate ** = HQ STN = 25 pts C = Club Station M = Club Member.

The response to the first club calls contest was very pleasing considering the lack of publicity given to the event. Many entrants suggested that a bonus of 50 points should be awarded to those who managed to find the rules. Please note that the next 'CCC' will take place on 11 November 1989 and that it is all modes.

On the night there were 19 club stations active, some put on by the individual licence holder; others involving many members of the club. Denby Dale radio club must get special mention here, they put three class 'B' operators on to 160M for the first time. They are now working towards their class 'A' licences. Fourteen clubs put in logs, many containing favourable comments. 'Good fun' were the words most often used to describe the four hours of sociable inter-club exchanges.

Taking G2BBC's log, we find that 124 QSOs were made during the contest, with contact being made between members of 54 different clubs. The Verulam ARC and Lichfield ARS must be congratulated on having the largest numbers of their club members on the air. Verulam fielded nine members and Lichfield five, with Cheltenham, Denby Dale and Swansea making a good showing. Lichfield ARS did however submit the most logs.

Conditions were described by everyone as noisy. Equipment used by the three leading stations: G2BBC, Icom IC.735 with a half wave dipole at 130'! G3WAS, Icom IC 735 with 110' half wave sloper and 110' vertical. G4HTD, IC 720A with a half wave dipole at 40'

This contest hopes to achieve several objectives: To promote the use of the 160m band. To encourage clubs to activate their club calls thus giving them publicity. To give class 'B' licencees a chance to experience working the band and to improve inter-club relations.

Certificates go to the leading club G2BBC, the Ariel Radio Group (Birmingham) and to the leading club member G4HTD who is a member of Plymouth RC. There were no logs sent in by non-club members, so that certificate cannot be awarded. The leading SWL certificate goes to Norman Henbrey who is a member of Hasings E&RC. *G4JKS*

1988 SWL CONTEST RESULTS

Last year's contest was not quite as well supported as in previous years, but 32 logs were received in all sections.

Congratulations are due to the winners of each of the four sections. Particularly good entries were received from the British Isles SSB winner Trevor Newstead G1YWW, Don Piccarillo, BRS52868, winner of the home CW section, and from Jean Jacques Yerganian ONL383, the overseas CW winner.

Conditions were quite good for the contest weekend and some exotic dx was logged by most contestants. It was particularly pleasing to receive a greater number of CW logs from overseas and to get so many entries from our friends in Japan. Eric Trebilcock, BCRS195 put in an entry from VK, and YC0EHN put in an entry too. It was also good to see so many licenced amateurs entering, but one wonders where all the 'real' SWL's were?

There were a few problems this year, which I should mention in the hope of jogging some memories ready for 1989. Some of the European entries disregarded the '1 in 3 except' rule, which is employed to discourage listeners from sitting on any one station for long periods. Some claimed 4J1FS as a different country, but I am afraid that the RSGB could not prejudge the DXAC vote on whether country status is granted! Some entrants had some duplicates and will find that their claimed scores have been reduced. Please be sure to check your log for duplicates carefully, two logs were particularly poor on neatness. Lastly, CU2LN caused some confusion, he was on mainland Portugal, not the Azores.

BRS32525

BRITISH ISLES SSB

Pos	Station	Pts	Multi	Checked 'score'
1	G1YWW	711	214	152,154
2	G1YIY	631	196	123,676
3	BRS52543	533	180	95,940
4	BRS25209	353	145	51,185
5	BRS90400	369	119	43,911
6	BRS88969	209	122	25,498
7	G1VDW	212	94	19,928
8	RS90393	151	88	13,288
9	G7AOY	126	62	7,812

BRITISH ISLES CW

Pos	Station	Pts	Multi	Checked 'score'
1	BRS52868	744	227	168,888

OVERSEAS SSB

Pos	Station	Pts	Multi	Checked 'score'
1	PA3342	443	185	81,955
2	NL8898	293	130	38,090
3	Y34-18-F	233	96	22,368
4	Y45-19-J	154	55	8,470
5	JA1-20762	186	44	5,984
6	YC0EHN	120	40	4,800
7	Y48-05-I+	114	30	3,420
8	JA8-3769	55	23	1,265
9	JA7-10052	48	21	1,008
10	JA3-34466	67	11	737
11	Y87-17-L+	34	17	578
12	Y31-95-B	28	20	560
13	Y31-47-B	24	20	480
14	JA8-4736/8	24	7	168

OVERSEAS CW

Pos	Station	Pts	Multi	Checked 'score'
1	ONL383	644	207	133,308
2	OZ-DR-2044	232	132	30,624
3	Y32-01-F	227	77	17,479
4	BCRS195	81	38	3,078
5	OK1-31434	66	26	1,716
6	JG7LBN	24	20	480
7	Y31-23-B	13	10	130
8	JA6-35444/1	5	4	20

THE MID THAMES RDF CLUB TRIPLE NIGHT CONTEST 1988

Historically the toughest HF-DF Contest held each year, The Mid Thames Triple Night event drew eighteen teams from several parts of the country to the starting point at Stokenchurch, Bucks., on the evening of Saturday 22 October 1988.

Precisely at 1920hrs BST, much to the relief of the organizer Trevor Gage (G1MPJ), each of the three transmitters' first signals were to be heard, in spite of copious traffic on top-band, enabling the majority of the competitors to take satisfactory bearings. An approximate bearing was given to those two or three teams who claimed to have difficulty in hearing a station, then eighteen cars with a total of 50 crew members roared off into the night at 1930 hours.

Transmitter 'A', manned by Peter Bradley (G3UJO/P) working on 1843kHz, was situated near to the overgrown entrance to a tunnel on the track of a long dismantled railway line at Horspath, near Oxford. Peter, a dedicated camouflager of DF sites for many years, enlarged a Badger's hole (fortunately abandoned by the previous occupants) until he was able to completely vanish underground. The antenna of very fine wire was pushed up through the ground over the hide and over a tree that grew next to it's entrance. It then ran through the bushes and undergrowth for several yards, terminating after about a half wave length, well into the old tunnel.

This site was first located and signed in at 2101 hrs by Ian Butson (G4HKC). A twelfth team actually spent all night at this site without finding our Troglodyte at all.

Transmitter 'B' manned by Colin Boyce (G4XWP) working on 1950 kHz was situated at the summit of Quainton Hill, North-West of Aylesbury. As the access to the top of the hill was such that whatever direction was used, an on foot journey of about three quarters of a mile each way was required, the hidden station was not to be hidden at all as a gesture of goodwill to the competitors. Colin therefore erected a simple Marconni 'Tee' between two tall trees that grew near the crest of the hill and simply sat under the bank between them. Colin discovered that DF teams must develop a form of tunnel vision as they get in the area of the hidden station as he watched nearly every team examine every likely looking bush and clump of grass that might just hide a rabbit, while totally ignoring the 'Yokel' watching them on the side of the field. Min Standen (G0JMS) was the first of 14 competitors who located this station, at 2125 hours.

Transmitter 'C' was placed at a nature reserve close to Great Kimble, near Princes Risborough. Trevor and Colin set up the antenna at this site using about two wavelengths of fine wire in a semi-circular pattern round the thickly overgrown site. So well was the spot for the transmitter hidden, that the operator Ron Ray (G3NCL) assisted by John (G0JRK) could not find it, or find the aerial to enable then to trace it to the transmitter site. Demonstrating that initiative for which all Radio Amateurs are famous, they erected another simple antenna to enable them to go on the air at 1920 hours. They reported their problem to the organizer on the two meter link who was able to get them into the correct spot (only 15 yards away) leaving the temporary aerial as a 'dummy'.

Following the end of the contest at 2400 hours, everyone taking part and Shirley Hesketh (G4HES) who had come along to observe the event, met at The Clayton Arms, Lane End to enjoy a hot supper and learn the results. The winner this year, Brian Bristow (G4KBB) will be the first to receive a new trophy, presented in memory of Eric Mollart (G6AGE), who died earlier this year, who did so much to promote the cause of Top-Band DF in this country.

The full results are as follows. *G1MPJ*

Pos	Name	Time at 1st TX	Time at 2nd TX	Time at 3rd TX	Club Member
1	B M Bristow	2111	2223	2327	Mid Thames
2	C D Plummer	2107	2224	2330	Mid Thames
3	C M Wells	2114	2225	2340	S Manchester
4	D Holland	2113	2238	2345	S Manchester
5	M J Hawkins	2106	2224	2346	Colchester
6	A Collett	2137	2236	2347	Dartford Heath
7	D Yorke	2114	2225	2348	S Manchester
8	I R Butson	2101	2224	2351	Chelmsford
9	A Simmons	2126	2250	2356	Mid Thames
10	W Pechey	2107	2225	2357	Mid Thames
11	D Newman	2051	2222	–	Northampton
12	M Y Standen	2125	2232	–	Mid Thames
13	B Poole	2139	2312	–	Mid Thames
14	J Drakeley	2106	–	–	Slade
15	G Whenham	2131	–	–	Coventry
16	A Judd	2219	–	–	Mid Thames

Kee Chan (South Manchester) and Richard Kelly (Oxford) also took part but unfortunately did not locate any station this time.

RSGB NATIONAL DF FINAL 1988

Sunday 18 September dawned bright and fine, the day of the RSGB DF National Final competition. This year Colchester and Chelmsford Amateur Radio Societies were jointly responsible for organising the event in the 75th Anniversary year of the RSGB. For DF participants this was also a most memorable year, being the 'Diamond Jubilee' celebration of this aspect of amateur radio, it generally being accepted that the first DF contests took place in 1928. At midday 18 teams assembled on the village green adjacent to the church at Long Melford in Suffolk. At 1250 BST good signals were heard from all three transmitters; the competitors took their bearings, made their deliberations and at 1300 BST departed in search of the hidden transmitters.

Station A, G4PQY/P operated by Alan Williams was located in the Kings Forest at West Stow Field to the north of Bury St Edmunds about 16·5 miles NNW of the start. Alan was located in undergrowth which also included trees blown down in the gales of last year. Following a fairly long run through the forest in the heat of the autumn afternoon some competitors were then faced with the prospect of traversing uprooted trees. For those who have not attempted this activity a degree of difficutly ensued and various choice words and threats were heard to the amusement of the transmitter operator.

Station B, G4JAA/P was located in undergrowth in a small wooded area at Cornard Country Park to the South East of Sudbury, about five miles SE of the start. This was a 'first' for National direction finding, being the first time that a hidden station has been operated by YLs. Pat Hawkins, G4JAA was station operator, assisted by Pat Butson, G4HKB, both being XYLs of the organisers. Several competitors found the wetter areas of the nearby River Stour more interesting than the real transmitter's location, but eventually located the ladies. In all, 16 of the 18 competitors found this transmitter.

Station C operated by Paul Clark was located 11·5 miles ESE of the start in heavy undergrowth at the side Hadleigh Railway Walk. To reach the site of this transmitter required a walk of at least ¾-mile from any direction and since the transmitter was operating under the call sign G0BTH/P competitors were half expecting to be greeted by the assistance of the dummy transmitter operator 'Fred'. In this they were not disappointed. Fred had been positioned in the dry culvert of two which passed beneath the disused railway track. The other culvert carried a fast flowing brook. Antennas abounded in the area and it was evident that many competitors had been deceived into entering both culverts following antennas in the hope of reaching the transmitter. An elaborate antenna system was used with the actual hidden station being located some distance from the dummy. These ploys caused many of the competitors a considerable amount of difficulty, wasted time and frustration, but eventually the real TX was located by most competitors.

After the event, 62 persons enjoyed a sumptuous buffet tea at the Club House of Sudbury Town Football Club, where Willie McClintock, a recent past-president of the RSGB presented the '1950 Council Trophy' for DF to a worthy winner, Andy Collett of the Dartford Heath Club. Other prizes, including one for the first lady in a competing team, were also presented. A very special "Booby Prize" was also presented to the most unlucky competitor in the contest. This was adjudged to be Bill Pechey, G4CUE for although he found three transmitters, the third was located just after the end of the contest. The condition of this prize was that the recipient should read the description of this 'fine' wine from the lable upon the bottle. This was duly done to the merriment of the audience. Willie thanked the organisers for an excellent contest, and hoped that everyone had enjoyed it, and personally hoped that he may attend again, perhaps in the future as a competitor!

G3TRY

NATIONAL DF FINAL RESULTS

Ps	Name	Club	Time of arrival Stn A	Stn B	Stn C
1	A Collet	Dartford Heath	1614	1451	1412
2	G Whenham	Coventry	1614	1520	1443
3	A Simmons	Mid-Thames	1621	1520	1432
4	B Bristow	Mid-Thames	1622	1521	1431
5	C Plummer	Mid-Thames	1624	1523	1432
6	P Lisle	Mid-Thames	1627	1521	1432
7	D Holland	Sth. Manchester	1629	1521	1432
8	C Wells	Sth. Manchester	1629	1403	1500
9	W Pechey	Mid-Thames	–	1532	1442
10	A Malbon	Mid-Thames	–	1537	1431
11	K Chan	Sth. Manchester	–	1450	1541
12	D Newman	Northampton	1418	–	1548
13	C Metcalfe	Mid-Thames	1428	1554	–
14	P Larbalestier	Devies	–	1554	1444
15	B Poole	Mid-Thames	–	1558	1449
16	T Gage	Mid-Thames	1441	1610	–
17	R Pearce-Boby	*	–	1417	1620
18	A Judd	Mid-Thames	1438	–	1621

* RSGB Rep. (Non-qualified guest)

IARU/RSGB 432MHz-24MHz Contest results

Entries for this contest were slightly up on last year, particularly on the higher bands and it was good to see the large increase in single-operators on 2·3 and 3·4GHz. Nevertheless many contestants commented on the lack of activity from the UK, one in particular mentioning the number of known 24GHz operators who could not be persuaded to come out of the woodwork. He suggested that the committee provide incentives and this will be considered, although getting bundles of used fivers could be a problem.

Conditions varied considerably from poor in the North to above average in the South, many stations reporting a good dawn lift. Logging standards were good although several stations claimed crossband contacts which do not count for points.

Congratulations to all the winners, certificates will be awarded as appropriate and the logs forwarded to Finland for IARU adjudication. *G4WAD*

Multi Operator Band Positions

Pos	Group	Pts	432	1·2	2·3	3·4	5·6	10	24
1	Hadrabs CG	4733	2	1	4	1	–	2	1
2	Wulfrun CG	4629	1	3	3	3	1	1	–
3	Martlesham & Bracknell CG	2546	3	2	1	–	–	–	–
4	South Birmingham RS	1794	–	5	2	2	–	–	–
5	Flight Refueling ARS	1613	5	8	–	–	1	3	–
6	Five Bells	901	6	4	–	–	–	–	–
7	Three Spires CG	804	4	6	–	–	–	–	–
8	South Manchester RC	676	7	7	5	–	–	–	–
9	His & Hers CG	70	8	–	–	–	–	–	–

Single Operator Band Positions

Pos	Callsign	Pts	432	1·2	2·3	3·4	5·6	10	24
1	G3JXN	3000	1	1	1	–	–	–	–
2	G6DER	1863	5	3	2	2	–	–	–
3	G4PMK	1384	7	5	4	2	–	–	–
4	G4LRT	1092	–	9	5	1	–	–	–
5	G4NBS	946	6	2	–	–	–	–	–
6	G8HHI	826	2	7	–	–	–	–	–
7	G4ZTR	691	–	4	3	–	–	–	–
8	G1GEY	600	4	8	–	–	–	–	–
9	G8ZQB	582	8	6	6	–	–	–	–
10	G1HLT	250	9	–	–	–	–	–	–

432MHz Multi Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	G8KQWP	89535	319	90JO	400	8x19Y	F6ISI/P	845
2	G8PUB/P	79707	281	01QE	350	2x21Y	EI5FK	689
3	G4MRS/P	52419	204	01QX	300	4x17Y	HB9Z/P	756
4	G4HRY/P	41639	226	91RU	300	6x21Y	F6ECI	742
5	G0FRR/P	40778	166	80UU	400	4x24QLY	DC5NA	813
6	G8ZHP	37669	170	92TR	400	8x21Y	FC1EAN	677
7	G3FVA/P	21103	93	93EH	180	4x23Y	DL1ZC/P	838
8	G6YLJ/A	6242	36	91RQ	30	2x48M	DK0BN/P	615

432MHz Single Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	G3JXN	16489	94	91UM	100	2x21Y	F6KSX/P	659
2	G8HHI	11503	52	910H	400	2x21Y	DC9BJ	632
3	G6YLW	8371	36	01HI	50	2x217Y	DF0GBT	545
4	G1GEY	7776	30	94FW	100	17Y	F6CTT/P	617
5	G6DER	6268	31	93GN	60	21Y	F6CTT/P	464
6	G4NBS	5748	28	02AF	100	21Y	F6KSX/P	728
7	G4PMK	5344	25	93GT	70	19Y	F6CTT/P	492
8	G8ZQB	4355	29	92JN	40	191	PA0PLY	424
9	G1HLT	4125	19	93KD	30	48M	PA0GUS/P	439
10	G8XYN	3538	17	910M	10	46M	F6KSX/P	668
11	G3ILO	2413	10	81VQ	10	19Y	F6HPP/P	472

432MHz SWL

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	BRS31976	3156	26	01HO	–	19Y	–	–

Check log received with thanks from G2DHV

1296MHz Multi Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	G4PUB/P	22175	82	01QE	300	55Y	HB9AMH/P	614
2	G3UAX/P	21301	97	01QX	150	1m Dish	FC1EAN	599
3	G8IFT/P	15276	68	90JO	100	8x23Y	F6KSX/P	585
4	G4SIV	10638	42	92TR	150	1·8m Dish	DK1VC	559
5	G8OHM/P	9073	60	92GB	100	4x23Y	PA0GUS/P	482
6	G4IEV/P	7519	58	91RU	25	2x55Y	–	–
7	G3UHF/P	4396	33	93EH	85	4x23Y	PE0MAR/P	415
8	G4RFR/P	3238	20	80UU	100	8x50QLY	G3UAX/P	283

