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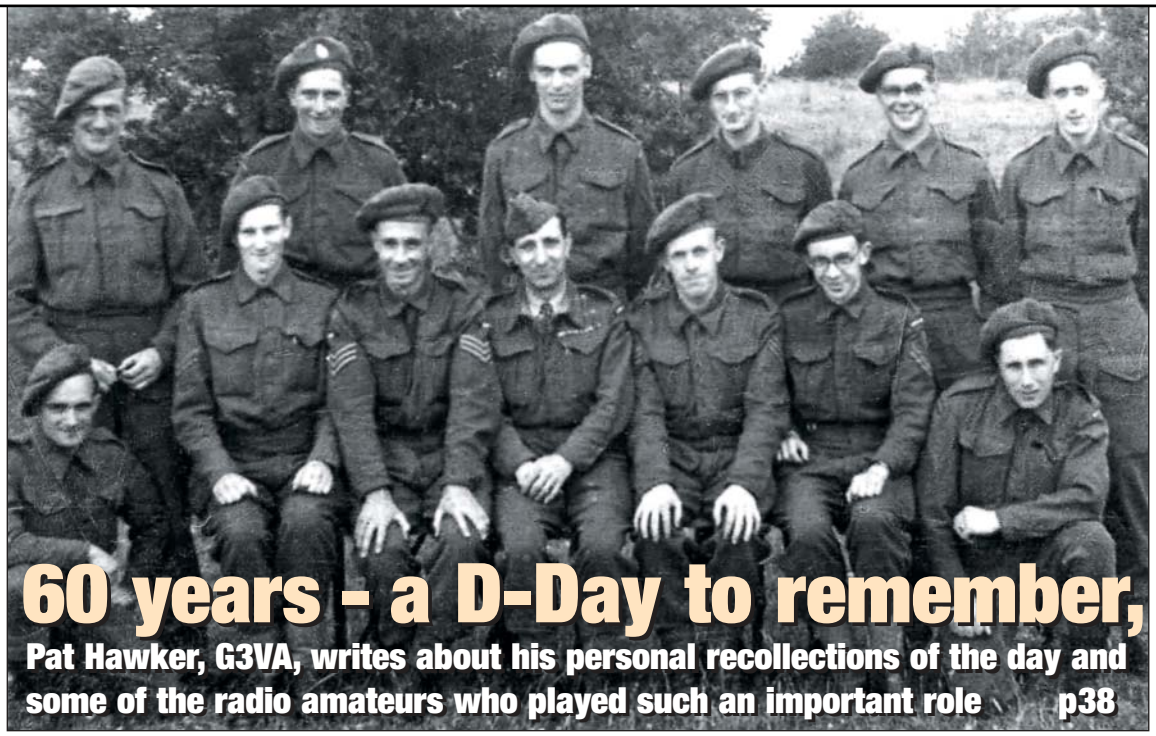
The Radio Society of Great Britain Members' Magazine

RadCom

£3.95 Vol 80 No. 6 June 2004

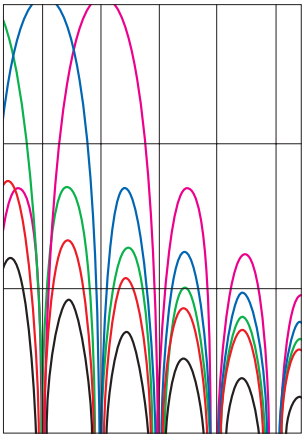


60 years - a D-Day to remember,

Pat Hawker, G3VA, writes about his personal recollections of the day and some of the radio amateurs who played such an important role p38

Review

John Alexander, G7GCK, builds the electronic Enigma-E machine in kit form p32



Digital SSB phasing

Peter Martinez, G3PLX, presents another design that is capable of far better performance than any described so far p84

The Ten-Tec Orion

The first UK full technical review of this flagship transceiver. "Truly awesome" says Peter Hart, G3SJX p18

INSIDE

WATERS & STANTON

PAY NOTH

NO DEPOSIT NOTHING TO PAY FOR 12

HOCKLEY OPEN DAY 30TH MAY 2004

see opposite →

carriage charges:
A=£2.75, B=£6, C=£10

NEW IC-7800 In Stock!

The most advanced amateur band transceiver ever produced!

New Wonder Wand!

40m - 70cm QRP Antenna

Ideal for FT-817 and radios up to 25 Watts. This pocket size system includes tuner and telescopic whip. PL-259 fitting plugs straight into the radio. The antenna is hinged for easy adjustment. Made by bhi in the UK, this is a must for FT-817 owners. **£89.95**

Order code: W-WAND

Carriage £6

Special Offer

All HF whip antennas need a counterpoise. We can offer you the mini tuneable bhi CPOISE with the Wonder Wand for a special inclusive price of **£139.95**

Order code: W-WAND Offer

BUY NOW PAY LATER AT ALL THREE STORES

You won't find a better deal!

Proof that at W&S you get the best possible deal. On selected items it is now possible to pay nothing for a whole year without incurring any interest charge. Amazing but true. And what's more, you get probably the best prices in the business. Give us a call today or visit one of our branches.

