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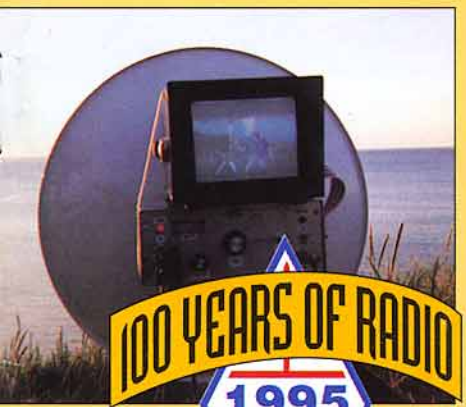
February 1995

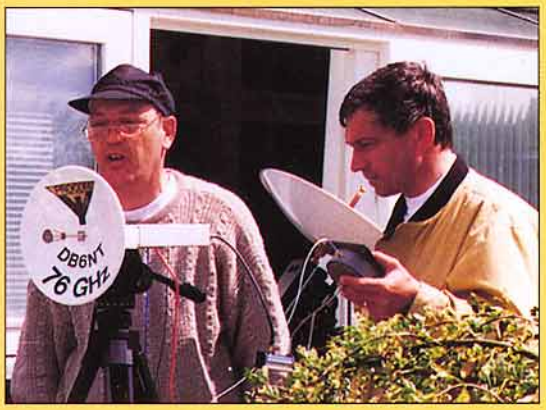
RadCom

Radio Communication

The Journal of the Radio Society of Great Britain

THE VOICE OF AMATEUR RADIO FOR 82 YEARS

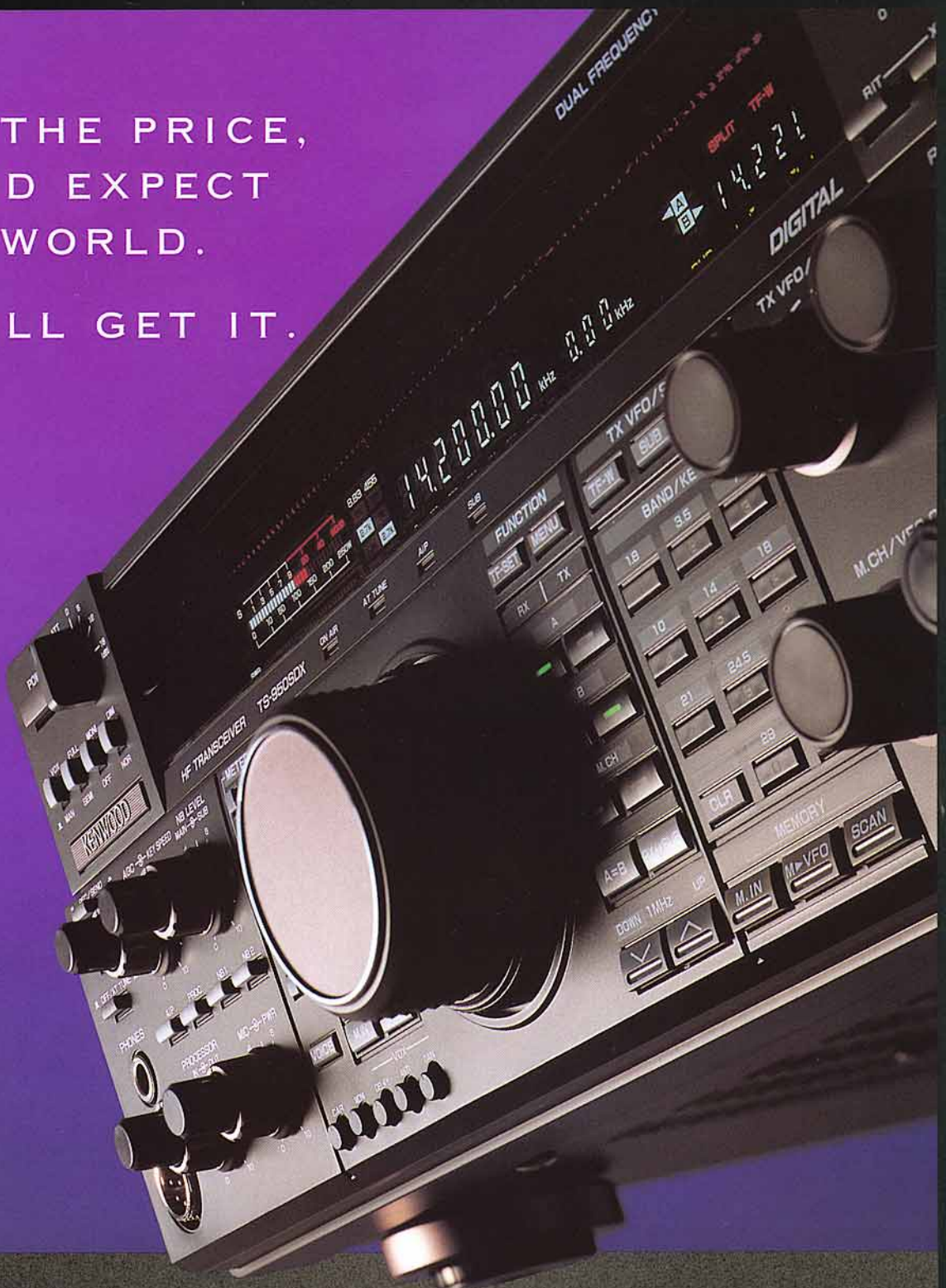




Danish Dishes: OZs portable on 10 - 145 GHz

FOR THE PRICE, YOU'D EXPECT THE WORLD.

YOU'LL GET IT.



The TS-950SDX is at the very pinnacle of the Kenwood HF transceiver range. And when you look at its specification, that's not surprising.

It boasts a number of highly advanced features like built-in digital signal processing, 50 Volt MOSFET finals, AIP (advanced intercept point), built-in sub-receiver and built-in automatic antenna tuner. To name but some of its world-leading technical tours-de-force.

Just as important, it's made with Kenwood's traditional attention to detail and reliability, to stand up to a lifetime's use.

The TS-950SDX is part of a range of HF transceivers priced from around £1000 to £3500. And although quality is never cheap, it's still a small price to pay to have the world of radio communications at your command.

KENWOOD

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RadCom

COVER PICTURE:
Scenes from Danish Microwave Activity Week when tests were carried out on 10, 24,47,76 and 145GHz.
Feature : page 16.

NEWS AND REPORTS

TECHNICAL FEATURES

REGULARS

REVIEWS

For Everything In Packet Radio,
There Is Only One Make To Choose From

When AEA appointed their U.K. distributors, they wanted to ensure maximum support to their end users. They chose MARTIN LYNCH & SISKIN ELECTRONICS for this very reason. Since October last year the retail prices have been reduced and remember, buying from either company will ensure you get products designed for the U.K. market. Phone or fax your order through today.

DSP-2232 & 1232

The only DSP (Digital Signal Processing) Data Controller available. The DSP-1232 with 2 switchable ports, and the DSP-2232 with 2 simultaneous ports, provide a new level of performance & versatility in data controllers.

RRP £799.95 & £649.95

PK-232MBX

Probably the best selling Data Controller in the world, the PK-232MBX is the Radio Modem to choose if you want all modes, including Morse Code, Baudot, (RTTY), Ascii, Amtor/Sitor 476 & 625, Pactor, HF & VHF Packet, B&W Fax tx/rx, Navtex & Amtex. As with the PK-900, the PK-232MBX now includes "SIAM" and is compatible with the popular TCP/IP networking protocol via KISS mode.

RRP £329.95

PK-12

The very latest replacement for the PK-88, the tiny PK-12 not only comes with more features, but its cheaper too! The PK-12 is a 1200 baud VHF packet controller ideal for those of you who are looking at getting started in digital communications. Full-featured mail drop facilities including internal lithium battery back-up.

RRP £139.95

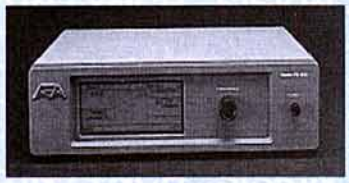
Isoloop 10-30

Magnetic Loop

This high-Q, high efficiency antenna is perfect for Amateurs (and professionals), living in areas with antenna restrictions. The IsoLoop is a compact (only 35") diameter, rugged low profile design, allowing 150 watts of RF anywhere between 10 and 30MHz. Efficiency ranges from a staggering 96% on 28MHz to 72% on 14MHz and because of the high-Q design, TVI is reduced still further over "conventional" antennas. The IsoLoop includes 50ft of control cable and a new improved antenna controller.

RRP £399.95

PK-900



When you're ready to step up from the best selling PK-232MBX, then take a look at the PK-900. Dual simultaneous ports, switchable via a single keystroke, will still allow the user to receive two signals at the same time. Internal firmware includes SIAM - Signal Identification & Acquisition Mode, automatically identifying the incoming mode of transmission - takes out the guess work! Add the optional 9600 baud modem and you're satellite ready!

RRP £479.95

PK-96

Whilst others are still having a five course lunch waiting for 1K of data to transfer, you can enjoy the incredible speed of using a new PK-96 and find yourself with hours of free time on your hands! The PK-96 takes over from where the old PK-88 left off. It comes standard with 1200 baud AFSK tone signalling, as well as 9600 baud G3RUH compatible direct frequency modulation, making the PK-96 an ideal high speed terrestrial, or satellite data controller.

RRP £199.95

PC-Pakratt for Windows

Operate the entire range of AEA controllers from one package. Run two controllers at once, run other programmes on your PC (in Windows), whilst controlling your data controller. Additional features include seperate windows for mailbox operation, QSO Logging, file transfers and more.

RRP £79.95

Other AEA Products

IT-1
8 preset auto tuner for IsoLoop
RRP £269.95

SWR-121
Digital FULL visual display 1-32MHz Antenna Analyser
RRP £389.95

SWR-121 V/U
As above, but Range: 120-175, 200-225, 400-475MHz
RRP £449.95

KK-1 Keyboard Keyer
The ultimate high speed keyboard keyer
RRP £199.95

AEA FAX 111
NEW! Computer control s/ware for DATA DECODING
RRP £139.95

The full range of AEA products are always available. Call, write or Fax today.

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NEVADA

.....Everything For The Radio Enthusiast!

... This Month I've listed a selection of our most popular items - But why not send a Large S.A.E. (A4 Size) for our latest 48 page catalogue packed full of equipment. Can you spot the bargains?

73 -

Mike Devereux G3SED

PAY BY THREE POST DATED CHEQUES - *Interest Free!*

Simply divide the price into 3 equal payments. Write 3 cheques dated in consecutive months starting with today's date. Write your TELEPHONE NUMBER, CHEQUE CARD NUMBER & EXPIRY DATE on the back of each cheque. Post them to us with your order remembering to include your full postal address. When we receive your order/cheques correctly completed - subject to status we will send the goods immediately. *.....The hardest part is deciding what to buy!*

Special Deals This Month

ICOM - YAESU - KENWOOD - Best UK Prices!
.....And take 3 months to pay.

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IC 707 HF Transceiver **£795**
IC 736 HF + 6m ..... **£Call**
IC 4iE 70cms H/Held **£259**

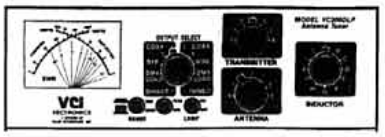
KENWOOD
TS50 HF Mobile ..... **£Call**
TS 850 HF ..... **£Call**
TM 732 D/Band Mobile ..... **£Call**
TM 255 2m m/mode ..... **£Call**
R5000 RX **£895**
TH-48E 70cms H/H **£319**

YAESU
FT900 HF Mobile ..... **£Call**
FT51R New D/Bander ..... **£Call**
FT530 D/Bander ..... **£Call**

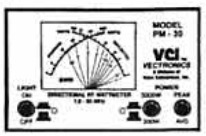
Note: We will WITHOUT HESITATION match any genuine advertised price - And remember we have our own IN-HOUSE service dept, to ensure peace of mind.

VECTRONICS A range of high quality accessories imported by us direct from the USA.

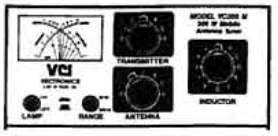
HFT1500 - A 3K Watt (PEP) ATU, with all the extras. 4 way ant.switching, roller-inductor, SWR/PWR meter, Balun for open wire feeders and Peak reading digital meter **£349**



VC300DLP - Our most popular ATU. 300W (PEP), Dummy load, VSWR meter, 3 way ant. switch & Balun for open wire feeders **£129.95**



PM30 - Displays Peak or Average forward power, reflected power & SWR simultaneously. 1.8 to 60 MHz Pwr 3Kw (in two ranges) **£69.95**



VC300M - New 300W mobile ATU covers all bands. Dual meter reads simultaneously Pwr & SWR. Can be used at home or in the car.... **£89.95**

SCANNERS
Yupiteru MVT 7100 H/H **£389**
AOR AR 3000A Base ..... ~~£945~~ **£899**
AOR AR 8000 H/H **£449**

TIMEWAVE AUDIO FILTERS

Digital Signal Processing technology gives random noise reduction, elimination of heterodynes automatically and razor sharp CW reception without ringing. These filters really help you hear and work rare DX under marginal conditions.
DSP 9 MkII...Basic CW/SSB model **£189**
DSP 9 Plus...CW/SSB/DATA modes w/AGC **£239**
DSP 59 Plus All modes 320 filter **£299**

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A range of British made low cost transceivers - that offer outstanding value for money. At these prices we just can't keep up with the demand!
2001 2mtr 25/5W FM **£193.95**
4001 4mtr 25/5W FM **£193.95**
6001 6mtr 25/5W FM **£193.95**
7003 70cm 3W FM **£193.95**
P&P for all models **£4.75**

ERA MICROREADER

New Version 4.2

Decode Data without the need of a computer. Complete stand alone RTTY, AMTOR & CW decoder. Just plug into the extension loud speaker socket & decode!
Special offer:- **Save £10** ..... ~~£199~~ **£189**

MFJ ANTENNA ANALYSER & ACCESS.
MFJ-249 SWR FRQ ctr from 1.8 - 170 MHz **£249.00**
MFJ-209 Same as MFJ-249 - but with calibrated dial **£129.95**
MFJ-207 Same as MFJ-209 but covers 10 - 160 mtr **£99.95**
MFJ-557 Practice Key/Oscillator (all-in-one) **£31.95**

HARI HF ANTENNAS
Professionally designed, high quality antennas. Constructed from heavy duty multi-stranded wire.
G5RV Half size - (10 - 40)mtrs (High Quality) 1KW **£34.95**
G5RV Full size - (10 - 80)mtrs (High Quality) 1KW **£39.95**
Windom (10 - 80)mtrs (M) - 200W, Balun ..... 42mtrs **£49.95**
Windom (10 - 80)mtrs (H) - 1KW, Balun ..... 42mtrs **£79.95**
Windom (10 - 40)mtrs (M) - 200W, Balun ..... 21mtrs **£49.95**
Windom (10 - 40)mtrs (H) - 1KW, Balun ..... 21mtrs **£59.95**
W3DZZ 80/40 T/Dipole - 200W, Balun ..... 34mtrs **£79.95**
W3DZZ 80/40 T/Dipole - 1KW, Balun ..... 34mtrs **£99.95**
WARC band T/Dipole - 200W **£79.95**
Hari 1:1 Balun - 1KW/SO239 Connectors **£32.70**
Hari 2:1 Balun - 1KW/SO239 Connectors **£32.70**

NEW TS HIGH QUALITY VHF ANTENNAS - BASE ANTENNAS
TSB 3002 - 144 MHz, 6.5dB gain ..... 2.87mtrs **£39.95**
TSB 3301 - 2/70cms, 6.5/9dB gain ..... 3.07mtrs **£79.95**
TSB 3302 - 2/70cms, 4.4/7.2 dB gain ..... 1.79mtrs **£69.95**
TSB 3603 - 2/70/1200 (6.5/9.0/9.0dB gain) **£99.95**

MOBILE ANTENNAS
TSM 1002 - 144 MHz 4.1dB gain ..... 1.43mtrs **£22.95**
TSM 1316 - 2/70cms, 2.15/3.8dB gain ..... 0.44mtrs **£21.95**
TSM 1339 - 2/70cms, 3/5.5dB gain ..... 0.89mtrs **£26.95**
TSM 1309 - 2/70cms, 3.0/5.5dB gain ..... 0.93mtrs **£29.95**

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All Safety Tested & Guaranteed For 3 Months

SHORTWAVE RECEIVERS
JRC 515 - Excellent Receiver & Speaker **£495**
JRC 525 - Excellent RX, Boxed, Rare **£725**
Kenwood R600 - Gen. Cov. S/W Receiver **£245**
Kenwood R1000 - Digital S/W Receiver **£350**
Trio R2000 RX + Fitted VHF **£475**
Yaesu FRG100 - Excellent S/wave RX **£475**
Yaesu FRG7700 + VHF Conv. - G.Con **£425**
Yaesu FRG8800 + VHF Convertor **£495**
Yaesu FRG9600 - Basic Model **£325**

HF TRANSCEIVERS
Drake TR7, PS7 - Matching Mic & Spkr, ... **£775**
Icom IC701-701PSU Both Boxed **£495**
Icom IC707 HF - Add FM if needed (1only) **£775**
Icom IC730 - 100W Mobile H.F **£499**
Kenwood TS120S + VFO120S - Filtered **£495**
Kenwood TS140S - Boxed Excellent Con. **£695**
Kenwood TS520SE - Good Faithful H.F. **£385**
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Trio TS900 - H.F. Cheap but works well! **£275**
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Yaesu FT747GX - Fitted FM, A1 Condition **£545**
Yaesu FT900 - Latest H.F Mobile **£1325**

HANDHELDS
Icom IC-P4E - 2m Handie Boxed **£215**
Icom IC 2SRE - 2m Handie Boxed **£195**
Kenpro KT220 - 2m Handies, K.Pad+LCD **£165**
Kenwood TH-78 - Dual Band Handie **£399**
Yaesu FT709 - 70cm Handie, Good **£140**

MOBILE TRANSCEIVERS
Alinco DR599E - Dual Band 50W Mobile **£495**
Alinco DJ580 - Dual Band Handie, Boxed **£399**
Icom IC290 + 40W P.A. - 2m m/mode **£425**
Kenwood TM255 - 2m m/mode (1 only) **£775**
Kenwood TM732 - Dual Band, 1 Only **£595**
Trio 7200G - Cheap 2m Mobile - Bargain! **£75**
Yaesu FT290(Mk II) - Good 2m m/mode VGC **£395**
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STATION ACCESSORIES
ERA Microreader - V4.2 ..... **£125**
Tokyo HP HX240 - 2m to HF Transvertor **£195**
Tokyo HP HX640 - 6m to HF Transvertor **£225**
Vectronics VC300DLP - Bargain A.T.U. **£95**

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Icom IC728 - Fitted FM/AM Board **£750**
Kenwood TL922 - 2Kw amp **£1150**
Kenwood TS-50 - Boxed as new, Perfect **£745**
Kenwood TS440 S - Int. ATU+Filters+PSU **£895**
Tokyo H.Power HL 1K/6 6m Amp - A beast! **£495**
Tono 130W - Big 70cms Amp, V.Rare **£450**
Trio TS700S + VFO+ SPKR, Mutek F.End **£595**

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IN TOUCH WIT

NEW FROM CHELCOM AERIALS

CHELCOM *Aerials*

At just £119.00, you won't find a better vertical! The CAHFV1 is a helical antenna and has been designed to be resonant on 80m and you can be operational in just minutes! There's just two fibreglass helical sections to screw together plus a stainless steel top section. No measuring to do, no coil winding and no cutting. It comes complete with a small stub mounting pole and brackets for a two inch mast. If you hammer a short length of pole into the ground and mount the antenna on that, you've got a great antenna system. Easy isn't it! Our test model loaded up straight away on 80m and surprisingly on 20m and 10m WITHOUT AN ATU! Using an outboard ATU, we were soon active on all the other bands as well, from top band to 10m! (By the way, did you know you can work G4LOW and G8LOW most Wednesday nights!)

You can also mount it above ground level but you will probably have to install a radial system of some type but that is easily worked out.

The construction is really good, something that purchasers of our Chelcom VHF and UHF colinears have really appreciated. It is made from the same high quality fibreglass with heavily chromed brass fittings to ensure a long life out in the elements and will easily handle a kilowatt.

Why not order one today and get active on HF now!

Check out Chelcom's dynamic duo.

SINGLE BAND COLINEARS FOR 2M AND 70CMS

CO-LINEAR CA432358

Specification:
430 - 440 MHz
3 x ⅝ colinear
Gain: 8.5dB
Impedance: 50 Ohms
SWR <1.4:1

Construction:
Fibreglass, stainless steel, heavily chromed brass, with 'N' Type socket
complete with mounting tube, brackets and clamps for 2" dia masting.

£45.95

COLINEAR CA144258

Specification:
144 - 146 MHz
⅝ over ⅝ colinear
Gain: 6.5dB
Impedance: 50 Ohms
SWR <1.4:1

Construction:
Fibreglass, stainless steel, heavily chromed brass, with 'N' Type socket complete with mounting tube, brackets and clamps for 2" dia masting.
Made in the U.K. by....
....for Lowe Electronics

£49.95

We have the power

The Manson is back! We've increased our orders once again for these superb power supplies but you just keep on buying them! Sorry to keep so many of you waiting. If you don't yet know what all the fuss is about check this out! The EP925 is a variable voltage PSU that gives a continuous 25A current, peaking on 30A, Twin meters give you current and voltage readout and the thermostatically controlled fan keeps things cool, ideal for powering any of todays HF transceivers. When you check out the price of a matching power supply for your rig, you'll see just what great value it is at just £99.95.

If you don't need all that power then the EP815 may be the one for you. Case size and style is the same as the EP925 but without the metering. Output is 13.8V at up to 15A, just right if you use your mobile radio at home. Ideal too for running all your shack accessories, like your Packet or GTOR equipment, backlighting your Diamond SWR meters or even a stand alone transverter or VHF linear amplifier. Like its big brother it is superb value for money and you get change from seventy quid!

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H THE WORLD

SPEED THRILLS

If you haven't yet upgraded to 9600 baud packet, now's the time. Its been a long time coming but now you can get to 9600 of the shelf - complete radio and TNC packages with no mods to do and no extra boards to add in - just plug in and go - at high speed!

The radio end...

Check out Kenwood's twin FM transceivers - The TM251E puts you straight on to 2m or the TM451E for 70cms. Both run more than enough power to get you right into the network and feature dedicated data ports tailored to the needs of high speed packet.

The TNC end...

The new Kantronics KPC9612 is fast becoming the new standard in TNCs and when you see what it can do you'll know why! This is the only dual speed, dual port TNC on the market. It will let you connect two transceivers to it for working on two bands, or two frequencies on the same band if you prefer. One port is 1200 baud and the other can be configured to 4800, 9600 or 19k2 as standard! If you are already on Packet, imagine doing what you are doing already but eight times faster! With many new 9600 baud user ports fast becoming available on many BBS's this is the way forward! The new KPC9612 is available direct from Lowe Electronics, the Kantronics distributor - who better to buy from!

If you want a complete package, we can supply you with everything from the power supply to the antenna and all the bits in between, including all the interconnecting leads. We canít supply the computer but we've got some great software we can offer! Ask now if you are considering upgrading, we're doing super deals on trade-ins and some great package deals on complete 9600 baud stations. Donít miss out!

Why not send us four first-class stamps and request our DataComms information pack and we will also give you a free copy of the Lowe Packet Radio ideal for beginners to get going or a useful reminder to those with more experience.

Don't forget our Second Hand List FaxBack service.

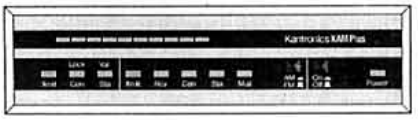
Dial 01629 580008 from your fax machine and follow the voice instructions.

We've also launched a great new service for customers equipped with computers and modems. You can now reach us via the Internet. We've got separate e-mail addresses for orders and enquiries. Leave the appropriate message at orders@lowe.demon.co.uk or info@lowe.demon.co.uk. Please make sure you leave your full postal address and daytime phone number as replies by e-mail may not always be practical!

New V7.1 upgrades for KAMPLUS and KAM Expansion Boards

That's right the new V7.1 upgrades are available at last, promising new, easy functionality of all TOR modes, including AMTOR, PACTOR and the ever growing GTOR. The upgrade allows identical changeover commands for all three modes and uses the same mark and space tones and introduces TOR Standby.

TOR standby allows access to your mailbox in any of the three modes and allows other stations to link to you in AMTOR, PACTOR or GTOR automatically. The mode in which you are linked is displayed in the linked message on your screen.



The KAMPLUS is available now with all the new features but if you have an older KAM you can still upgrade via the KAM Expansion board.

Finally, you may be interested to know that there is now a book about GTOR. Called GTOR: The New Mode, it is nearly 100 pages of collected published articles and a full description of the GTOR protocol - just the thing for the more inquisitive who likes to know what is going on in the background or those that really like to know their subject!

KAMPLUS £399.00 KAM Expansion Board £95.00 V7.1 Upgrade £35.00 GTOR: The New Mode £15.95

Lowe takes away the pain of mobile operating!

These days so many cars are just not conducive to operating mobile! Fewer and fewer places to mount a radio and when you do find someplace, someone breaks in and nicks it! Many people today are using handhelds in their vehicles which presents two problems - how do you operate it safely and where do you put it? Trust Lowe to solve the problem!

The QS200 is a superb little gizmo that everyone will want to buy for two reasons - it is so good and it is also so inexpensive! Just look at the picture. The QS200 holds the radio in a convenient place on the dash where you can still see the display and operate the major controls be it a handheld transceiver or a scanner. The QS200 mounts into the vents of your car dashboard with no drilling or cutting and your handheld just slots into it using its belt clip - fits in seconds and you can remove your handheld just as fast when you want to take it from the car - beats any quick release mount ! Get one now while stocks last!

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Zone F: I J Kyle, GI8AYZ
Zone G: F D Hall, GM8BZX

ANNUAL SUBSCRIPTION RATES
Corporate Members: UK and Overseas (*Radio Communication* sent by surface post): **£32.00.** Airmail rates on request.
UK associate member under 18: £16.00. Family member: £14.00
Corporate (Concessionary): £27.00 over 65 or full time student under 25. (Applications should provide proof of age at last renewal date and/or include evidence of student status.)
Affiliated club or society/registered group (UK): £16.00 (including *Radio Commmunication*). (Subscriptions include VAT where applicable.)

Special arrangements exist for blind and disabled persons. Details are available from RSGB HQ.

Membership application forms are available from RSGB HQ

RSGB Main Switchboard:
01707-659015

The RadCom Leader

Looking Forward from History

There are many memories that we can reflect on during 1995. For example, it was 75 years ago that eminent amateur radio operators were attempting to bridge the mighty Atlantic with radio signals, which was achieved finally in 1921. It was 70 years that ago the first edition of the *T & R Bulletin* (now *RadCom*) was printed. Forty years ago saw the first VHF Convention and the first Mobile Rally.

This is only a part of the history and tradition of this great hobby of ours. 1995 is the 100th anniversary of the successful experiments by Marconi . . . the list could be endless. Without this history, our hobby would not enjoy the respect that it does throughout all walks of life, and by national administrations world-wide. And we should all respect the traditions that stem from amateur radio's past.

The Radio Society of Great Britain was conceived by these traditions, but they must not be seen as sacred cows. To keep alive these traditions we must maintain a vibrant Society that is capable of survival into the 21st century and beyond; to do this we have to temper the traditions of the past with common sense and forward thinking. During 1992 we held a Strategy Conference at Warwick. Some of its recommendations were considered a little radical at the time, but they have not stopped the world revolving. This work must and will continue.

The European Union, with its centre of activity in Brussels, presents us with other challenges to our hobby. It follows that we and our sister Societies in the EU must stand firmly together to oppose the commercial and administrative pressures that we could be facing. It is essential that good relations with other Societies must be nurtured and maintained, to enable us to face these pressures with a united front.

I wish you all a peaceful and happy 1995.

Clive Trotman, GW4YKL
President

RadCom NEWS

● STOLEN FROM the QTH of G1UGH: Trio 9000 Tx S/N 1041210, matching speaker S/N 2010873 and matching PSU S/N 1030335. Also IC-505 6m Tx S/N 05008 and Super Zenith 10x50 binoculars. All of these are postcoded IP33 3DU. Other items stolen were: MML144 2m linear, HL66V 6m linear; EP925 PSU; two VSWR meters, an ERA Microreader and numerous smaller items. Information, please, to Bury St Edmunds Police, quoting Ref BU/94/5665.

● THERE IS NO LONGER a need for individuals to hold licences to operate 27MHz Citizens Band in Australia. Under a system called 'class licensing' CB radio will continue to be regulated, operators will still need to use approved equipment, and there will be penalties for any breach of licence conditions.

● COVENTRY RAYNET Group was involved in assisting the emergency services in the aftermath of the airplane crash in Coventry just before Christmas. The group would like to thank all amateurs who co-operated by keeping frequencies clear during this operation.

● THIS YEAR'S 20th anniversary of the Friedrichshafen Ham Radio show is to be celebrated in a party which will include VIP guests. The event is 23 - 25 June on Lake Constance, southern Germany.

● A SHROPSHIRE RAIBC net has been started. It runs every Tuesday at 2pm on 145.325MHz. All callers are welcome. Details from Gerry Craig, G4IUT.

● THE LATEST callsigns issued by SSL at 11 January were in the G*0VP*, G*7TX*, 2*0AJ* and 2*1DO* series.

Firth of Forth GB2RS

GB2RS newsreader GM4EHO is aiming to retire from the job of providing a 2m FM service at 9.30am each Sunday. Anyone who is willing and able to continue this service, which covers the Firth of Forth area, is asked to contact Zone G Council Member Frank Hall, GM8BZX, or GB2RS Co-ordinator Ian Kyle, GI8AYZ.

● NEW ZEALAND has an amateur location at 614 - 622MHz, the lower end of which is used for ATV.

Government Minister Relaxes with Amateur Radio During Official Visit

Qatar Society President Visits RSGB HQ

AT THE END OF a hectic five-day official visit to the UK, His Excellency Mr Abdullah bin Hamad Al-Attiyah, Minister for Energy and Industry of the State of Qatar, visited RSGB HQ. Why? Well, in addition to his government duties, he is an active radio amateur - A71AU - and President of the Qatar Amateur Radio Society.

The visit took place on 8 December, and whilst at Potters Bar the Minister met RSGB President-Elect Clive Trotman, GW4YKL, and General Manager Peter Kirby (G0TWW). During the visit, he was briefed on the production of *Radio Communication*, and toured the Library and Museum.

RSGB President GW4YKL accepts on behalf of the Society an ornamental salver from QARS President A71AU.

He spent some time in the shack as guest operator of the HQ station, GB3RS. The two Presidents exchanged gifts on behalf of their radio societies, as well as QSL cards.

The Qatar Amateur Radio Society (QARS) was set up in 1991 and has expanded from 24 to 70 members in just two years. Last year the Qatar government signed a reciprocal licence agreement with the UK.

The Qatar Call Book lists 41 licensed amateurs.

Council Member's Address Change

MIKE SHREAD, GM6TAN, is an RSGB Council Member and the RSGB QSL Bureau Sub-Manager who deals with Novice QSL cards. His new address is: 15 Hardie Court, Aberchirder, Huntly, Aberdeenshire AB54 5TG.

Kings College

OMITTED FROM THE letter about lectures at Kings College (*The Last Word*, January) is the College's address which is: The Department of Physics, Kings College London, Strand, London WC2R 2LS. Apologies for this omission.

Honour for AMSAT Ron

RON BROADBENT, G3AAJ, was awarded an MBE in the 1995 New Year Honours list in recognition of his services to amateur radio.

Ron is secretary of the amateur satellite organisation AMSAT-UK, and is Editor of its monthly magazine *OSCAR News*. We are sure that all RSGB members will join us in congratulating him on this well-deserved honour.

Members' attention is drawn to the item on the Phase 3D satellite in last month's *Satellites* column which contains an appeal by Ron Broadbent for funds for this major project.

QSL of the QARS club station.

President's Talk at Home Club

RSGB PRESIDENT Clive Trotman, GW4YKL, will undoubtedly be giving a large number of lectures to radio clubs throughout the UK this year. His first, however, will be at his home club, the Bridgend and District Amateur Radio Club (BDARC).

The BDARC, which is one of the oldest radio clubs in South Wales, meets on the first and third Wednesdays of each month at Club Brynmenyn, Brynmenyn nr Bridgend. The 'third Weds' meetings are for lectures and talks. A fully equipped shack is available for those wishing to use any band from 1.8 to 430MHz, and a workshop for constructors.

Other activities include training for Novice, RAE and Morse; financing and servicing the GB3MG UHF repeater; running the Bridgend rally; teaching ATC cadets; and Raynet. Further details of BDARC can be obtained by calling Allan on 01656 721574.

RSGB HQ Open Day

THIS YEAR'S opportunity to visit your Headquarters is on Saturday, 22 April. The 1994 HQ Open Day is expected to be an even bigger event than in previous years and, since it coincides with International Marconi Day, there will be exhibits and a special event station celebrating 100 years of radio. Open to the public will be the HQ offices, the RadCom production office, the GB3RS shack, the amateur radio museum, the library and of course the book shop. A number of traders and clubs will be supporting the event. If you've not been to HQ before, you'll find it fascinating. If you have already seen it, we'd like to meet you again. Put it in your diary now - Saturday 22 April.

Thinking Day

THE ANNUAL GUIDES Thinking Day on the Air (TDOTA) takes place over the weekend 18/19 February. A pack is available from RSGB HQ consisting of a list of participating special event stations and details of the countries which permit third party Greetings Messages during then event. Groups using a GX or similar prefix instead of a GB call are asked to contact HQ as well.

If your TDOTA group would like a pack, please send an SASE (A4 size with 38p in stamps) *as soon as possible* to Mrs Fiorina Sinapi at RSGB HQ.

PHOTOGRAPH: G0JGV

The Group of National Experimental Amateurs celebrated the Worldwide Sikh Festival on 18 November 1994. At the microphone of GB0WSF is visitor Tirath Singh, watched by Norman Ash G7ASH/2E0AGN. The station was located at the Sikh Temple in Bedford.

Yeovil Club Commemorate Birth of Broadcasting

SEVENTY-FIVE YEARS ago, on 23 February 1920, the first radio broadcasts in Britain began. These first broadcasts were on a frequency of 107kHz (2800m wavelength) and were mainly listened to by radio amateurs. Amateur radio was much involved with the start of broadcasting in Britain in three ways:

Until regular national broadcasting started there was no domestic radio industry, so radio amateurs were mainly the only ones who had radio receivers and knew how to make them (radio amateurs were already building and using superhets in 1921).

Following the initial broadcasts in 1920, it was mainly as a result of negotiations between the government and amateur radio that regular broadcasting started.

When in 1922 the government gave the go-ahead for regular broadcasting to start, it was at the request of the RSGB (then called The Wireless Society of London) that the Marconi Company then went ahead and transmitted a half-hour programme each week until broadcasting was taken over by the BBC in 1923.

Yeovil Amateur Radio Club plans to commemorate the 75th anniversary of the first radio broadcast in Britain in the following way:

On 23 February 1995 (the exact 75th anniversary) G3MYM will give a talk at Yeovil Amateur Radio Club, describing the history and technology of the 1920 event. G7LNJ will then give a demonstration of working early 1920s radio receivers, which will be powered by an accumulator and a high tension battery.

The antenna for the demonstration will be the club's 80m band dipole used as a random length of wire. It is likely that other members of the club will also contribute to the commemorative event. The local media will be invited, as well as the heads of science of the local schools.

In the Media

AMATEUR RADIO HAS, once again, been brought to the public's attention through the press and broadcasting media.

On 17 December, the evening chat show on BBC Southern Counties Radio featured amateur radio. Representing the Amateur Service were Jim Harries, G4DRV, RLO for East and West Sussex; Dennis Andrews, G3MXJ, well-known contester and former RSGB HF Contests Committee Chairman; Doug Love, G8BBI, Sussex County Controller for Raynet and, explaining the Novice point of view, Mark Larcombe, 2E1AOU. The programme was friendly and there was plenty of opportunity to put over the hobby in its most favourable light.

And on 6 January a team from the Radio 5's Sybil Roscoe Show visited RSGB HQ and recorded a programme about packet radio. The show, broadcast on the following Monday, included interviews with RSGB Council Member Neil Lasher, G6HIU, and General Manager Peter Kirby, G0TWW. It turned out to be a positive piece which emphasised amateur radio keeping up with the times.

More VLF

AUSTRALIANS VK2TZ and VK3ACA have obtained permission to conduct tests on VLF using CW, AM and SSB on 175, 185 and 196kHz.

Taking part in BBC TV's *Songs of Praise* broadcast on Remembrance Sunday were: (L to R) Elaine Hartford, G0CDZ; Mark Wilson, G1CSS; and Robin Walker, G7SLV who was the organist. The recording was made at the Royal Garrison Church, Aldershot on 2 November 1994.

Young Communicators

FOLLOWING LAST YEAR'S Jamboree on the Air several members of 5th Douglas (IoM) Scouts received participation certificates from Denys Hall, GD4OEL, at a ceremony attended by many of the Scouts' parents and relations.

In addition, Denys presented eleven-year-old Brian Cowley with his Communicator Badge. To earn the badge Brian had to log at least 25 amateur stations, learn the phonetic alphabet and some Q codes.

He had to pass a greetings message, learn about propagation, callsigns and radio regulations, and tune a receiver. Brian is now working for his computer badge.

5th Douglas Scouts with their certificates: (Front Row) Denise Wild, Kerry Crossland-Cowin, Brian Cowley, Robert Manley, Chris Shaw. (Back Row) Denys Hall, GD4OEL and Scout leader Robert Wild.

Liberation Commemorated

IN DECEMBER 1944 the French village of Théding was liberated by the allies. Fifty years later, as part of the commemoration of this event, special event station F6KFT successfully completed a sked with GB2RN, the Royal Naval Amateur Radio Society station on the former WW2 cruiser*** HMS Belfast. The contact, on 4 December 1994, took place on the 7MHz band.

Solent Amateur Radio Group Re-fortified

AFTER A YEAR OFF from special events stations, the Solent Fortifications Amateur Radio Group is to resume its activities during 1995.

Prior to 1994, this group was extremely active with special event GB calls from the forts and castles in and around the Solent and Isle of Wight.

Raynet & RSGB Trade Marks

New RLOs

THE NEW RSGB LIAISON Officer (RLO) for **Lancashire** is Steve Ireland, G1VRH, 'Ashlea', 11 Wood Park Road, Marton, Blackpool, Lancashire FY1 6QS; tel/fax 01253 695920.

The new RLO for **West Grampian, Highland and the Western Isles** is Elaine Shread, 2M1DLV, 15 Hardie Court, Aberchirder, Huntly, Aberdeenshire AB54 5TG; tel 01466 780739.

The new RLO for Powys is Gordon Rogers, GW0RJV, Maesgwersyl, Garthmyl, Newtown, Powys SY15 6RS; tel 01686 640611 (home) or 630327 (office).

RSGB Stands

THE SOCIETY HAS book and information stands at the VHF Convention on 19 February (see page 24) and at the Tyneside Rally on 25 February. This is an opportunity to buy books at over-the-counter prices, to renew your subscription and to tell us what you think of the service you receive from your Society.

Mobile Masts

THIS IS THE SECOND in the series of occasional notes which I have prepared for members who feel that they have no alternative but to resort to the use of a mobile mast as their primary aerial system. The Planning Advisory Committee is aware that many amateurs consider this approach if they have been refused permission by their local council, or on appeal, but it is a confrontational one and should only be employed as a last resort. I think it would be helpful, therefore, to re-state the advice as given in the current edition (orange cover) of the Society's booklet *Planning Advice to Members*.

When you move a mobile mast onto your garden, what you are doing is avoiding the need for planning permission, simply because you are not carrying out development for which a planning permission is required. However, this only holds good as long as certain guide-lines are observed and these have arisen as a result of test cases in the High Court or Court of Appeal.

1. The mast must be truly mobile and must not be permanently attached in any way to the ground or to a building.
2. Outriggers (usually four in number), at the base are acceptable provided that they only rest on the ground to give improved stability.
3. There must be no guy wires.
4. The mast should *not* be of a type described by the manufacturer as being only suitable for commercial purposes, although there is no objection to it being made by a commercial firm.
5. The whole system must be insubstantial relative to the amount of garden space that is available.
6. The mast and trailer can, *and must*, be moved around the site on occasions and preferably taken off site (perhaps lent to the local radio club for an event) altogether. Such moves should be carefully recorded or witnessed.
7. Aerial feeders and rotator cables should be easily and quickly disconnected with a minimum need for tools.

The key points are size, degree of permanence, and physical attachment. Keep these to the minimum and you should be alright.

G J Bond, G4GJB
Chairman Planning Advisory Cttee.

RSGB HF Awards News

TWO MORE COUNTRIES have joined IARU Region 1, making a total of 74 member countries. UA (Russian Federation) and YI should be added to the list in the 1995 *RSGB Call Book* (or send an SASE to G4BWP for a full list).

The following awards have been issued up to 30 Nov 94.

IARU Region One Award

Class 1
(for all counties on current list)
DL1XE ..... SSB
DK8UH ..... SSB
ON6TP ..... SSB

Class 2
(for 45 countries from the list)
EA6AA ..... CW
JI6URU SSB/15m
G0ORM ..... SSB
GW3TKZ ..... CW
G2AKK ..... SSB
LX1TI ..... SSB
G0ORO ..... SSB
DL9FCQ ..... Mixed
DL3FT ..... CW
GM0SRD ..... Mixed

Class 3
(for 30 countries from the list)
YB8DOK SSB/15m
JA0BOV ..... SSB
SV5AZP ..... SSB
OE3VID ..... Phone/VHF-Satellite
DL3FT ..... CW
G2AKK 28MHz
DL9CTG ..... CW
BV2CD/7 ..... SSB/15m
DL2ROT ..... CW
OE6JTD ..... SSB
G4AIH 28MHz
G0BPJ ..... Mixed
DL1KT ..... CW
JE6KLR ..... CW
DL3BBR ..... Mixed
DL1NOF ..... Mixed
VK4ARB ..... Mixed
DL4FCK ..... CW
C21BR ..... SSB

Worked ITU Zones

Supreme (All Zones)
EA5AT ..... All SSB
#1 Award ON5KL
Standard (70 zones).....WB2AQC

Commonwealth Century Club

Standard (100 call areas)
KI6PG
SM5HV/HK7
VE3MS
AB4DU
JE1VTZ
G4MVA (All CW)
ON5KL

5-Bnd Class 1
(450 call areas) I8SAT

28MHz Counties Award

Standard (40 counties)..UA9FLD
60 County Sticker G0DNV
DXLCA
(SWL DXCC) 100 F11HYX

Scottish Trophies

This year the Jock Kyle Trophy has been awarded to David Anderson, GM4JJJ in recognition of the outstanding work he has done over a number of years of operating.

In particular he has been the most consistent moonbounce operator in GM over many years and has achieved substantial 'first' contacts between Scotland and countries around the world. He had worked quietly on the bands and never sought recognition for the work he had done.

The Trophy was presented to David at the recent SARCOM in Aberdeen.

The Jack Wylie Trophy this year has been awarded to Tommy Hughes, GM3EDZ. Tommy has worked for the past twelve years as part of the Central Scotland FM Repeater Group, standing down this year as Chairman. Over a number of years he has also been responsible for the organisation of Scottish Amateur Radio Conventions held at Cardonald College in Glasgow. Tommy was unable to attend SARCOM in Aberdeen to receive his trophy and the presentation to him will be made later in the year.

BERU Research

THE WINNER of the 1994 RSGB Commonwealth Contest (BERU), Bob Whelan, G3PJT, is researching the history of this competition. He would like to hear from past entrants and from those who have records of events earlier than the 60s. Information on pre-war contests would be especially helpful. Photographs and personal recollections would also be useful.

Please write to Bob, QTHR, describing the information which you have available.

Golden Antenna Winner

The Mayor of Bad Bentheim presents the Golden Antenna award to Rolf Sigrist, DJ2RN, for his humanitarian work.

EACH YEAR, DURING the German-Dutch Amateur Radio Festival at Bad Bentheim, the town awards the Golden Antenna to amateurs who have carried out humanitarian work through their hobby.

The 1994 winner was Rolf Sigrist, DJ2RN, whose selfless activities included saving a family with four children who were in serious trouble in Uganda, and making it possible for a Ugandan school to be built.

The 14th award of the Golden Antenna will take place at Bad Bentheim on 25 August. Detailed nominations should be sent before 15 June to: Stadt Bad Bentheim, PO Box 14 52, D48445 Bad Bentheim, Germany.

Quad Antenna

THIS NEW BOOK from CQ Communications Inc, reviewed in January's *RadCom*, is now available from RSGB Sales. See pages 90/91 this month.

The well-supported annual conference of the World Association of Christian Radio Amateurs and Listeners (WACRAL) took place in October at Leasowe Morton in the Wirral. The picture shows Harold Turner, G4YRH (left), and Harry Bellfield, G3SBV, operating WACRAL's conference station G3NJB.

500 Years of Aberdeen University

AMAZINGLY, ABERDEEN University was founded as long ago as 1495, and celebrates its half-millennium this year.

Thomas Wratten, GM4CAU, Chief Technician at the University's Language Centre, tells us that the call GB500AU will be used from the Centre for seven days from Friday 10 February between 0900 and 2100 daily. Operation will be on all bands, 10 - 80m, using SSB, SSTV, QRP and perhaps CW.

On Founders Day, the 10th, the station will concentrate on SSB operation on 20 or 15m in an attempt to contact many of the former graduates of the University who have since become licensed amateurs. In addition, it is hoped to involve some of the current undergraduates in sending greetings messages.

IC-Z1 - SPECIAL AGENT IN THE FIELD

You all know that ICOM are constantly expanding the frontiers of radio communication - the very latest IC-Z1 is no exception to this tradition, now read on...

ICOM introduce a unique new dual-band handheld transceiver with a difference... namely an optional, detachable front panel that can be used as a remote control microphone. The radio's keypad is removed instantly allowing the installation of the dummy panel and extension lead creating a remote speaker/mic that can be hand held or clipped to your lapel for hands-free operation, (see diagram below).

To help you to store station names etc., alphanumeric notes can be programmed into each memory channel and displayed together with the operation frequency.

Up to 6 messages can be transmitted using DTMF codes, ideal for transmitting 'secret' codes etc.

Other features include:

- Twin tuning dials for both main and sub-band control.
- Electric volume control via detached panel.
- Wide 4.5 -16 Volt operating via external DC jack.
- V/V and U/U for simultaneous 2 signal receive capability in the same band.
- Large memory capacity of 100 channels (50 channels for each band).

We anticipate that this truly innovative dual-band transceiver will catch on in a big way, just imagine being able to walk around and communicate hands-free, very 'Special Agent', in fact... *VERY SPECIAL!*

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Closes for lunch 1300-1400.

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THIS MONTH'S LEADING FEATURE

Danish Microwave Activity Week

by Mike Dixon, G3PFR* from a report by Steen Gruby, OZ9ZI

THIS PRESTIGIOUS European event is held in June each year on the coasts of Denmark in order to take advantage of many, largely over-sea, paths available. 1995 will be its tenth anniversary. In the past couple of years, activity has been concentrated on the 10GHz band and above, and some remarkable results have been achieved, as previously reported in the *Microwaves* column.

The event, in the past, has been blessed with 'above-average' or 'excellent' weather and microwave propagation conditions: 1994 seems to have been an exception, with high winds which made antenna pointing difficult and high atmospheric water absorption (humidity and rain) which restricted ranges on the higher bands!

Nevertheless, the 1994 Activity Week was a great success, starting on 11 June and ending on 17 June with the now-traditional get-together at Ebeltoft, the home of the 'GHz North Zealand Work Group' and the Procom Amateur Radio Club who organised the whole event.

Twenty-two OZ, three LA, two SM, two PA0, three DL callsigns and one ON callsign were active during the event, a total of 33 operators.

The 1994 event was marked by the appearance of improved versions of the 1993 'LMT1-24' 24GHz transverters and by the completion of a number of what I jocularly named the 'JIT 1-47' transverter ('Just-In-Time, Version-1, 47GHz'). Our Danish and German colleagues seem to have latched on to this name, having worked long hours until the last minute before the Activity Week in order to complete some 20 working examples! During the 1994 Activity week, therefore, there were many operators active on 10, 24 and 47GHz, some with 10GHz ATV and a few operators active on 76 and 145GHz. Now on to the band-by-band results!

10GHZ OPERATION

USING NARROWBAND, nothing particularly spectacular in terms of DX was achieved: many of the participants worked distances between 31km and 208km from

OZ1UM's 145GHz transverter.

locator JO55WX to six squares, JO45, JO55, JO56, JO57, JO66 and JO67.

OZ1UM, OZ9ZI and OZ3VC brought 10GHz ATV equipment which consisted of modified satellite TV LNBs on 10.4GHz receive (LNB Nf = 1dB), 5.5MHz sound subcarrier and 50cm Procom dishes with an estimated gain of 29dB. On transmit, signals from frequency modulated dielectric resonator stabilised oscillators (DRSOs or DROs) were amplified to a level of 500mW output, with a bandwidth of about 16MHz for full colour, fast-scan ATV. Talkback (the 'engineering channel') used 10GHz narrowband. The best DX worked was about 90km; a path of 208km was tried but failed under the prevailing weather conditions (This was later achieved on 4 July).

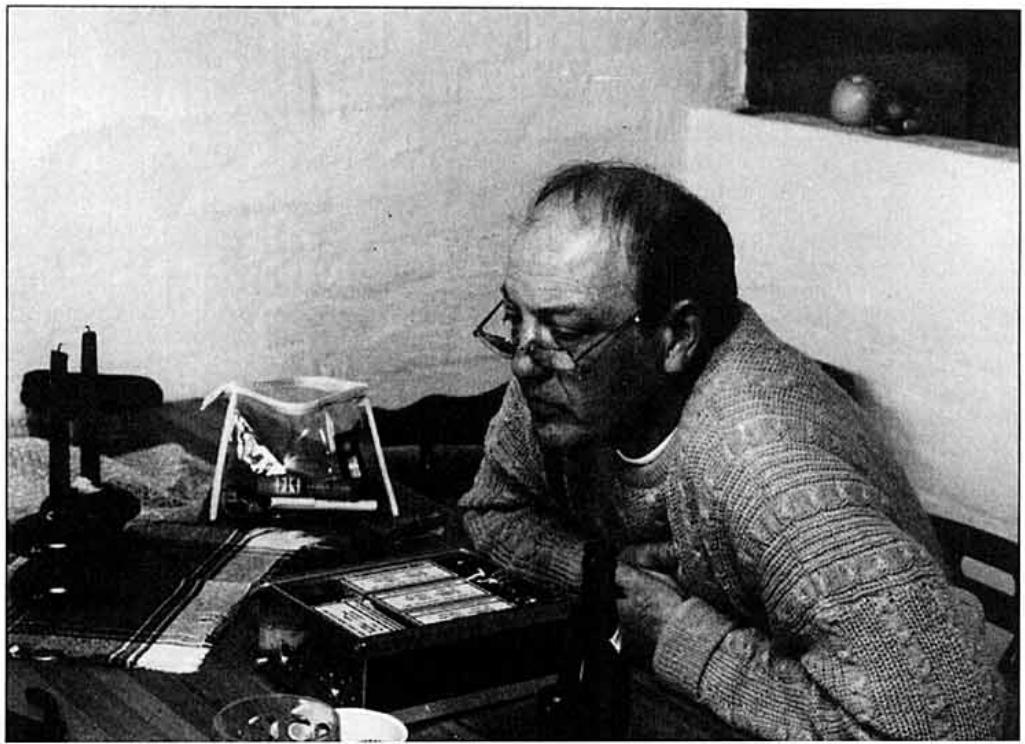
ON 24GHZ

During the worst of the weather and conditions, some system measurements were undertaken at Ebeltoft, in the few spells when the sun was available as a 'standard' noise source ie. was more-or-less visible, instead of being hidden behind thick layers of microwave absorptive cloud!

Under these conditions the 'standard' LMT1-24 transverters were able to show about 1dB of solar noise whilst DF9LN's new transverter indicated 3dB of sun noise measured under the same conditions.

Antenna measurements showed Procom 25cm (10in) dishes to be about 1dB better with a Cassegrain sub-reflector feed than a direct 'shepherds' crook' feed, although the degree of accuracy of measurement is suspect at this level!

Improved versions of the LMT1-24 24GHz transverter were based on various DB6NT modules (12GHz driver, 12/24GHz doubler/amplifier and sub-harmonic mixer) described in *Dubus*, and available as PCBs from that source. The 24GHz output was approximately 100µW with a receive noise figure of 10-15dB. The principal improvement to most stations was, however, the inclusion of carefully engineered quarter-wave choke slots between the ports in the rotary, home-made waveguide changeover switches to improve greatly the 'crosstalk' isolation between transmit and receive.



Jürgen, DC0DA, checks over his equipment for the Activity Week.

Mike Dixon, G3PFR, is the RSGB Microwave Manager and RadCom Microwaves *columnist.*

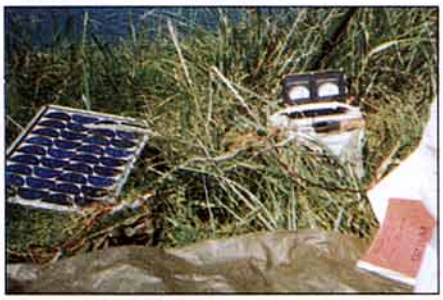
The two 145GHz transceivers consisted of DB6NT's 12GHz injection chain and doubler/amplifier, a double-balanced harmonic mixer with four diodes manufactured in the Russian Salut plants. The aerials are 25cm PROCOM dishes with a backfire feed system.

NEW 145GHz WORLD RECORD

IT WAS HOPED to establish a World record on this, the second highest amateur band, during Danish Activity Week. However, the weather did not permit this.

But on 2 August, 1994, at 1630UTC, a record contact took place between OZ1UM and OZ9ZI over a distance of 11km! The path was tried and tested as it had been used for the group's first 10GHz tests back in 1983. Once communication had been made on the talk-back frequency on the 47GHz band it was surprisingly easy to establish contact on 145GHz, considering that the beamwidth of the 145GHz dish was extremely sharp. Frequency stability was very good with the transmitter found to be only 146kHz away from its estimated frequency.

OZ1UM calculates that a 60km path should be possible with the equipment used for these tests, so it shouldn't be long before we're reporting yet another World record.



All of OZ1UM's equipment was solar powered.

The 10GHz band was used for . . .

. . . setting Danish microwave ATV records.

Under poor propagation conditions, the best DX on 24GHz was 90km, between OZ/ON6UG and OZ1UM.

UP TO 47GHZ

SEVERAL 47GHz QSOs of 31km resulted from the newly designed transverters: indeed, all participants achieved contacts over this path, reasonable for first contacts on this band, although many operators had been given a quite severe challenge by operating with low power outputs and very narrow beamwidths, under adverse weather conditions! Several pieces of equipment were damaged when tripods blew over.

The best DX on 47GHz was 38km between OZ/PA0EHG (JO57FJ) and OZ9ZI (JO57HR).

76GHZ AND 145GHZ

ON THE 76GHz BAND, OZ1UM had made two (linear) SSB transverters with outputs of -3 and -6dBm (0.5mW and 0.25mW) respectively and receive noise figures of 5.5 to 6dB. And two transverters for 145GHz, with -7 and -9dBm output (0.2mW and 0.125mW) respectively and RX noise figures of about 13dB. Both designs used Russian 'Salyut' diodes 3A643E-3 type.

These diodes had the following characteristics: Ft = 2500GHz, Ct = 0.04pF, Pdis = 100mW. They were so small that Russian stereo-microscopes had to be purchased and used to locate the diodes accurately whilst fixing them in place with conductive epoxy adhesive! In addition to OZ1UM's equipment, DB6NT, DF9LN and DC0DA brought 76 and 145 GHz equipment with them. 76GHz yielded a 'best DX' of 11km (OZ1UM/DB6NT), improving the Danish record from 8.8km, set in last year's Activity Week, whilst what is believed to be the first Danish 145GHz

The son of OZ1UM relaxes on the cliff top amidst the TV dishes.

SSB contact, over 1.1km with 5/6 reports, took place between OZ1UM and OZ/DB6NT.

The transverter, designed by DB6NT, was similar to that featured as a dual-band (145/241GHz) combined multiplier/mixer using a HP HSCH-9101 beam-lead diode, in *Dubus* 2/94. Those interested in these higher bands might like to note that DB6NT's article also described an antenna feed and a simple 'spectrum analyser' mixer with output in the range 0.1GHz to 2GHz which, with a little adaptation and additional down-converters, could be used with G4PMK's 'Simple Spectrum Analyser' described in *RadCom*, November 1995.

A working lunch involves technical discussion between the Dutch and the Germans.

CONCLUSION

Thanks are due to Steen, OZ1UM, for the very comprehensive report and photographs, some of which are reproduced here and on our cover.

The main objective this year was to increase the number of stations active on the 47GHz band. In the tenth anniversary year, 1995, the objective is stated to be "to upgrade the whole group to operation on 76GHz" - the 'JIT 1-76' I wonder?! If this is as successful as this year's objective, then the group will have done extremely well!

I believe that the pioneering work in the bands above 24GHz which is being carried out by our European colleagues (especially in Denmark, Germany and Switzerland) is particularly valuable: 10GHz, and to a great extent 24GHz, techniques have been 'mastered' by large numbers of UK and European amateurs.

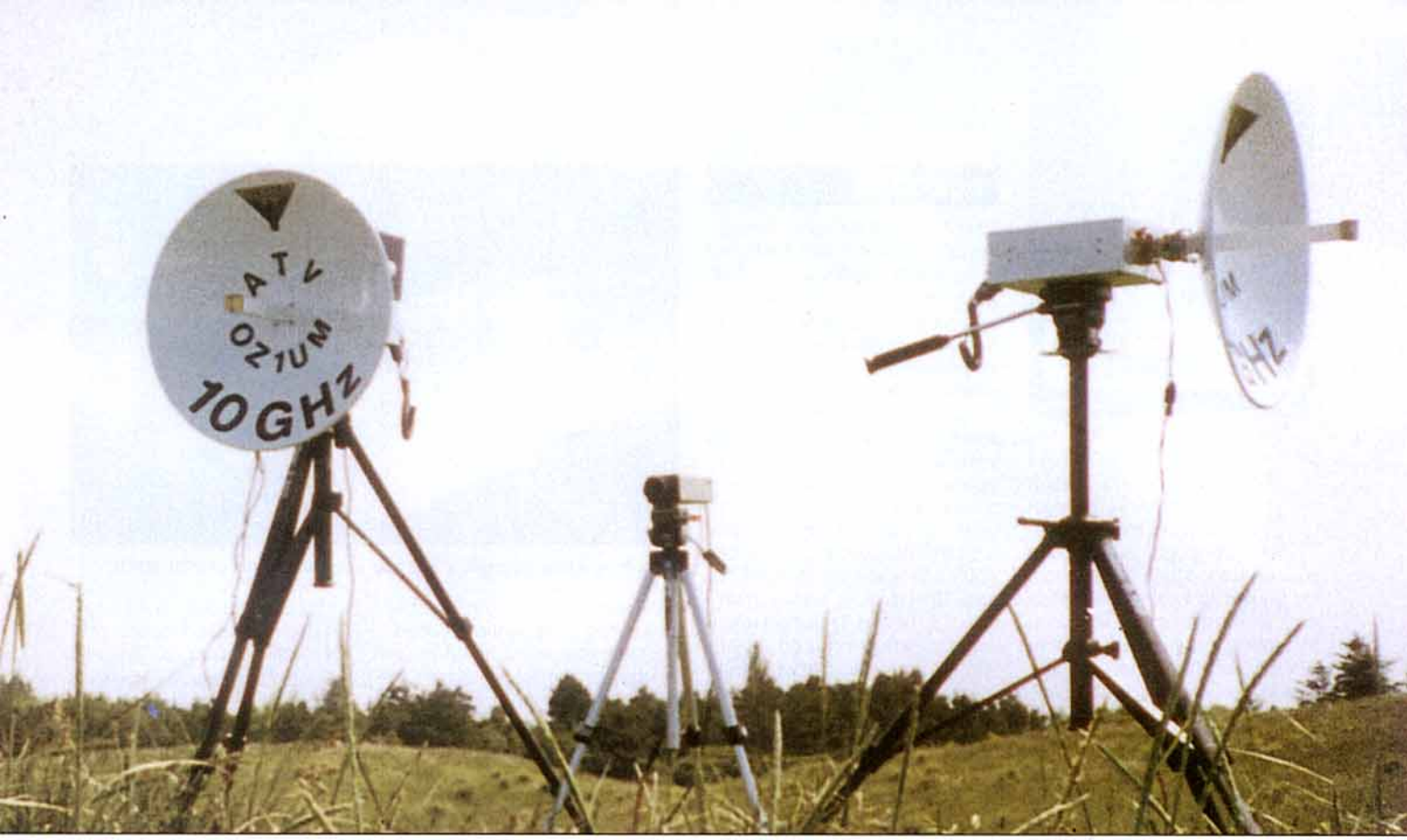
The kind of co-ordinated activity which is brought about by such events as the Danish Microwave Activity Week is most commendable as a means of focusing

OZ1UM's portable site at Spodsbjerg. OZ1JLA is uderneath the Solectra with open waveguide; OZ5DI prepares for a QSO and OZ1UM stands on the right.