1296MHz Single Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	G3JXN	8564	55	91UM	80	4x23Y	PA0GUS/P	431
2	G4NBS	5112	28	02AF	10	4x23Y	PAGUS/P	379
3	G6DER	3988	22	93GN	100	1·4m Dish	PA0PLY	456
4	G4ZTR	3290	25	01LV	100	55Y	PA0GUS/P	334
5	G4PMK	3107	21	93GT	60	23Y	G8IFT/P	356
6	G8ZQB	2554	22	92JN	50	27QLY	F6GIF/P	307
7	G8HHI	1096	7	91OH	40	55Y	ON4ALC	284
8	G1GEY	667	5	94FW	5	23Y	G8XVY	183
9	G4LRT	425	4	92KJ	25	27QLY	F6GIF/P	282

2320MHz Multi Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	G4DDK/P	4410	25	01QX	7	1·2m Dish	PE0AGO	349
2	G30HM/P	3716	24	92GB	25	1·3m Dish	PA0EZ	456
3	G8IFT/P	3685	20	90JO	20	1·3m Dish	F6KSX/P	585
4	G4JAR/P	3650	21	01QE	40	1m Dish	DJ6EP	378
5	G8SMR/P	1068	9	93EH	4·5	1·2m Dish	G8IFT/P	302

2320MHZ Single Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	G3JXN	4554	25	91UM	25	1·2m Dish	PA0GUS/P	431
2	G6DER	1772	10	93GN	30	1·4m Dish	PE0MAR/P	414
3	G4ZTR	1399	11	01LV	5	66QLY	PE1ALA	261
4	G4PMK	312	5	93GT	5	0·6m Dish	G6PHJ	137
5	G4LRT	192	4	92KJ	8	46QLY	G8SMR/P	107
6	G8ZQB	91	3	92JN	4	270QLY	G30HM/P	58

3456MHz Multi Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	G4EPP/P	1571	8	01QE	5	1·2m Dish	PA0EX	288
2	G3OHM/P	851	6	92GB	20	66QLY	G4EZP/P	220
3	G3FYX/P	163	1	90JO	0·15	1m Dish	G3OHM/P	163

3456MHz Single Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	G4LRT	43	1	92KJ	0·5	BeerCan	G3OHM/P	43
2	G4PMK	27	1	93GT	2·5mw	0·6m Dish	G6DER	27
2	G6DER	27	1	93GN	20mw	0·6m Dish	G4PMK	27

5·6MHz Multi Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	G3FYX/P	83	1	90JO	50mw	0·6m Dish	G3YGF/P	83
1	G3YGF/P	83	1	80UU	50mw	1·2m Dish	G3FYX/P	83

10GHz Multi Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	G3FYX/P	656	8	90JO	0·25	0·5m Dish	G8LSD/P	145
2	G4EZP/P	98	1	01QE	0·25	0·6m Dish	G0BPU	98
3	G3YGF/P	83	1	80UU	5mw	1·2m Dish	G3FYX/P	81

24GHz Multi Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best dx	km
1	G4EZP/P	18	1	01QE	7mw	0·4m Dish	G6JAD/P	18

70MHz CUMULATIVE CONTEST RULES AMENDMENT

Time should read 1000-1200GMT 29 January.

BARTG SPRING HF CONTEST RESULTS 1989

Single Operator

Pos	Callsign	Score	Pos	Callsign	Score
1	TG9VT	1,030,160	74	KC2FD	105,144
2	UZ9CWA	831,600	75	F6BVB	104,060
3	SM4CMG	821,184	76	HA8BI	101,420
4	I20LW	744,192	77	G3HJC	100,576
5	WB5HBR	649,908	78	F6AUS	96,684
6	G4PKP	538,692	79	UA3TN	91,060
7	NL4483	518,000	80	W8LNK	89,862
8	IA5PLP	510,112	81	W0HAH	89,658
9	OH2LU	504,384	82	W3KV	89,440
10	3C1MB	489,440	83	HP1AC	86,800
11	DJ6JC	487,236	84	VK2BQS	75,432
12	K6WZ/O	462,852	85	W8PBX	75,240
13	NTOV	460,528	86	SM5AAY	72,450
14	ZC4JA	450,934	87	PY6ACP	70,144
15	K7LXC	404,984	88	IK1DFH	68,240
16	WOWP	399,632	89	VE7DTA	62,712
17	SM6ASD	370,862	90	VK7AE	56,610
18	ABOY/4	367,092	91	VK2SG	53,312
19	AA5AU	360,640	92	G8VF	53,200
20	OE2DAN	357,768	93	VK3EBP	52,032
21	G0ARF	342,472	94	OH2BYS	51,000
22	VE6ZX	337,343	95	OK1MP	49,290
23	G0ATX	336,896	96	DK3JU	48,576
24	AL7BB	320,394	97	VE3ST	48,236
25	PT2BW	318,240	98	EA8AKQ	45,000
26	CR6AUR	316,370	99	VK2EG	44,400
27	OK2FD	316,260	100	IN3NHZ	43,296
28	N6GG	314,292	101	VK1GN	42,100
29	JH1BIH	307,476	102	G0BRY	42,056
30	A22BW	297,900	103	G3XON	40,658
31	YU7AM	294,270	104	W2JGR	40,078
32	VK5RY	285,360	105	YU3HJ	38,502
33	W6JOX	278,214	106	Y51XO	38,192
34	G0AZT/W6	275,060	107	WA8FLF	35,224
35	N9CCI	271,260	108	Y23NI	34,720
36	7J6CAS	266,604	109	KD2HE	34,074
37	KE0KB	263,190	110	WA9FBV	33,852
38	SP5DED	259,200	111	G0IUW	33,280
39	DL3YBL	258,148	112	DL8QP	33,250
40	KI4MI	257,868	113	Y67RG	31,230
41	Y79XN	253,528	114	DF5BX	29,900
42	HB9DCQ	253,344	115	GM4VDI	29,140
43	W7MI	248,818	116	FK8AH	28,960
44	KH6UL	244,650	117	SM4LLP	28,044
45	JA1DFQ	242,176	118	OH5VL	27,930
46	I2HEO	226,260	119	I41BR	27,748
47	Y38CG	225,164	120	FE6FNI	27,360
48	Y76ZL	213,568	121	JA2NNF	26,928
49	I2WEG	199,424	122	YB0QC	25,252
50	PA3DBS	195,130	123	Y24ZM	25,200
51	YV5AKJ	184,952	124	SK4BX	22,898
52	W5HEZ	183,616	125	OK1AMS	22,616
53	YO21S	180,498	126	Y24MB	21,840
54	HC8GR	168,764	127	WB2CHO/6	21,480
55	KA1GET	167,832	128	I0KHP	21,360
56	LZ2OV	162,624	129	HA8AL	21,120
57	ZL2AKI	161,436	130	KA1LMR	21,084
58	SP9BCH	158,790	131	Y54OL	20,983
59	Y27AO/A	151,097	132	IK2IKW	17,708
60	WB4UBD	145,026	133	VE7VP	17,240
61	YV5IZE	144,000	134	Y26QL/A	14,872
62	AI7B	142,426	135	SP3BGD	14,110
63	WA6WGL	141,700	136	DK5KJ	12,960
64	Y22UL	141,120	137	PA0KHM	12,120
65	SM7BGE	138,024	138	Y84CL	11,762
66	HA5CP	136,820	139	Y43ZB	10,530
67	SM5FUG	125,008	140	Y22HA	9,960
68	HA6PX	124,932	141	ZL2BRO	8,832
69	IV3UT	124,196	142	YO2DNO	6,768
70	W3FV	123,660	143	WA3JXW	5,040
71	F6GMB/P	119,080	144	Y64ZF	3,120
72	ZC4NC	109,662	145	HA8XF	3,000
73	WB6ZHN	109,120			

Multi Operator section

Pos	Callsign	Score
1	WA7EGA	1,143,296
2	NG7P	1,081,880
3	HD5G	1,046,220
4	KT1N	1,024,974
5	LZ2KIM	678,720
6	LZ1KDP	617,568
7	4U1UN	475,300
8	G3UUP	464,520
9	4N7M	378,240
10	HA5KAG	337,610
11	LZ1KKR	317,374
12	OK3RJB	299,040
13	OK3KG1	183,376
14	YU7BZD	136,524
15	OK3KII	135,120
16	YO5KDW	12,960
17	DF0DG	8,030

SWL section

Pos	Callsign	Score
1	ONL383	544,036
2	Y32-10-F	371,544
3	G8CDW	257,136
4	G6LAU	215,080
5	F11ADB	175,000
6	IW5-AFB	173,944
7	Y32-01-F	121,932
8	DE1GMH	94,815
9	Y56-05-F	43,456
10	Y32-08-F	43,344
11	Y55-02-J	26,796
12	OK2-32762	15,876
13	Y44-12-F	8,636

Check Logs: WA9TMU, SP5IYU, G1DPL, SM5APS, KH2F, IK2ECX, G4SKA, Y55ZF, HA5FA, VE7ARS, G2BUY, DF9XI, PA3AFD, IK1AMC, KA7IVA, LZ2KRR.

CONTESTS CALENDAR

RSGB HF CONTESTS

2 Feb	1·8MHz Cumulative
4 Feb	3·5MHz Cumulative
5 Feb	7MHz Cumulative
10 Feb	1·8MHz Cumulative
11 Feb	1·8MHz CW
25, 26 Feb	7MHz CW (Oct88)
11, 12 Mar	Commonwealth Contest (Jan89)
2 Apr	Ropoco 1
10 Apr	28MHz Cumulative
16 Apr	Low Power Fixed
18 Apr	28MHz Cumulative
26 Apr	28MHz Cumulative
4 May	28MHz Cumulative
12 May	28MHz Cumulative
21 May	Region Roundup
3, 4 Jun	NFD/Region 1 CW Field Day
24, 25 Jun	Summer 1·8MHz
8, 9 July	SWL
16 July	Low Power Field Day
6 Aug	Ropoco 2
20 Aug	Hopscotch
2, 3 Sep	SSB Field Day
8 Oct	21/28MHz Phone
9 Oct	28MHz Cumulative
15 Oct	21MHz CW
17 Oct	28MHz Cumulative
25 Oct	28MHz Cumulative

Region Roundup and Hopscotch are under review and may be replaced with similar type events. Please watch RadCom for further information

RSGB VHF CONTESTS

5 Feb	432MHz Fixed & AFS & SWL (Jan 89)
12 Feb	70MHz Cumulative (Jan 89)
26 Feb	70MHz Cumulative (Jan 89)
4, 5 Mar	144/432MHz & SWL (Jan 89)
11 Mar	South Manchester Quad Night DF
12 Mar	70MHz Cumulative (Jan 89)
26 Mar	70MHz Cumulative (Jan 89)
9 Apr	50MHz Fixed (Jan 89)
9 Apr	10GHz Cumulative
23 Apr	70MHz Fixed Station Contest
6, 7 May	432MHz-24GHz Trophy Contests & SWL
14 May	10GHz Cumulative
27, 28 May	144MHz & SWL
18 Jun	50MHz Trophy & SWL
25 Jun	10GHz Cumulative
1, 2 Jul	VHF National Field Day
16 Jul	10GHz Cumulative
5 Aug	144MHz Low Power & SWL
6 Aug	432MHz Low Power & SWL
13 Aug	10GHz Cumulative
2, 3 Sep	144MHz Trophy/IARU VHF & SWL
10 Sep	10GHz Cumulative
17 Sep	70MHz Trophy & SWL
7, 8 Oct	432MHz-24GHz/IARU UHF/SHF
13 Oct	432MHz Cumulative
21 Oct	1·3/2·3GHz Cumulative
29 Oct	432GHz Cumulative
4, 5 Nov	144MHz CW
6 Nov	1·3/2·3GHz Cumulative

OTHER CONTESTS

4 Feb	WAB 1·8MHz Mixed Mode
4 Feb	Vermont QSO Party
11 FEb	YLRL YL-OM Contest (Phone)
18 Feb	ARRL International DX Contest (CW)
25 Feb	YLRL YL-OM Contest (CW)
25, 26 Feb	French HF SSB Contest (Jan 89 HFN)
4 Mar	ARRL International DX Contest (Phone)
11 Mar	BART Spring RTTY
18 Mar	The Bermuda Contest
15 Apr	VHF/UHF RTTY
21 May	WAB LF Phone
18 June	WAB 144MHz SSB QRO
9 July	WAB 144MHz SSB QRP
9 July	WAB 432MHz SSB
8 Oct	WAB 50MHz

First Tuesday each month 144MHz Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)
First Thursday each month 432MHz Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)
First Monday each month Microwave Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)
Dates of publication of rules in RadCom are shown in parentheses

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FOR SALE.

● G8kW trapped dipole and W2AU balun: £12. Trio lowpass filter: £18. Trio mic MC42S: £10 new. Full size G5RV made, but never used: £6. 3.7 traps new: £7. 0740 51938 eve.

● FT401B tcvr with SP401 spkr and YD844 mic: £160. FRG7700 rcvr: £210. Datong AD370 active receiving antenna: £30. G4FLW QTHR. 0803 842844.

● G2DAF TX and PSU. G2DAF RX. Cossor 1045K 4in scope. Cash Offers. QTHR. 0772 616929.

● TRIO Kenwood SM220, plus BS8 pan display. Little used, with inst. book and orig. packing. Offers. GM2FVV QTHR. 0786 811237.

● FT757GX tcvr: £630 ono. FT221R 2m multimode: £300. VIC20+ complete RTTY system computer G5LIV modem: £100 ono. Antenna tuner: £30. Extra VIC20 computer complete: £40. G3XMA QTHR. (Coventry) 0203 410208.

● AMERICAN Swan-500 and matching spkr/PSU. 400W 10/15/20/40/80m valve rig (c/w orig. inst. manual) in exc. cond. Ideal for new licensee to try HF bands before investing in new HF equip. Serious offers around £250. Buyer collects. G4GKO QTHR. 07918 2491.

● RS232 T-switch selecting eg modem or terminal unit to computer port. Front panel A/B, 25-pole change-over rotary switch wired to rear panel, three 25-way D-sockets. Fully shielded metal case. New, boxed, inc post: £18. GM4XUS QTHR. 0506 843639.

● PHILIPS colour monitor type CM8833 RGB analogue, TTL and composite video inputs. 2 mths old. Unused. Offers. G4ZEK. (Colchester) 0206 851343.

● SILENT key HF station. KW202 RX, KW204 TX 1.8-30MHz SSB. Both with circuits and manuals plus desk mic and Homebrew ATU: £100. Buyer collects please. G4KZA. 01-868 5881.

● DAIWA auto antenna tuner CNA1001 500W PEP model. With dummy load, cross needle meter load with 1/5/10W. Exc. cond: £100. Plus carr. G0EYN QTHR. (Mansfield) 0623 556509.

● BARGAINS: Kenwood TR9130 TX/RX, genuine reason for sale, mint: £320. 5A PSU/charger (for TR2300): £15. Homebrew 5A PSU: £10. Icom ICB1050 10m FM TX/RX: £30. Zetagi 80W amp for 10m: £30. Try an offer? G4UWW. (Colchester) 0206 395720.

● ALTRON AQ620 spacesaver 3ele beam 6/10/15/20m: £75. Hirschmann RO250 rotator: £30. Microwave Modules MMT144/28 tvtr 10W output: £75. MML144/50S linear amp 10W input, 50W output: £75. G0DFA not QTHR. (nr Bognor Regis) 0243 696838.

● FT290R Mk1, mic, leather case, nicads and charger. Looks new: £250. 9ele crossed Tonna with Skyking rotator, cables etc: £60. FT290R mobile bracket: £10. Spare set of nicads for 290R: £10. G0IOK. 01-904 3282.

● SWAP 6 berth frame tent, VGC plus stove, gas cylinder, table etc for PSU, ATU, filters (FL3) handheld WHY? G0CTC QTHR. (Formby) 07048 76669.

● COLOUR TV 20in. Full remote control. Monitor style cabinet: £150 ono (buyer arranges delivery). RadCom Jan 1981 to latest issue: £5 or free to clubs. G4CDW QTHR. (Cirencester) 0285 652036 eve only please.

● G3HXJ silent key. TR820S: £550. MC60A: £60. TS700G (all-mode VHF): £280. HamIII rotator complete: £250. P60 Versatower complete: £500. Jaybeam TR3MKIII: £260. Hilomast 40ft: £100. 6146B: £18 pair. Test gear, mics. SAE lists. G3ION QTHR. (Southampton) 0703 769706.

● FT901DE good cond. FM fitted. CW filter fitted: £500 ono. 2m tvtr 28 IF: £75. Poss. part exch. mobile gear WHY? G0JCN. (Telford) 0952 616166.

● AR88LF VGC: £60. Major 588 multimode CB tcvr for conversion: £45. Colt 10FM unused: £30. Eddystone 730/4 comm. RX, mint: £100. Wanted: Racal RA17 in VGC. Would exch. with cash adjustment. GW0FPY, 4 Bryn Deiniol, Valley Rd, Llanfairfechan, LL33 0SR.

● HEATHKIT aerial tower fully self-supporting 32ft high. 10/15/20m beam aerial CDE AR22R antenna rota and control box. All with fitting inst. Buyer dismantles. Any sensible offers. G3SZB. 01-568 6319.

● FT102 FM board, CW narrow filter, mic, boxed with full inst. Good as new: £575. Could deliver to Birmingham area. GW4URC QTHR. 0222 794190.

● QTH for sale Grantham. Large 3-bed detached with garage. Lounge, dining room, utility room, kitchen. Good size garden will take 80m dipole. No problems with mast/beams. Good for VHF/UHF. Offers near £74,950. (London just 55mins intercity). 0235 32653.

● FT101B in as new cond. Spare PA's, inc WARC bands: £295. FL2100B linear, recently professionally overhauled, and re-valved. Superb cond: £360. Two together: £625 ono. G4KGG QTHR. 0509 268561.

● YAESU FT726. 2m HF, 6m 70cm modules will separate: £1100. Linear MM144/100S: £85. MM432/50: £85. Going QRT. G6MSM QTHR. 0323 840209.

● CHALLENGER (Black Jaguar) MkII 'BJ200'. AM/FM selectable portable keypad scanner, 26-29.995MHz, 50-88MHz, 115-178MHz, 200-280MHz, 360-520MHz (although found to exceed these specs). 16 memories, c/w case, charger, manual and box. ONLY 1 mth old, therefore in immaculate cond. (See HRT, June 1988): £170 ono. Icom IC2E 2m FM synthesised handheld, c/w spkr/mic, 3 battery packs and nicads, mobile charging lead, case, charger. In good cond: £135 ono. Adam, G0GRA QTHR. Gainsborough, Lincs. Student, therefore hours flexible. (Torksey) 042771 739.