If you can find a better advertised deal we will match it!

0% APR TYPICAL EXAMPLE OF BUY NOW PAY LATER. CASH PRICE £600. PAY NO DEPOSIT AND PAY THE FULL AMOUNT 12 MONTH'S LATER. PAY NO INTEREST.

OR AFTER TWELVE MONTHS

29.8% APR REPAY £31.53 PER MONTH FOR 36 MONTHS. TOTAL AMOUNT DUE £1135.08. INTEREST IS CALULATED FROM THE DATE OF THE AGREEMENT.

ALL FINANCE SUBJECT TO STATUS WRITTEN QUOTATION ON REQUEST.

ICOM IC-756 PRO II £1899 C

Flagship of the Icom range of HF transceivers. HF & 50MHz, features large colour LCD with spectrum scope, auto ATU and 32-bit floating point DSP unit.

ICOM IC-7400 SPECIAL OFFER £1299 C

HF/VHF 100W transceiver covers 1.8 - 146MHz Features large LCD with spectrum scope, auto ATU and same DSP system as IC-756PRO II. A great base station!

Comes with *FREE* SP-21 Speaker & SM-20 Desk mic

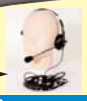
ICOM IC-703 NEW £589 C

HF/ 50MHz Transceiver 0.1-10W Portable, Mobile, Base-Station. Ideal for Foundation Licence/QRP. Auto ATU, DSP memory keyer. External batt **BP-228 £71.76. B**

◄ Rucksack **LC-156 £62 B**

ICOM IC-706 IIG DSP £769 C

HF/VHF/UHF mobile DSP transceiver. Its relative small size not only makes it a great mobile rig but also for fixed station use as well. HF general coverage and VHF & UHF .



Heil Traveler single ear "706" headset + PTT **£89.95 B** →

ICOM IC-718 £449 C

HF 100W transceiver. Covers all HF bands plus wideband receive. C/w auto notch, dual VFO, SWR meter etc. Options include extnl ATU DSP & filters.

KENWOOD TS-2000 £1599 C

Top-of-the-range Kenwood transceiver. HF/VHF/UHF or up to 23cm with the optional module. Built-in auto ATU, DSP and its unique TNC.

ARCP Control Software. **£44.95 B**

KENWOOD TS-870S DSP £1399 C

HFDSP 100W base station. 1.8 - 30MHz. Excellent all round rig great for DX working with its ability to winkle out weak stations using its true IF DSP. No filters to buy.

MC-60A base mic with pre-amp. Ideal match. **£117.95 B** →

KENWOOD TS-570DGE £849 C

HF100W base station with built-in auto ATU. Very popular rig, excellent performance on SSB and CW. Two fitted antenna sockets - very handy.

SP-23 Matching base station receiver **£68.95 B** →

ICOM IC-910X with 23cm £1249 C

Icom's all mode VHF/UHF transceiver with 23cm. Large clear LCD with lots of facilities. 100W on VHF and 75W on UHF, 10W on 23cm.

UT-106 DSP unit **£84.99 B**

Basic Model IC-910H £1129 C

YAESU FT-1000 MKV £2349 C

200W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC PSU - Acknowledged as one of the finest DX rigs on the market. Superb tailored audio and the ability to select Class A bias for dramatic signal purity.

YAESU FT-1000 FIELD £1749 C

100W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC / 13.8V DC - Building on the success of the FT-1000MkV, the Field has become a respected leader in its class.

KENWOOD TS-480SAT & TS-480HX

NEW

The **TS-480SAT** is the 100W version of this new HF+6m transceiver from Kenwood. Smaller than the TS-2000/ TS-B2000 it has many similar features.

TS-480SAT £999 C

The **TS-480HX** is the 200W version of this new HF+6m transceiver. **TS-480HX £1099 C**

YAESU FT-897 £899 C

100W HF rig plus 2m and 70cms (50W/20W) 13.8V external supply / internal optional FP-30V AC power supply / self powered portable using optional Ni-MH pack at 20W output. Compatible with FC-30 auto ATU and ATAS 120/100 antennas. The "must have" radio for 2003.

YAESU FT-847 £1199 C

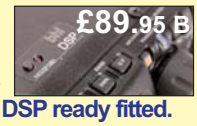
1.8 to 440MHz, this all-in-one transceiver offers unbeatable value. 100W on HF plus 6m, and 50W on 2m and 70cm. You get genuine RF clipping on SSB for up to 6dB gain and there are 4 separate antenna sockets.

YAESU FT-857 NEW £729 C

HF / 50 / 144 / 430MHz Mobile Transceiver. HF/6m 100W, 2m 50W, 70cm 20W. (13.8V DC) Developed on the FT-897 and FT-817 transceivers. Built-in features 32 colour display, spectrum scope, AM airband aircraft reception, built-in memory keyer, detachable front panel.

YAESU FT-817ND £499 C

bhi NE-DSP1061 Module available!