Microwave Round Table

MICROWAVE TELEVISION will be the theme of a joint meeting of the Southern Microwave Group and the British Amateur Television Club to be held on Sunday 5 March at the Rutherford-Appleton Laboratory, Chilton, Near Didcot, Oxfordshire. Attractions at the meeting, which commences at 10am, will include technical talks and a bring and buy sale. It is hoped to have a range of test equipment available for calibration and alignment of microwave equipment. It is also hoped that the RSGB Microwave Component Service will be attendance.

Further information can be obtained by sending an SASE to Mike Scott, G3LYP, QTHR, or telephone 01494 881298.



on, and stimulating interest in, the higher bands. The lack of test equipment for bands above 24GHz is often manifest even at professional establishments! It is therefore particularly gratifying to be able to report lots of enthusiasm and novel ideas of the 'simple' kind which were apparent in the days before 'high-technology' reached 10GHz. The results may not seem spectacular to amateurs interested only in HF DXing, but they do mark yet another milestone at the 'cutting edge' of amateur radio. ♦

THE CHELMSFORD BEACON, GB3CMS, on 10.36896GHz, returned to service on 3 December.

THE ORIGINAL MICROWAVE (PETAHERTZ) COMMUNICATIONS

Microwave digital communications preceded radio communications as we know it by some 40 years in the form of the heliograph. This communication equipment comprised a oscillating mirror arrangement using reflected sunlight to signal in morse code. It was used by the British Army in India around 1880 and forms the basis of this little known poem by Rudyard Kipling

A CODE OF MORALS

Now Jones had left his new-wed bride to keep his house in order,
And hied away to the Hurrum Hills above the Afghan border,
To sit on a rock with a heliograph; but ere he left he taught
His wife the working of the Code that sets the miles at naught.

And Love had made him very sage, as Nature made her fair;
So Cupid and Apollo linked, *per* heliograph, the pair.
At dawn, across the Hurrum Hills, he flashed her counsel wise -
At e'en, the dying sunset bore her husband's homilies.

He warned her 'gainst seductive youths in scarlet clad and gold,
As much as 'gainst the blandishments paternal of the old;
But kept his gravest warnings for (hereby the ditty hangs)
That snowy-haired Lothario, Lieutenant-General Bangs.

'Twas General Bangs, with Aide and Staff, who tittupped on the way,
When they beheld a heliograph tempestuously at play.
They thought of Border risings, and of stations sacked and burnt -
So stopped to take the message down - and this is what they learnt -

"Dash dot dot, dot, dot dash, dot dash dot" twice. The General swore.
"Was ever General Officer addressed as 'dear' before?
"'My Love,' i' faith! 'My Duck,' Gadzooks! 'My darling popsy-wop!'
"Spirit of great Lord Wolseley, *who* is on that mountain-top?"

The artless Aide-de-camp was mute, the gilded Staff were still,
As, dumb with pent-up mirth, they booked that message from the hill;
For clear as summer lightning-flare, the husband's warning ran:-
"Don't dance or ride with General Bangs - a most immoral man."

(At dawn, across the Hurrum Hills, he flashed her counsel wise -
But, howsoever Love be blind, the world at large hath eyes.)
With damnatory dot and dash he heliographed his wife
Some interesting details of the General's private life.

The artless Aide-de-camp was mute, the shining Staff were still,
And red and ever redder grew the General's shaven gill.
And this is what he said at last (his feelings matter not):-
"I think we've tapped a private line. Hi! Threes about there! Trot!"

All honour unto Bangs, for ne'er did Jones thereafter know
By word or act official who read off that helio.
But the tale is on the Frontier, and from Michni to Mool*tan*
They know the worthy General as "that most immoral man."

HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham B17 8QB

THE DECEMBER 1994 issue of *QST* said: "Have you been reluctant to enter a CW contest because the code speeds are too high ? A solution, for people to whom 35WPM is another word for impossible, is to try slow speed code up to 10 to 13WPM on the higher frequencies in the CW portions on each band and the Novice CW subbands. Now you can participate at code speeds you find comfortable! What an excellent idea!

VERON IS 50

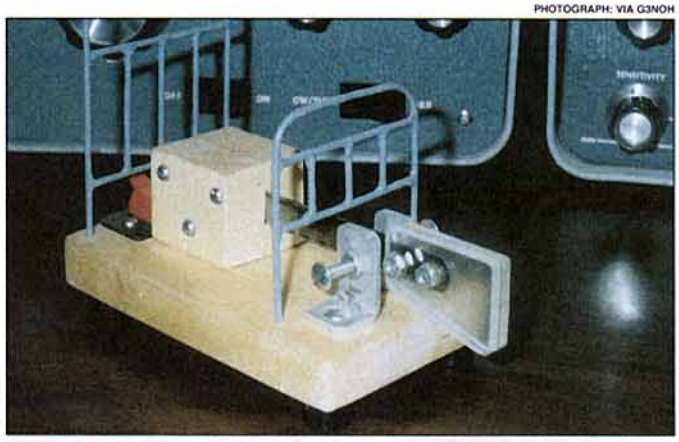
TO COMMEMORATE the 50th anniversary of our sister society VERON, founded on 21 Oct 1945, the following special prefixes will be in use during 1995: (A) VERON Society transmitters may use PI50 instead of PI4. (B) There will be special callsigns for club stations - eg PA6XYZ may be changed into PA56. (C) During the PACC Contest (11 & 12 Feb) all Dutch amateurs may add a 5 to their prefix - eg PA0XYZ might become PA50XYZ etc. In addition, to commemorate the 50th anniversary of the liberation of the Netherlands after WWII, all Dutch *individual* licence holders may add to their prefixes the figure 5 - *this will apply during May only.* Thus PA0AAA may sign PA50AAA, PB0BBB as PB50BBB etc.

BEACONS

I HEARD FROM Jack Troster, W6ISQ, recently and the good news is that LU4AA/B and CT3B are back on the air. The bad news is that Bob Jones, KH6O, died in September 1994 and so KH6O/B is temporarily off the air. However, another volunteer has been found and the Hawaii beacon should be active again just as soon as the licence can be renewed. Delivery of a second generation of boards is awaited to begin the construction of what is hoped will be a production model. W6WX/B is still on 14.1, 21.15, and 28MHz. It is widely monitored on 14 and 21 but not many reports are received about 28MHz. Jack says that we should be able to hear it on 14MHz sometimes because the beacon has a spectacular location.

Jack also enclosed a reprint of a two part article which had appeared in October and November 1994 *QST*. Under the heading "Conclusion" he wrote: "The present 14.1MHz beacon network is for everyone, whether you are a DXer looking for general band-opening information, or a contester looking for spot-opening information, or perhaps a high school or college student working on your science project, or a laboratory researcher, or SWL, or just a rag chewer who would like to find out what's new. Get the 14.1MHz habit now. Flip in your CW filter and listen along. When complete, the Phase III beacon network will allow you to check for band openings on a particular band (and of the five bands from 14 to 28MHz) in three minutes. Or, you will be able to track the same beacon though five bands to determine the band that has the best propagation to a particular area. We are in for some interesting propagation experiences in the next several years as the sunspot count begins to move up from the approaching minimum. We can hardly wait!

PHOTOGRAPH: VIA G3NOH



Something a little different: a 'bed bug' constructed and used by N5RQ.

DX NEWS

A DX ADVISORY Committee News Release from ARRL dated 2 December 1994 said that the DXAC has voted 14 to 2 against a petition to add the Austral Is and the Marquesas Is to the DXCC Countries List. Those voting against shared the feeling that French Polynesia is not a Point 1 DXCC country, and for that reason these two island groups do not qualify as separate countries under the current DXCC rules. The DXAC also voted 13 to 1 against adding the **Balleny Is** to the list and most felt that the Balleny Is are a part of Antarctica. Finally the committee voted 14 to 2 against recommending the establishment of a DXCC award for contacts made while operating mobile. Many comments stated the impossibility of verifying the fact that contacts were indeed made while operating mobile. It was also noted that all current DXCC awards are based on either mode or band. The DXCC Desk announced that the number of unprocessed applications at the end of November was 138 (15,248 QSLs). 328 applications (29,441 cards) were received during November and at the end of the month applications were being processed in less than a week.

RSGB DX News Sheet quotes the result of a poll conducted by *The DX Magazine* to identify the 20 most wanted countries. European needs are: (1) Kermadec, (2) Heard Is, (3) Bhutan, (4) Macquarie Is, (5) Auckland & Campbell Is, (6) Andaman Is, (7) Conway Reef, (8) Palmyra Reef, (9) Kingman Reef, (10) Central Kiribati, (11) Libya, (12) Midway Is, (13) Tunisia, (14) Amsterdam Is, (15) Banaba Is, (16) Agalega, (17) Bouvet, (18) S Georgia, (19) (not identified), and (20) Willis Is.

RSGB DX News Sheet reports a recent visit to the **United Arab Emirates** undertaken by WB2DND/A61AD. Don had made about 1,700 contacts in four evenings. It seems that the PTT approved three more licences - for A61AH, A61AI, and A61AN just after he had left to graduates from the Dubai Men's Technical College. A61AH is Al Mur Al Mohiri and he has a TS-850 and DX88 vertical antenna. A61AN is Nasr Fekri who is an experienced operator who has been working from the club station A61AF. He has a TS-850 but also a TL922 linear and a monobander for 28MHz and wire antennas for 3.5 to 21MHz, and should also have an R7 vertical by now. Don hopes to return early this year. The same news source quotes *QRZ DX* as saying that UA0FM will be in **Vietnam** until April or May and is trying to get a licence. Last month I reported that Rolf, SM5MX, is now XV7SW. It now seems that his special licence allows him to use CW spot frequencies only and these are 3.505, 7.033, 14.016, 14.021, 21.016, 21.019, 28.016, and 28.019MHz. David Platter, A45XJ, is located on Masirah Is (AS-14) and is expecting delivery of an MFJ loop antenna - he already has a 2-element 14MHz X-beam. He regularly takes part in the G3MTL 'Lazy DX' net on 14.184MHz between 1400 and 1800 on Saturdays and Sundays. QSLs can go direct or via the bureau to his G4MZY call.

Several reports have been received of stations operating from **Tunisia.** However the situation is very confusing because a close, Arabic speaking friend of mine was there recently and talked to the administration. He was led to believe that amateur radio would probably not become legal in the immediate future but that circumstances could well change. There

Two of the operators who visited Peter 1 Island last year: ON4TT (left) and DXpedition leader Dr Ralph Fedor, K0IR. In the middle is Ken Miller, K6IR.

may be a lack of liaison between departments however! LA9IY is in **Zaire** with the UN and is on the air as 9Q5IY. He should be there until February/March and may appear from 9X during the period. He has an IC-726 and wire antennas and seems to prefer CW on all bands (including WARC) from 7 to 28MHz. Another amateur in **Rwanda** is PA3DZN who was operating as 9X5EE with TS-50 and Cushcraft antenna on 7 to 28MHz at the time of writing but who was hoping to get on 1.8 and 3.5MHz at a later date. *DXPRESS* quotes the *DX Bulletin* as saying that Pierre, F5NLL, was expected to have returned to **Kerguelen Is** as FT5XJ during the January to March 1995 period.

PA3ERA and PA3FUE were scheduled to operate form the Dorma Hospital in **Ghana** between 17 and 31 January 1995 as 9G1AA. This is the second time that Dutch amateurs have operated from the area and this time it is with the help of Kofi Jackson 9G1AJ (director of the Frequency Board) and John Kaba, 9G1JK, who is a doctor at the hospital. DP1KGI is located on Ardley Island near King George Island, **South Shetland**, and is being operated by DL7VTS. He should be there until 31 March and seems to like operating 3 or 10kHz up from lower band edges on CW and also uses SSB and PacTOR. Another operator, who is Polish, will be in the same area probably until the end of the year at HF0POL.

ZL2HU was expected to be on the **North Cook Is** from 17 December until 28 January but the dates given were approximate. He was to use SSB only on 3.677, 7.077, 14.177/277, 18.137, 21.177/277, 24.937, and 28.277/477/577MHz. He will have an FT-757 and two G5RV antennas installed at right angles to each other to cover all directions. This expedition has received financial support from the Chiltern DX Club and the RSGB DXpedition Fund.

Steve Muster, G4UOL, made 6,500 QSOs in 121 countries (1,538 of them during the *CQ* WW contest) during his recent stint in the Isle of Man as GD4UOL. He operated from the IoM club station as GT3FLH and made 1,003 more. He reports that his band DXCC countries from GD are now: 1.8MHz = 59, 3.5MHz=88, 7MHz=115, 10MHz = 78, 14MHz = 158, 18MHz = 72, 21MHz = 145, 24MHz = 57, and 28MHz = 142. Steve is already booked again for 1995. *The Long Island DX Bulletin* says that Father Edward Schmidt, W9SI/OA4SS, will be operating from **Vatican City** from HV3SJ between early January and 25 March. He hopes to be on between 1400 and 1530 and 1930 - 2230 on Saturdays and 0800 - 1130, 1430 - 1830, and 1930 - 2230 on Sundays.

Bill, KM1E, should be on from Green Turtle Cay (NA-080) as C6AGN until 1 March.

1994 WARC BANDS TABLE+

	10MHz	18MHz	24MHz	Total
G4OBK	**149**	**216**	**146**	**511**
G4YVV	50	132	64	246
EA5GQI	-	137	77	214
G0MHC	59	91	45	195 (CW)
GJ4GG	42	70	45	157
EA5DQE	-	92	49	141
G4CMZ	55	64	18	137
G2AFV	57	56	12	125
G3ING	62	46	15	123
G3KKJ	17	53	39	109
G0TMZ	25	32	11	68
G4FVK	20	26	12	58
G3IAR	33	16	2	51

PALESTINE

JUST BEFORE the deadline I received a fax from Ray Gerrard, HS0/G3NOM reporting activity from the **Gaza Strip** by JA1UT and an "advance party". Ray has received faxes which confirm that the resumption of amateur radio has been officially sanctioned by Chairman Arafat of the Palestinian Authority. He has agreed to the establishment of a "Palestinian Wireless Group" and this information was printed in the *Al Quds* newspaper on 5 December 1994. The paper also said that Dr Tarazi, a Palestinian, had already made the first amateur wireless communication in 48 years using the historic ZC6 prefix on 3 December. A news release from JA1UT reads: "The Palestinian Authority is presently preparing the resumption of amateur radio after a long period of suspension. They have asked for help to establish a government club station and to set up an official amateur radio organisation. A volunteer group led by JA1UT arrived in the Gaza Strip in Palestine Territory on 12 December 1994. The new club station will be operated by the individual instructors from 15 December 1994, using their home callsigns '/Gaza' for the time being, because a new prefix has not yet been allocated." It is hoped that DXAC will acknowledge the autonomy of this area and grant DXCC credit in due course.

28 MHZ COUNTRIES TABLE

G0AEV	109
G4OBK	101
G0DNV	83
G0MCT	52
G3XBM	32
GJ4GG	27
G0NQC	20
GM4CHX	16
G2FQR	14

CONTESTS

DUTCH PACC CONTEST

1200 11 February - 1200 12 February

1.8 to 28MHz, CW and SSB - but no cross band/mode contacts allowed. Please follow IARU Region 1 HF band plans. Please also note that SSB QSOs on 1.8MHz are not valid. Single and multi-operator and listener sections. Exchange RS/T and serial number from 001. Dutch stations will give RS/T plus province abbreviation (GR, FR, DR, OV, GD, UT, NH, ZH, FL, ZL, NB and LB - a total of 12). Each QSO with PA/PB/PI counts one point and a station may only be worked once per band. The multiplier is the total of provinces worked on each band. Listeners log Dutch stations and each counts for one point - multiplier as in transmitting section. Logs must contain the code groups sent by the Dutch station and the callsign of the station being worked. Send logs no later than 31 March to Frank E van Dijk, PA3BFM, Middellaan 24, NL-3721 PH Bilthoven, The Netherlands. I have photocopies of the rules (SASE please).

INTERNATIONAL DX CONTESTS

0000 18 February - 2400 19 February (CW)

0000 4 March - 2400 5 March (SSB)

Work the USA and Canada on 1.8.to 28MHz (excluding 10, 18, and 24MHz). Single operator: (1) all band, (a) QRP (less than 5W output, (b) low power (150W or less), (c) high power (more than 150W output), and (2) single band. Single operator assisted and multioperator single, two, and multi-transmitter sections. Exchange RS/T plus power - Ws and VEs send RS/T and state/province. Each QSO is worth three points and the multiplier is the sum of states/provinces worked on each band (a maximum of 62 per band). Official entry forms are available from ARRL Contest Branch 225 Main St, Newington, CT 06111, USA in exchange for a few IRCs. Entries must go to the same address and be postmarked no later than 5 April 1995. If you are entering I can supply copies of the detailed rules which should be studied closely (SASE please).

CQ WW 160 METER CONTEST (SSB)

2200 24 February - 1600 26 February

Details given last month.

REF CONTEST (SSB)

0600 25 February - 1800 26 February

Single and multioperator 3.5 to 28MHz. Work French stations including overseas territories and DA1 and DA2 military stations. Exchange RS and serial number. One point for QSOs with own continent, three with others. Multiply by total of French departments (Corsica has two 2A and 2B). QSOs with F6REF/00 gives a special multiplier. Entries must be received by 15 April 1995 by Reseau des Emetteurs Francais, REF French Contest, BP 2129, 37021 Tours Cedex, France.

UBA CONTEST (CW)

1300 25 February - 1300 26 February

3.5 to 28MHz (no WARC) observing IARU Region 1 band plans. Single-operator single and multiband, multioperator, QRP (5W output), and listener sections. Exchange RST and serial number. Belgian stations will give their province abbreviation. QSOs with ON, DA1, and DA2 count ten points, with other member states of the EU three, and with others one. Belgian provinces (AN, BT, HT, LB, LG, LU, NR, PV, and WV) count as multipliers as do the prefixes ON4 - ON9, DA1 and DA2, and all EU countries (plus CU, SV5, SV9, SY, TK, and ZB2). Mail logs within 30 days to Jan Galicia, ON6JG, Oude Gendarmeriestraat 62, B-3100 Herst op den Berg, Belgium.

In the **1994 SP DX Contest (SSB)** in the single-operator multiband class **GW4HBK** scored 31,228 points, G4IQM 18,876, and G0SQF 1,638. In the multi-operator category **G0RGH/p** scored 12,600. In the listener section **BRS-91529** came second with 12,804 points and received a special prize.

BYLARA CONTEST

1900 - 2200 9 February
1000 - 1300 11 February

All licensed amateurs and listeners can participate. I can supply photocopies of the rules (SASE please).

1B OR NOT 1B?

THIS IS THE TITLE of a paper written by Igor Zdorov, KU0J, which was sent to me by GW2ADZ. Extracts of this say:" The foundation of what is now known as the Turkish Republic of Northern Cyprus (TRNC) was established in 1974 by Turkish intervention carried out in accordance with the international agreement which finally put an end to the ethnic bloodshed in Cyprus. The UN failed to do this. In 1994 the TRNC celebrated the 20th anniversary of it's foundation. Two years prior to this, amateur radio was authorised in TRNC. 5B prefix usage remained under the jurisdiction of the South Government. After TRNC's request for a new prefix was not even rejected but simply ignored, due to lack of international recognition, the only alternative was to use an unofficial prefix. This is how 1B was chosen and this is why it is not in some books . . . .

"Meanwhile, amateur radio in TRNC is gaining it's momentum. The first licence was issued to 1B1NCC, Northern Cyprus Club, in 1992. As of now six permanent licenses to local hams have been issued. More and more temporary licenses are issued as well. In 1993 1B/DK7ZZ was on the air for two weeks, followed by my almost three weeks long operation as 1B/KU0J in December. In March-April of 1994 1B/DJ6SI, Baldur, was on the air for a while, and later I provided N1CYA and a few others with 1B licensing procedure. In September of 1994 1B/DK8FD was on the air for two weeks, concurrently with my four week long second operation. 1B1AD can be often found on HF using SSB and digital modes."

(I realise that this situation is highly charged politically. What appears above is only the point of view of one side. It seems that TRNC is only internationally recognised by Turkey as a country. No doubt this will not be the end of the rather sad story.)

I hold no opinion in this dispute but it does seem that if operating from a territory which has *not* been officially allocated a prefix by the ITU the correct procedure is to use the home callsign of the person operating followed by /A or /the location. In this way KU0J would have been KU0J/A. (*See 'Palestine'* above)

THE OH-TELEGRAPHY CLUB

THIS WAS FOUNDED in June 1994 "to develop and to spread QRQ-CW operation in Finland". The club station call is 'OH0-9ABD' and it is active on Saturdays on 14.060 and 3.535MHz between 1600 and 2000UTC. It is possible to join OHTC by calling in during the sked times which are at 1700 on Wednesdays and Sundays on 3.535MHz - you should call in at 30WPM or faster, and use full BK or QSK if possible. Ask the member contacted to send his recommendation to the club and when you have collected four of these (at least two from Finnish stations) send your application to the secretary - Janne Karresuo, OH6BLW, Timonvita 3, 60150 Seinajoki, Finland, together with a signed statement that a computer, decoder, encoder, or keyboard has not been used and enclosing US $5 or 10 IRCs.

THANK YOU

TO ALL who have provided input this month and to the authors of the *Long Island DX Bulletin* (VP2ML), the *RSGB DX News Sheet* (G4DYO), *DXPRESS* (PA3FQA), and the *Lynx DX Bulletin* (EA2KL). Please send everything for the **April** column to reach me **no later than 16 February.** ♦

QTH CORNER

A45XJ	D J Plater, c/o RAFO (Masirah), PO Box 731, Muscat 111, Sultanate of Oman.
A61AH	Al Mur Al Mohiri, PO Box 4800, Dubai, UAE.
A61AN	Nasr Fekri, PO Box 53656, Dubai, UAE.
HV3SJ	(operation by W9SI) via I0DUD, Giuseppe Aurelio, Via Foggazarro 87, I-00137 Rome, Italy.
XV7SW	Rolf Salme, Embassy of Sweden, Box 9, Hanoi, Vietnam.
9G1BJ	via G4XTA, P D Godolphin, 3 Knipe View, Bampton, Penrith, Cumbria, CA10 2RF.
9K2F	via KARS, PO Box 5240 Safat, 13053 Kuwait. (Please include 2 IRCs)
9N1WT	OE7KWT, Wilhelm Wallenta, Perthalerg 17, A-6020 Innsbruck, Austria.
9Q5IY	direct only to LA1K, Academic Radio Club, Studpost 250, N-7034 Trondheim, Norway.
9X5EE	Tiny Mahoney, J Haydnstr. 17, 4536 BT Terneuzen, Netherlands.

VHF/UHF NEWS

NORMAN FITCH G3FPK
40 Eskdale Gardens, Purley, Surrey CR8 1EZ

NOT MANY reports were received this month. A combination of uninspiring conditions, many being busy with Christmas chores, and the appalling weather in much of Britain before Christmas, seems the most likely explanation.

144MHZ BANDPLAN

AT ITS meeting on 10 December, the VHF Committee discussed the feedback from members following the publication of the proposals for amending the 144.00-145.00MHz band plan published in the December 1994 *RadCom*. We were very impressed with the amount and quality of this input and have made some fine tuning of the proposals as a result of studying it.

First, the reference to SSB in the EME segment has been deleted. Second, the exclusive CW section has been extended to 144.130MHz to accommodate the current IARU 'letter' operating system, as explained on pages 3-17 in *The VHF/UHF DX Book*. Third, the CW/SSB segment has been extended to 144.400MHz. Fourth, the narrow band data mode segment is 144.400-144.425MHz and last, the beacon sub-band has been reduced to 144.425-144.510MHz.

These revised proposals will be tabled at the Vienna IARU Region 1 VHF Managers' Meeting this February by RSGB VHF Manager David Butler, G4ASR. It must be emphasized that any proposals have to be agreed by the Region 1 societies and it would be surprising if 'ours' were adopted in their entirety. In any case, no final decision will be made before the September 1996 conference.

REPEATERS

BILL TULLY, G0ANX, wrote on behalf of the South Oxfordshire Repeater Group (SORG) which was formed in late-1993. The group has written authority from the Director of Services of the Oxfordshire Ambulance Service to use a redundant antenna on its mast at the Churchill Hospital in Oxford. The site is within a few metres of the old GB3OX location.

An application has been forwarded to the Repeater Management Group (RMG) for the original GB3OX 70cm channel RB15, with 118.8Hz CTCSS in tone area J. Successful tests have been conducted using one watt ERP. The beacon keeper will be Steve Vaughan, G4WXC. The group is setting up another 70cm repeater, GB3DI, at Didcot (OFE) with a view to linking to GB3OX. Its keeper will be SORG chairman Chris Stevens (QTHR). For details of the SORG, contact G0ANX (QTHR) or telephone Wantage (01235) 868498.

The latest batch of repeater applications is now with the Radiocommunications Agency (RA). They include six packet relays: GB7BS at Bristol on 144 and 439MHz, GB7EH at Edge Hill on 430, 432 and 439MHz and GB7EA at Bury St Edmunds on 1.3GHz. The Hexham VHF repeater GB3TY on R6 was closed down permanently on 30 November; contact Mr H Swaddle, G0GXO, for details.

The November *Newsletter* from the Kent Repeater Group reports that GB3RE, the Rochester (KNT) repeater on RB11, was closed down on 4 December and will remain so until the RA clears a new site. Contact its keeper, Mr M Bernard, G4AKQ, for the latest information. There are status reports of the KRG's 2m repeaters GB3KN, GB3KS and GB3CK, and 70cm ones GB3CK, GB3EK, GB3NK and GB3SK.

PUBLICATIONS

THE WINTER issue of *FM News*, the journal of the Central Scotland FM Group, is the neatest issue yet. It includes detailed reports on GB3AY, GB3FF, GB3PA, GB3DG, GB3LG and the 23cm video repeater. There is lots of useful information in this 40-page issue, number 86, but some of the grammar and punctuation needs attention. The CSFMG had 368 members on 16 November and if you would like to swell the ranks, the secretary is Alasdair Fraser, GM3AXX (QTHR).

The November edition of *CQ-TV*, the quarterly journal of the British Amateur Television Club (BATC) maintains its high standard of content and printing. The ATV folk make full use of commercial equipment which appears on the surplus market and *CQ-TV* always includes articles on

LOCATOR SQUARES TABLE

STARTING DATE: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1.3GHz	Total
G4RGK	167	–	319	182	58	726
G3XDY	–	–	224	153	100	477
G3IMV	460	15	525	125	52	1177
GJ4ICD	611	1	264	121	68	1065
G6HKM	456	–	241	118	58	873
G6RAF	–	–	172	117	–	289
G4TIF	310	28	207	112	–	657
GW4LXO	440	23	261	108	48	880
G4MUT	186	25	158	97	34	500
G8LHT	196	20	202	93	17	528
G0CUZ	125	–	388	80	–	593
G4RRA	–	–	299	80	–	379
G0FIG	200	–	212	69	25	506
G6MXL	110	23	115	64	28	340
G1SWH	245	33	179	63	9	529
G6ODT	–	3	57	62	–	122
G0NFH	133	26	101	51	18	329
G4YTL	–	38	279	37	–	354
GW8JLY	–	–	277	36	–	313
G3FIJ	32	24	82	27	3	168
GW6VZW	377	–	143	6	–	526
GI1CET	95	–	60	3	–	158
G7JAF	–	–	53	3	–	56
G7CLY	70	–	60	2	–	132
GM1XOG	207	–	8	2	–	217
G4IGO	565	–	250	–	–	815
G6HCV	468	–	250	–	–	718
G0JHC	512	–	48	–	–	560
G0MGA	249	–	216	–	–	465
G4SWX	–	–	404	–	–	404
G0HVQ	310	–	71	–	–	381
G1UGH	234	–	122	–	–	356
G8XTJ	183	–	129	–	–	312
GW4VEQ	–	–	267	–	–	267
G3FPK	–	–	246	–	–	246
GW4FRX	–	–	236	–	–	236
G7LIJ	–	–	181	–	–	181
GW0PZT	–	–	160	–	–	160
G4OUT	–	21	100	–	–	121
GU4HUY	–	–	84	–	–	84
G0HDZ	11	–	67	–	–	78
GW7SMV	2	–	51	–	–	53
G3UOL	–	–	43	–	–	43

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is 24 February. Band of the month 430MHz.

modifying it for amateur use. John Stockley, G8MNY, has a piece on the Panasonic WV-1400 camera and John Bales, G0HAT, illustrates mods to the Philips HSC3 colour monitor.

There is a report on the Cat 94 Convention held at the Shuttleworth College on 10/11 September. Reporter Paul Marshall, G8MJW, seeks feedback on the event and is QTHR. BATC's 'Rally 95' will be held at The Sports Connexion, Coventry on 30 April. For further information and bookings contact Mike Wooding, G6IQM (QTHR); tel 01788 890365 or fax 01788 891883. Mike has handed over his editor's eye-shade and blue pencil to Chris Smith, G1FEF, 36 Grasmere Green, Wellingborough, Northants, NN8 3EJ.

The Winter edition of *VHF Communications*, 4/1994, includes a description of an RF power meter with a linear scale by SM6MOM/W6, a further piece about the DB1NV spectrum analyzer, a hybrid antenna switch for 23cm, an article by DJ8ES and another contribution by SM6MOM/W6, on resonance measurements in capacitors. For details of subscription rates to this excellent quarterly, UK residents should contact KM Publications, 5 Ware Orchard, Barby, Rugby, CV23 8UF.

PROPAGATION

THE 50MHZ propagation puzzle which I aired in last month's column has generated more correspondence in the November *Report* of the Six and Ten Reporting Club. Editor Ray Cracknell, G2AHU (HWR), writes: "My present thinking...is that we have revealed a new mode, or probably modes, of forward scatter as far as amateurs are concerned, that it is still not adequately explained but it does open up opportunities for further experiments at 28, 50 and 70MHz."

He concludes: "It illustrates the often propounded principle that, if two stations with 100 watts and a beam are sufficiently determined and point their beams at each other, and call on CW, the likelihood of success is very high. That was the philosophy that led us to reveal the potentialities of TEP, and has much to commend it at times when other modes of propagation are not working."

The key phrase in Ray's comment is "...as far as *amateurs* are concerned..." One of the reasons that the Ministry of Defence was so keen to keep control of the lower VHFs was because of the many scatter links between NATO bases in Europe, as well as British links. These operated extremely reliably for decades.

If conventional wire and satellite systems failed, such VHF scatter circuits became important for back-up use. A popular PA valve in the transmitters was the CCS1, the conduction cooled equivalent to the 4CX250B. Antennas were usually of the 5 or 6-ele Yagi type. No doubt, some ex-service readers may remember such equipment.

In Britain, we can now run such ERP legally on 6m, so can now achieve what the military have been doing for years. In the ARRL book *Beyond Line of Sight*, edited by Emil Pocock, W3EP, there is a section on 50MHz ionoscatter reprinted from the May 1967 issue of *QST* - 28 years ago. So let not anyone conclude that some new propagation mode has been discovered.

FURTHER TESTS

Ken Osborne, G4IGO (SOM), has made an exhaustive study of E-layer propagation over many years. He monitors distant Band 1 TV signals in the 48-50MHz region from 0600-2400 every day and has found these low-level scatter signals to be audible much of the time, frequently enhanced by reflections from sporadic meteor trails.

W3EP stated this scatter mode was totally dependent on solar radiation, peaking at noon in the summer months. Last month I suggested tests be arranged around noon in the summer months, but Ken reckons they should be conducted at hourly intervals from, say, 0600 local time through noon. He feels that these ionoscatter signals could be better in the early morning when the Earth is rotating into incoming sporadic meteors.

It is well known that MS skeds via random meteors are best arranged for the midnight through dawn local time period. See page 2-56 in *The VHF/UHF DX Book* for an illustrated explanation. If tests prove that local noon is not the optimum time for this scatter mode, then it would seem that additional ionization in the lower E-layer from meteors is significant.

Professor Martin Harrison, G3USF (SFD), has published a list of 38 European TV transmitter with video carriers in the 48.24 to 49.76MHz part of the spectrum. These run from 30 to 250kW ERP, usually omni-directional, and are located in Spain, through Hungary and the CIS to Norway and Sweden. They would be ideal to monitor since they run constant power.

Any tests between pairs of stations must be carried out in a scientific way over a long term. Accurate measurements of signal strengths over noise must be recorded and the actual TX power fed to the antenna noted. With the availability of digital signal processors, this communication mode could be exploited using modest ERP. If you don't try, you'll never know.

NET ACTIVITY

MALCOLM SADLER, 2E1DLC (SOM), would like more information about net operation, a subject mentioned by Jack Hum, G5UM, in the December issue. As a Novice B licensee, he only has access to the 6m and 70cm bands. Having invested in decent equipment, hours of calling "CQ" on 6m had brought only *two* contacts up to 18 December.

He wrote to the UK Six Metre Group for advice but was told that members were only interested in DX so stayed monitoring 50.110MHz. Calls on the SSB and FM calling frequencies proved fruitless. He did hear one net but the participants left no opportunities for anyone else to break in. When it finished, his calls were ignored and they all went QRT.

Malcolm would like to create some activity so invites anyone in the Ilminster district to contact him to discuss possible days and frequencies. He is not yet in the *RSGB Call Book* so suggests a telephone call to Ilminster (01460) 54657. He can access a few local 70cm repeaters, so please listen for 2E1DLC and any other B Novices.

Bill Rothwell, G0VDE (SFK), wrote about the East Anglian 6m net which meets on Monday evenings from 2100 local time on 50.140MHz SSB. Andy, G7OEC, is net control and he is located near Harwich (ESX). There is an eight-point suggested net protocol, too long to list here. They have about 60 stations on their list including five novices. Since the winter of 1993, they have had callers from Sussex to Yorkshire and invite anyone to call in.

Ross Wilkinson, G6GVI, is the licensee of G8CXH, the callsign of the University of Bristol ARS.

RSGB NATIONAL VHF CONVENTION

Sandown Exhibition Centre, Esher, Surrey

SUNDAY 19 FEBRUARY 1995

● One Day Exhibition and Lecture Programme ● Specialist Groups ● Full Lecture Programme on VHF, UHF and Microwave Subjects ● Morse Tests ● Presentation of Trophies ● Comprehensive Trade Exhibition

PROGRAMME

1030	Convention opens. Enter through main entrance.
1100	Refreshments. Snack bar in the hall will be open from 1100 to 1800 and the licensed bar will be open throughout the convention.
1130	AGM 6m Group
1130 -1230	Lecture: Getting Started on the Microwave Bands by Lehane Kellet, G8KMH (Stream C Lecture Room)
1330	Convention address and presentation of trophies by RSGB President Clive Trotman, GW4YKL.

AFTERNOON LECTURE PROGRAMME

Detailed arrangements for lectures will be notified on arrival

	A	B	C
1400	VHF Contesting in the 1990's *by the VHF Contests Committee*	Single & Dual Band Log Periodic Yagis *Mike Gibbings, G3FDW*	The Middle Microwave Bands *Andy Talbot, G4JNT*
1500	A 50MHz DXpedition to Jordan	The Sun and Aurora *Ron Livesey of the British Astronomical Association*	A Year on 10GHz *G4KNZ, G4CBW, G8VZT and G3WDG*
1600	VHF Contest Committee Forum	VHF Committee Forum	

1700	Lecture Sessions End
1730	Trade Exhibition Closes. Convention Ends.

ADMISSION

Admission will be by payment on entry as follows:

Convention and Exhibition £3.00	(over 65)	£1.50
	(under 18)	£1.00
	(under 14)	Free

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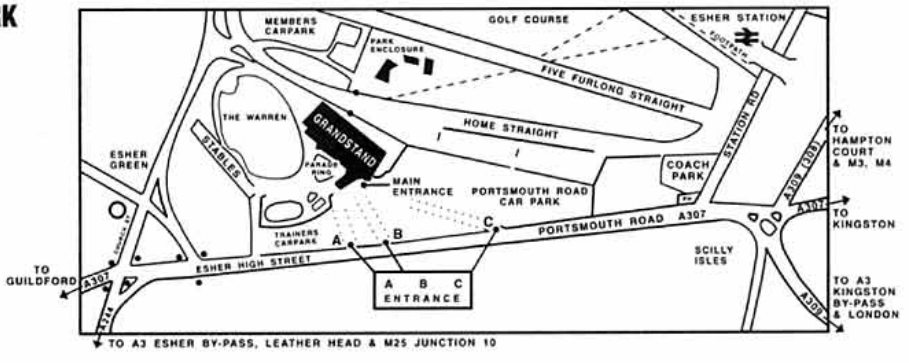


Map by courtesy of United Racecourses

He reports very similar experiences to 2E1DLC and has been trying to promote activity in the Bristol area on 4m and 6m by loaning out converted PMR sets. He suggests a 4m and 6m FM night each week, with stations calling on 70.45 and 51.41MHz.

Ross's home QTH is in Lancashire and he mentions the Manchester FM net on 51.43MHz on Sunday mornings, following the GB2RS news broadcast. There are usually five participants. Please write if you know of any such nets in other parts of the kingdom.

MOONBOUNCE

1995 PROSPECTS

John Regnault, G4SWX (JO02), forwarded some information from Derwin King, W5LUU, entitled 'Moondata Update - 1995' extracted from *Two Metre EME News* issue number 53. This shows that for 2m, it will be another poor year due to the relative positions of the Sun, Moon and Earth. 1996 will be even worse and this downward trend won't start to reverse till 1997-8.

He has produced a table for all Sundays of the year showing the Moon's declination, right ascension and phase, 144MHz sky temperature, and range factor and DGRD in dB. The final column uses the terms very poor, poor, moderate and good to describe expected conditions. There are no weekends when the DGRD (signal-to-noise degradation) is under 2dB. The first of the nine good weekends is not till 6/7 May.

Perigee, when the Moon is closest to Earth at 348,030km surface-to-surface, should be optimum due to minimum path loss. However, in 1994, perigee occurred in an increasingly noisy part of the sky and this trend will worsen this year. Derwin's DGRD figures are derived from the sky noise and Earth-Moon separation effects.

G4SWX points out that optimum 144MHz EME weekends now rarely coincide with 432MHz ones. Consequently, 2m operators often pay little notice to the activity weekends proposed by the 70cm EME folk. It is no longer a valid assumption that the nearest weekend to perigee is the best choice.

ACTIVITY

Doug Mallett, G3HUL (JO02), operated on 70cm during part of the second leg of the ARRL EME Contest on the 26/27 November weekend. He completed with 19 stations in Europe and the USA. John Hunter, G3IMV (IO91), used 2m and had nine additional contacts including three more initials. His total tally for the overall event was 39 QSOs and 21 multipliers. On 13 November, he completed with JW0BY (JQ88AD) at moonrise and SV1BTR (KM17VX) on 10 December was also new.

VE3ONT was QRV in the second ARRL weekend. Michael Owen, W9IP, says that conditions were the worst he has seen in over nine years, especially after dawn on both days. At times, even with 1.5kW output to the 46m dish at Algonquin Park, they could hardly hear their own echoes. Even so, they completed nearly 300 QSOs with 52 multipliers and W9IP concludes: "We worked a ton of stations not in any EME database, suggesting that they were first-timers. Very happy about that!"

On 31 December, there was an Internet message from Mike, K6MYC/KC4, at the IMP8 Station, McMurdo in the Antarctic. He had completed 12 QSOs including I2FAK heard calling CQ. At the time, Mike was only running 200W, but later repaired his PA, which had been damaged in transit, to boost the power to 800W. He was due to leave the area on 9 January.

Stefan Heck, LA0BY, sent details of his proposed JW0BY operations on 144.155MHz from Svalbard this year. His February schedule is: 3, 1300-1600; 4, 0700-1630, 1930-2200, random CQ 1300-1600; 5, 0700-1730, 2000-2400 (US only), random CQ 1500-1700; 12, 0100-2300, random CQ 0200-0400 and 2000-2300; 13, 0200-0700 and 1600-2400; 14, 0230-0700 and 1600-2400; 15, 0330-0700 and 1600-2400; 16, 0000-0100 and 0400-0700, all times UTC. He will next be QRV 9-11 April.

50MHZ

TED COLLINS, G4UPS (DVN), reports some changed Slovenian callsigns; S50N (ex-S57AV), S57C (S57CC), S59A (S59UN), S57A (S57AN) and S59F (S59AM). Jack Anderson, V51KC has moved to JG88LA and his QRA is PO Box 5, Okahandja, Namibia. Mike Rudenco's, ER5OK, QRA is Box 7, Chadyr-Lunga, 278700 Moldova.

In addition to the tropo skeds at 0800 with G3CCH, Ted tries to work SM7AED by ionoscatter when Arne is available at 1000/1100. OZ7DX and OZ5AGJ (JO56) have joined these skeds with reasonable success. He lists MS contacts in the Geminids activity and notes strong signals from a few OZs and SMs on 22 December, the peak day for the Ursids shower.

Geoff Brown, GJ4ICD, reports a winter Es opening to ES, LA, OH and SM for three hours on the morning of 26 December. At 1800, some SPs appeared but there wasn't much activity.

144MHZ

G3IMV DID NOT find the Geminids shower all that good. The highlight was working JX7DFA (IQ50OV) on sked at 2100 on 13 December, although John has completed with him three times on EME. In a tropo opening on 29 November, he worked OK1, OK2 and OM3 stations plus: "...the usual horde of DLs, etc."

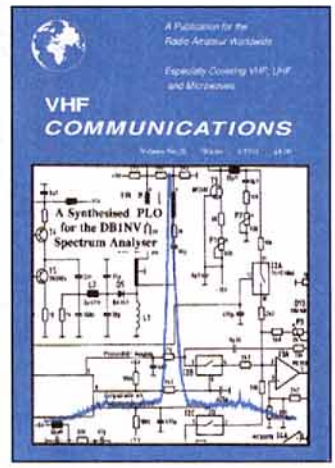
John Fitzgerald, G8XTJ (BUX), worked to JO50 on 27 November and GD4IOM was his best DX in the 4 December contest. He has finally achieved 2,000 WAB areas, thanks to many mobiles who operated from rare places. In the Christmas Fun Contest, GM4JJJ (FFE) was heard and the best DX worked, up to the 28th, were G1SWH (MCH), G4KUX (DHM), G6QM (YSN) and G0FDX (LNH).

Jamie Ashford, GW7SMV (GWT), caught the tropo in the 23-29 November period. Best DX on the 28th was OK1VMS/P (JO70) but activity was low. Best DX next day was to DL (JN59). 12 December brought his first Swiss QSOs, HB9ACA (JN36), and HB9DFP and HB9AMH/P (JN37). Then F5JRX (JN25) and DF1CF (JN57) were two more new squares.

Joe Ludlow, GW3ZTH (GNM), struggled to work some DX on 28 November through computer hash from home. Next day he was out portable at IO81FP but the tropo lift was fast collapsing. From 1500 for a couple of hours he worked 32 stations in 14 squares, best DX being DD2VA (JN39) and DL2FDX (JO40).

430MHZ

REG WOOLLEY, operating G6RAF (LEC) in the contest on 28 November, made 48 QSOs in the first half hour, the final total being 114. Best DX was JN67, with lots in JN48, 49, 58 and JO60. During a 2m QSO afterwards with HA/DL1MAJ on tropo they QSYed to 70cm and successfully completed even though the DX was only running 10W to a single Yagi. Reg runs an FT-726R, 100W PA to two 21-ele Yagis at 75ft AGL with masthead preamp.



***VHF Communications* is a mine of technical information for the VHF/UHF and Microwave enthusiast. An index covering 1970-1994 is available at £2.50 inc P&P from KM Publications, 5 Ware Orchard, Barby, Nr Rugby CV23 8UF.**

SOFTWARE

THE LATEST version of OH5IY's meteor scatter software is now available. It is v4.2f and Internet users can get the file via anonymous FTP from funet.fi in Finland.

Keith Hodges, G0CHI (SXW), pointed out an error in the filename in the November *RadCom*; it is now mssof42f.zip and the file is in the directory /pub/ham/vhf-work. Alternatively, send me an IBM-formatted disk, 720k or more, 3.5 or 5.25in, with SASE - preferably a *Jiffy Bag* - and I'll copy for you. Don't forget to state your Maidenhead locator.

Doug McArthur's, VK3UM, EME Planner and Emetrak software is also available at funet.fi as vk3um702.zip. I'll copy this lot for you but only to a 3.5in, 1.44Mb disk. State your lat/long in deg/min/sec.

FINALE

HUMBLE APOLOGIES to Nick Shaxted, GM4OGI, whose call I wrongly typed as GM0OGI last month, and to Mr D T Keely, GW0OGI, whose friends thought he had moved to Scotland. I guess it's anno domini setting in at G3FPK!

The **April** deadline is **23 February** and the **May** one, which sees the first appearance of the 1995 Annual Table, is **30 March**. I have deleted several callsigns from the Squares Table which have not been updated for a year. The tel/fax system is on 0181 763 9457, my CompuServe ID is 70630,603, the Internet route is 70630.603@compuserve.com and the BT Gold mailbox is 87:CQQ083. ♦

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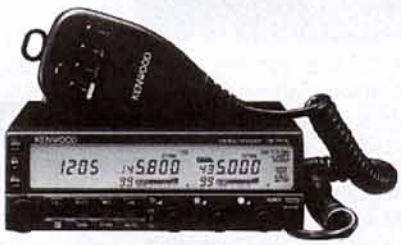

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A103	30m Extension A3WS	£115.00
204CD	4 ele 20m Yagi	£439.00
154CD	4 ele 15m Yagi	£249.00
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A144-20T	2m 10-ele Cross Yagi 12.2 dBd	£99.00
13B2	13-ele 2m Yagi	£99.95
17B2	17-ele 2m Yagi	£169.00
A50-3S	3-ele 6m Yagi	£75.95
424B	24-ele 70cms Yagi	£115.00
22XB	2m 22-ele Yagi c/w polarization switching	£199.00
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B1016G	2m, 10W input, 160W output preamp	299.00	C
B2516G	2m, 25W input, 160W output preamp	269.00	C
B5016G	2m, 50W input, 160W output preamp	269.00	C
D1010N	70cm, 10W input, 100W output	349.00	C
D3010N	70cm, 25W input, 100W output	329.00	C
RC1	Remote switching unit for Mirage amps c/w 18ft cable run	38.00	B

MAST HEAD PREAMPS

		CARR.
KP2/2M	2m GaAs fet 0.6dB NF 20-25dB gain or 10-15dB adjustable 165W through power. 149.95	B
KP2/440	70cm GaAs fet 0.6dB NF 20-25dB gain or 10-15dB adjustable 165W through power. 149.95	B

POWER METERS

		CARR.
MP2	50-200MHz, 50-500-1500W average and PEP reading + SWR 9-13.6VDC internal battery. 189.00	B
MP4	1260-1300MHz, 1-10-100W average and PEP reading + SWR9-13.6VDC internal battery. 229.00	B

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CA-21HR	7MHZ Mobile Whip	£38.00
CA-14HR	14MHZ Mobile Whip	£38.00
CA-21HR	21MHZ Mobile Whip	£38.00
CH72S	2M/70CM Whip BNC	£14.00
CH600MX	2/70/23CM Whip BNC	£25.00
CA-50HR	6M MOBILE Whip	£38.00
CA2X4KG	2M/70CM Mobile Whip	£45.00
Z4	2m/70cm M. whip w/locking collar	£33.00
B-10	2M/70CM Mobile Whip	£18.50
CHL21J	2M/70CM Mobile Whip	£15.00
CA-350dB	6M/10M Base Colinear	£140.00
ABC23	3 x ⅝ Base Colinear	£55.00
GP9N	2M/70CM Base Colinear	£123.00
GP15	6M/2M/70CM Base Colinear	£85.00
CX-902	2M/70CM/23CM Base Colinear	£84.50

COMET DUPLEXERS

CF-305	HF/VHF Duplexer	£25.00
CF-306A	HF/VHF/UHF Duplexer	£34.00
CFX-514	6M/2M/70CM Triplexer	£39.50
CFX-431	2M/70CM/23CM Triplexer	£42.50
CF-520	2M/6M Duplexer	£24.50

COMET ANTENNA ACCESSORIES

RS-9	Mini Boot Mount	£6.75
RS20	Mini Gutter Clip	£15.00
CK-3MB	Mini Cable Assembly	£19.50
WS-1M	Window Mount & Cable	£36.50

COMET STATION ACCESSORIES

CBL-30	HF 1:1 Balun 1KW PEP	£20.00
CBL-2000	HF 1:1 Balun 2KW PEP	£25.50
CSW-20N	Switch 2 WAY 'N'	£39.00
CF-30MR	HF Low Pass Filter 1KW PEP	£34.00
CF-50MR	6M Low Pass Filter 1KW PEP	£35.00
CF-30H	HF Low Pass Filter 2KW PEP	£69.00
CF-30S	HF Low Pass Filter 150W PEP	£19.00
CF-50S	6M Low Pass Filter 150W PEP	£19.50
CF-BPF2	2M Band Pass Filter 150W PEP	£36.00
CD-160H	SWR/PWR 1.6-60MHZ 20/200/2000W	£95.00
CD-270D	SWR/PWR 140-525MHZ 15/60/200W	£82.00
CMX-2	SWR/PWR 1.8-200MHZ 20/50/200W	£110.50

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SMC are now importing direct from the factory the famous AEA range of Data Terminals and at amazing savings from previously advertised prices.

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PK-12	Low cost Packet TNC with 14K mail drop memory	£119.00
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CS201GII	2 Way Switch 'N' 1KW PEP	£23.50
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DLA80H	2M/70CM Dual Band Amp 0.5-25W IN 80-60W Out Pre Amps	£345.00
DX10N	2m/70cm Duplexer UHF/N	£19.50
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PSU = D Meters = B
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MFJ941E	Antenna tuner 1.8-30MHz 300W 8 position antenna switch +4:1 balun	£119.00
MFJ949E	Antenna tuner 1.8-30MHz 300W 8 position antenna switch 4:1 balun Built in dummy load	£159.00
MFJ-962C	Antenna tuner 1.8-30MHz 1.5kW PEP 6 way antenna switch 4:1 balun	£259.00
MFJ-986	Antenna tuner 1.8-30MHz 3kW PEP Rotary Inductor 6 way antenna switch built in current balun	£319.00
MFJ-989C	Antenna tuner 1.8-30MHz 3kW PEP Rotary Inductor built in 300W dummy load 6 way antenna switch built in balun	£369.00

CARRIAGE: Base Antennas £9.50 Mobile Antennas £5.00 Station Accessories £5.00

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Birmingham B8 3HX
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9.00am – 5.00pm Tuesday – Friday
9.00am – 4.00pm Saturday

HF F-LAYER PROPAGATION PREDICTIONS FOR FEBRUARY 1995

The time is represented vertically at two-hour intervals UTC for each band, ie 00=0000, 02=0200, etc. The probability of signals being heard is given on a 0 (indicated by a dot) to 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally F-layer openings at 50MHz and 1.8MHz are indicated by a plus (+) sign in the 28 and 3.5MHz columns, with these latter bands having a probability of 9.

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	....1.....	...222....	...3565....	...57873...	...188787..	21.6655677 12	8745332357 78	++42....24++
MALTA	...11.....	...12221...	...4555....	...67776 1..	...187788 5..	4526655678 63	9986422357 99	+++3....25++
GIBRALTAR	.....	...11.....	...3332....	...26665 1..	...688786..	1211866678 61	7877543347 98	++++2...24++
ICELAND	.....	.....	....12....	....1442...	....57773..	...4766782.	4511644457 75	++++3...24++
** ASIA								
OSAKA	.....	.....	.....	...21.....	...64.....	..1532232..	....21.12532	.....35.
HONGKONG	.....	...12.....	...351....	...563....	..15652....	...2333321	1...1.12545	353
BANGKOK	...121....	...243....	...5761....	...1677 3...	..146552...	1...1323541 1	3...1.12667	.....35+
SINGAPORE	...1221....	...3442....	...5765....	...16777 2...	..136566...	2...1323541 2	2...1.12666	354
NEW DELHI	...122.....	...344.....	...5762....	...26775....	..335561...	31.1122341 13	73.....12568	4.....35+
TEHERAN	...2321....	...4543....	...16776 1...	...36677 3...	..544566...	5323112355 24	8731...12678	+4.....35+
COLOMBO	...2321....	...4543....	...16776 1...	...25677 4...	..224567 1..	.1...1235624	42.....12678	4.....35+
BAHRAIN	...3322....	...4544....	...16677 1...	...35677 3...	1..533566 1..	7322..235545	872.....2678	+4.....35+
CYPRUS	...3433....	...5655 2...	...1888885...	...3888871..	21.7666785 11	8746333468 77	9963111236 88	++4.....4++
ADEN	...3333....	...5555 1...	...16677 4...	...35567 6...	2..422367 411	7122..135766	862.....2688	+5.....35+
** OCEANIA								
SUVA/S	.....	.....	.....11....	.....22....	.....3551...	....233343..	....21.123..	.....
SUVA/L	.....	....1.....	....41.....	....731...1.	.1117542.441	..1353223 52.	...22...23..	.....
WELLINGTON/S	.....	.....	....121....	.....342....	....35552...	....533352..	...121.123..	.....
WELLINGTON/L	.....	.....	....1.....	....3.....1.	.11.63...341	..2253111531	...121..13..	.....
SYDNEY/S	....1.....	....13.....	....4622....	....67451...	...276564...	...2533353..	....21.1262.	.....3..
SYDNEY/L	.....	.....	.....1.....	.....2....2.	....452...5.	....5322145 1	....21..142.	.....2..
PERTH	....232.....	....4541....	...16774 1...	...26776 4...	...246567 1..	2...1323562 3	1.....12674	.....35.
HONOLULU	.....	.....	.....	.....	.....3..	....1212 41.	...121.122..	...3.....
** AFRICA								
SEYCHELLES	....1233....	....2355 1...	...14577 4...	...34567 6...	2..322367 411	711...135766	841.....2688	+2.....35+
MAURITIUS	....3433....	....5655 2...	...16677 5...	...25567 71..	21.322467 511	751...135776	841.....2588	+.....25+
NAIROBI	....3444 1...	....5666 3...	...16668 6...	...25557 82..	21.422257 621	8622...25777	883.....2588	+5.....25+
HARARE	....1355 2...	....3567 4...	....56687 1..	...15557 83..	22.422247 732	8832...15787	883.....2588	+5.....25+
CAPETOWN	....1553....	....1377 6...	....45778 2...	....55568 51.	21.232236 852	8633 1..13788	8851....1488	++2.....5+
LAGOS	....25654...	....4777 61..	....77778 3...	....76568 61.	24.153236 862	7945 3...3698	8884.....488	5++.....5+
ASCENSION Is	....4324....	....2654 62..	....5766 75..	....76556 62.	142.74223662	7884 41...388	8896 1....168	+++3.....3+
DAKAR	....4544 1..	....1676 62..	....3877 75..	....67656 72.	133.753247 62	6883 52..1488	8796 2....168	+5+3.....3+
LAS PALMAS	....2323....	....5555 1..	....3787 74..	....58888 71.	122.876678 61	6885 7543 4797	9897 4211 2479	+++5.....5+
** S. AMERICA								
Sth SHETLAND	....111..	....2232..	....2456 5..	....14666 61.	133.555544 41	4773 5322 1123	3555 21....1	.222.....
FALKLAND Is	....2341..	....1456 2..	....4777 5..	....16766 61.	123.565334 41	5883 5321.124	5886 21....2	2554.....
R DE JANEIRO	....11.11..	....3212 2..	....6534 5..	....754452.	.23.163223 51	6882 43...136	8896 21....15	+++4.....2
BUENOS AIRES	....2131..	....1425 2..	....3746 5..	....57555 2.	.12.365223 41	4782 532...24	6896 21....2	4++4.....
LIMA	....2121..	....4332..	....6554..	....76541.	....53222.	2461 2121...2	5895 31....1	2++4.....
BOGOTA	....111...	....3332..	....6554..	....76541.	....115 4222.	245.4321..13	6884 31....2	4++4.....
** N. AMERICA								
BARBADOS	....2121..	....4332..	....1655 4..	....37555 1.	....553 2341	245.232...34	8875 31....4	++54.....
JAMAICA	....11....	....1221..	....4553..	....66541.	....55323.	133.3222..12	6883 31....2	4++4.....
BERMUDA	....11....	....1221..	....4554..	....66551.	....255344.	123.1322 1134	7873 21....14	+++4.....
NEW YORK	.....	....2221..	....1443..	....36 65..	....55553.	121..2332232	6772 21....13	4++4.....
MEXICO	.....	....2111..	....542...	....653...	....16421.	.21.1123 1..1	2772 31.....	.5+4.....
MONTREAL	.....	....111...	....1442..	....3665..	....55553.	121..2332232	6772 21....13	4++4.....
DENVER	.....	.....	.....21..	.....153..	.....3641.	.1..1..33211	2651 2...1..1	.4+4.....
LOS ANGELES	.....	.....	.....21..	.....42..	.....1641.	.1.....2421.	1451 21..1...	.2+4.....
VANCOUVER	.....	.....	.....	.....1..	.....34..	.1.....1432.	1431 21.121..	.254.....
FAIRBANKS	.....	.....	.....	.....	.....1..	....1.11352.	1211 21.12321	..23.....

The provisional mean sunspot number for December 1994 issued by the Sunspot Data Centre, Brussels was 26.7. The maximum daily sunspot number was 57 on 11 December and the minimum was 0 on 3 December. The predicted smoothed sunspot numbers for February, March and April, are respectively: (classical method) 21, 20, 19; (SIDC adjusted values) 14, 12, 19.

IARU

JOHN ALLAWAY, G3FKM
and
TIM HUGHES, G3GVV

IT BECAME CLEAR during the recent RSGB AGM that some members do not fully understand the way in which the various constituent parts of the IARU are funded and we think that a more detailed explanation might be of interest - after all it is *your* money which is being invested! First of all - there is *no* overall 'IARU budget' because in fact there are four separate budgets for the four main parts of the organisation. These parts are Regions 1, 2, and 3 and the International Secretariat.

The three Regions levy different amounts from their member societies and calculate these in different ways. Region 2 societies pay a fee related to the *total* number of licensed amateurs in the country they represent - non-members and members included. Region 3 has a sliding scale of fees based on the membership of each society but the larger the membership the less the per-capita amount.

Region 1 societies pay annually a flat rate of 1.40 Swiss Francs (about 60p) per licensed member plus (at present) a temporary surcharge of another 20 Swiss centimes (rather less than 10p) per licensed member the proceeds of which go wholly and solely to the STARS (Support To Amateur Radio Services) project which is working to bring amateur radio into being in some areas where it is very under-developed or non-existent.

It is vital at World Radiocommunications Conferences that a large number of the administrations attending are favourable to our interests and at present there are frighteningly few amateurs in the countries of the African continent - which have more than 40 votes at ITU conferences. We have already been able to report considerable progress in promoting amateur radio in Africa and this situation has come about largely as a result of the good work of the STARS group. RSGB also actively supports this development - not only in our own Region but also in Region 3 - by supplying educational material to some of the smaller societies. Recently books have been sent to Sierra Leone, The Gambia, and Ghana. Books have also been made available to Region 3 to use in making a presentation to the authorities in Myanmar (formerly Burma) who now are beginning to take an interest in the amateur services. The fourth part of the organisation is the International Secretariat. This a volunteer member society which under takes to deal with many of the worldwide administrative tasks of IARU and to very largely fund these activities. At present this good Samaritan is the American Radio Relay League (ARRL) - whose efforts on behalf of *all* of us are not always recognised or appreciated.

IARU Region 1 is legally registered in Geneva, Switzerland, and is under close financial supervision - annual accounts are produced and sent to member societies and these are audited by Deloitte and Touche in Geneva. Any society can question these accounts and at the triennial conferences they are gone into in considerable detail. Any changes to the fees also have to be approved at the conference.

RUSSIA

Unfortunately there seems to be a strange situation in Russia. Following the break-up of the Soviet Union the former Radio Sports Federation of the USSR (RSF) ceased to exist. The Krenkel Central Radio Club (KCRC) applied to be considered as successor to the RSF, and this question was discussed at length by the IARU Administrative Council who came to the conclusion that this would not be possible and the KCRC was advised to file an application for IARU membership.