● YAESU FT221R multimode tcvr. Mains battery with mic. Bound inst. manual. Good cond: £190. Jaybeam Q42M with assembly inst. Erected in loft but not used: £15. Stephen James Mk2 multi-tuner ATU: £10. G4KVF QTHR. 061-652 7825.

● YAESU FT757GX all-mode tcvr. BNOS PSU 12/25A. As new. FC700 ATU. Datong auto RF speech processor. Yaesu MH1 scanning mic. Pair phones. All in orig. boxes: £875. Buyer to inspect and collect or pay carr. 0282 34688 anytime.

● KENWOOD TS940S with auto ATU: £1650. Kenwood TS140S: £650. Kenwood TS711E: £650. 2m Tokyo HY mast head preamp: £70. Kenwood scope SM230: £190. BBC-B computer inc disk drive, WP programs: £280. Spkrs for above radios: £50 each. Not QTHR. 0872 560373.

● IC290E 2m multimode mobile tcvr, complete HM10 scanmic, all packing and supplied accessories, manual etc. Super rig: £290 ovno. G6MUV QTHR. 0424 210113.

● ICOM IC275E, mint cond. Includes optional 500Hz filter, high stability local oscillator: £725 with boxed 9ele Tonna thrown in. First come, first served. G4PLZ. 061-439 4136 eve-w/e.

● TRIO TL922 linear, in exc. cond, boxed with manual: £750. Sony ICF7600DS rcvr, c/w earpiece, case, manual, ext. aerial, in exc. cond: £110. Lowe Elect. HF125 gen.cov. rcvr, 30kHz-30MHz, FM board fitted, PSU, manual, 6 mths old: £325. MM tvtr 144/28, 10W output. VGC: £80. Also MM432/144, 10W output, also VGC: £80. Would consider part exch. on TL922 ie: HF gear or 2m gear plus cash. Ian RS84695. 0692 82075 day.

● TRIO TS430S HF gen.cov. TX/RX with 500Hz CW filter, AM filter and FM board purchased and fitted by Lowe. Orig. box etc. Immaculate cond: £620. MM 28/432 tvtr: £60. Ant. Silver 70 14ele 70cm beam: £20. G4RWO. 0229 23287.

● LAFAYETTE HA350RX amateur bands top to ten: £50. Eddystone S640RX gen.cov. 1.6MHz, 31.0MHz: £30. Rank basestation TX/RX 71MHz, 19x12x15in, heavy: £10. Box mixed xtals, FT243, 10X etc: £2. All ono. GW3XHJ QTHR. 0656 725748.

● HRO 5T orig. PSU. 8 coils inc bandspread, clean: £80 ono. Wanted. Pye A200 linear for 70MHz. GW3UMD QTHR. (Cardiff) 0222 761813.

● YAESU FT301 top to ten, fitted CW filter, matching 25A PSU. Inspect, offer, collect. G5KC QTHR. 0904 703787 until 7pm or w/e.

● KW202, KW204 with manuals, spkr, mic and leads: £240. G3GAD. (Flax Bourton) 027583 2668.

● AQ6-20/3E minibeam 3ele, spare spokes: £60. G4BLG QTHR.

● AL84 linear. Spare set 6LQ6 valves: £250 ono. G0ENW QTHR. 04865 2808 after 6pm.

● HRO orig. full set coils, phones, matching spkr, PSU, manuals plus many spare coils inc some B/S and spare new valves. Also Heathkit HF transmitter DX4OU with matching VFO VFIU, manuals: £120 the lot. G0GHX QTHR. (Wimborne) 0202 880194.

● YAESU FT726 2m, HF, mint cond, boxed: £650. Yaesu FTV107R with 2m: £150. Philips 12in green screen monitor 80cpi, brand new: £60. FT107 spkr: £25. G0ENY QTHR. 0676 23028.

● TNC220: £100. Toni-tuner: £50. ST5 RTTY terminal unit £40. WS2000 modem (auto-dial/answer): £100. Apple 2 computer with 2xdrives and some business software: £200. 30ft telomast: £30. Xerox 820-1 (CP/M) computer with spares, offers. Richard, G3RWL QTHR. 01-366 4297.

● TRIO TS130S mobile bracket, MC50 mic: £450. Buyer collects. G3CSE QTHR. 0707 328831.

● DRAKE TR7 tcvr: £900. Yaesu FT101B tcvr: £300. Yaesu FL2100 linear: £300. Icom IC260E multimode tcvr: £280. Microwave Modules 2/70cm tvtr: £100. Heathkit station monitor scope: £40. Heathkit pwr meter: £25. Ken, G3RQY QTHR. (Norwich) 0603 419967.

● YAESU FT757GX in exc. cond, very little used: £550. G0GGT not QTHR. (Nelson Lancs) 0282 67047.

● FDK750 multimode 10W tcvr: £175 ono. On-air test available. Silent key sale so buyer collects. Mike, G6ZGA QTHR. Phone eve.

● IC551 6m multimode. Mint cond, complete in orig. packing inc operation and workshop manuals, mic, leads, 3ele full size beam: £525. BNOS 12V/12A metered PSU, mint: £85. G4FEQ QTHR. (Castleford) 0977 552862 or write.

● RTTY cvtr. MM2000. Just audio from your RX and connect to TV or monitor. 45.5, 50, 75 buad RTTY 110, 150, 300 baud ASCII: £110. Monitor: £40. Buyer inspects/collects or pays postage. Tony Cox. (Camberley) 0276 79308.

● TPC2000 CP/M computer, 2x5in drives, manuals, RF screened, plus all the software you want: £250. Nascom Imp (serial) printer, old but working with spares and documentation: £25. CP/M software collection, shame to throw away, offers. Richard, G3RWL QTHR. 01-366 4297.

● HALLICRAFTERS Skyrider Defiant model SX24 rcvr. VGC with manual. Offers. Buyer inspects and collects. Collectors item: Bush radio MW/LW. VGC: £30 ono. RS90661. 01-397 2785.

● YAESU FT480R 2m multimode, unmodified and perfect cond. Orig. box and manual: £300 cash, no offers. Also Swan 350 HF tcvr. Exc. cond: £195 ono. G4UWJ. 0428 76301 after 8pm or w/e.

● TEN-TEC Argosy II 1.8kHz filter, audio filter, noise blanker, circuit breaker: £425. G4WDZ. 0480 217026.

● DATONG morse tutor and hi-mound HK706 key: £35 the two. G8EVK QTHR. 0903 501502.

● ICOM IC730 superb cond. FL44A SSB 2 VFO, memo, 2 manuals, HM7, mic: £450. Gould/Advance SW mode PSU 13.8V 16A. List £340 offered at: £110. Complete outfit: £525. Carr. extra. Any test, no offers. G3RHM QTHR. 01-423 2329.

● DATONG FL1 filter: £25. Tasco CWR600 Morsemaster, reads CW, RTTY, ASCII: £75. 100MHz standard uses gold-plated 5X BAE.: £5. Heathkit code oscillator: £10. Heathkit RC bridge: £20. Carr. extra. G3FPJ QTHR. 0364 52238.

● HOUSE moving clearout! Lots of goodies, treasures, junk, etc. Scope, testgear, components, other items that won't fit into the tiny cottage we're moving to. Les. 0785 814643.

● ICOM ICR71E rcvr with FM board fitted. Boxed, mint cond: £450. Buyer must collect please. Ken G1XTT. (nr Watford) 0923 670475.

● PYE Westminsters low-band FM suitable 70MHz: £30. UHF suitable 70cm: £30. One of each requiring attention: £15 each. Advance audio generator: £15. Dual-beam scope: £125. 12V 10A PSU: £20. Shure noise cancelling mic: £10. Phones: £2. G4YVJ QTHR. 0507 85203.

● YAESU FT23R handheld FNB10, case, charger, PA6 DC adaptor/charger: £195. 24cm ATV, Solent TX, Mitsumi RX, 2 aerials: £125. Canon VMEIN camcorder, 2 nicads, case, (8mm). Mint: £600 ono. Weather satellite frame store, scanning rcvr, antenna, preamp: £225. G1NVV QTHR. 0582 668648.

● BBC-B computer with view WP rom and manuals: £150. 14in Novex colour monitor, RGB and PAL inputs in BBC colour scheme with lead for BBC: £95. Philips paper white monitor 80 (new) with BBC lead: £50. John G8BXH. 01-428 0974.

● TRIO TS530SP 10m-160m tcvr in mint cond: £625 ono. Buyer collects. 0287 38103 after 6pm or w/e.

● TRIO TS700 2m all-mode tcvr. Recently realigned by Lowe's. Buyer collects or pays carr: £250. G8CGK QTHR. 0989 62715.

● WINCHESTER disk drive model CM5412. As new. First sensible offer secures. G4WSX QTHR. 0243 783054.

● YAESU FT980 MDI, mic. Little used: £1000. FT209H new FNB4 cell, spkr, mic, YH2 mic, headset, NC15 base charger, PA3 car adaptor, Welz 2DB antenna: £275. Hi-mound marble base, key: £30. All ono. G4XJI QTHR. 0527 25928 or 45158.

● YAESU FT290R: £215. Icom IC2E: £139. Icom IC4E: £150. Icom spkr/mic: £10. Microwave Modules MMS2 speaking morse trainer: £99. RM940 infra-red mobile mic: £30. Hi-mound HK704 morse key: £15. Trio TR2200GX 2m TX/RX, xtals for 15 channels, requires mic: £50. Packer AT145 2m ATU: £10. Gen.cov. rcvr, Realistic DX200, requires new dial cord: £25. Kenda DMFS for BBC micro: £25. G4FTG not QTHR. (Maidenhead) 0628 22187.

● YAESU FRG8800 gen.cov. rcvr 150kHz-30MHz with FRV8800 VHF cvtr 118-174MHz. All boxed, as new and immaculate: £500 ono. Buyer collects or pays carr. Ian G7APP. (Suffolk) 0359 70527 after 6pm.

● TRIO R1000 rcvr plus KX2 antenna coupler. Exc.cond: £230 ono. G3UUG QTHR. 0622 831173.

● PHILIPS D2999 synthesised semi-comm rcvr. 150kHz-30MHz cont. plus FM. BFO. keypad frequency selection. 16 channel memory. Mains/batt. Integral whip aerial. As new: £150. G3GIB QTHR. 0442 862814.

● RECEIVERS. Racal RA17L and Yaesu FRG7 with SSB filter: £120 each. 0902 781726.

● SHACK clearout. BNOS LPM10/100 70cm linear: £195. Kenwood TR9500 with BO9: £325. Sommerkamp TS788DX 26-30MHz: £160. Pocket phones, charger and spares: £20. BXx2 TNC with PBBS: £85 ono. G4XAK QTHR. 061-945 2561.

● YAESU FT902DM HF all-mode tcvr. Unmarked, mint cond: £575. Ian, G0FNF QTHR. (Lincs) 0526 833059 after 5.30pm.

● AR2002 scanning rcvr. 25-550MHz NFM. 800-1300MHz AM, WFM. c/w 12V PSU, antenna and operating manual: £350. G6FDJ. (Lyme Regis) 02974 5307.

● YAESU FT208R handheld for 144MHz c/w NC8 fast charger, spkr/mic and leatherette case. Ideal second set for packet or portable use. Exc. cond: £165 ono. GM4SUF QTHR. 086282 246.

● COMPUTER Apricot portable 256K-ram. Single 3.5in disk drive. LCD screen, monitor socket. RS232 expansion parallel printer ports. MSDOS 2.2 software inc WP, Basic, Spreadsheet, Speech, Diary and assorted utility programs. Complete in case. Good cond: £220 ono. GM4SUF QTHR. 086282 246.

● ERA microreader CW/RTTY plus morse tutor. Upgraded VDU, brilliant performer, unexpired warranty. Mint, manual: £85. RTTY terminal and interface kit built with own PS. Bar graph indicator. Handbook, bargain: £30. Valve QQVO6-40A with socket: £15. G0EZW QTHR. 0773 810010.

● TRIO TH41E 70cm handheld. Immaculate cond. c/w battery, soft case and charger: £120 ono. John G6YRB. (Skelmersdale) 0695 33499 eve-w/e.

● YAESU FT101ZD FM CW filter. VGC. New PA's: £395. Yaesu FT7 with mobile mount. Exc.cond: £220. Trio 2m FM HH TR2400 with base, stand, charger, STI. VGC: £145. 0203 450476 after 6pm.

● TRIO TR9130 2m multimode: £350. Icom IC2E 2m h/held: £150. Both boxed with manuals. Little used. Selection of resistors, caps, trs, ICs etc. Offers. G6NHS QTHR. 091-469 6408.

● FT101ZD exc.cond: £395. Kenwood TR7850 as new: £180. PSU: £15. All aces, manuals, packing etc. Capco SPC 3000 ATU: £195. Prefer buyers inspect and collect or carr. extra. GW3CBA QTHR. 0446 741520 anytime.

● ST5MC terminal unit plus TX3 program for CBM64: £82.50 includes postage. Or swap for memory keyer or scope. Kevin, GI4SNC QTHR. 05047 66151.

● QRT sale: IC260E. 3 mics. M/mount. IC02E. Case, spare battery and whip antenna. Charger. Not used. Immaculate. Drae; 12A PSU, wavemeter, 3-way switch. Welz 15W d/load. Hansen FS302M 50-150 swr/pwr meter. 5/8 colinear. 4CX250BC plus base, chimney. RSGB books: RadCom H/book 5th ed. Test Equipment 2nd ed. Amateur Radio Techniques 7th ed. ARRL: Understanding Amateur Radio. All in pristine cond. All above goodies orig. boxed. Offers invited please. G4ZMY QTHR. 0705 467583 eve.

● HQ-1 HF mini-beam 6/10/15/20m. 6 mths old: £105. HF5 vertical: £35. Nikon FE2 SLR camera, black with Nikkor 35-105mm f3.4/4.5 zoom lens, boxed with Vivitar 550FD dedicated flash, used five films only. Fantastic bargain: £320. Ken. (Beds) 0525 222163.

● RACAL 9084 synthesised sig. gen. 10kHz-104MHz in 7 bands, 1Hz steps. AM/FM reverse power protection. Very high stability, c/w handbook. Fine cond: £500. Cost £5k new! Trio Kenwood TS711E: £625. VGC. Motorola UHF basestation: £20. G4AJE (Cambs) 0354 741168.

● YAESU FT101ZD Mk3 with FM, fan and mic. Immaculate working order with WARC bands: £475 or offers including Hansen FS301MH swr/pwr meter and 1kW filter. 01-398 0043 eve.

● YAESU 726 satellite module: £40. Cue Dee 17432 70cm antenna (new, unused): £38. Icom 1200E (latest model) 23cm. mobile/base tcvr, mint: £400. Yaesu SP102 extension spkr, mint: £55. Jaybeam D15/23 23cm yagi (unused): £29. Paul G4XHF. 0293 515201.

● 12/24V cvtr TX/RX assys separate 600/250 195TX. 170/90RX. Neg 90/30 stab. superior commerical equip H/B case suitable KW2000: £25. Recorder spools, qty 35. Speeds 3.75/7.5: £30. Mostly classical 7in LP all tabulated. Can erase. G2BPC QTHR. 0638 742998.

● IC251E with Mutek front end and Icom desktop mic. VGC. Boxed: £450. Linear MML 144/LS 100W output. Boxed: £100. GW6UPW QTHR. (Barry) 0446 744985.

● DATONG morse tutor. Good cond: £35. G6DCR QTHR. 0539 32047.

● TOKYO hy-power HT106 50MHz SSB/CW tcvr, fitted noiseblanker with matching HP100S mains PSU. All boxed and as new: £350. Buyer also gets free 4CX250B amp. Will swap for FT221R TS700S in good cond. John, G8KBQ QTHR. (Somerset) 0458 34105.

● MINT Pye PF2UB handheld, converted 70cm with good nicad spkr/mic, 3-channel: £30. Pye Europa MF25FM, 6-channel, low-band FM: £40. Mint 4CX250 bases and chimneys, HF bases: £6. VHF bases: £10. G8KBQ QTHR. 0458 34105.

● FT208R with accessories. Boxed with manual: £160. FT708R with accessories. Boxed with manual. Also NC8 deluxe charger stand: £195. G8LPY QTHR. 0903 32880.

● SEM QRM eliminator, Heathkit HR1680 amateur bands RX, pair new GE6146B, Beckman capacitance meter. All VGC. N. Cameron, EI4DZ. 16 St. Mary's Cres, Westport, Co. Mayo, Eire.

● FTONE with FM, VGC: £900 ono. FC102 ATU, VGC: £160. ono. Would exch. both for FT757 and ATU or similar. Also AMT2 and rom for BBC: £125 ono. Derek, GM0HLV QTHR. 04312 242.

● VERY good FT200. Orig. boxes, handbook: £225. Eddystone valve RX 640S. Works fine: £45. 12-core screened cable, cheap. Del G0DLN. 01-657 0716.

● TRIO TS711E 2m basestation multimode: £635 ono. Kenwood TS811E 70cm basestation multimode: £685 ono. Icom IC505 6m rig: £475. All VGC. G4TBR QTHR. (Bucks) 0494 786510.

● 2m met 2-way power splitter, unused: £22. Avo digital multimeter M2004, VGC: £40. Data I/O 20A mos memory programmer, full inst. handbook, VGC: £50 ono. World Radio TV handbook 1988 unmarked: £8. G3ZXZ QTHR. (Huddersfield) 0484 657669 after 6pm.

● FT290R and case, Mutek, Tokyo HL35V, charger, spare battery: £310. GM1SYA QTHR. 041-649 4345.

● COMPLETE 2m station, comprising FT480R, mic, m/bracket, handbook. PSU FP80, orig. cartons, Tonna 9X beam. Total package: £300. Delivery by arrangement but prefer buyer inspects and collects. G4PNK QTHR. (Bedford area) 02302 5274.

● SHACK clearance. Icom mobiles, IC27E: £205. IC47E: £280. H/helds, Icom ICO2E: £200, Yaesu FT708R: £155. Linear, M/Modules 144/30LS: £55. FT290 spkr/mic: £10. All as new, boxes, manuals, many extras. Can deliver/demo South East. Details on 07914 2823 eve.