£89.95 B

160m - 70cms. Up to 5W output all modes. ***Ours includes*** **battery and charger.** **Add £90 for DSP ready fitted.**

NEW DSP Module

There is NO new FT-817 DSP! The fact is that the UK manufacturers, **bhi**, (of whom we are their largest distributor), have produced a lovely 4-stage DSP module that can be fitted inside the FT-817. The NE-DSP1061 module costs £89 plus a fitting charge of £25 for retro-fitting to existing models. This includes installing a mini switch and LED on top cover.

TOKYO HY-POWER HL-50B £269.95 C

FT-817 VERSION !

This Linear Amplifier has been specifically designed for use with the FT-817. Enjoy up to 50 Watts output

HING 'TIL 2005!

MONTHS ON SELECTED ITEMS MARKED BY £

THE ONLY THING WE CUSTOMER SERVICE WON'T DISCOUNT

ICOM IC-E208 NEW £279 C

VHF/UHF FM Dual Band Mobile Transceiver *Freq range 144-146MHz, 430-440MHz Tx *55/50W (3 pwr steps each band) *Wideband Rx 118-173, 230-549 & 810-999MHz *512 memories *FM narrow capability *104x2 DTCS, 50 CTCSS tone squelch *16 DTMF channels *HM-133 remote control mic *Packet ready for 9600/1200bps-mini DIN or 1200bps-mic socket *Supply 13.8V

ICOM IC-2725E £269 C

The Icom IC-2725 dual band FM transceiver is proving very popular. Easy to install, the controller is separated from the main unit - great where space is limited.

ICOM IC-2100H £229 C

2m 55W FM mobile. Commercial grade, rugged construction. One piece die-cast aluminium chassis. Selectable green or amber display.

YAESU FT-8900R NEW £339 C

Want the best of all worlds then the FT-8900R is just the ticket! A rig with four of the most popular mobile bands - 10m/6m/2m & 70cm. Detachable head.

YAESU FT-2800M NEW £159 C

*144-146MHz *FM *137 - 174MHz expanded Rx *RF Pwr 65/25/10/5W *25/12.5kHz channel spacing.The NewFT-2800M from Yaesu with 65 Watts High Power, rugged construction, excellent receiver performance and direct keypad entry.

YAESU FT-8800E £289 B

Dual Band FM Mobile 50/35W
The FT-8800R series operates as two radios in one, with independant two channel operation.
Remote head mounting capability, wideband receive on VHF & UHF and over 1000 memories.

YAESU FT-7800E NEW £239 C

*2m/70cms Dual Band Mobile *High power 50W 2m /40W 70cms *Wide receive inc. civil & military airband *CTCSS & DCS with direct keypad mic. *Detachable front panel *1000 memories plus five one-touch

We Price Match!
Call 08000 73 73 88

KENWOOD TMD-700E £449 C

Certainly the best 2m/70cm dual band mobile transceiver with APRS. Does not need extra high cost boards to function. The only extra if required is a compatible GPS receiver.

KENWOOD TM-V7E £359 C

Dual-band 2m/70cm.
A lovely cool blue display, easy to read with 50/35W output. 50W/35W plus 280 memos and five storable operating profiles.

KENWOOD TM-G707E £289 C

Dual Band
If you are looking for simplicity and low cost, here's the answer. 2m &70cms with detachable front panel and "Easy operation mode." GREAT!

YAESU VX-7R £299 B

6m/2m/70cm

Available in Silver or Black

The VX-7R is the best outdoor handie ever. The case, keypad, speaker and connectors are all sealed against water damage. Wide Frequency coverage from 500kHz to 900MHz the VX-7R is ideal for monitoring a variety of broadcasts. The display is a dazzling 132x64 dot matrix providing easy-to-read frequencies and information plus pictorial graphics.

YAESU VX-150 £125 B

The VX-150 is a fully featured compact yet incredibly rugged 2m 5W Handheld. Features include direct keypad frequency entry, CTCSS, DTMF, 1750Hz tone calling, wide/narrow deviation selection. It has a die-cast case, large high output speaker, illuminated keypad and battery voltage meter.

YAESU VX-2E NEW £169 B

Dual Band handy, 1.5W (2m) and 1W (70cm). Full DTMF, CTSS and DCS. With 1300 memories and AM/FM coverage 500kHz-960MHz.

ICOM IC-E90 £269 B

The new E-90 offers triple band coverage of 6m, 2m and 70cms. Up to 5W output and rx coverage from 495kHz - 999MHz makes this a very attractive rig.

ICOM IC-T3H £129 B

The IC-T3H 2m handheld features tough quality but with slim looks. Its striking green polycarbonate case has been ergonomically designed. The rig is capable of providing a powerful 5.5W output with either Ni-Cad or Ni-MH battery packs. Supplied with charger and rechargeable battery.

KENWOOD TH-D7E £319 B

DATA COMMUNICATOR

One of the most successful handhelds over the past few years. It has a built-in TNC for Packet use. You can also use it for APRS operation in conjunction with an external GPS unit. Plus NMEA, 200 memos, and up to 5W output.