This it was never done and another society - the Union of Radio Amateurs of Russia (SRR) - did send in a perfectly correct application which was approved by the member societies worldwide and SRR was duly and democratically elected. Now the KCRC is sending out rather unpleasant circulars to member societies alleging that the IARU Constitution was violated and they are asking for QSL bureaux to send all cards to the KCRC at Box 88, and alleging malpractice at SRR!

MEETINGS

RECENT ACTIVITY on the administrative front included the attendance by Tom Sprenger, PA3AVV, at a meeting of CISPR (Comité International Special des Perturbations Radioelectriques) which took place in Beijing in October. Tom is IARU International Coordinator for CISPR and IARU is a member of the CISPR Steering Committee. The meeting was attended by 188 experts from 19 countries and the rapport built up previously with administrations was confirmed because he was asked for his advice on several occasions on amateur radio matters. This means that IARU is able to take part actively in the setting of standards relating to EMC problems.

The ITU Plenipotentiary Conference in Kyoto, Japan, which took place in September and October 1994, was rather interesting from the point of view of radio amateurs - but it is not possible for IARU to attend this meeting in an official capacity. There were 1,083 delegates from 151 of the 184 of ITU's member countries present. Robert W Jones, VE3CTM, was elected to succeed Richard Kirby, W0LCT, as Director of the Radiocommunications Bureau, and Thormod ('Tom') Boe, LA7OF, elected to a seat on the part-time Radio Regulations Board.

A special event station, 8N3ITU, was operated from the conference site and it is believed that the equipment used is to be donated for use in Geneva at 4U1ITU. A Resolution with special significance for us was passed: It endorsed Resolution 7 of the WTDC-94 (World Telecommunication Development Conference) which makes specific reference to the usefulness of the Amateur Service in disaster relief.

Region 1 Chairman, PA0LOU, and Vice-Chairman, SP5FM, recently attended a meeting of the fourth CEPT (Conference Europeenne des administrations des Postes et Telecommunications) Radio Conference which was held in Prague from 21 to 23 November. Several items of vital amateur radio interest were discussed and IARU took part in these discussions. As well as representatives from the CEPT countries there were also delegates from important non-CEPT administrations including Canada, South Africa, and the United States.

There were two amateur stations operating in the conference hotel - OL9ERO and OL9ER, and a meeting of the newly formed ERO (European Radiocommunications Office) amateur radio club was held.

At the 1994 IARU Region 3 Conference: 9V1RH talking to JR1ANP, with JA1AN (President JARL) on the right.

Finally a course in Amateur Radio Administration was presented in Maseru, Lesotho, during the week beginning 14 November, by Dick Baldwin, W1RU, assisted by Tafa Diop, 6W1KI. Participants included the official who is writing new amateur regulations in Lesotho and this proved helpful.

Thanks to the STARS programme there are now four or five indigenous licensees - although at present they do not have any equipment.

A meeting of Region 1 HF and VHF/UHF/SHF managers is scheduled to take place in late February. This is an opportunity for member societies to deal with urgent matters which cannot really wait for the 1996 Conference. If items are approved then they are considered by the Region 1 Executive Committee and can be approved temporarily while awaiting ratification (or otherwise) in 1996. More about this in *RadCom* at a later date. ♦

Contest Exchange

ANDY COOK, G4PIQ
Fishers Farm, Colchester Road,
Tendring, Essex, CO16 9AA.
G4PIQ @ GB7MXM.#36.GBR.EU

I HAD PLANNED ON filling in some of the quiet period between Christmas and New Year with the VHF Christmas Fun contests, but like many people I succumbed to a fairly vicious cold which meant that extensive talking really wasn't going to be on the agenda. However, it did set me wondering if perhaps a little gentle biological warfare should be in the successful contesters armoury - now, if you could just ensure that your main opposition could be relied upon to go down with the flu just before the contest . . .

TACO

NO - THIS HAS nothing to do with Mexican food, but actually stands for Totally Automated Computer Operation, a name given by WU1F to a system he developed and ran during the 1994 CW legs of the ARRL 10m contest and CQWW.

Having written much of last month's column on the state of automated contesting, I was amused to read a posting on the Internet contest reflector from WU1F about this system which he used to make about 100 contacts in each contest. The machine apparently searched for stations automatically and made QSOs with those who WU1F asked it to work. It looks like it needed fairly good signals to work properly and no doubt has some way to go until its fully developed, but it does show how things are proceeding in this field.

INTERNET AND CONTESTING

JUST SO AS TO BE in keeping with every other current publication *[including RadCom - see page 38 - Ed]*. I guess I had better mention the Information Super-Hype-Way or the Internet! There is a very active discussion group on the Internet on contesting - albeit with something of an American flavour *[flavor?]*. It covers a whole variety of topics including new rules, antennas, amplifiers, rigs, operating techniques and rumours of scores in recent contests. If you send a message to cq-contest-request@tgv.com with just the word subscribe in the body of the message you'll be joined onto the reflector mailing list and will receive a set of instructions. Thereafter, any mail which is sent to the main cq-contest address is also copied out to you and the many hundreds of other subscribers to the list.

You don't need full Internet access for this service - just the ability to send and receive mail through the network. There is just one thing to beware of - it generates an awful lot of mail - typically several tens of messages a day - so watch out if you are on a system where you have to pay per message read! There are also a number of other similar reflectors, including one for the CT software package.

It's interesting to see how some other societies are taking to the new technology with great fervour. The ARRL have accepted contest entries by Internet for several years, and now the Japanese JIDX contest takes receiving the entries by Internet in its stride and is asking for electronic copies of photographs to be submitted via the Internet to them! If anyone cares to send me anything suitable for this column by that route I'll be quite happy to try and deal with it!

VHF CONTEST COMMITTEE

GETTING THE LOGS to the right address for contests has always been something of a headache, usually meaning that you have to go back and look at the rules yet again to dig out who was adjudicator for that particular event. The VHFCC have now made this a little easier for VHF contests - all logs for VHF events can now be sent to PO Box 29, Bridgend, CF35 5YA, and for this year of course it doesn't matter if you send the logs to this central address or to the published adjudicator.

Don't forget that it is the RSGB VHF Convention at Sandown Park on 19 February. Not only will there be a set of short talks on some aspects of modern contesting, but the bi-annual rotten tomato session has been turned into an annual event and there will be a contest forum session for you to discuss issues which are important to you both although there will also be plenty of opportunity to cover most things by catching the committee members at their stand during the rest of the day.

CQWW MULTI-MULTI

YOU MAY HAVE SEEN the photograph of the *CQ*WW SSB multi-multi set-up at G0KPW in the January '95 *RadCom* and you may also have been able to guess that this scale of event would generate a few little hiccups over the contest. I just thought I'd just pass on one or two tips on how not to do it!

When the generator arrives, do think about where you are going to put it - the ideal place is not where the 20m aerials will be when the tower is luffed over to replace a broken rotator shortly before dusk on Friday night! Do test your antennas in the wet, even if you can't see the slightest way in which the rain could affect them - wires stretched along fibreglass poles get quite a lot electrically longer when they get wet, and big 40m beams become big dummy loads.

Don't put your beverage antennas where the farmer can drive over them in his Land-Rover. If you have one operator who has a little more talk power than everyone else - perhaps they can fully drive the 15m rig from 15 feet away when they are on 10m - do make sure you have some enclosed headphones handy as well as the more comfortable open variety!

And finally - if you do expect to sort out the various problems mainly before the start of the contest - or at least before that band gets active (dawn - a whole extra 6 hours!) - make sure that you're not expecting to get more than a couple of hours sleep a night for the whole week before the event, certainly none during the final night before, and that everyone else knows just to ignore you when you're screaming and shouting at either the equipment or them!

ARRL CONTESTS

ONE OF THE fun bits of contesting in February (CW) and early March (Phone) are the ARRL DX Contests. I've recommended these before, but I think it's worth talking about them again because they are not as well supported from the UK as they should be. The basic philosophy of the events is that the rest of the world works the USA and Canada on the main 6 HF bands.

This may sound a little monotonous, but it isn't at all - the US states and Canadian provinces on each band are the multipliers, so there are plenty there to look for, and North America always

You don't need a tent to go portable as this 1951 picture shows.

generates big QSO volumes and some nice easy pile ups to practise your technique on, this time without having to feel guilty that perhaps you should be off looking for multipliers elsewhere! Although more metal is always helpful, these are events where it isn't absolutely essential to have a big antenna system to be fairly effective. Last year I spent a few hours in the SSB event on 15m running stations at about 150/hour using just a 160m dipole and getting some very good reports - at least until I finally melted the coil in the ATU - moral: don't use a 200W ATU into a very high SWR and expect it to handle 400W just because the capacitors aren't flashing over; if there aren't too many volts around, there must be too many amps! The limited geographical coverage also means that you don't have to worry about having to be able to rotate the antenna and I'm sure this opens up some options for fixed wire arrays like V-beams, collinears, etc.

But the best is yet to come - the fact that you're only worried about working North America means you have a nice natural break in the operating between the low bands closing after dawn, and the high bands opening around lunchtime! There are several sections for single operators, both assisted (with cluster / external spotters) and unassisted (single or all band) and QRP (5W, all band), and for multi-operators (one transmitter, two transmitters, or unlimited (one per band)). The multi-operator sections are great for clubs - if you want to involve more of your members, it's not too difficult to get two stations on the air and run two bands at once in the 'Multi-2' section. ♦

SWL NEWS

BOB TREACHER BRS 32525
93 Elibank Road, Eltham, London SE9 1QJ

DENNIS, GW6JNE HAS updated the listener situation of this very popular Award program. Twenty-seven listeners claimed the HAB Lifeboat Award and over £1,000 was raised towards helping the RNLI acquire a further Lifeboat. The cheque will be passed to the RNLI at the 1995 WAB/HAB AGM at Drayton Manor. The Group is anxious to receive comments from listeners about the success of the Lifeboat weekend, together with any ideas on how a further Lifeboat activity period might be improved from a listeners viewpoint.

NEWS AND VIEWS

GRAEME Caselton, RS44984, sent an RTTY log, mainly taken from the *CQ* contest in September. RTTY is via a dedicated BBC-B micro and a PK-232 decoder, fed from a TS-130V and a 5-band vertical. Although his receiver is equipped with a narrow SSB filter and IF shift, a good adjustable audio filter is needed. Graeme would like to know if any reader can recommend a good design suitable for home construction. If anyone can help, drop me a line. I will pass the details on to Graeme.

Mick Toms, BRS31976, has responded to the many helpful comments readers offered to help him in converting a Spectrum program to a PC due to the lack of an ARC Cosine function in Microsoft QBASIC. He commented that the easiest solution was the one he should have known and that it showed how much of the trigonometry they tried to teach him at school he had forgotten! Between business trips to W2, Mick is trying to get his contest program written, but it is a slow process. Mick asked that I thank, on his behalf, those that had taken the time to write to me with the various solutions.

NEWS FROM AUSTRIA

BEFORE MY OCTOBER Challenge, Helmut and Roland Dlabac, OEs 527 and 533, wrote with information about SWLing in Austria. They belong to the ADXB DX Club in Vienna. They are the only SWLs in the Club and knew of no other Austrian SWLs (although two other logs have been received from OE). They have 220 DXCC countries heard with 199 confirmed. They seem to have a well equipped shack with the main receiver being an Icom IC-R71D. They have a useful 'Antenna farm' too, plus other ancillary equipment and a Commodore Amiga 500 computer which is used for Packet, AMTOR, FAX and RTTY. If any British SWL would like to further this approach, their address is simply PO Box 60,A-1025 Vienna.

INTERPRODUCTS BOOKS

THIS COMPANY KEEPS me up-to-date with new radio books. Their latest offering has two books which may be of interest to listeners who either use a scanner receiver or who use their receiver with a computer. Scanner users may be interested to know that *The UK Scanning Directory* which lists over 20,000 spot frequencies and covers 25MHz to the GHz bands is available at a cost of £18.50 including postage and packing. They also stock *Computerised Radio Monitoring* which explains how to use radios with computers, develops computerised monitoring strategies, covers databases, and reviews suitable radios and terminals. This costs £19.50 including postage and packing. The company also market an *Audio Guide to the Sounds of Shortwave* which contains over 30 of the most commonly heard transmission sounds on the short wave bands, including RTTY, CW, SITOR, FAX, etc which aid new listeners to identify and decode transmissions. This costs £4.95 including postage and packing. If any listener is interested in these, or any of their vast range of books, their address is: Interproducts, 8 Abbot Street, Perth, PH2 0EB.

SWL CONTEST ACTIVITY

APART FROM MY SWL Challenge, the White Rose, the IOTA and the RSGB SWL contests, listener participation remains poor. Following a discussion with Chris, G3SJJ, Chairman of the HF Contests Committee, it has been decided to withdraw the SWL sections of the Society's many CW contests. Instead, an SWL section will be added to the SSB sections of the 'Club Calls' and 'AFS' contests. More SWL SSB contests could follow - HF NFD, for example - but as HF conditions will be poor for the 1995 event this change will not take place for a while.

The decision to shift the emphasis to SSB contests has been taken (rather belatedly in my view) because there are no listener entries to Society CW contests nowadays. This decision should not, therefore, upset any SWLs, but it is hoped that catering more for the SSB listener will lead to an increase in entries. I have asked in the past for feedback as to why SWLs do not enter Society contests, but response has always been poor. However, I shall try again. Please write and let me know why *you* do not enter RSGB contests. I will pass all the letters to G3SJJ for his analysis. If enough of you write, there is a much greater chance of change.

John, BRS94761 in his Plymouth shack. Some interesting QSLs can be seen - HF0POL, VK9NS, 5Z4IOTA, 3Y0PI, BV9P, XF4CI and 9M0S.

DX NEWS

EARLY DECEMBER DID NOT disappoint LF types. Some good DX was reported. 7, 3.5 and 1.8MHz all saw interesting DX. Starting at 1.8MHz, several good Stateside openings occurred on SSB around midnight GMT.

Perhaps the best was the early hours of 10 December when stations in the W5, W8 and VE3 call areas were heard. Earlier in the evening, JW0C was heard as a welcome new one to some SWLs - including me. At sunrise, David Whitaker heard one W7, while Robert Small bagged PY0FF on Fernando de Noronha. Listening to inter-European QSOs on the band, it was clear that those using CW fared even better. BV, 4U1UN, 9G and 9K were all worked.

At the top end of Eighty metres, the Europeans seem even louder this season. Good DX was reported, perhaps the best DX being T5AR, at 0100 on 4 December. However, there were reports of VK9NS at 1815, DU9RG at 2200 and 9M8DB at 2250. The grey-line path to the West Coast of the USA was also available at our sunset. Indeed, I heard N7UA at 1540 on 11 December. There were many reports of strong JA signals at various times ranging from 1520, 1820, 2110 and 2240, while VKs were reported from 1920. Good DX is expected to be reported around our sunset next month. At sunrise, I was in bed but my reporters suggested that W6 and W7 signals were the best for many years and signals from VK and ZL were also stronger than in recent years. All this suggests a good winter season on the low bands.

7MHz, was disappointing with little really good DX heard. The exception being Robert Small's logging of FR5ZU/G from Glorieuses Is. Indeed, as I put pen to paper very late on 17 December, the best DX on the band is an SV5. My impressions of this band over the years lend weight to the theory that the band is at its best in late January and February. Only time and a lot of listening will show if I'm correct.

The higher bands have been very poor with little outstanding DX reported and hardly anything of note at all on 24 and 28MHz.

Cards for the C56 DXpedition should be available at about the time you read this, so if you need a card for the Gambia on any band and heard C56DX or C56/G0MRF in late October/early November (or if you just want another coloured DXpedition card to add to your collection) send me your card and return postage (or send it to me via the bureau) and I will respond as quickly as I can.

DEADLINES

THE NEXT DEADLINES that you should note are 10 February and 17 March. ♦

NOVICE NEWS

MRS ESDE TYLER, G0AEC
43 Nest Est, Mytholmroyd, Hebden Bridge, W Yorks, HX7 5BH

TETNEY COUNTY PRIMARY SCHOOL is active on the air each Tuesday and Thursday using the school callsign, GX0PHA. Paul, G0NUE, has four youngsters at a time and, using SSB, they speak clearly and confidently to any amateur who has the time to spare to have a word or two. The childrens' interest in radio has spilled over into the rest of the curriculum - British geography and distances to contacts, with letter writing to contacts as an added skill to name just a few.

It must be a time consuming exercise as the groups of four children are allowed to use the mic only after preliminary work is covered. What radio entails, how to speak clearly and concisely, how to respond to the amateur at the other end, how to make and complete a QSL card, and how to log and record where each contact is. Recently, Paul and GX0PHA have moved into the field of packet radio using GX0PHA @ GB7GBY because Paul has found that by doing so, children can be working in the classroom preparing a message which can be fine honed and sent in minimum time giving the children more opportunities. Now operating time is divided each day with SSB from 1500 to 1600 with packet for another half hour - all messages being prepared and ready to send by 1600

So it was hardly surprising that a brief conversation with Paul produced the following thought. How many schools do this or would like to forge permanent links with other similar minded schools?

There is a list of schools affiliated to STELAR (Science and Technology Links through Amateur Radio). There is a list of schools known to have been interested in Kidlink in the past. There are schools where the resident amateur can not operate an HF station but could perhaps operate a VHF packet station - indeed I had a phone call on just this subject. If there are those willing to go into a school and start a packet station - was there a list of other schools interested in this?

There isn't - yet - but it could be arranged. If you work in a school and use packet radio now, please let me know - giving your BBS. If you would like to involve your school, let me add you to the list. If you are willing to go into your local school for this purpose, approach someone, set up the idea and then give me details. I promise to send details to everyone who sends them to me. A network of schools on packet radio sounds an excellent idea to me - think of the information you can compare!

MORSE TUITION

THERE I WAS, FINGERS POISED, ready to write this column, when I foolishly gave in to temptation.

Derek Brandon, G4UXD, sent me a copy of his Morse tuition program some time ago and asked me what I thought. If you read *Novice News*, February 1994, you will find what I wrote then. I have played with the program since, when time permitted and still stand by what I wrote then.

However, there on my doormat was a new, up-dated version - and a challenge to play with this one. I'll do it when I have written this column, I thought. Which brings us back to the first line.

A computer, of course, is spot-on for accurate timing and perfection of characters - which the friendly radio club member may not be. I am not decrying the friendly cub member - his/her help is invaluable, especially when the human touch is needed - not many computers supply that.

One thing the friendly amateur can do is send a letter for the student to copy - so does this program now! In fact it does it with some often wrongly/badly-sent five letter words. It tells you if you are wrong and lets you try again!

There are over 125 simulated tests in the new format, and the option to add more. It includes Q-codes, common abbreviations, procedures, punctuation, callsigns and many other features.

Whilst playing, I discovered that I still have that basic fault. Anticipating the rest of the word from the shape of the beginning. This is a legacy from teaching reading, being conscious of formations of clusters of letters within words. With this program, this is absolutely impossible - take my word for it! A conventional word begins - apparently - but does not end as expected. All perfectly good words but not predictable.

For those amateurs who spend valuable time preparing mock tests for learners, help is at hand too. The program can tell you how long tests 'prepared earlier' will take to run - whether at Novice or full speed - or any speed come to that. It will count the character frequency for you within the passage, showing instantly which - if any - characters are missing. For busy Morse teachers, these facilities must be time-saving. All the receiving tests last the correct length of time and each one contains each of the 26 letters and all numbers at least once.

Are you ready to practice sending? Full instructions on attaching a key are included - and if a computer accepts your Morse, it must be pretty good. Again, you can include punctuation marks, procedural abbreviations etc.

Now the commercial details. The disk is for IBM and IBM clones. The price is £9.99 from the author: Derek Brandon G4UXD, 1 Woodlands Road, Saltney, Chester CH4 8LB. For this you get a personalized version which will give hours of fun to even the least dedicated Morse user. Derek has worked out that his efforts so far have paid him the princely sum of 1p per hour which tells you the scope of the finished product.

KIDLINK 94

I MENTIONED THE LACK of stations heard for this event a few months ago - and have heard nothing more concerning others.

Scarborough College was one of the two stations I contacted - as I reported after the event. I mentioned that one of the youngsters I spoke to was Chris - who was eagerly awaiting the NRAE results to see if he was successful. I am pleased to report that he was, and now holds the callsign 2E1DLP. Chris's brother may be on the next training course which was due to start in the early days of this term.

The College is the home of the Royal Signals Scarborough Amateur Radio Club who do a great deal of work leading youngsters into all aspects of amateur radio. Peter, G3LCG, is always on hand when the Club station is on the air leading the students in their contacts with others. At this point I must add that it must be due to his expert guidance that all of the youngsters I have spoken to - including their Novices - have shown perfect manners on the air and observed the exact rules of correct procedure. I wish I could say that for all experienced amateurs.

The four current Novices were busy with Peter in the RSGB Club Contest on 1.8MHz in November. Apart from contacting 25 Club stations, the Novices gained valuable hands-on experience.

Future plans include a lunch-time activity on Mondays between 12.30 and 1.30. This will be supervised by Geoff, G4ZGF, and although there will be SSB activity on 80m, Morse will not be forgotten. If you listen to the STELAR net on Wednesdays on you will hear GX0RCS there too. Later in the year, there are other plans. For VE Day in May and during June and July the Royal Corps of Signals celebrates its 75th Anniversary. Those Scarborough Novices have quite a busy life!

The photograph shows Chris, 2E1DLP, (left); Lt Col Keith Rowe, Commandant, Scarborough College; Peter, G3LCG; and Nick, 2E1DKA, in the G0RCS shack.

[redacted]

IN NOVEMBER, I APPEALED for instruction help for a group of school children - and their teacher. The phone number I gave was the school number and I do know that some people tried to offer help - and got no reply. They had naturally assumed that this was Sue's home number and that evenings were the likeliest time to catch a busy teacher. Fortunately, the matter is now resolved and a course was due to start on 10 January, with David, G4VCO, in charge.

Not one to do things by halves, Sue decided that a special event station would be a good introduction and demonstration of the hobby and could help the Children in Need Appeal. A station was set up at the school by Hoddesden Radio Club and £110.03 was raised for Pudsey Bear. Well done, Sue. ♦

QSL

JOHN HALL, G3KVA
Corfe Lodge, Ipswich Road, Long Stratton, Norfolk NR15 2TA.

ONE OF THE OVER-WORKED Special Event QSL Sub Managers has written to plead once again for return envelopes to be sent direct to the Sub Managers and *not* to Headquarters. Some bright spark did just that recently and by the time they had been forwarded to the Sub Manager in the next consignment of cards from Headquarters a large number of cards were on the brink of being destroyed by the Sub Manager as uncollected.

Another Sub Manager told me the other day that he had received a complaint from one of his 'customers' to the effect that he hadn't received any cards for 18 months. On looking into the matter the Sub Manager discovered he had no envelopes for that member! Words fail me!

FORMER USSR

EY8MM WROTE ME to say that the Tajikistan QSL Bureau is located at PO Box 303, Dushanbe, Glavpochtamt 734025, Tajikistan.

I am afraid the amateur radio situation in Russia is far from clear at the moment. Prior to the break up, the Krenkel Central Radio Club (KCRC) reigned supreme.

However, the Union of Radio Amateurs of Russia (SRR) was the organisation that submitted the only claim for IARU membership. The application was accepted by IARU so the situation at time of going to press is that SRR are the voice of amateur radio in Russia with their own QSL Bureau. However, my understanding is that the KCRC dispute this and insist that PO Box 88 is still the 'official' bureau. I am not quite sure where we should send the cards now!

Since writing the above, I received another letter from Alex, RK3DT, about the situation in Russia. Things are a little 'tacky' out there amateur radiowise although Alex says PO Box 49 is working well. The postal charges are horrendous and have gone up twice since 1 December. He says to forget about PO Box 88 but I have no doubt that remark will cause a furore! (A member rang me the other day to say he had received a card from a Russian ham asking for cards to be sent to PO Box 301. I must confess that's a new one on me). Alex tells me that I ruffled a few feathers by describing Vera Sviridova (the lady in charge at PO Box 88) as 'legendary'. That word was taken by some as meaning it was time she retired! I apologise for that. What I meant by legendary was famous.

The official international QSL Bureau address list is now available from Headquarters. It's invaluable for those that wish to send a card direct to any overseas bureau and was produced after I had received a number of requests. Not only does it give all the IARU bureaux but lists a number of unofficial ones as well.

RSGB HQ QSL Bureau, PO Box 1773, Potters Bar, Herts EN6 3EP, England.

John Bautista, ZB2EO, sent me this QSL card which bears the special prefix used during the period 2 September 1994 to 12 September 1994 to commemorate Gibraltar's National Day.

DUTCH BUREAU

CONTINUING THE 'QSL bureaux of the world' series, the Dutch national bureau is situated at Arnhem and I am grateful to Fv d Kraan for telling me all about it. The bureau handles about 1,000,000 cards per year utilising a staff of seven working a mixture of part time and full time. Most of the staff are disabled.

For QSL purposes The Netherlands is divided into 50 regions with each region having a QSL sub-manager who receives a parcel of cards from the central bureau in Arnhem every six weeks.

The biggest problem for the Dutch QSL bureau is finding somewhere to send cards destined for countries with no QSL bureau. This is a recurring message from all national bureaux and underlines the necessity for cards to bear explicit 'routeing' information on them. It really does help your cards get to the right place if a route is marked clearly on the card. The bureaux have more than enough to do without trying to play Poirot!

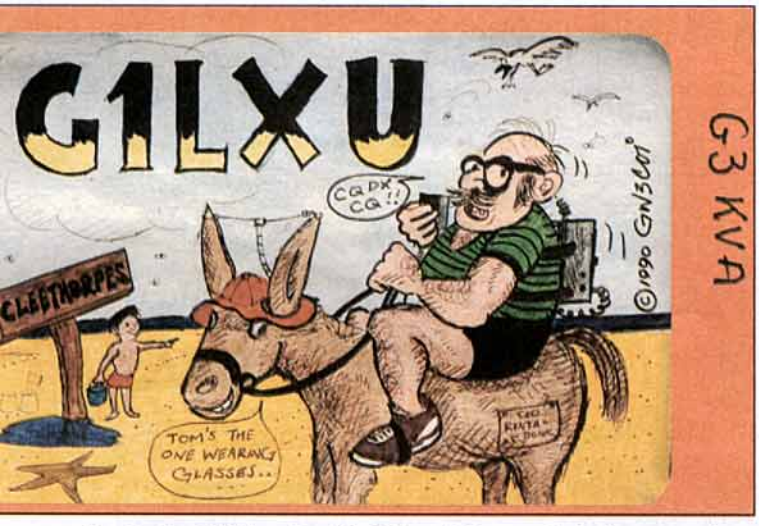
STRANGE BUT TRUE

DERYCK BUCKLEY, G3VLX, who is the G4R series Sub Manager sent me four G4R cards he recently had for return to their originators. I have no idea where they have been for 11 years because they are all for contacts with 3V8 in 1983! What is strange is that none of the G4s concerned have envelopes with Deryck despite one card being marked "my first QSO with Africa!" It's difficult to understand how any of them expected to get a confirmation via the Bureau. One of the cards, for a 20 metre QSO, shows a report of 59 + 20dB! With Tunisia being one of the five rarest calls on earth I wonder why the words 'pigs and fly' spring to my mind?

'Jakey' Gould, G3JKY, tells me a strange story. He sent an International Reply Coupon to an address in Hong Kong in order to obtain a QSL card for a contact he had made. Back came his self addressed envelope with the IRC firmly glued to the outside of the envelope instead of a stamp! Never heard of that one before.

HISTORY

DOUGLAS BYRNE, G3KPO, sent me his card which pinpoints the place where Marconi conducted his early experiments. The rest, as they say, is history. Douglas is also involved with the National Wireless Museum at Arreton Manor on the Isle of Wight. He would dearly like to have information on any experimenters on 400 metres before the first World War. Can anyone help? If so write direct to Douglas or to me and I will pass it on. ♦

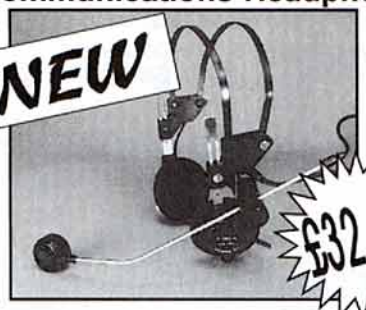


Tom Burke, G1LXU, sent me this QSL card. Tom says he had a cartoon drawn for him by GW3COI which he then coloured himself. He took it to Studio 7 in Lincoln and they produced a series of 'sticky back' photos for much less than a full colour printing job. He had a rubber stamp made for the details on the reverse side. A totally unique card.

QSL cards from G3KPO (see text).

Everything For The Amateur

Communications Headphones



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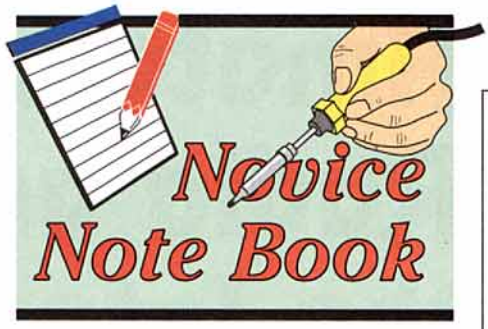
Shop and Mail Order; 22, Main Rd., Hockley, Essex. SS5 4QS Tel: (01702) 206835 Fax: 205843

VISA Branch Shop: 12, North Street, Hornchurch, Essex. RM11 1QX Tel: 01708 444765 ACCESS

MAIL ORDER To Hockley - 24 Hour Answerphone and Fax. Open 6 Days 9am - 5.30pm



IAN KEYSER, G3ROO
Rosemount, Church Whitfield, Dover, Kent CT16 3HZ

WINDOW CLAMP ANTENNA MOUNT

USING A UHF HANDHELD in a car is not very effective. To get any sort of result at all the rig has to be held against the window to reduce the considerable attenuation of the signal.

Fixing an external antenna mount is the answer. You could drill a hole in the car roof and fix the antenna mount directly to the roof. However, this would not do much for the resale value of the car!

You could use a gutter mount. Unfortunately most modern cars do not have gutters. Another way of solving the problem is to use a magnetic mount but it is easy to cause scratches to the paintwork of the roof of the car with such a fitting.

This months project is a car window mount for a 430MHz antenna which overcomes all of the problems described above. It comprises a clip BNC antenna mount that is fixed to the window of the car. The rubber duck antenna can be removed from the handheld and plugged into the window mount when the rig is used mobile.

When the window is closed the mount is held securely in position as shown in the photo.

A clamp is constructed from a piece of thin aluminium as shown in **Fig 1(b)**. It is bent, as shown in **Fig 1(a)** to slide over the top of the window glass. The BNC socket is mounted on the plate and a suitable length of coax soldered to the socket and led in through the door seal to the handheld.

The only disadvantage of the window antenna mount is that the vertical element does not have a counterpoise. The antenna will work but it has to rely on the coax feed itself or the proximity of the car roof to provide a counterpoise or ground plane. The effectiveness of the matching of the antenna to the feeder can vary considerably from one installation to another when the antenna is used without a counterpoise. If the SWR on the coax is high then the power output of the set will be reduced.

This problem was overcome by adding a couple of radials which formed an efficient counterpoise. These radials comprise 170mm of thin insulated wire, the ends of which are passed through the two 1.5mm holes and soldered to the BNC socket.

When the antenna mount is fixed to the window the two radials are taped to the glass using Scotch glazing tape (used to join exterior corrugated plastic roofing sheeting). This tape is waterproof and lasts for years in the open... Amazing stuff indeed!

HINT OF THE MONTH

IF YOU USE AN END-FED long-wire or inverted-L antenna, a radial or counterpoise can dramatically increase the efficiency of the antenna system. It will also reduce 'RF in the shack' problem. This can manifest itself as an unstable transmitter, distorted audio on transmit or even burns to the hands when the gear is touched!

This is most common, but by no means exclusively so, when the shack is in an upstairs or attic room away from a good earthing system.

If the problem is on a single band cut a quarter wave length of insulated instrument wire and connect one end to the wing nut usually found on the back of transceivers for earthing purposes. The other end is lead out to the window and attached, via an insulator, to a suitable fence or tree. The height of the radial end is unimportant.

If the problem occurs on more than one band add radials commencing with the lowest frequency band and then add others as found necessary. A radial will also work on three times its quarter wave length.

Please let me have your ideas or requirements, this column will be so much enhanced if we are passing on your ideas.

I am now on Packet and can be reached on G3ROO@GB7YUH ♦

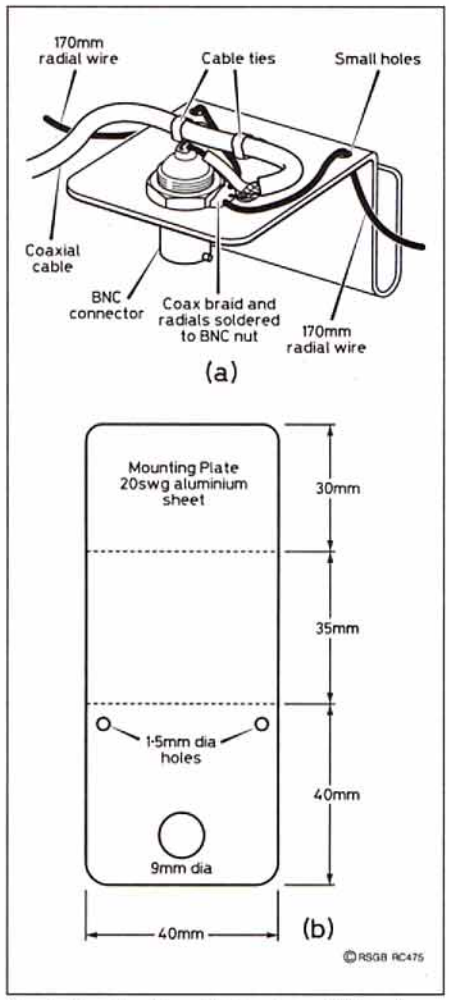
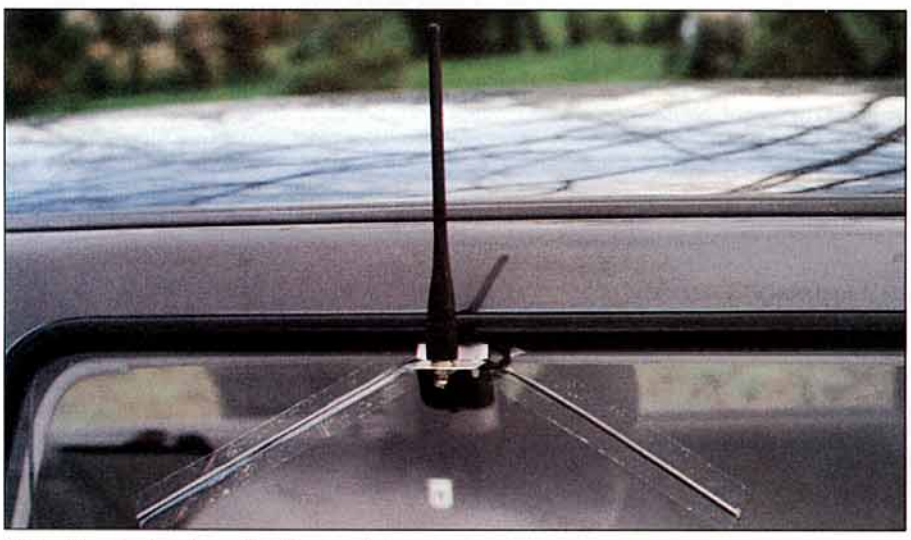


Fig 1: Construction details of the UHF antenna mount.



UHF, rubber duck, antenna fixed to car window mount.

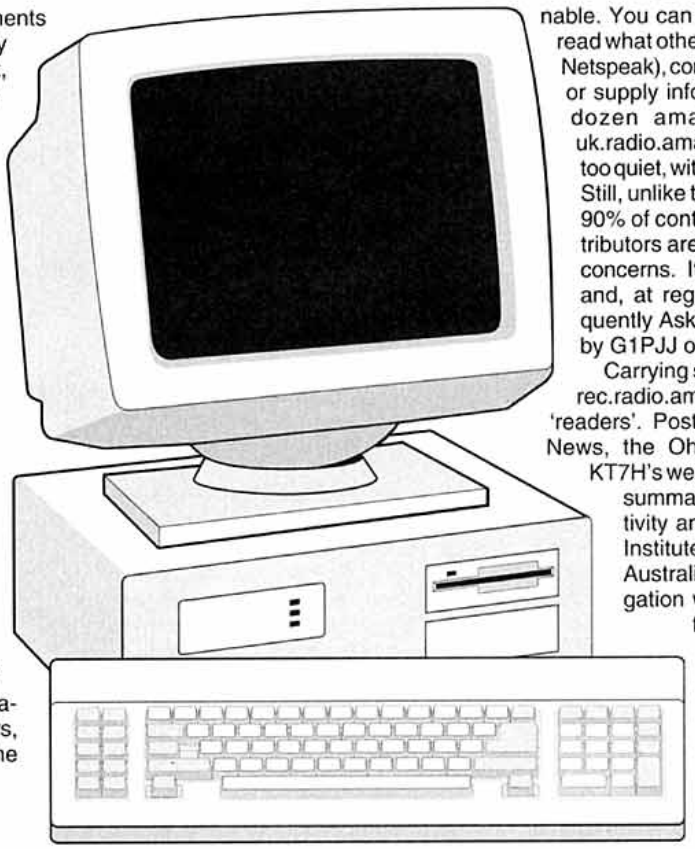
RADCOM TECHNICAL FEATURE

Amateur Radio and the Internet

by Prof Martin Harrison, G3USF*

EVEN THE BEST developments can drown in hype. That may be the danger for the Internet, which has been both uncritically oversold by enthusiasts and tainted by sensational media coverage of its exotic periphery. Yet behind all that gee-whizzery and the shock-horror accounts lie important developments, not least for amateur radio. But just what *is* in it for us? This article addresses that very reasonable question for those wondering whether to take the plunge.

The Internet is a network of computer networks intercommunicating by a common TCP/IP protocol. Nobody really knows how many users are connected. Most accounts suggest 20 - 30 million (including about 150,000 in the UK) in at least 125 countries, with connections growing at something like 10% per month. As with amateur radio, the great majority of users are in the richer and more industrialised countries - the US alone has over 60% of connections. Several thousand radio amateurs world-wide are known to be users, though G 'Netters' seem to be only in the low hundreds.



WHAT DOES IT COST?

WHAT INTERNET WILL cost depends very much on individual circumstances. Anyone in higher education or a research establishment probably enjoys free interconnectivity through the Joint Academic Network (JANET). JANET subscriptions are (for the moment) on a flat rate basis, so no significant additional costs fall on employers. Most are unlikely to object to your exploring the Net as long as you do it in your time, not theirs.

In companies with volume based subscriptions through commercial providers the issues will be similar to those governing using the phone for private calls. If you are not in the lucky minority, then you must subscribe through a provider like demon or CompuServe. That means getting into real money (see box).

On top of the start-up costs, subscription and time charges are unlikely to be less than £150 - 200 per year - and could be considerably more if you really get hooked. For most of us they will be significant enough to require serious thought whether, maybe in combination with other professional or leisure interests, there is enough on the Net to warrant such an outlay.

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WHAT CAN IT DO?

ONE OF THE MOST USEFUL Net facilities is e-mail. Most of us naturally prefer communicating by radio. Nevertheless, e-mail is faster and more reliable than packet radio over long distances and cheaper than post, phone or fax. During solar minimum, when long-haul HF is more problematic, e-mail is a useful fallback when propagation will not stretch to VK or W7 - if your friends are on-line, of course. Among those you can reach are *RadCom's* QRP and VHF columnists, G3RJV (g3rjv@gqrp.demon.uk) and G3FPK - 70630.603@compuserve.com. But not, as yet, HQ *[A new HQ computer system is currently being commissioned and must be working satisfactorily before add-ons such as e-mail are considered - Ed].*

The Net's best known feature is its newsgroups (bulletin boards). Over three thousand of them cover almost every topic imaginable. You can choose whether you simply read what others are posting (be a 'lurker' in Netspeak), contribute to discussions or seek or supply information. There are about a dozen amateur radio groups. The uk.radio.amateur group is relatively quiet, too quiet, with maybe fifty postings weekly. Still, unlike the other radio groups, where 90% of contributors are Ws or VEs, contributors are almost all Gs, addressing G concerns. It carries the *GB2RS* script and, at regular intervals, a useful Frequently Asked Questions (FAQ) briefing by G1PJJ on amateur radio in the UK.

Carrying some 250 messages weekly, rec.radio.amateur.misc has over 100,000 'readers'. Postings include the ARRL DX News, the Ohio/Penn DX Club bulletin, KT7H's weekly propagation report, daily summaries of Solar-Geophysical Activity and the Daily Report from the Institute of Propagation Studies in Australia. this contains useful propagation warnings and short-term HF forecasts. The VK2WI weekly news covers ructions in our sister society down under with a colourful candour quite unlike the staider prose of *GB2RS*. Info-Hams Digest offers timely coverage from a West Coast perspective. There are abstracts from *QST*, orbital data, SAREX postings, KB2BD's Space News, YouthNews and ANARTS (RTTY) News. It is a good place for seeking information - though much of it is already available on packet. Despite its US bias anyone with broad hobby interests will usually pick up some interesting comment or fact.

Rec.radio.amateur.policy is also busy but its preoccupation with US licensing issues, notably wrangling about the code qualification, limits its UK interest. Rec.radio.info carries only factual postings, often duplicating 'misc', plus periodic listings of amateurs on Usenet with their Internet e-mail addresses, amateur radio newsline, the GB2ATG report and the daily summary of ionospheric data.

Other group titles speak for themselves: rec.radio.amateur.antenna, rec.radio.amateur.digital.misc, alt.radio.digital, rec.radio.amateur.equipment, rec.radio.amateur.homebrew and rec.radio.amateur.space. All carry contributions from entry to advanced levels and all are well patronised except alt.radio.digital, which appears to be in terminal decline. Rec.radio.shortwave, another very busy

READ ALL ABOUT IT

Pending top flight home-grown products the best guides are American.

Two of the best are Ed Krol, *The Whole Internet User's Guide and Catalog*, O'Reilly & Associates 2ed 1994 ISBN-1-56592-063-5, £18.50, and J R Levine and Carol Baroudi, *The Internet Guide for Dummies*, IDG Books 1993 ISBN 1-56884-024-1 L17.99.

Both are readily available in the UK

THE COST?

What will it cost assuming you already have an appropriate PC? (If uncertain check professionally before going further.)

(1) A fast modem - preferably V.42bis for text or V.34 or V.fast for graphics: £135 - £200. If you have a laptop or notebook this may incorporate an adequate modem.

(2) Setting-up charge of around £10 - 15.

(3) Subscription £8 - £12 monthly inc VAT.

(4) Line / time charges depending on usage and distance from the nearest node.

group, has much of interest to short-wave broadcast listeners. There are also groups for CB, pirate radio, scanners and European satellite broadcasting. (If subscribing through a commercial provider be sure to check it carries the groups you want).

. . . AND THERE'S MORE

BUT THERE IS MUCH MORE to the Net than newsgroups. The N6QMY Internet/Packet gateway provides direct access to the US packet network (e-mail to gateway-request@lbc.com with callsign, first name, last name, town, country and postcode all on separate lines). N0ARY (gateway_info@arasmith.com) operates on similar lines. Other US gateways seem to be available only to countries which allow third-party traffic. However limited facilities are available on several BBSs. Try telnet 44.48.0.22 (K9IU), 44.72.123.97 (WB9UUS), 44.135.88.3 (VE3RPI), 44.178.1.2 (RA3APW), 148.202.8.211 (XE1IX) or 128.183.105.17 (NASA). GB7GBR (packet) users can reportedly connect to WA2NDV-9 and be put on to an Internet connected TCP/IP platform - I have not tried this personally. A US DX cluster is supposedly accessible by e-mailing f6cnb@sugarland.ampr.org though recently this has not responded. Plenty of scope for development here.

Nevertheless, the DX community is well served. Information on QSL managers is available from qsl-info@aug3.augsburg.edu and, by now, G7OBS' facility (listserv@imcldn.demon.co.uk) should be fully operational ('subscribe qsl routes your callsign'). There is a DX mailing list at dx-request@unbc.edu with the message 'subscribe'. (Mailing lists accept e-mail at a central point and redistribute it to subscribers: despite the term 'subscribe' such lists are free). There is a contest list (cq-contest-request@tgv.com) and two VHF-UHF lists, one at vhf-request@w6yx.stanford.edu, the other at VHF-Request.Icon_Fonts @xeroxaffiliates.xerox.com. The UK TCP/IP Networking Group list (ukip-request@cs.nott.ac.uk) promotes the use of TCP/IP while QRP enthusiasts have their list (listserv@netcom.com with subscribe qrp-l as the message text). FT900 and FT1000 owners have theirs at 900-request@xyzoom.info.com, as have people interested in the DSP 2232 digital signal processing multi-mode data controller (dsp2232-request@rmi.de). AMSAT-related lists, KEPS, SAREX and AMSAT-BB are at listserv@amsat.org.

PROPAGATION

PROPAGATION AND SOLAR and geophysical information are widely available. In addition to sources already mentioned, daily and hourly forecasts are at http://canada.unbc.edu/radio/solar.daily and http://canada.unbc.edu/radio/solar.daily. Unix users can access solar bulletins at finger solar@xi.uleth.ca or finger daily at the same address. Finger aurora (ditto) has half-hourly updates on visual auroras in North America. The daily summary from Boulder and a vast volume of back data are available from the IGS in Edinburgh on telnet 192.171.143.1 (User GIFS, password GMINFO). They take a kindly view of amateurs but commercial users are charged.

Several sites archive hobby-related material, whether backfiles from the newsgroups, reference resources or freeware. A useful starting point for exploration is http://www.einet/galaxy.html. One of the most useful is run by Peter, G3UBX, reached by anonymous ftp to scitsc@wlv.ac.uk, changing to the directory /pub/hamradio. It contains, among much else, beacon lists, the UK amateur radio FAQ and the ARRL's library of informational files. Many of these are specifically for US consumption but DXCC information, propagation prediction programs, contest details and cover sheets are among items of wider interest. The University of Manchester RC runs an excellent facility at http://www.mcc.ac.uk/OtherPages/Amateur-Radio.html. This holds the US and G callbooks, with search facilities, and also links to other holdings, including G3UBX's. Rest-of-world listings, not currently on-line. GM4ANB recently started running an experimental e-mail server at rsgb@kirsta.demon.co.uk - best approached by e-mail with HELP or INDEX as the message text. The address notwithstanding, this is a personal not a Society initiative. Current and archive material can also be obtained by anonymous ftp at ftp.funet.fi in the directory /pub/dx or pub/ham (use your e-mail address as password). For general short-wave information try http://itre.uncecs.edu/radio/. Finally, the Shortwave/Radio Catalogue listed at EiNet (above) contains MUF and LUF programs, GOES 6.7 satellite plots updated every 15 minutes and for those with the necessary graphics, monthly maps of MUFs, albeit based on California and a welter of information on Shortwave broadcasting. You can find more with a WWW or gopher keyword search for hamradio and amateur radio.

HYPERSPACE IS VAST

THE INTERNET IS SO VAST you can never be sure you have tracked down everything. Others could doubtless add to the listings here; new materials spring up almost weekly. Whether this makes an attractive enough package remains a matter for individual judgement. Anyone with free access has only to take a look round to see whether it is worth their time.

For anyone who will be committing not inconsiderable sums the decision may be more difficult. They would be wise to try and spend a session with someone already on line before taking the plunge. For myself, a year on the Net has proved an enjoyable and interesting way of gleaning information, accessing remotely held data and exchanging ideas with amateurs with similar interests. On the other hand, some areas of the hobby are not as yet well covered, the patchy geographical spread can be frustrating and some of the material may duplicate what you already receive.

The Net may hook you - or turn you off. The Net can make you laugh and can make you think but it can also be irritating or boring. The tone of most amateur traffic is civilised but there are occasional boors or 'flamers'. It can be expensive - though costs are tending to fall. And while it undoubtedly has its limitations, the amount of material of amateur radio interest is rising all the time.

IT'S EASY

FINALLY, EXPLORING THE Net is not difficult for anyone with even the most modest computer experience. Most operations require only one or more standard commands like those listed above. However, since there is quite a range of Net tools it is all too easy initially to get bogged down in a mass of detail. Without a step-by-step guide at your elbow you can waste a lot of time. There are literally dozens of these around now, but their quality is variable. My favourite is Ed Krol's *The Whole Internet* (1994 edition £18.50) but I suggest you borrow or browse before buying to make sure you will be comfortable with it. Here and there you may find the Net not quite as user-friendly as it might be - but if a low-tech, wrinkly G3 can settle down and feel at home, be sure that you can too! ♦

BUYING FROM THE USA

HOW SAFE IS IT to buy equipment from abroad, especially the USA?

FAR BE IT FROM ME to enter into the Holy Wars about the prices of transceivers etc. in the UK compared with the USA and the Far East. All I'll say is that DIY importing is a matter of balancing cost savings against the risks of the equipment breaking down at an early stage of its life. The big Japanese manufacturers generally do not allow UK distributors to honour guarantees on equipment bought outside of the European Union, though *RadCom* advertisers will usually consider repairs at their normal out-of-guarantee rates.

If you tremble even to unscrew the covers of a transceiver, DIY importing of such complex pieces of equipment is not for you – regardless of any potential cost savings. On the other hand, if you feel competent to diagnose problems, order spares from abroad under guarantee and fit them yourself, the balance tips the other way.

Obviously there are other factors, including the size of the item and also the carriage and import charges. For example you might think twice about importing a beam or a tower, regardless of lower prices in the USA! But if it's something straightforward, relatively inexpensive and quite small, or something you simply cannot buy in this country, why not have a go?

Wherever you're buying from, the first requirement is a local magazine, and that of course favours the USA. *QST*, *CQ* and *73* are all available in the UK, and contain essentially the same ads from the major US distributors and manufacturers. The general distributors seem to stock almost everything you could imagine, though accessories and other small items are rarely featured in the big display ads. Therefore you have to telephone to ask about prices – writing isn't really feasible. Dealing direct with US manufacturers and software authors is easier because their products and prices are usually listed in the advertisements.

The advantage for us in telephoning the USA is that cheap-rate (well, less expensive) calls after 8pm are still in business hours over there; in California it may even be before lunchtime. Before you telephone, think how much money you're prepared to spend (in both £££ and US$) and have a credit card and calculator handy. Remember to insist on airmail carriage and to ask how much this will cost. Be very careful when giving your name and address, and have the operator read them back to you. TV and films have made us quite good at understanding American accents, but the reverse definitely does not apply!

Notice I said "credit card". This is the accepted way of paying in the USA, and it's also the only cost-effective way for this kind of purchase because the credit-card companies give better exchange rates than the banks, and they charge no commission. You also have some degree of protection if anything goes wrong, though this is quite unlikely in dealing with amateur radio suppliers in the USA. On the contrary, I've always found them refreshingly straightforward and helpful.

All credit cards are accepted without question, including cards such as RSGB and Access which do not exist in the USA. If the world-wide computer network that checks all credit card numbers says "Yes", that's good enough. Unlike the UK, the US credit card system allows delivery to a different address from that of the cardholder. This opens up interesting possibilities such as having goods mailed to a US amateur friend for checking and onward mailing, or ordering in advance of a personal visit. When deciding how much you're prepared to spend, remember that HM Customs & Excise are entitled to charge duty (about 10%) and then VAT on the total invoiced value *including carriage*. And when the Post Office collect this at your door, they too will charge for the privilege. If the goods can be sent by normal airmail and you specifically ask the US company to mark them "Components for Amateur Radio", then Customs may smile and look the other way – if so, consider this as a discount on the total price you were prepared to pay. By bringing amateur radio goods in personally with other purchases made abroad, you save on carriage but are more likely to be charged duty and VAT.

To sum up: DIY importing favours small, simple items like specialised rotator spares (see last month), a microphone insert (see above), semiconductors and specialised computer software. More costly and complex items such as transceivers are very much your own decision. Check carefully that you can make a real cost saving by importing – don't forget the price of the transatlantic phone call, the airmail and the possibility of duty and VAT. Finally, remember to have the operator read-back your address, and insist that they mark the parcel "Components for Amateur Radio".

IAN WHITE, G3SEK
52 Abingdon Road, Drayton, Abingdon, Oxon OX14 4HP – or @ GB7AVM

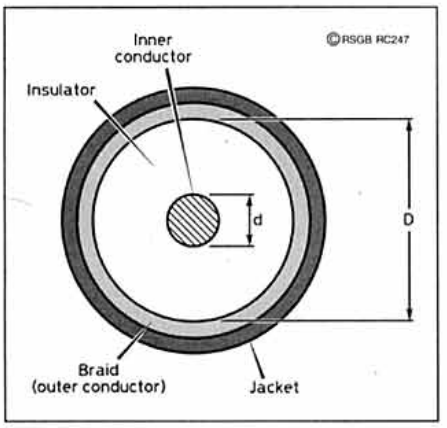

Fig 1: To determine the impedance of a coaxial cable, measure the diameters of the inner conductor (d) and the insulation (D).

FINDING COAX IMPEDANCE

I'VE ACQUIRED A LENGTH of unknown coaxial cable. How do I find its characteristic impedance?

THERE ARE SEVERAL METHODS. Apart from plain unbranded domestic coax, almost every other kind has its type number printed all along the outside. Your first stop should therefore be one of the large component catalogues, to see if it's listed in there. If so, full data will be included and your problem's solved. If you know the type of coax but can't find any details about it, a message on the packet BBS network or the DXcluster will quite likely produce the information you need. Another obvious pointer towards the impedance of the cable is the impedance of any attached connectors: if these are BNC or N, you can generally tell from a '50' or '75' in the type number.

If the coax is unmarked or totally obscure in origin, there are two possible routes. One is to measure its physical dimensions and the other is to test it electrically. To measure the physical dimensions you'll need a micrometer or similarly accurate vernier calipers – on normal-sized cables a ruler isn't accurate enough. Measure the outside diameter of the inner conductor (d in **Fig 1**) and also the outside diameter D of the insulating material, which is an easier way of measuring the inside diameter of the outer conductor. Also check the insulating material: is it solid polyethylene (translucent grey), PTFE (shiny white), a semi-airspaced structure or foam? Armed with this information, go back to the catalogues and see if anything matches the dimensions you've measured, and has the same insulating material. Failing that, calculate the ratio D/d and compare with the values shown in **Table 1**.

Cable impedances fall into a few well-defined groups, and the D/d ratios are sufficiently different that there's little risk of error in identifying which group a cable belongs to. You may not be able to distinguish between 70Ω and 75Ω for example, but that is rarely important. The values for foam and semi-airspaced coax depend on the internal construction, and are based on typical cables. Even so, you can make a pretty accurate guess, especially if you have some known cables to compare against. The values for 90/100Ω cable are given for reference only; 90/100Ω coax is mainly intended for nucleonic pulse applications, and even at surplus prices it's not a good buy for amateur radio.

	50Ω	70/75Ω	90/100Ω
Solid polyethylene	3.5	6.3	11
Solid PTFE	3.2	5.5	unlikely
Foam/semi-arspaced	2.1 approx	3.0 approx	4.1 approx

Table 1: D/d ratios for determining coax impedance (see Fig 1).

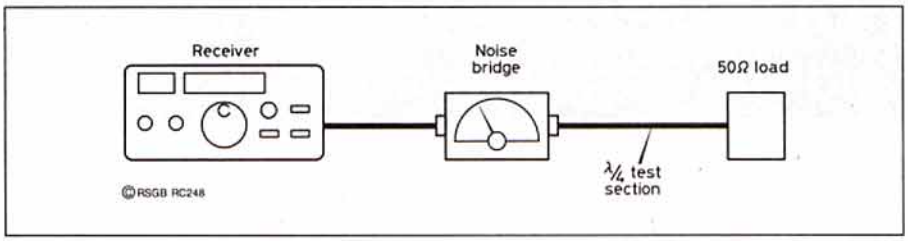

Fig 2: Using a noise bridge and a 50ohm load to estimate the impedance of a quarter-wavelength test section of coax.

Turning to electrical tests, one handy way for solid-dielectric cables is to measure the capacitance per unit length. One of life's little curiosities is that the capacitance per unit length is the same for all coaxial cables of the same impedance, regardless of the cable's size or dielectric material (provided that the dielectric is uniform, not foam or semi-airspaced). 50ohm cable is close to 100pF/m and 70/75ohm cable about 66pF/m.

If you have an RF noise bridge or any other kind of RF impedance bridge, you can quite easily test the impedance by seeing what a quarter-wavelength of cable does to the apparent impedance of a 50Ω test load (**Fig 2**). A quarter-wave section of cable produces the following impedance transformation:

$$Z_{CABLE} = 50\sqrt{Z(\text{measured})}$$

Being matched to the 50ohm load, 50Ω cable will cause no impedance transformation. 70Ω cable will transform the measured impedance to 98Ω, and so on according to the formula. The only slight problem is to cut a quarter-wavelength of unknown cable. For solid polyethylene insulation assume a velocity factor of 0.67 (ie make the coax 67% of a free-space quarter-wavelength), for solid PTFE 0.71 and for foam or semi-airspaced guess at 0.8. For 145MHz, cut 35cm of polyethylene- or PTFE-insulated cable, or about 40 centimetre of semi-airspaced or foam.

The results should be close enough to identify the impedance of the unknown cable, because there are relatively few commercial standard values.

Yet another option if you have a reasonable oscilloscope is to build a very simple Time Domain Reflectometer. This can consist of little more than a 555 IC and a transistor, and can tell you much more than cable impedance. For example it can detect a broken connection in the middle of a long run of cable, without leaving the shack. Interested? See Chapter 12 of The *VHF/UHF DX Book* (available from RSGB) for details.

TACKY TIP

FOR EXTERNAL connections and screw terminals (eg on the base of a rotator) I can recommend a sticky-putty product called Coax-Seal. This is widely advertised in the USA and may be available from satellite TV dealers – when I find reliable a UK source I'll let you know. Meanwhile a correspondent has recommended ordinary Blu-Tack for outdoor sealing. It doesn't weather as well as products specially formulated for outdoor use, but if you knead it thoroughly before use to get the surface good and tacky, it'll probably last long enough.

ANTENNA ROUNDUP

ROTATOR CAGES

As I mentioned in July 1994, the most likely reason for the body casting of a rotator to break is because of the leverage exerted by the antennas and the stub mast in a high wind. With towers it is standard practice to use a rotator cage or 'head unit' to protect the rotator from these sideways forces, but this is far less common with masts. If you have a substantial pipe mast but no rotator cage, it's worth considering the units available from Tennamast (01505 503824); see below. These are of galvanised steel construction with a pre-drilled rotator platform and a sleeve top bearing to suit a scaffold-pole stub mast. They are available in three models to fit standard pipe masts of 48.1mm, 60.3mm or 76.1mm outside diameter, 48.1mm being the diameter of a scaffold pole. The cage simply slides over the top of the mast and clamps on very firmly.

Do bear in mind that a rotator cage of sufficient size and strength is quite heavy in its own right. It is only suitable for scaffold-pole masts that are very well guyed, right to the top, or for self-supporting masts using heavy-wall steel pipe in the two larger sizes quoted above. Some users have fitted a ball-race or a nylon bearing at the top to reduce the friction. It's worth adding that I have always found Tennamast extremely helpful and ready to advise on any 'special' application.

The Tennamast rotator cage for pipe masts.

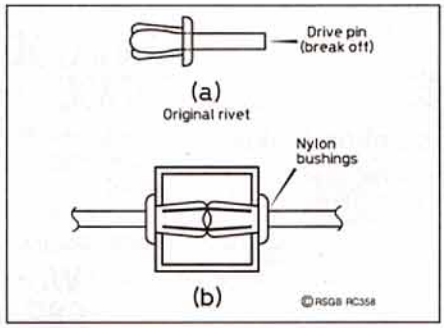

Fig 3: Nylon drive rivets make excellent mounting bushes for 4mm rod elements.

NYLON RIVETS FOR MOUNTING YAGI ELEMENTS

One of the best ways to build your own high-performance Yagis for 144MHz and above is to use elements made of 4mm rod, mounted through the boom on nylon bushes. These are sold as fasteners for sheet metal or plastic (**Fig 3a**), the manufacturer's idea being that you simply drive in the peg to expand the rivet and create a permanent fastening. But some ingenious amateur in France or Germany discovered that if you snap off the peg, standard 4mm aluminium welding rod is also a drive fit. Two of these rivets back-to-back through a square boom thus make an excellent mounting for Yagi elements (**Fig 3b**) which is extremely robust and immune to the corrosion of a metal-to-metal joint. Although nylon is generally regarded as a poor RF insulator, it is being used here at a voltage minimum and is more than adequate. Similarly, although nylon tends to become yellowed and brittle in sunlight, these bushes are under no stress - mine are outlasting the aluminium parts of the antenna.