● TONNA 20089 portable 9ele 2m antenna, new unused and in makers orig. box: £25. Buyer collects but can deliver within 30 mile radius of Brighton. (Brighton) 0293 722955 eve-w/e.

● TRIO 2500 2m handheld: £125. Trio 7930 2m 25W mobile: £155. 17ele Tonna: £25. 13ele portable Tonna: £20. Spectrum converted 10m all-mode Ham Major: £85. Spectrum converted 10m all-mode Cobra: £105. Alan, G4WFS not QTHR. (Tyne and Wear) 091-415 3687.

● TRIO 9130 2m multimode 5/25W. Boxed, manual, mobile bracket, mic, limited use, VGC: £350 ono. 10ele parabeam rotator control, VGC: £45. Bargain lot: £370. Voightlander Vitessa-T ERC hood, filters F2.8 VGC. Collectors item: £55. GW0KDM. (Gwynedd) 0758 740171.

● COLLINS 30LI linear HF amp 3.5-30Mcs. Good order. Can be seen working. Spare set valves. Sensible offer please. J. Farlow, G3BXI QTHR. (Wilts) 0373 830404.

● FT726 owners. HF module, mint, unused with inst. Boxed. Bought new from SMC this year. Cost £269. Sale: £180. Katsumi keyer, list £133. Mint, boxed, inst. 11-15V DC or 120V AC supply: £70. G2FZU QTHR. (Southwell, Notts) 0636 813847.

● PROFESSIONAL quality satellite prime focus dish and EL-AZ mount, heavy spun alum dish 1.6m dia. with substantial mount which can easily be dissassembled: £150. Buyer collects. G4AKL QTHR. 0327 857350.

● AIRCRAFT band monitor RX R532 118-140MHz: £100. Roger. 0908 693122 day, 0908 542440 eve.

● FT102 tcvr and FC102 ATU with all expensive filters and options fitted. Exc. cond, boxed: £800. (will not split). Two 17ele 2m Tonna's: £40 each. All plus carr. 3ele duo-band yagi. Bargain: £80. Jackson. (Horsham) 0403 732851.

● KW 2000B, Shure 201 mic, mobile PSU, Datong speech proc: £200. Yaesu FT208R 2m handheld. 2 sets nicads, mains charger, PA3 mobile PSU. Adonis mobile boom mic headset, Modular Electronics 20W linear: £150. G3MEW QTHR. (Portsmouth) 0705 820315.

● YAESU module for FTV901R or similar tvtr realigned for 4m. Should reconvert to 6m if preferred. Buyer collects or adds £2 carr. As new: £50. G2YS QTHR. 0923 776864.

● TEN-TEC 580 delta HF TRX with CW filter, remote VFO and PSU. Exc. cond. (second rig): £450. keyer ETM8: £75. 12V electric winch 9000lb pull. Suit Versatower etc: £300. Dale G3VMK. 0602 736149.

● KENWOOD TS940S, auto ATU, MC85, SP940, AM filter, Lowe MOD, workshop manual, mint cond, very little use: £1800. KW monitor scope, manual, mint: £110. Shure 444: £30. Yaesu SP900: £25. G4ERU QTHR. 0202 510400.

● COMPLETE clearance: All parts for several really serious linear amps, part-built PSU on trolley, prefer sell as one lot. Absolutely mint Dentron MLA 2500B HF linear – brand new Eimac valves. Sensible offers. Mike. 03306 613 after 7pm.

● ELKA X109 portable pro. organ. First class cond. Easily transportable and stored. Most facilities, theatre sound easy. Smart black and chrome. LED voice indicators, auto chords, auto bass, piano arpeggio accomp. pedals, stool. Complete: £550 ono. G4NZY. 021-427 1788.

● CW filter XF8.9HCN for FT101Z, FT901, FT107, FT707, new: £35. Also XF8.9KCN, XF8.9GA filters. Interested in FL2050 linear FRV7700A/B/D/E modules, FT980, FTONE or Drake TR7 HF tcvr? All new. Phone for details. G4GIY not QTHR. 0482 848958.

● FT290R Mk1, nicads, charger, c/case, m/mount: £275. RN Electronics 144/50MHz 25W PEP tvtr, mint: £150. Wood and Douglas linear and preamp 1/3-30W: £50. Pye Europa UHF SU20, SU18, RB xtals, fitted preamp, tone burst: £60. G1NWO QTHR. 0753 853490.

● TR9000 10W 2m all-mode tcvr, matching plinth spkr and PSU. Use as basestation only: £375. GM0BQR. 0324 711363 after 6pm.

● YAESU FT902DM tcvr, FC902 ATV. Mint cond. All boxes etc: £725. Daiwa 7011 round controller rotator and hy-gain TH3-Mk2 tribander: £185. Whole package: £875 ovno. GM0BQR. 0324 711363 after 6pm.

● UNFINISHED project, box section 100mmx100mmx6.5m and 60mmx60mmx8.5m long. Plus foot hinge. All galvoprimed: £50 ono. Skyking rotator: £10. All plus carr. if necessary. G1VOQ QTHR. 0327 62126.

● FT290 charger, nicads, case, rubberduck, mobile mount: £250. MML432/100 70cm linear 100W: £240. Welz CT150 dummy load, new: £70. FT221 multimode, VGC: £300. Burns CC10 calibrator 1MHz-5kW: £50. Trio TM201A 2m, FC10 controller, mount: £240. G4HMF. (Ipswich) 0473 51319.

● BIRD 43 hide case. Elements 10C, 50C, 10E, 50E, 1000D, 50H, 250H. Immaculate: £500 ovno. HQ180 not used 5 yrs: £140. Miracle Technology WS2000 modem: £90. Mutek GLNA423E masthead preamp ATCS500 controller: £90. All ono. Owen G4HMF. (Ipswich) 0473 51319 daily.

● £50 buys a DNT 10FM rig 29.310-29.700MHz. Brand new. Warranted air tested OK. TR8400 70cm tcvr, little used, orig. packing: £250. Datong D70 morse tutor, as new: £38. All postage inc. G4SNO QTHR. 0562 710817.

● HEATHKIT OS2 scope: £15. Sinclair ZX81 kit: £5. 11in green monitor: £15. CDE AR40 rotator and control unit (no base): £15. Heathkit HD1410 iambic keyer: £15. Postage extra. G3ZLR QTHR. 07462 2069.

● FT902DM narrow CW filter: £475. SP901: £35. FTV901R fitted 432MHz only: £200. FT22-5RD Mutek and memory unit: £500. HL160V 2m PA 3/10W in 160W out: £170. Selling due to lack of use. G4SEU. (Nuneaton) 0203 392503 eve.

● YAESU FT7 HF SSB/CW tcvr (80-10m). c/w mobile bracket, manual and orig. box. VGC: £230 ono. G4ZYR. 0529 306089.

● SHACK clearout. Jaybeam 10X/Y, mint: £25. AR33 rotator plus 20yds cable, GWO: £25. Mutek TVHF230c 2m, HF band TSVTR, hardly used, mint: £240. Would exch. all above for TS830S add-ons AT230, VFO230 and SP230, or Trio 9130 or good HF RX (Racal). Any offers, will haggle. 35yds approx 5-core rotator cable: £10. PSU bits. 120VA TSFMRS, bridge rectifiers, smoothing caps, heatsinks, all very cheap to clear. Relays, PCB mounting 24VDC, contact rating 5A at 250VAC (new and unused): £1.50 each. Varic TSFMR 250VAC input 0-110% output at 2.5A: £15. Two ITT Starphones, no batts or mods: £10. RadComs 83-88: £5 per year. Box of old radio valves, free to collector. All prices ono. Prefer buyer inspects/collects. Carr. extra. G4WUS QTHR. 0287 42596.

● KR-500 elevation rotor: £95. Emotator model 105TSX rotator complete preset controller. 500kg rotation torque. Indicator needs new pointer drive belt. Hence bargain price: £35. Clarke. 0483 275461.

● YAESU FT790 70cm multimode tcvr, mobile bracket, FL7010 linear amp, YDL48 desk mic: £325 ono. Paul G8EJL. 021-427 8205.

● ALTRON 60ft 4-section tiltover wallmount tower, rotator housing, Jaybeam DB4/6 beam, 2m 10ele parabeam, 70cm 18ele parabeam. Fully galvanised with all fittings and two autobrake winches. As new, assembled only once. All inst. Buyer collects. Bargain: £500. G1XXQ. 043871 4278.

● FT102 and FC102 VGC, little used. Together: £685. FT726R 70cm, 2m and satellite: £750 with mic MML144/100S: £80. Sota 432/100: £90. All in good cond. PSU for both: £30. G4BD QTHR. 0709 379095 day to 4.30pm and after 9pm.

● TS830S with 500Hz CW filter, de-luxe tuning knob, spare set of new valves, SP230 spkr, manual, boxed, mint cond: £750. Cambridge antenna noise bridge, perfect: £28. Hansen PEP meter, ranges 20W/200W/2000W: £40 ono. Mark, GI3YDH QTHR. (Belfast) 0232 795783.

● TRIO TS711E basestation 2m, mint, boxed with mic: £580. Kenwood TM221E 2m mobile tcvr, 45W, boxed, mic, mount: £210. Standard C78 70cm tcvr, boxed, case, rubberduck: £135. PK232 data terminal, mint, boxed: £175. G4RKO not QTHR. (Newbury) 0635 60263.

● SWAP collection of classic cameras for HF gear, mics, test equip, valve TX, ATU etc WHY? 20 items valved at approx: £25 each. Lists available. G0JLD. (Minehead) 0643 5196.

● CAPCO SPC300 ATU, exc. cond: £150 plus p+p. G4JQI QTHR. (Lancs) 0254 823366.

● ICOM ICR7000 25-2000MHz. AM/FM/SSB 99 memories scanning rcvr: £600. Philips PM6616 1300MHz universal counter: £100. Robot 800C RTTY/morse/SSTV terminal with Tono CRT1200G display: £150. With handbooks in good, mint cond. GW3FKO QTHR. (Brecon) 0874 2772.

● WEATHER facsimile recorder. Muirhead Mufax K600. Functional. Plus another almost complete. Real bargain at: £70 for both. Carr. extra. 0670 513994.

● ANTENNA full quarter wave, new, 7MHz 1.2 max swr 21MHz 1.6 max. Will tune on other bands with ATU. This antenna is made to order: £50. G0JLI. 0272 892627.

● KW107 ATU inc manual: £95. GM0GYN QTHR. 041-641 4700.

● 70cm Fortop ATV tcvr. Miniscan camera, zoom lens ATV RX cvtr, demodulator wall bracket for camera: £250 ovno. Buyer collects. Reason for sale, lack of activity in this area. G6FOK QTHR.

● YAESU FT200 SSB tcvr, plus FP200 PSU, c/w manual: £150. Buyer collects. London N3. Peter G3ZXU. (Finchley) 01-346 9030.

● YAESU FT101ZDFM, mic, CW filter, fan, manual, mint: £450. Trio 9000 mic, m/bracket, manual, good cond: £250. Yaesu FT202R handheld, base stand, charger, sp.mic, manual, boxed, works OK, offers. 2xFT290 mobile, m/brackets, one carrying case, offers. G6CMQ QTHR. 0262 88330 after 6pm.

● ROLLEIFLEX camera (SLR) type SL35E, superb spec (SAE for copy of spec). With leather ever-ready case and in exc cond. Offers or swap for 2m handheld or WHY? G3HCM QTHR. (E. Yorks) 0759 318408.

● TRIO TW4000 dual-band 2m/70cm mobile tcvr with voice readout option fitted. 5W/25W output. Mint cond, boxed with manual etc. Mainly basestation use: £260. Also Icom IC4E, mint: £150. G0BII QTHR. (Oxford) 0865 880229 after 7pm or w/e.

● Drake R4C with Sherwood filter mods for CW and SSB. Ron G3TLX. 01-958 8671 eve.

● YAESU FT480R MkII 144MHz multimode, manual etc: £275. VGC Midland basestation converted CB 28-29.1MHz SSB, AM: £50. G4JXK. (Fareham, Hants) 0329 230737.

● WS19/B44 sets, audio/video DA, pcbs, 19in metal-work, junk-box. SAE, Hatchways Farm, Burrows Cross, Gomshall, Surrey, GU5 9QF.

● KENWOOD TR9500 multimode: £275. Mutek GLNA432E and controller: £80. 70cm Homebnrew amp, 4CX250B and PSU: £200. May part exch. for BNOS LPM50-10-100 amp or possibly for HF rig and cash adjustment. G6ZYG. 0933 318493.

● Sommerkamp FL200B TX. Exc. cond. 240W SSB, CW: £120 ono. G0DTR. 091-273 5320.

● FT703R handheld with mobile mount, nicad pack, battery pack and charger: £125. New spkr mic, boxed: £25. Revco mobile antenna, coils for 10m, 2m, 70cm: £20. Altai rotator: £35. 3.5MHz trans: £15. Offers to G4VEN QTHR. 0705 473764 after 6pm.

● TRIO/KENWOOD TS770 workshop manual: £30. Trio TR3500 70cm handheld: £155. Mains base stand charger ST2 for TR3500: £40. Low-band Pye Westminster convert to 4/6m?: £25. PAL-COM TNC220: £90. Panasonic colour camera with PSU for ATV: £100. G8EBM QTHR. (Asbourne) 0335 60755.

● YAESU FT77 8-band tcvr in VGC. Has FM and CW 500Hz filter fitted. Orig. box and packing, plus handbook and mic: £380. GM4OSS. (Ayrshire) 0560 83800.

● TANDY model 100, portable computer, LCD, modem: £125. (Misc software). Disk/display unit: £105. Multiplan, interactive solutions roms: £25 each. Sinclair QL: £69. Many micro-cassettes. CB's Barracuda/Realistic: £25. Amateur TV: WandD XMTR and rcvr: £80. Sony AVC3200CE camera/mono: £90. 0865 863333.

● ICOM IC271E with Mutek front end, boxed as new: £550. IC02E set and AE only: £145. 70cm 1kW linear amp. Lack of time forces sale of half finished Arcos USA manufactured kit. High quality unit with all parts inc new boxed pair of Eimac 8930 tubes: £450. Lots of VHF/UHF/HF aerials. Tonna, Jaybeam, Cushcraft. Also parts for HF/VHF linears. Call for details. ITT FRST UHF rptr: £25. G4BWG. 01-680 1585 day, 08832 4656 eve.

● FT101ZD, FV101Z, FC902, SP901. All in immaculate cond: £750. BNOS 12/25A PSU: £150. FT726R 2m/70cm handie with extra power pack. Quick charger and accessories: £425. G1KSQ. 02302 3897.

● KENWOOD/TRIO TS811E 70cm multimode, as new: £675. BBC Master 128 computer with 20MHz Winchester plus 40/80 disk drive (bridged for 128). Philips colour monitor, software and interface for Robot 1200C SSTV: £780. All mint. 0326 40595.

● ICOM 25E 2m mobile tcvr. 25/5W output with mobile mounting brackets: £150. Mag mount with 5/8 and 1/4 wave mobile whips for 2m: £10. G3UFQ. 0564 777802.

● HOUSE for sale. Hove, East Sussex. Semi-detached house, 4 bedrooms, large bathroom, oak-panelled entrance hall. 2 separate reception rooms, breakfast room and kitchen. Gas central heating. Detached garage with driveway. Large rear garden with terrace and fish-pond, medium sized front garden. Short walk to beach, schools, local shops, doctors and dentists. About 20 mins walk to large shopping centre at Hove. Hove and Brighton mainline stations with direct trains to London within easy reach. Good access to A23, M23. G3YCP and family moving to ZLI. Quick completion possible. Offers in the region of £172,500 to inc. most carpets and 80m dipole and masts. Gavin Williams, G3YCP QTHR. 0273 728322.

● £61,500 house West Hill, Hastings. 300ft ASL. Super take-off all directions. Magnificent views Hastings Old Town, fishing village and English Channel. Three bedrooms, garden front and rear. Gas central heating. Wright G3CYT. 0424 438688. ▶

● R107 comm. rcvr, working cond: £35. Cash only, buyer collects. Write to R. Mills G8CQC, 48 Lady Bank, Birch Hill, Bracknell, RG12 4BH.

● TR9000 multimode boxed with mobile bracket and manual. BO9 base unit and Sota 10W in 100W out linear with preamp: £385 ono. GM9IOY not QTHR.

● PK88 packet controller as new. Software, leads for BBC micro: £90. Ref, manuals for BBC Master, immaculate: £15 the pair. Many other oddments for BBC. All immaculate. Please phone. Slim Jim unused, offers. G3XKT QTHR. (Nottingham) 0602 392554.

● TR9000 2m multimode c/w mic, manual, mobile mount: £275. Hokushin 7/8 antenna with gutter mount: £15. Hokushin GP144W 2m base antenna: £30. New Trio MC42S mic: £15. New Yaesu FRB757 relay box: £8. Condenser mic and stand: £15. (Swindon) 0793 822055.

● ATARI STM internal 1Mb upgrade, mouse, manual, boxed. Cumana double sided disk drive. 20 disks, filebox, progs inc. Database, Processor, Startrek, Chess etc. Several other ST books, all in as new cond. Giving up computers: £275 complete. John. 01-857 8096.

● YAESU FRG9600 scanner extended coverage to 950MHz. C/W, PSU, boxed, VGC: £375. Or swap/PX 2m multimode and sundry equip. Kris. (Haywards Heath) 0444 457202 eve-w/e.

● CAPCO SPC3000 ATU: £265. Alinco 25A PSU meters: £125. Zegati 6A PSU: £17. Cantenna dummy load: £17. Yaesu EP2500 ATU: £65. Heathkit 10-12E scope: £50. 3 Westminster W30's 4m: £70. All mostly new equip. 0624 22342 eve.

● FT101Z MkIII with fan, FM and 250Hz CW filter. Exc. cond, inc. spare PA tubes. MM 28-432MHz tvtr, latest spec. Good cond. Very rugged TX section!: £450 and £80 respectively. £500 for both. (Rugeley) 0889 583692.

● YAESU FT757GX trans, boxed. Yaesu FT757 handheld mic, boxed. Yaesu FP757GW PSU, boxed. FT757GX manual. In first class cond. Buyer pays carr.: £600. Bill. 0479 2034.

● YAESU FT401B HF SSB tcvr. Perfect working order. Matched pair 6KD6's mic and spkr inc: £250. Buyer inspects and collects. G5DJ QTHR. (Sevenoaks) 0732 455685.