KENWOOD TH-F7E £249 B

WITH EXTRA WIDE RX COVERAGE
- 144-146MHz Tx/Rx: FM
- 430-440MHz Tx/Rx: FM

Up to 6W out with Li-ion battery and "scanner" style coverage from 100kHz to 1300MHz including SSB on receive! This is a great radio to have at all times when you are on your travels.

KENWOOD TH-G71E 199 B

If you want an excellent 2m/70cm dual-bander then you can't go wrong with the TH-G71. Fully functional with three power levels, 200 memories, CTCSS tone encoder/decoder, illuminated keypad and backlit LED.

YAESU VX-110 £119 B

Combining the ruggedness of the VX-150 with the simplicity of 8-key operation, the VX-110 is a fully featured 2m hand held ideal for the most demanding of applications. With its die-cast case, large speaker, and illuminated keypad, it is particularly well suited for most conditions. The VX-110 is a very affordable, rugged and reliable handheld.

E&OE, prices may vary from those advertised.

Price Match Competitor's goods must be: new, UK sourced via official UK distributors and be in stock. Some competitors items offered may be non-UK compatible, ex demonstrationn or have no CE or E approval. All our new products come through official sources.

Hockley Open Day
30th May. 10am
The BIG EVENT!

Our **Massive Open Day** gives you bargains galore! FREE food and drink plus raffle. Support from Yaesu, Icom, Kenwood, repeater groups.
Check web for details.
30th May, 10am

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VERTICAL ANTENNAS

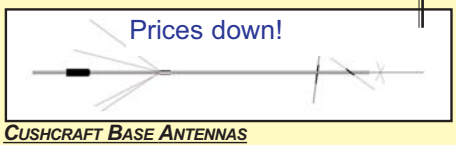
Hustler Mobiles

Get top performance when on the move. Purchase the **MO-3 base** (137cm) for **£24.95** or the **MO-4 base** (68cm) for **£22.95**. Then add the resonator of your choice. **RM-10, RM-12, RM-15**, all **£19.95** ea. **RM-17, RM-20 £24.95** ea. **RM-40 £26.95, RM-80 £29.95**
Carriage £6

Resonator

Base section MO-3 or MO-4

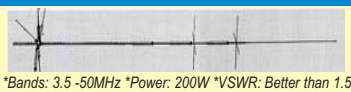
MA5V Base vertical
No radials needed



CUSHCRAFT BASE ANTENNAS

MA6V *NEW*	20-17-15-12-10-6m 250W PEP	**£269.95**	C
MA5V	20-17-14-12-10m 250W PEP	**£239.95**	C
R8	40-30-20-17-15-12-10-6m 1.5kW	**£469.95**	C
R6000	20-17-15-12-10-6m 1.5kW PEP	**£329.95**	C

DIAMOND CP6 £239.95 C



**Bands: 3.5 -50MHz *Power: 200W *VSWR: Better than 1.5:1*
**Socket: SO-239 *Height: 4.6m *Radials: 1.8m adjustable*

Covers five popular HF bands and the 6m band. Low angle radiation makes it ideal for DX work. Outperforms dipoles for long distance contacts and compares favourably with beams located 10m+ above ground. It doesn't need long wire radials. Adjustable rigid radials, DC return helps the antenna get rid of static noise. Antenna is adjustable for each band.

HARI High quality German traps. (Pairs)
200W 20m £44.95 40m £49.95 80m £53.95
1kW 20m £59.95 40m £64.95 80m £73.95
Carriage £2.75

HARI High quality German Baluns
SO-239200W 1:1, 4:1 or 6:1 £25.95 ea.
1kw 1:1 £34.95 4:1 or 6:1 £41.95 ea
Carriage £2.75

HORIZONTAL BEAMS & DIPOLES

CUSHCRAFT Prices down!

Premier HF beam used around the world by serious DX'ers.

X-7	20/15/10m 7 el. Yagi 2kW	**£669.95**	D

Not got the space for a full sized HF beam antenna, then the mini beam MA-5B should be considered.

MA-5B	10-12-15-17-20m 4 el. Yagi 2kW	**£369.95**	C
A4-S	10-15 & 20m 4 el. Yagi 2kW	**£569.95**	D
A3-WS	12 & 17m 3 el. Yagi 2kW	**£379.95**	D
D-3	10-15-20m dipole element 2kW	**£249.95**	C

Don't want a wire antenna but can't fit a Yagi, then consider a rotatable dipole.

D-3W	12-17-30m dipole element 2kW	**£249.95**	C
D-4	10-40m dipole element 2kW	**£349.95**	C
D-40	40m dipole element 2kW	**£319.95**	C
TEN-3	10m 3 el. Yagi 2kW	**£229.95**	C
ASL-2010	13.5-32MHz 8 el. log periodic	**£749.95**	C

RADIO WORKS

A choice of quality wire antennas available to fit almost any circumstances. Prices down!