After having praised the virtues of this method of construction, using nylon rivets made by the German company Heyco and obtained from friends in that country, I have often been asked about a UK supplier. Thanks to G7HUD and G0RUZ we've now tracked down the supplier and determined the UK equivalent to part number 61PR80000 as specified by DJ9BV [1]. Contact Heyco Ltd, Uddens Trading Estate, Wimborne, Dorset BH21 7NL (01202 861000) and ask for part No 057 5586. These are currently priced at £3.49 per 100, plus £4.00 p&p plus VAT; and they accept payment by 'plastic'. The minimum order is thus 300, so get together with a few friends and plan to build some seriously long Yagis!

WALL BRACKET FIXING

THE PRACTICALITIES of fixing an antenna wall bracket (see antenna 'wind loading', Jan 1995), promised for for this month, has been carried over because of lack of space.

REFERENCE

[1] Rainer Bertelsmeier, DJ9BV: Yagis for 144MHz, *DUBUS* 1/1990; High Gain Yagis for 432MHz, *DUBUS* 2/1991. Reprinted in *DUBUS-Technik III*. The UK representative for the *DUBUS* quarterly is G4PMK (QTHR).

IF YOU HAVE NEW QUESTIONS, or any comments to add to this month's column, I'd be very pleased to hear from you by mail or by packet (see head of column). But please remember that I can **only** answer questions through this column, so they need to be on topics of **general** interest.

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RADCOM TECHNICAL FEATURE

LF Mobile Antenna Design

by R Bearne, G4DUA

TOP BAND IS A GOOD BAND for mobile working, offering reliable SSB communications over 50 miles during the day and providing capable coverage of the British Isles and beyond at night.

The reason why 160m is not a popular mobile band may lie in the fact that antenna performance is crucial to the success of a Top Band mobile installation.

This article attempts to cover the important factors when venturing into the design of a low frequency antenna.

ANTENNA EQUIVALENT CIRCUIT

A SIMPLIFIED EQUIVALENT circuit of the antenna is given in **Fig 1** and can be used as a model to analyse each component part in detail. The circuit elements are listed as follows:

Tx represents the transmitter with a source impedance of 50Ω.

L is the inductance of the loading coil

R_1 is the resistive loss of the loading coil

R_r is the radiation resistance of the antenna

C_a is the capacitance of the antenna

R_e is the resistive earth return via the car body and back to the transmitter

C_m is the shunt capacitance required to match the antenna to 50Ω

ANTENNA EFFICIENCY

WHEN THE ANTENNA is at resonance the circuit simplifies to purely resistive components, these being R_1, R_r and R_e. As they are in series the current flowing through each is equal.

The power radiated by the antenna is I^2R_r because R_r is the resistance to which transmit power must be delivered for the antenna to radiate.

The power dissipated in R_e and R_1 is power wasted as heat developed in the loading coil and through the ground return.

Thus the antenna efficiency=

$$\frac{\text{Power Radiated}}{\text{Total Power}} = \frac{I^2R_r}{I^2(R_1+R_r+R_e)}$$

$$\text{which simplifies to: } \frac{R_r}{R_1+R_r+R_e}$$

Thus in order to obtain the best possible antenna efficiency we need to maximise the radiation resistance (R_r) and minimise the coil and earth losses (R_1 and R_e)

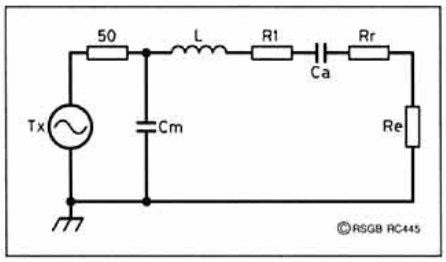


Fig 1: Antenna Equivalent Circuit.

MAXIMISING RADIATION RESISTANCE

RADIATION RESISTANCE R_r depends solely on the length of the antenna and is given by:

$$R_r = 40 \tan^2(\pi h/\lambda)\Omega$$

where h = antenna length and λ is the wavelength.

A 2m long whip has a radiation resistance of 0.13Ω whereas a 3m whip has a radiation resistance of 0.28Ω which is more than double. Clearly the antenna needs to be as long as you are able to make it.

ANTENNA CAPACITANCE

IN ORDER TO HELP minimise the losses from the coil (R_1) it would help if the required load inductance could be made as small as possible. To achieve this it is necessary to make the antenna capacitance as large as possible. The capacitance of a whip is given by the formula:

Radius a	Turns n	Length l	Wire Length	Inductance L, µH
1.00	10.00	0.39	31.42	7.73
1.00	50.00	1.97	157.10	87.26
1.00	75.00	2.95	235.65	146.20
1.00	100.00	3.93	314.20	207.04
1.00	150.00	5.90	471.30	331.13
1.00	*170.00*	*6.68*	*534.14*	*381.22*
1.50	10.00	0.39	47.13	12.91
1.50	50.00	1.97	235.65	169.68
1.50	75.00	2.95	353.48	294.50
1.50	92.00	3.62	433.60	383.52
2.00	10.00	0.39	62.84	18.24
2.00	50.00	1.97	314.20	265.60
2.00	65.00	2.55	408.46	388.10
2.50	10.00	0.39	78.55	23.65
2.50	51.00	2.00	400.61	382.11

Table 1: Coil Winding Characteristics.

$$Ca = 2\pi\varepsilon_o [\ln(h/a) - 1]$$

Where h = antenna length
a = radius of whip in metres
ln = natural logarithm
ε_o = 8.85 E-12 F/metre (Permittivity of Free Space)

This capacitance increases with antenna length and diameter and so once again the antenna should be made as long as possible with the largest diameter practical. For example a 2m long whip of 4mm diameter would have a capacitance to earth of 21pF.

SERIES INDUCTOR L1

TO GET THE MAXIMUM efficiency out of the antenna we must ensure the coil has the maximum possible Q (minimum RF losses). The Q of a coil is defined by :

$$Q = \frac{2\pi fL}{R_1}$$

Where f = frequency
π = 3.142
L = Inductance
R_1 = Coil resistance at frequency f

To increase Q, we need to minimise the coil resistance. The coil resistance is made up of two factors, RF loss and DC loss and each must be considered in the coil design. DC resistance is proportional to the diameter and length of wire used. Therefore to obtain minimum DC resistance the largest practical wire size should be used on a coil with the minimum winding length. The inductance of a coil is given by the following equation:

$$L = \frac{a^2n^2}{9a+10l}$$

Where a = radius in (in)
n = no.of turns
l = overall length of coil (in)

Table 1 gives winding characteristics in a table of results which determine winding lengths for various inductance values on a given radius. As the radius is increased the winding length decreases and hence DC resistance will be reduced.

RF resistance is made up of two phenomena and these are known as Skin Effect and Proximity Effect. Consider a solid wire carrying an RF current. This current generates a magnetic field which tends to force the RF current to the outer surface of the wire. This is known as **skin effect** and is proportional to the square root of frequency. The skin effect for a material is defined by its skin depth, which gives a measure of how far the RF

* 30 Bouvirie Avenue, Salisbury, Wiltshire SP2 8DT

current penetrates the material at a given wavelength. At VHF and above almost all the current flows on the outer surface and hence the use of silver plated wire at these frequencies.

This phenomena is still very relevant at low frequencies and an example of this is given in **Table 2**. Impedances are shown for straight circular copper wires of three diameters of a given length at a frequency of 2MHz. The results demonstrate how the impedance increase of the wire is not directly proportional to diameter, this being due to skin effect. Two 22AWG wires used in place of one 2AWG would present a smaller impedance, ie 129Ω against 200Ω respectively.

This idea was taken further with the development of Litz wire which consists of many strands of enamelled copper wire twisted together. Because the wires are insulated from each other the wire surface area is increased and the RF losses are reduced correspondingly.

Conductor resistance of a coil is given by:

$$R_c(\omega) = Rdc[1 + (\omega \mu \sigma r^2)^{1/2}]$$

where ω = frequency in radians
μ = permeability of the wire
σ = conductivity of the wire
r = wire radius

This shows how DC and RF resistance play a part in the overall coil loss. The equation also shows how care must be taken in choosing the characteristics of Litz wire. If the DC loss of the wire is too high then any improvement in RF resistance will be negated.

The proximity effect represents itself as the distortion of the magnetic field in an RF current carrying coil due to proximity of adjacent wires in the coil. Butterworth stated that this effect could be minimised by use of a specific coil shape, ie its length to diameter ratio which he stated to be:

$$\text{Coil diameter} = \frac{8}{15} \times \text{Coil Length}$$

ie about a 2:1 diameter to length ratio.

Butterworth also stated that for a given inductance and a given coil diameter there is an optimum wire size such that the turns would always be spaced apart to reduce this effect.

Wire diameter mm	Impedance (ohms)
6.5mm	200
2.6mm	223
0.64mm	258

Table 2: Impedance of a Copper Wire at 2MHz.

OVERALL ANTENNA DESIGN

TAKING ALL THE theoretical factors into account the design of the whip can now be pursued. The whip was designed to operate at 1933kHz which is the mobile channel used on Top Band. Using a spreadsheet program an analysis was performed on antenna efficiency for various whip lengths and loading coil Qs.

The results of this analysis are given in **Table 3** and the resultant efficiencies are related to a 0.5m whip having a loading coil with a Q of 200. **Fig 2** gives the results in graphical form and clearly shows the how the efficiency is enhanced by greater whip lengths and larger coil Qs. For example increasing the whip length from 1.5m to 3m gives an 8dB improvement in efficiency (which is 1.5 'S' points). In addition a coil Q improvement to 600 gives another 4dB which gives a 2 'S' point advantage over the shorter and less efficient antenna. In linear terms this means 15 times more power radiated!

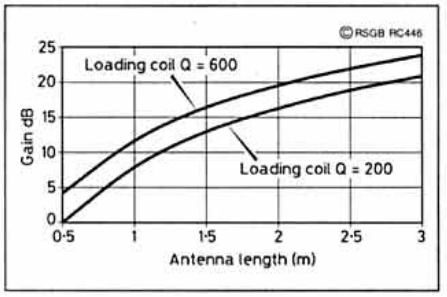


Fig 2: Antenna gain relative to a 0.5m whip.

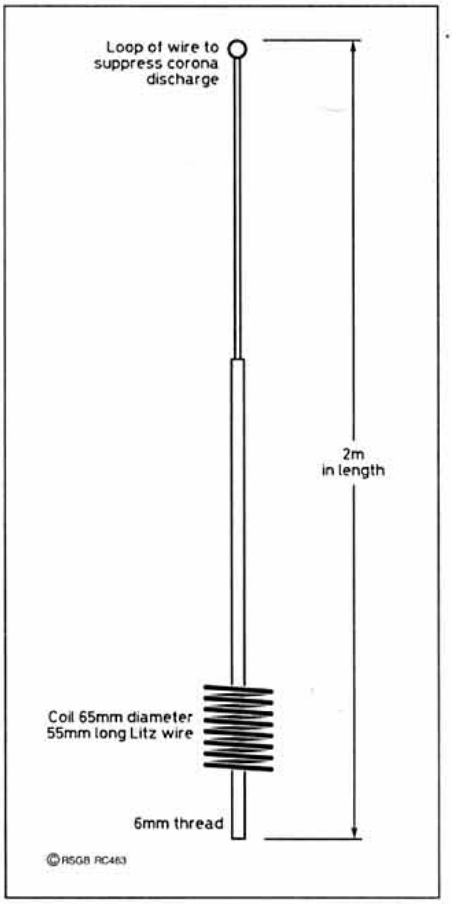


Fig 3: 160m whip antenna construction.

PRACTICAL COIL DESIGN

THE FIRST COIL was wound with 1mm diameter enamelled copper wire with each turn spaced 0.5mm apart on 50mm plastic pipe with approximately 200 turns. The inductance and Q were measured on a Network Analyser, the resultant Q was 210 with an inductance of 400μH, so nowhere near the target Q of 600.

The next stage was to obtain some Litz wire and fortunately some was snapped up at a junk sale. The wire was approximately 50 strands of 0.03 mm diameter with an overall diameter equivalent to 0.65mm. A coil was closewound on a 75mm former with an overall length of 40mm (close to the 2:1 ratio) resulting in some 70 turns. The coil Q increased to a remarkable 640.

PRACTICAL ANTENNA DESIGN

ONCE A COIL WINDING technique and wire type had been established a mechanical structure had to be made. The overall structure had to be strong and light enough for possible fitting on a simple gutter mount. A fairly discrete antenna was in mind so an overall length of 2m was decided upon and is shown in **Fig 3**.

ANTENNA SET UP & TESTING

THE ANTENNA WAS MOUNTED on the roof the car and the resonant frequency measured. Once this was found it was necessary to match the antenna to 50Ω by use of a shunt capacitance (C_m in the equivalent circuit).

Now if the antenna will match without any shunt capacitance then the antenna losses are in the region of 50Ω which means the antenna efficiency is well below par. Listed in **Table 4** are some approximate values of antenna loss and how they relate to shunt capacitance .

ANTENNA Q

IN ORDER TO MATCH the antenna on the car 2.2nF was required which gives an overall loss of 18Ω. To confirm this the antenna Q

Antenna Length	Radiation Resistance	Capacitance	Series L	Coil Loss (Q=200)	Coil Loss (Q=600)	Ant Effic'y % Coil Q=200	Ant Effic'y % Coil Q=600	Gain dB, re 0.5m Ant with Coil Q=200	Gain dB, re 0.5m Ant with Coil Q=600
0.54.11	E-03	7.26E-12	9.33E-04	56.67	18.89	0.01	0.02	0.00	4.12
1 1.64	E-02	1.23E-11	5.51E-04	33.47	11.16	0.04	0.10	8.07	11.84
1.53.70	E-02	1.69E-11	4.00E-04	24.31	8.10	0.13	0.28	12.77	16.26
2 6.58	E-02	2.13E-11	3.18E-04	19.30	6.43	0.27	0.57	16.08	19.34
2.51.03	E-01	2.56E-11	2.65E-04	16.10	5.37	0.49	0.98	18.62	21.69
3 1.48	E-01	2.97E-11	2.28E-04	13.87	4.62	0.78	1.52	20.68	23.58

Table 3: Antenna efficiencies for specific whip lengths and coil Qs.

Overall Antenna Loss	Required Shunt Capacitance
10Ω	4nF
20Ω	2nF
30Ω	1.3nF
50Ω	0nf

Table 4: Antenna loss and shunt capacitance.

was calculated by measuring the antenna bandwidth (bandwidth is related to Q by measuring the frequency span between the 2.6:1 SWR points of the antenna).

The bandwidth was found to be 7kHz and hence Q was calculated by using the following formula:

$$Q = f_0/(f_{u\,2.6:1} - f_{l\,2.6:1})$$

where f_0 = resonant frequency

$f_{l\,2.6:1}$ = lower frequency where SWR is 2.6:1

$f_{u\,2.6:1}$ = upper frequency where SWR is 2.6:1

Hence Q = 276

Now $Q = 2\pi fL/R$ for the antenna, where L is the coil inductance and R is the antenna overall loss. The inductance was measured as 380mH and so R can be calculated. The antenna loss was 18Ω which corresponds to the theoretical value of 22Ω. Now this suggests an earth loss in the region of 11Ω.

ON AIR TESTING

THE ANTENNA RADIATES well and has been given good reports throughout the UK. Due to the high Q and hence narrow bandwidth the antenna is difficult to keep on tune under all weather conditions. A capacity hat was tried but did not provide a large enough increase in antenna capacitance to reduce the antenna Q and hence widen the bandwidth. The best route would seem to be to improve the overall weather protection of the loading coil. ♦

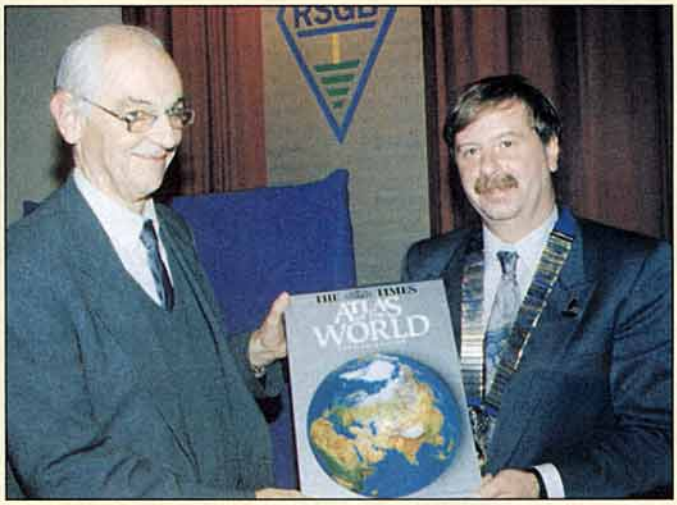
Annual Meeting Awards

SEVERAL TROPHIES were presented during the Informal Session of the 1994 RSGB Annual Meeting, held in London last December:

The Ostermeyer Trophy for the best article about home constructed equipment in *RadCom* went to John Hey, G3TDZ, for 'The Multiband Phasing Transceiver' (June, July, August 93).

Professor R C Jennison with the Pilot Officer Norman Keith Adams prize.

Receiving the Fraser-Shepherd Award for research into Microwave communication: A Horsfall (left) and D B Hall.



Pat Hawker, G3VA, accepted the Benet trophy on behalf of C W Horrabin, G3SBI.

The Wortley-Talbot Trophy for outstanding experimental work in amateur radio was presented to Ian Keyser, G3ROO, for his *RadCom* article: 'An easy-to-set-up Amateur Band Synthesiser' (December 93).

The Fraser Shepherd Award for research into microwave radio communication was awarded to A Horsfall, G4CBW and D B Hall, G8VZT.

The Pilot Officer Norman Keith Adams Prize for the most original article published in *RadCom* went to Professor R C Jennison, G2AJV, for his article 'The G2AJV Toroidal Antenna' (April, May 94).

The Courtney-Price Trophy for the most outstanding published technical contribution to amateur radio in published in *RadCom* was awarded to Mr J Hollingworth, ZF1HJ, for 'The new HF data mode - Clover 2'.

The Bennett Trophy for significant contribution or innovation which furthers the art of radio communication was awarded to Mr C W Horrabin, G3SBI for his work on receiver mixers, crystal filters and low noise oscillators (reported in *Technical Topics*).

The Calcutta Key for outstanding service to international friendship was awarded to Tim Hughes, G3GVV. ♦

Radio Communication

The Journal of the Radio Society of Great Britain

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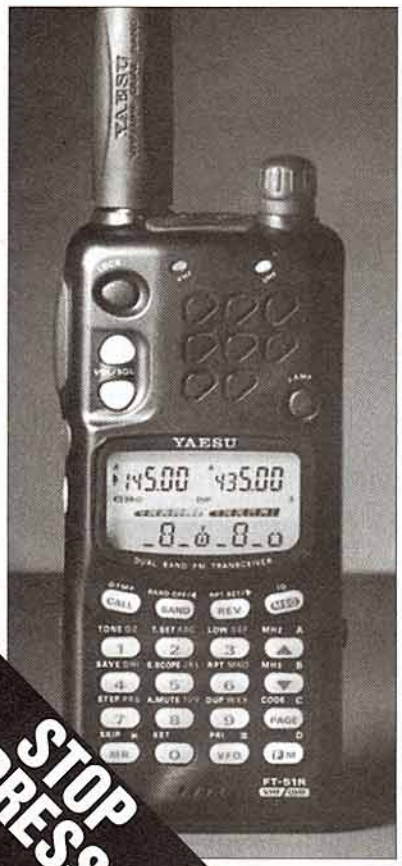

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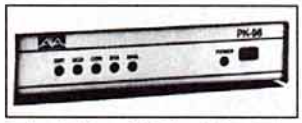
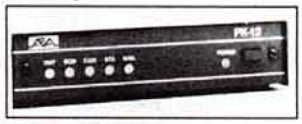


Select 1200 or 9600 baud simply by typing ONE command. Includes AEA's powerful Maildrop easily expandable to 128K. PK-96's from Siskin INCLUDE ready made computer and radio cables plus software! **£199.00**

PK-12-QUART IN A PINT POT



If you already own a PK-232 or PK-88 and want to set up a dedicated VHF packet station then the PK-12 is probably for you! Features include AEA maildrop (expandable to over 100K) and open squelch DCD. **£139.00**

The AMAZING TINY 2 MK II

The Tiny 2 has to be the UK's most POPULAR 1200 baud TNC by now, we've sold thousands of them and still the orders pour in! Equipped with PacComm's POWERFUL PMS plus easily upgradable to 9600 baud and TRUE TNC-2 compatibility Tiny's from Siskin once again are supplied WITH ready made computer and radio cables plus software. **£139.00**

SYMEK TNC-2H 9600 TNC

The TNC-2H from Symek is a dedicated 9600 TNC incorporating licensed G3RUH modem coupled to excellent German Engineering. This unit is already very popular with OSCAR enthusiasts and is also used extensively on many backbone 9600 node links throughout Europe. Like the Tiny 2 the TNC2-H is fully TNC-2 compatible for Netrom/BBS operations. **£179.00**

KANTRONIC'S KPC-3

The KPC-3 really has found its way to many amateurs' shelves over the past couple of years. Equipped with Kantronics JUMBO 100K+ PMS and ease of portability this little unit is a lot of fun! As ever KPC-3s supplied by Siskin INCLUDE ready made computer and radio cables plus software! **£149.00**

PACOMM'S 9600 SPRINT

If you were ever looking for a 9600 baud Tiny 2 then the Sprint's for you! Once again the Sprint uses licensed G3RUH modem technology and is easily reconfigurable to higher baud rates with internal jumpers. Supplied by Siskin complete with ready made computer and radio cables. **£199.00**

NOW WHO WAS THAT INTERNATIONAL CALL I WAS TRYING TO LOOK UP?

The Buckmaster HamCall CD rom makes checking international calls a breeze and is now supported by popular BBS and DX Cluster programs. Why not have a whip round and buy your local Sysop a copy and ask him to put it on line, it's fun! The CD also includes HUNDREDS of popular Amateur PD and shareware programs for the IBM PC too! **£39.95**

KA & PKGOLD - stunning driver programs for AEA and Kantronics TNCs and Multimodes. Both now include on-line support for the Buckmaster HamCall CD and are Windows/OS/2 ready! **£69.95**

PC-PAKRATT for WINDOWS - the new update has just arrived! Allows one to drive AEA TNCs in a true Windows environment. ~~£79.95~~ **£69.95**

Plus the widest selection of TNCs and Multimodes in the UK!

Siskin Electronics Ltd.
2 South Street, Hythe,
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01703 207587
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PRODUCT NEWS

Note: Product news is compiled from press releases sent in by the manufacturers and distributors concerned. Details are published in good faith but *Radio Communication* cannot be held responsible for false or exaggerated claims made in the source material.

THE LATEST **SCANNER** from Realistic is the PRO2035, which covers 25 - 520MHz and 760 - 1300MHz. This 12V DC or 240V AC unit boasts 1000 direct entry channels plus a tuning knob. All the usual search facilities are provided, including a priority channel. The design is triple conversion, and AM, W/B FM and N/B FM modes are available.

Link Electronics - Tandy Millfield, 216 Lincoln Road, Peterborough PE1 2NE. Tel: 01733 345731. Fax: 01733 346770.

MANY REPEATER GROUPS use variants of the two G3RKL 'GB3US' **control logic** circuits published some years ago in *RadCom*. Now a modern logic board is available which includes such recent developments as CTCSS and remote control. Designed by G8CUL, the board is expected to be available ready-built or as a PCB with programmed microcomputer, PC set-up programme and documentation (buy your own components). Full details can be obtained from:

Mike Stevens, G8CUL, 67 New Road, East Hagbourne, Didcot, Oxon OX11 9JX. Tel: 01235 816379.

WELL-KNOWN COMPONENT manufacturers Jackson Brothers Ltd (famous for variable capacitors) are prepared to make their **components** available for published projects via a distribution company, Isoplethics. This avoids a possible lead-in time of four to six weeks for some products.

Jackson Bros or Isoplethics can supply price and delivery details of specialist items, and Jackson Bros would be pleased to supply product specifications to authors of constructional projects.

Isoplethics, 13 Greenway Close, North Walsham, Norfolk NR28 0DE.

Jackson Brothers Ltd, 58 - 72 Dalmain Road, London SE23 1AX.

MORE NEW PRODUCTS from Ben Spencer Consultants:

A **high VSWR Detector Board** monitors SWR and if it exceeds 1.6:1 an LED and sounder warns you. It can also be used to shut down your transmitter - handy for unattended operation. The kit is £16.90 and ready built it's £19.90.

A **Bench AF Amplifier Board** has a high impedance input, a wide gain range and a 2W output (plus a line o/p for the 'scope etc). It is powered from 12v DC and has a bandwidth of 16Hz to 30kHz. The kit is £12.90; ready built price is £15.90.

Four **audio filters** are available in kit or ready-built form: two are 100Hz-wide CW filters (centre freq is 775Hz); and two are SSB receiver filters with a 3dB response of 250Hz to 3200Hz. Each of these is available as internally mountable, or externally (includes a 1W AF amp).

Ben Spencer Consultants, Enterprise House, 33 New King Street, Bath BA1 2BL. Tel/Fax: 01225 482604.

LOWE ELECTRONICS in Matlock and their chain of retail outlets (Cumbernauld, Bristol, Plymouth, Newbury, Newcastle upon Tyne, Leeds, Cambridge and Maidstone) are now stockists of the Trio-Kenwood range of general purpose **test and measuring instruments**.

The range includes oscilloscopes, PSUs, multimeters, frequency counters and function generators. For further information and addresses of branches, contact:

Lowe Electronics Ltd, Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: 01629 580800; Fax: 01629 580020.

FOR THE VHF SWL a handy **2m monitor receiver**, MFJ-8400K. Supplied in kit form for £79.95, this fully tuneable double-conversion radio has a 0.1µV sensitivity, a built-in speaker and an all metal cabinet. A quarter-wave whip antenna is included plus a socket for an external antenna. The kit includes all components, a step by step instruction booklet and directions for alignment without the need for test gear. The radio is powered by a 9V battery.

Brand new from MFJ is the 8621 'packet only' crystal controlled **2m Data Transceiver** designed for 24-hour-a-day operation. It comprises a dedicated packet receiver, plus a 5W transmitter. All data rates up to 9600Bd can be used without modification- just plug in your TNC, 12V DC and an antenna! It measures 5 x 5 x 1.5 inches and draws just 15mA on receive and less than 1A on transmit. Available in the UK very soon at £139 and a boon to those whose base station or 'handie' is currently tied up running a mailbox or node.

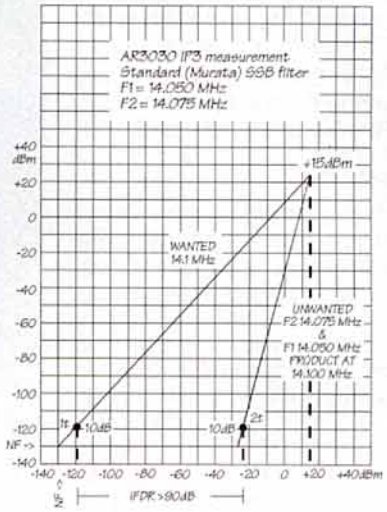
Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: 01702 206835. Fax: 01702 205843.

AOR™ The New Classic : AR3030

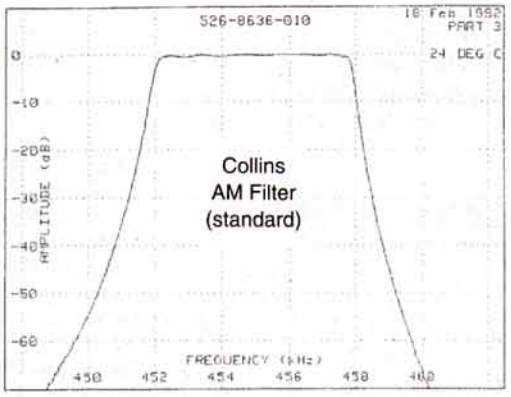
The **AR3030** receiver combines a classical appearance on the outside using aluminium extrusion & cases with a high-tech low noise DDS (Direct Digital Synthesizer) design inside with the legendary **Collins** 6 kHz AM mechanical filter fitted as standard, the result is **"THE NEW CLASSIC from AOR".**

Collins Inside

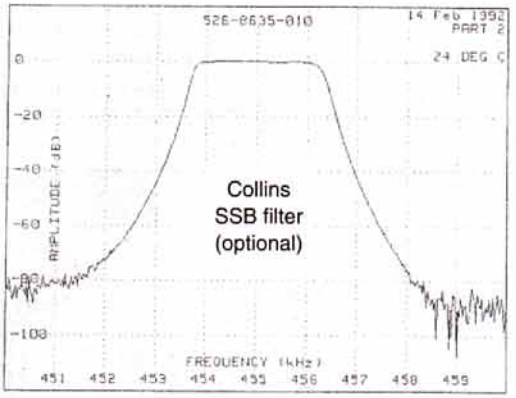
*Collins is a trade name of Rockwell International



The **AR3030** offers high performance, user friendly operation, an easy to see large rear illuminated LCD and true value for money, the list of "standard features" is exceptional: ● Frequency coverage 30 kHz ~ 30 MHz ● ALL MODE receive AM, S.AM, NFM, USB, LSB, CW & FAX with true carrier re-insertion ● 5 Hz DDS tuning ● Fully adjustable BFO on USB, LSB, CW & FAX ● Unrivalled selectivity offered by the Collins 6 kHz AM mechanical filter ● Options of a substitute Collins 4 kHz AM mechanical filter, Collins 2.5 kHz SSB mechanical filter and Collins 500 Hz CW mechanical filter (ceramic SSB filter fitted as standard) ● TCXO for the ultimate in frequency stability ideal for data communications and ECSS ● Dual VFOs plus 100 memories which retain all operating data ● Front panel AGC fast / slow ● Standard rear panel RS232C connector, I.F. output, audio outputs and carrier operated relay ● Large analogue S-meter ● Direct frequency entry by MHz, kHz or metre band ● Optional VHF converters for airband (108 ~ 139.99999) and 2m HAM + MARINE (140 ~ 169.99999 MHz)

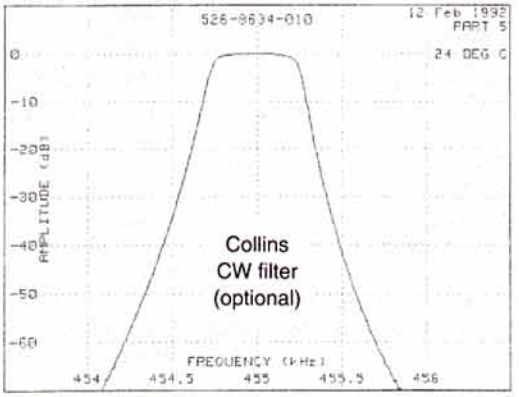


AM/S.AM: 6kHz/-3dB in the normal position using the legendary Collins eight resonator mechanical filter (526 8636 010 or 526 8695 010) and a 2.4kHz/-6dB Murata ceramic filter (CFJ455K6) in the narrow position. A narrower 4.0 kHz Collins mechanical AM filter may be fitted in the standard AM filter position (a wider AM filter such as Collins 8.5kHz/-3dB 526 8561 020 could be fitted in the AM position). Due to the I.F. cascade filter, the widest possible filter is 8.5kHz.



USB/LSB/FAX: 2.4kHz Murata ceramic filter (CFJ455K6). An optional Collins 2.5kHz/-3dB Collins eight resonator mechanical filter (526 8635 010 or 526 8694 010) of higher specification may be optionally fitted (workshop fitting) to replace the 2.4kHz filter.

CW: 2.4kHz Murata ceramic filter in the Normal position. An optional Collins 500Hz/-3dB Collins seven resonator mechanical filter (526 8634 010 or 526 8693 010) may be optionally fitted (workshop fitting) in the Narrow position.



FM: 15kHz Murata ceramic filter (CFU455E2) fixed. Selection of Normal/Narrow is disabled.

Strong sinal handling is very good providing 3rd order intercept measurements of around +15dBm between 1.8 ~ 28 MHz with 50/25 kHz tone spacing.

*** Special offer for a limited period only**
AR3030 receiver with one optional Collins filter
'or' VHF converter 'or' PC software at no extra cost

£699.00 including VAT

The AR3030 General Coverage Receiver * **Collins** mechanical filter inside

AOR (UK) LTD

Adam Bede High Tech Centre, Derby Road, Wirksworth, Derbys. DE4 4BG

Tel: 01629 825926 Fax: 01629 825927 E&OE

THE PETER HART REVIEW

AOR AR3030 HF Receiver

by Peter Hart, G3SJX*

TOWARDS THE END of 1993, AOR unveiled a new high performance HF communications receiver, the AR3030, which looks an interesting receiver for the SWL. It is well suited to the needs of the amateur bands listener as well as for the broadcast bands, HF SSB point to point, data and utility modes. The transmitting amateur has a wide range of transceivers available from which to choose but the SWL has much less choice. The number of true communications receivers aimed at the 'hobby market' can be counted on the fingers of one hand.

AR3030 viewed from the front.

PRINCIPAL FEATURES

THE AOR AR3030 IS a 12V radio covering the continuous frequency range from 30kHz to 30MHz. It is equipped for reception on USB, LSB, CW, AM, FM, synchronous AM and FAX. FAX mode is basically USB with a tailored audio frequency response and tuning offset to suit external facsimile decoders. Synchronous AM is being provided on more and more HF receivers and is useful in reducing distortion when selective fading is experienced.

The 34mm diameter main rotary tuning knob has a maximum resolution of 5Hz tuning steps and about 50 steps maximum per revolution of the knob. 100Hz, 1kHz and 1MHz tuning steps may be selected for more rapid changes in frequency and the selected step size is indicated by an underscore placed under the relevant digit on the frequency display. The frequency may be entered directly in kHz or MHz using numeric keys and this is also probably the quickest way of coarse setting the frequency. The numeric keypad is very simple to use, with no dual function or select keys, and includes a backspace key for correcting errors.

Some 22 frequency bands are recognised for the different amateur bands and broadcast bands and the last used frequency, mode, VFO, step size, filter, AGC and input attenuator setting is stored in the band memory for selection the next time that band is accessed. These band stores are accessed by keying in the metre designation for that band finishing with the 'mtr' key, eg '20 mtr' or '49 mtr'. Unfortunately, 80 mtr is only recognised as 3500 - 3575 kHz and 160 mtr as 1907.5 - 1912.5 kHz, the Japanese allocations for these bands. Band store data is not updated continuously during tuning but only when the receiver has been static on one frequency for more than about 10s.

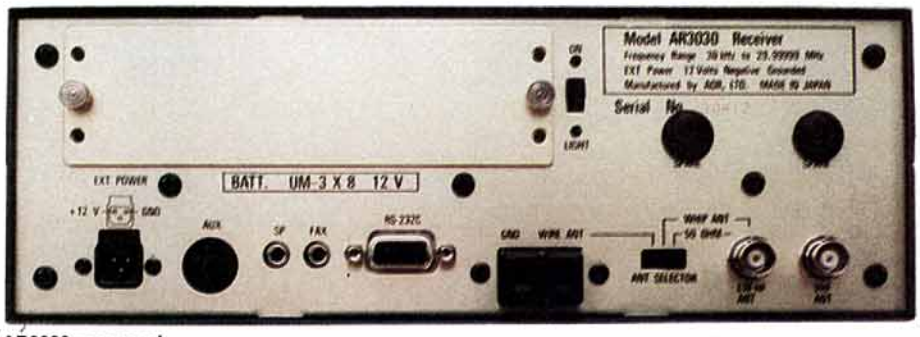
There are two selectable VFOs provided (A,B) and 100 memories in addition to the 22 band stores. The memories each store frequency, mode, AGC time constant, attenuator setting, IF and AF filter settings, BFO and lockout status and step size. Apart from the usual store and recall from any memory channel to VFO, a quick store facility will automatically store into the lowest numbered empty memory channel. Memories may be deleted either singly or as a block. There is no direct tune from a memory channel, it is necessary to transfer first to a VFO, and there is no provision for preview of memory contents without first tuning to that memory channel.

Scanning of the memory channels is a feature provided, but not programmed frequency scan. It is possible to scan all occupied channels or a subset of channels and individual channels may be skipped. Scanning is relatively slow, pausing on each channel for between 1 and 10s.

Two IF bandwidth settings, normal and narrow, are selectable on all modes except FM. The standard radio is fitted with a 2.4kHz bandwidth ceramic filter for normal bandwidth on SSB, CW and FAX and the narrow AM setting. Also a standard fitment is a 6kHz bandwidth Collins 8-resonator mechanical filter in the AM normal position. The manual and brochures take great pains to emphasise the performance of this filter and indeed the top of the case sports a large 'Collins Inside' logo. Optional Collins mechanical filters may be fitted to give a CW narrow bandwidth of 500Hz or SSB 2.5kHz with improved skirt selectivity. These mechanical filters have a much improved skirt selectivity compared with the ceramic filters although at a substantially higher cost.

Two settings of audio bandwidth are selectable, high giving a cut-off frequency of 3kHz and low giving a cut-off of 1.8kHz. On CW the cut-off is set to 800Hz. Unusual in a modern receiver, a variable BFO pitch control is provided to set the most comfortable pitch on CW and provide a form of passband tuning / IF shift on SSB and CW modes. It is necessary to offset this control to give single signal reception on CW. Two AGC speeds are provided, fast and slow, but no facility to switch the AGC off. An RF gain control is provided, three levels of input attenuation 0, 10 and 20dB and an all-mode squelch. A noise blanker is not incorporated.

A conventional analogue S meter is fitted and a backlit LCD panel which indicates frequency to 10Hz resolution, memory number and various status indicators. The S-meter and LCD illumination may be turned off via a rear panel switch to save current when powered from internal batteries.



AR3030 rear panel.

* The Willows, Paice Ln, Medstead, Alton, Hants, GU34 5PR.

Three antenna possibilities are catered for via two antenna connectors on the rear panel and selected by a three position slide switch. A BNC socket provides either 50Ω coaxial input or high impedance whip antenna input to a high impedance amplifier / impedance converter. A separate connector for end fed wire antennas is provided at about 450Ω impedance level.

Connectors on the rear panel provide for DC power input, external speaker and constant level audio for FAX and data decoders. An RS232 computer interface is fitted which may be directly connected to a computer serial port without the need for the usual external interface box / level converter. 4800 and 9600 baud rates are accommodated and most of the functions of the radio can be set or read including the S-meter reading. An auxiliary socket is provided for general interfacing giving AGC level, audio record output, IF output, squelch controlled relay contacts and access to the RF gain control which may be used for transmit muting.

A small mains PSU is provided with the receiver giving 12V nominal output (model AA3030UK in the UK). Alternatively any suitable external PSU can be used with the optional DC lead. The receiver can be powered from internal dry batteries, and the battery compartment in the rear panel gains access to the battery holder which holds 8 AA sized cells. However, the manual quotes only 30 minutes life with Manganese and 45+ minutes with alkaline cells. NICADs can also be used. These times seem somewhat pessimistic considering the measured current consumption of 360mA. The internal batteries are automatically disconnected when the external power lead is connected.

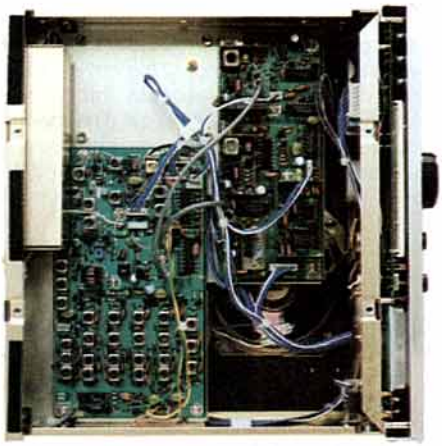
The receiver may also be fitted internally with one of two VHF converters. VHF-AM converter covers 108 to 140MHz and VHF-FM covers 140 to 170MHz. The memory and scanning features also extend to cover the VHF converter when fitted and a separate antenna connector is provided on the rear panel for the converter input.

The AR3030 is provided with a 54-page A5 operating manual. This covers very well the operation of the receiver, interfacing to other units, operation of the computer interface and some useful advice on antennas and propagation. A block diagram is included but no circuit or servicing details. A separate service manual should be available as an option.

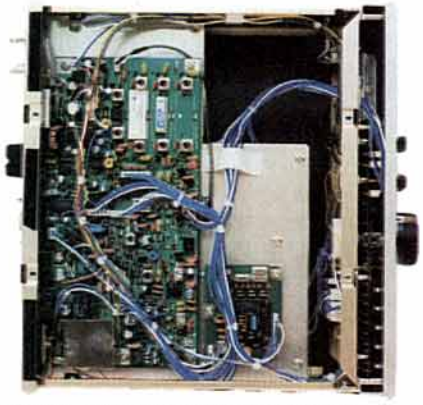
DESCRIPTION

THE AR3030 IS HOUSED in a rectangular case measuring 250mm (W) by 88mm (H) by 240mm (D) and weighs 2.2kg without batteries. This is a good size for a receiver, large enough to be ergonomically easy to use yet small and light enough to be used anywhere. The two-piece case unscrews to reveal five easily accessible PC boards, mainly mounted on either side of a central chassis. These boards comprise the receiver front-end and first IF, receiver back-end from 2nd IF, frequency synthesiser, BFO, and the front panel PCB which also contains the microcontroller. The grill on the front panel suggests a front facing loudspeaker.

87



AR3030 top view with cover removed.



AR3030 bottom view with cover removed.

AOR AR3030 MEASURED PERFORMANCE

FREQUENCY	SENSITIVITY SSB 10dBs+n:n	INPUT FOR S9	IMAGE REJECTION
1.8 MHz	0.25µV (-119dBm)	28µV	79dB
3.5 MHz	0.22µV (-120dBm)	28µV	87dB
7 MHz	0.25µV (-119dBm)	28µV	88dB
10 MHz	0.2µV (-121dBm)	25µV	90dB
14 MHz	0.2µV (-121dBm)	22µV	93dB
18 MHz	0.28µV (-118dBm)	35µV	87dB
21 MHz	0.2µV (-121dBm)	25µV	90dB
24 MHz	0.2µV (-121dBm)	22µV	90dB
28 MHz	0.45µV (-114dBm)	40µV	75dB

S-READING (14MHz)	INPUT LEVEL
S1	1.3uV
S3	2.5uV
S5	5.6uV
S7	13uV
S9	22uV
S9+20	200uV
S9+40	7mV
S9+60	63mV

AM sensitivity (21MHz): 1uV for 10dBs+n:n at 30% mod depth

FM sensitivity (21MHz): 0.32V for 12dB SINAD 3kHz pk deviation

AGC threshold: 2.2µV

90dB above AGC threshold for +10dB audio output (see text)

AGC attack time: see text

AGC decay time: 0.5 - 1s (fast), 3 - 4s (slow)

Max audio before clipping: 2W into 8Ω

MODE	IF BANDWIDTH -6dB	-60dB
SSB,CW	2740Hz	4170Hz
AM	5910Hz	9740Hz
AM(narrow)	2740Hz	4170Hz
FM	9240Hz	15.1kHz

INTERMODULATION (50kHz TONE SPACING)

FREQUENCY	3rd ORDER INTERCEPT	2 TONE DYNAMIC RANGE
1.8 MHz	+8dBm	91dB
3.5 MHz	+5dBm	90dB
7 MHz	+6dBm	90dB
14 MHz	+5dBm	91dB
21 MHz	+5dBm	91dB
28 MHz	+10dBm	90dB

TONE SPACING (7MHz BAND)	3rd ORDER INTERCEPT	2 TONE DYNAMIC RANGE
5kHz	-31dBm	66dB
7kHz	-25dBm	70dB
10kHz	-16dBm	76dB
15kHz	-1dBm	86dB
20kHz	+2.5dBm	88dB
>30kHz	+6dBm	90dB

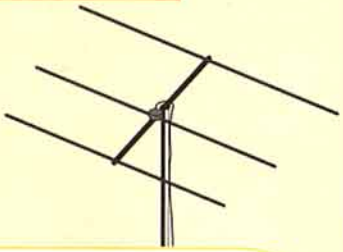
FREQUENCY OFFSET	RECIPROCAL MIXING FOR 3dB NOISE	BLOCKING
3 kHz	71dB	unmeas
5 kHz	77dB	-38dBm
10 kHz	85dB	-37dBm
15 kHz	87dB	-25dBm
20 kHz	94dB	-13dBm
30 kHz	97dB	-3dBm
50 kHz	102dB	-3dBm
100 kHz	107dB	-3dBm
200 kHz	111dB	-3dBm

NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on SSB.

RadioSport-RSGB Events, 1995

Coming soon....

(so make a note of the date in your diary)



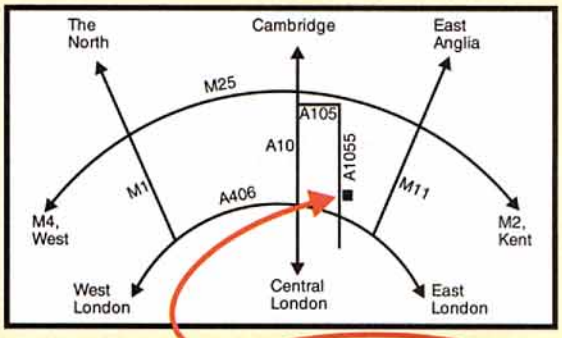
1 (THE BIG ONE)

LONDON AMATEUR RADIO & COMPUTER SHOW

1995 Saturday March 11th & Sunday March 12th 1995

Lee Valley Leisure Centre,
Picketts Lock Lane,
Edmonton, London, N9.

Lee Valley Leisure Park



Admission:
Adults £2.50
Concessions £1.50

See you there!

- **Over 120 exhibitors**
- **Disabled facilities**
- **FREE parking**
- **Bars and restaurants**
- **Talk-in on 2m & 70cm**
- **Priority admission for the disabled**
- **Lectures each day**
- **Special Interest Groups**
- **Giant Bring & Buy sale**
- **On-demand Morse Tests**

Organised in co-operation with the Radio Society of Great Britain and Southgate Amateur Radio Club

NEW

BLETCHLEY PARK AMATEUR RADIO & COMPUTER RALLY

"At the place where electronic computers were born and where communications came of age"

Huge new mobile rally in the grounds of Bletchley Park, which houses a fantastic museum of computer and communication equipment, vintage vehicles, military uniforms, Churchill memorabilia, German ENIGMA cypher machines, a crashed aircraft display, a working Y Station, firearm and cinema projector displays. There's even a Country House for the family to visit!

June 17th & 18th - Bletchley Park, Milton Keynes, Bucks

Exhibitors please call to reserve your stands

Organised in co-operation with RSGB by RadioSport Ltd

Make a note of the date in your diary

STAFFORD AMATEUR RADIO & COMPUTER SHOW

Incorporating RSGB National Convention

Building on last year's "HAMfest" foundations,we present our second great event at Stafford. Morse tests, FREE parking, over 100 exhibitors, Bring & Buy, Lectures, Special Interest Groups, etc.

August 19th & 20th - The County Showground, Stafford

Exhibitors please call to reserve your stands

Club Secretaries and Special Interest Group co-ordinators please call for details of FREE stands

Organised in co-operation with RSGB by RadioSport Ltd

For details contact RadioSport Ltd., 126 Mount Pleasant Lane, Bricket Wood, Herts, AL2 3XD. Tel 01923-893929. Fax 01923-678770.

RADCOM TECHNICAL FEATURE

Pulsed Tone Tx Tuning Unit

By John Forward, G3HTA*

CHANGING TO A different band can be a complicated process. Some seem to enjoy the business of throwing switches, dipping and loading, adjusting the drive and studying meters. Modern equipment has greatly reduced the need for much of this and usually pressing the appropriate band button is all that is required. However, there are circumstances where a signal or carrier will be needed to adjust an aerial tuning unit or to tune a linear amplifier.

If you have one of the expensive processor controlled linear amplifiers designed to work with your transceiver then the tuning will be done automatically for you. A contest or DX enthusiast needs to be able to change bands quickly and to concentrate on a number other things while doing so. The tuning pulser provides an instant means of causing a transceiver to provide a modulated SSB signal so that aerial or linear amplifier tuning can be done quickly.

The tuning pulser provides an instant means of causing a transceiver to provide a modulated SSB signal so that aerial or linear amplifier tuning can be done quickly.

Having bought a new transceiver and eventually learnt what all the buttons were for, it was most surprising to discover that no easy means was provided to insert a controlled carrier to tune the traditional valve linear amplifier.

Enquiries made of owners of modern transceivers revealed that this problem was not peculiar to just my model. Others had discovered all manner of ways involving much switching or button pressing to produce a carrier so that the linear amplifier or aerial tuning unit could be adjusted for a change of band. In most cases the handbooks do not mention how this should be done.

One very expensive rig is able to provide a low level carrier but this is unsatisfactory because in most cases it will not provide sufficient drive for correct operation of a linear.

Tuning an amplifier at low drive without checking the adjustments again at the designed working power output could result in damage to the valves. The need to exercise care when tuning linear amplifiers is usually emphasised in manuals and handbooks. Using a large amount of drive in the initial tuning causes overheating of the valves and stress on circuit components leading to premature failure and costly replacements

AG6K has written about this problem and described a tuning pulser that keyed the transmitter at roughly 28 dots per second, on for 12ms and off for 24ms [1]. Using the normal level of drive for correct power output the pulser allows the amplifier to be tuned at the intended working power level while maintaining a lower average amplifier power level. This greatly reduces overheating and stress on components and the possibility of arc over. This type of pulser can be used in the CW mode only. Tuning up while operating in the CW mode is a little easier than when using SSB so a simple means was needed for use when operating SSB.

All manner of methods can be heard which include whistling or blowing into the microphone and attempting to sing a constant note. Usually this is done with the antenna connected and no thought of switching to a dummy load.

*Sunrays, Barnstaple Cross, Crediton, Devon EX17 2EP.

The components are mounted on stripboard.

Using the pulsing principle described by R L Measures, AG6K, a simple unit was constructed to produce a pulsed tone that is fed into the microphone input at the appropriate audio level.

This provides a sufficiently stable pulsed tone which allows tuning to be done quickly at full power but with the equipment operating at a lower average power level and therefore greatly reducing any risk of damage. The on/off ratio and speed of the pulses is such that approximately half power is registered on the power meter. The pulse speed is set just high enough not to cause the power meter needle to flicker.

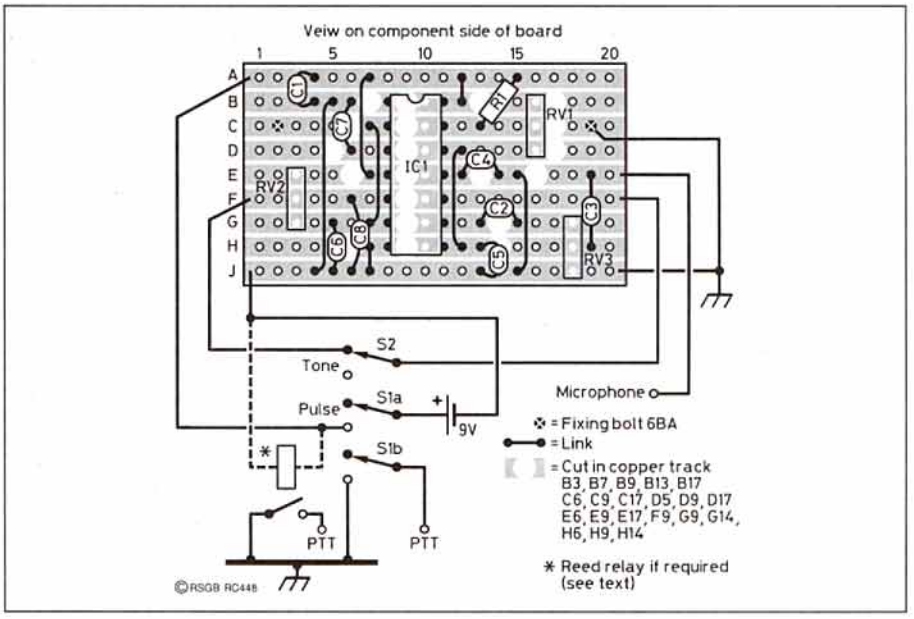


Fig 2: Tone pulser, component layout.

THE CIRCUIT

THE CIRCUIT DIAGRAM is shown in **Fig 1**. A single NE556 IC contains two timers of the NE555 type that can be used in a large number of ways. The circuit uses one half as an audio oscillator that can be adjusted to provide an output frequency somewhere around 800 to 1500Hz.

The frequency is not critical providing that it is within the audio bandpass range and it is determined by adjusting RV1. The output is connected across the microphone and the injection level is set by RV3. The other half of the NE556 is an astable multivibrator that provides the pulsing. RV2 sets the pulse speed that gates the audio oscillator from pin 5 of the IC.

The pulse shape is quite sharp and the addition of C8 rounds the corners to reduce spikes. It was not felt necessary to provide any adjustment for the pulse ratio. It would have allowed control of the transceiver average power output but would have made the circuit needlessly more complicated. The types of capacitor used are not important and were ones that were on hand. Tantalum capacitors were used for C1 and C8 because of their convenient size for mounting on the strip board.

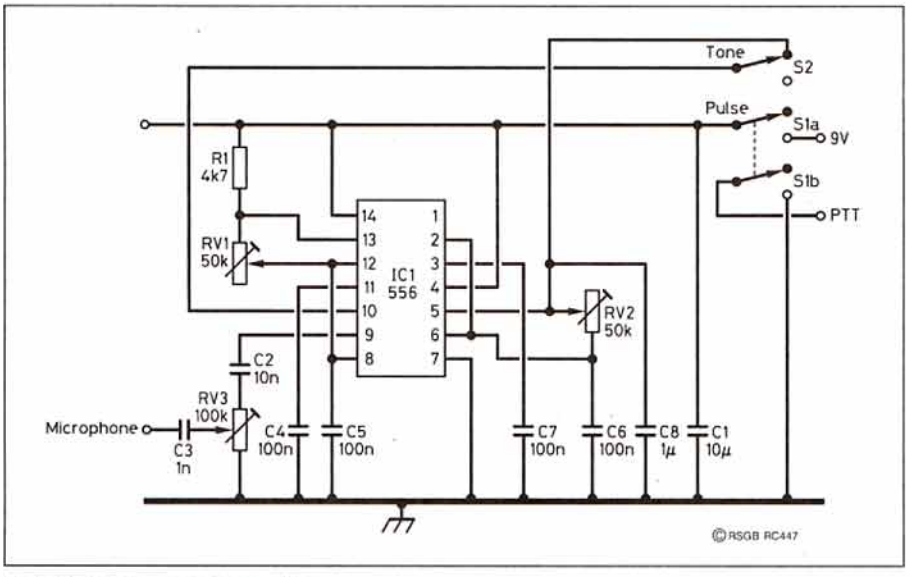


Fig 1: Circuit diagram of tone pulser.

CONSTRUCTION

THE PULSING UNIT is built into a small diecast metal box that rests on the operating desk. A lead from the box plugs into the transceiver microphone socket and the microphone plugs into the socket on the pulsing unit. If the microphone is a desk type then it might be more convenient to plug the short lead into the microphone base and use the double ended microphone lead to connect the pulser to the transceiver. The only controls are two non-locking press switches. One switch causes a pulsed tone to be connected to the microphone lead to the transceiver and at the same time operates the PTT. Pressing the second switch while holding down the first changes the pulsed tone to a continuous tone.

All the components are mounted on 0.1 inch pitch copper stripboard, 20 holes by 9 rows. Location of components and where copper strip has to be removed from the board is shown in **Fig 2**. The board is secured by two 6 BA bolts with spacing pillars and the PP3 battery is held by a double sided sticky pad of the type used for fixing wall mirror tiles.

One of the non-locking press switches should have two make contacts but suitable two pole press switches are not easy to obtain.

Fig 2 shows how this was overcome in one of the two units made. A reed relay was mounted in the box, again with a sticky pad, and operates when current is applied to the pulser board.

A contact of the reed relay is connected to operate the transceiver PTT. The microphone socket on the pulser and the plug on the short lead to the transceiver must be of the same type as used on the transceiver and microphone. The connections are pin to pin from plug to socket using the

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RADCOM TECHNICAL FEATURE

Graphic Method for Calculating Z

By A J Harwood, G4HHZ

THIS ARTICLE AROSE out of a simple enquiry which upon reflection (and *there's* an apt phrase when writing about transmission lines) proved quite difficult to answer without being too mathematical whilst still giving an adequate explanation.

The question was prompted by a discussion on the measurement of impedance using a noise bridge and was: "If a complex impedance (consisting of both a resistive and reactive component) is measured at the end of a transmission line how can the standing wave ratio on the line and the impedance at other points on the line be calculated?" The quick answer is that you simply plot the impedance on a Smith Chart.

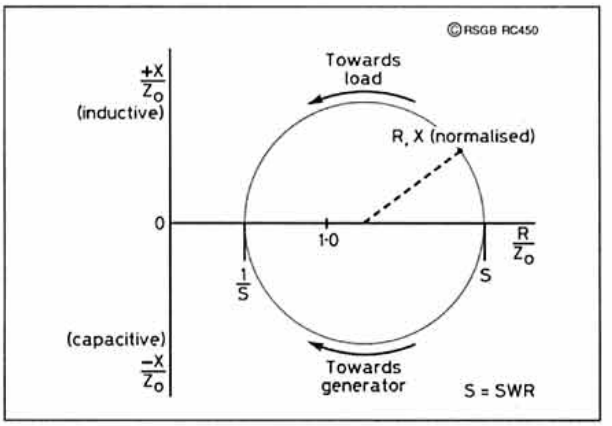


Fig1: Plotting all values of impedance along a line results in a circle. If the impedance is normalized the circle passes the points S and 1/S on the R axis. From S to 1/S corresponds to a quarter wavelength on the transmission line.

THE CIRCLE CHART

AS THE ENQUIRER was neither familiar with, nor had, a Smith Chart, I showed how to use a different graphical solution which also gives a lot of information of use in allied areas such as the design of impedance bridges and aerial tuning units. What this article aims to do is to explain how this method, a simple graphical transmission line calculator known as the Cartesian Circle Diagram, can be constructed with a ruler, compasses and protractor and used in conjunction with a pocket calculator to solve such problems.

Although an understanding of the mathematics is not essential to solving transmission line problems it is helpful to understand exactly what is meant by impedance, perhaps by reading G4FZH's recent article [1], explaining how impedance changes at different points along a transmission line. A full explanation of the latter was given by G3HRH in [2] and is summarised opposite.

It is the usual practice when dealing with transmission lines to work in terms of the normalised impedance, that is all impedances are divided by the characteristic impedance, Z_o, of the line. For instance a resistance of 75Ω connected across a 50Ω line has a normalised value of 75/50 or 1.5. This article considers the case of series connected impedances and those quoted will be normalised.

One of the easiest ways of understanding a subject which can be expressed as a complicated mathematical expression is by plotting it as a graph and this is particularly true when applied to the transmission line problem. Taking a lossless line which is over a half wavelength long and terminated in a normalised impedance, R_t in series with X_t, the resistive and reactive components R and X of the impedance arising as the measurement point is moved along the line are plotted. Resistance is on the horizontal scale, (1 representing the characteristic impedance of the line) and the reactance is on the vertical. By convention inductive reactance is positive and capacitive reactance is negative. This results in a circle as shown in **Fig 1.** The complete circle represents the change of impedance occurring over a half wavelength of line for the particular load impedance. Moving around the circle in an anticlockwise direction corresponds to moving from the measurement point towards the load and vice versa. Of particular interest are the points which are purely resistive since these are equal in value to the SWR(S) and its reciprocal (1/S) and are a quarter wavelength apart. As an example, for an SWR of 2 the circle passes through 2 and 0.5 on the line of zero reactance and so has a diameter of 1.5 with its centre at the point (2+0.5)/2 = 1.25. In general terms the circle will have a diameter of (S-1/S) with the centre at (S+1/S)/2. We are well on the way to answering the original question! To find the complete answer we need to consider **Fig 2.**

The circle passing through the point R,X also passes through the point R, -X and two other points where the reactance is +X and -X but the resistance has a different value, r. Point r, -X lies at the other end of a diameter of the circle to R, X. R, r and X are connected by the expression.

$$Rr = 1 + X^2 \text{ or } r = \frac{1+X^2}{R} \quad (1)$$

so as R and X are known, r can be calculated. The centre point of the circle is at R_o on the zero reactance line. Here the reactance is at its maximum value, X_{max} R_o has the average value of R and r, so can also be calculated since

$$R_C = \frac{R+r}{2} = \frac{R+\frac{1+X^2}{R}}{2} = \frac{R^2+X^2+1}{2R} \quad (2)$$

The circle can now be drawn with centre at R_o, 0 and a radius from this point to R, X enabling S to be found.