● YAESU FT290R still boxed with nicads, carry case, strap, manual. VGC: £250. Microwave Modules linear 144/40: £60. Spectrum RTTY filter: £10. G0GZM. 01-660 8692 eve-w/e.

● COMPLETE home station. Yaesu 101ZD (SMC checked). Fan, filters, AM/FM boards, hand mic, CW key footswitch. FC902 ATU. FV101DM ext-VFO memories, keyboard entry, up/down scanning. FTV901R tvtr 3-band VHF/UHF 144MHz only fitted. SP901 spkr also spare spkr. Dummy antennas HF/VHF. Phones. Hansen FS5S swr meter. Co-ax switches, insulators. Lafayette 600 comm. rcvr with ATU spkr. Scope T02. FT290R 2m charger whip antenna. MML/144/100/LS linear amp. Everything to go inc. junk box. The lot, bargain: £800. No splits. G4SCF. 0329 42273.

● TRIO/KENWOOD TS940S auto ATU. Mint cond. A joy to own and operate. Sacrifice: £1395. G2KF QTHR. 0637 878741.

● ICOM 28E 2m mobile tcvr. As new, boxed: £250 delivered. GW8NCF not QTHR. 0222 387455.

● YAESU FT726 tcvr, mint, orig. packing: £525. Icom 1200E 23cm tcvr, unused, latest model: £395. Cue Dee 17432 70cm antenna, unused: £32. Yaesu SP767 ext. spkr, new: £52. SSB 23/24cm linear: £90. Paul, G4XHF QTHR. 0293 515201.

● TRIO TS830S, full workshop manual, 500Hz filter, spare BY7A, plus pair 6146B: £750. VFO240: £60. SP230: £30. MC50 mic: £25. G4UTQ QTHR. 0670 824454 after 5.30pm.

● ICOM IC751 HF gen.cov. TX/RX c/w additional FL33 high performance AM filter. Absolutely mint cond: £925. Pentax ME F1.7 50mm lens. Almost new: £95. Minnimitter low-pass filter, 30MHz: £10. Carr. extra. G3HWX QTHR. 0704 840328.

● FTONE, Yaesu, perfect cond. all options fitted: £800. 0288 2951 after 6pm.

● R600 Kenwood rcvr in mint cond. with handbook: £190 ono. Inspect and collect only. G1NMX QTHR. (Orpington) 0689 26951.

● DATONG D70 morse tutor. Mint cond, boxed, as new hardly used: £40. G0KPH. (Leamington Spa) 0926 429719.

● YAESU equip. FRG9600 VHF/UHF multimode scanning rcvr: £395. FT790R UHF multimode portable tcvr with case, etc: £285. FRG7 rcvr, no mods: £120. All supplied with manuals. Prefer buyer to inspect and collect. Bob, G8VOI QTHR. 0705 250830 after 6pm.

● CREED 444 teleprinter 50 and 45.5 baud: £30. RTTY terminal unit (Pag) for Creed 444: £30. Workshop manuals Trio TS770: £30. Trio TR2500: £15.Pac-Com TNC220: £100. Trio TR3500 UHF handheld: £150. All carr. extra. G8EBM. (Ashbourne) 0335 60755.

● SINCLAIR QL with Philips amber monitor and terminal emulation. Exc cond. Dread to think of cost. Sell for: £100. Also Texas TI59 card programmable scientific calculator: £40. Tony Cadwell QTHR. 0734 698787 day, 0734 788110 eve.

● YAESU HF separates FR101 21-band RX digital readout inc 2m and 6m bands. Matching FT101 TX both exc. cond. c/w spkr, mic and manuals: £450. G2CJL. (Somerset) 0934 742327 day, 0934 743636 eve.

● BNOS linear 10-180 180W 2m: £175. BBC-B computer, dual Cumana disk drives, colour monitor: £250. Eprom programmer for Beeb: £40. OK180 matrix printer: £50. Daisywheel printer: £100. G3LIV RTTY unit: £30. G1MLR QTHR. (Croydon) 01-660 8371.

● AMSTRAD PCW8256. Hardly used. First offer over: £195 secures. FT790R: £240. No offers. 70cm antennas MBM48 and MBM88. Offers. B. Edwards G3WCE. (Norwich) 0603 53331. No calls before 7pm as this is daytime business no.

● STANDARD C500 dual-band UHF/VHF handheld. 2 nicad packs as new: £300. Exch. FT290 WHY? Trio TR2300: £115. LX80 printer: £40. FX80 printer: £40. 2 K-band LMB's plus polariser: £50 pair. G8LX1. Not QTHR. 01-981 3518.

● ICOM R7000 with remote. Exch. for Kenwood R5000 with VHF cvtr. G3FUN QTHR. 0795 532608.

● WESTERN DX33 penetrator 3ele tri-band 10-15-20 antenna. As new with manual: £100. Gem quad HF antenna spares. G4HXQ. (Tunbridge Wells) 089285 2817 eve-w/e.

● HRO MX H/brew B/S coils 160-15m. Product det. spare valves. H/book: £45. The Wireless Constructor Nov 1924 to Dec 1927: £25. Three PT5. Believe ex T1083: £8. Prefer buyers collect. G3AGF QTHR. 0323 423427.

● HY-GAIN TH3JR 3ele beam: £45. Rotator CDE CD452 unused in orig. packing: £90. 8-core cable for above, 75m: £35. G3CYL QTHR. 0252 617521.

● FT707 100W CW, AM, SSB, WARC bands. Immaculate cond. No mods. Sorry no mic: £325. Can deliver 30 mile radius. G8OGV not QTHR. 0733 66471 after 6pm.

● TRIO TS940 auto ATU voice unit, CW 500Hz SEC IF filter and mic: £1700. Trio TR9130 matched ex-spkrs. Fist mic, accessories: £350. Exc. cond. Both boxed. 0663 44118.

● PANASONIC model RF4800 gen.cov. 10-band comm. rcvr. Exc. bargain: £100. KW Vespa MkII sideband transmitter, handbook, circuit. Good cond: £75. Cash, no offers. Buyers collect. Write G4BAB QTHR.

● CD670 RTTY/AMTOR/CW decoder, built-in display, TV/video/printer outputs. As new: £175 ono. Westminster low-band FM boot mount, 10-channel, c/w remote controller, mic etc. Ideal for 70MHz: £25. G4LOO. (Beds) 0582 811591 after 6pm.

● VERY large Marconi ATU for HF use. Beautiful silver-plated components etc: £100. No offers. Also Redifon SD1 synthesised TX. Drive unit 1MHz to 29.9999MHz in 100Hz steps: £100 no offers. Both items high quality commercial gear. Steve. 0254 823305.

● DATONG D75 manual RF speech processor, mint cond, boxed: £40. PSU (ex computer swtich mode, +-12V, -15V, +5V at 20A: £10. 021-730 2001.

● BBC-B computer, rom-board, dual disk drives 4OT d/s d/d, much software, many roms: £345. Tandy 100 lap-held computer, modem, disk/video unit, software, roms (inc Multiplan) 32k memory, bargain: £245. Sinclair QL computer, software, spare micro-cassettes, unused: £69. (Oxford) 0865 863333.

● BBC-B with 6502 second processor, sideways rom/ram, twin d/s floppies, speech system. All enclosed in professional case with remote keyboard: £400. Vince G8LLB. 01-531 0716 after 7pm.

● BBC Master 128 with turbo, d/s floppy, 28Mb hard disk: £700. Vince G8LLB. 01-531 0716 after 7pm.

● FT790R with case, nicads and charger: £295. FTV 2m module: £100. B300P Zetagi LIN all-band: £100. Rama F50 freq. counter: £40. CTE 27/375 pre-amp: £30. G1NWU QTHR. (Market Harborough) 0858 880625.

● BRAND new Heatherlite Explorer-2 HF linear amp, output up to 1kW. Front panel ALC control. Bargain: £1000. Used for 20 QSO's. Reason for sale, too much RF for neighbour. My television clear. Pair of 3-500Z valves. G3JZL QTHR. 0203 543382.

● WIDE-BAND sig.gen. 100kHz-150MHz. New, unused. Boxed, full guarantee. Leads, probes etc. Carr. extra. Ken G4IZW. 0660 20636 or fax 0660 20707.

● TRIO R2000 rcvr 100kHz-30MHz. VGC, orig. packing, manual etc: £400. Buyer inspects/collects. Cash only. Ian QTHR. (Mansfield) 0623 25751.

● TRIO 9R59DS and matching spkr. Gen.cov. short wave rcvr with expanded coverage of amateur bands: £55 ono. G4HHT QTHR. (Coventry) 0203 610408.

● AN ideal South Coast DX location. Completely refurbished bungalow situated near cliff top at Barton-on-Sea, Hants. 3 double bedrooms, (one with en-suite bathroom). Second bathroom. Fully fitted kitchen. Large utility room. Gas fired central heating. Garage and gardeners cloakroom with wc and wash hand basin. Matured garden and grounds with greenhouse and summerhouse. For further details phone G3FYS QTHR. 0425 479226.

● TH3 Thunderbird: £225. TH3 Junior: £150. 18AVT vertical unused: £90. Top section of Versatower and head unit: £130. Ham IV rotator: £180. Uniden 2020 tcvr and 8120 spkr: £220. Drake R4C and MS spkr: £220. Belcom AMR-217B VHF FM scanning monitor: £50. PM 2000 watt meter: £45. Datong FLI filter: £20. Datong RF clipper: £15. All in exc.cond. Buyer collects Hemel Hempstead area. G3NUG QTHR. 0442 62929.

● TEN-TEC Argosy c/w filters, mic and morse key. Recently checked by KW Communications Ltd: £325. (Bognor Regis) 0243 864867.

● SHACK clearout. FT101E with G3LLL FM spare valves and Sem Tranzmatch ATU: £300 ono. Trio R600 HF RX. Exc.cond: £150. Telequipment single beam scope: £20. Paul Johnson. (Leeds) 0532 781301.

● RACAL RA17L with IF cvtr to 10kHz: £125. KW Vespa TX: £50. 10GHz wavemeter in-line WG16 8-12GHz: £25. 10GHz Gunn oscillator: £8. 2ft dish with H/M feed: £15. Lots of WG16 fittings. Large items buyer collects. G0FJY QTHR. 0903 40072.

● ZX Spectrum plus 48K: £40. Microdrive, unused, c/w cartridges: £20. Terminal: £20. Tape deck: £10. Programs inc. CW, RTTY, SSTV, clock, fax, c/w interface boards: £20 or the lot: £100. Des, G4NEK QTHR. (Bedford) 0234 852865.

● FT720RU Yaesu, 70cm 10W mobile/base tcvr complete. c/w mic, mobile bracket, DC cable, stand, orig. packing. Only used as base-station. In first class working order: £99 plus carr. G8UUO. (Chelmsford) 0245 252170 after 5pm-w/e.

● FL2100B Lin amp: £400. GM3UWO not QTHR. (Kilmarnock) 0563 40730.

● HRO MX power pack, 25 spare valves, 7-coil packs 100kHz-30MHz in wooden rack: £45. 01-778 9422.

● WWII no.19 set, switch box, AF gear and leads, no.19 supply unit. No.2, no.19 aerial variometer, 240V PSU. Also reception set R206 MkII with orig. PSU. Exch. for 2m handheld with cash adjustment? G0IJI QTHR. (Halifax) 0422 831036 eve.

● TS120S with narrow CW filter plus VFO/120 and 25A Yaesu PSU: £450. Would split or swap FT101ZD Mk3. GW3COI QTHR. (Abersoch) 075881 2675.

● FT726 inc 2m 70cm and Sat unit: £725. 50MHz unit for above: £225. TS930S as new: £1150. Auto ATU for TS930: £150. Mobile mount for FT707: £10. Ext.spkr for TS430S: £15. G3TBF. 045382 4853.

● HITACHI VT7000E portable VHS video recorder, VTTU70E video tuner, carrying case, VGC: £300. 3V20A video camera and case for use with above: £200. Little use. Will demonstrate to purchaser: £475 for both. G4AJE. (Cambs) 0354 741168.

● FT101ZD MkIII, immaculate, FM, fan, narrow CW filter, WARC, plus Yaesu YD148 base mic. Delivery may be possible: £530. Mike, G0DMI not QTHR. (Reigate) 0737 765550.

● BOOKS 2nd Thoughts on Radio Theory 1956. Elementary Principles of Wireless Telegraphy 1940. Radio Designers Handbook 1940. PW Service Manual FJ Camm 1940. Radio Mathematics 1957. Any offers. John, G4BYV QTHR. 036285 8142.

● KENWOOD TS140 boxed as new: £775. Yaesu HD757 PSU: £140. Trio hand mic MC43, Yaesu hand mic MH1BH: £15. Hately dipole for 15m and 20m: £10. G4WGR QTHR. 061-320 6941.

● AMT2 c/w CBM64 software and interface: £150. Commodore 64C: £100. 1541 disk drive: £120. 1701 colour monitor: £120. Buy the lot for: £450 or will separate. Also PCW 8512: £350. K. Baker, G4RPV QTHR. 021-459 7041 after 6.30pm.

● Lowe HF125 rcvr, FM, PSU, manual, VGC: £325 or exch. for FT707 or YO901 scope. Also Belcom LS102L 10m multimode, mobile bracket, boxed, plus 10m/2m tvtr, manual, both in VGC. Exch. 934MHz outfit. 0692 82075 day.

● ICOM IC551 6m basestation tcvr: £425. Plus carr. GW3WSU QTHR. 04468 261.

● JENNINGS 250pF 5kV vacuum variables: £37. EEV 300pF 10kV vacuum variables: £30. Eimac new SK600, SK610, SK606. Andrew Corp 6ft 0.37 dishes, 23cm circulators and isolators. 0743 884858.

● SOMMERKAMP FL2000DX HF linear amp: £225. Semi-prof JVC GX59E video camera, hard case: £200. Sanyo 5000 VCR (Betamax). New head needed otherwise works OK: £20. Chris, G4MXB QTHR. (St. Austell, Cornwall) 0726 850576.

● EDDYSTONE EA12: ££180. KW Viceroy Mk4: £80. KW2000A: £180. GM3UCI QTHR. 0555 70914.

● 70CM/2M tvtr, MM432/144S unboxed, brand new module 1/2W in/out with full paperwork: £50 ono. G8ATE QTHR. 0533 392842.

● VINTAGE amateur radio publications inc. 1947 Microwave Techniques, 1948 Amateur VHF Techniques, 1948 Transmitter Interference, 1949 Simple Transmitters, 1949 Amateur Radio Receivers, 1961 RSGB Handbook, 1964 Amateur Circuit Book. 1969 VHF/UHF Manual, HF Antenna Handbook (Moxon above RSGB publications). ARRL Handbooks 1952, 1964, 1966 and 1968. Wm Orr VHF Handbook CQ. VHF for Radio Amateur. ARRL Antenna Book. Offers for lot. G3CGQ QTHR. 0582 25519.

● FT101 c/w mic, leads, manual and G3LLL RF clipper: £250. Buyer collects. Bill G3PFE, 5 Penlington Court, Nantwich, Cheshire. 0270 628990.

● FT101E 250Hz CW filter. Two sets spare PA valves and driver. Intermittent fault on SSB otherwise pristine: £225. G4HMC QTHR. 01-878 5303.

● YAESU MF1A3B mobile boom mic with SB1C PTT unit, suit FT290RII: £25. Metronix 524B PSU 0-18V/3A twin meters. GWO, fair cond, but 110V input: £5. Cyril G7AJW. (Sawbridgeworth) 0279 723336 after 6pm or w/e.

● TRIO TS830S with YG455CN CW filter, VFO 230, SP230, MC50 mic, all in mint cond: £800. No splits. Yaesu FT480R with mobile mounting bracket, 5/8 wave magmount antenna, 13.8V 10A PSU: £300. G4CCK QTHR. 0228 26502.

● COMPACT HF station. Swan 100MX with matching ST3 ATU and PSU5 power supply: £300. BNOS LPM144-10-100 linear amp virtually unused: £150. G4CCK QTHR. 0228 26502.

● TRIO TS940S, MC60 mic, SP930, all mint. No mods: £1600. Early test gear, wooden case sig. gen. type 603A, BFO type 613-8 by General Radio Co. Both battery operated. Offers. Tim G0AUI. (Haywards Heath, W.Sussex) 0444 458390.

● 1HP Halder petrol engine, lightweight, suitable mobile generator. Absolutely unused: £65. G0GGI QTHR. (Cumbria) 0229 89635 anytime.

● ALINCO ALM203E handheld with 30W amp, DC-DC cvtr: £185. Tandy PRO2021 scanner with SEM preamp: £150. Both in immaculate cond. with orig. packing. Peter G0JWV. (Truro) 0872 501656 after 6pm.

WANTED..

● 587BLY wanted. Also Pye Compac for experiments. Any condition. Any details of digital display for FT713. G3JQL QTHR. 091-386 1116.

● VERTICAL antennas for HF, anything considered to cover 10-40m or 10-80m or 10-160m or 40-160m etc. With or without WARC bands. G4IRD not QTHR. (Northampton) 0604 44341.

● 4-TRACK reel-to-reel tape recorder (and quantity of 7in dia tapes). Also AR88 comm. rcvr (or similar). Roberts. 26 Beech Ave, Brentwood, CM13 2DX.

● 50MHz module for FT726. Exch for FT726 HF module. G0ENY QTHR. 0676 23028.

● UP to £300 offered for ex-RAF rcvr R1082 for display in Battle of Britain museum. Dick or Derick. 0227 764000 x3245 day.

● METER for 500V Metrohm Megga or info on the makers Edgcumbe Peebles. G0EXE QTHR. 051-336 3819.

● BOOMLESS quad for 10/15/20m. Would buy f/glass spreaders or centre spider separately. Also wanted, heavy duty rotator prefer Daiwa MR750 etc. Both must be in GWO. Cash waiting. (Yorks) 0422 51852.

● EX-RAF morse key model D. Must be the type with square contacts and c/w cover. G3TEL QTHR. 02357 4019.

● MINI-BEAM. Rotator. 12XY 2m antenna. Commodore 64's. RTTY modem for Commodore 64/128. Typewriter Olivetti ET250 or similar with computer interface. Cash waiting. Ken G4IZW. 0660 20636 or fax 0660 20707.