CW-160	160-10m 76.8m long	**£129.95**	C
CWS-160	160-10m 40.5m long	**£114.95**	C
CW-80	80-10m 40.5m long	**£89.95**	C
CWS-80	80-10m 20.1m long	**£109.95**	C
CW-40	40-10m 20.1m long	**£84.95**	C
CW-20	20-10m 10.36m long	**£89.95**	C
CW-620	20-6m 9.7m (32ft) long	**£89.95**	C
G5RV PLUS	80-10m with balun 31m (102ft) long	**£59.95**	B

WATSON FC-130 FREQUENCY COUNTER £59.95 B

**1MHz-3GHz *Impedance 50 Ohms*
**LCD readout *10-digit display*
**16 segment bargraph*
**BNC Whip Antenna*
**Black anodised case *Internal Ni-Cads*
**600mAH *6 hours operation*
**AC charger *9V DC 300mA*
**68 x 80 x 31mm*240g*

WATSON HUNTER FREQ. COUNTER £49.95 B

**10MHz-3GHz *Impedance 50 Ohms*
**LCD readout *8- digit display*
**BNC Whip Antenna*
**Black anodised case *Internal Ni-Cads*
**AC charger *9V DC 300mA*
**68 x 80 x 31mm *210g*

PORTABLE ANTENNAS

MIZUHO (FOR FT-817)

ATX-WBN	Walkabout 80-6m Whip 1.5mBNC	**£49.95**	B
ATX-WPL	Walkabout 80-6m Whip1.5mSO-239	**£49.95**	B
ATX-W38	Walkabout 80-6m Whip 1.5m 3/8in	**£49.95**	B

New Low price on Walkabout whips, three to choose from with three different connectors.

AT-80	Single band 80m whip with BNC	**£19.95**	A
AT-40	Single band 40m whip with BNC	**£19.95**	A
AT-30	Single band 30m whip with BNC	**£14.95**	A
AT-20	Single band 20m whip with BNC	**£14.95**	A

Range of single band HF antennas with BNC connection. Ideal for FT-817.

AT-17	Single band 17m whip with BNC	**£14.95**	A
AT-15	Single band 15m whip with BNC	**£14.95**	A
AT-12	Single band 12m whip with BNC	**£14.95**	A
AT-10	Single band 10m whip with BNC	**£14.95**	A

Zero Space - - DX Antennas

From Hustler USA

Run full legal power - 80m to 10m - with no masts or guys to worry about. 50 Ohm feed.

Small garden, planning problems or similar restrictions? Then the Hustler range is the answer. These HF verticals will take 1kW of power, work at ground level, and are self-supporting. A single earth rod will get you going. Add buried radials for even better results. Many hams have got on the HF bands with just this simple system. So why not join in the fun. These are rugged, well-built antennas that American hams have been using for years. Now they are available in the UK from our three stores.

4BTV
40-20-15-10m. 6.52m high. Full band coverage.
£159.95 C

5BTV
80-40-20-15-10m. 7.64m high. Full band coverage (100kHz on 80m).
£199.95 C

6BTV
80-40-30-20-15-10m. 7.3m high. Full band coverage (100KHz on 80m).
£219.95 C

MFJ Compact Portable Tuners

MFJ-971
QRP portable tuner, 300/30/6W. Wire, coax or balanced. **£99.95 B**

MFJ-902 Travel Tuner
Smallest 150W ATU in the world! 3.5 - 30MHz coax or end fed wires. Real air spaced capacitors! **£74.95 B**

MFJ Power Tuners

MFJ-989C £359.95 C
3kW 1.8 - 30MHz. Wire, balanced and coax feed. Full metering and switching

3kW fast differential tuning design. 1.8 - 30MHz. Wire balanced and coax systems. Full metering and switching.

MFJ-986 £329.95 C

MFJ Popular Tuners

MFJ-949E £159.95 B
1.8 - 30MHz. 300W wire, balanced and coax. Inc dummy load, metering and antenna selector.

Similar to the MFJ-949E, but without internal dummy load. One of the most popular ATUs in the world!

MFJ-948E £139.95 B

MFJ Match Makers

MFJ-910 £24.95 A Mobile Matcher. Connect between mobile whip and transceiver. See your VSWR come down as you switch impedance match.

Auto ATU extender. It let's your internal transc. ATU handle difficult coax antennas such as G5RVs etc. Greatly extends the range cpability.

MFJ-914 £64.95 B

Antenna Analysers

MFJ-259B £259.95 B

Full diagnostic information about your antenna. 1.8 - 170MHz. Totally portable. Great value.

MFJ-269 £349.95 B

The most comprehensive diagnostic analyser ever made. 1.8 - 170 plus 415 - 470MHz

MFJ-969 ATU £199.95 B

The latest design from MFJ, this unit features an active power meter for really accurate PEP measurements. Powered by an internal PP3 battery (not supplied) or an external 12V source. This is one of the most popular 300W models, having a very wide frequency range an excellent power and VSWR accuracy.