X_{max} can also be calculated since at this point the values of R and r coincide both being R_o hence

$$R_O^2 = 1 + X_{max}^2 \text{ or } X_{max}^2 = R_O^2 - 1 \quad (3)$$

$$\text{As } R_O = \frac{(S+\frac{1}{2})}{2} \text{ and } X_{max} = \frac{(S-\frac{1}{2})}{2S}$$

S can also be determined simply by adding R_o to X_{max}.

To summarise we can find a second point on the circle from equation 1, and its centre from equation 2. The SWR can then be found either by drawing or by using equation 3.

PRACTICAL EXAMPLE

AT THIS POINT perhaps it would be useful to take an example and see how it works out in practice. Like many amateurs I use a G5RV multiband dipole and have measured the impedance on all bands at the junction of the balanced open wire feeder and the 75Ω feeder into the shack. On 14.2MHz the equivalent series impedance is 88.5Ω resistance and 8.43Ω inductive reactance, which normalised to 75Ω is 1.18 resistive and +0.1124 reactive.

Calculating R_o (from equation 2) gives a value of $(1.18^2+0.1124^2+1)/(2 \times 1.18)$ which is 1.019; X_{max} (from equation 3) is the square root of $(1.019^2 - 1)$ or 0.196. Adding R_o and X_{max} gives the value of S as 1.215 which is quite a good SWR to be working with. What though of the SWR on the open wire feeder which, for my G5RV has a Z_o calculated from its dimensions of 620Ω? Normalising the measured values to this gives 0.1427Ω resistive and 0.014Ω reactive. R_o works out at 3.576 and X_{max} as 3.433 giving an SWR of 7:1 on the open wire feeder. A high SWR does not necessarily mean an inefficient aerial system!

* 55 Nichol Road, Chandlers Ford, Eastleigh, Hants SO5 1AX.

The circle diagram is a graph of all values of impedance existing on the transmission line for a given value of SWRS and although moving a given number of electrical degrees along the line does not correspond to moving twice the same distance around the circle (as is the case for the Smith Chart) the diagram can be used to calculate the impedance at any point once the relationship between a point on the circle and its equivalent position on the transmission line is known. For instance it is often useful to know the impedance a quarter of a wavelength along the line from a point where the impedance is resistance R in series with reactance X. Here the values of the resistance and reactance are given by

$$\frac{R}{R^2+X^2} \text{ and } \frac{X}{R^2+X^2} \quad (4)$$

Alternatively they can be found graphically by drawing a line from R, X through the point $1/R_o$ ie $2/(S+1/S)$ on the zero reactance line. This line intercepts the circle at the point corresponding to a quarter wavelength along the line from R, X.

To find the impedance at any point one of the two purely re-

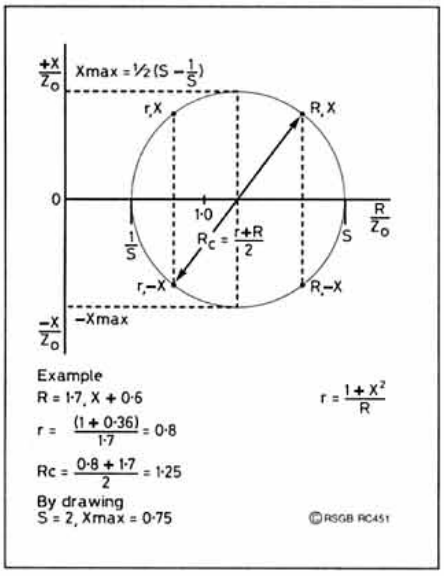
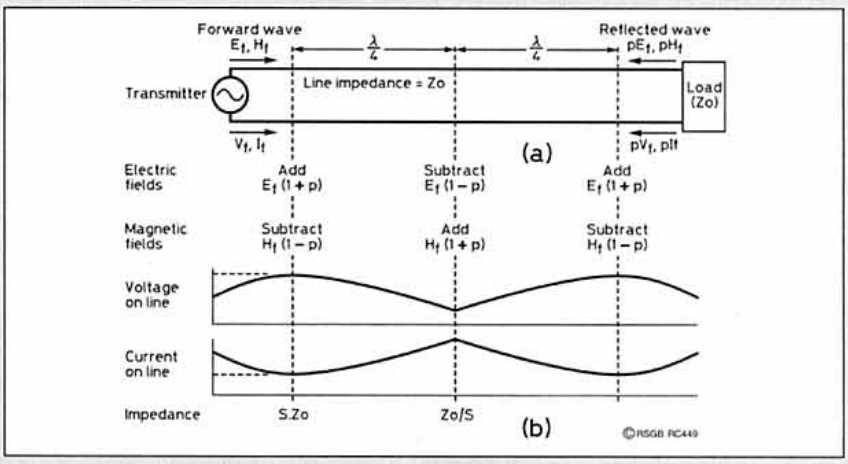


Fig 2: The SWR can be found from the values of R, X by calculating r = I + X²/ R and Rc = R = r / 2. The SWR circle can then be drawn.



On an unmatched transmission line a portion (p) of the forward power ($V_f \times I_f$) is reflected at the load to give reflected power of $pV_f \times pI_f$. This causes the impedance along the line to vary and gives rise to a standing wave of SWR(1 + p)/(1 - p).

WHY THE IMPEDANCE VARIES ALONG A TRANSMISSION LINE.

ENERGY SUPPLIED BY a generator of V_f volts and I_f amps to a lossless transmission line of characteristic impedance Z_o is transported by means of an electromagnetic wave with electric field E_f and magnetic field H_f to the load as shown in the diagram. If the load is purely resistive and equal to the line's characteristic impedance Z_o then all the energy fed to the line is dissipated in the load and the input impedance is purely resistive and equal to the load: the load is properly matched to the line. For all other values of terminating impedance a portion of the energy fed to the line is returned towards the input by a reflected wave. The magnitudes of the electric and magnetic components of the reflected wave are related to that of the forward fields, E_f and H_f, by the reflection coefficient, p, which depends on the load and Z_o. If p is 10% then the reflected wave has an amplitude of 10% of the forward. At any point on the line the phases of the two fields of the reflected wave relative to those of the forward are determined by the load, the frequency and the distance from the termination.

Since the forward and reflected waves are travelling in opposite directions, at those points where the electric fields are in phase the magnetic fields are in antiphase. Here the impedance is purely resistive and at a maximum value. R_{max}, as is the voltage, V_{max}, across the line which is (1+p) times the forward voltage, V_f. The current has a minimum value, I_{min}, of (1-p) times the forward current I_f. The resistance is thus $Z_o(1+p)/(1-p)$. Similarly a quarter of a wavelength away the magnetic fields add and the electric fields subtract with the voltage being at a minimum, V_{min}, of $(1-p)V_f$, and the current at a maximum, I_{max}, of $(1+p)I_f$. Here the resistance, R_{min}, is $Z_o(1-p)/(1+p)$. the SWR, S, is the ratio of the maximum to minimum voltage so has a value of (1+p)/(1-p) and is related to the maximum and minimum resistance values and Z_o by

$$S = \frac{1+p}{1-p} = \frac{V_{max}}{V_{min}} = \frac{R_{max}}{Z_o} = \frac{Z_o}{R_{min}} \quad \text{so } R_{max} = SZ_o \text{ and } R_{min} = \frac{Z_o}{S}$$

$$\text{and } R_{max}.R_{min} = Z_o^2$$

At any point on the line the voltage depends on the vector sum of the forward and reflected electric fields, and the current to that of the corresponding magnetic fields. The impedance is given by the ratio of voltage to current and, for a lossless line, is given by the equation.

$$Z_s = \frac{Z_o(Z_r + jZ_o\,\text{Tan}(L))}{Z_o + jZ_s\,\text{Tan}(L)}$$

where:

Z_o is the characteristic impedance of the line

I_s is the complex input impedance

Z_r is the terminating impedance

d is the distance from load to measuring point

L is the electrical angle corresponding to d and can be expressed either in radians when $L=2\pi d/\lambda$ or in degrees when $L=360d/\lambda$.

T will be used subsequently for the expression tan(L). For a normalised input impedance, Z_i, and terminating impedance, Z_t the equation then becomes

$$Z_i = \frac{Z_t + jT}{1 + jZ_tT}$$

Take the case of a line terminated in a normalised impedance $Z_t = R_t + jX_t$ (ie a resistance R_t in series with a reactance X_t). Substituting these values in the above equation and separating the real and imaginary parts shows that the input impedance Z_i consists of two components, a resistance

$$R_i = \frac{R_t(1+T^2)}{(1-X_tT)^2 + (TR_t)^2} \text{ in series with a reactance } X_i = \frac{(X_tT)(1-X_tT)^2 - TR_t^2}{(1-X_tT) + (TR_t)^2}$$

Plotting these values of R_t and X_t for different values of L results in the circle diagram.

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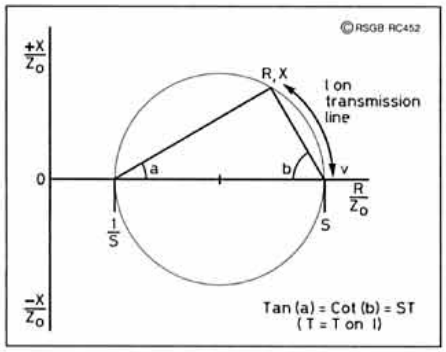

Fig 3: The distance on the transmission line between R, X and S can be determined from angle a or b.

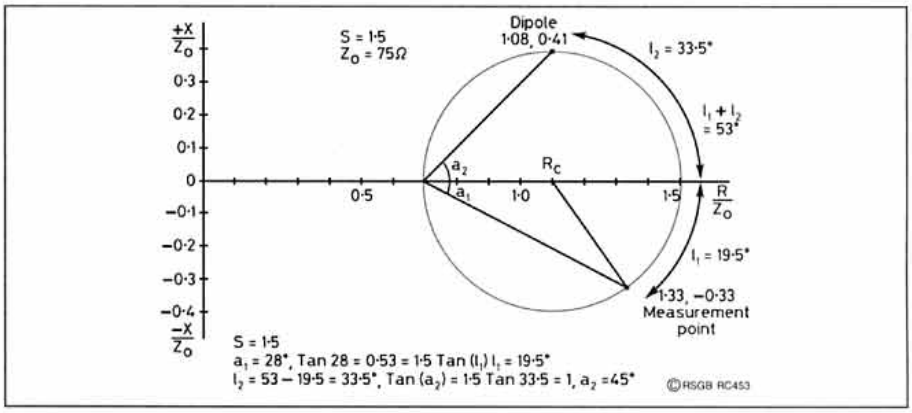

Fig 4: The circle diagram can be used to calculate the impedance at the input to a dipole from a measurement made at the transmitter end of the feeder.

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sistive points where the normalised impedance is S or 1/S is taken as a reference. The distance from the measuring point to that where the resistance is S as shown in **Fig 4** can be calculated from

$$\tan(a) = \cot(b) = ST \qquad (5)$$

where T = tan(L) and L = 360 d/λ as in the side bar.

We now have a graphical method whereby the impedance at any point on the line can be calculated if its characteristic impedance and the impedance at one point are known. For instance the impedance at the input to a dipole can be calculated from a measurement at the bottom end of the feeder.

To illustrate this consider the case of an 80m dipole fed by 75W twin balanced feeder 12 metres long corresponding to 53° or 0.146 wavelengths at 3.65MHz. The impedance measured at the transmitter end is 100W in series with -23W capacitive reactance giving normalised values of 1.33 resistive and -0.33 reactive. Calculating the SWR gives 1.5, quite good for a dipole but can it be improved by adjusting the dipole length?

To find out the impedance at the dipole must be determined **(Fig 4)**. Plotting the impedance on the circle diagram shows that the angle a_1 is 28°, the equivalent electrical angle L_1 on the feeder is found using equation 5.

$\text{Tan}(a_1) = S\,\text{Tan}(L_1)$ so $\text{Tan}(28) = 1.5\,\text{Tan}(L_1)$

giving L_1 as 19.5°. The total feeder length is 53° and to get to the dipole impedance a further equation 1 calculation is required for angle L_2 of 53 - 19.5 = 19.5° to get a_2. Here

$\text{Tan}(a_2) = 1.5\text{Tan}(33.5)$ whence $a_2 = 45°$

The line from 1/S at 45° cuts the circle at 1.08, +0.41 corresponding to a dipole impedance of 81Ω in series with 31Ω inductive reactance. The dipole is too long and judicious pruning should reduce the standing wave ratio.

REFERENCES

[1] 'Circuit Concepts Explained', Clive Smith, G4FZH, *Radio Communication*, Volume 69 No 11, November 1993.

[2] 'Some Reflections on Standing Waves', R C Hills, G3HRH, *RSGB Bulletin* Vol. 40 No 1 January 1964.

PULSED TONE TRANSMITTER TUNING UNIT

Continued from page 63

pins which are normally in use. From the transceiver manual identify which pins are for the microphone and PTT and connect these to the pulser as shown.

ADJUSTMENT

CONNECT THE MICROPHONE to the pulser and the pulser lead to the transceiver. First set RV3 so that the slider is at the earth end of the control. This ensures that the output to the microphone is minimum. Some means of listening to the output is required and this can be an earphone connected across RV3 from the junction with C2 to earth.

If you have a monitoring facility on your transceiver then this could be used in which case RV3 should be adjusted for a low level audio tone when carrying out the following adjustment. Press both switches and adjust RV1 until you hear a tone of about 800 to 1500 Hz. Release SW2 and adjust RV2 so that the tone is pulsed at somewhere around 100 times per second. This is a preliminary setting for RV2. If an earphone was used to monitor the output then it should be removed now.

With your transceiver already tuned preferably into a dummy load via an SWR or power meter, press SW1 and adjust RV3 to indicate power into the load. Watch the meter needle while you turn RV2 so that flickering is reduced to an imperceptible amount. With both switches pressed adjust RV3 so that maximum power out is indicated, then back off RV3 so that the output is at the point where power just begins to fall. If your power meter can be switched to show average or mean power then you will find in that position the reading is similar whether pulsing or continuous tone.

As a guide, the resistance values for RV1 and RV2 were measured to be approximately 5k6 and 22k respectively when adjusted for correct operation.

CONCLUSIONS

TWO IDENTICAL PULSERS have been made and both are in constant use with a FT1000 and a FT990 elsewhere. They sit on the desk beside the microphone and are taken for granted as the means for tuning the linear amplifier when on SSB. Changing bands is so amazingly fast that no longer is there need to consider whether or not it will be worthwhile doing so - especially when contesting.

The pulser is a simple project and the cost is obviously very small but the value is high. No doubt the circuit could be improved but it does what is wanted adequately. It would not be too difficult to add a means of using the multivibrator to key the transceiver on CW and so make the tuning up exercise even more simple when operating in that mode.

REFERENCES

[1] 'A tuning pulser for SSB Amplifiers', *Ham Radio*, September, 1985 page 33. Richard L Measures, AG6K.

COMPONENTS

Resistors	
R1	4k7 0.25W
RV1	50k Cermet in line tags for 0.1" grid pitch
RV2	50k Cermet in line tags for 0.1" grid pitch
RV3	100k Cermet in line tags for 0.1" grid pitch
Capacitors	
C1	10µ Tantalum
C2	10n Ceramic/Polyester
C 3	1n Ceramic/Polyester
C4,5,6,7	100n Ceramic/Polyester
C8	1µ Tantalum
Semiconductors	
IC1	556
Miscellaneous	
Diecast Metal Box	approx 110 x 60 x 30 mm
S1	non-locking press button, two make contacts (see text)
S2	non-locking press button, one break contact
Copper stripboard	0.1" pitch, 20 holes x 9 rows
Battery press stud twin for PP3	
Plug and socket to match those on microphone and transmitter	
Four stick-on rubber feet for case	
Short length of multi-wire screened cable	
Number of conductors to be the same as used on microphone lead	
Reed relay, one make contact (if needed but see text)	

Pat Hawker's Technical Topics

PAT HAWKER, G3VA
London 37/SE22 8SS

NEAR-TO-EARTH ANTENNAS

ON A NUMBER OF OCCASIONS attention has been drawn to the value of NVIS (Near Vertical Incidence Skywave) propagation for medium-distance contacts on such bands as 3.5, 7 and 10MHz as a means of largely overcoming the problem of the skip ('dead') zone. By directing the bulk of radiation at a high vertical angle at frequencies around the critical frequency, reliable working at distances up to a few hundred miles, without a skip zone, can usually be achieved. For military applications, this requirement has encouraged the use of compact transmitting loops or very low dipoles not more than about 10ft above ground (*TT* noted many years ago the marketing by Racal of a low dipole for this application). Conventional vehicle whip antennas, on the other hand, have a pronounced null in the vertical direction.

Traditionally, amateurs plan their antennas to provide maximum low-angle radiation and so enhance long-distance working, or use vertically-polarized antennas to maximise ground-wave propagation. As William McLeod, VK3MI puts it in 'Low Radiators and High Ground Planes' (*Amateur Radio*, November 1994, pp10-14): the accepted amateur criteria for horizontal HF radiators has traditionally been 'as high as possible' not only to take advantage of ground reflection but also to clear obstructions, particularly metal conductors and sizeable buildings. Yet, on the lower HF bands, for most suburban and portable locations these conditions of height and space are virtually impossible. Furthermore, in the real world, the ground reflector is anything but perfectly conducting and should be regarded as a lossy dielectric.

VK3MI points out that for 7MHz a height of 10m is a bare quarter-wave above ground; on 3.5MHz only an eighth-wave. This raises the question whether in practice it is worth striving even for this height. What sort of performance can be expected from horizontal antennas only a metre or two above ground? VK3MI summarises the factors involved with low horizontal radiators as follows:

- For low practical heights the radiation resistance at the centre of a resonant dipole remains within the 2:1 VSWR range for the usual coaxial cable feeder so matching procedures are minimal, more so when an electrical half-wave of cable is used to transfer the centre impedance directly to the transmitter: see **Fig 1.**
- Whereas the resonant length of a dipole remote from ground is mainly determined by the length-to-diameter ratio of the conductor, when the ground becomes an increasing part of the dielectric the length is determined by the height to diameter ratio: see Tables 1 and 2. Due to the wide spread of dielectric constant no simple formula can determine this ratio.
- The losses increase as height decreases towards ground level but do not become prohibitive until very low levels are reached; for a 7MHz dipole above common clay this can be as low as λ/40 (1m). [In desert conditions, an antenna can be laid directly on the sand, or even buried a few inches below the surface and yet still radiate reasonably well - G3VA].
- The 'cone' of radiation directed vertically, then reflected back from the ionosphere, can produce non-direction communication with no 'skip distance' to some 400-500km. This is NVIS transmission and is the mode supporting most of those semi-local nets on the 3.5MHz and 7MHz bands. There is usually some fading but for SSB reception the long AGC time-constant of the receiver will alleviate this.
- Two or three hop transmission can occur where the intermediate reflection points fall at sea so some long-distance working is possible in these favoured directions without low-angle transmission lobes. Land reflection points include greater losses which soon become excessive.

VK3MI in his Amateur Radio article provides detailed test results and tabulated data, including **Tables 1** and **2**. He sums up his results as showing that: "In general, the resonant horizontal dipole is an effective radiator at very low height from ground, particularly for NVIS transmission, or where a 'concealed' antenna is required. Losses increase seriously below λ/30 and the high impedance ends of the elements should have at least this amount of separation from ground or metallic earthed objects, towers and poles - but λ/30 is only 1.5m for the 7MHz band.

"Kevlar, Black Dacron, Polypropylene Baler Twine and Nylon Rope are all suitable insulating supports with far less end effects than the single egg-shaped strain insulator wired back to a steel tower which has been commonly used. Supports of this nature have been measured with 6 to 15pF coupling to the earthed object and Table 2 can be used to estimate the end effects of this type of support.

"With the elements double-insulated inside the popular 12mm polypropylene garden irrigation piping erected at 1.5m on the post side of a suburban wooden fence a very effective concealed radiator should result. For portable use a couple of 4m bamboo poles for end supports and a saggy dipole radiator require no apology as to effectiveness for NVIS transmission but directivity, if any, depends on local obstructions and reflectors."

Apart from considerations of possible RF

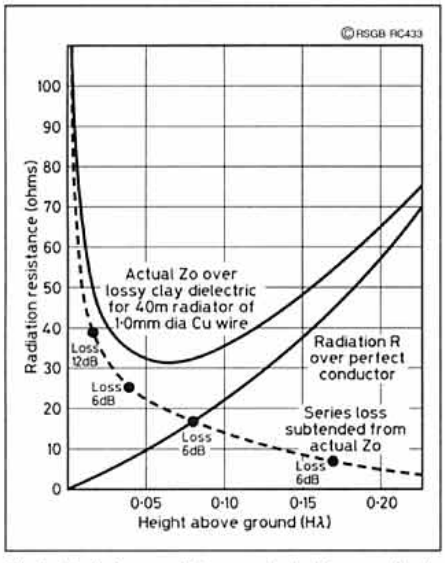

Fig 1: Radiation resistance of a half-wave dipole less than a quarter-wave above ground.

Horizontal dipole - 8m94 + 8m94 - nominal 33μH

Shape	Height (metres) End	Centre	End	Freq. kHz	Impedance Ω	'E' factor %	Measured C = pF
Level	2	2	2	7765	31.5	92.5	38
Saggy	2	1	2	7810	32	93	37
Level	1	1	1	7705	35.5	91.75	39
Droopy	0.05	1	0.05	6977	47	83	43
Level	0.05	0.05	0.05	4710	116	56	110

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Table 1: Effects of shape, close to clay ground for Dipole of 1mm dia. PVC covered wire - (hot, dry weather - green grass).

Level horizontal dipole - 8m94 + 8m94 - nominal 33μH

Height	Freq. kHz	Impedance Ω	'E' factor %	Measured C = pF	Resonant C = pF
2m0	7767	31R5	92.5	38	12.5
1m5	7745	32R	92.3	37	=
1m	7727	35R5	92	38	=
0m5	7550	45	90	40	=
0m2	7135	61	83	46	15
0m1	6400	70	76	87	=
0m05 (50mm)	4710	116	56	110	35

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Table 2: Effects of height above clay ground for Dipole of 1mm dia. PVC insulated copper wire - (hot, dry weather - green grass).

health hazards with high-power operation if the radiator is close to a living area (most current guidelines stipulate a minimum safe height of 30-35ft for high-power HF operation) there are other safety aspects that need to be considered. VK3MI writes: "Safety is an important consideration for both low radiators and for elevated ground planes. One part is physical in that any wires below 3m can be regarded as a trap for man and beast, including horses and wandering cattle. Even in daylight a thin wire can disappear against some backgrounds and at night is a very serious hazard. Therefore a protective, non-metallic guard-rail or fence is necessary, not just a coloured streamer tied in the middle of the hazard.

"Another aspect of safety is electrical as even at low power a nasty sting and RF burn can occur which, for non-technical people or for climbing children, can produce an emotional reaction far in excess of the initial injury. At medium power, around 100 watts, these effects can become severe and for higher powers the effect of corona and irradiation must also be considered. The use of unprotected low installations is not recommended for high powers and even for low power the radiator should be double insulated by enclosure in plastic pipe or conduit."

In his article, VK3MI also describes how by erecting an antenna above the double-pitched metal roof of a building about 20m long and some 6 to 8m wide, it is possible to obtain low-angle radiation: a system he dubs a 'Woolshed Reflector'. He also provides information on elevated ground-plane antennas and vehicle whip antennas.

WHO NEEDS INTEGRATION?

TT, MAY 1991 told the 'Sad story of an electronic hobbyist' based on the account of Robert W Lucky in *IEEE Spectrum*. He explained how he had found that electronics home-construction, a hobby he had followed since youthful building of progressively more complicated radio receivers, hi-fi amplifiers, home-designed computers and writing software programs in the golden age of home-construction, had gradually been overtaken by 'keep-your-hands-off' commercial packages. He questioned whether there was any connection with the steady drop in enrolments in electronic engineering. I pointed out that amateur radio was one of the few remaining areas in which to some degree home-construction was still attractive and worthwhile - even if the golden age has lost much of its glitter.

Pierre Mosrin, F2WW draws attention to an article 'Integration: who needs it?' by an Edinburgh University lecturer, Alistair Armitage, in *Physics World* (November 1994, p80). Like Dr Lucky, his interest in electronics had been sparked off early on - in his case the result of "the long hours I spent as a youth mucking about with an electronics construction kit."

Building a succession of projects, with never enough components for more than one at a time, he found that "most of the fun came in building and debugging the circuit". Admittedly he learned "surprisingly little theory, despite the simple explanations included in the manual. Theoretical rigour (yawn) came later during my student days, and when I began teaching electronics. But I was left with an impression that tinkering with electronics was fun. This led me on to the hobby electronics magazines and the joys of our local hobby electronics store [but not apparently to Amateur Radio] . . . . Now, some 25 years later, electronics has moved on. The hobby shop has closed down due to a decline in the market. Why on earth should this be, when electronics is now seemingly all-pervasive . .

"The answer is simple: integration has killed the fun of tinkering with electronics. A glance at an RS catalogue illustrates my point. Why spend a rainy afternoon soldering transistors when you can buy a 'monolithic integrated audio amplifier' for the princely sum of 53p. turn on three pages and there is the ZN414Z receiver. this disgusting 10-transistor device provides a complete RF amplifier, detector and AGC circuit on one chip for 90p. What's even worse, the dratted thing only has three leads, labelled i/p o/p and gnd. I defy anyone to get any technical satisfaction out of building a circuit with that . . !"

But Alistair Armitage does find some positive benefits in integration: "The most important seems to be in digital circuitry and computing - an area only made accessible to the hobbyist through the advent of integration. and perhaps there will also be a renaissance in hobby electronics when we can design our own chips using home computers. Will we take our designs into the local high street silicon foundry for processing, in the way that we now get our photographs developed . . . We might then get back to the stage of mucking around with circuits, useful and useless, just for the hell of it. . . .While waiting, pass me my soldering iron - I've still a few transistors to stick into this Walkman I'm building."

SHARPER-RESONANCE STRIP-LINE FILTER

THE JANUARY 1994 *TT* (p40) included the experiences of P R Kemble, G3UYK in using a 144MHz strip-line filter (as originally described in *Radio Communication Handbook*) in overcoming the problem of the bursts of 153MHz data (paging) interference to 144MHz mobile reception, particularly in town centres, emphasising the relatively poor selectivity of VHF front-ends.

This item proved of interest to Uwe F W Keonneker, DL80BF of the Institute of Space Technology and Reactor Technology in Braunschweig, Germany. His problem was the reverse situation to that of G3UYK. Interference from a local 144.675MHz amateur radio digipeater to reception of BREMSAT-signals on 137.800MHz +/- Doppler-shift. DL80BF built the strip-line filter as described in the January *TT* and found it no problem to detune the filter to 137.8MHz. Unfortunately the -3dB bandwidth proved to be 15MHz so that attenuation of the digipeater signals was insufficient. However, the insertion-loss was less than a dB despite the use of less than optimum materials for the strip lines (copper- and zinc-plated sheets of metal). This underlined that this filter-design would be beneficial for broad bandwidth and low insertion losses but unable to overcome the digipeater interference to their satellite receiver.

With the help of Ullrich Wintzer, DL7FZ, the filter was modified to give a sharper resonance though at some increase in insertion-loss. The modified filter design is shown in **Fig 2** and its characteristics shown in **Fig 3**. DL8OBF writes:

"Only two strip-lines are used with looser coupling, reducing the bandwidth but resulting in a rather higher insertion-loss of roughly 1.8dB. We have chosen galvanic coupling to the coax as this achieves better far-off rejection. For mechanical reason I used the more easily-available 'radial' capacitors with the value unchanged at 50pF. With the dimensions shown it is no problem to detune the filter to the amateur-band nor to use it for satellite reception. After cascading this filter with the pre-amplifier and a further commercially-made filter we completely eliminated the interference caused by the 144MHz digipeater.

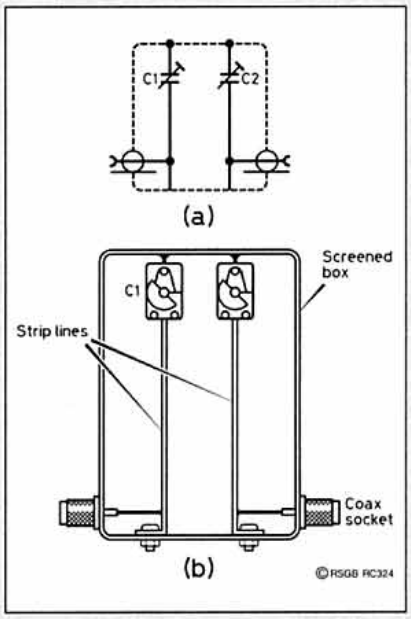


Fig 2: Modified strip-line filter with sharper resonance than the design shown in *TT* January 1994.

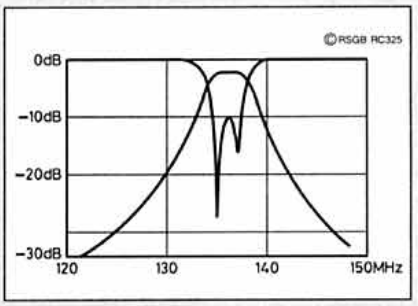


Fig 3: Return-loss and insertion-loss of the modified strip-line filter.

TESTING A SCIENTIFIC CALCULATOR

A BBC TV programme recently drew attention to the errors that can arise when using certain computers; such chip errors may in some circumstances be very significant. An

WATERPROOFING DIPOLE TEES

THE PROBLEM OF providing effective waterproofing of the connection between a coaxial-cable feeder and an antenna element has been raised a number of times in *TT* and elsewhere but it seems worth emphasising that this is a perennial problem. As Dr J A Share, G3OKA puts it: "One of the curses of the British climate is the rain and the resulting tendency of rainwater finding its way into small openings and ruining any electrical contact with which it comes into contact. Over the past thirty years countless lengths of coax cable have been destroyed by rain water penetrating dipole-centre connections." [A major problem is that, particularly with air-spaced and semi-air-spaced cables, a single entry-point can ruin many metres of costly cable - G3VA].

G3OKA continues: "Some six years ago a simple waterproofing idea was noted in the *ARRL Handbook* in connection with a lightweight portable dipole design. This used a plumbers plastic Tee, three rubber bungs, DIY sealant, waterproof adhesive and some scrap fibreglass circuit board. Since adopting this practice and despite the rigours of six winters and summers, I have experienced no repetition of water penetration and the design (**Fig 4**) seems worthy of greater exploitation.

"The Plumbers Tee can be purchased from DIY stores (22mm ideal size) and suitable rubber bungs are available from stores selling home wine-making materials. A tube of black waterproof glue is recommended but clear Bostick would no doubt suffice. Superglue can be used but this makes it impossible subsequently to take the connection apart. Only a small amount of silicone sealant is required (left over from some other DIY project?). Since the full strain of the antenna is taken on the centre insulator, 3.2mm fibreglass PCB is recommended, but alternatively two pieces of standard 1.6mm board could be superglued together, but in this case it is essential to roughen the surfaces to be joined, otherwise the pieces will not adhere.

"Hold the Tee in a vice, force in the bungs and drill the holes with a hand drill, using sharp bits somewhat smaller than the required hole sizes. If done slowly and carefully the bungs will be a tight fit onto the coax/antenna-wire. Cut the centre insulator so that it is about 6mm less than the distance between the inside ends of the bungs; drill holes for the connections; and remove the unwanted copper from the centre of the insulator using a rough file or by tinning the entire area and then lifting off the copper using a sharp knife while the solder is molten.

"Fit bung (3) onto the coax and feed the coax into the tee so that it exists at one of the wire holes; feed the antenna wire through bung (1) and then through the Tee. Feed the second antenna wire through bung (2) and assemble the centre insulator. Ensure the solder joints are of high quality because it is difficult to resolder once the centre is fully assembled. It takes a little dexterity to push the insulator back into the tee, rather akin to a ship in a bottle.

"Apply Waterproof Bostick to the antenna wires close to the centre insulator and also to the inside of the Tee where bungs are going to be fitted. Slide the bungs into place and leave until the adhesive is cured. Fill the Tee-piece with the silicone sealant leaving space to fit the final bung. Curing time varies according to the sealant but at least 24 hours should be allowed. The final step is to coat the coax with more waterproof Bostick and glue the last bung into position.

"In practice, the whole assembly is light yet strong, and has withstood the wind-loading on a W3DZZ trap-dipole at 40ft in a location only a few hundred metres from the Irish Sea for the past six years without failure or water penetration.

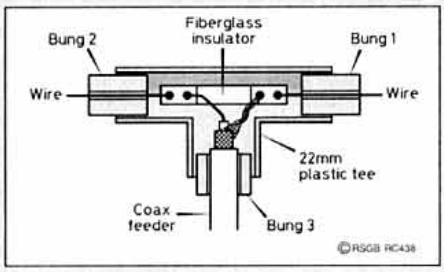


Fig 4: Detail drawing of the waterproof dipole Centre Tee.

anonymous *TT* reader has sent along a rigorous 'Engineer's test for any scientific calculator. Put calculator readout into degree mode and then press buttons as follows: 29°; sin; cos; tan; x^2; log x; 1/x; 1/x; 10^x; $\sqrt{x}$; arc tan; arc cos; and finally arc sin. The resulting readout should be approximately 29° of arc +/- 0.01.

A NEW LOOK AT THE MULTEE ANTENNA

IN CONNECTION WITH the quarter-wave folded dipole antenna, I included in the November 1944 *TT* (p62) an outline of the two-band Multee antenna originally devised by W6BCX and which has appeared for many years in editions of the *Radio Handbook*. However the dimensions given in Fig 11 were those given in *TT*, May 1965 and appear to have been taken from an article in *73* or *CQ*, although the rather different dimensions given in the text for a 1.8/3.5MHz version are as given in the *Radio Handbook*. The version reproduced in *TT* suggested open-wire line and not 300ohm ribbon with its lower velocity ratio for both the vertical and horizontal sections whereas recent editions of the *Radio Handbook* (including the 1992 edition) suggest that 300ohm open-wire TV-type line can be used. **Fig 5** shows the Handbook dimensions.

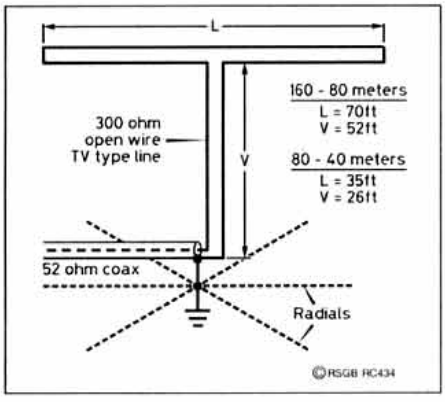


Fig 5: The Multee two-band antenna with dimensions as shown in *The Radio Handbook*.

Dr John S (Jack) Belrose, VE2CV has sent some pertinent comments on this antenna. He writes:

"I wonder whether anyone has fabricated a Multee - in my view it is certainly not a resonant antenna, but it does have interesting radiation characteristics. I can computer-model antennas, including folded antennas, provided that open wire is used.

"The purpose of my letter is to question the dimensions given in *TT*. You have suggested making the antenna out of 300W twin lead. [Actually the November *TT* referred to 300ohm *open wire* - G3VA]. This is not a good suggestion, since whatever the frequency (low-band or high-band) there is a large standing wave on the antenna. Also re-dimensioning the antenna raises the question of dimensioning the length of a radiator (which is independent of velocity factor) and dimensioning a transmission line (where the velocity factor is important).

"A folded dipole is a (sort of) complex radiator, since it carries both transmission line currents (out of phase currents) and radiating currents (the in-phase currents) on the two conductors. The velocity factors for these two modes are quite different when using 300Ω ribbon.

Let us consider a 3.75MHz half-wave folded dipole made with 300Ω twin-lead. The resonant dipole length for a half-wave radiator is about 123.2ft (37.55m), [half-wavelength times antenna factor] with an arm length 61.6ft or 18.77m. Whereas for the transmission line mode the length for a quarter wavelength is 53.86ft (16.43m quarter-wavelength times velocity factor). Therefore, for the antenna to function properly (better impedance match) you have to include shorting straps at the shorter dimension locations: see **Fig 6** for a folded dipole made from 300ohm ribbon as described in many editions of the *Radio Handbook*.

[The need for such shorting straps with folded-dipoles using 300ohm ribbon was described many years ago in *TT*, and an example appears in *ART7*, p265, derived from *The Radio Handbook* and which, incidentally, was

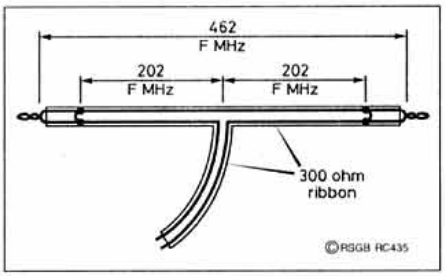


Fig 6: Single-band folded dipole formed from 300ohm ribbon feeder with shorting straps to compensate for the velocity factor of the cable as suggested for many years in *The Radio Handbook*.

used as a 14MHz antenna for many years at G3VA].

VE2CV continues: "All this raises the question: how to dimension the Multee when changing from open-wire line to 300ohm (ribbon or ladder) twin-lead? This begs the question concerning the original dimensions (dimension L2 is not a high-band half-wave times velocity factor). Furthermore, you cannot consider that the two-conductor transmission line forming he vertical element of the antenna acts like a linear (impedance) transformer, when it is fed in an unbalanced way (ie fed on one leg only).

"I have rather carefully modelled the 160/80-metre Multee, having the original dimensions for open-wire line, using a version of NEC-2. I modelled the antenna using 600ohm open-wire line (neither MININEC nor NEC can model transmission lines, particularly shorted (folded) lines, if the spacing between conductors is too small). I have assumed that the antenna is used with four insulated radials, 15.24m (50ft) long, as in the November *TT*. The height of the radials for my model is one metre, but this is not a critical dimension. I have assumed average ground characteristics (σ= 3mS/m, ε = 13).

The antenna is in the X-Z plane, the radials in the 45° planes. The input impedance, according to NEC-2 is 16 - j247Ω at 3.75MHz and 72 -j1059Ω at 1.9MHz (remember that the impedance of the open wire line for the model is 600ohm, not 300Ω). However it is clear that the antenna is not resonant in either the 1.8MHz or 3.5MHz bands.

"**Figs 7** and **8** show the computed radiation patterns. Indeed, the radiation characteristics of the antenna are as described, viz dominantly vertically polarized in the 1.8MHz band; for the 3.5MHz band the polarization is horizontal in the plane orthogonal to the horizontal element, and vertically polarized in the plane of the antenna. The asymmetry of the pattern in the plane of the antenna is interesting. The antenna's impedance will depend on the characteristic impedance of the transmission line used, the dimensions of the antenna, the length and height of the insulated radials, and to some extent on the characteristics of the ground beneath the antenna. A low-loss coaxial feeder must be used together with a good antenna system tuning unit (ASTU)."

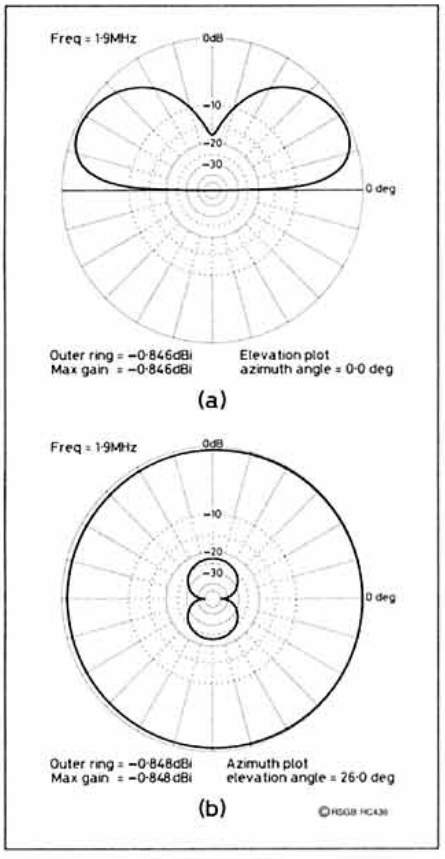


Fig 7: VE2CV's computed radiation patterns for the Multee antenna at 1.9MHz.

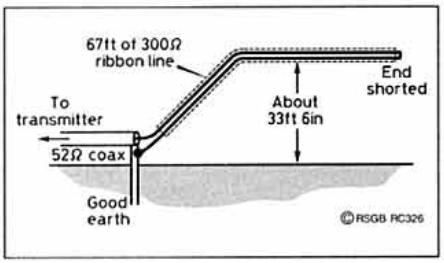


Fig 9: λ/4 ground Marconi antenna for 3.5MHz using 57ft of 300- or 450-ohm ribbon line. A good earth system (preferably including radials or elevated counterpoise) is needed for good performance.

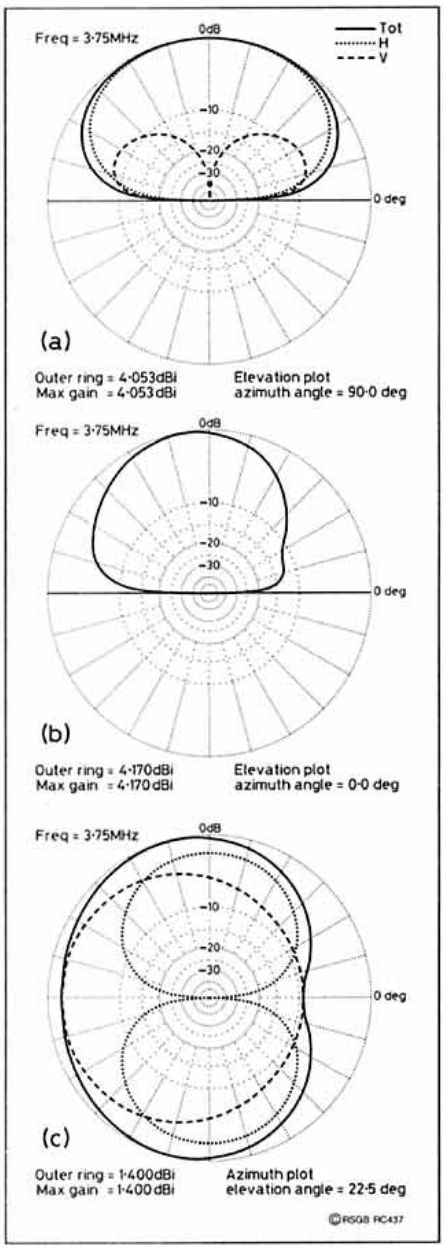


Fig 8: VE2CV's computed radiation patterns for the Multee antenna at 3.75MHz.

QUARTER WAVE MARCONI ANTENNA

AN OLD BUT STILL useful compact antenna idea for the lower-frequency bands is revived in *CQ*, June 1994. This is the λ/4 grounded Marconi antenna fed from coaxial cable using 300Ω or 450Ω ribbon feeder (or open line): **Fig 9**. For 3.5MHz some 67ft of cable is used and the length can be halved for 7MHz or doubled for 1.8MHz (preferable at double the height of the horizontal span). A good earth or radials system is essential. At low power, it is believed that a length of coaxial cable could be used short-circuited at the far end.

'CORROSION' BETWEEN DISSIMILAR PLASTICS

BILL COOPER, G4CIA, RAISES the question of whether 'corrosion' can occur between dissimilar plastics. This followed the discovery that after keeping a short power lead coiled up and held by a strong elastic band to the clear plastic cover of his computer chess set for a period of several months the power lead had etched several concentric grooves into the cover, deep enough not to be removable by polishing. He points out that this could have significant implications since it is not unusual for dissimilar plastics to be in close contact in expensive electronic equipment.

Since my knowledge of plastics technology is virtually non-existent, it seemed worth seeking expert opinion from Dr Dick Biddulph, G8DPS who writes: "The report from G4CIA of 'corrosion' between flexible PVC cable and a 'hard plastic clear cover' (probably polystyrene) is almost certainly migration of the plasticiser from the PVC which then attacks the polystyrene. Flexible PVC contains about 50% of one of several types of plasticiser some of which migrate faster than others. This can be felt with some cables as they become sticky with age.

"This is only likely to occur when flexible PVC is one component and the other is a simple thermoplastic such as polystyrene or acrylic plastic such as Perspex. It is very unlikely to affect thermosetting plastics such as phenolics (Bakelite), epoxys (Araldite) or polyurethanes (solder through wire insulation)."

THE 'OS-CON' ELECTROLYTIC CAPACITOR

EUGENE TRUNDLE in *Television* (December 1994, pp98-99) draws attention to a new form of electrolytic capacitor to add to the present ranges using aluminium and tantalum as the positive electrode in foil or solid form. This is the Os-CoN (Organic Semiconductor) capacitor, introduced by Sanyo, which has an electrolyte in solid form rather than the gel or solution of semiconducting manganese dioxide used in conventional types (**Fig 10**).

The electrolyte is based on the organic semiconductor TCNQ, a complex salt in a fine-powdered black crystalline form termed N-n-butyl isoquinolinium which in production

is melted, inserted, immersed and cooled in carefully-controlled conditions. This new type of electrolytic capacitor would seem to be of particular interest for amateur radio equipment and switched-mode PSUs since its main feature is its good high-frequency characteristic, approaching that of a film capacitor and much better than that of a conventional electrolytic. Eugene Trundle states that "at frequencies above 100kHz a 47uF os-con capacitor is superior to a special low-impedance 1000uF aluminium capacitor whose physical size is twenty times greater." The temperature and frequency characteristics of an os-con are claimed to be such that it can replace three components in a noise/ripple filtering circuit: **Fig 11.**

Thus it would appear that the os-con eliminates the need to parallel a ceramic capacitor across an electrolytic in HF circuitry - a practice which, as shown in *TT* (May 1993, p58), may prove self-defeating. With the os-con, apparently, the increase in impedance above 1MHz, as shown in **Fig 12 and 13**, is caused by the inductance of the lead-out wires, which at HF should be kept as short as possible.

Fig 19, from the *Television* article, shows the construction of an os-con capacitor. There is an aluminium case with aluminium oxide as dielectric. But instead of a porous or vented seal the os-con has an impervious resin seal, since there is no electrolyte evaporation when in solid form. Sanyo are marketing the capacitors in tubular and surface-mounting forms. For a given type (capacitance value and working voltage) they are roughly equivalent in size and price to solid tantalum electrolytic capacitors, that is slightly bigger and rather more expensive than aluminium types; they are currently available with capacitance values from 0.1µF to 220µF and voltage ratings from 6.3V to 25V. The temperature coefficient of the os-con is superior to that of aluminium

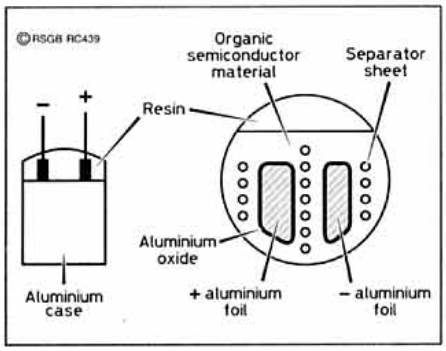


Fig 10: Construction of the OS-CON electrolytic capacitor introduced by Sanyo. (Source *Television*, December 1994).

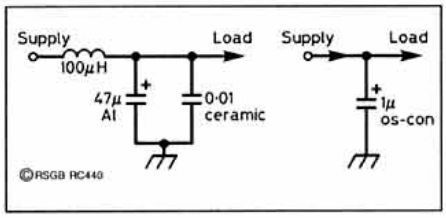


Fig 11: The temperature and frequency characteristics of an os-con capacitor enable it to replace three components in a typical noise/ripple filtering circuit. It is claimed that these two configurations both provide similar filtering over a wide temperature and frequency range. (Source *Television*).

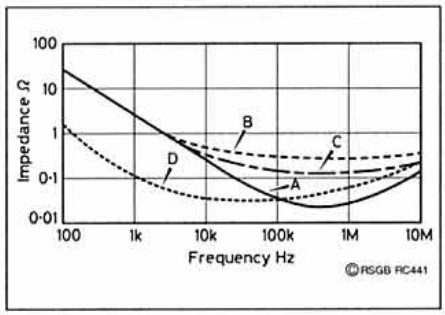


Fig 12: Frequency characteristics of different types of electrolytic capacitors at 25°C. A os-con (47µF, 16V); B low-impedance aluminium electrolytic (47µF, 16V); C tantalum electrolytic (47µF, 16V); D low-impedance aluminium electrolytic (1000µF, 16V). (Source *Television*).

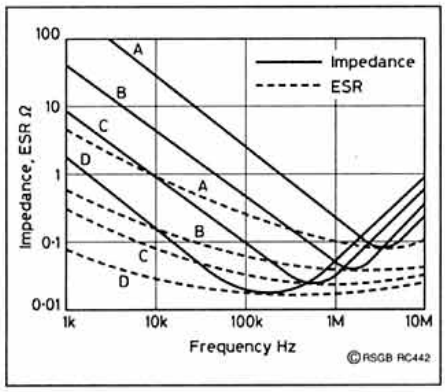


Fig 13: Os-con impedance and ESR ratings over the range 1kHz to 10MHz (at 25°C). A 0.47µF, 25V; B 4.7µF, 25V; C22µF, 6.3V; D 150µF, 16V. (Source *Television*).

and tantalum capacitors particularly at low temperatures (below 0°C): **Figs 14** and **15.** The ageing characteristics are also very different. With no electrolyte solution to dry out, there is a very gradual and relatively small capacitance loss over a very long time, with a life-span expected to extend to centuries at normal working temperatures. It is also claimed that, for example in switch-mode power supplies, the permissible ripple current with an os-con is about four times that of an aluminium electrolytic and about ten times that of a solid tantalum type. It would clearly be inadvisable to attempt to replace a faulty os-con capacitor with a conventional electrolytic.

Apparently the basic crystal formulation was first synthesised by DuPont and studied for capacitor use by Sprague over 30 years ago but production only became possible with Sanyo's development of a melting immersion method.

HERE AND THERE

IVAN JAMES, G5IJ hopes that in the flurry of radio pioneering centennials, we do not forget the work of Admiral Sir Henry Jackson, president of the Society in 1922, the year in which the decision was made to change the name from the Wireless Society of London to the RSGB. In December 1895, the then Captain Jackson read a paper in the *Proceedings of the Royal Society* describing experiments by Jagadis Bose at Calcutta University who used equipment based on that shown by Sir Oliver Lodge in 1894 (see *TT* August 1994).

Jackson soon began to experiment with

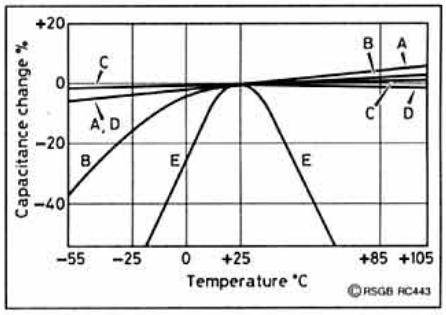


Fig 14: Temperature/capacitance characteristics of different types of capacitor. A os-con; B aluminium electrolytic; C tantalum electrolytic; D Mylar film capacitor; E ceramic capacitor. (Source *Television*).

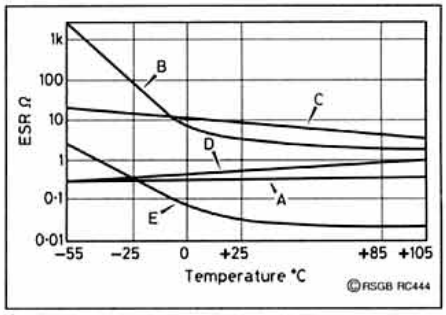
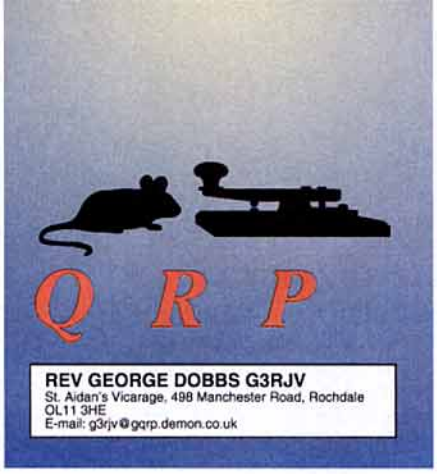


Fig 15: ESR/temperature characteristics of different types of capacitors. A os-con; B aluminium electrolytic; C tantalum electrolytic; D Mylar film capacitor; E ceramic capacitor. (Source *Television*)

wireless telegraphy on the deck of HMS Defiance, then used as the Torpedo School in the harbour at Devonport. This was in early 1896, some months before the arrival in the UK of Marconi in March 1896, by which time Jackson had succeeded in sending and receiving messages over a distance of nearly one-and-a-half miles. The full story is told in *The Origins of Maritime Radio.* by R F Pocock and G R M Garratt (G5CS) from which both Jackson and Marconi (with whom he was soon in contact) emerge with great credit. As G5IJ puts it: "Let us hope that 1996 does not pass without some appreciation (by RSGB, RNARS or local societies) of the pioneering work of Admiral Jackson (1855-1929)".

Gordon Mather, G3GKA notes that the 'cohering' of lightly packed copper filings in a glass tube caused by 'oscillatory' current was the subject of a British Patent (No 156 of 1866) under the names of C and S S Varley as a means of providing lightning protection for telegraph stations, thus preceding the coherers of Oriesti (1884), Branley (1890) and Lodge (1894), although not for 'wireless' communications. (Source *'Science for the Citizen'* by Lancelot Hogben, p742). The use of a coherer for radio was indisputably a Lodge contributiion.

A practical application of 'high-temperature' (liquid nitrogen cooled) superconductors is being tested in the USA by the mobile cellular radio company Ameritech based on work by Illinois Superconductor. The idea is to use superconducting materials to form bandpass VHF/UHF bandpass filters at mobile base stations. Very much higher-Q is claimed than with more conventional techniques, making possible 'brick-wall' filters at UHF. See report 'Superconductors move into mobiles' by Charles Arthur in *New Scientist*, 24 September 1994, p17. ♦



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IN RECENT YEARS there has been a growth in clubs devoted to the promotion of QRP philosophy and operating. Perhaps the time has come for me to issue another list of current QRP Clubs.

IN EUROPE

G QRP CLUB: Membership Secretary, John Leak, G0BXO, Flat 7, 56 Heath Crescent, Halifax HX1 2PW. Still the largest QRP organisation in the world. Membership fee £6.00 or $12 per year. Send a SAE for a free sample of the journal *SPRAT* and an application form. Many overseas countries have local representatives for subscription renewals; credit card payments accepted.

EA QRP CLUB: Details from Miguel Molina, Avenia Rio de Janeiro 123 2-1, 08016 Barcelona, Spain. Newsletter in Spanish.

OK QRP CLUB: c/o Petr Doudera, OK1CZ, U1.baterie 1, 162 00 Praha 6, Czech Republic.15 IRCs or $10 annual fee. Czech Newsletter with English translations.

BENELUX QRP CLUB: PA3BHK, Robert van Zaal, Parklaan 89, 2171 ED, SASSENHEIM, The Netherlands.

IN AUSTRALIA:

CW OPERATORS QRP CLUB: c/o Kevin Zietz, VK5AKZ, 41 Tobruk Ave, St. Marys SA 5042, Australia. A$14 for new membership.

IN THE USA

QRP AMATEUR RADIO CLUB INTERNATIONAL (QRP ARCI): Secretary: Mike Bryce, 2225 Mayflower NW, Massillon OH 44647, USA. This is the oldest club. Annual renewals can be made in the UK.

There are many more local QRP Groups in the USA, most of them welcome overseas members but check the overseas mailing costs. These clubs include:

THE MICHIGAN QRP CLUB: c/o 654 Georgia, Marysville MI 48040, USA. $7 for new USA membership.

THE NORTHERN CALIFORNIA QRP CLUB: Jim Cates, WA6GER, 3241 Eastwood Road, Sacramento CA 95821, USA. $5 a year in the USA.

THE NORTHWEST QRP CLUB: Bill Todd, N7MFB, 2418 55th Ave, SW. Seattle WA 98116, USA. $10 for new US membership.

QRP CLUB OF NEW ENGLAND: Jack Franke, NG1G, PO Box 1153, Barnard VT 05031, USA. $10 for new USA membership.

K5FO QRP NEWSLETTER: Chuck Adams, K5FO, Twilight Publishing Co. 1301 W. Highway 407, Suite # 353, Lewisville, Texas 75067. $10 a year for 12 issues in the USA.

ST. LOUIS QRP SOCIETY: Details from Keith Arns, KC0PP, 2832 Penbrooke Ln, St. Charles MO 63301-0344, USA.

OKLAHOMA QRP CLUB: Don Kelly, 703, West 8th St, Edmond, OK 73003, USA. $10 a year donation invited.

COLORADO QRP CLUB: Rich High, W0HEP, 14261 E 4th Ave. #161, Aurora CO 80011-8711, USA.

THE 11TH YEOVIL QRP AND CONSTRUCTION CONVENTION

This popular annual event is on Sunday 21 May 1995 at The Preston School, Monks Dale, Preston Road, Yeovil. Doors open at 9am, the formal opening being at 10am by the RSGB President, Clive Trotman, GW4YKL. Admission charge is £1.75. A free car park will be available. There will be: Talks on QRP and Construction topics; Equipment displays and On-Air stations; Trade stands (biased towards QRP and Construction); and the G-QRP Club stand & QSL exchange. The convention will be preceded by a Morse 'Funrun' on each evening from Tuesday 9 to Friday 12 May; rules in Spring Journal of the G QRP Club, *SPRAT No. 82*.

This year the Yeovil Construction Challenge is to build a CW filter using up to ten passive components in any combination of R, L and C, which will pass a wanted signal of 750Hz, while rejecting unwanted signals of 500Hz and 1000Hz. The winner give the greatest rejection of 500Hz and 1000Hz signals in comparison to the 750Hz signal. The use of test frequencies above and below the desired one means that the filter can have any combination of bandpass, lowpass highpass characteristics.

Entries will be judged using a standard test procedure. Three audio oscillators will provide the reference frequencies at a level of 1V RMS (open circuit) and a source impedance of 1kΩ to the filter input. The measuring equipment connected to the filter output will present a load of 1kΩ and comprise an amplifier driving a calibrated audio voltmeter. The Tester will first apply the wanted 750Hz signal to the filter, and the meter amplifier will be adjusted to give full scale reading representing 0dB. The signal will be set to 1000Hz and meter reading taken, and expressed as 'X'dB below full scale. The signal will be set to 500Hz, and the meter reading taken, and expressed as 'Y'dB below full scale. The winner will have the greatest value of (X+Y). Adjudication will be during the lunch break on Convention day. Further details from G3CQR QTHR, tel 01935 813054 (no calls on Saturday 20 May, preparation day, please!). ♦

CZEBRIS 1995

CZEBRIS IS AN ANNUAL QRP Operating event sponsored jointly by the OK QRP Club and the G QRP Club. The Rules for 1995 are as follows:

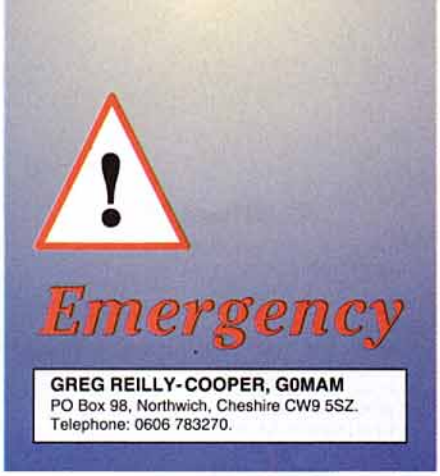
1 When: 1600UTC 24 February to 2359UTC 26 February 1995.
2 Modes and frequencies: CW only on 3560, 7030, 14060, 21060, and 28060, all +/- 10kHz.
3 Power: Not to exceed 5W RF output. Stations unable to measure their output take half DC input power to PA, eg 10W DC = 5W RF.
4 Stations eligible: Any licensed amateur.
5 Call 'CQ QRP'.
6 Contest exchange: RST, power and name of operator.
7 Scoring: Station worked once per band; only QRP/QRP QSO score; points score as follows:

QRP Stn located in	QSO with QRP Stn in UK	OK/OM	EU	NON-EU
UK	2	4	2	3
OK/OM	4	2	2	3
EU	4	4	1	2
Non-EU	4	4	2	1

No multipliers. Final score is the sum points obtained on each band.

8 Logs: Separate log sheets for each band showing for each QSO, date, time, call, exchanges (RST, power, name) sent and received. Also a summary sheet showing name, QTH and call-sign, claimed score for each band and brief details of equipment used must be submitted to:
For UK stations to G P Stancey G3MCK, 14 Cherry Orchard, Staines, TW18 2DF.
All other logs to P Doudera OK1CZ, U 1 baterie 1, 16200 Praha 6, Czech Republic. All logs to be received by 15 April 1995.
9 The leading three stations in each continent will receive a certificate.
10 Disputes: The decision of the organisers will be final.