● HF linear commerical, Homebrew WHY? 50MHz linear. G4XAK QTHR. 061-945 2561.

● PEN chart-recorder or paper transport mechanism for continuous monitoring of my jam-jar magnetometer. G3UKV QTHR. 0952 255416.

● KWM2 with 516F2 PSU any cond. Also 1000pF Jennings vacuum variable. 0743 884858.

● DRAKE TR7 tcvr. 0203 450476 after 6pm.

● PAIR of KEF 104A/B speakers (teak finish). Good cond. essential. G3MRT QTHR. 0252 547900.

● MONITOR scope, Heathkit SB610 or 1-10-10, or similar. Must work well though appearance doesn't matter. G3UML QTHR. (Hendon) 01-202 7071.

● RECTANGULAR cream or white rubber CRT mask as used on immediate post-war VCR 97 televisors. G3YNN. (Sussex) 0424 893078.
● BIRD thruline elements. G4AJE. 0354 741168.
● HF linear, 10W in, 100W out. Suitable TS120Y. G0ILE. (Peacehaven) 07914 2364 after 6pm.
● CIRCUIT diagram and mod details for Cossor Novatel business terminal type 35E/TM00/001/AAB. Want to convert to station monitor. G0HDU QTHR. 0532 861333 eve.
● COLLINS or Kokusai mechanical filter. Swap valves or other good junk. Del G0DLN. 01-657 0716 eve.
● REMOTE VFO FV102DM for Yaesu FT102. Must be in first class cond. G0FRK not QTHR. (Warrington) 092572 8253 after 6pm.
● SHERWOOD filters for Drake R4C, Kenwood filters YK88A1, YK88C. GM1SYA QTHR. 041-649 4345.
● WESTMINSTER W15U c/w handbook and CCT: £25-30 willingly offered. Also handbooks for Pye VHF SG3V nand SG5U sig. gens. Buy or substantial deposit for copy. G2AVI QTHR. 0227 374774.
● EARLY wireless/crystal sets, horn speakers, valves, old books, catalogues, bound volumes Wireless World wanted. Also interested in American Comm. RX's. Jim Taylor, G4ERU, 5 Luther Road, Winton, Bournemouth. 0202 510400.
● SMALL HF tcvr. Good comm. RX. G4ERU QTHR. 0202 510400.
● COPY of manual, or photocopy of circuit diagram of Telequipment scope model D32. Info please to Bob, G4KWI QTHR. 0763 246472.
● LINEAR amp MML114/30 and Datong morse tutor. Colin, G7CVU QTHR. 0535 273891.
● YAESU FV102DM in good cond. G3HLI. (Coventry) 0203 456128 eve.
● ICOM 761 or 781 wanted. Good price paid. Must be in first class cond. Both hand mic and separate spkr required. Howard G0HZH. (Suffolk) 0394 460474.
● 4CX350F new or good cond, or circuit details of how to change the neg linear amp to accept alternative valve of the same class. All correspondence gratefully accepted and any out of pocket expenses reimbursed. Peter G8IQO. 0323 763123.
● NO.19 set and accessories, must be in orig. GWO. 0736 795948 eve.
● WANTED for Collins KWM2A xtal pack CP1, remote VFO 312B5. Also VHF unit 6251. Must be good cond. Write, D. Aird, British Embassy, BFPO 5. Forces Airmail.
● COLLECTOR/RESTORER requires valves, particularly WW2 and early B4 types. Also need urgently T/R3191, R3515, T/U207A indicators 62A, 162A, radar jammers APQ2, APT4 W plugs and large Jones sockets WHY? Rod Burman G4RSN. Kinnagh, Hancocks Mount, Sunningdale, Berks, SL5 9PQ.
● OPERATING manual for NAG 2200 VHF linear amp. Also circuit diagram for same. G8GVS QTHR.
● A1134A/R1082/T1083/TR9/T21/B2 PSU, Pre-WWII aircraft wireless's eg Marconi AD series etc and comm RX's. Orig. manuals/data on Hallicrafters SX18 (Sky Challenger II), S72. Marconi Atalanta, Oceanic, Yeoman. Parmeko R/T4066. B2 set. Wellington MkIA bomber, Peto-Scott Trophy 8, R1082/T1083. TR9. Redifon R50M. Hatchways Farm, Burrows Cross, Gomshall GU5 9QF.
● CLASS D wavemeter in good cond. G3VXI QTHR. 0521 6382.
● DIAWA MR750U motor. G6ZYG. 0933 318493.
● WANTED in good cond. HW20 or KW2000. Must have handbook available. Fair price offered. Jeff Harris, G3LWM QTHR. 0255 432621 day or write.
● BEG, borrow please info circuits for Taylor 110C CandR bridge, Airmec valve voltmeter 712, Cossor scope 1045K. G0AEO QTHR. 0903 785717.
● AP1086 (RAF stores ref nos). All sections particularly sections 10-10A to 10Z. Also all air publications relating to radio, radar and navigation equip, such as Babs, Oboe, Loran, Gee, H25 etc. Exc. price offered. Martin Gee, 17 Foxley Close, Mountford Est, Ferncliff Rd, Hackney, London, E8 2JN. 01-254 9083 or 01-790 2846.
● CIRCUIT diagram for Green 2m 20 TX and Eddystone 770R MkII RX. Also wireless set No 31 Mk/I. J.C.James, RS90512, Solaby, 4 Longview Drive, Huyton, Liverpool, L36 6EE.
● DATONG FL3 audio filter and auto notch. Must be GWO and good cond. Nigel G0ILA. (Southampton) 0703 433642.
● MUTEK VHF preamp type SBLA144E or GFBA144E. Peter G7BNU. (Bradford) 0274 573233.
● FIVE pounds plus costs offered for photocopy of handbook and circuit for Eddystone 750 RX. GW3UMD QTHR. 0222 761813.
● WIDE-SPACED variable capacitor, split stator 2x28-60pF approx. Eddystone ceramic former 2.5in dia, ribbed 23 or 26 turns. 2-pole 7-way ceramic band switch suitable for use in Pi Tank section 2x813 linear. Tony G4KDZ. (Grays, Essex) 0375 378783.
● COLLINS 516F2 R/E 220VAC PSU. Any cond. Time served or new 8877. 0743 884858.
● EDDYSTONE 1837/2 in good cond. Will do straight swap with new Icom R71. Genuine offer. Gates, 16 Highmill Drive, Scarborough, Yorks, YO12 6RN. 0723 365093.
● PERFORMANCE details and alignment inst. for rcvr APR4Y and cvtr CV253/ALR covering 38-1000MHz. Case for APR4Y. Acorn valve ceramic base. M!T radiation laboratory books. Cooper, 52 Eastheath Avenue, Wokingham, Berks, RG11 2PJ. 0734 791488.
● 35ft telescopic mast lattice or tubular. Good cond. Electric winch. Minibeam 10/15/20/40m. Tilt rotator. Ken G4IZW. 0660 20636 or fax 0660 20707.
● HARDWARE/SOFTWARE for BBC-B. eg teletext adaptor, packet WHY? G4HHT QTHR. (Coventry) 0203 610408.
● HANDBOOK for Advance sig.gen. E2 (Type E model 2). Would be prepared to photocopy and return for £5. D.Alexander G0KCO, Flat 4, 37 Sutherland Rd, W. Ealing, London, W13 0DX. 01-998 3573.
● BC348 for old timer. GWO and cond. For use and sentiment. Moded for mains but prefer no S meter. Transport costs paid. GM3KMF QTHR. 0592 742249.
● MORSE keys GPO junkers, any others. Your price. Also Codar AT5 RX or exch. Yaesu 227RB EZE match valves 866, 6LQ6 others. G4WJB QTHR. 0733 43021 eve.
● SHERWOOD filters for Drake R4C, QRP, transmitter, Ten-Tec HW8-9. GM0KMG. 041-649 4345.
● FT290R wanted. Also HF mobile whip. Bill. (Blackpool) 0253 791699.
● VFO wanted for Belcom liner 430 70cm rig. Freq. range 57.8-58.7MHz. Must be stable for use on SSB or suitable for modification. G8ATE QTHR. 0533 392842.
● REWARD £5 bonus given plus costs for circuit of BC453, the Q fiver, can photocopy it and return. If in North West can even collect and return. Would buy good unit. Ted. 0706 218290 after 7pm.
● HEAVY duty rotator Ham 4 or Daiwa MR750 multi torque. Brian, G0KDX not QTHR. (Standish) 0257 422547.
● STANDARD C800 auto scan rcvr with one TX channel. Alan, G4HMF QTHR. (Ipswich) 0473 51319.
● H7 linear amp. Homebrew considered. SP230 ext. spkr. D.Goodhew G0ISF, Strathwell Manor, Whitwell, Isle of Wight. 0983 730292.
● EDDYSTONE EA12. Will pay reasonable price for rcvr in good cond, preferably from SE England so that I can collect. G8AMJ QTHR. 0603 738440 eve.
● AUDIO valve amp(s). Need one stereo or two mono. 30W output or more. Would consider faulty unit(s) if transformers OK. G4EIS QTHR. 01-529 3674.
● KW1000. Good price will be paid. G. Ellison, PO Box 376, Perry Barr, Birmingham, B42 2TB.
● HF and 2m coils for Bird watt meter. (100W or 50W rating). GM1XHZ QTHR. 0674 76503.
● COLLINS equip, 62S1, R390A in GWO, although marked cabinets do not debar. Drake L7 linear amp. G0GGI QTHR. (Cumbria) 0229 89635 anytime.
● YAESU FTV107 tvtr with switching box for use with FT707 tcvr. Prefer 2m and 6m boards but will accept 2m only as min. requirement. Please phone with price to David Gough on 01-207 0709 after 7pm or w/e. Have IC211 basestation 2m tcvr for sale or consider exch/cash adjustment for above.

"... from Honorary Treasurer"

Some questions raised at the Society's Annual General Meeting last December and their answers deserve a wider audience. The opportunity is now taken to pass them on to the membership through the pages of *RadCom*.

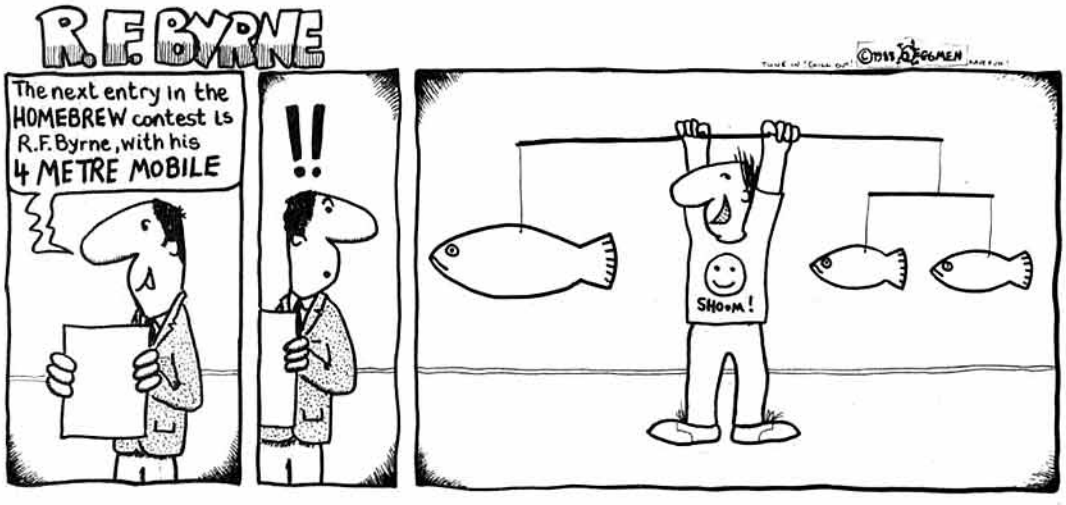
Before the meeting a written question had been received at Headquarters and this was answered during the formal presentation of the accounts. A member had added the individual costs of all committees and had taken the total from the item 'Committee, Council and Regional meetings'. The result made the cost of the last two named appear extremely expensive! What is not clear from the accounts is that the heading "C. C. & R. meetings" includes additionally the following – Committee expenses not applicable to an individual committee, the cost of the Annual General Meeting and Presidential Expenses including several meetings of 'ad hoc' groups to advise the President. It should also be recorded that the AGM expenses have traditionally included the cost of the Annual Council Election. The associated printing, stationery and insertion in *RadCom* are expensive items.

This begs the comment that the description of the item in the accounts could be more detailed. However, there must be some limitation in the degree of breakdown in published figures. Nevertheless ways of improving the description of this item will be considered for next year.

During the 'informal' part of the meeting a member asked about Committee Expenses and Subsistence Allowances. He was told that volunteer workers are entitled to claim for the cost of second class travel by public transport to and from meetings etc. When it is not possible to use public transport volunteers may claim 14p a mile for cars up to 1·8 litres or 17p for over that size. There is no subsistence allowance as such. However the society will, if requested, reimburse the cost of essential meals while the member is away from home on authorised RSGB duties. In fairness it must be said that a number of volunteers do not take full advantage of these entitlements.

One member who was unlucky in that his question did not come 'out of the hat' at the meeting asked 'whether the Society is now making a profit?' I prefer to avoid the words 'profit' and 'loss' in so far as RSGB is concerned. The Society should be described as a non-profit making organisation in that surpluses are ploughed back for the good of all the members. The reverse is the case for deficits of course! The Finance & Staff Committee sees monthly management accounts and these are summarised for Council. Whilst they give a good indication of the current state of affairs and enable swift action to be taken where necessary and where possible it should be pointed out that the Society has only limited control over its income. (The 1987/88 financial report highlights this – an annual saving of £68,000 had been effected. However, falls in advertising revenue and book sales rendered that effort insufficient to bring us 'back into the black' although showing a considerable improvement on the previous year).

The management accounts at the end of September '88 reflected the effect of the postal strike on the Society and did not make good reading. Happily subsequent months' figures showed a recovery.



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RSGB BOOKS

Amateur Radio Awards Book (3rd Ed)	£9.35	£7.95
Amateur Radio Operating Manual (3rd Ed)	£6.84	£5.81
Buyer's Guide to Amateur Radio Equipment	£8.49	£7.22
G-QRP Club Circuit Book	£6.54	£5.56
HF Antennas for All Locations	£7.24	£6.15
Ins and Outs of Repeaters	£1.35	£1.15
Morse Code for Radio Amateurs	£3.21	£2.73
Radio Amateurs Examination Manual (12th Ed)	£5.82	£4.95
Radio Communication Handbook Vols.1+2 (PB)	£21.12	£17.95
Radio Data Reference Book (5th Ed)	£9.59	£8.15
Teleprinter Handbook (2nd Ed) – Reduced to Cl ear	£2.29	£1.95
Television Interference Manual (2nd Ed)	£3.41	£2.90
VHF/UHF Manual (4th Ed)	£10.88	£9.25
World at their Fingertips	£8.62	£7.33

RSGB LOGBOOKS

Amateur Radio Logbook	£2.65	£2.25
Mobile Logbook	£1.37	£1.16
Receiving Station Logbook	£4.46	£3.79

RSGB MAPS CHARTS & LISTS

Great Circle DX Map (desk)	£0.59	£0.50
Great Circle DX Map (card for desk)	£3.21	£2.73
HF Awards List and Countries List	£0.54	£0.46
IARU Region 1 Beacon List	£0.44	£0.37
Locator Map of Europe (wall)	£2.17	£1.84
Locator Map of Europe (card for desk)	£0.79	£0.67
Locator Map of Western Europe (wall)	£3.40	£2.89
Meteor Scatter Data Sheets	£3.91	£3.32
Smith Charts – pad of 25 (Chartwell D7510)	£3.29	£2.80
Software Register	£1.18	£1.00
UK Beacon List	£0.44	£0.37
UK Repeater List	£0.56	£0.48
World Prefix Map in full colour (wall)	£3.38	£2.87

RSGB MEMBERS SUNDRIES (MEMBERS ONLY)

RSGB badge car sticker	£0.81
RSGB belt (leather)	£10.88
RSGB tie (coffee, maroon, green, blue – please state)	£4.50
RSGB teeshirts (medium, large, ex.large – please state)	£5.15
RSGB 'Green Book' (details structure, organisation and objectives of the Society)	£1.20
Standard callsign lapel badge (5 weeks delivery)	£2.95
De-luxe callsign lapel badge (5 weeks delivery)	£3.34
Standard lapel badge (RSGB emblem, pin fitting)	£1.36
Mini lapel badge (RSGB emblem, pin fitting)	£0.91
Members' headed notepaper (50 sheets) quarto	£2.81
Members' headed notepaper (50 sheets) octavo	£1.50
T & R Bulletin July 1926 souvenir copy	£0.45
75th Anniversary Calender	£1.50

MISCELLANEOUS

Car sticker 'Amateur Radio' (2 colours)	£0.81	£0.69
Car sticker 'I Love Amateur Radio'	£1.14	£0.97
Car sticker 'I'm on the air with amateur radio' (4 colours)	£0.93	£0.79
Car sticker 'I'm monitoring .5, are you?' (2 colours)	£0.81	£0.69
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Radio Communication back issues	£1.47	£1.25
Radio Communication bound volumes	£22.69	£19.29
Radio Communication Easibinder	£5.82	£4.95
RSGB HF contest log sheets (100)	£3.87	£3.29
RSGB VHF contest log sheets (100)	£3.87	£3.29

OTHER PUBLICATIONS

All About Cubical Quad Antennas (RPI)	Out of Stock	
All About Vertical Antennas (RPI)	Out of Stock	
Amateur Radio Computer Networking Conference Papers Vols.1-4 (ARRL)	£18.10	£15.39
Amateur Radio Satellites – The First 25 years (AMSAT-UK)	£2.06	£1.75
Amateur Television Handbook (BATC)	£2.34	£1.99
Antenna Compendium Volume 1 (ARRL)	£10.76	£9.15
Antenna Notebook, W1FB (ARRL)	£7.82	£6.65
ARRL Antenna Book	Out of Stock	
ARRL Handbook 1989 (hardback)	£16.41	£13.95
ARRL Operating Manual	£13.65	£11.60
AX25 Amateur packet radio link-layer protocol (ARRL)	£6.76	£5.75
Basic Radio Electronics (Tab)	£15.87	£13.49
Beam Antenna Handbook (RPI)	Out of Stock	
Better Short-wave Reception (RPI)	£5.87	£4.99
Callbook – International Listings 1989	£19.41	£16.50
Callbook – N.American Listings 1989	Out of Stock	
Care & Feeding of Power Grid Tubes (Varian)	£7.88	£6.70
Complete Dxer (Idiom)	£8.47	£7.20
Complete S.W. Listener's Handbook (Tab)	Out of Stock	
DX Edge (HF propagation aid)	£21.07	£17.91
DX Power: Effective Techniques	£9.29	£7.90
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the last ...