MFJ-260C DUMMY LOAD £37.95 B

MFJ-260C 1.5MHz - 150MHz 300W 50 Ohm SO-239
**Size 180 x 57 x63mm • Weight 450g*
Handles 300W for 30 seconds and lower powers proportionally longer.

MFJ-901B VERSA TUNER £85.95 B

This compact tuner is a low cost alternative where the main station already has a VSWR meter and just requires the 'bare bones' tuner. It will handle all types of aerials, match coax fed systems, long wires and balanced feeders and is very simple to use. It retains the basic MFJ T-network that has a wide impedance matching capability.

MFJ-461 MORSE READER £84.95 B

The MFJ-461 is a stand-alone pocket sized Morse code reader. Similar in size to the MFJ Morse tutors, all you do is hold it close to your receiver and it instantly displays CW on the 32 character high contrast LCD. It has automatic speed tracking, a serial port - if you wish to connect to a computer to display the text on a bigger screen. It can also be connected to your receivers audio if required.

Check our website for more info - www.wsplc.com

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OF GREAT BRITAIN

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WHICH REPRESENTS UK
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(GB2RS and club news items)
RadCom@rsgb.org.uk
(news items, feature submissions, etc)
AR.Dept@rsgb.org.uk
(Morse tests, beacons, repeaters, GB calls, licensing)
IOTA.HQ@rsgb.org.uk (Islands On The Air)
GM.Dept@rsgb.org.uk (managerial)

Website: www.rsgb.org
WebPlus: Members-only web site **www.rsgb.org/membersonly** Use your callsign in lower case as the user name, and your membership number (see RadCom address label) as the password.

RSGB matters

HF CONVENTION 2004

The RSGB is pleased to announce that this year's RSGB HF & IOTA Convention will be held at the Europa Hotel, Gatwick, from 22 to 24 October. Apart from celebrating IOTA's 40th Anniversary, the event will cover all interests in the bands 136kHz to 50MHz. A special welcome is extended to newcomers to the HF spectrum who, along with seasoned HF DXers, contesters and constructors, will find the mix of lectures along with a state-of-the-art demonstration station and exhibition by the principle sponsors Yaesu (UK) and Martin Lynch and Sons of great interest.

Over the last few years the event has been held in a number of locations after running for many years at the Beaumont in Old Windsor. Last year we enjoyed the warm hospitality of the North West by hosting the event in Manchester. This year, with the 40th Anniversary of IOTA, we are expecting a large number of overseas visitors and are thus taking advantage of the excellent air, rail and road links to Gatwick in the heart of Sussex.

Please follow the weblink www.rsgb.org.uk/hfc and *RadCom* over the next few months for further information, other attractions, booking and day-visitor information.

IOTA 40th BIRTHDAY CRUISE

IOTA will be holding a 40th birthday party on Bodensee (Lake Constance) for those attending the Ham Radio 2004 event in Friedrichshafen. IOTA has chartered one of the lake's famous steamers for a buffet dinner cruise during the evening of Saturday 26 June. Tickets may be purchased from www.rsgb.org/shop and a small number will also be available at the Ham Radio 2004 show. In order to determine the likely number of people for whom to cater, those interested in participating are requested to e-mail iota.hq@rsgb.org.uk to express their interest.

RSGB / RAEN MEMORANDUM OF UNDERSTANDING

A Memorandum of Understanding, which recognises the respective strengths of both organisations, has been agreed between the Radio Society of Great Britain and the Radio Amateurs' Emergency Network. The document, which was signed at the Kempton Park Rally on Sunday 18 April by RSGB President Jeff Smith, MI0AEX, and Network Chair, Cathy Clark, G1GQJ, reflects the desire of both the Network and the RSGB to work together to further a common interest in amateur radio in general and emergency communications in particular. The text of the Memorandum of Understanding can be found on the RSGB Emergency Communications website at www.rsgb.org/emergency

NEW LICENSEES AT RSGB HQ

There are now seven more licensees at RSGB HQ following the successful completion of a Foundation course for new HQ staff which was held by Steve Telenius-Lowe, G4JVG, and George Brown, M5ACN, both of the *RadCom* department. The photo shows, back row, left to right: Alex Perkins, M3IIM (Commercial dept admin); Teresa Baker, M3MKI (AR Secretariat admin); Fiona Ficetola, M3GLY (GM Dept admin); Abby Thynne, M3LCT (Commercial dept admin). Front row: Kelly Greenwood, M3KDG (AR Secretariat admin); Jodie Escott, M3TPQ (AR Secretariat admin); and HQ receptionist Sarah Clark (callsign not yet received).

NEW TIMINGS FOR INTERMEDIATE EXAM

The RSGB and Ofcom are working towards making Intermediate licence examination papers available at short notice. Until such time as this is possible, an additional exam start time will be introduced. As from July 2004, candidates will be able to sit the Intermediate licence exam at the normal 6.30pm start time or at 8.00pm. Each exam session will have its own paper, and the start time of the exam must be declared to the RSGB and the local office of Ofcom when registering the exam.