Three QRP enthusiasts at repose: (L to R) Ian Keyser, G3ROO, writer of the *Novice Notebook* column; Derry Spittle, VE7QK, builder of miniature SSB Transceivers; George Dobbs, G3RJV and Sheldon Hands, GW8ELR, owner of Hands Electronics. Photograph taken in the shack of G3RJV by Robert van de Zaal, PA3BHK, on the evening of the G QRP Club Mini-Convention.



GREG REILLY-COOPER, G0MAM
PO Box 98, Northwich, Cheshire CW9 5SZ.
Telephone: 0606 783270.

SINCE THE LAST *Emergency!* column appeared three months ago there have been a number of developments of which Raynet members need to be aware. Although the period has been relatively quiet in terms of emergencies requiring network involvement, as the following reports show, work behind the scenes has carried on 'as normal' for groups throughout the UK and for the RSGB Emergency Communications Officer (me).

E-MAIL

THERE HAS BEEN a fast growing interest in the medium of e-mail during recent months, encouraged no doubt by television features on the Internet *[see also this month's feature on page 38 -Ed]*. I am in regular e-mail contact with amateurs throughout the UK and abroad, including many who share our interest in emergency communications, so I am aware of its value as a communications resource. Those of you who took a note of my e-mail address from previous columns may wish to note that I have changed service provider and my address has therefore changed accordingly. I can no longer be reached via Demon but my replacement e-mail address is: **Raynet@cix.compulink.co.uk**.

Compulink are only one of several service providers but I am delighted to tell you that the company has agreed to waive its normal £25 registration fee for any Raynet member who wishes to subscribe to them. If this is of interest to you, please contact me for further details.

The ex-RNLI lifeboat owned by Stan Ellis, GD3LSF (far left), collected volunteers (see Isle of Man events).

MESSAGE PAGERS

ANOTHER SINGULARLY useful service now being made available to Raynet members at special rates is full alpha-numeric message paging. Following discussions with Vodapage Ltd, which covers 98% of the UK, I am delighted to report that full message paging facilities are available for between £4.90 and £8.05 plus VAT per month! The normal Vodapage tariff is over £42 plus VAT per month but Vodapage Ltd have very kindly acknowledged the network's contribution to public safety and service. The offer is open to any Raynet member or Raynet group and, again, please contact me if you require further details.

EMERGENCY PLANNING COLLEGE

UNFORTUNATELY, the Emergency Management Seminar between 3 and 5 January is the last to be offered at current prices. At the time of writing, the Treasury is currently reviewing prices for College facilities and they are likely to rise sharply. Looking on the positive side, however, the Principal has written to assure me that he is aware of the difficulties faced by volunteers and hopes that the new price structure will afford him some discretion where volunteers such as ourselves are involved.

The Annual Communications Workshop last October and the RAEN Trainers' Weekend were both well attended and feedback from the College confirms that Raynet members have continued to impress staff and other delegates with their professionalism and dedication. This is sound praise indeed, coming as it does from the Government's primary training resource for emergency planners. I would like to take this opportunity of recording a "very well done" to each and every member involved.

IDENTITY CARDS

IN RESPONSE TO several requests received over recent months, I am now able to provide blank Membership Identity Cards for use by Group Controllers. The cards are identical to those originally designed by the now defunct RSGB Raynet Committee and still in use by RAEN members, with the exception of the logo. RSGB affiliated Group cards will continue to show the diamond Raynet logo (see page 11) 'ghost printed' on the face. RAEN members, of course, should continue to register with and obtain their cards from that company.

It should be noted, however, that the cards have been made available from within the network and are not issued by the RSGB. Similarly, the Society will not become involved with membership registrations. There are security considerations, of course, and any Group Controller wishing to make use of the new cards should please contact me in the first instance for further details.

Since this is specifically a network initiative, I do not think it appropriate for me, as an Honorary Officer of the Society, to be involved beyond co-ordinating the development of the scheme. I would be very grateful to hear, therefore, from anyone willing to volunteer themselves as a distribution source for the blank cards. A little administrative work would be involved but the role would primarily be that of distributor.

BUCKS AIDEX 94

WE ARE ALL AWARE of the shortages and suffering in Croatia and, whilst it is not specifically emergency communications, I thought you would like to know a little of the activities of the Bucks International Aid to Orphaned Children, since that organisation was founded by our fellow UK amateurs.

In October 1994, the group determined to acquire, transport and deliver humanitarian aid supplies direct to refugee camp 'TTTS Storbrec" in Split, Croatia. The primary requirements had been identified following a visit to the camp by a group member in 1993 and the group therefore solicited donations of the required food and clothes. Initial planning called for two Transit type vehicles and six crew members but in the event, when one of the team fell ill, it was decided to make the trip with one vehicle and a crew of three.

Racal Instruments Ltd loaned a van and the boxes were all loaded during the afternoon of Saturday, 15 October: a total of 1014.6kg. The journey started at High Wycombe at 0045 on Sunday, made Dover for the ferry by 0255 and then took the group through France, Germany, Austria and Slovenia into Croatia where they arrived at Kraljevica Children's Hospital at 1650 on Monday, 17 October.

After twenty-four hours rest, they left Kraljevica at 0910 on Wednesday for Split, arriving at TTTS Storbrec at 1722 where a ton of supplies were unloaded straight into the camp stores under the direction of the camp doctor. They then visited a family in the camp, sampling the local food and drink before turning-in for the night inside the van.

At 0700 the following day, the group left at 0848 and drove south to Ploce, on the Dubrovnik Road, to rendezvous with a local amateur. Unfortunately, they failed to meet the amateur but did spend some time at the roadside with UN and World Health Organisation personnel. The UN personnel were very impressed with the group's radio link to the UK.

The group arrived back at Kraljevica at 2142 to find the place in darkness so made themselves a hot meal and turned-in for the night, in the van again. Friday and Saturday had been set aside for rest and recreation. This included a visit to a family they had met in 1993; during a convivial evening some English books were passed to the family's children.

The Group left Kraljevica for home at 0934 on Sunday, 23 October and arrived on the 24th at 2025. They had travelled some 2842 miles in just over a week. The short-wave radio fitted into the van worked extremely well and kept the group in constant touch with the UK. The trip was considered very worthwhile and, if necessary, the group will make it again next year.

ISLE OF MAN EVENTS

EARLY LAST YEAR, I passed on a request from the Isle of Man Raynet Group for assistance with some of the prestigious events held annually on the island. As readers of the weekly packet news bulletins will know, the level of response was a credit to the network

with members travelling the length of the UK to help out.

The rallies and TT Races staged on the island are perhaps the highest profile non-emergency events in which Raynet participates, attracting as they do international interest. Raynet operations there are vital to the events' success and Stan, GD3LSF, and Cary, GD7ESU, the Island Controller and Group Controller respectively, send their thanks to all who offered their help.

Raynet is very highly thought of on the island and the group operates slightly differently from those on the mainland (see below).

Rain stopped play on the Monday of the IoM TT races. The picture was taken about half-way up Snaefell.

The volunteers who travelled to the island reported having thoroughly enjoyed the experience and Terry (G0UIO, who travelled from Cambridge with another volunteer, Harri, G1EIX) kindly sent the following report of his own visit:

THE ISLE OF MAN TT

The first lesson to be learned by anyone planning to travel to the island around race weeks is to make an early ferry booking. If you don't, you will be unable to get your vehicle onto the boat. As it was, we had to travel the extra distance between Liverpool and Heysham to get a place.

We set off for Heysham in the afternoon of 3 June after much careful route planning. Ferry check-in time was 2300 and we finally scraped-in at 2310 having under-estimated travel time and stopped for a meal-break mid way.

The ferry was late arriving at Douglas the next day but we managed to contact Stan, GD3LSF, via the GB3GD repeater and he met us off the boat with Cary, GD7ESU. Stan owns an ex-RNLI lifeboat and had arranged to pick up some other volunteers from Scotland so I went with him. It's interesting how a force 6 - 7 wind doesn't look quite so aggressive when you have your feet firmly on dry land! While I went with Stan, Harri went around the course with one of the island operators, Rod, GD1NGR, to check the locations we would be using and to do some operating and marshalling.

Most locations on the course are manned by Race Marshals with flags and First Aid / Ambulance teams but all Raynet members are also marshals. They are also signed-in as Special Constables (complete with Warrant Cards). This is important from a safety point of view because it is vital that members of the public are kept well back from the road when racing is taking place and at all times when the roads are closed. If a spectator is reluctant to move when asked, a wave of the warrant card should usually produce the desired effect. Another important part of the Raynet operator's duty is to keep a log of the numbers of all the motorcycles as they pass, and to report the leaders and back markers to Control as they pass. Unlike most Raynet events, yellow tabards are not worn when on the course, to avoid distracting the riders.

On the Saturday, the first day of racing, the weather on the island was very wet and windy. The first race was stopped after several laps - much to the disgust of the leaders and the entrants to the second race, a sidecar event which was postponed until the Sunday. Apart from the obvious disappointment such postponements create, they are not popular with those visitors who take their own motorcycles to the island because there is traditionally a 'Mad Sunday' during race week when the course is effectively opened to the public with no speed limits in force. That is not a day to go out for a Sunday afternoon drive! The weather was just as foul the following day and racing was cancelled.

Tuesday, dawned fine and clear and we made our way to our designated station in good time. Being right on the course, we had to leave the car some 200 yards away and work from batteries. Harri sorted out the equipment while I bravely ventured back into the traffic (motorcycles everywhere!) to park the car in the nearest safe parking place at a nearby farm. While the roads are open before the racing, it's quite a nerve-wracking experience to drive among literally thousands of high-performance motorcyclists, all intent upon overtaking any slow cars in their path. Although there were fatalities among the racers during practise week, the fatalities which occurred while we were on the island involved visiting 'non-racers' on their own machines. The fatality figures would doubtless have been higher had the 'Mad Sunday' not been cancelled.

Because of the terrain at our location, the Island Group had pre-installed a ZL-Special five-element beam for us and we simply plugged the 2m handheld transceiver into that. The beam was actually pointing straight at the nearest mountain, where the signal was bounced off and back to the Talk-Through Unit. The Talk-Through Unit was a crossband repeater, with Raynet Control operating on 70cm and all mobiles on 2m. Without monitoring the UHF frequency it was very difficult to hear any of the other mobiles and I was glad I had taken my dual-band Kenwood with me, which I set up on a mobile mount aerial at our location. One lesson we learned, and well worth remembering, is that the squelch on the Talk-through Unit needed a second to open so it was always necessary to pause for a second between keying the microphone and actually speaking. Failure to do so would have meant that the first few words would have been 'clipped' from the transmission.

When racing is about to start, a 'Road Closed' car traverses the course and all non-race traffic must leave the road. By monitoring the local Medium Wave radio station as well as the UHF downlink from Control we were able to monitor progress. This was the first motorcycle event I had worked at and I quickly discovered that writing down the numbers of competitors as they passed was quite a challenge - particularly when they roared past in tight groups of three or four!

The weather on Wednesday was sunny again but racing was cancelled again on the Thursday because of wind and rain. Stan took the opportunity to carry out some work on GB3GD while I went with Rod, GD1NGR, to carry out some signal and path tests.

Racing resumed on the Friday in glorious weather conditions. We were not operating with Raynet that day and so took our pick of the races to watch.

I would like to say how much Harri and I enjoyed our stay on the island and the opportunity to be involved with such an interesting event. The Manx people we met were all very warm and friendly and it was obvious that Raynet is highly respected. All being well, we shall be returning to the island in September for the Rally and are already making the necessary arrangements.

Our biggest thanks must go to our hosts, Stan and Carey, who went out of their way to make our stay, and that of the other visiting operators, as enjoyable as possible - a goal which they certainly achieved. ♦

PHOTOGRAPH: G7EUL

9A/G4PGZ/M operating on 20m on the road to Split. G4PGZ was with the Bucks International Aid to Orphaned Children relief expedition (see Bucks AIDEX 94).

EMC

HILARY CLAYTONSMITH, G4JKS
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Herts AL1 4UU

THANKS TO ALL readers who have been writing or telephoning about EMC matters. Please keep the information rolling in, even if your own case has been solved, as this can help us with other cases involving the same product. Members have also given us advance warning of potential EMC problems with new products.

AUTOMOTIVE EMC

DUE TO INCREASINGLY strict exhaust emission regulations, electronic fuel injection is becoming standard on new cars. The proliferation of electronics in modern vehicles has alerted us to the possibility of car electronics malfunctioning, or even being damaged, in the presence of RF. Such things as electronic engine management systems can also cause QRM for mobile operators.

We would like to obtain more information on the following aspects of amateur mobile operation: Bands, power and modes used, rig and aerial types and locations, and any EMC problems experienced inside or outside the vehicle.

If you operate mobile and are prepared to fill in a questionnaire, this would help us to build up a picture of the automotive EMC scene in the UK. To obtain this questionnaire, please send an SASE to me, QTHR.

EMC ON 70CM

MOST OF THIS MONTH'S EMC Column is devoted to the 430 - 440MHz band which has a lower natural noise level than any VHF or HF band and suffers from fewer sources of man-made interference. Unfortunately, these are on the increase, for example computer clock harmonics particularly on the 432.000MHz EME (moonbounce) frequency. We have also found cable TV vision carrier leakage on 432.000MHz and TV sound leakage on 438.000MHz. Some UHF super-regenerative receivers in Low Power devices (LPDs) can cover the whole band with broad band noise completely masking weaker signals. It can be difficult to distinguish super-regen noise from natural thermal noise, particularly on a 70cm FM receiver without an S-meter.

Alarm immunity is also featured again but this time it is wireless alarms which have far more potential for electromagnetic incompatibility than the wired type.

LOW POWER DEVICE ALLOCATIONS

Consumer applications for licence-exempt short range radio links include radio keys for car central locking or alarms, remote controlled garage door openers, wireless door bells and wireless intruder alarms for domestic use. To promote harmonised European allocations, the CEPT (European Conference of Postal and Telecommunications Administrations) published a recommendation, T/R 01-04, (Oslo 1991, revised Madrid 1992). The only VHF recommendation is 10mW ERP on 40.660 - 40.700MHz and the next recommended allocation is at UHF, in the 70cm Amateur Band at 433.05 - 434.79MHz with an ERP of 10mW. This is centred on 433.92MHz which is the 16th harmonic of the 27.12MHz ISM (Industrial Scientific and Medical) frequency. LPD allocations around 433MHz now exist in Belgium, Denmark, France, Germany, Greece, Ireland, The Netherlands and Spain so there was European pressure for a 433MHz allocation in the UK, at least for cars so that drivers of cars from these countries could use their radio keys legally in the UK.

It seems a pity that a European allocation 0.5 - 1MHz wide couldn't have been found for LPDs somewhere between 173 and 430MHz rather than in an amateur band. A 12.5MHz wide band was found at 217.5 - 230MHz as a 'parking' band for TDAB (Terrestrial Digital Audio Broadcasting) in the UK and there is also 170MHz of sparsely used bandwidth between 230MHz and 400MHz.

A letter from the Radiocommunications Agency of the DTI reproduced in *Radio Communication*, March 1993, p7, states that 433.92MHz has been allocated to low power radio keys for car alarms on a non-protected basis and that there never was any intention of removing existing services from the band. There is however, commercial pressure to implement recommendation T/R 01-04 fully in the UK, releasing 433.72 - 434.12MHz for general LPD use for such things as wireless alarms and garage door openers. In December 1994, the Low Power Devices section at the RA was telling LPD manufacturers that an announcement on this matter was expected soon.

The Low Power Radio Association (LPRA) has stated that it would like the full 433.05 - 434.79MHz range as an exclusive allocation for LPDs although judging from the performance of some LPD receivers, even an exclusive allocation 10MHz wide would not be sufficient for them to coexist with other UHF radio users. In any case, T/R 01-04 and the UK LPD standards such as MPT 1340 and MPT 1344 all state that LPDs are not protected from interference from other radio users and must not cause interference to other radio users. The RA has stated that: "If manufacturers of low power devices wish to use this band, then the onus is upon them to ensure that the receivers are properly designed."

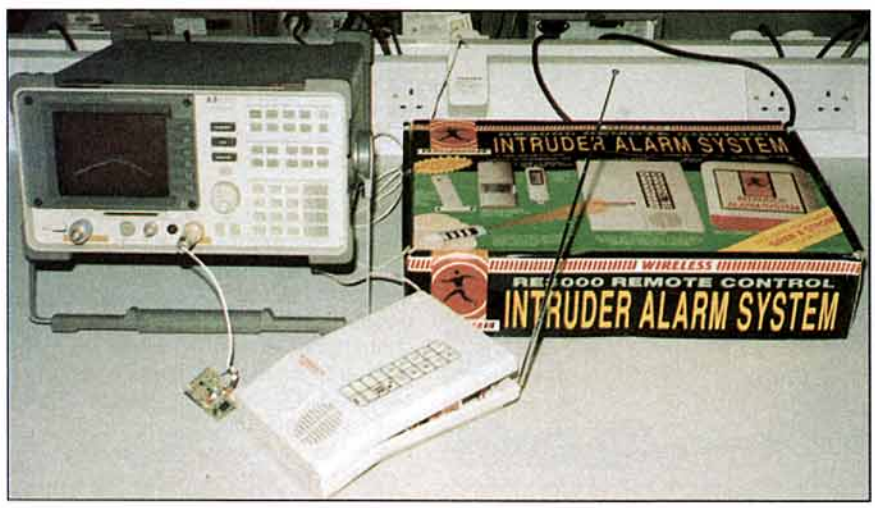
SUPER-REGEN NOISE

Super-regenerative receivers offer the selectivity of a crystal set and some have the EMC friendliness of a spark transmitter!

A super-regenerative receiver oscillates at or near the received frequency but 'squeggs' (cuts in and out of oscillation) at a rate called the quench frequency. This is not a new idea and its original attraction was a very high gain from a single valve. *The Admiralty Handbook of Wireless Telegraphy 1938*, Volume 2, section W15, says that this type of receiver was sometimes called a "howling squegger"! They went out of favour on the HF amateur bands about 40 years ago but transistor super-regens on 173, 418 or 433.92MHz are still used for LPDs. Making a free-running UHF oscillator switch on and off at a rate of about 800kHz is a sure way of generating a frequency spectrum like the proverbial hedgehog with a large number of sidebands at intervals of the quench frequency. With no received signal, the sidebands usually merge together to produce broad band noise as Steve Larkins, G8SBF of Bracknell, Berks found out to his cost.

When Steve moved into a new house, he suffered white noise at levels of S9 which blanked out all but strong signals in the 70cm band 24 hours a day. He traced the source to some Response Electronics wireless alarm systems installed in show houses about 100 yards away. The receiver units have eight coloured LEDs and super-regenerative receivers. It appears that the builders had bought the alarms in bulk. Steve sent in form RA179 to his local office of the Radiocommunications Agency. As he was nominating the source of interference, he could have put in an unpaid complaint but Amateur Radio is not a protected service so such a case would only be investigated when RA resources permit. He therefore chose to put in a paid complaint with the fee which is now £35. This could have been refunded if the source turned out to be a non-approved device.

The RA took away one of the wireless alarm systems for test-



Laboratory testing of RE3000.

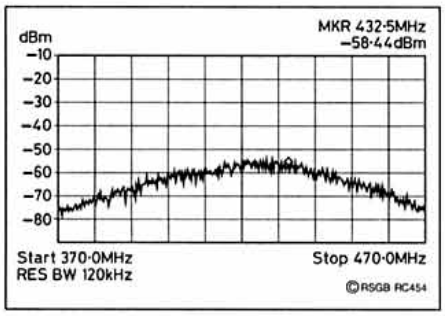


Fig 1: Super-regenerative noise emissions 370-470MHz from RE3000 with no signal

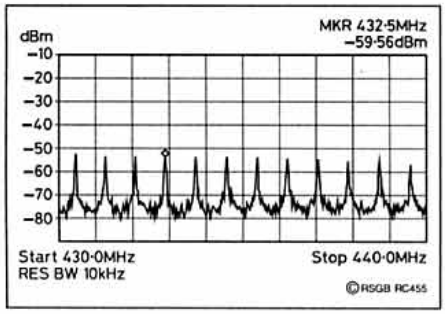


Fig 2: Super-regenerative emissions 430-440MHz from RE3000 with a 418MHz input signal.

ing at their Radio Technology Laboratory at Kenley. Although MPT 1340 approved, we understand that the transmitter failed on transmit spectrum. The receivers, which were causing the problem, do not require type approval so the RA advised Steve to ask the builder to re-site the alarms which they did. They are now lower down and shielded from his house so that he only suffers slight interference.

There are various wireless alarms on the market, most of which use super-regenerative receivers. The EMC Committee has tested another Response Electronics wireless alarm, the RE3000 model. A 33cm telescopic antenna feeds a two transistor 418MHz super-regenerative receiver. Such receivers generate what we regard as an unacceptably high level of pollution of the 70cm amateur band and the UHF radio frequency spectrum in general.

We tested the RE3000 in a laboratory using a Hewlett Packard 8591A spectrum analyser connected to the receiver antenna input terminals (see photo). The sweep was 370 - 470MHz with a resolution bandwidth of 120kHz which is standard for EMC measurements above 30MHz. With a peak responding detector, the plot was as shown in **Fig 1**. The level measured at 432.5MHz was -55dBm to -58dBm (dB relative to 1 milliwatt). When the receiver detects a carrier within about +/-6MHz of its centre frequency, it goes into 'hedgehog' mode, as shown in **Fig 2**, which is a 430 - 440MHz sweep with 10kHz bandwidth. The broad band noise level drops on most frequencies and emissions become concentrated in 'spines' spaced at intervals of the quench frequency which is 827kHz in this case. Received signals are re-radiated complete with modulation on at least 100 different frequencies.

Response Electronics PLC have made the following comments:

"1. All current products marketed conform to MPT 1340 (418MHz) requirements."

"2. All future products shall conform to relevant EMC directives covering Tx and Rx for emissions and immunity."

"3. Response Electronics PLC has not used the 433MHz frequency for over three years and does not intend to use this frequency on future products due to the congestion at/around this frequency."

GARAGE DOOR OPENERS

Angus McKenzie, G3OSS of Finchley, London N3 has a 70cm station with a 32 element quad loop Yagi, GaAsFET mast-head preamplifier and an SSB Products transverter feeding a TS-950 HF transceiver. He would be delighted to be able to operate on 70cm but this high performance radio equipment is standing idle due to strong broad-band noise which is 10 to 50dB above thermal noise depending on beam heading. Being blind, he enlisted the help of a former EMC Committee member to trace the source which turned out to be five super-regenerative receivers in a block of garages about 120 metres away.

Another EMC Committee member who took over the case, examined the receiver emission spectrum and found that it peaked at around 434MHz, extending well into the UHF TV band up to 550MHz. It even produced fine patterning on a portable UHF TV in the street outside.

It is possible to measure the receive frequency and even the bandwidth of a super-regenerative receiver at a distance of 10 metres or more by monitoring its emission spectrum and seeing if it goes into 'hedgehog' mode in response to a low power transmission. The Finchley garages were first thought to be operating at UHF but they didn't 'see' a 1mW carrier between 432 and 440MHz nor a 418MHz LPD transmitter. Eventually, a fairly inconspicuous noise peak was found around 173MHz and an LPD transmitter near this frequency caused the 432 - 440MHz noise to drop. The case continues.

Roger Peggram, G7RUH of Bracknell, has suffered from radio paging interference on 2m and 70cm since he got his licence in March 1994. Some powerful radio paging transmitters around 138MHz and 153MHz which are about half a mile away, can be heard between 144 and 146MHz. This is probably due to unwanted responses in the receiver but this was not the cause of the radio paging signals which could be heard in the 70cm band. These sometimes came up on the local club net frequency with S9+20dB signals every few seconds but no other club members could hear them. Roger logged 12 strong drifting signals at intervals of 879kHz from 430.038MHz to 439.705MHz. When the radio pagers weren't transmitting, there was broad band noise at about S2 right across the band.

Roger discovered that the source of the signals was in his garage. The 173.3MHz radio controlled door opener, which had been fitted in 1988, was picking up the radio paging signals and re-radiating them on many VHF and UHF frequencies. The transmitter is an MPT 1309 approved Stanley model 1045 with a model 2028 super-regenerative receiver. The RFI was greatly reduced by fitting coaxial stub filters to the garage door receiver aerial input and mounting the aerial wire horizontally instead of vertically. The EMC Committee has been in contact with Stanley Door Systems (Europe) Ltd of Bracknell who are being most helpful.

CAR REMOTE LOCKING

Many cars made in the last few years have alarms or central locking using 418MHz super-regenerative receivers. Some types generate noise above 430MHz so it is worth checking for this if you buy a car and intend to operate 70cm mobile.

Recently, 433.92MHz super-regenerative receivers have started to appear. Those fitted as standard by manufacturers seem to be fairly quiet and may be stabilised by a SAW (Surface Acoustic Wave) delay line. They could still be detectable on a 70cm transceiver fitted in the vehicle and we have a report of one which failed due to RF. New MPT 1340 car alarms are allowed to operate on 433.92MHz but there is still no requirement for receiver type-approval in the UK. At least one car alarm manufacturer is taking advantage of this by using noisy unstabilised super-regens on 433.92MHz in the UK which would not be permitted in Germany. We are concerned about the possible effects of such cars being parked near a 70cm amateur station and especially near a 70cm repeater.

SECURELY IMMOBILISED

We have received a report that in September 1994, two brand new cars were delivered to a customer in South Wales by car transporter. They had factory fitted radio controlled engine immobilisers, which operate via the electronic engine management system. These particular radio keys operate on 434.030MHz, close to the frequency of an authorised non-amateur transmitter nearby. Its continuous transmissions jammed the receivers and the cars could not be started so they were loaded back onto the transporter and taken away again.

Vehicle electronics designers appear to have overlooked a fundamental problem here. LPDs are an unprotected service so their users cannot complain if their radio link is unavailable due to other authorised radio users. LPD receiver designers should make their receivers selective enough to cope with signals from other authorised services on adjacent frequencies. Any strong signal within a few Megahertz of 433.92MHz could prevent a driver from using a radio key to turn off a car alarm / immobiliser which was set when the transmitter was not on the air. Such signals include the MoD as primary user and radio amateurs using FM simplex channels, repeater outputs and packet radio between 433.000 and 433.775MHz. Perhaps the motoring organisations might consider equipping their patrols with UHF spectrum analysers to investigate receiver blocking problems!

WIRELESS ALARMS

A radio amateur in Welwyn Garden City, Herts, bought an early type of wireless alarm in 1991 after another amateur had bought one and did not have any EMC problems. Then in 1993, his next door neighbour bought the same model. Transmitting 1W or more on 433MHz into a mobile whip sometimes causes false alarms although these are unpredictable and the cause remains a mystery. The EMC Committee is in contact with the manufacturer of this alarm.

More recent wireless alarms include jamming detection which can sound the external siren for 20 minutes or so if the receiver detects a radio signal which might indicate deliberate jamming. 418MHz FM superhets are starting to appear with better sensitivity and selectivity than super-regens but they sound a jamming alarm on any continuous 418MHz carrier which exceeds a certain level for more than a certain time. It was found that one detects jamming with about 1nW (nanowatt!) on 418MHz at a distance of 10 metres. We were concerned that it may not be immune to a few watts on 430 - 440MHz. After testing two superhet models, we submitted the results to the manufacturers for comment. They needed more time to respond so rather than delay publication until the April 1995 *EMC* Column, the manufacturers' names are not being mentioned.

Ready-made 418MHz transmitter and receiver modules are sold for many purposes such as low power telemetry links. These compact and sensitive modules are used in the first wireless alarm which we tested. The carrier detect output with a fixed threshold of typically 0.5µV has been used so that a carrier above the threshold for over 20 seconds causes the alarm to sound if the system is armed and if jamming detection is enabled. Fortunately, there is a frequency discriminator which ensures that the carrier detector does not respond to signals outside a bandwidth of about 400kHz.

Nevertheless, the whole idea of sounding an alarm on detecting a weak carrier on a frequency used by an unprotected service seems more than a little risky to us, especially with such high sensitivity. There must be no signals apart from short bursts within about +/- 200kHz of the operating frequency and no strong signals on the image frequency or other spurious responses.

We tuned an FM portable radio to 93.8MHz and found that it could trigger a jamming alarm at a distance of 8m or more with an unobstructed path. Users of this alarm system in the Enniskillen and Aberdeen areas may have to disable jamming detection if their neighbours listen to BBC Radio Scotland (Durris) or Radio Ulster (Brougher Mountain) on 93.8MHz! This is because the local oscillator runs 10.7MHz above 93.8MHz at 104.5MHz and its 4th harmonic is at 418.0MHz.

Our main concern is that like any other receiver, this 418MHz receiver has spurious responses. Even if they could all be kept 100dB down, which would be impossible in a consumer product, a 3V/m field strength on certain frequencies could still cause a jamming alarm. The most significant spurious response is the image frequency which is only 20dB down so it only needs 5µV on the centre of the image response to cause a jamming alarm. Fortunately, the image frequency lies well outside an amateur band but it can include several PMR frequencies just above 450MHz, depending on SAW tolerances.

We did a thorough laboratory test for other spurious responses taking care to check that they really exist and are not caused by any spurious output of the signal generator. The signal levels are given in dBm at the input together with the approximate field strength in dB(µV/m) using the internal antenna. The response from 340 - 500MHz is shown in **Fig 3** with the centre portion enlarged in **Fig 4**. The two responses at 433.85 and 434.06MHz are due to signals bypassing the second mixer and they are narrower than other responses. The actual frequencies depend on the exact LO frequency and are about 100kHz either side of the LO. The responses marked '3rd', '4th', etc appear to be third and fourth order products in the first or second mixer.

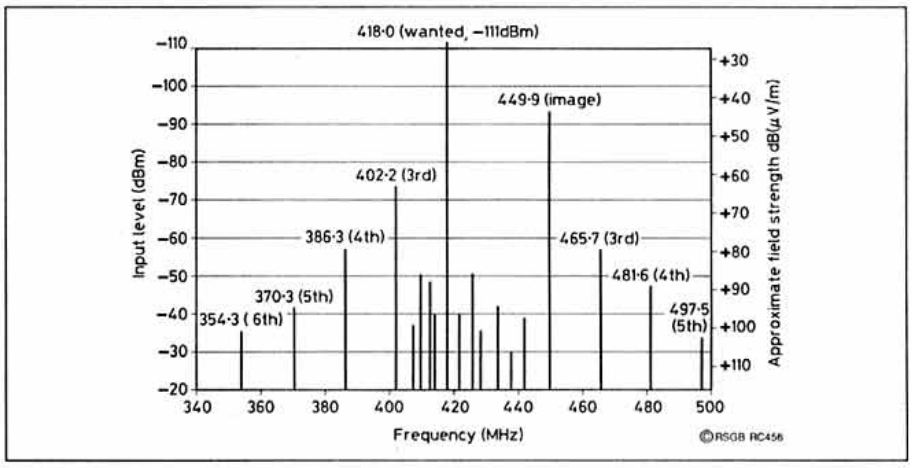


Fig 3: Carrier detection threshold of first wireless alarm, 340 - 500MHz.

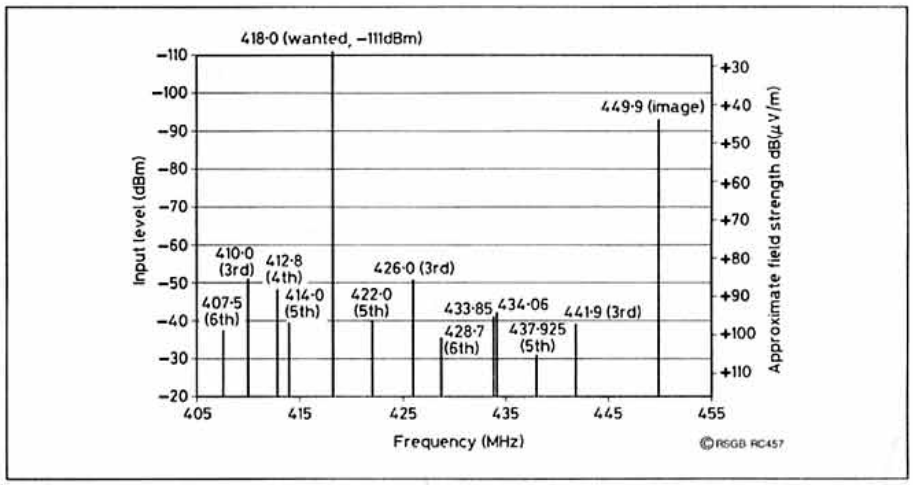


Fig 4: Carrier detection threshold of first wireless alarm, 405 - 455MHz.

The SAW stabilised local oscillator frequency is 433.92MHz +/-70kHz. On the receiver tested, it was at 433.956MHz and the level of LO radiation was measured at-48dBm or 15.8nW compared to the limit of 2nW which would be required to meet the IETS 300 220 standard.

We also tested the receiver used in a second wireless alarm system which uses a conventional superhet design with a single 10.7MHz ceramic IF filter but suffers from out-of-band spurious responses of the ceramic filter. It does not discriminate against signals which are off frequency but fortunately, the spurious responses are mainly below 425MHz.

The EMC Committee is very concerned that if either of these alarm systems were allowed to move to 433.92MHz with the same type of receiver, the spurious responses between 430 and 440MHz would cause problems for radio amateurs operating on 70cm nearby. They might find themselves accidentally jamming wireless alarms, possibly some distance away and might then be blamed for a problem which is actually caused by inadequate receiver performance. This would not be helped by one instruction manual which suggests incorrectly that a probable cause of false jamming alarms is: "high levels of illegal radio frequency signals in your area". Although jamming detection can normally be turned off, a wireless alarm owner who has paid £200 or more for their system might refuse to do so on the grounds that it makes the system less secure.

The EMC Committee has referred the matter of Low Power Devices to the RSGB Licensing Advisory Committee (LAC) who are raising it with the RA. We consider that:

- The 433.92MHz LPD allocation should not be released for general low power device use in the UK. In particular, wireless alarms which alarm on carrier detection should stay on 418MHz and should not be permitted on 433.92MHz.
- Standards for LPDs should specify suitable and unsuitable applications. In particular, any application where non-availability of the radio link cannot be tolerated should be considered unsuitable.
- Instruction manuals for all LPDs should be required to explain that the radio link is not protected from interference, as cordless telephone instructions do.
- Receivers on 418MHz and especially on 433.92MHz should be required to meet the 2nW spurious emission limit as per IETS 300 220 before 1996. ♦

RADCOM OPERATING FEATURE

IARU Region 1 SSB FD 1994

Logs checked by G3VHB, report compiled / written by G3SJJ

Lichfield Amateur Radio Society has won so many times that it seems appropriate to let them begin this year's report: "After a long spell of mediocre propagation, conditions peaked for the weekend. Based on how we had found the bands some days before, a winning score might be around 1150 to 1200 QSOs. We were pleasantly surprised! For the first time in several years the station was not fully ready. The experimental 80m special was just about up but not tried, the spotting antenna and mast were still on the ground and a rotator wouldn't rotate. Post Saturday lunch, lethargy and miserable weather induced a degree of slowness in getting things finished, eventually all was completed and worked without a hitch".

Leading Stations

G3WAS/P WERE AGAIN Open section winners with a self-admitted low technology set-up and well practised strategy! The RSGB Bristol Contest Group, G6YB/P, moved to a creditable second place. Restricted section leaders, Plymouth Radio Club, G3PRC/P, held off Stratford on Avon RS, G0SOA/P by just three multipliers!

Band Reports

3.5MHz

Eighty plays an important part in the contest providing the high scoring Eu and UK portable traffic. With higher frequency contacts being more difficult, Restricted groups spend a large portion of their time here. G0SOA/P lead with 271 QSOs and 25 multipliers, not far behind Open section band winners G6YB/P with 307/28. The period from 1800 to 0600 contains the greatest amount of activity and for western path DX, it is worth checking the DX window from 2300, (sunset in Eastern USA), until our sunrise at around 0530.

7.0MHz

Lichfield group reported: "The band is always open to somewhere. As skip lengthened in the evening we had some difficulty in copying weaker near-in stations, both high and low antennas would be desirable given the time." 200 to 300 QSOs were the norm for keen Open section groups whereas 100 to 180 were achievable by Restricted groups. A glance at GM0TXX/P's log shows a leading score of 303 QSOs and 48 multipliers gained in nine visits to the band at 1609 - 1634, 1750 - 1940 (JA/VK), 2245 - 2303 / 0033 - 0106 (East Coast NA), 0149 - 0336 (SA), 0447 - 0620 (West Coast NA), 1054 - 1117 / 1326 - 1341 / 1403 - 1424 (G). Valuable Eu portables were worked in all sessions.

14.0MHz

Open section stations could make their mark with a superb opening to the States from 1930 to 0030 and contact rates of 100+ per hour sustainable for several hours. Five groups capitalised on this: G3WAS/P with 761 QSOs and 78 multipliers, G6YB/P - 755 / 61, G0OAU/P - 766 / 62, GW3CSA/P - 784 / 55 and G0PWE/P - 693 / 67. For those in the Restricted section, 200 QSOs was the target with four groups making the grade, G3PRC/P - 201 / 38, G0SOA/P - 212 / 41, G2XP/P - 230 / 38 and G3WOI/P 234 / 37. The important European traffic was available from 1500 to 1900, 0830 to 1030 and 1300 to 1500.

21MHz

Most groups found only a handful of contacts. Several made 60 to 90, whilst just four groups topped the 100 mark, G3WAS/P - 132 with 37 multipliers and G3VHB/P - 211 / 38 and GM0TXX/P - 164 / 31 and G4HRS/P - 101 / 32. A welcome opening to Japan on Sunday morning was limited to the eastern side of the UK and this accounted for 120 of the contacts made by G3VHB/P. Restricted section bandleaders were G3PRC/P with a creditable 30 multipliers from 85 contacts, the group paid several visits to the band from 1530 to 2130 and 0645 to 1300. Open section entrants also made their scores between these hours with 1300 being a noticeable cut-off point.

28MHz

Surprisingly a Restricted station,

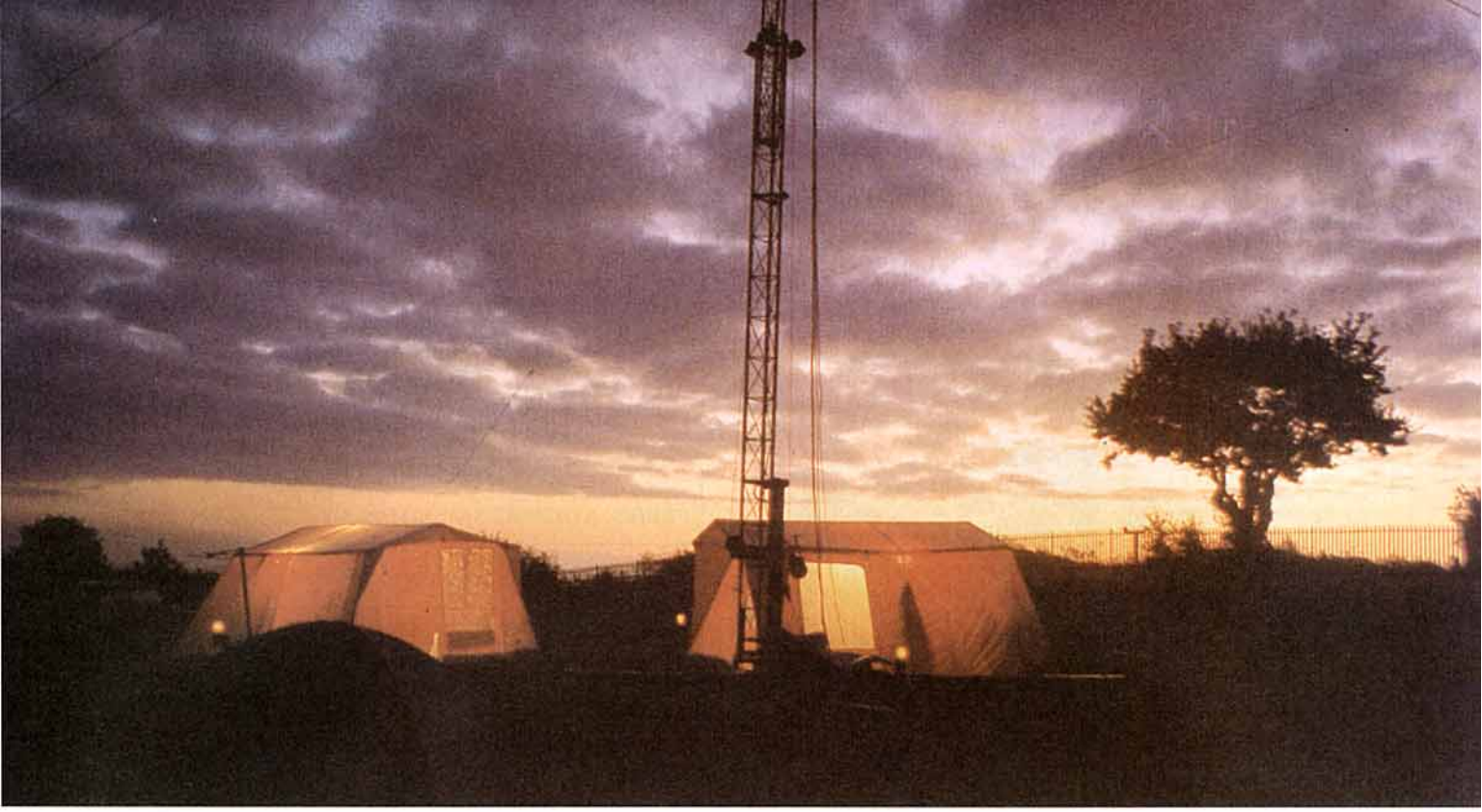
OPEN SECTION (QSOs PER BAND)

Pos	Group	Callsign	3.5	7.0	14	21	28	Mults	Points	Score
1	Lichfield ARS A	G3WAS/P	231	278	761	132	23	201	4721	948921
2	RSGB Bristol CG	G6YB/P	307	174	755	98	28	155	4542	704010
3	Windy Yett CG	GM0TXX/P	216	303	565	163	21	158	4281	676398
4	Lichfield ARS B	G3VHB/P	265	235	358	211	15	171	3895	666045
5	Swansea ARS	GW4CC/P	203	210	566	98	17	136	3901	530536
6	Inverclyde ARG	GM0GNK/P	292	277	337	95	27	124	3822	473928
7	South Notts ARC	G0OAU/P	128	176	766	14	0	108	3752	405216
8	Port Talbot ARC	GW3EOP/P	261	62	434	93	0	110	3012	331320
9	John's CG	G0PWE/P	130	51	693	37	0	108	3014	325512
10	Melton Mowbray ARS	G4FOX/P	214	272	425	32	0	90	3409	306810
11	South Wirral CG	GW3CSA/P	165	59	784	14	3	88	3426	301488
12	Horsham ARC	G4HRS/P	190	103	301	101	15	114	2587	294918
13	Edgware & DARS	G3ASR/P	167	200	243	61	4	105	2648	278040
14	White Rose CG	G3XEP/P	330	216	156	28	0	99	2689	266211
15	South Essex ARS	G4RSE/P	180	135	307	59	3	99	2549	252351
16	Ipswich RC	G4IRC/P	184	166	143	94	14	112	2435	251216
17	Southgate ARC	G3SFG/P	217	254	144	32	4	75	2626	196950
18	E Sussex CG	G0MSA/P	143	119	217	71	4	93	2025	188325
19	Farnborough & DARS	G4FRS/P	45	98	406	34	2	68	2029	137972
20	Echelford ARS	G3UES/P	145	155	92	19	1	73	1801	131473
21	Inverness ARC	GM4TPF/P	97	22	325	0	11	64	1641	105024
22	Chesham & DARS	G3MDG/P	90	84	226	0	2	68	1521	103428
23	Clifton ARS	G3NWR/P	236	72	253	16	1	43	2203	94729
24	Wirral ARS	G3GHN/P	91	65	103	43	10	70	1301	91070
25	11th Hour CG	G0MEG/P	167	106	60	19	0	65	1329	86385
26	Atherstone CG	G4LCQ/P	132	77	63	25	11	60	1324	79440
27	Aylesbury Vale RS	G4VRS/P	156	84	42	6	1	55	1268	69740
28	Welwyn Hatfield ARC	G3WGC/P	62	44	55	17	2	57	748	42636
29	Bangor & DARS	GI3XRQ/P	74	58	68	5	0	43	951	40893
30	Bredhurst RATS	G0BRC/P	105	53	43	0	0	37	854	31598
31	Guernsey ARS	GU3HFN/P	5	137	84	0	0	36	872	31392
32	North Sefton ARC	G0TSI/P	74	41	49	3	3	36	758	27288

RESTRICTED SECTION (QSOs PER BAND)

Pos	Group	Callsign	3.5	7.0	14	21	28	Mults	Points	Score
1	Plymouth RC	G3PRC/P	187	151	201	85	11	115	2554	293710
2	Stratford on Avon	G0SOA/P	271	102	212	63	6	111	2487	276057
3	Torbay ARS	G3NJA/P	208	179	122	74	8	104	2424	252096
4	Sutton & Cheam RS	G2XP/P	193	176	230	58	7	96	2608	250368
5	Gravesend RS	G3GRS/P	186	170	151	60	12	97	2425	235225
6	Newbury & DARS	G3WOI/P	163	148	234	71	12	94	2484	233496
7	Barrow in Furness CG	G3IZD/P	228	145	157	31	37	91	2257	205387
8	Red Dragon CG	GW8GT/P	179	119	156	50	7	95	2138	203110
9		G3SEM/P	223	152	110	32	0	92	2094	192648
10	Gloucester ARS	G4AYM/P	205	106	160	17	1	76	1991	151316
11	Reading & DARC	G3ULT/P	153	105	141	38	1	75	1861	139575
12	Kilmarnock & Loudon ARC	GM0ADX/P	119	183	129	23	3	75	1838	137850
13	Central Lancs ARC	G0FDX/P	159	113	111	48	0	76	1764	134064
14	Flight Refuelling ARS	G4RFR/P	189	35	152	62	1	75	1784	133800
15	Stevenage & DARS	G3SAD/P	193	99	111	27	1	74	1717	127058
16	Havering & DARC	G4HRC/P	136	135	71	29	2	68	1584	107712
17	S Manchester RC	G3FVA/P	109	72	120	25	5	71	1380	97980
18	Scunthorpe ARC	G4OGB/P	178	118	82	11	0	58	1683	97614
19	Crowborough & DARS	G0CRW/P	138	59	81	23	2	72	1296	93312
20	Ripon & DARS	G4SJM/P	144	76	73	25	0	66	1223	80718
21	Scarborough ARS	G4BP/P	209	140	34	11	0	43	1692	72756
22	Hereford ARS	G3YDD/P	173	101	71	9	1	49	1462	71638
23	Greenock & DARC	GM3ZRC/P	57	92	88	37	0	48	1130	54240
24	Wigan Douglas Valley	G3BPK/P	160	49	69	0	0	44	1165	51260
25	Taunton & DARC	G3XZW/P	73	58	53	15	7	51	875	44625
26	Leicester RS	G2AA/P	45	84	46	12	0	40	833	33320
27	Horndean & DARC	G4FBS/P	124	15	38	8	5	32	809	25888
28	Burton & District RS	G3NFC/P	66	60	40	2	0	32	756	24192
29	Dorking & District RS	G3CZU/P	42	77	37	3	0	34	678	23052

Check logs gratefully received from YU7SF, G/OZ7SM, G3UFY and G5LO/P.



The sun rises over the South Notts Amateur Radio club station, G0OAU/P (seventh in open section).

G3IZD/P, was overall bandleader with 37 contacts although only managing eight multipliers. Most other groups found the band either dead or at the best disappointing, with just a few making more than 20 contacts, G3WAS/P - 23, G6YB/P - 28, GM0TXX/P - 21, GM0GNK/P - 27, all in the Open section.

There were two openings - one which lasted from around 0730 to 0930 and a shorter one around 1100, although G3VHB/P gained most of their chart topping 14 multipliers from just 15 contacts scattered throughout the event. This latter showing efficient use being made of their spotting system!

Log keeping

WITH THE ADVENT OF computer logging, paper logs are fast becoming obsolete. Forty-five entries were on disk using recognised software ie Super-Duper, LOG, CT or NA. A further six were computer generated printouts with just ten being hand written. These last 16 logs were keyed into the checking programme so that a 100% check could be carried out.

Groups not fully confident with computer logging can choose several options. Continue paper logging and enter the contacts in after the event, this will save considerable post-contest time if using EI5DI's Super Duper for example, since the programme will dupe check and score the log, produce correctly formatted disk and paper logs, and even print out a multiplier list and summary sheet! Or have one person operating the transceiver and another on the computer.

Multipliers

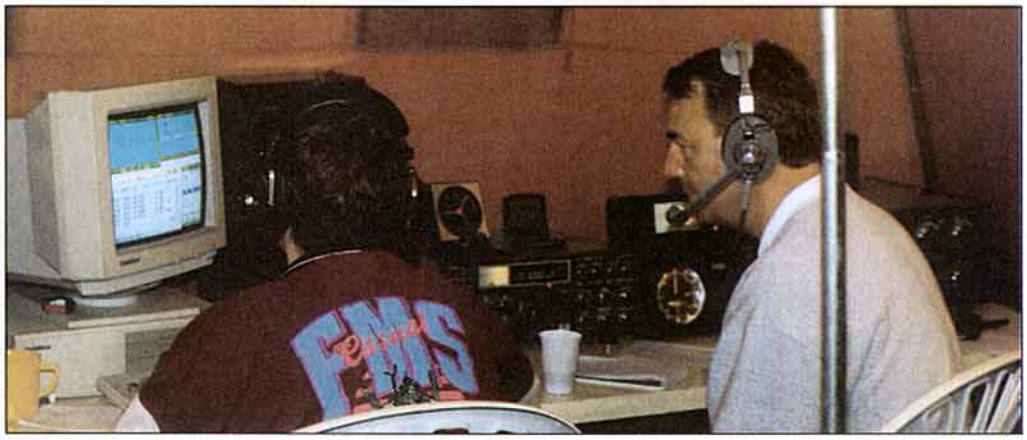
THE MAIN STRATEGY of this event is to establish a solid base of contacts whilst building up the country multipliers. A second receiver or transceiver with the transmitter disabled, although some kind of protection, such as back-to-back diodes, is necessary to cope with the strong local signal. Passing on multipliers can be done in two ways, either a paper written note giving full callsign and frequency details or if CT or NA computer logging programmes are used, ALT G will provide a local talk path between two locally networked computers, one at the operating position and one at the spotting position elsewhere on site. The programmes also enable connection to the DX Cluster in order to collect other generally spotted multipliers. The HF Contests Committee are aware that such techniques are open to abuse and are prepared to introduce site registration and inspection if this is suspected.

Everyone a winner

THIS CONTEST PROVIDES lots of fun for all levels of expertise. 170 G0, Class B or Novice calls were listed on the summary sheets as operators. This is most welcome and gratifying showing that group events are well and truly established in the contest calendar. Experienced operators dominate the leader board in the Open section but there will be plenty of competition in years to come. See you in September! ♦

CONTEST CLASSIFIED IS ON PAGE 85

Not quite wireless at G0SOA/P.



G0SOM and G4IRH operating the South Notts ARC station, G0OAU/P.

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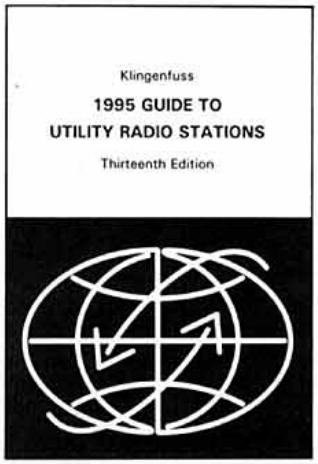

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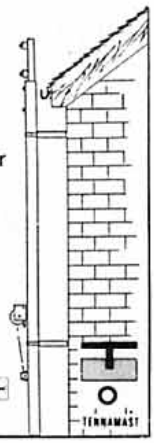

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CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest News* January 1993

HF RESULTS

2ND QRS CUMULATIVES 1993

In the second series of 1993, the gap between the leaders reduced. Jenny, 2E0ABC, did a good job of closing the lead on Thomas, 2E0ACY, compared to the first series, but not quite sufficiently to take the lead. A number of stations suffered with thunder and lightning in their locality and high QRN. Thankfully no damage was caused and a number of stations wisely shut down for part of the event. Guy, GD0LQE, had problems with QRN from the Manx electric railway only yards from his QTH but persevered.

A range of keys were used by stations. One reported a bath tub key, another had to borrow a straight key whilst a third station started off with a straight key but had to resort to an electronic key because of problems with his wrist!

The leading stations were dispersed over a wide area of the country. The top five covered the following counties: Berkshire, Merseyside, Yorkshire, Devon and Hertfordshire so the exact location does not seem to be too important in this event which is pleasing to see. Once again all stations were looking forward to the next series. Finally congratulations to all the certificate winners.

Strategy: The important thing when looking at the results table, whatever position you come, is to look at your placing relative to those around you. By comparing results over a number of series, or on different nights it is possible to monitor one's progress and determine what worked better. Questions to ask oneself are: Was it better to call CQ or to look for other stations? Has changing the antenna made any difference? Should one wait for a Novice (for the bonus points) or try to work extra stations at lower points? Would it be better to leave the popular stations to later in the contest when there may be less demand or will they just switch off? Pure operating is only part of the story. Station design and strategy form an important part in any contest and it is wise for all stations to look at these points - initially immediately after the contest, next when the results are published and again prior to the next event when planning for that. It is all a continual self training process.

G4HTD

Posn	Call	Code	6/9	14/9	22/9	30/9	8/10	Score
1	2E0ACY*		CK	336	420	440	CK	1196
2	2E0ABC*	1C12	347	440	CK	CK	300	1087
3=	2E0ADL	1W4-		80	200		140	420
3=	G4BLI*	2C1-	CK	150	CK	140	130	420
5	G4DDX*	2C1-	125		105	150	CK	380
6	G0FYP	1C1-	115	115	146	CK	376	
7	G0HDB	2C13	CK	113	130	130	CK	373
8	G0IRL	2C12	101	125	CK	90	CK	316
9	G4EIX	2W12	74	138	68			300
10	G3ZDD	2C13	CK	CK	90	95	93	278
11	G0HIN	2Q1-	90	113	70	CK		273
12	G4XPE	2C11		53	125	85		263
13	GD0LQE	2C12	95	86		CK	80	261
14	G4VPU+*	2C1-		CK	68	55	115	258
15	G0GHH	2C1-	CK	CK	73	86	75	234
16	G0TMT+*	2C1-			91	85	51	227
17	G3GMS	2G10	40	85	95	CK	CK	220
18	G4BUO	2C14			100	95		195
19	G0NNI	1C1-	63	47	59			169
20	G0NID	2C12	CK	43	55	53		151
21	G0ROT	1C13	75	50			25	150
22	G3SQX	2C13	40		55	10		105
23	G0SJC	2G10			30	25	20	75

Check logs gratefully received from G0LKX, G2HLU, G3BPM, G3ZHE

* = Certificate winner, + = First time entrant.

LOW POWER FIELD DAY JULY 1994

Field days are always enjoyable when the sun shines and the weather is good, this Low power Field day was just that, although it was a bit windy in places. Band conditions were fair. Congratulations to G3HEJ/P in section A and to G6UQ/P in section B who win the Houston-Fergus Trophy and the Southgate Trophy respectively. Certificates to G4FOX/P, G4RCC/P, in section A and G4ARI/P, G6KQ/P in section B, also a certificate goes to G3VIP (fixed station, check log) who gave the most points to entrants. A number of stations made favourable comments on 2E0ACY's operating and dedication - well done. Comments on the frequency limits to be increased to include Novices have been passed to HFCC. Comments received: "Weather perfect, table in middle of field, NO tent, very windy, used plenty of paper weights. 80 metre signals were unusually strong" (GI3LFH/P); "Enjoyed the event very much, had high winds, on the beach this year - 1/4 mile from home" (GW3SB); "Great fun but stuck on 3.560, thanks to all stations who let me stay on QRG all day so I could participate." (2E0ACY); "Apologies to 2E0ACY for QRM at one time" (G3HEJ); "Brilliant weather, 40m not very lively" (G4ARI). *G3RXP*

SECTION A - 10W OUTPUT MAX

Posn	Callsign	3.5	7.0	TOTAL	CLUB	EQUIPMENT
1*	G3HEJ/P	630	685	1315		TS130
2*	G4FOX/P	600	480	1080	Melton Mowbray	Argonaut
3*	G4RCC/P	665	235	900		TS120
4	G6AJ/P	390	355	745	Barnsley & DARS	FT7
5	G3WKS/P	470	235	705	West Kent ARS	TS120
6	G8CA/P	410	245	655	Axe Vale ARC	FT757/PA
7	G3TRF/P	325	235	560	Maidstone YMCA ARS	Homemade

SECTION B - 3W OUTPUT MAX

1*	G6UQ/P	705	465	1170	Stockport RS	TS120
2*	G4ARI/P	760	400	1160		F850
3*	G6KQ/P	470	500	970		Homemade
4	G4OGB/P	575	360	935		TS430
5	GI3LFH/P	370	450	820		FT7
6	G4XUV/P	540	215	755		TS130
7	G4CZB/P	495	220	715		Homemade
8	G0CRW/P	410	245	655	Crowborough Dist ARS	IC735
9	2E0ACY/P	560	-	560	Univ of Reading ARC	747 no PA
10	G3BPM/P	330	210	540		Homemade
11	G0JIT/P	450	80	530		FT7
12	G3NFC/P	450	70	520	Burton & DARS	Argosy
13=	G2FKO/P	225	215	440	Appledore & DARS	HW9
13=	G3CQR/P	250	190	440		Homemade
13=	GW3SB/P	295	145	440		HW8

Checklogs gratefully received from G3VIP*, G0ATR, G3MCK, G5LP/P

* = Certificate winners

HF RULES

1ST SLOW CW (QRS) CUMULATIVE CONTEST 1995

1. General: The aim of this event is to provide training and encouragement for those less experienced in CW and contesting. It is intended primarily for Novices and those newly licensed or just getting their feet wet in the world of CW contesting.

2. The General Rules for HF Contests published in the January 1995 issue of *RadCom* apply.

3. Sections: (a) Transmitting, single or multi operator. No limit on the number of operators in a team, nor need they be the same for each session. (b) Receiving, single operator only.

4. Eligible Entrants: Section (a) All operators must be members of RSGB. Section (b) Individual RSGB Members who do not hold a Class A Full or Novice licence. This contest is open only to stations in the British Isles (excluding Eire). Stations outside this area may not be contacted or logged for points.

5. Dates/Times: Five sessions, each from 1900 to 2030UTC on: Tue 4 April, Wed 12 April, Thur 20 April, Fri 28 April, Mon 1 May 1995.

6. Frequency / Mode: CW only, no faster than 12WPM, between 3540 and 3580kHz.

7. Exchange: RST and First Name. Multi-operator stations must send only one name during any particular session, regardless of who is operating, although different names may be used during different sessions.

8. Maximum Power: 3W RF output for Novices, 10W RF output for Full licensees.

9. Scoring: Section (a) Any UK station may be worked once for points during each session. Any contact with a Novice callsign at either or both ends scores 20 points. Contacts between two Full licence-holders score 5 points. The overall score is the total of the best three sessions. Section (b) Listeners may log only stations actively participating in the contest. Each Novice logged scores 20 points, each Full callsign counts 5 points.

10. Logs: Entrants are requested to submit logs for all sessions during which they are active to HF Contests Committee, c/o D Mason, G3RXP, 5 Spa Top, Caistor, Lincs LN7 6RB. Post-marked no later than Monday 15 May 1995. Full details of the correct format for logs are given in the General Rules. The name of the operator worked / heard should be recorded in column 5.

11. Awards: Section (a) Certificates of Merit to the leading Novice and Full licence-holder, and also to the highest placed station entering any RSGB HF CW Contest for the first time (please note on your Cover Sheet if you qualify for this last award). Section (b) Certificate of Merit to the leading listener. At the discretion of the HF Contests Committee, additional certificates may be awarded if there is sufficient support.

HF CONTEST CHAMPIONSHIP 1995

1 The Championship will be decided on the basis of RSGB HF contests held between 1 January and 31 December 1995.

2 Every UK single operator station entering two or more of the events listed below will automatically be entered for the Championship. For each event, the entrant will be awarded points according to his/her score expressed as a percentage of the score achieved by the leading UK station in that contest. These points will then be multiplied by the appropriate factor for the contest:

1st 1.8MHz	10
7MHz CW	20
Commonwealth	30
ROPOCO 1	10
IOTA	30
ROPOCO 2	10
21/28MHz SSB	20
21/28MHz CW	20
2nd 1.8MHz	10

The winner will be the station with the highest number of points at the end of the year.