THE AMATEUR RADIO BENEVOLENT FUND

Now that the Anniversary Year is behind us, and operation "YEAR" is showing signs of getting off the ground, is it not time that we gave some thought to the problems that beset those who are established operators and perhaps been supporters of the Society, in some voluntary capacity or simply anxious to promote its aims and membership? I think the time has come to establish a Trust Fund which I suggest might be known as 'The Amateur Radio Benevolent Fund'. It would be a cause where clubs and individuals might show the support for their less fortunate colleagues for which the amateur operator is noted – anything from sponsored 'special activity' stations to collecting boxes at club meetings. The officers of the Trust would meet as required – say four times a year – and distribute the disposable income to worthy cases. Typically these might include the problems facing an XYL whose husband unexpectedly becomes a silent key; a loan to a member of the amateur's family who has to go overseas for medical treatment; the money to replace a set of reference books lost by fire or flood – there would be no limit to the range of succour that might be possible.

I put this suggestion to a Council member some years ago, but although I was assured the idea was under review, nothing was done. How far do members think we should go to help our fellow amateurs survive calamities which may be unexpected and devastating. *John Swinnerton, G2YS*

LITTLE BOXES

Having finally made up my mind to go QRT I feel I would just like to express my reasons through *RadCom*.

I have no personal animosity towards the Japanese, but I find I am gradually objecting more and more to the way in which their products are taking over our lives. They have certainly taken over the world of amateur radio; where would be without their little grey/black boxes?

I suspect that a great many amateurs are, like myself, no more than operators. This was brought home to me when I developed a fault in my grey box. I took it all the way to Southampton where it was repaired at a cost of one hour's labour. I simply felt that I should have been able to do it.

Since then I have been searching for a suitable circuit to build myself from components I can actually buy. First problem; years of RadCom proved useless. The one place you would expect a choice of circuits; RSGB manual; useless. Pages on the fabulous G2DAF which I think I remember reading about in the '50s but useless. I know valves are wonderful, they must be because everybody says so, but I am not going back thirty years.

The nearest I've come so far is G3TSO's current offering in RadCom. It could be just what I want, but I would have liked just a little more info; eg. voltage readings at various points (see the follow-up last month – Ed) which is something to help me get it going when I find nothing happens on first switch-on. Out here in the sticks there is no one I can go to for help.

I have always admired the 'homebrew' man/lady, but they are few and far between. Many seem to know the theory and can give advice easily but the amateur who has built the lot is a rare animal. Construction seems to be limited to wire aerials, although most are happy with their half-size G5RVs.

Over the years I've tried to interest my three offspring (now in their mid 20s) in the hobby, but with no luck. One tells me that RadCom has to be the world's most boring presentation only being surpassed by "Naval Architect" (give us a chance – we've just recruited a designer for the first time ever. She starts next month). I think it's that diabolical print you use (the computer print-out is about to go – Ed). I still feel RadCom should be inspiring experimentation but the pages that attempt this are often too technical for me and make me feel inadequate. How did I pass the RAE?

I shall not quit entirely; I will keep up my licence fee in the hope that I do manage to construct my entire station one day.

One final plea – what about having a small section of every band just for homebrewers? After all, Amtor, Packet, CW, SSTV all have theirs. *C M Maceke, G4LXN*

KEEP CONTESTS OUT OF HARM'S WAY

I was reading the November '88 RadCom and some comments regarding contests. As far as I am concerned there are too many of them which forces non-contest people QRT.

However, a lot of people get a kick out of them so each to his or her own. Having said that, I still would like to see contests won by skill and not just power, so what about a power restriction? Say 100watts DC or less for NFD and 10watts or less for QRP contests. 25 watts is not QRP by me.

Also, restrict the frequency so non-contest operators can carry on and do their own thing, discouraging stations outside the limit.

Also monitor signals and if necessary record them. Then let offending people hear how badly they send, ie splatter, over processing or over-driving linears. If they don't clean it all up, disqualify them.

I hope this stirs up some people. It's meant to! *Terry Vale, G6FOK*

CW HAS ITS USES

Having just read "in praise of CW again" (Alex Dodd's letter in your Last Word section), I would like to add that there's another reason why the morse test should still remain – up-and-coming radio hams with speech impediments.

Reading it brought to my mind letters in past RadComs from Class B ops harping on about why we have to take a morse test and that it's an antiquated mode. The Romans had central heating; is that antiquated? The people that say those things just want things easy. The RAE is far too easy now and I believe that this is why we find so much degraded operating on our frequencies. I never use 80m now it's a slanging-match frequency with bad language too. Why is there nothing being done about those people?

If these moaners of CW don't like the system, they can either go on 27MHz or try another hobby, like train spotting. Something simple for their simple minds.

I love CW. It's my favourite mode. I use phone as well, but not much. This junior licence could prove to be a good thing – I've worked some very good CW stations in the USA and a lot of them are very young indeed; and they have a good fist.

The class B's, or those who are dragging CW down, don't know what they're missing. I enjoyed learning CW. It's a beautiful thing, well worth the effort, and is simply another means of communicating. There's a lot more rarer DX to work on CW because of the language barrier. You'll find a lot more CW than phone stations coming from South America, and you make the trip on less power too.

I suggest that these people that think CW is an outdated mode, have a spell of listening on the CW segments of the HF bands where they will find it very much alive.

Just learn it, chaps, and stop griping. Maybe you'll even find too that there's no better way of communicating. *J P Bortowski, GW0FPY*

WHO'S A DUMMY THEN?

The expression 'Dummy Load' is a misnomer; it should really be called a 'dummy aerial'. If, however, you are in the habit of referring to your aerial as a 'load' (which it is, strictly speaking), then the thing you connect in its place for test purposes may be referred to as a 'Test Load'. *Yours pedantically, R W Barnes, G4YLI*

CONDENSE CONTESTS NEWS

I gather from December issue that there are adverse comments about the amount of space allocated to the G3TSO transceiver. I am sure that there are many apart from myself who are already building it. What constantly bothers me is the space devoted to Contest News (eight pages this month), and yet it is clear to see that the numbers competing are very small. Almost every report starts "fewer entries than usual", "disappointingly low numbers" etc. Presumably this small minority make as much of a nuisance in the places that matter in the RSGB as they do on air. Devoting fewer pages to Contest News could lead to more general interest articles not being held over. *J Leigh, G4ILK*

IMPROVE OUR RACE RELATIONS

I have on several occasions heard a net operating in the 80m band from the North of England whose conduct appalls me. This net regularly abuses foreign amateurs, especially Germans. A typical remark heard recently was "we should have kept the Lancasters going after 1945 ..."

They never seem to use callsigns and often 'double', which displays poor operating ability as well as behaviour. I hope these people are being 'observed'.

I would add that I am English and did live through the II World War, and that the behaviour of the aforementioned is totally against the spirit of amateur radio and represents the views of a very tiny minority. *M J Thorogood, GM0JKF*

THE BIAS TOWARDS HF

With the publication of the December issue of RadCom, I noted yet again, with increasing disappointment, the apparent trend towards a decline in the space given over to HF matters.

Compared with other radio magazines' coverage of HF news, for instance, the content of the HF News and Views column pales into obscurity! Yet space and content given over to the excellent VHF column remains at a very healthy level. Surely the postal dispute cannot be used as an excuse for this disparity any longer; after all, there are other means of communication. I believe one of them, in its many guises, is called radio!

Also, in September, a very well organised RSGB event called the HF Convention took place, attracting many UK and overseas visitors, yet to date no write-up of this increasingly important and extremely well patronised gathering has appeared in RadCom. (You'll be pleased to see that we've now got the report, with pictures. It's on page 58 – Ed). However, again in comparison, there was no shortage of space in the August issue (2.5 pages) for the write-up of the VHF Convention held in May, not to mention coverage of events related to the 75th Anniversary celebrations which have appeared in every issue of RadCom this year.

It is my view, and one that I know is shared by many other members, that the RSGB is just ever so slightly biased towards VHF; the content of RadCom, while grudgingly acknowledging that there is life below 30MHz, certainly does nothing to dispel this feeling. No doubt editorial staff would probably take issue on this point! *John Pitty, G4PEO*

THE LAST WORD...

Congratulations on your skilful solution of the cartoon/anti-cartoon controversy, ie publish the cartoons but make them so small that no-one can read them.

Absolutely masterly. You should be in politics! *S Kind, G4AYP*

THE PRECIOUS PAGES

On page 995 of December's RadCom you mention that you frequently receive grouses from members about the undue length and technicality of published articles. Your subsequent remarks imply that you intend to respond positively to these grouses and change editorial direction. (Rebalancing – not changing, necessarily – Ed.) Have you considered that by so doing you may be displeasing the silent majority? Certainly one recent constructional project was so far OTT as to be laughable, were it not an alarming indicator of the RSGB's trend toward the encouragement of very high power operation. But on the whole, those of us who still regard ourselves as 'real' amateurs rather than hotshot award-chasers do, I feel sure, look to RadCom primarily as a source of technical information.

Latterly we, of the less competitive instinct, for whom amateur radio is an outlet for our technical curiosity, have not found as much in RadCom to interest us as might once have been the case. I have never understood, for instance, what possible value the majority of members can find in page after page of historical reporting of band conditions and award-chasers' achievements. Neither have I fathomed why contests, which seem to attract only handfuls of participants at best (it would be interesting to see the numbers as percentages of the membership), warrant

... word

the last ...

several pages almost every month.

I suppose the acres of Society proceedings that are now faithfully reported must be accepted as an honest attempt to keep the membership better informed, but oh, so very, very boring.

Wouldn't it make sense to allocate space in the journal in proportion to the number of members whose interest a topic services? If that were done I'd be very surprised if we didn't see Technical Topics expanded to ten or more pages, with contests and historical activity reporting sharing a single page.

Most of us belong to the RSGB for only two reasons, namely receiving RadCom and making use of the QSL Bureau. Yes, we have reason to value the Society's work as an interface with the DTI, but few of us can relate to the 'Learned Society' image it still pompously promotes. Surely the Society has a duty to find out properly what its members' tastes really are and to reflect the majority view in its journal? We probably need two journals, one for those of us whose operating positions are a tiny corner of a cluttered workbench, and another for those black box operators for whom amateur radio satisfies their collectors' instinct. Come to think of it, we probably need two Societies...

May I now tell you what I'd very much like you to publish? Please will somebody write an article which explains in jargon-free English how I can transceive in the various data modes such as Amtor, RTTY, SSTV etc using my transceiver and my Amstrad PCW computer? I simply wish to know what I would have to buy and how it would be interconnected and operated. In my vocabulary RS means Radiospares and TU means Trade Union. I'm too old now to remember any new jargon; its hard enough trying to remember the newfangled name for a kilocycle. I wish your advertisers would get that message. *Bob Connell, G4JQY*

(I feel a questionnaire coming on – Ed)

A BASIC PROBLEM

As a user of an Amstrad PCW8256, which uses Mallard Basic, I recently typed in the NGR to Locator conversion program listed on page 60 of the 1987/88 edition of the *Amateur Radio Call Book*. It would not print out the correct check locators.

In order to get the program to operate and print out the correct Locator I found it necessary to alter line 1020 to read as below:

```
1020 N=F*(N-INT(N)):E=F*(E-
INT(E)):L$=L$+CHR$(INT(T)+IN-
T(E))+CHR$(INT(T)+INT(N))
```

You may care to pass on this information by way of Last Word. *Peter Hunter, G3OFF*

PROTECTION, IN PRACTICE

Sir, With regard to the 'In Practice' on waterproofing in Jan's *RadCom* I have had great success over a number of years using Finnigans 'Waxoyl' on aerial fittings and elements. It can be painted on or sprayed onto the items and forms a waxy weatherproof coating, the advantage being components can be undone easily even after a long period. A 2-metre beam that had been on the roof for over two years was bright and shining when cleaned off with white spirit; all its fixings were in first class condition.

I am sure I am not the first to use Waxoyl on aerials but cannot remember seeing it mentioned in *RadCom*, so thought I would write and point out its potential to others.

J. Thompson-Woollons, G1OSP

I read the article on waterproofing with the greatest interest and appreciation. However, I looked in vain for any mention of the most useful product in the field of waterproofing antennas, connectors, etc? I am of course, referring tot he invaluable product known as 'Sylglas' which is readily available all over the UK.

Here in the Shetland Islands where wind speeds of 100mph + are common and everything is lashed by salt spray, it has been found by experience that Sylglas is the ultimate material for waterproofing antennas, cables, connector blocks or WHY. Furthermore, Sylglas is cheap and available in a number of widths and sizes. The proof of the pudding regarding Sylglas is that all local firms who instal and service antennas on North Sea trawlers use only Sylglas; they have found it to be a first class material capable of surviving for years in an extremely severe environment. Once you have used Sylglas your waterproofing problems are over! *A. Tait, GM4LBE*

LINK THE STUDENT LICENCE TO THE GCSE

I read with dismay the letter concerning the lack of success of the Greater Peterborough ARC in attracting school pupils to its open night. Of course, it is sad that no reply was given to the club's invitation but perhaps I may be able to offer an explanantion, but I must stress *not* an excuse, for the seemingly poor show.

As a teacher I see the mail that arrives in schools every day, and it really is a great pile. Most school secretaries re-direct mail addressed to Head to other school departments and I am sure that the club's letters have just been lost in the system. Perhaps this reflects the lack of an efficient business-like approach but that is another story.

A better approach would have been to 'phone the school (this is best done in the lunch period) and if the Head is not available ask to speak to either the head of science/physics/electronics. Why not send out some posters advertising the event? Publicity is the name of the game in schools as well as elsewhere.

On the subject of getting pupils into AR I have noticed some trends.

In my experience most young OPs tend to pass their RAE prior to sitting GCSEs. I would suggest that the reasons for this are rather obvious. Modern exams place far more emphasis on coursework. It is now not possible for 'bright sparks' to leave everything to the night before the exam. Most pupils in their final two years of study (if they leave after GCSE) could not cope with further demands such as an RAE or even a mini RAE in the form of a novice licence. Now an RAE apart from opening the doors of amateur radio will give a youngster an extra qualification which I am sure will continue to provoke interest at interviews (I wonder if everyone remembers to put their RAE on job application forms? I have been to interviews where the RAE rather than my professional qualifications were discussed at length!!), but why not tie the novice licence in with existing GCSEs? For example in a few years the vast majority of upper school pupils will be studying a Balanced Science course which means Physics, Chemistry, Biology and Earth Science. The structure of the National Curriculum is taking shape at present but will almost certainly include a topic on communication. What a marvellous opportunity! When it is considered that these pupils will be sitting exams covering most of the electrical theory suggested by the novice exam why not set the requirements for the novice licence as:

A GCSE pass grade A, B, C in Balanced Science (or for now Physics, Technology or Electronics). Plus a pass in a practical test covering operating practice and procedure. The advantages of this system it would seem are that as pupils are already studying for their GCSEs it will not be expecting too much to take a practical test, probably run by the local ARC. Also the extra qualification could well come in use when the student applies for a job. *B Laniosh, G4NZK*

THE COMMERCIAL ATTITUDE TO CHANNEL SPACINGS

We read with interest the article in November RadCom by Angus McKenzie regarding 12.5kHz channel spacing. As a company who have recently designed, and are manufacturing in the UK, a new 2m FM transceiver, the problems mentioned in the article have been the subject of much debate over the last twelve months during its development. Being one of the very few manufacturers of marine VHF transceivers, we have to follow a very strict technical specification and have to ensure there can be no possible abuse of the internationally agreed bandplan. We saw no reason not to apply the same philosophy to the less stringently controlled 2m band.

As concerned amateurs it had become apparent to us that the 2m band has indeed become overcrowded and that very frequent abuse of band planning by a large number of users was ruining enjoyment of the hobby for others. This overcrowding has also tempted large numbers to seek 'a quiet channel' outside the amateur bands. This activity has been encouraged by imported transceivers that are very easy to modify so that other frequencies can be covered. The majority of transceivers will now cover typically 134 – 170MHz. This, coupled with the fact that these transceivers are designed for world markets with different bandplanning, also means frequency steps of 5, 10, 12.5, 15, 20 and 25kHz are included, along with both + and – repeater offsets, encouraging the use of non-standard channels with the subsequent interference to those trying to adhere to the bandplan.

We therefore chose to provide a radio with a technical specification capable of operation at 12.5 kHz frequency steps with the minimum of interference to and from other users. At the same time, to encourage correct use of the bandplan, we have included a channelised mode of operation in accordance with the Region 1 bandplan which also inserts the correct repeater offset for all repeater channels, including options to select R8, R9 and the non-standard French repeaters. We have also restricted frequency coverage to 144-146MHz, so operation out of band is discouraged. We sought clarification from the DTI on this point and they confirmed that any transceiver modified for frequency coverage outside the amateur bands would require both type-approval and licensing, and that anyone found using such equipment would be subject to the full force of the law.

With regard to the technical specifications of the Navico range of amateur radio transceivers much care was taken to maintain compatibility with 25kHz and 12.5kHz operation. On receive we have chosen to use the Murata "G" series filter, typically giving greater than 60dB adjacent channel rejection of a 12.5kHz interfering signal. On transmit, deviation has been left as 5kHz maximum but a preset is available to reduce this to the required deviation for 12.5kHz spacing. The transmit audio frequency response is the normal 750s pre-emphasis with 12dB/octave roll-off above 3kHz as specified for PMR/Marine type approval.

12.5kHz channel spacing is becoming more and more necessary in all VHF bands. There is currently a European working party looking into its use in the marine band. It is imperative that wherever possible equipment purchased now is compatible with future requirements. *David Sheekey, Senior Design Engineer and Tom Crosbie, G6PZZ, Amateur Radio Products Manager.*

DON'T GIVE UP ON THE NEWCOMERS

In January's Last Word, Mr Meadows (G1UGA) asks "Where do we find the young enthusiasts?...Where did we go wrong?"