The following dates have been identified for Intermediate and Advanced licence exams for 2004:

Intermediate Exam Dates (6.30pm & 8.00pm)
Tuesday, 27 July
Monday, 9 August
Tuesday, 21 September
Monday, 11 October
Tuesday, 9 November
Monday, 6 December

Advanced Exam Dates
Monday, 23 August
Tuesday, 26 October
Monday, 13 December

COMPETITION WINNER

The winner of the *RadCom* / bhi competition in the April issue was Ray Rogers, G3LIA, of Norfolk. Ray writes: "I am 87 years old and have deteriorated hearing. I was surprised what a difference the bhi unit makes in this noisy area. I can thoroughly recommend its use, especially in similar circumstances."

Ray Rogers, G3LIA. a bhi NES10-2 noise-eliminating speaker sits on top of his TS-930S transceiver.

'UNPROTECTED SERVICE'

The term 'unprotected service' has been used in various RSGB books and leaflets for many years. Checking back it looks as if the term was first used to indicate that amateur stations cannot claim protection from each other because they have equal right to operate in the allocated bands. Later the term came to be used to indicate that the RA (as it then was) did not undertake to investigate cases of interference to amateur radio - though in some cases they might take action should the situation warrant it.

Karl, DJ5IL, has pointed out that the use of the term 'unprotected service', in this context, is erroneous and more importantly gives rise to the idea that the Amateur Service in some way comes outside the requirement of the International Radio Regulations for Administrations to protect the radio spectrum - including the amateur bands - from harmful interference. This is most definitely not the case.

It has been agreed by the EMC Committee that the term 'unprotected service' should no longer be used in future books and leaflets. Our thanks to Karl for pointing this out. The fight to protect the bands is truly an international effort.

AROS TALKS

The RSGB Amateur Radio Observation Service coordinator, Barry Scarisbrick, G4ACK, is giving a talk on the work of AROS at the South Dorset Radio Society on 8 June. For further details please contact Carol, 2E1RBH, tel: 01305 820400 or e-mail: carolonfraggle@tiscali.co.uk

SUPPORTERS OF THE RADIO COMMUNICATIONS FOUNDATION

We asked members when renewing their membership to include a donation to help to support the work of the Radio Communications Foundation. The following is the list of those members who have kindly sent in a donation by the deadline date for this issue.

Contributions continue to be wanted: if you would like to help, please send your donation to RCF, c/o RSGB HQ.

H K Gall	DK3YD
H W Stevens	G0NBQ
Mrs S F Poulter	G0PNT
K M Rogawski	G0UNU
Dengie Hundred ARS	G0UTT
Dr K W Harris	G1HWA
T H Harris	G2KF
J P Traynor	G3HEL
M A Hooles	G3LGR
Y A G Remedios	G4UDT
W James	G6XM
N A Singer	G7HYM
B Young	G7UAN
F W Gibbs	G7UUB
I Coulson	GM0KKE
J Robertson	GM0KYU
C Urquhart	GM3JUD
D Taylor	GW0WQP
B H Giles	M0BHG
G Waugh	M0DQH
A Vine	M3FCU
G Waters	MW0SWR
A J M de Graauw	PA3GRR
M J Sweeney	RS185592
G D Mills	RS185975
N Sheridan	RS188020
M Crawford	RS192669
M D Reeve	RS192866
R A Maskell	VE3ADM
Dr J Engelhardt	WB9CEJ

The RSGB is also grateful to those members who have sent donations anonymously, or who have asked us not to publish their names.

RSGB DISTRICT 52: CHANGE OF NAME

Roy Clarke, G8AYD, the RSGB Regional Manager for Region 5, writes: "Each region is split into several districts served by a deputy regional manager. The West Midlands, as a region has four districts, one of which, district 52, was also named West Midlands. This has led to some confusion, and it has been decided to rename district 52 to the Birmingham Area so as to better reflect the geographical nature of the area, and to avoid further confusion."

QSL BUREAU NEWS

William Couse, MM0ABQ, has given up as the RSGB QSL Bureau Sub-Manager for the GM0MAA - ZZZ and the MM0MAA - ZZZ series of callsigns. Dr D A Dhuglas, GM4ELV, 1 Micklehouse Road, Springhill Farm, Glasgow G69 6TG has taken over from him.

Dave Hughes, G0RVW, is giving up as QSL Sub-Manager for the G0UAA - UZZ series and Christopher Richmond, G0TOO, 116 Clarendon Road, Morecambe, Lancs LA3 1SD has taken over the G0UAA - UZZ series of calls.

J Godfrey, M0JOH, the QSL Sub Manager for the G2 series of calls, asks members to ensure that they lodge envelopes with him. He has many unclaimed cards awaiting collection.

VHF AWARD NEWS

Heath Rees, GW3HWR (SA), sent what seems to be his monthly claim (three in as many months). Heath sent 19 cards which gained him a 'sticker' for 275 squares on 50MHz. Derek, G8TOK (BR), sent a batch of cards which qualified him for the '400' increment sticker. Derek uses 100W to a 6m vertical dipole mounted about 33ft AGL. Well-known contester Roger Piper, G3MEH (HP), submitted sufficient confirmations of Postal Districts and countries to gain a Senior Transmitting Award at 50MHz.