3 Awards: The G2QT Trophy will be awarded to the winner, and the runner-up will receive a certificate of merit.

HF CONTESTS CALENDAR

2 Feb	LF Cums 1.8MHz (Dec 94)
4 Feb	LF Cums 7.0MHz (Dec 94)
5 Feb	LF Cums 3.5MHz (Dec 94)
11/12 Feb	1st 1.8MHz (Oct 94)
11/12 Feb	*PACC (MM) (Feb 95, p21)*
18/19 Feb	*ARRL DX CW (Feb 95, p21)*
25/26 Feb	7MHz DX CW (Nov 94)
24/26 Feb	*COWW 160 SSB (Jan 95, p.24)*
25/26 Feb	*REF DX SSB (Feb 95, p21)*
25/26 Feb	*UBA CW (Feb 95, p21)*
4/5 Mar	*ARRL DX SSB (Feb 95, p21)*
11/12 Mar	Commonwealth (Nov 94)
18/19 Mar	*Bermuda*
25/26 Mar	*WPX SSB*
1/2 Apr	*SP DX SSB*
2 Apr	ROPOCO-1
4 Apr	1st QRS Cumulative (Feb 95)
23 Apr	Low Power Fixed
22/23 Apr	*Helvetia (Mixed Mode)*
12/20/28 Apr	1st QRS Cumulative (Feb 95)

DIRECTION FINDING

TORBAY TOP BAND QUALIFYING EVENT

This year's Torbay event used a new map, OS sheet 191, to allow competitors to sample the delights and rugged beauty of Dartmoor. The start at Haytor commanded an excellent view in all directions and clean signals from the two hidden stations were anticipated. The organiser had some worries prior to the start as the expected test transmission from transmitter 'B' was not forthcoming. After the event the reason was discovered. the lone transmitter 'B' operator had too heavy a pack and had fallen and wedged himself in a gully, taking half-an-hour to free himself, but did so in time for the start.

Both start signals were heard at 1320 hours although most competitors commented that the null on 'B' transmission seemed to drift with time, possibly due to multipath. Both stations were sited at reservoirs, Fernworthy on the moors and Kennick just on the edge. Many teams decided to run across the moor to 'B' station from the main road rather than drive the narrow Devon country lanes and this proved very tiring.

The event saw no further qualifiers for the National Final as all participants entering the event had already qualified! Even so, a good day was had by all.

Pos	Name	club	Transmitter A	B
1	A Collett	Colchester	1502	1600
2	T Gage	Mid Thames	1515	1612
3	R Brocks	Colchester	1504	1613
4	C Wells	Mid Thames	1500	1614
5	A Simmons	Mid Thames	1516	1615
6	G Nicholls	Banbury	1546	1623
7	P Cunningham	Colchester	-	1434
8	G Wrenham	Coventry	-	1459

One competitor failed to find either transmitter due to equipment failure.

VHF RESULTS

23 / 13CM CUMULATIVES

While entries to many VHF/UHF contests are on the increase, entries to this event - as with many cumulatives - were down to a very disappointing level this year, particularly on 13cm. The contest will run again during 1994 but if entries do not show a significant increase we will have to consider the future of this event carefully. Is there something in the format of the cumulatives which you are unhappy with - please let us know so we can consider what we can do about it.

On 23cm John Quarmby, G3XDY, achieved an excellent performance once again - in spite of having only low power and radar jammer QRM during the first session, and being denied the DX worked by many stations further west in the fourth session. To prove that you don't always need a mega station to compete if you have a reasonable site and a lot of patience, Robert Ferguson, GD4GNH, was a close runner-up slot in the single operator section using only 10W. G3XDY commented on his remarkably consistent signal and often the only real DX worked. In the multi-operator section, the South Birmingham Radio Society once again took the honours however, two days after the last event their tower folded over in the high winds and the whole antenna system was destroyed.

On 13cm thanks and congratulations to John Smith, G8ZQB, for being the sole entrant and winning the band once again. Martin Platt, G4XUM, commented that although he had gear for the band, he just didn't make it on - he thought that there were only two stations active so it didn't seem worth it! Well - this is a classic case of inactivity breading inactivity - there were five stations worked including G8ZQB and many more are equipped and would come on if they thought others would appear. Let's see a little more activity for '94. *G4PIQ*

23CM SINGLE OPERATOR FIXED

Pos	Callsign	5-Oct	21-Oct	2-Nov	18-Nov	6-Dec	Norm	QSO	Loc	Pwr	Ant	km
1	G3XDY	80	107	115	213	97	3000	78	02OB	250	8 x 23Y	453
2	GD4GNH	51	79	100	242	0	2608	49	74QD	10	4 x 23Y	627
3	G4XUM	92	77	0	119	34	2211	60	83SB	250	8 x 23Y	272
4	G8ZQB	50	44	78	72	29	1633	32	74QD	10	4 x 23Y	452
5	G8NEY	38	38	68	93	45	1468	50	81VK	250	55Y	342
6	G3MEH	46	48	52	91	47	1437	72	91QS	100	2 x 50QLY	376

23CM ALL OTHERS

Pos	Callsign	5-Oct	21-Oct	2-Nov	18-Nov	6-Dec	Norm	QSO	Loc	Pwr	Ant	km
1	G8OHM	45	107	101	175	26	3000	70	92AJ	150	4 x 23Y	809

13CM SINGLE OPERATOR FIXED

Pos	Callsign	5-Oct	21-Oct	2-Nov	18-Nov	6-Dec	Norm	QSO	Loc	Pwr	Ant	km
1	G8ZQB	7	1	2	1	1	3000	8	92JN	8	1.6m	121

144/432 MHZ CONTEST MARCH 94

There is a new format for the results this time. In recent years this contest has grown entry sections for most combinations of single/multi op, fixed/portable and high/low power. This resulted in fragmented results tables with many of the section having very few entries. The new layout simplifies the tables and entry sections without losing any of the award sections. Within each table, fixed/portable status is obvious and low power stations are marked; everyone can guage their overall performance and also make detailed comparisons against directly equivalent stations. Comments please.

Unfortunately the new format rules did not get fully published; apologies to anyone who suffered inconvenience.

Conditions and activity over mainland Europe were both good, but the conditions did not extend over the UK and only a few well-equipped stations on the east coast were able to benefit. For G4VIX/P, barely a fifth of contacts on both bands were with UK stations, with 70cm providing excellent DX. A few miles inland, and further north, conditions on both bands were, at best, uninspiring; "dreadful" was a general comment. GM4VVX/P endured snow and ice to report "absolute silence" on 70cm. Nevertheless, entry levels were very healthy, especially from 'normal' domestic stations, and many people commented on having enjoyed the contest, which is as it should be.

A number of logs showed evidence of databases being used to fill in information which was not copied off air. Databases remain controversial, but they are supported by a number of widely used logging programs and, from a practical point of view, it is difficult to see how their use can be prevented. There is, however, a major difference between carrying out a check on what you copied, and filling in information which was never heard in the first place. VHFCC will be discussing what action to take if this cheating is seen to continue. Again, your comments please.

Thanks go to everyone who entered, with congratulations to the many certificate.

Steve Thompson, GW8GSQ
(Comments to 8 Nant Lais, Corntown, Bridgend CF35 5SA).

144MHZ SECTION SS

Pos	Pwr	Call	Points	QSO	Loc	Power	Ae	DX	km
1*		G4WFR	4021	306	JO01	400	8 x 9	DF0YY	778
2*		GW8OQV	1284	155	IO81	400	17	DL3SBA/P	692
3*	L	G6FQZ	332	62	IO91	25	9	DL3EBM	510
4		G8ZRE	248	52	IO83	100	8	G4VIX/P	318
5*	L	G4XPE	180	22	IO92	10	10	DL3EBM	537
6	L	G0TCD	166	45	IO91	15	7	DL3EBM	459
7	L	G3JJZ	165	33	JO01	25	8 / 8	DL3EBM	427
8		G7AZP	114	22	IO90	100	9	G4KUX	430
9		G7JHZ	102	20	IO91	40	9	PA0FHG	348
10	L	G1WAC	35	7	IO92	25		G4KUX	250

SECTION S

Pos	Pwr	Call	Points	QSO	Loc	Power	Ae	dx	km
1*		G4PIQ	1129	75	JO01	300	4 x 15	DH0OG	906
2*	L	G7GUC/P	746	100	IO92	25	13	F6KSL	645
3=*		G3RHH	619	72	IO82	200	9	F6KSL	680
3=*		G0MYE	619	106	IO91	400	10	DL0HA	566
5*	L	G8JAY/P	580	63	IO91	10	9	DK0BN/P	715
6		G4KDL	501	39	JO02	100	17	DF0CI	597
7		G7KAO	474	49	JO01	160	10	DL0WAE	474
8*	L	G1TWS	456						
9*	L	G7MHZ	369	19	JO01	25	13	DF0CI	659
10	L	G7KXZ	255	37	IO91	10	8	DK7KF	555
11	L	G3CKR	236	39	IO83	20	11	GM4VVX/P	524
12	L	G7MFV	234	28	IO80	25	9	G8TIC/P	440
13	L	G3FIJ	230	32	JO01	12	9	GI8TSI/P	531
14	L	G0JLF/P	202	42	IO91	20	9	GI8TSI/P	487
15	L	G8IFU	124	18	IO90	12	4	GI8TSI/P	487
16	L	G0TLG	19	7	IO90	25	Vert.	G4ZAP	247

SECTION M

Pos	Pwr	Group	Call	Points	QSO	Loc	Power	Ae	Dx	km
1*		Hadrabs and Windbreakers	G4VIX/P	6809	494	JO01	400	2 x 15	DF0YY	770
2*	A1	CG	G4ZAP	5812	590	IO93	400	4 x 9	DL0FH	807
3*		Victory CG	G8LNC/P	5415	493	IO90	400	4 x 19	GM4VVX/P	846
4		Spalding + Dist. ARC	G4DSP/P	5174	345	JO03	400	80 el	DL2NBU	834
5		Colchester Radio Amateurs	G4CRA/P	3427	321	JO01	100	2 x 14	DL0NF	789
6*		Northern Lights	G4KUX	2895	240	IO94	400	4 x 19	DF0IT	814
7		Black Sheep CG	G8TIC/P	2125	240	IO84	400	2 x 14	DL1KDA	741
8		11th Hour CG	G6CTU/P	2010	307	IO91	200	2 x 17	DF0OG	647
9		Southampton Univ RC	G3KMI	1829	208	IO90	150	4 x 17	DL6FBL/P	760
10		Bracknell ARC	G6BRA/P	1469	175	IO91	400	17	DL0CT/P	717
11		Chesham + Dist ARS	G3MDG/P	1287	206	IO91	400	13	DL4NAC/P	750
12		North Wakefield RC	G4NOK/P	1229	201	IO93	400	4 x 14	F6KSL	754
13*	L	Wirral + Dist ARC	GW4MGR/P	627	98	IO83	25	13	ON7HY	580
14*	L		GM4VVX/P	482	35	IO78	25	17	G8LNC/P	846
15		Welwyn-Hatfield ARC	G3WGC/P	452	80	IO91	400	14	DF0IT	590
16	L	Swale ARC CG	G6SRC/P	446	48	JO01	25	15	DF0CI	659

432MHZ SECTION SS

Pos	Pwr	Call	Points	QSO	Loc	Power	Ae	dx	km
1*	L	G3JJZ	120	20	JO01	25	19	ON4CP/A	330
2*	L	G3YHF	83	17	IO92	10	19	PA3BPC/P	414
3*		G8JXV	74	14	IO91	120	88	G6YIN/P	368
4*		G7AZP	53	11	IO90	100	16	G4RCG/P	316
5	L	G1WAC	48	8	IO92	25		ON4CP/A	484
6	L	G5UM	45	12	IO92	10	18	GW8AWM/P	151

SECTION S

Ps	Pwr	Call	Points	QSO	Loc	Power	Ae	dx	km
1*		G6RAF	409	52	IO92	110	2 x 21	DF0IMH	
2*	L	G3RHH	132	22	IO82	25	17	PA0WMX	542
3*		G0MYE	74	16	IO91	400	24	PA3BPC/P	331
4*	L	G3FIJ	53	9	JO01	20	19	PA3FPS	267

SECTION M

Pos	Pwr	Group	Call	Points	QSO	Loc	Power	Ae	dx	km
1*		Hadrabs and Windbreakers	G4VIX/P	5526	346	JO01	400	4 x 21	SP6ASD/P	1091
2*		Spalding + Dist. ARC	G1DSP/P	1920	121	JO03	400	4 x 28	DL3ARH/P	840
3		Colchester Radio Amateurs	G6SPS/P	1388	120	JO01	100	4 x 17	DG7NDC	686
4=*		A1 CG	G6APZ	858	125	IO93	400	4 x 23	DB4VY/P	721
4=*		11th Hour CG	G8MNY/P	858	124	IO91	400	27	DG3FK/P	703
6		North Wakefield RC	G4RCG/P	458	78	IO93	250	4 x 21	DL0AAN	627
7		Victory CG	G8NEH/P	300	38	IO90	150	22	DC0KO	626
8*	L	Wirral + Dist ARC	GW0MGR/P	243	47	IO83	20	19	G6SPS/P	354
9		Bracknell ARC	G6BRA/P	204	28	IO91	400	21	DL0KK/P	503
10*		Southampton Univ RC	G8KMI	172	30	IO90	100	2 x 21	DK0VKG/P	562
11		Chesham + Dist ARS	G1MDG/P	75	19	IO91	10	19	PA3BPC	329
12		Black Sheep CG	G6YIN/P	50	8	IO84	50	18	G8JXV	368
13*	L	Swale ARC CG	G6SRC/P	50	8	JO01	25	19	G6APZ	254
14	L		GM4VVX/P	7	3	IO78	10	21	GM0AKJ	60

OVERALL RESULTS
SECTION M, HIGH POWER

Pos	Group	144 Norm	432 Norm	Total Norm
1*	Hadrabs and Windbreakers	1000	1000	2000
2*	Spalding + Dist. ARC	760	347	1107
3*	A1 CG	854	155	1009
4	Victory CG	795	54	850
5	Colchester Radio Amateurs	503	251	754
6	11th Hour CG	295	155	450
7*	Northern Lights	425	0	425
8	Black Sheep CG	312	9	321
9	Southampton Univ RC	269	31	300
10	North Wakefield RC	180	83	263
11	Bracknell ARC	216	37	253
12	Chesham + Dist ARS	189	14	203
13	Welwyn-Hatfield ARC	66	0	66

SECTION M, LOW POWER

Pos	Group	144 Norm	432 Norm	Total Norm
1*	Wirral + Dist ARC	1000	1000	2000
2*	Swale ARC CG	711	206	917
3	GM4VVX/P	769	29	798

SECTION S, HIGH POWER

Pos	Call	144 Norm	432 Norm	Total Norm
1=*	G4PIQ	1000	0	1000
1=*	G6RAF	0	1000	1000
3	G3RHH	548	323	871
4	G0MYE	548	181	729
5	G4KDL	444	0	444
6	G7KAO	420	0	420

SECTION S, LOW POWER

Pos	Call	144 Norm	432 Norm	Total Norm
1*	G3FIJ	308	1000	1308
2*	G7GUC/P	1000	0	1000
3*	G8JAY/P	777	0	777
4*	G1TWS	611	0	611
5	G7MHZ	495	0	495
6	G7KXZ	342	0	342
7	G3CKR	316	0	316
8	G7MFV	314	0	314
9	G0JLF/P	271	0	271
10	G8IFU	166	0	166
11	G0TLG	25	0	25

SECTION SS, HIGH POWER

Pos	Call	144 Norm	432 Norm	Total Norm
1=*	G4WFR	1000	0	1000
1=*	G8JXV	0	1000	1000
3	G7AZP	28	716	745
4	GW8OQV	319	0	319
5	G8ZRE	62	0	62
6	G7JHZ	25	0	25

SECTION SS, LOW POWER

Pos	Call	144 Norm	432 Norm	Total Norm
1*	G3JJZ	497	1000	1497
2*	G6FQZ	1000	0	1000
3	G3YHF	0	692	692
4	G4XPE	542	0	542
5	G1WAC	105	400	505
6	G0TCD	500	0	500
7	G5UM	0	375	375

* Certificate winner

Ajudicators note:
These results were agreed by VHFCC on 7 July, but unfortunately they failed to reach *RadCom* for publishing. Since issuing the certificates, GM4VVX/P advised me that their 2m station operated with high power. As a result, Swale ARC, G6SRC/P, should be shown as certificate winners as the second placed low power portable station on 144MHz, section M. Thanks for your honesty, Clive.

VHF RULES

144 / 432MHZ

When: 4/5 March, 1400 - 1400UTC
Rules: General Rules apply. Entry to both full 24h and 6h sections is not allowed, choose one or the other but *not* both. Serial numbers start at 001 on each band. Single band entries will be accepted as long as the 4422 cover sheet is marked 0 points on the band not used. Separate certificates for low power (25W, any number of antennas) and normal Open section, the 25W single antenna certificate for the highest placed station still applies also.
Sections: S single operator fixed / portable, M multi operator, (fixed or portable), L listeners, SS single operator fixed, Six hour duration. SS Operation for any contiguous 6 hour period (no breaks, a continuous 6 hours), starting at any complete hour eg 1400 - 2000 or 0000 - 0600 not 0823 - 1423) Only one entry per station.
Adjudicator: S. Thompson 8, Nantlais, Corntown, Bridgend. Mid Glamorgan CF35 5SA.

70 MHZ FIXED / SWL

When: 26 March 0900 - 1300UTC
Rules: General Rules apply and Rule 24 (1995).
Sections: S single operator, M multi operator, L listeners.
Adjudicator: A Cook, Fishers Farm, Tendring, Clacton-on-Sea, Essex CO16 9AA.

144MHZ SSB CUMULATIVES

When: 4 / 12 / 20 April, 2000 - 2200 local time.
Rules: General rules apply.
Scoring: Radial rings. Single operator fixed station only.
Sections: (1) 25W output from the rig only, not 25W at the top of the mast. Best two logs from three to count to score. Please send all three so that adjudicator can chose your best entry. (2) Open, (400W max power, single or multi antennas).
Adjudicator: I Pawson, 3 Orion, Bracknell, Berks RG12 7YX.

1ST 23CM & 13CM FIXED / SWL CONTESTS

When: 9 April, 1700 - 2100UTC
Rules: General Rules apply.
Scoring: Radial rings.
Sections: For each contest - F fixed station single operator, M multi operator fixed, L listeners.
There are two separate contests running concurrently. Separate cover sheets and logs please, summary sheet *not* required.
Adjudicator: A Cook, Fishers Farm, Tendring Clacton-on-Sea, Essex CO16 9AA.

VHF/UHF CONTESTS CALENDAR

29 Jan	70MHz Cumulatives (Jan95)
5 Feb	432MHz Fixed/AFS/SWL (Jan95)
12 Feb	70MHz Cumulatives
26 Feb	70MHz Cumulatives
4/5 Mar	144 / 432MHz (Feb 95)
12 Mar	70MHz Cumulatives
26 Mar	70MHz Fixed / SWL (Feb 95)
9 Apr	1st 23cm & 13cm Fixed / SWL (Feb 95)
12 Apr	144MHz SSB Cumulatives
20 Apr	144MHz SSB Cumulatives
6/7 May	432MHz to 24 GHz and 70cm Trophy
20/21 May	144MHz and SWL, Single / All Others
21 May	1st Back Packers 144MHz
3 Jun	50MHz Trophy
3/4 Jun	IARU 50MHz
4 Jun	1st 50MHz Backpackers
18 Jun	70MHz CW

60 This had been adopted for early prototypes but all production models have used a good-sized 90mm diameter unit facing downwards in the bottom panel.

The receiver is a double conversion superhet with IFs of 51.655MHz and 455kHz. There is no RF amplifier except when the whip antenna input is selected which uses a small impedance converting amplifier. The front-end is filtered by one of seven diode-switched bandpass filters prior to feeding the first mixer via the RF AGC circuitry. Two small resonators are used at the first IF and the main selectivity is achieved with ceramic or mechanical resonators at the 455kHz IF.

The first local oscillator injection is provided by a direct digital synthesiser (DDS) to give a clean signal with small step size. To ensure excellent frequency stability, a TCXO (temperature compensated crystal oscillator) is used for the reference. This is available as an option in most radios including those costing considerably more but is standard in the AR3030. This 12.8MHz TCXO is multiplied by four to give the second LO injection.

The AR3030 uses EEPROM (electronically erasable PROM) for storage of memories instead of the more normal battery-backed RAM. This has the advantage that there is no battery which would eventually need replacing. EEPROM life tends to be more limited than RAM, and fuzzy logic control is used to determine intelligently when to store new data. This is the main reason that the band stores are not constantly updated.

MEASUREMENTS

ALL MEASUREMENTS WERE made with the receiver powered from the provided AA3030UK mains PSU and the results are summarised in the table. Additional comments are as follows.

SENSITIVITY

The sensitivity is entirely adequate on all bands except 28MHz for most normal antennas. It is lower than is normally seen in receivers equipped with RF amplifiers. The sensitivity on MW below 1.8MHz reduces by about 10dB to accommodate the large signals in this part of the spectrum.

S-METER CALIBRATION

The S-meter linearity is good at about 6dB/S unit. On AM and FM the S meter was 4dB more sensitive across the whole range.

AGC

The AGC attack time was poor, showing much overshoot and 'bounce' extending to 500ms particularly with stronger signals. The audio output was not held as constant as most receivers, rising by approximately 1dB for every 10dB increase in input signal. This is not a problem and tends to make strong signals sound louder than weak ones.

SPURIOUS REJECTION

Rejection of the first IF was in excess of 80dB below 18MHz but reduced to around 45dB above 18MHz. This is due to the use of a highpass input filter above 18MHz instead of the bandpass filters used at the lower frequencies. The image rejection is good in excess of 75dB, and all other responses, including second mixer image, are in excess of 90dB down.

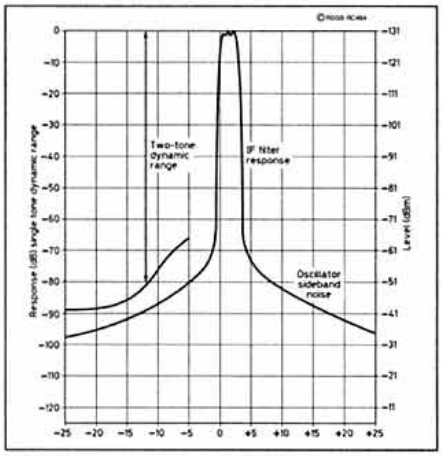

Fig 1: AR3030 effective selectivity curve on USB.

STRONG SIGNAL PERFORMANCE

The third order intercept and dynamic range are reasonable with 50kHz tone spacing but degrade substantially close-in. The reciprocal mixing performance is also reasonable. **Fig 1** shows the combined effective selectivity curve on USB.

The second order intermodulation performance was checked at 14.3MHz (test signals 7.2 and 7.1MHz) and at 21.1MHz (test signals 11.6 and 9.5MHz). Input signals of -47dBm gave a 10dB S+N:N response, a rather poor result and most likely due to the switching diodes in the front-end and input filters. A response at this level is likely to give rise to out-of-band signals when strong broadcast stations are around.

SELECTIVITY

Both the ceramic SSB filter and the mechanical AM filter had good skirt selectivity. No optional filters were fitted to the review radio.

FREQUENCY CALIBRATION

When measured at room temperature the frequency was accurate to within the display resolution of 10Hz, a very good result even considering that a TCXO is fitted.

POWER REQUIREMENTS

Under normal operation, the measured current consumption was 580mA from a 12V supply with the dial illumination switched on, reducing to 360mA with the illumination switched off. The receiver continued to function down to 9.6V and slightly lower, but not reliably down to 9V. Although the use of eight NICAD cells is feasible according to the operating manual, this is only possible with well charged cells. A 'Battery Low' indicator on the display comes on below 10.9V.

ON-THE-AIR PERFORMANCE

THE AR3030 IS A GOOD all-rounder. It is easy to use and there are no multifunction button operations. Keypad frequency selection, both direct frequency and metre bands, is rapid and as a consequence frequently used. However, I found the rotary tuning facilities not ideal. Either the steps were too coarse or tuning too slow. Although the main tuning knob is very smooth in operation, the combination of a small number of steps per revolution and a small step size needed for smooth tuning on SSB and CW makes the tuning somewhat tedious. I found the tuning knob rather small but the finger ident was a great help (in fact essential). AM tuning with 1kHz steps is much more satisfactory. In reality the 50 steps per revolution is not achieved. This is only obtained at very slow tuning speeds and at usual tuning rates, 15 to 25 steps per revolution is more likely. Much better tuning ergonomics are achieved with higher resolution shaft encoders giving many more steps per revolution as are found on most HF transceivers.

The overall performance on all modes was good. Sensitivity was adequate on the higher bands and strong signal performance on the LF bands seemed reasonable most of the time. Second order products from strong 41m broadcast signals were audible on the quiet 20m amateur band during the evenings and these were not entirely eliminated by switching in maximum input attenuation. This problem was observed in the measurements. At times, broadcast signals were heard on the CW end of 40m. The VLF performance below 150kHz seemed much better than average indicating a clean synthesiser, low noise microcontroller and PSU.

Although the AGC seemed generally acceptable, there was a noticeable click on the attack on strong signals. The AM performance was excellent on both normal and synchronous modes with a good balance between filter bandwidth and fidelity. Copying weak AM signals on SSB was also most effective.

AR3030 CONCERTO CONTROL SOFTWARE

A BETA TEST VERSION of this software was provided with the review radio but a computer problem prevented proper assessment. The Concerto control software is a Windows driven package providing full control of the receiver via the RS232 port. All functions of the radio can be controlled and monitored via a front panel screen display on the computer. Additional features such as user definable step size are available. Computer control can also provide a virtually unlimited number of disk based memory banks. Each bank contains 100 memory channels and the computer environment allows these to be properly labelled, viewed, sorted and accessed. Additional scanning features are provided, including between two frequency limits, and also a graphical spectrum analysis display. The package looks very useful and opens up a host of new possibilities.

CONCLUSIONS

THE AR3030 IS AN IDEAL radio for the general short-wave listener requiring good all-round performance on all modes of operation. It is overall easy to use and the only significant shortcoming is in the second-order intermodulation performance, most likely due to front-end switching diodes. The current price of the AR3030 is £699 inc VAT.

ACKNOWLEDGEMENTS

I would like to thank AOR (UK) Ltd for the loan of the transceiver. ♦

Members' Advertisements

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Ads for CB equipment will not be accepted. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Amateur Callbook is correct. RS members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom*.

Warning: *Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid.*

FOR SALE

COLLINS for sale. KWM2A, 30L1 Linear Amp 600w. 75S1, 32S1 S Line, 312B5 VFO and wattmeter 312B4 Wattmeter and station control. All with PSUs and handbooks. 136B2 Blanker. New PSU 12V DC for KWM2A. Contact Mac, G3OEM. (Brighton) 01273 605132.

DRAKE TR5, PSU: £450. Xerox FAX: £70. Drake R4A: £100. IBM PS2 Base Unit, faulty: £20. G3PJJ. (Cambridge) 01223 263137.

F726R 2m, 70cm, 6m, SAT board: £795. FRG 9600 HF and VHF UHF: £250. LT23S 144 to 23cms Transverter: £350. C5 Jaybeam Collinear: £50. KPC4 D/port TNC: £200. KPC3: £100. WRASSB SC1 SSTV FAX: £150. IC751 with internal PSU: £675. TB2 HF Beam: £140. FC902 ATU: £125. TH75E D/band H/held c/w spare battery and charger: £180. (Blairgowrie) 01250 876235.

JRC SEPARATES. NSD515 Tx, NRD515 Rx, NBD515 PSU, NVA515 Spkr, NCM515 Controller, Mic, Low pass fltr, Daiwa Rotator & Controller + cables, TenTec 2kW ATU Dummy Load, Masthead Balun, TET Aerial Array, 3 section steel Mast/fittings, Morse Key, Coax/ Wire aerials/traps + (G5RV full + half size) Books/various other items. All major items securely boxed for transit with manuals: £1250 include. Buyer collects. (Newark) 01636 813547 .

KENWOOD R5000 HF Comms Rx, c/w VHF Converter and CW filter: £500. Dennis, G0FMT. (Royston, Herts) 01763 261215.

TOKYO HF All-band Linear Amp HL-1K, o/p 500W: £400. (Humberston) 01472 814146.

VALVES. BRAND NEW at £1 each. EB91, EBC81, ECC84, ECL84/85, EF80, EF91/92, EF184, EH90, EL36, EL85/86, EL91, EL360, EL821, EZ35, PD500, PL33/36, PL504, PY500A, PZ30, R19, 6C4, 6H6, 6SL7GT, 6U4G, 12AE6, 6X4, DAF91, DF96, DK91, DL92 and many more at £1. Too numerous to list. SAE with your enquiries. Please add £2 Postage. Cheques to:- K Bailey, 40 Seymour Close, Birmingham, B29 7JD.

VINTAGE Domestic Receivers, private collection for sale. 1930s to 1950s including Pye, Phillips, Cossor etc. Phone for list. (Huntly) 01466 780884.

VETEK 1MHz - 1GKz RF network Analyser comprising Model 1901C Display, 1080 Sweep Gen, 1076 Sweep Comparator, all VGC: £300. FTDx 400 Rx, FLDx 400 Tx. The pair: £150. Buyer inspects/ collects. Brand new, boxed Weir HSS-180, S/mode PSUs, 1x 5V at 10A, 2x 12V at 6A: £30 each plus P & P. Phone: Graeme, G4NVH. (Stafford) 01785 225974.

YAESU 726R, 2m, 70cm and 6m All Mode, with Desk Mic, Fist Mic, DC lead, manual, excellent condx: £650. GW8VGG, QTHR. (Newport) 01633 257839.

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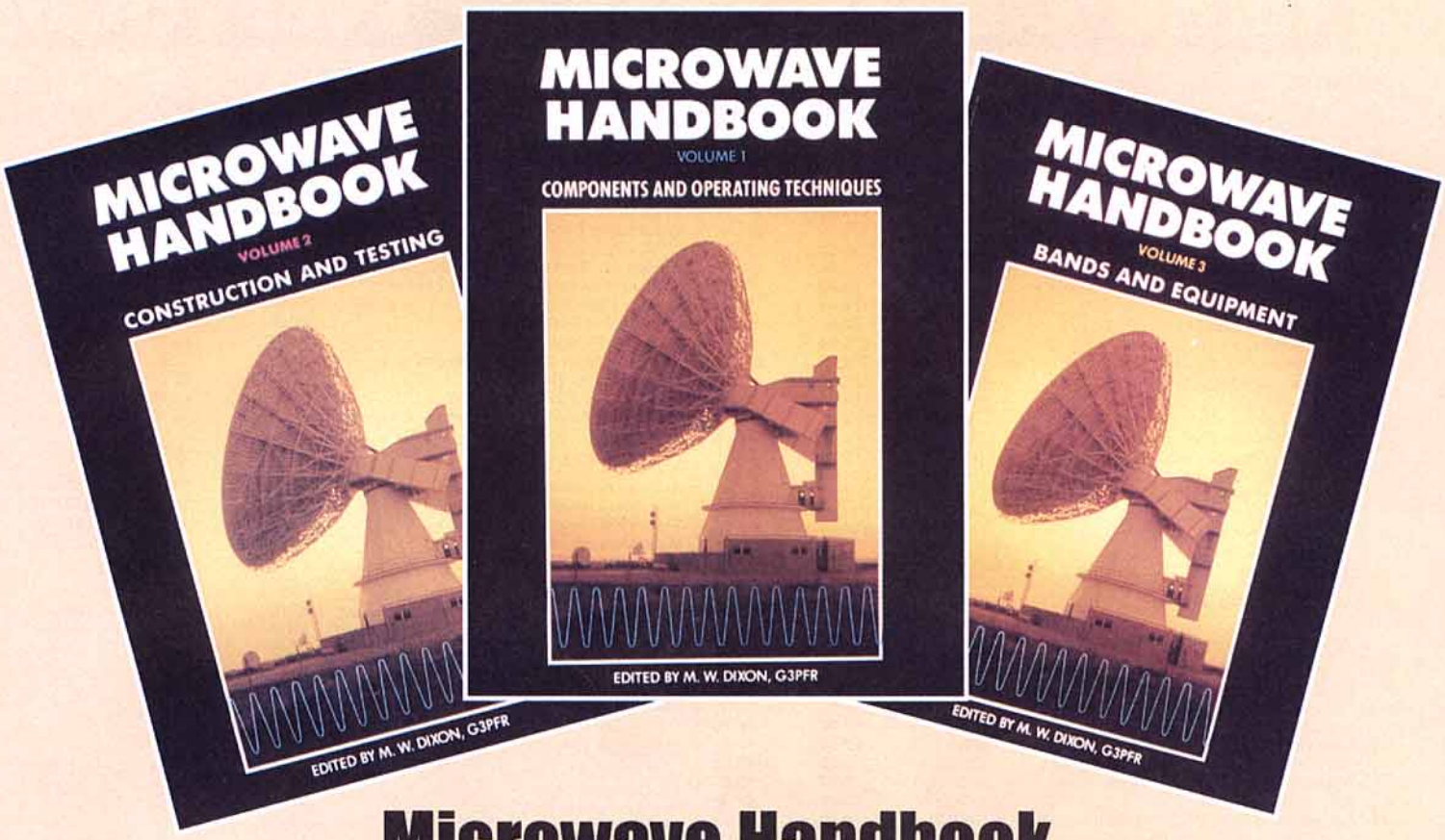

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Newsletter and magazine prices include postage. Overseas Airmail and first class UK post prices are available on request.

AVAILABILITY. Goods are available over the counter at RSGB Headquarters 9.15am to 5.15pm, Monday to Friday. However, you are strongly advised to confirm availability of goods by telephone before visiting Headquarters.

PAYMENT. Payment may be made by post, enclosing a cheque or postal order. These should be crossed and made payable to 'Radio Society of Great Britain'. If sending cash please use registered post. We accept Visa and Access (Mastercharge) cards and our telephone number for credit-card orders is 0956-707373.. Our Giro account number is 533 5256.

DELIVERY. Goods will be despatched to UK destinations by 2nd class letter post or parcel post, or surface mail to overseas destinations. Please allow 28 days for delivery.

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The 1995 RSGB Diary

THIS IS your last opportunity to purchase this diary which is dedicated solely to radio amateurs *and* shortwave listeners. At last information will be at your fingertips (or in your pocket!) wherever you go. This attractive, black finish, gold embossed diary has been printed by Letts and published by Bambers with cooperation from the RSGB. Contents include*:

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IMPORTANT: This is not a standard diary with a few extra pages inserted - we have designed this diary from start to finish with *your* needs in mind.
*Please note this is only a small selection of what is covered in this diary.

Radio Society of Great Britain
Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE

NAVICO 1000 2m Tcvr, 5/25W: £125 ono. Tiny-2, TNC include connectors: £130 ono. (G4ESK. (Lichfield) 01543 263608.

PK88 HF/VHF TNC, as new: £120. Fax1, Wefax, Navtex, RTTY Demodulator, excl condx: £100. G3KZU, QTHR. (Oxford) 01865 63000.

PYE SG1U Sig Gen, UHF VHF H/port Storno 800 inc charger. Storno High band Duplexers. Commodore 1084S Monitor. Ray, G8EZT. (London W11) 0171 602 1171.

RACAL 65385 Radar, unused, ex-sales never been to sea, fully working. Good range, spare display, 12v: £300 ono. (Harlow) 01279 426862.

RECEIVER MODULES. 12V 25mA, 0.5uV for 10db, s+n:n. 2x BF981 MC3359 IC. 10.7MHz crystal filter. 455KHz Mechanical Filter, complete but failed manufacturer's testing, with data and circuit diagrams. 173MHz FM, convertible to 2m. Several available: £5 each plus 50p P&P. G8ZGK, QTHR. (High Wycombe) 01494 448030.

SANGEAN ATS-803A Short-wave Rx 0.15-29.99MHz, AM/SSB, BFO + RF gain, W/N Filter, direct Freq Keyin, handbook, as new, boxed: £65. Phone after 5pm. G6BHB. (Waterlooville) 01705 250875.

SATELLITE L L Grace Kansas City Tracker. Tuner V.2.41 half length PC Board, with cable for controller Kenpro KR5400A or similar rotator. Instantrack S/ware included; £100. G3RUH 400BPS PSK modem board, populated, in case with meter but not set up: £50. G3RUH 1200BPS PSK modem self-powered with auto-Doppler correction. Cable to Tiny-2 disconnect header. In diecast box with meter: £50. Full docs all above. G0SPO, QTHR'94. (Soham, Cambs) 01353 722838.

SILENT KEY plus other items Sale. Icom IC-2E and IC-4E H/held Tcvrs with charger and Mic: £165. Kenwood DM-81 Dip Meter: £30. Avo CT38 M/meter with RF Probe, 95 ranges, leads and shunts: £85. Various items of BBC Computer, twin D/drive, Printers, Monitors etc. Items from WW2 secret listening station. Army/Naval gear, Wavemeter, Meters, Valves Testgear etc. Offers!. (Bexley) 01322 525828.

SILENT KEY SALE G4GOF. FT102: £450. SP102 Spkr/Filter: £50. YP150 Wattmeter/D-load: £50. FF501 L P F: £15. Capco SPC 300 ATU: £100. Shure 444 Mic: £20. Datong FL3 Filter: £80. All with manuals. Prefer see and collect. Contact G4ERA, QTHR. (Hastings) 01424 812350.

SILENT KEY SALE, G4PUU: Yaesu FT209R Tcvr: £115. Yaesu FRG700C Rx: £200. Datong FL1 Filter: £20. Hi-Mound HK705 Key: £10. Packer ATU: £5. Drae VHF Wavemeter: £10. (Wareham) 01929 556022.

SILENT KEY SALE. ICOM IC725 HF Tcvr: £520. Icom R7000 Rx (SSB/FM/FM-N/AM) include TV-AM Adpt: £600. Icom IC R71 Communication Rx +IC Ex 257 FM Unit fitted: £600. Icom IC SP3 Ext Spkr: £40. All items boxed c/w instructions, VGC. Shure 450 Mic: £20. SEM Active Notch Filter: £10. Maplin ATU and Notch Filter: £10 each. Buyers collect or P/P extra. G4UYI, QTHR. (Workington) 01900 67226.

SILENT KEY Sale: Labgear LG300, IC720A PSU FT220R 2m Multi Sony Communications Rx. Home brew Txs, PSUs Xfers, valves 813s 811As 6146, 6KD6, 5763, 100TH, 35T, Black Star 600MHz Counter. Many more items. Buyer inspects, collects. G4HMC, QTHR. (Bucks) 01494 866925.

SKIPTECH 15-20A PSU. Alinco D/band Tcvr 2m/70cm and Discone aerial. For collection only if possible. (Grangemouth) 01324 474643.

SOMMERKAMP FL200B 100w Tx, (matches FR-100B Rx) 80-10m, no WARC bands, mains powered, Offers. Global AT1000 ATU as new: £75. Call Gavin or Mike, 9am - 5.30pm. (Peterborough) 01733 345731.

STRUMECH 40ft Versatower, gd condx, ground post and 21inch Wall Mount stand off brackets: £450 ono. B3 Wide Band TV Aerial: £25 ono.(Hayes) 0181 842 1688.

TRI-BAND Beam DX33 Penetrator, vg condition: £100. Collect at Carlisle. (Carlisle) 01228 513554.

TRIO AT130: £85. KW2000, many spares valves, Tx side needs attention: £50. Wanted 500pF wide spaced capacitor, Loudenboomer Linear. G4ILA. (Stockport) 0161 477 6702.

TRIO TS520 HF Tcvr, gd condx, new PAs last year, SSB Filter, manual, inc S520 Spkr and Mic: £250 ono. G0PMY, QTHR. (Nr Blackpool) 01253 700684.

TRIO TS700G 2m M/mode Base station: £220. Trio TS130S with WARC bands, matching Spkr: £350. Tonna 19el Crossed Yagi: £40. (Nr Matlock) 01773 856159.

TRIO TS930S all Filters, MC85 Desk Mic, manual, super rig: £750. Colin. (Cirencester) 01285 821571.

TS440SAT 2nd Rig: 650. SP31 Filters, new: £50. Datong FL3: £85. AL-811 Ameritron 600W+: £650, ovno. All boxed + spare 811. (Peterborough) 01733 840268.

TS530SP with MC50 Desk Mic: £350. Scamclark Pump up Mast, 40ft: £150. G3WMX, NOT QTHR. (Somerton) 01458 223466.

TS930S, Auto ATU, CW Filter, Kenwood MC80 Mic, Kenwood LF30A L/P Filter, manual, original box as new: £775. (Lymington) 01590 644788.

UNIVERSAL M-7000 Communication Terminal plus Hantarex VDU: £500 ono. AOR 3030 Rx: £500 ono. Buyer inspects and collect. (Northampton) 01606 413103.

VHF/UHF GEAR. Yaesu FT208R and FT708R H/helds, chargers, manuals and other accessories. Icom IC240 2m mobile with Mic, manual, boxed: £100 each. Jim, G4LWY, QTHR. (Warrington) 01925 762485.

WESTERN DX33 3-ele Tri-Bander, excl condx: £125. Telex Hygain All-band Vertical, unused: £45. AEA PK88 TNC with manual: £85. G3XZO. (Stratford-on-Avon) 01789 740073.

YAESU FRG7700 Rx 0.15-30MHz, c/w FRT7700 Ant Tuner, FRV 7700 VHF Converter, VGC, manual: £300. G3LTZ, QTHR. (Swindon) 01793 762559.

YAESU FT1000 mint condition, one year old, very little use, with matching Spkr SP5 and DVS - Digital voice recorder, all boxed with manuals: £2,450. Phone G4ZIP. (Feltham) 0181 890 4666.

YAESU FT101EE, gd condx, w/Mic, handbook + spare valves, fan: £125 ono. Antenna Rotator AR-40, unused boxed, w/control & cable, instructions: £50. buyer collects. G4KDB, QTHR. (Newbury) 01635 34971.

YAESU FT200 Tcvr, manual. Working, buyer collects. (Benfleet) 01702 554764.

YAESU FT650 Triband M/mode 6/10/12m 100W, mint: £850. 6m Tokyo HL166V Amp 3/10w i/p 80/160w o/p, mint: £185. Bird 43 elements. 500w 6m, 1kW 70cm: £25 each. (Kettering) 01933 653608.

YAESU FT70G HF Portable, mint, boxed, c/w Mic and Hands ATU. Tx 2-30MHz, Rx 0.5-30MHz. USB/LSB & AM. Functions: T/wheel Freq Selector, Clarifier, Squelch, SWR Protection, Jack for Key, Noise blanker, 5/10w: £250. Robin, G0TGY. (Basingstoke) 01256 780624 (night).

YAESU FT76 70cm H/held, c/w Nicads, charger, Drycell case, Spkr Mic, case, power lead, as new, hardly used: £250 complete. Yaesu FT208R 2m H/held c/w Nicads, charger, Spkr Mic, Mobile Mic/PSU, case: £120. Yaesu FT708R 70cms H/held, c/w Nicads, base PSU, charger, Spkr Mic. case: £150. All in first class condition. For details phone evenings or w/end. (Tamworth) 01827 58004.

YAESU FT77 Mobile HF Tcvr 80 - 10m, inc WARC. With FM, immac, boxed, as new, with Mic: £350. FC77 Matching ATU - P/SWR Meter, also boxed, as new: £80. FC707 ATU, with P/SWR Meter, gd condx: £65. Hameg G05 60MHz D/Beam Scope, leads, instructions, brand new <20h use: £400. Yaesu G400 Rotator, one year use: £100. All ono. (N. Notts) 01777 248080.

YAESU FT840: £650. Also PK232 BMX: £290. Both only months old. Move forces sale. No offers. (G0IWW, QTHR. (Wigan) 01942 36342.

YAESU FT902DM HF Tcvr, all filters and memory module: £520. FTV901R Transverter 2m, 70cm with repeater shifts: £350 VGC with boxes. Both units: £835. (Birmingham) 0121 472 8746.

WANTED

ALL EARLY WIRELESS and Television items, Crystal Sets, Receivers, Transmitters, Horn Speakers, pre-1925 Valves, early Hi-Fi, pre-war television, Spy sets, any Clandestine equipment, early radio, television Books. Pay cash and collect. G4ERU, 5 Luther Road, Winton, Bournemouth BH9 1LH. (Bournemouth) 01202 510400.

AP1086 ISSUE 1 (RAF Radio Stores Ref Nos) Also Air Publications relating to Radio, Radar equipment and AP1186A, AP1186B, AP1186D, AP1186E. Excellent price offered. Would purchase Post-War to current Magnetrons, Klystrons, T/R cells, Photo Multipliers, Thyratrons, Ignitrons, Planar-Ceramic, Microwave and special CV types. Required Rx Type R1355 10D/13032, unmodified. Also R3002-3, R3120-1, ABK-ABKI IFF Units and Control Unit Type 17/18. Phone anytime. (London) 0171 511 4786 or FAX.

HF LINEAR. Compact Oscilloscope <20MHz. Spectrum Analyser. Network Analyser. 10 metre Yagi substantial Rotator. Full details please, G4AHH, 5 Kennel Road, Whittlebury, Towcester, Northants NN12 8XW. Or phone (Towcester) 01327 858573.

15 METRE TRAP for HY-Gain TH3JR. Good or reasonable condition. Reasonable price paid. G3HLG, QTHR. (Newark) 01636 892384.

6 METRE Module, any condition, for Yaesu FT726R, also a CTCSS encoder (FTE 36). Phone eves, w/ends, Malcolm, G7SGF. (Upminster) 01708 250578.

ATARI ST1040 50MHz Tvtr 2m IF, 2m H/held, QRP SWR/ATU. PC music programme 'QBase', 'Musicator' etc. Five Band 'Cobwebb' H/brew details. (Huddersfield) 01484 424137.

BP 60 VERSATOWER or similar. Must be complete and gd condition. Phone evenings, John. (Grimsby) 01472 220609.

CIRCUITS, Data for Oscilloscopes; Heathkit Model 10-21, Telequipment Model S32A. Savage Output Transformer model 2B36B, secondary connections as used on Williamson Amplifier. Write to: N D Nicol, PO Box 41337, Craighall 2024, Transvaal, South Africa.

CODAR AT5 and PSU wanted. Also CR100 Rx, will pay cash and collect. (London) 0181 317 1717 x220 work.

COLLINS 7553C and KWM2A. First class condx preferred. Phone (NW London) 0181 459 1413.

COMPLETE VFO Assembly for FT101ZD Mk 3, part No. C0014400. This must be in gd working condx. G0GCM, QTHR. (Ellesmere Port) 0151 355 9325.

DATONG Morse Tutors. Also Yaesu FP757HD, FC757AT for Rishworth school radio club. Phone Richard, G3UGF (W. Yorks) daytime 01484 710313, evenings 01422 882663.

FT102 FM/AM Board also FT7B YC7B Digital Display. G3JQQ, QTHR. (Bath) 01225 314331 after 6pm.

GERMAN SIDE CONTACT Valves types AK2, AF3, ABC1, AL5n, AC2 and AZ12. Also parts of RAF TR1143 and any parts or information on FuG7 equipment to help with Me109 'Black Six' project together with battery box for Torn Eb Manpack receiver. Please reply to Derek, G3KXB. (Whitstable) 01227 792340.

HEATHKIT VTVM in good condx, with manual. Write to Noel Cameron, EI4DZ. 16 St Mary's Cres., Westport, Co Mayo, Eire. (No phone number)

KW600 or KW1000 Linear Amp, in good order, including PSU and ATU, if possible. Also two American 4-Pin valve bases for two fat pins and two thin ones. Will collect within 50 mile radius. G0AUO. (Daventry) 01327 703964.

LINE DRAKE TR7 with accessories or only Drake TR7. Reply, write to Waldy Porto, CT1AUR, PO Box 61, PT -2766 Estoril, Portugal.

MARCONI WAVEMETER VHF 0-250MHz Model TF643C wanted please. Could collect. Other models also of interest. (Oxford) 01295 720022.

METROPOLITAN VICKERS 4 Mk7 Radar with associated electrical generator. Prefer full working model. Also EMERS associated with above. (Edinburgh) 0131 447 9979.

MICROPHONES. Shure 444, Static D104, Electro Voice 638 or WHY. Drake T4XB, any condition. MFJ 948/9 ATU. MFJ Antenna Analyser. Two metre M/mode. Has anyone an old diy 'Helford' for sale. Call Geoff, G4DED. (Oxford) 01865 372215.

OXLEY TEMPATRIMMER or Thermo Trimmer. Telephone evenings G3KGN, QTHR. (Southend) 01702 77779.

PANDA ATU or similar. G3ZFQ, QTHR. (Leicester) 0116 286 4723.

PAYPHONE 100 Mk2, 200 Mk2, any info, Manuals, Prog info etc. Costs reimbursed. Ray, G8EZT. (London W11) 0171 602 1171.

PLASTIC PIN Protectors for B7G and B9A miniature valves. Three dozen of each. G3IJS, QTHR. (Bognor Regis) 01243 861578.

PMR DUPLEX VHF/UHF mobiles required in dead or alive condition. Philip, G4ZOW, during office hours. (Potters Bar) 01707 660760.

SSTV SOFTWARE for BBC Computer tape/disk. Colour Monitor for BBC, Interface cartridge for 120-D Printer or cheap Printer. (Rochdale) 01706 373339.

TEN INCH REEL Library Cases. Record Guidebooks. Selling 7inch 1200ft Tapes: 50p. Exchanges Vintage International Opera Broadcasts. Write to: Hudson, Dinasdinlle, Caernarfon, Gwynedd. LL54 5TW.

WANTED 2el Quad, either for cash or exchange 3 el Hi-Gain Beam bought April 1994. Phone Peter. (Lutterworth) 01455 557263.

WANTED Reasonable lightweight 15m three or four element Beam. Also petrol Generator up to 1kVA. Willing to travel up to 100 miles of Bristol or Stafford. G3TCO, QTHR. Evenings or w/ends. (Bristol) 0117 968 1068.

YAESU FT101B Accessories or Sommerkamp equivalent. Also spare valve set wanted for the above radio. Phone Brian. (Bebington) 0151 645 9132.

CLUB NEWS

DEADLINE - Items for inclusion in the April 1995 issue must be sent to HQ marked "Club News - DIARY", to be received by 24 February latest. If news is received by the published deadline, it should appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. 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.

NOTE: This is primarily a service for clubs affiliated to the RSGB, to whom priority will be given. Basic unchanging information is not normally published in *RadCom* - see *RSGB Call Book* for club venues etc.

AVON

BRISTOL ARC - 2, Contests Discussion; 9, HF night; 16, 'Nova Scotia' by Dennis, G4CQI; 23, Computers. Secretary David, G4ZBT. Details 0117 965 4886.

RSGB CITY OF BRISTOL GROUP - Jan 31, 'Radio Investigation Service'; Feb 28, talk on 'Portishead Radio'. Details 0117 967 2124.

SOUTH BRISTOL ARC - 1, 10m Activity evening; 8, Loop Aerial Demonstration; 15, Aircraft Magazine evening; 22, Short-wave Listeners night. Details 01275 834282, 24 hr Answerphone.

BEDFORDSHIRE

SHEFFORD & DARS - 2, Members Activity night; 9, G8EMJ Constructors contest; 16, Members Activity night; 23, AGM. Details 01462 700618.

BERKSHIRE

BRACKNELL ARC - 8, Bring and Show; Mar 8, 'RACE 3' Adaptive HF. Details 01344 420577.

NEWBURY & DARS - 22, talk 'TCP/IP'. Details 01635 863310.

READING & DARC - 9, Quiz with Maidenhead at Reading; 23, Talk '*RadCom*, the Editor's View' by Mike Dennison, G3XDV. Details 01734 698274 evenings.

READING & WEST BERKSHIRE RAYNET Gp - The club is urgently seeking new members. Net every Monday evening on 144.775MHz at 7.30pm (local). All contacts welcome. Details 01734 698526.

BUCKINGHAMSHIRE

CHESHAM & DARS -1, General Meeting; 8, Technical topic 'Switch-Mode Power Supplies' by Mike, G0DNJ; 15, CW practice evening; 22, Technical topic 'Medical Electronics' with Steve, G6HUH. Details 01494 676391.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 3, Informal; 10, Rally Preparations; 17, Shooting (indoor); 24, talk on Video (ATV or commercial). Details 01954 200072.

CHESHIRE

MID-CHESHIRE ARS - 1, Construction night; 6, Committee meeting, Monday 8.45pm Cabbage Hall; 8, talk 'Backpack Radio experiences' by G0LBO & G7LQD; 15, Raynet Packeteer for frostbite, G4XUV & G6GAK; 22, On Air night with RAE Students. Details 01606 592207.

CLWYD

RHYL & DARC - ***NEW VENUE***. Now meets every 2nd and 4th Monday in each month, United Reform Church Hall, Tynewydd Road, Rhyl at 8pm. Details (GW3UTG) 01745 351362.

CORNWALL

CORNISH RAC - 2, '3Y0PI Video' by Robin. Details 01209 820118.

SALTASH & DARC - 3, Aerial Test and Club Rig night; 17, Epidiascope Evening; Mar 3, Maritime Tales by Dave, G0RUP. Details 01752 8444321.

DERBYSHIRE

BUXTON RA - 14, 'Communications underground' by Harold, G0BGN; Mar 14, 'Live Morse' - Derek, G4IHO. Details 01298 25506.

DEVON

APPLEDORE & DARC - 21, talk 'Fire Brigade Emergency Communications' by G0PGK. Details 01237 477301.

EXMOUTH ARC - 1, AGM; 15, Junk Sale. Meetings held at the Scout Hut, Marpool Road, Exmouth on alternate Wednesdays at 7.30pm. Details 01395 279574.

TORBAY ARS - 17, AGM. Club nights every Friday at the ECC Social Club, Highweek, Newton Abbot. Details 01803 526762.

DORSET

AXE VALE ARC - 3, talk 'The Somerset Range of Kits' by G3PCJ; Mar 3, talk 'Op Amps' by G3HAL. Details 01297 445518.

BLACKMORE VALE ARS - ***NEW VENUE*** Now meets at Shaftesbury School, Dorset on 2nd and 4th Tuesday of each month. Details 01963 362766.

FLIGHT REFUELLING ARS - 5, Video 'The Vulcan Bomber' (part 2); 12, Repeaters (and EME update) by G0API; 19, Workshop/store tidy up & operating; 26, Meet the RSGB RLO Phil Mayer, G0KKL. Details 01425 653404.

POOLE RS - 10, Novice Evening, all local Novices welcome to attend. Novice stations active on HF/VHF and UHF; Mar 10, talk 'Tessla Coils' by Phil Mason. Details 01202 762110.

DYFED

ABERYSTWYTH & DARS - 9, DIY Project 'Building an RF Noise Bridge' by Les, GW3SON. Details 01545 580675.

EAST SUSSEX

HASTINGS E & RC - 15, talk 'Stolen Vehicle Tracking System' by Tracker Network (UK) Ltd; Mar 15, AGM. Details 01424 830454.

SOUTHDOWN ARS - 6, 'Nodes and Bulletin Boards' by Fraser, G0JDR @ GB7ZZZ; Mar 6, 'Foxhunts' by Brian, G4BCO. Details 01323 484282 or G0UOI @ GB7HAS.

ESSEX

BRAINTREE & DARS - 6, 'Satellites, part 2' by Frank, G3FIJ; 20, Operating evening. Details 01376 327431.

CHELMSFORD ARS - 7, talks 'JVFAX' by G0IPU and 'Noise Bridges' by G2HNF; Mar 7, talk 'The Vodaphone Digital Experience' by Colin, G4IIK. Details 01245 256654.

COLCHESTER RA - 9, 'Local Radio in UK' by Bill, G1WJR; 23, 'Fibre Optics in the Future' East Coast Cable; Mar 9, Inter-club Quiz. Details 01206 383510.

DENGIE HUNDRED ARS - 6, HM Coastguard Sections; 20, DF Construction; Mar 6, Two years in Antarctica (G3HTF). Details 01621 776237.

GLOUCESTERSHIRE

GLOUCESTER ARS - 1, Visit by Clive Trotman, GW4YKL, RSGB President. Now meets every Wednesday at St John Ambulance Heathville Road, Gloucester at 7.30pm. Talk, first Wednesday of each month. Other Wednesdays, Construction Group, Novice Licence and Morse Groups. Details 01452 421510.

GRAMPIAN

MORAY FIRTH ARS - ***Change of Telephone number***. Club meets every Thursday at 7.30pm in Fleurs House, 62 Plusgarden Road, Elgin. Details 01343 547299.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 21, 'Working with QRP'. Details 0181 749 9972.

BROMLEY & DARS - Mar 21, talk 'Slow Scan TV' by G0TLK. Meets 3rd Tuesday of every month, 7.30 for 8pm at the Victory Social Club, Kechill Gardens, Hayes. Details 0181 777 0420.

COULSDON ATS - 13, The History of Wireless by Jon, G0GNA and Ken Tithercot. Details 0181 684 0610.

CRYSTAL PALACE & DRC - 18, AGM; 25, Club Dinner. Details 0181 699 5732 or 01737 552170.

SOUTHGATE ARC - 9, talk 'Digital signal processing in communications' by Harvey Collins; 23, 'Club Radio, on the air' - chance to improve your operating technique. Details 0181 360 2453.

SURREY RCC - 6, talk 'One Hundred Years of Radio' by Jon, G0GNA; Mar 6, Surplus Sale. Details 0181 660 7517.

SUTTON & CHEAM RS - 2, Informal meeting; 16, Constructional Contest. Details 0181 644 9945.

WIMBLEDON & DARS - 10, On Air, general activity; 24, Desert Island Radio. Details 0181 540 2180.

GREATER MANCHESTER

ECCLES & DARS - 7, Discussion 'Club stand at the Norbreck Rally'; Mar 7, Lecture 'The Pentium FDIV fault' by G8KRG. Informal meetings every Tuesday from 9.30pm. Lectures/demonstrations 1st Tuesday of each month. Details 0161 773 7899.

SOUTH MANCHESTER RC - 3, Air Band revisited by G7FQY and G0BJK; 10, Setting up Computers by G4HON; 17, Avionics by John, G1LML; 24, Packet on the Air. Details 0161 969 1964.

TAMESIDE ARS - Now meets every Wednesday night at 7.30pm at the ATC Hut, Moorcroft Street, Droylsden, Tameside. Details from: A N Laughlan, 8 Kempton Close, Droylsden, Tameside, M43 7JL.

GWYNEDD

DRAGON ARC - 6, talk 'Underwater Exploration' by Graham Wright; 20, a talk on 'Radio Ysputy Gwynedd (hospital radio)'; Mar 6, 'A home-brew Spectrum Analyser' by Stewart, GW0ETF. Details 01248 600963.

HAMPSHIRE

HORNDEAN & DARC -7, Club night; 28, Junk Sale. ***NEW VENUE*** Now meets at Lovedean Village Hall, Lovedean Lane, Lovedean, Hants on 1st & 4th Tuesday each month at 7.30pm. Details 01705 472846.

ITCHEN VALLEY ARC - 10, talk 'Slow Scan TV' by Frank, G6OLK; 24, Open meeting. Details 01703 732997.

THREE COUNTIES ARC - 1, HMS Warrior; 15, Junk Sale. Details 01428 606298.

HEREFORD AND WORCESTER

BROMSGROVE ARS - .Mar 10, AGM. Meets at Lickey End Social Club, Alcester Road, Burcot. Details 01527 542266.

MALVERN HILLS RAC - 14, talk 'Bats and their unique radar type direction finding abilities'. All visitors welcome. Details 01684 560490.

VALE OF EVESHAM RAC - 2, Magazine Swap night/ Video night. Details Alasdair on 01386 41508.

CONGRATULATIONS

To the following who our records show as having reached fifty years continuous RSGB membership this month:

Mr J Smith, RS9475

Mr F W J Neale, G8AQT

Mr E Parvin, G2ADR

Mr P J Williams, GW3CZC

HERTFORDSHIRE

CHESHUNT & DARC -; 1, talk 'Cellnet basics' by Graham, G7OZM. Meets at 8pm. Details 01992 464795.

DACORUM ARTS - 21, Beginners Guide to DXing by John, G0FSP; Mar 21, talk 'Novice Licence' by John, G4JOV. Details Nick, G7KFQ.

HARPENDEN ARC - 2, Annual Dinner (John, G4GOV); Mar 2, Construction Evening by David, 2E1BZP on Mondays at 8pm (during term time) at Aldwickbury school. Club Net Thursdays 7.30pm on GB3VH. Details 2E1BDB.