I suspect he made the same mistake that I did with Jamboree-on-the-air, two years ago. Nowadays, in the age of computers, portable 'phones and satellites, there is nothing *inherently* exciting about radio. We believe that the scope our licences give us make the hobby fun and exciting, but we must put that message across to potential newcomers; and that we cannot do through a third party, be he Headmaster or Scout Leader.

Two years ago I contacted every Scout and Cub leader in the district, and asked them to tell the lads about JOTA. (This was the second year we had run it as a district event.) The response was disappointing. Last year two of us visited every pack and troop, either together or separately. We took a radio with us, and held a short conversation on the air. We then gave a very brief introduction to the hobby, and why we enjoy it. Far more interest was generated, many more boys came to JOTA, and a few are now interested in the novice licence.I am not advocating thrusting my hobby down other people's throats, just because it interests me; far from it. But if we give newcomers enough information to decide whether it is the hobby for them, I believe we are doing them, and ourselves a service.

If Project YEAR is to be a success, it must not just kindle enthusiasm, it must also generate the first sparks. Please do not give up Mr Meadows. I am sure the enthusiasts are potentially there. The difficult part is getting to them in the first place. *G. Dellbridge, G1ZIH*

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R.S.G.B. MORSE TESTING dates at Maidstone Y.M.C.A. (A229 Loose Village) are February 11th, May 6th and September 9th. No tests on Rally Day (28th May).

PATENTS, TRADE MARKS AND DESIGNS. Literature on request. Kings Patent Agency Limited, Established 1886. Ferringdon Road, London EC1M 3JB. Telephone 01-248 6161. Telex 882805 and FAX 01-831 9306.

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Amateur Radio Band Plans

On all bands there are recommended sections set aside for use by each mode. In some parts of the world (e.g. the USA) observance of these band sub-divisions is mandatory and their use also depends on the class of licence held by the operator. The IARU Region 1 hf band plan (which is supported by all IARU member societies in Europe and Africa) is set out below and should be observed at all times even though its recommendations are only advisory as far as UK amateurs are concerned.

IARU Region 1HF Band Plan

Band (MHz)		Type of emission
1.81 – 1.84		cw
1.84	±2kHz	rtty
1.84 – 2.00		cw and phone
3.50 – 3.60		cw (2)
3.60	±20kHz	rtty (1)
3.60 – 3.80		cw and phone (2, 3)
7.00 – 7.04		cw
7.04	±5kHz	rtty (1)
7.04 – 7.10		cw and phone
10.100 – 10.150		cw
10.145	±5kHz	rtty (1)
14.00 – 14.10		cw
14.070 – 14.099	±12.5kHz	rtty (1, 14)
14.10 – 14.35		cw and phone (14)
18.068 – 18.110		cw
18.105	±5kHz	rtty (1)
18.110 – 18.168		cw and phone (13)
21.00 – 21.15		cw
21.10	±20kHz	rtty (1)
21.15 – 21.45		cw and phone
24.890 – 24.930		cw
24.925	±5kHz	rtty (1)
24.930 – 24.990		cw and phone (13)
28.00 – 28.20		cw
28.10	±50kHz	rtty (1)
28.20 – 29.70		cw and phone

The 1.8MHz band is shared with other services. Below is a list of coastal radio station frequencies to be avoided.

All frequencies are used for ssb, except those marked with an asterisk (rtty), apart from those in brackets, which are available when required, they are all in regular use. "W" indicates a working frequency.

Callsign	Location	Frequencies (kHz)
GNI	Niton IoW	(1831) 1834 (1911) (1922) (1925)
GLD	Land's End	1841w (1908) (1911) (1925)
GIL	Ilfracombe	(1852) 1855
GLV	Anglesey	(1911) (1922) 1925
GPK	Portpatrick	(1880) 1883w
GHD	Hebrides	1866w
GKR	Wick	(1824) 1827w
GND	Stonehaven	(1853)1856w 1946
GCC	Cullercoats	1838 (1841)
GKZ	Humber	(1866) 1869w
GNF	N. foreland	(1845) 1848w
Guernsey Radio		1810w
EJM	Malin Head	1841w
EJK	Valentia	1827w
OST	Ostende	1817w 1820w 1905 1908 *1971.5
OSA	Antwerpe	1901w 1904
PCH	Scheveningen	1862w 1890w *1919.5 1939w (1971) *1972.5 (1995)
DAN	Norddeich	1911
DAO	Kiel	1880 1883 1915 1918
OXB	Blavand	1813
FFU	Brest	(1894) (1995)
FFO	St Nazaire	1817 (1995)
FFC	Bordeaux	1820 1862w
FFM	Marseilles	1906w 1988
TKM	Grasse	1834 1988

In addition to these, 1950 and 1953kHz, both J3E/USB, are assigned to all UK coastal radio stations. The frequencies which tend to suffer interference from stations in the amateur service are 1,820, 1,841, 1,852 and 1,953kHz, with the last being by far the most commonly affected.

Notes

(1) for rtty, recommended section of operation shared with cw.
(2) 3,500 – 3,510 and 3,775 – 3,800kHz reserved for intercontinental working.
(3) 3,635 – 3,650kHz is used by USSR stations for intercontinental working.
(4) For sstv recommended operation frequencies are: 3,735, 7,040, 14,230, 21,340, 28,680kHz all ± 5kHz.
(5) For beacons, 28.195 – 28.3MHz is recommended.
(6) The downlink for amateur satellites is reserved on 29.30 – 29.55MHz.
(7) The transmitter power on the 10MHz band should not exceed 250W mean output power, (NB: UK max carrier power is 20dBW).
(8) No contests should be organised on the 10MHz band.
(9) Credit for awards or diplomas should be accepted for contacts made on the 10MHz band.
(10) SSB may be used on the 10MHz band during emergencies involving the immediate safety of life and property, and only by stations actually involved in the handling of emergency traffic.
(11) Context preferred segments for major contests: 3.5 – 3.56, 3.6 – 3.65, 3.7 – 3.8, 14 – 14.06, 14.125 – 14.3MHz.
(12) The following frequencies are reserved for the international Beacon Project: 14.099 – 14.101, 21.149 – 21.151, 28.190, 28.300MHz.
(13) Use of SSB on 18 and 24MHz in the UK is not permitted at the present time although it is hoped that such permission will be granted during 1989.
(14) Packet operators are asked to take special care to avoid causing interference to the beacon network on 14100kHz.

50MHz Band Plan

50.000		
CW only	50.020 – 50.080	*Beacons*
	50.090	*Centre of cw activity*
50.100		
All narrow band modes	50.110	*Intercontinental calling*
	50.100 – 130	*SSB dx*
	50.300	*CW ms ref. freq.*
	50.350	*SSB ms ref. freq.*
50.500		
All modes	50.600 ±	*rtty (fsk)*
	50.620 – 50.760	*packet radio*
51.000		
Pacific DX window		
51.100		
All modes	51.410 – 51.590	*FM telephony*
	51.510	*FM calling*
52.000		

UK 70MHz Band Plan

70.000		
Beacons only		
70.075		
CW only		
70.150		
SSB and cw only	70.200	*SSB calling frequency*
70.260		
All modes	70.260	*National mobile and calling frequency*
	70.300	*RTTY calling frequency*
	70.350 – 70.400	*Raynet*
70.400		
FM simplex only	70.450	*FM calling frequency*
70.500		

UK 144 MHz Band Plan

144.000		
CW only	144.000 – 144.025	*Moonbounce*
	144.050	*CW calling frequency*
	144.100	*MS cw reference frequency*
144.150		
SSB and cw only	144.250	*Used for GB2RS (ssb) and slow morse transmissions*
	144.260	*Used by Raynet*
	144.300	*SSB calling frequency*
	144.400	*MS ssb reference frequency*
144.500		
All modes non-channelised	144.500	*SSTV calling frequency*
	144.600	*RTTY calling frequency*
	144.600±	*RTTY working (fsk)*
	144.625	*Data and packet radio*
	144.650	*AX.25 packet radio repeaters and mailboxes*
	144.675	*Data and packet radio*
	144.700	*FAX calling frequency*
	144.750	*ATV calling and talkback*
	144.775	*Raynet*
	144.800	*Raynet*
	144.825	*Raynet*
144.845		
Beacons	144.850	*Raynet**
144.990		
FM repeater inputs	145.000 R0	
	145.025 R1	
	145.050 R2	
	145.075 R3	
	145.100 R4	
	145.125 R5	
	145.150 R6	
	145.175 R7	
145.200		
FM Simplex channels	145.200 S8	*Raynet*
	145.225 S9	*Used by Raynet*
	145.250 S10	*Used for slow morse tone modulated transmissions*
	145.275 S11	
	145.300 S12	*RTTY afsk*
	145.325 S13	
	145.350 S14	
	145.375 S15	
	145.400 S16	
	145.425 S17	
	145.450 S18	
	145.475 S19	
	145.500 S20	*FM calling channel*
	145.525 S21	*Used for GB2RS (fm) broadcast*
	145.550 S22	*Used for rally/exhibition talk-in*
	145.575 S23	
145.600		
FM repeater outputs	145.600 R0	
	145.625 R1	
	145.650 R2	
	145.675 R3	
	145.700 R4	
	145.725 R5	
	145.750 R6	
	145.775 R7	
145.800		
Satellite service		
146.000		

Notes on UK 144MHz and 430MHz Band Plans

MS operation can take place up to 26kHz higher than the reference frequency (see RSGB *Amateur Radio Operating Manual* p80).

The beacon and satellite service must be kept free of normal communication transmissions to prevent interference with these services. (* – 144.850MHz in use by Raynet until further notice, subject to 25W erp max and vertical polarisation).

The use of the fm mode within the ssb/cw section and cw and ssb in the fm-only sector is not recommended.

Repeater stations are primarily intended as an aid for mobile working and they are not intended to be used for dx communication. FM stations wishing to work dx should use the all-modes section, taking care to avoid frequencies allocated for specific purposes.

From January 1987, 433.200MHz ceased to be a simplex channel and became a permanently designated repeater channel, R88.

UK 430 — 440 MHz Band Plan

430.000		
	NB: 431 – 432MHz not available within 100 km of Charing Cross, London	
432.000		
CW only	432.000 – 432.025	*Moonbounce*
	432.050	*CW centre of activity*
432.150		
SSB and CW only	432.200	*SSB centre of activity*
	432.350	*Microwave talk-back*
432.500		
All modes non-channelised	432.600±	*RTTY (fsk)*
	432.625	*UK packet links*
	432.650	*UK packet links*
	432.675	*Data and packet*
	432.700	*FAX calling frequency*
432.800		
Beacons		
433.000		
FM repeater outputs in UK only	433.000 RB0	
	433.025 RB1	
	433.050 RB2	
	433.075 RB3	
	433.100 RB4	
	433.125 RB5	
	433.150 RB6	
	433.175 RB7	
	433.200 RB8	
	433.225 RB9	
	433.250 RB10	
	433.275 RB11	
	433.300 RB12/SU12	*RTTY repeater and rtty afsk working*
	433.325 RB13	
	433.350 RB14	
	433.375 RB15	
433.400		
FM simplex channels	433.400 SU16	
	433.425 SU17	
	433.450 SU18	
	433.475 SU19	
	433.500 SU20	*FM calling channel*
	433.525 SU21	
	433.550 SU22	*Used for rally and exhibition talk-in*
	433.600 SU24	*RTTY afsk*
	433.625	*Packet radio*
	433.650	*Packet radio*
	433.675	*Packet radio*
	433.700	*Raynet*
	433.725	*Raynet*
	433.750	*Raynet*
	433.775	*Raynet*
434.600		
FM repeater inputs in UK only	434.600 RB0	
	434.625 RB1	
	434.650 RB2	
	434.675 RB3	
	434.700 RB4	
	434.725 RB5	
	434.750 RB6	
	434.775 RB7	
	434.800 RB8	
	434.825 RB9	
	434.850 RB10	
	434.875 RB11	
	434.900 RB12	*RTTY repeater afsk*
	434.925 RB13	
	434.950 RB14	
	434.975 RB15	
435.000		
Satellite Service	434 – 440	*ATV — frequencies chosen so as to avoid interference to other band users and, in particular, the amateur satellite service*
438.000		
440.000		

1,240 to 1,300MHz Band Plan — Region 1

1,240.000		
All modes		*Digital communications*
1,241.100		
ATV		
1,251.500		
All modes	1,258.150 to 1,259.350	*R20 – R36 repeater output*
1,260.000		
Satellite service		
1,270.100		
ATV		
1,286.000		
All modes c)		
1,291.000		
Repeater input	RMO RM19	*(UK) 25kHz spacing*
1,291.475		
1,291.500		
All modes	1,293.150 to 1,294.350	*R20 – R36 repeater input*
1,296.000		
CW	1,296.000 1,296.025	*Moonbounce*
1,296.150		
SSB — **Narrow band DX segment** a)	1,296.200 1,296.500 1,296.600 1,296.600 1,296.700	*Narrow-band centre of activity* *Linear transponder input* *Linear transponder output*
1,296.800		
Beacons exclusive b)	1,296.500 1,296.600 1,296.700	*SSTV* *RTTY* *FAX*
1,296.990		
1,297.000		
Repeater output	RM0 RM19	*(UK) 25kHz spacing*
1,297.475		
1,297.500		
FM simplex d)	SM20 SM30	
1,298.000		
All modes		*Digital communications*
1,298.500		
1,300.000		

Notes on the 1,240 to 1,300MHz Band Plan

1. IARU Region 1 Band Plan
the following notes are part of the provisional IARU Region 1 band plan, adopted at the IARU Region 1 conference in Cefalu (1984), and all member societies should strongly promote adherence to the recommendations made in these notes.

1.1 Footnotes
a. CW is permitted over the whole narrow-band dx part of the band; cw exclusive between 1,296.000 to 1,296.150 MHz.
b. Regional planning by the Beacon Co-ordinator only for beacons with more than 50 Watts ERP.
c. DARC draws attention to the fact that in order to avoid interference to/from primary users the use of 1,286 to 1,291MHz for atv will be continued in The Federal Republic of Germany.
d. In countries which do not have access to 1,298 to 1,300MHz (e.g. Italy) the fm simplex segment may also be used for digital communications, if necessary.

1.2. Miscellaneous agreements
At the IARU Region 1 conference in Warsaw (1975) it was recommended that France, after their loss of the upper part of the band to other services, adopt the portion 1,238 to 1,240 MHz for narrow-band operations in the same way as the rest of Region 1 uses in 1,296 to 1,298MHz segment of the band.

2. Usage
The following notes are referring to the usage column in the band plan. In the right amateur spirit operators should take notice of these agreements which are made for operating convenience, but no right to reserved frequencies can be derived from a mention in the usage column or from the following notes.

2.1 During contests and band openings local traffic using narrow-band modes should operate between 1,297 to 1,298MHz.

2,320 to 2,450MHz Band Plan — Region 1

2,300.000		
Sub-regional (National band plans)		
2,320.100		
CW exclusive	2,320.000 2,320.025	*EME (Moonbounce)*
2,320.150		
CW & SSB	2,320.200	*SSB centre of activity*
2,320.800		
Beacons exclusive		
2,320.990		
2,321.000		
Simplex & repeaters (FM)		
2,322.000		
All modes	2,322 to 2,355 2,355 to 2,365 2,365 to 2,370 2,370 to 2,390	*ATV* *Digital comms* *Repeaters* *ATV*
2,390.000		
		EME (Moonbounce)
2,392.000		
All modes		
2,400.000		
Amateur satellite service		
2,450.000		

Notes on the provisional 2,300 to 2,450MHz Band Plan

a) In countries which do not have access to the ALL MODES against 2,322 to 2,390MHz, the FM SIMPLEX & REPEATER segment 2,321 to 2,322MHz may be used for digital data transmissions.
b) In countries where the narrow-band segment 2,320 to 2,322MHz is not available, the following alternative narrow-band segments can be used:
2,304 to 2,306MHz and 2,308 to 2,310MHz.

3,400 to 3,475MHz Band Plan — Region 1

3,400.000		
All modes		
3,456.000		
Narrow band CW/EME/SSB	3,456.200	*Centre of activity*
3,458.000		
All modes		
3,475.800		

5,650 to 5850MHz Band Plan — Region 1

5,650.000		
Amateur satellite service (up-link)		
5,670.000		
All modes		
5,760.000		
Narrow-band CW/EME/SSB	5,760.200	*Centre of Activity*
5,762.000		
All modes		
5,830.000		
Amateur satellite service (down-link)		
5,850.000		

10,000 to 10,500MHz Band Plan — Region 1

10,000.000		
All modes (ATV, data transmission, FM simplex, duplex and repeaters)		
01,368.000		
Narrow-band CW/EME/SSB/ Beacons	10,368.200	*SSB centre of activity*
10,370.000		
All modes		
10,450.000		
Amateur and amateur satellite service (all modes)		
10,500.000		

Notes on the provisional 10,000 to 10,500MHz Band Plan

In those countries where the narrow-band segment 10,368 — 10,370MHz is not available, the segment 10,450 to 10,452MHz is suggested as an alternative narrow-band segment.

24.0 to 24.25GHz Band Plan — Region 1

24.000.000		
Amateur satellite service	24,025.000	*Preferred operating frequency wide-band equipment*
24,050.000		
All modes		
24,192.000		
Narrow-band CW/SSB/ Beacons	24,192.000	*Centre of activity*
24,194.000		
All modes		
24,250.000		

47.0 to 47.2GHz Band plan — Region 1

47,000.000		
	47,088.000	*Centre of narrow-band activity*
47,200.000		

IARU: Band Plan co-ordination

As the RSGB represents the interests of radio amateurs within the UK, so the International Amateur Radio Union (IARU) represents amateur radio on an international scale.Its membership is made up of national societies rather than individuals and it has 124 member societies. It was founded in 1925 and has its headquarters in the USA. It is split into three sections as is the International Telecommunications Union (ITU), the UK coming under the administration of Region 1.

The aim of the IARU is to promote worldwide growth in the movement and where necessary represent the movement's interests at the ITU. It also regulates and co-ordinates band plans, and makes recommendations for the use in operation of specialised activities such as meteor scatter.

Another service provided is the Monitoring Service (IARUMS) which monitors unauthorised transmissions by other services within the amateur bands. Reports from the IARUMS are sent to both the ITU and national telecommunication administrations.

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