HODDESDON RC - 2, Talk by the Editor of *Practical Wireless*, Rob Mannion, G3XFD, at 8pm prompt. Details 01920 466639.

STEVENAGE & DARS - 7, General Get Together - HF/VHF on Air, CW practice - Beginners & Improvers; 14, talk 'Latest in DF Equipment' by Tony, G0OVO; 21, Junk Sale; 28, Video evening. Details 01438 724509.

VERULAM ARC - 28, Visit and talk by Martin Lynch. Visitors are welcome at all club meetings. Details 01923 262180.

HIGHLAND

INVERNESS ARC - **NEW VENUE** Now meets at the Cameron Youth Centre, Planefield Road, Inverness on the 1st & 3rd Thursdays of each month at 7.30pm. Details Ian, GM4JAE, QTHR or @ GB7INV.

HUMBERSIDE

GRIMSBY ARS - 2, Video night; 16, talk 'Band Plans' by G1BRB; 17, Club Dinner at Littlefields; Mar 2, Packet Logic by Brian, G4DXB. Details 01472 825899.

NORTH FERRIBY ARS; 3, AGM. Details from 01482 656324.

HORNSEA ARC - 1, talk 'Steam Trawlers' by G7NNT; 8, talk 'Short way to Valves' by G4IGY; 15, RSGB videos by G4YTV; 22, Activity night; Mar 1, Archive of G4YTV. Details 01964 562258.

ISLE OF WIGHT

BRICKFIELDS ARS and Vintage Wireless Museum - 1st Monday of every month, Bring & buy nights; Every Tuesday, Novice Training & Construction evenings by Mike, G0SEB - 7.30pm to 10pm. Morse classes to be run as and when required; The Clubs Isle of Wight County Award is now Available, details Dennis, 2E1BND. Club details G1VGM at GB7IOW.

KENT

EAST KENT RS - 3, 'Data Noises heard on HF' from tapes by Nick, G7FUM at 8pm, with Novice class at 7pm; 9, Novice class at Icom, new candidates can join - phone for details; 17, talk 'Reviewing Transceivers' by Chris Lorek, G4HCL, *Ham Radio Today*; 23, Novice class at Icom at 7pm. Details 01227 743070.

MAIDSTONE YMCA ARS - 3, 'EMC lecture - don't QRT. Operate!' by G3ORP; 10, RAE, Morse tuition and club night; 17, 'Linear loaded verticals and simple Antennas by G3ORP; 24, RAE, Morse tuition and club night. Details 01622 832259.

MEDWAY A Rx & Tx S - 10, Construction Contest; 24, AGM, 8pm. Meets every Friday, other evenings include construction and Morse as required plus Novice help. Details 01634 685585 or 201462.

SEVENOAKS & DARS - 20, talk 'Radio & TV Distribution Systems' by John Black. Details The Secretary, Sevenoaks & DARS, c/o Sevenoaks District Council, Argyle Road, Sevenoaks. TN13 1HG.

LANCASHIRE

CENTRAL LANCS ARC - 6, AGM. Details G0FQN 01772 423741.

THORNTON CLEVELEYS ARS - 6, talk by Les, G0ETV; 13, 'Raynet' by Roger, G0NCY and '*RadCom* propagation forecast' by Jack, G4BFH; 20, DIY Satellite TV; 27, Rally discussion - Stand design. Details G4BFH, QTHR.

MERSEYSIDE

LIVERPOOL & DARS - 7, Radio Controlled Flying (G0OSC); 14, Club on Air; 21, Operation JASON; 28, Surplus Sale. Now offer RAE Course, Novice RAE and Morse courses. Details 0151 722 1178.

WIRRAL & DARS - ***NEW CONTACT*** Details 0151 606 8989.

MID-GLAMORGAN

BRIDGEND & DARC - ***NEW *** Meets on the 1st & 3rd Wednesdays in the month at Club Brynmenyn, Brynmenyn, Bridgend. Details Alun, GW7KYT 01656 721574.

MID-GLAMORGAN ARG - 2, talk 'Fibre Optics for transmission of data information' by Brian, GW3WBU; Mar 2, talk by Clive Trotman, GW4YKL, RSGB President. Details 01656 733729 or 0656 736954.

NORFOLK

LEISTON ARC - 7, Talk 'Flying Saucers - the truth' by Professor John Allen. Details 01728 832924.

NORFOLK ARC - 1, DF Equipment; 8, Night on Air; Construction QRP; Morse practice; 22, Night on Air; construction QRP; Mar 1, talk 'Use of Test Equipment' by Mike, G4UUB. Details 01603 789792.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 2, Talk 'Transmissions lines' by Trevor, G0IXR; 9, Forum & night on Air; 16, talk 'Contest Operations' by Martin, G6ABU & Colin, G0FOG; 23, Construction/activity night. Details 0115 950 1733.

MANSFIELD ARS - 13, RSGB Video presentation. Details 01623 423697 or 792243.

SOUTH NOTTINGHAM ARC - 3, Open Forum, members only; 10, Construction + On Air (HF & VHF); 17, Surplus Equipment auction; 24, talk 'Basic First Aid for the Amateur Radio Shack', by Mike Braidey, St John Ambulance Trainer. Details 01509 672734.

SHROPSHIRE

SALOP ARS - 9, Equipment Sale (Not junk); 16, RAE Tuition and workshop Evening; 23, talk '23cm The Easy Way' by G8DIQ and G4EAB. Details G7SBD QTHR or @ GB7PMB.

TELFORD & DARS - 1, Club equipment evening. All meetings take place at Dawley Bank Community Centre, Telford at 7.30pm. Details 01952 588878.

SOMERSET

TAUNTON & DARC - 3, talk 'Ham Practical workshop' by Graham, G0GTR; 17, 'Spark Days' by Dr George Grisedale. Details 01823 680778.

YEOVIL ARC - 2, talk 'Operating Techniques' by G3KSK; 9, Applying for Planning Permission, by a Planning Officer; 16, RAE Class Members Request night; 23, talk 'First Broadcasts in Britain(75th Anniversary) by G3MYM; Mar 2, committee meeting (adjourned from 23rd). RAE Class held every Thursday for beginners. Details 01258 473845.

SOUTH GLAMORGAN

CARDIFF RSGB G - 8, 'Computer aided design of computers'. Details 01222 810368.

SOUTH YORKSHIRE

SHEFFIELD ARC - 6, talk 'The Workings of Raynet' by Rick, G7DSD; 7, Raynet meeting at the club venue; 13, Silent Key Memorial talk 'VHF Aerial spacing'; 20, Quiz -preparation for inter club competition; 27, Lessons, mainly for N & RAE students on HF working and Packet radio. Details 0114 244 6282 or G0JJR @ GB7CWS.

SUFFOLK

FELIXSTOWE & DARS - 6, OPS Activity Afternoon (2pm); 20, Packet Clinic with Andy, G3ZYP and Adrian, 2E1BEY; Mar 6, talk 'PC Networks' by Steve, 2E1CRV. Details 01394 273507 evenings.

SUDBURY & DRA - 7, talk and demo 'Weather Satellites' by Mark, G3CQL; 21, N & N Details 01787 313212 (before 10pm).

SURREY

DORKING & DRS - 28, A talk by Graham Mytton from the BBC, at Friends Meeting House, South Street, Dorking at 7.45pm. Details 01306 631236.

ECHELFORD ARS - 23, Construction Contest (G8FSZ Cup); Mar 9, Classic Wireless Competition. Details 01344 843472.

TAYSIDE

DUNDEE ARC - 7, Construction night; 14, Shack & Equipment Security: Tayside Police; 21, Construction night; 28, Questions & Answer Forum. Club Net 7.07MHz at 1300 UTC daily. Morse Code class every Tuesday evening. Details Allan, GM7ONJ, QTHR.

STRATHMORE & DARC - Now meets on Tuesdays at 7.30pm in the rooms of 2231 (Forfar) Squadron, Air Training Corps, 1 Lochside Road, Forfar, Angus. Details Alan, GM4JCM, QTHR.

WARWICKSHIRE

STRATFORD U AVON & DARS - 13, talk by John, G4YZO of Badger Boards; 27, Test Equipment Evening' with Terry, G3MXH and Dave, G6FEO. Now meets at the Home Guard Club, Main Street, Tiddington, Stratford upon Avon at 7.30pm. Details 01789 740073.

WEST MIDLANDS

RS OF BLOXWICH - 7, Slide show 'DXpeditions and contesting' by Martin. (joint meeting with Aldridge & Barr Beacon ARC); 14, Society Net, 8pm on 432.725MHz FM/SSB; 19, Trip to RSGB VHF Convention; 21, Annual broadcast bands SWL contest; 28, Society net 8pm. Details 01922 683877.

COVENTRY ARS - 3, NOTA - HF CW; 10, Indoor DF / Construction evening; 17, NOTA - VHF Packet; 24, Equipment Sale. Meets every Friday at 8pm. Visitors are always welcome. ***New Secretary*** John, G8SEQ. Details 01203 617367.

MIDLAND ARS - Every Wednesday, RAE & Morse classes; Every Thursday "Night on the Air"; 2nd and 4th Monday in month, PC night; Last Friday in month Atari night. Details John, G0LAI 0121 628 7632.

STOURBRIDGE & DARS - 6, On Air & natter night; 20, 'The Royal Signals' by Phil Martin; Mar 6, Constructors Competition. Details G7HEZ @ GB7PZT or 01384 374354.

WEST SUSSEX

HORSHAM ARC - 2, talk 'WW2 radar' by Brian, G3GDU. Details 01737 842150.

WEST YORKSHIRE

DENBY DALE & DARS - 1, talk 'We are sailing' by Ken, G0CVJ; 15, 'Radio controlled aeromodelling' by David Brian; Mar 1, talk 'Aspects of sky wave propagation' by David, G0EVA. Meets each Wednesday in Pie Hall, Wakefield Road, Denby Dale at 8.30pm. Details 01484 547553.

HALIFAX & DARS - 21, Videos. Details 01422 202306.

KEIGHLEY ARS - 2, Natter night; 9, 'Keighley during 2nd World War' by Ian Dewhirst; 16, Natter night; 23, Quiz; Details 01274 496222.

PONTEFRACT & DARS - 9, Computers by Derek, G6NDF; 23, AGM. Meets every Thursday, 7.30pm at Carleton Community Centre, Carleton, Pontefract. Visitors and new members are always welcome. Morse classes, Monday nights (Reg, G4KMW) and Novice classes, Tuesday nights (Colin, G0NQE). Details 01977 677006.

WILTSHIRE

TROWBRIDGE & DARC - 1, Surplus equipment sale - open to all; 15, Social. Details 01225 864698 (evenings).

RALLIES AND EVENTS

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

29 JANUARY

LANCASTER Rally - Lancaster University, Lancaster. Doors open 11am, 10.30 for disabled visitors. This year in larger halls, more trade stands, a bigger bring and buy and special interest groups. Refreshments and bar available. Entrance £1. Details Susan, G1OHH on 01524 64239 or 01384 896199.

5 FEBRUARY

SDX SUPPORT GROUP Junk Sale - Community Halls, Maryhill Road, Glasgow. Doors open 11am. Features a number of Scottish based amateur radio traders, junk sale and a bring & buy. Refreshments available and talk-in on S22. Details Ray, GM4CXM, QTHR or @ GB7SAN/GB7SDX.

SOUTH ESSEX ARS Radio Rally - The Paddocks, Long Road, Canvey Island, Essex. (The Paddocks is located at the end of the A130). Doors open 10.30am. Features trade stands, bring and buy, home made refreshments, free car parking. Disabled car parking facilities outside main doors. Admission £1. Talk-in on S22. Details Roger, G0LTO, on 01268 693786 or Ken, G0BBN, on 01268 755350.

12 FEBRUARY

CAMBRIDGE & DISTRICT ARC Rally - Addenbrookes Ambulance Station, Cambridge. Doors open at 10am. Features trade stands, car boot sale and a bring and buy. Refreshments available. Details from John, G0GKP, on 01954 200072.

EVENTS DIARY

NORTHERN CROSS Rally - Rodillian School, on A61 between Leeds and Wakefield, near junction M1/M62. Doors open at 11am, 10.30 for disabled visitors and bring and buy. Features usual dealers, groups and a bring and buy stall. RSGB Morse Tests available on demand, subject to two passport photos and the necessary fee. Refreshments available. Talk-in on 2m and 70cm. Entry still £1. Details Dave Gray on 0113 282 7883.

18/19 FEBRUARY

THINKING DAY ON THE AIR - The Guides Association. Details 0171 834 6242.

19 FEBRUARY

RSGB VHF CONVENTION - Sandown Park Exhibition Centre, Esher, Surrey. Comprehensive trade exhibition, specialist groups and a lecture programme. Details G3MVV 01277 225563 and see page 24 this month.

25 FEBRUARY (SATURDAY)

10th RAINHAM Radio Rally - Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent. Easy to find off the M2 motorway, jcn 4, the A278 or the A2 from Rainham. Follow the RRR arrows. Doors open 10am, 9.30 for disabled visitors. Event features the usual trade stands plus a few new ones selling computers and peripherals, Raynet, RNARS, Packet, Kent Repeater Group and Kent TV Group and a bring and buy stall. Ample off road parking, licensed bar, snacks and refreshments, with a place to sit and eat. All on one level with easy access for the disabled. Admission £1, children under 14 free. Further info from Martin, G7JBO 01634 365980.

9th TYNESIDE ARS Rally - The Temple Park Centre, John Reid Road, South Shields. Accessible from the A1, A19 North and South and from the A69 from the West. Doors open at 11am, 10,30am for disabled. RSGB HQ stand, trade stands and bring & buy stalls, ample parking, catering and leisure facilities. Details Stuart, G0BEV, 0191 281 0999.

26 FEBRUARY

BARRY MOBILE Rally - Barry Leisure Centre, Off Holton Road, Barry. Doors open 10.30am. Features trade stands, bring and buy stall and refreshments. Trader details from Mike, GW8CMU 01446 711426. General enquires to Margaret, GW4GSH 01446 738756.

8th TAW & TORRIDGE Rally - Bideford Hall, The Pill, adjacent to Victoria Park, Bideford, North Devon. Doors open at 10.30am. Event features trade stands, a bring and buy stall. Refreshments available. Details Mike, G3PGA 01271 860930.

4 MARCH (SATURDAY)

ABERYSTWYTH & DARS Annual Amateur Radio Rally - Aberaeron School, Aberaeron, Dyfed. Event features trade stands, special interest stalls, amateur radio demonstrations and a bring and buy. Plenty of room, easy parking. Town and craft centre near by. Details from Katy, GW0SFO, 01545 580675.

11 - 12 MARCH (SATURDAY-SUNDAY)

RSGB LONDON Amateur Radio & Computer Show - Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9. Doors open 10am, with priority admission for the disabled. Event features trade stands, RSGB books, lectures, special interest groups and a bring & buy. RSGB Morse Test available on demand (two photos needed). Refreshments available. Ample free parking. Talk-in on 2m and 70cm. *Official Show Guide* published with March *RadCom*. Details Steve, G3ZVW, 0181 882 5125.

12 MARCH

10th ANNUAL WYTHALL Radio Club Rally - Wythall Park, Silver Street, Wythall, near Birmingham, on the A435, 2 miles from the M42, junction 3. Features the usual traders in three halls and a marquee. A bring and buy stall. Bar and refreshments facilities will be available. Talk-in on S22. Admission £1. Details Chris, G0EYO, 0121 430 7267.

19 MARCH

NORBRECK Amateur Radio Electronic and Computing Exhibition - Norbreck Castle Exhibition Centre, Blackpool. Organised by the Northern Amateur Radio Societies Association (NARSA). Details Peter, G6CGF 0151 630 5790.

TIVERTON Rally -

26 MARCH

BOURNEMOUTH Radio Society Annual Sale - Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open 10.30am until 4.30pm. Features Amateur radio and computer traders, clubs and specialised groups. Refreshments available. Admission £1 including free raffle. Talk-in on 2 metres on S22 by G1BRS. Details from Malcolm, G0UCX QTHR or 01202 747745.

THE MAGNUM Radio & Computer Rally - Details Bob, GM0DEQ, on 01563 40048.

PONTEFRACT & DARS, 15th Annual Components Fair & Spring Rally - The Carleton Community Centre, Carleton, nr Pontefract. Doors open 11am, 10.30 for disabled visitors. Features trade stands, bookstall and a bring and buy stall. Morse tests on demand, the usual two passport size photos required. Refreshments available. Admission by prize programme. Details Colin, G0NQE on 01977 677006.

9 APRIL

LAUNCESTON 9th Amateur Radio Rally - Launceston College. Doors open 10.30am. Event features trade stands, RSGB bookstall and a bring and buy stand. RSGB Morse tests available on demand, remember to bring two passport size photos and the relevant fee. Hot snacks from 7am. Talk-in on S22. Ample parking. Details Roy, G0IKC on 01409 22164 or Rodney, G8HDW on 01566 775167.

WHITE ROSE Rally - ***NEW VENUE*** Leeds University. Morse test available on demand, subject to two passport size photos and the necessary fee. Details Allen, G7ELS PO Box 73, Leeds LS1 5AR or tel 01973 189276.

16 APRIL

CAMBRIDGESHIRE Repeater Group Amateur Radio Rally - Philips Telecom - Catering Centre, St Andrews Road, Chesterton, Cambridge. Doors open 10.30am. Event features trade stalls and a bring and buy. Ample parking space. Details Darren, G1ERM on 01223 60601 evenings.

22 APRIL (SATURDAY)

INTERNATIONAL MARCONI DAY Special Exhibition Station at the Wireless Museum, Puckpool Park, Seaview, Isle of Wight. Details Douglas, G3KPO 01983 567665.

INTERNATIONAL MARCONI DAY H/Q - Details Norman, G4USB 01209 212314.

23 APRIL

BURY RS Annual Rally - the Castle Leisure Centre, Bolton Street, Bury. Doors open 11am, 10.30 for disabled visitors. Bring and buy. Bar and refreshments available. Talk-in on S22. Details G4KLT, 0161 762 9308.

SWANSEA ARS Amateur Radio and Computer Show - Swansea Leisure Centre, on the A4067 Swansea to Mumbles road. Doors open from 10.30am to 5pm. Event features trade stands, a bring and buy stall and special interest groups. Operational HF and VHF Station. Talk-in on S22. Details Roger, GW4HSH 01792 404422.

30 APRIL

BRITISH ATV CLUB (BATC) Rally - The Sports Connexion, Coventry. Doors open 10am, 9.30 for disabled visitors. Rally features many radio trade stands, special interest groups and a bring and buy. Refreshments available all day. Entrance £1, 50p under 14 and OAP. Talk-in on S22 and GB3CV. Details & trade enquiries Mike, G6IQM 01788 890365 or Fax 01788 891883.

EAST CLEVELAND ARC Annual Rally - the Leisure Centre, Marske by the Sea. Doors open 11am. Event features the usual trader stands and a bring and buy stall. Refreshments available. Details Malcolm, G4YMB 01287 638119.

12th ANGLO-SCOTTISH Rally - Tait Hall, Kelso. Doors open 11am. Features the usual traders and a bring and buy. Refreshments available. Talk-in on S22 via GM4KHS. Entrance still £1. Details Colin, GM4UFP, 01750 20006 after 6pm.

6 MAY (SATURDAY)

DARTMOOR Radio Rally - Details Ron on 01822 852586.

8 MAY (MONDAY)

EXHIBITION OF WARTIME equipment and Special Event Station at Puckpool Park Wireless Museum, Seaview, Ryde, IOW. Details Douglas, G3KPO 01983 567665.

MID CHESHIRE ARS Rally - Details David, G4XUV 01606 77787.

14 MAY

DUNSTABLE DOWNS Radio Club 12th Annual National Amateur Radio Car Boot Sale - Plot details on 01582 451057. Pre-booking for plots until 11 May. Plots can be purchased on the day.

MARS / DRAYTON MANOR Radio and Computer Rally - Details Norman, G8BHE 0121 422 9787(evenings).

21 MAY

11th YEOVIL QRP & Construction Convention - Details G3CQR, 01935 813054.

28 MAY

EAST SUFFOLK Wireless Revival - Ipswich Rally - Details Bob, G7HZV on 01394 271257 or 01473 645885.

MAIDSTONE Mobile Rally - Trade bookings Ian, 01622 630000.

PLYMOUTH Radio Club Rally - Details Frank, G7LUL on 01752 563222.

TRAFFORD Rally (The Great Northern Rally) at G-Mex - Trade and further enquiries Graham, G1IJK on 0161 748 9804.

4 JUNE

SPALDING Amateur Radio and Computer Rally - Details G4TWR, 01775 722940.

11 JUNE

THE 26th ELVASTON CASTLE National Radio Rally - Details from Ken, G3OCA, 01332 662818. Trade enquiries, Keith, G1ZLQ 01332 662896 after 7pm.

ROYAL NAVAL Amateur Radio Society (RNARS) Annual Mobile Rally - Details Clive, G3YTQ on 01329 234143.

18 JUNE

THE GORDON Rally (North of Scotland AR Convention) - Huntly, Aberdeenshire. Details GM6TAN 01466 780739.

25 JUNE

38th LONGLEAT Amateur Radio Rally - Details Gordon, G0KGL 0117 940 2950.

2 JULY

The 6th YORK Radio Rally - Details Dave, G7FGA 01904 790079.

8 JULY (SATURDAY)

CORNISH Radio Rally and Computer Fair - Information & booking Ken, G0FIC 01209 821073.

9 JULY

SUSSEX Amateur Radio & Computer Fair - Information and booking Ron, G8VEH 01903 763978 or 0273 417756 office hours.

22 JULY

AIR FORMATION Open Day - Colerne Airfield. (RSARS) Stall applications etc to RSM G Baldry on 01225 743240 x5256.

23 JULY

COLCHESTER Radio & Computer Rally - Details Richard, G7BIV, 01376 571239.

2nd HUMBER BRIDGE Amateur Radio Rally - Details or bookings Roly, G0UKS, 01482 837042.

30 JULY

SCARBOROUGH ARS Radio Electronics and Computer Fair - Details Ross, G4ZNZ, 01723 514767

6 AUGUST

RSGB WOBURN Rally - Woburn Abbey, Bedfordshire. Details from Norman Miller, G3MVV, 01277 225563.

13 AUGUST

38th ANNUAL DERBY Mobile Rally - Details 0332 556875.

18 AUGUST (FRIDAY)

COCKENZIE & PORT SETON ARC Radio Junk Night - Details Bob, GM4UYZ on 01875 811723 or via GB7EDN.

20 AUGUST

6th GREAT EASTERN Rally - Details Ian, G0BMS 01553 765614 or @GB7OPC.

WEST MANCHESTER Radio Clubs 'Red Rose' Rally - Details Dave, G1IOO 01204 24104 evenings only.

27 AUGUST

TORBAY ARS ANNUAL Mobile Rally - Details John, G3YCH, QTHR; 01803 842178.

2 SEPTEMBER (SATURDAY)

ANNUAL WIGHT WIRELESS Rally - National Wireless Museum, Arreton Manor, Newport, IOW. Details Douglas, G3KPO 01983 567665.

3 SEPTEMBER

BRISTOL RADIO RALLY - Details Muriel, G4YZR 01275 834282 (24 hour answerphone.)

18th TELFORD Rally - Details 01952 588878 or 01743 249943. Traders only contact Jim on 01952 684173.

VANGE ARS Rally - Details Stuart, G1VWB, 01375 859632.

10 SEPTEMBER

BARTG Rally - Details Peter Nichol, 38 Mitten Ave., Rubery, Rednal, Birmingham. B45 0JB. Tel: 0121 680 5963.

SOUTHEND & DRS 75th Anniversary Radio & Computer Rally - ***NEW VENUE***Cliffs Pavilion, Southend-on-Sea. Details Ron, G0UAW on 01702 353676 or Fax Martin, G0OQR, on 01702 602271.

24 SEPTEMBER

NORTH WAKEFIELD Radio Club Rally - Details John, G4RCG on 01924 362144 or John, G0EVT 01924 825443.

THE THREE COUNTIES Rally - Details Eddie, G4PQZ on 01905 773181.

8 OCTOBER

KIDDERMINSTER & DARS Rally - Details G8JTL on 01384 894019.

20/21 OCTOBER (FRIDAY/SATURDAY)

LEICESTER AR Exhibition - Details Frank, G4PDZ, on 0116 287 1086.

28 OCTOBER (SATURDAY)

HORNSEA ARC Rally - Details Duncan, G3TLI, on 01964 532588.

12 NOVEMBER

MARS-STOCKLAND Radio / Computer Rally - Details Norman, G8BHE on 0121 422 9787.

26 NOVEMBER

BRIDGEND & DARC Radio Rally - Details Mike, GW7NIS, on 01656 722199.

WEST MANCHESTER Radio Clubs 'WINTER' Rally - Details Dave, G1IOO, on 01204 24104 evenings only.

3 DECEMBER

VERULAM ARC Rally - Details Ian, G0PAU, on 01923 222284.

SILENT KEYS

WE REGRET to record the passing of the following radio amateurs:

G0LIV	Mr J Barratt	09.11.94
G1BXU	Mr A Watson	29.10.94
G1SLS	Mr K B Jones	
G2AFD	Mr J Byrne	01.11.94
G2BVW	Mr R F Weston	02.10.94
G3LVQ	Mr W Bates	27.11.94
G3NZT	Mr A Hodgkinson	18.11.94
G3YNB	Mr H Clayton	02.12.94
G4GOF	Mr J H Luxton	22.11.94
G4PUU	Mr C H May	11.12.94
G4RMP	Mr R Herrington	07.11.94
G5WG	Mr G F Wakefield	23.11.94
G6SV	Mr M Savage	17.10.94
G7ELP	Mr R Carter	Apr 94
G7MOE	Mr B T Jones	16.09.94
G8ARS	Mr J Oliver	28.11.94
GM5MI	Mr E N Black	02.11.94
GW3IVX	Mr G D Birtwistle	15.11.94
W2IDZ	Mr F E Ladd	
ZL3AFT	Mr C Williamson	Dec 94
RS30680	Mr C H Reed	
RS53689	Mr L F Smart	20.10.94
RS92776	Mr H Johnson	19.04.94

Jack Hum, G5UM

Just as we were going to press, we learned of the death of Jack Hum, G5UM. He was a Vice-President of the RSGB and a former *RadCom* columnist. An obituary will be published next month.

GB CALLS

The list below shows special event stations licensed for operation during this month and known at the time of going to press. The callsigns are valid from the date given but the period of operation may vary from 1 - 28 days.

FEBRUARY

1	GB2BDG	Blackburn Division Scouts
	GB2WGC	Woodlands Guide Camp
	GB6CG	Chequerfield Guides
4	GB2SR	STELAR Radio
10	GB0BBP	Berkeley Brownie Pack
	GB0SWG	South Woodham Guides
	GB500AU	500yrs of Aberdeen University
11	GB0ASB	All Saints Brownies
	GB4ASG	All Saints Guides
	GB5TT	PACC Contest 1995
	GB6MGB	Maltby Guides & Brownies
13	GB0GTD	Guides Thinking Day
	GB4CW	Cats Whisker
16	GB4BDG	Barnard Castle District Guides
17	GB0NG	Nuneaton Guides
	GB1KBG	Kettering Brownies & Guides
	GB1PDG	Penarth District Guides
	GB2PDG	Penarth District Guides
	GB2SGS	Suffolk Guides
	GB4KBG	Kettering Brownies & Guides
	GB4KLG	Kings Lynn Guides
18	GB0ADG	Allestree District Guides
	GB0PDG	Pitsea & District Girl Guides
	GB0RGB	Rother Guides Brownies
	GB0THG	Taplow & Hitcham Guides
	GB0WHD	Washington & Houghton Div
	GB4CDW	Charmandean District Worthing
	GB4GTD	Guide Thinking Day
	GB4NAG	Newton Aycliffe Guides
	GB5SR	STELAR Radio Net

THINKING DAY ON THE AIR
18/19 February

The LAST WORD

MORE FOR LESS

I must say how much I agree with G4DFQ's comments (*The Last Word*, Jan 95). In my experience amateur gear has fallen in price, in real terms, and increased in performance over the years. What has changed is the expectation of amateurs. I have never, for instance, understood why it is expected that the newly licensed amateur should buy a brand new top-of-the-range rig.

When I was first licensed, in 1959, my complete station cost me about £35, including a very well used HRO Senior receiver and a home-brew top band CW transmitter (I couldn't afford a modulation transformer!) Translated into today's prices, this represents around £525. For that sum of money, now, it is possible to set up a very effective arrangement indeed, if you are prepared to go for second-hand or home-brew.

New commercial equipment was available in 1960, but was very expensive (the figures in brackets are the effective prices today). For instance an Eddystone 888 receiver was £110 (£1650); an AR88D ex-WD receiver cost £65 (£975); a KW Vanguard 50W AM/CW Tx (kit) was £56.70 (£850) and a KW Viceroy SSB Tx cost £125 (£1170).

An Eddystone 888 plus a Viceroy would have cost the equivalent of £3525 if bought new. The same amount today would buy something very significantly better in terms of performance and capability.

Don't get me wrong, I'm not indulging in a "we had to suffer, why shouldn't you" session. Actually, I'm grateful for the way in which I became involved in amateur radio and would be more than happy to repeat the experience. It was a very good way of learning about radio techniques and practices; and, by golly, I certainly appreciated the advantages of commercial equipment when I could afford it! The message that I'm trying to get across is that it has never been cheap to go for new commercial equipment but you get more for your money these days.

I have to say, though, that all these early experiences of mine took place in the days of plentiful high quality and cheap ex-WD bits and pieces. Also, building for CW and AM is a darn sight easier than building for SSB. That being said, companies like Howes, Lake, Kanga and many others produce excellent kits; there is still much reasonably priced second-hand gear available; ex-PMR equipment is available and can be modified; and journals such as *RadCom* and the splendid G-QRP Club magazine *SPRAT* regularly publish a range of designs to suit all pockets and capabilities.

Perhaps the best advice for those recently licensed is: read the glossy advertisements for interest and entertainment if you wish, but make your initial purchases through the small ads! You may not achieve the same credibility with the 'loadsamoney' characters in the local club who buy their rigs more as fashion accessories than as means of communication; however, you will learn much more about the nuts and bolts of this hobby than they will and, probably, develop a longer lasting and more positive enjoyment of it.

In case I have given the wrong impression, I am not a home-brew fanatic who is anti commercial equipment. On the contrary, most of my contacts are made using Japanese 'black boxes'. In my case, though, I replace equipment only when there is a positive need rather than simply because there is a newer and more fancy rig on the market.

Anthony B Plant, G3NXC

ONE TO ONE, TWICE, MAKES ZERO

As a B class amateur (G7MPQ) for over two years and trying to learn Morse code in order to gain my A class licence, I thought I would never master the code. I bought the RSGB tapes and also a computer, with Morse programs. The going seemed hard. On discussing CW with a very experienced war-time operator, he offered to teach me one-to-one. After a few weeks I learned the code, then I had a contact with another amateur and he offered to send me CW over the air. This he did for several weeks - he kept me at it. At my third attempt I am pleased to say I have now passed the test and acquired the callsign G0VIJ.

Without the help and encouragement of Vic, G0CWD, who taught me the code, and Jim, G0FVS, who sent over 50 hours of CW, I think I would have given up. They assured me that my sixty years plus would not let me down; they reminded me of amateurs who make it at much older ages.

It makes one feel proud being a radio amateur, knowing we have colleagues who will give so much of their time to help others I would like to say a sincere thank you to Vic and Jim. Without their help I would still be hoping.

Joe Johnson, G0VIJ

OVERWHELMING GENEROSITY

After my letter (*The Last Word*, Jan 95) which you so kindly printed, I have been overwhelmed by the generosity of some amateurs in this country. Since the appearance of the letter at the end of December I have received a considerable amount of cash and cheques which I was looking forward to using to purchase a good second-hand handheld to send over to Mirek.

Today, I arrived home at lunchtime to find a parcel awaiting me which contained a brand new FT415, with nothing to tell me who sent it, just a note saying: "Perhaps your Czech friend can make use of it".

To you all who have sent cash and can be identified, I will write direct; to those of you, especially the sender of the radio, my heartfelt thanks, and I can say that Mirek, OK2VZE, will be overwhelmed by your generosity.

The cash will be used for postage and registration to the Czech Republic, and the purchase of a battery and a battery charger.

Once again, on behalf of Mirek, many, many thanks, and a peaceful and really Happy New Year.

Dave Mann, G0HXN, Secretary CDXC

ANYTHING COULD HAPPEN . . .

Reading the letter about Morse on a road-sign (*The Last Word*, Jan 95) reminded me of something which I noticed some time ago.

Near the centre-hole on the playing surface of CDs you will generally find some kind of alphabetic identification code written. On some CDs, however, you will also find what looks like a series of Morse code characters too.

On all the CDs I have seen with this, all characters have been valid Morse code symbols, but they read as an apparently random series of letters.

There is one further curiosity. The alphabetic characters are always written to be read by rotating the playing surface clockwise while face upwards in your hand, but the 'Morse' characters can be read the other way too, although obviously some of them read differently. A 'G' becoming a 'W' for instance.

Again, I have never come across an arrangement which produces an invalid Morse character when read anti-clockwise either.

Can anyone enlighten me?

David Reynolds, G3ZPF

LID MYSTERY

Can anybody please advise me as to the derivation of the CW abbreviation LID?

David Thomas, G4OGW

Please note that the views expressed in *The Last Word* are not necessarily those of the RSGB. We reserve the right to edit letters for publication. All letters are acknowledged and may be passed to the relevant department or committee.

BEST FOOT FORWARD

I am sure many readers will be relieved that you will continue to use feet and inches, despite the protestations of G0RFJ (*The Last Word*, Jan 95). Of course the decimal system, as any other, has advantages and disadvantages; it is very useful if you use your fingers to add up for example! But it is by no means superior in all ways. It is nonsense to dismiss the duodecimal system as 'outdated and illogical'. Indeed, unlike the decimal system, it is based on practical units as G0RFJ would find if he read the interesting history of the subject.

The base twelve is so much more versatile; for a start, it is divisible by 2, 3, 4 and 6 and is thus superior for scaling up or down drawings, or for model-making for example. Computers use binary or hexadecimal systems, and base 20 is still used in parts of South America. It's all a matter of convenience and the application involved with a bit of tradition thrown in!

Can G0RFJ explain the advantage of changing petrol sales to litres? The conversion of pumps cost millions, and who paid? The latest decimal lunacy is that all spirit optics have got to be changed to so-many millilitres. What a criminal waste of money when there are homeless and starving peopled in the world. That's what I call illogical.

Incidentally, if the metric system is so wonderful, why do they sell beer in 1/3 litre glasses on the Continent, still use BA threads in some electronic equipment and mount it in 19 inch racks - that's hardly decimal, is it? I, for one, prefer the Imperial System. I will continue to walk my dog for miles and enjoy a pint afterwards!

John E Malt, G3SMP

[And afterwards you could put both of your 33 centimetres up and go on the 262ft band - Ed]

MORE POWER TO THEIR WRISTS

Some years ago I stood nearby and overheard the successful reading by a volunteer passer-by, of a 40WPM Morse test.. The test was conducted by a RNARS team at an RSGB rally. As a struggling 20WPM reader, I was greatly impressed by the stranger's 'gift', 'skill', 'ability', whatever.

Now I read in *RadCom* (*News & Reports*, Jan 95) that a World-wide and European High Speed Morse Championship is to be held by the IARU in 1995, and that the 'basic criterion' is to be able to send (straight key?) and receive Morse at 50WPM! Incredible!

My great and sincere hope now is that the RSGB will cover this championship and that *RadCom* will give us an in-depth profile of the background of the contestants, of how the contest is organised and conducted, together with individual placings, speeds, errors etc.

To the winner, I hope the IARU will devise a public and rewarding acknowledgement of one who has a special skill. To those who qualified to compete, an easily recognisable memento of their entitlement to have taken part in this 'special' championship.

C A Mitchell, G3UVS

HE WHO WAS LOST . . .

In August of this year I terminated my membership of the RSGB and realised a week later what a silly mistake I had made. I have recently applied for membership again which you have kindly reinstated and have disregarded the missing months.

I wish to offer my sincere thanks to the RSGB for their very nice gesture and to say that it is good to be back. I realise what a great deal of work is done on behalf of the amateur by the RSGB and wish the Society every success for the future.

Harold McIntyre, G3FLJ

UNCHARITABLE CHRISTMAS THOUGHTS

I was listening to the radio on Christmas Eve, when I chanced across a conversation by two radio amateurs on 3680kHz, a G6** and a G4**. I was mortified to hear these two Class A licensees denigrating the efforts of Emma Wills, 2E0AAX, and implying that somehow she achieved her DXCC by cheating or other trickery, including the voiced opinion that more power than that authorised to a Novice was used, and she was 'helped'.

Come on gentlemen, to work for and achieve DXCC is hard, dedicated work, and to be so negative in your attitude does yourselves and amateur radio no good at all. It's one thing to hold views like this in private, quite another to broadcast them to the world. I suspect that neither of you would say this to her face!

N Vernon, G8NAV

RSGB – at Your Service

SOME OF THE RSGB'S TEAM OF VOLUNTEER EXPERTS — AVAILABLE TO HELP YOU

Zonal Council members

Zone A (North of England): Peter Sheppard, G4EJP, 89 St Catherines Drive, Leconfield, Beverley, North Humberside HU17 7NY. Tel: 01964 550397.

Zone B (Midlands): TBA.

Zone C (SE England and East Anglia): Neil Lasher, G6HIU, 8 Highwood Grove, Mill Hill, London NW7 3LY. Tel: 0181 201 1578.

Zone D (SW England): Julian Gannaway, G3YGF, Dean Hill Barn, East Dean, Salisbury, Wiltshire SP5 1HJ. Tel: 01794 40008.

Zone E (Wales): E Paul Essery, GW3KFE, 287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1AR. Tel: 01686 628958.

Zone F (Northern Ireland): Ian Kyle, GI8AYZ, 1 Portulla Drive, Pond Park Road, Lisburn, Co Antrim BT28 3JS. Tel: 01846 665034.

Zone G (Scotland): Frank Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR. Tel: 01307 467565.

For general advice and details on local clubs, or if you don't know who to contact:

Your **RSGB Liaison Officer** see this page and January *RadCom*, page 93.

Specialists

Antenna Planning: Booklet free to members from RSGB HQ. Planning application refused – RSGB Planning Panel, via RSGB HQ. Planning Advisory Committee Chairman – Geoff Bond, G4GJB, QTHR.

Audio Visual Library: Coordinator – David Simmonds, G3JKB, QTHR.

Awards: For contest awards, refer to the appropriate contest committee. For other awards, enquiries and applications go to the: HF Awards Manager – Fred Handscombe, G4BWP; IOTA (Islands on the Air) Awards Manager – Roger Ballister, G3KMA or VHF (and Microwave) Awards Manager – Ian L Cornes, G4OUT. Trophies Manager – David Simmonds, G3JKB.

Band Plans and operating practices: See the *RSGB Call Book* or January 94 *RadCom* for latest bandplans. For policy, contact the appropriate spectrum manager or committee chairman: HF Committee Chairman – David Evans, G3OUF, QTHR; VHF Committee Chairman – Peter Burden, G3UBX, QTHR; Microwave Committee Chairman – Steve Davies, G4KNZ, QTHR; HF Manager – Post vacant; VHF Manager – Dave Butler, G4ASR; Microwave Manager – Mike Dixon, G3PFR.

Beacons: HF Beacon Coordinator – Prof Martin Harrison, G3USF, QTHR. VHF Beacon Coordinator – John Wilson, G3UUT, QTHR. Microwave Beacon Coordinator – Graham Murchie, G4FSG, QTHR.

RSGB Contests: First contact the appropriate contest adjudicator (see the contest rules). For policy, contact the respective Committee Chairman: HF Contest Committee – Chris Burbanks, G3SJJ, QTHR; VHF Contest Committee – David Johnson, G4DHF, QTHR; ARDF (direction finding) Committee – Post vacant.

EMC: Advice on solving breakthrough and other electromagnetic compatibility matters: Committee Chairman – Robin Page-Jones, G3JWI, QTHR. Local EMC Coordinators - see *RadCom* Feb 94, p91.

Emergency: Emergency Communications Officer – Greg Reilly-Cooper, G0MAM.

Exhibition & Rally Committee: Chairman – Norman Miller, G3MVV, QTHR.

History: Society Historian – George Jessop, G6JP.

IEE: Liaison Officer – Peter Saul, G8EUX, QTHR.

Licensing: LAC Vice-Chairman – Julian Gannaway, G3YGF, QTHR.

Membership Liaison: MLC Chairman – Peter Sheppard, G4EJP, see Zone A (left).

Morse: Morse Practice Transmissions Coordinator – David Pratt, G4DMP. Chief Morse Test Examiner – Roy Clayton, G4SSH.

Packet Radio: Datacomms Committee Chairman – Tom Lilley, G1YAA, QTHR.

President: Clive Trotman, GW4YKL, QTHR.

Propagation: Propagation Studies Committee Chairman – Charlie Newton, G2FKZ, QTHR.

QSL Bureau: Outgoing cards – PO Box 1773, Potters Bar, Herts, EN6 3EP. Incoming cards – your QSL submanager (see *RSGB Call Book* or November *RadCom*, p91 for a list). QSL Bureau Liaison Officer – John Hall, G3KVA.

Repeaters: Repeater Management Group Chairman – Geoff Dover, G4AFJ, QTHR.

Spectrum Abuse: Packet – Via Datacomms Committee. Repeaters – Via the Repeater Management group. Other – Via Licensing Advisory Committee. Intruder Watch Coordinator – Chris Cummings, G4BOH.

Technical & Publications: Committee Chairman – Dick Biddulph, G8DPS, QTHR.

Training and Education: Committee Chairman – John Case, GW4HWR, QTHR. Radio Amateur's Examination – George Benbow, G3HB, QTHR. Novice RAE – Hilary Claytonsmith, G4JKS, QTHR. Project YEAR Coordinator – Phil Mayer, G0KKL, QTHR.

The Society has a large number of volunteer experts available to help and advise members on a wide variety of subjects. Each month we will be focusing on a different section of the volunteer workforce, whilst still giving brief details of the main office-holders. See also the Information Directory section of the *RSGB Call Book*.

RSGB Liaison Officers

Part 2: Counties Highland – Wiltshire

HIGHLAND (Zone G) – Elaine Shread, 2M1DLV, 15 Hardie Court, Aberchirde, Huntly, Aberdeenshire AB54 5TG. Tel 01466 780739.

HUMBERSIDE (North Humberside: Zone A, South Humberside: Zone B): North: Clive Reynolds, G8EQZ, 49 Westborough Way, Anlaby Common, Hull, N Humberside HU4 7SW. South: (also for Lincs) Ray Degg, G0JOD, 42 Hawthorn Road, Cherry Willingham, Lincoln LN3 4JR. Tel 01522 750316.

ISLE OF MAN (Zone A) – Mr C G Baillie-Searle, GD4EIP, 2 Marguerite Place, Foxdale, Isle of Man IM4 3HE. Tel 01624 801353.

ISLE OF WIGHT (Zone D) – Doug Byrne, G3KPO, 'Lynwood', 52 West Hill Road, Ryde, Isle of Wight PO33 1LN. Tel 01983 67665.

JERSEY (Zone D) – Syd Smith, GJ0JSY, 31 Jardin-A-Pommiers, Patier Road, St Saviour, Jersey. Tel 01534 38996.

KENT (Zone C) – Fred Stewart, G0CSF, Shingles, Ingleborough Lane, St Mary's Platt, Sevenoaks, Kent TN15 8JU. Tel 01732 780721.

LANCASHIRE (Zone A) – Steve Ireland, G1VRH, 'Ashlea', 11 Wood Park Road, Marton, Blackpool, Lancashire FY1 6QS. Tel 01253 695920.

LEICESTERSHIRE (Zone B) – Gwynne Harries, G4WYN, 1 St Michael's Close, Ashby-de-la-Zouch, Leicestershire LE6 5ES. Tel 01530 417307.

LINCOLNSHIRE (Zone B) – see under South Humberside.

LOTHIAN (Zone G) – Tom Menzies, GM1GEQ, 31 Pentland Terrace, Edinburgh EH10 6HD. Tel 0131 447 3219.

MERSEYSIDE (Zone A) – Post vacant – refer to Zonal Council Member.

MID GLAMORGAN (Zone E) – David Jones, GW1SQT, 'Beridale', 41 Penrhys Road, Ystrad, Rhondda, Mid Glamorgan CF41 7SJ. Tel 01443 435309.

NORFOLK (Zone C) – Bill Higgins, G3PNR, 65 Hayden Court, Eleanor Road, Norwich NR1 2RG. Tel 01603 629150.

NORTHAMPTONSHIRE (Zone B) – Mr D J Linnell, G0MJK, 19 Beech Avenue, Northampton NN3 2HE. Tel 01604 711647.

NORTHUMBERLAND (Zone A) – Jack Swayne, G3BLE, 12 The Haven, Beadnell, Chathill, Northumberland NE67 5AW. Tel 01665 720601.

NORTH YORKSHIRE (Zone A) – Gareth Foster, G1DRG, 19 Asquith Avenue, Burnholme, York YO3 0PZ. Tel 01904 421392.

NOTTINGHAMSHIRE (Zone B) – Mrs Mary Lowe, G0NZA, 25 Manor House Court, Kirkby-in-Ashfield, Nottingham NG17 8LH. Tel 01623 755288.

ORKNEY (Zone G) – George M Christie, GM7GMC, Burnbank, Hillside Road, Stromness, Orkney KW16 3HR. Tel 01856 850270.

OXFORDSHIRE (Zone D) – Post vacant – refer to Zonal Council Member.

POWYS (Zone E) – Gordon Rogers, GW0RJV, Maesgwersyl, Garthmyl, Newtown, Powys SY15 6RS. Tel 01686 640611.

SHETLAND (Zone G) – Post vacant – refer to Zonal Council Member.

SHROPSHIRE (Zone B) – David Whalley, G4EIX, 1 Lees Farm Drive, Madeley, Telford, Salop TF7 5SU. Tel 01952 588878.

SOMERSET (Zone D) – Capt Richard S Atterbury, G4NQI, 14 Holloway Road, Taunton, Somerset TA1 2EY. Tel 01823 333009.

SOUTH GLAMORGAN (Zone E) – Mike Adcock, GW8CMU, 7 Channel Close, Rhoose, Barry, S Glamorgan CF62 3EH. Tel 01446 711426.

SOUTH YORKSHIRE (Zone A) – Mr A Whitehead, G4JKW, Laburnum Cott, 3 Darley Yard, Worsbrough Dale, Barnsley, S Yorks S70 4SB. Tel 01226 299031.

STAFFORDSHIRE (Zone B) – Ken Parkes, G3EHM, 41 Goldborn Avenue, Meirheath, Stoke-on-Trent, Staffs ST3 7JQ. Tel 01782 397240.

STRATHCLYDE (Zone G) – **NW:** Alan Foulis, GM7PGT, 12 Richmond Gardens, Chryston, Glasgow G69 9PA. Tel 0141 779 1444. **SE:** Gordon Hunter, GM3ULP, 12 Airbles Drive, Motherwell, Strathclyde ML1 3AS. Tel 01698 253394.

SUFFOLK (Zone C) – Post vacant – refer to Zonal Council Member.

SURREY (Zone C) – Post vacant – refer to Zonal Council Member.

TAYSIDE (Zone G) – Alfred Low, GM4UZP, 21 Earn Crescent, Menzieshill, Dundee DD2 4BS. Tel 01382 644597.

TYNE & WEAR (Zone A) – Keith Ritson, G0PKR, 14 Dunsdale Road, Holywell, Whitley Bay, Tyne & Wear NE25 0NG. Tel 0191 237 1963.

WARWICKSHIRE (Zone B) – see under Northamptonshire.

WESTERN ISLES (Zone G) – see under Highland.

WEST GLAMORGAN (Zone E) – Mr E Hays, GW3RGL, 23 Edgemoor Drive, Upper Killay, Swansea SA2 7HH. Tel 01792 207822.

WEST MIDLANDS (Zone B) – Tony Faulkner, G0SKG, 105 Corbyn Road, Russels Hall Estate, Dudley, W Mids DY1 2JZ. Tel 01384 820616.

WEST SUSSEX (Zone C) – Jim R Harris, G4DRV, Upton, Crowborough Hill, Crowborough, East Sussex TN6 2DA. Tel 01892 655894.

WEST YORKSHIRE (Zone A) – Derek W Allan, G0RZP, 283 Cliffe Lane, Gomersal, Cleckheaton, W Yorks BD19 4SB. Tel 01274 872244.

WILTSHIRE (Zone D) – Ian L Carter, G0GRI, 12 Bobbin Lane, Westwood, Bradford on Avon, Wilts BA15 2DL. Tel 01225 864698.

CLASSIFIED ADVERTISEMENTS

Classified advertisements 55p per word (VAT incl) minimum 14 words (£7.70). Please write clearly. No responsibility accepted for errors. Latest date for acceptance — 5 weeks before 1st of issue month.

All classified advertisements MUST be prepaid.

NB: CHEQUES SHOULD BE MADE PAYABLE TO RSGB.

Copy and remittance to: **Victor Brand Associates, 'West Barn', Low Common, Bunwell, Norwich, Norfolk, NR16 1SY.**

NB. Members' Ads must be sent to "Members' Ads," RSGB Hq.

FOR SALE

CAN'T AFFORD AN FT990? It's a super rig and we do very good cash/cheque prices. But — how about an IC738? It really is good, very quiet RX and a host of features, inc super ATU — £1,399 cash/cheque. G3LLL, Holdings Amateur Electronics, 45 Johnston St., Blackburn BB2 1EF. (0254) 59595. Open Tues, Wed, Fri & Sat. Lunch 12-1.30, but phone first and check!

G4TJB QSL CARDS, CARDS printed to your specifications, send large S.A.E. for samples and full product list. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-super-Mare, BS22 0BX. Tel: (0934) 512757, (0850) 707257, Fax (0934) 512757.

"RAYNET" YELLOW REFLECTIVE TABARDS with "RAYNET". Medium £10.50, Large £11.00, XLarge £11.50. "RAYNET CONTROLLER" 50p extra.- EPSON PX4+ lap top computer, built-in printer, charger Eprom for packet £46.50 inc pp. Nonreversible battery connectors line/panel mounting (10 pairs/pack) £6.50. Mike Watson G8CPH, Ipswich (0473) 831448.

MOSLEY ANTENNAE — All the famous British Manufactured Antennae, direct from us including spares/replacements. Mustang, Elan, TA-33Jnr etc. Full details shown in our Handbook, price £1.25 refunded upon purchase of Antennae, Mosley Electronics, 196 Norwich Road, New Costessey, Norwich NR5 0EX (Administrative address only).

ANTI-T.V.I. CUSTOM BUILT HF/VHF AERIALS, Trap-dipoles, multibanders, traps, baluns, parts. Reconditioned TX/RX's, Linears ATU's. Data 38p SAE, Aerial Guide £1.50. G2DYM, Uplowman, Devon, EX16 7PH. Tel: 03986-215 any time.

THE RIG REVIEW contains details of over 400 rigs (see Product News September). Unravel those small ads, and tell an IC2SRE from an IC2SE, covering 25 years of manufacture and describing each rig's main features and original price. Price £5.00 post free, or on disk at £4.00 from Twrog Press, see below.

AERIAL WIRES, strong pvc coated £6.50, hard drawn 14swg £14, 16swg £11.50, all per 50 metres post/VAT paid, 30p stamps for full list of cables etc — W. H. Westlake, Clawton, Holsworthy, Devon.

COLLINS — 325-1 £350; 75S-3 £300; KWM-2 £350; 30L-1 £300. Yaesu SSB Transceiver FT101 — £450. KW107 Tuner — £100. Reflective power meter — £50. Tel: 0277 363775.

QSL CARDS. Gloss or tinted cards. SAE for samples to Twrog Press, Penybont, Gellilydan, Blaenau Ffestiniog, Gwynedd LL41 4EP.

ALUMINIUM TUBE. Heavy-duty (scaffold) tube approx. dimensions 20' long, 2" dia, 11/64" (4.5mm) wall thickness. 20' and 10' lengths available @ £1.80 + VAT per ft. C.W.O. Rusper Hire (Crawley) 0293 87 1621 office hours only.

SOLAR/WIND POWER. All sizes and types available. For new catalogue, info, prices send £1 or 4 x 1st class stamps to Keysolar Systems (GW4IED), 4 Glanmor Cres, Newport, Gwent, NP9 8AX.

QSL CARDS — low cost, quick delivery, superior designs, quality guaranteed, personal designs our speciality. L.S.A.E. for samples: The Standfast Press, 5 South Drive, Inskip, Preston PR4 0UT.

AMIDON TOROIDS send £1.00 for catalogue, refundable on purchase. "Choke Baluns" Models for G5RV £28.25, Dipole £36.54, Yagi to fit 1.5" or 2" booms £37.15 inc, or send SAE for full details. Ferromagnetics, P.O. Box 577, Mold, Clwyd, N. Wales CH7-1AH.

QSL, SWL's ECONOMY CARDS. Very low prices, quick delivery, specials a speciality. Sample enquiry to G3ETU, 34 Park Lane Court, Salford, Manchester M7 0LF. Tel: 061-792 9144.

DIY Z MATCH ATU BFO. Loops. PRE Amps. Field strength meter. SAE G2VF, 39 Parkside Avenue, Southampton SO16 9AF.

LANDWEHR VHF/UHF MASTHEAD PREAMPLIFIERS 2 metre 145mas £147 and 70cm 435ma £152. Post & packing £4. Write or phone for leaflet. Qualitas Radio, 23 Dark Lane, Hollywood, Birmingham B47 5BS, Tel: 021-430 7267.

QSLS 1000 £28.50 (SWLS. Logos. Colour cards. Stamps. Patches — S.A.S.E. for samples) Currie, 87 Derwent St, Consett, DH8 8LT.

RSGB AMATEUR RADIO INSURANCE SCHEME

"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Jennifer Lawson, Amateur Radio Insurance Services Ltd, Shepheards Hurst, Green Lane, Outwood, Surrey RH1 5QS. Tel: 034-284-4000. Fax: 034-284-4554.

COMPUTER SOFTWARE HARDWARE

SUPER-DUPER, the PC Contest Logger. "Highly recommended" — RadCom, September 1993. With printed manual and upgrades for 12 months. HF £25.00, VHF £25.00, both £39.00. Paul O'Kane E15DI, 36 Coolkill, Sandyford, Dublin 18. (00 353 1295 3668).

G4UXD's MORSE TUTOR/PRACTISE: IBM-PC's, BBC's. 100% new "QSO" format. Random everything! Adjustable speed, delay, letter frequency. 100 tests, attach your key £9.99. SAE details/trial. P. Brandon, 1 Woodlands Rd, Chester, CH4 8LB.

G4BMK PACTOR — See display advert this issue. Grosvenor Software, 2 Beacon Close, Seaford, Sussex.

SHACKLOG4 *the* PC logging system. Real time and post event QSO logging. QSL labels. Database analysis, reports, import, packet terminal etc. Optional IOTA database (G3KMA). Plus lots more!! Still only £27.50!! SASE (+disk for demo copy) for full details. G3PMR, 30 West Street, Gt Gransden, Sandy, SG19 3AU. 0767 677913.

THE WINTER 1994 G0LOV/G04LUE. UK Amateur Callbook for IBM compatibles. The Callsign Data is supplied by the Radiocommunications Agency October 1994. Specially written database, easy to install and use. Fast searching, by callsign, address, postcode, surname or wildcard, shows WAB book numbers. Facilities also includes UK repeaters, mailboxes, nodes, European repeaters £12.50. Now available Hamfax, transmit and receive fax, slowscan pictures ritty and Morse code, all on one pcb, available in kit form £21.00 or ready built £25.00 both excluding box. New product CTCSS transmit on your radio a small pcb which when fitted in to your transceiver will transmit CTCSS tone one frequency, (see Radcom December page 66), kit £9.95 ready (built on your CTCSS code) £12.75. Please enclose £1.50 PPI and are available from J. Bailey, 8 Hild Avenue, Cudworth, Barnsley, South Yorkshire S72 8RN.

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JAVEA, SPAIN. Fantastic views, tranquil villa's guest's apartment, pool. G8JTW. 01754610331.

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VIDEO TAPE CONVERSIONS to and from all modes N.T.S.C.; S.E.C.A.M.; P.A.L.N.; P.A.L.M. Digital processing. Fast and economical service. Also 'cine' conversions. Phone G4WMP 0932 846139.

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Readers are also reminded that the use of radio transmission and reception equipment (including scanning) is subject to licencing and the erection of external aerials may be subject to local authority planning regulations.

ADVERTISERS INDEX

NEXT COPY DATE

The display advertisement copy date for our April 1995 issue will be **8th February 1995**

IC-738

HF 300kHz-29.995 MHz
All Mode Transceiver

- All band, all mode transceiver with a general coverage receiver
- Automatic antenna tuner
- Automatic antenna selector
- Quick split function with pre-programmable offset
- 1Hz tuning steps
- RIT and ΔTX with calculate function
- Memo pads
- PBT function and notch filter
- Speech compressor
- VOX function
- Double band stacking register
- 101 Memory channels
- Versatile scans

ICOM

ICOM manufacture a full range of base-stations, mobiles and handheld transceivers and receivers to cover all popular Ham frequencies... and beyond. No matter what your requirements, ICOM have the radio for you.

For the full picture and details of your local authorised Icom dealer contact:

Icom (UK) Ltd. Sea Street Herne Bay Kent CT6 8LD.

Telephone: 0227 743001(24hr). Fax: 0227 741742.

NEW
Dual Band HT

Dual Band Handheld FT-51R

Only one Dial/Volume knob required for easier use.

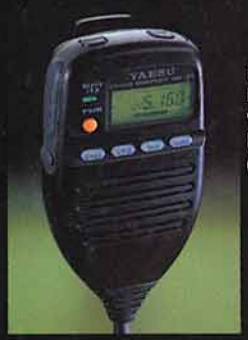
The First Dual Band HT with WINDOWS!

Three dual receive configurations VHF/VHF, UHF/UHF, or VHF/UHF with main band frequency on right or left side. Flexible programming allows transmit on main or sub band.

An 8 character alpha-numeric user help menu scrolls operation instructions in the bottom of the large, backlit display.

Digital battery voltage readout displays condition of battery in use. Scan skip function allows individual memory channel lockout during scanning mode.

Spectrascope™ displays active adjacent frequencies in real time with relative signal strength.



MH-29A2B
LCD Display Mic with Remote Functions. (Optional)

FT-51R
2¼"W x 4¾"H x 1⅛"D
(2 Watt version shown.)

The new FT-51R Dual Band HT is state-of-the-art, and easy to use! So easy, you won't need an operating manual. Its exclusive, scrolling instruction menu located in the large, backlit display "window", guides you through total operation while simultaneously viewing the main display window.

You'll like some of the other new, exclusive features, too. Like Spectrascope.™ This unique feature displays real time, continuous scanning of activity on adjacent frequencies in VFO mode or 8 of your favourite memories. A cloning feature duplicates favourite channels to another FT-51R.

A digital battery voltage display, five power output levels, the largest backlit dual band HT keypad made, Smart Mute,™ two VFOs on both VHF and UHF, as well as available 2 Watt and 5 Watt versions, round out the exciting FT-51R. Plus, the optional MH-29A2B Display Microphone allows you to control volume and also access Memory, VFO, Call Channel, Band Selection and scanning functions. All of this in world's smallest dual band HT radio!

See the FT-51R with "windows" at your Yaesu dealer today!

"I can see two frequencies and alpha-numeric all at the same time."

"Scrolling instructions tell me what to do next!"

"I use the Spectrascope to find new contacts faster."

"Yaesu did it again!"

Specifications

- Frequency Coverage
  VHF RX: 110-180 MHz
  TX: 144-146 MHz
  UHF RX: 420-470 MHz
  TX: 430-440 MHz
- Spectrascope™ Display
- Scrolling User Help Menu
- Alpha-Numeric 8 Character Display
- Up/Down Volume/Squelch Controls & Display
- Selectable Sub-Band TX Mute
- Automatic Tone Search (ATS)
- Digital Battery Voltage Display
- AM Aircraft Receive
- Scanning Light System (SLS)
- 120 Memory Channels (80 w/Alpha-Numeric)
- Large Backlit Keypad & Display
- Automatic Repeater Shift (ARS)
- Multiple Scanning Modes
- 3 Selectable Scan Stop Modes with Scan Skip
- User selectable lock function w/15 combinations
- Automatic Power Off (APO)
- TX/RX Battery Savers Built-in
- Handy Cloning Feature
- 5 Selectable Power Output Levels
- Message system with CW ID
- Selectable RX Smart Mute™
- Cross-Band & One-Way Repeat Functions
- DTMF Paging/Coded Squelch Built-in

Accessories
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