Moving to UHF, Colin Potter, G6FQZ (OX), provided sufficient cards to qualify for a 432MHz Standard Award using the new postal district format.

On the microwaves, Derek, G8TOK, sent in a superb 1296MHz distance claim of 1174km with SK6EI in JO68. Equipment in this case was 40W fed to two bayed 23-elements in his loft space (a picture of Derek's amazing loft installation appeared on page 24 of the February *RadCom*).

Regular microwave claimant John Quarmby, G3XDY (IP), sent claims for 30 squares at 2.3GHz, 10 squares at 5.6GHz and five cards for 10GHz squares, raising John to the 30 square increment.

Details on all VHF, UHF and Microwave Awards can be obtained on receipt of an A4 or A5 SASE from the Awards Manager, Tony Jarvis, G6TTL (QTHR) or e-mail: vhf.awards@rsgb.org.uk They are also available on the Internet at www.argonet.co.uk/users/tonyg6ttl/awards/awards.htm

Summary of Award Recipients

50MHz: 275 Squares: GW3HWR. 400S: G8TOK. Senior Award: G3MEH.
432MHz: Standard: G6FQZ.
1296 Distance: G8TOK.
2.3GHz: 30 Squares: G3XDY.
5.6GHz: 10 Squares: G3XDY.
10GHz: 30 Squares: G3XDY.

One of the many cards submitted by Derek, G8TOK, in furtherance of his VHF awards claims.

40th Anniversary

IOTA MERCHANDISE

To celebrate the 40 years of IOTA the RSGB has produced some high quality limited edition items. These goods are only on offer for a short time and will only be available until stocks are exhausted. We recommend that you purchase early to avoid disappointment.

£4.99
Plus (p&p)

IOTA MUGS
Limited Edition

* Special Limited Edition
* Unique 40th Anniversary logo
* Quality Earthenware Mug
* Burgundy with Yellow/Gold logo

IOTA POLO SHIRTS
Limited Edition

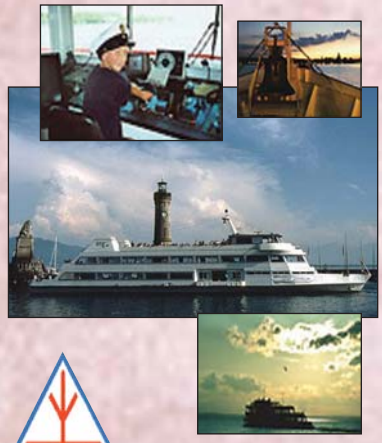
* Quality 175gsm 100% Cotton
* Rich Burgundy Colour
* Two Button Collar
* Fully embroidered with a special 40th Anniversary IOTA Logo
* Available in M, L, XL, XXL

£9.99
Plus (p&p)

IOTA 40th Anniversary Boat Trip - 26th June 2004

To celebrate 40 years of the IOTA programme the IOTA committee is organising special events to commemorate the anniversary. The first of these events will take place at Friedrichshafen in southern Germany during Ham Radio 2004.

€35.00
Per Ticket
Approx £24.00



We cannot offer an IOTA operation there but we can do the next best thing and celebrate IOTA's 40th Birthday Party afloat on Bodensee (Lake Constance). We have chartered one of the Lake's famous steamers for a Dinner Cruise on Saturday 26 June.

The cruise will sail from Friedrichshafen Harbour at 19:30 following which a sumptuous buffet will be served. After dinner the boat will visit a nearby port on the Swiss side of the lake where cruisers will be welcome to explore the town. After an hour in port the boat will take a leisurely cruise back to Friedrichshafen arriving around 23:00.

This will no doubt be a real occasion to remember!

Tickets are limited in number so please be sure to book early so as to avoid disappointment.

The price of these tickets covers the cost of the meal and the cruise.

Order today from the RSGB Bookshop
www.rsgb.org/shop or Tel: 0870 904 7373

RSGB SHOP
www.rsgb.org/shop

call us six days a week, mon - sat 9.30 - 5.30 or log on to www.hamradio.co.uk

For full specifications and more detailed information (including PDF's) see our NEW WEBSITE: www.hamradio.co.uk

TS-480SAT 100W HF with Auto Tuner

The new TS-480 is available in two versions, one with a built-in fast auto tuner (TS-480SAT), producing 100 Watts. The other is a 200 Watt version with no tuner, TS-480HX.

We stock both at ML&S and whilst the 200 Watt variant finds a home as a permanent install in peoples shacks, the majority of TS-480SAT's are used for both shack and mobile/portable operation.

The TS-480SAT (100W c/w ATU) is available from ML&S at only

£949 or 48 x £28.08 p/m

The TS-480HX (200W) is available from ML&S at only

£1099 or 48 x £32.52

Also available, TS-2000, TS-570DGE and the entire Kenwood product range.

Both versions are supplied with all cables and brackets to mount the Remote Head either permanently on the body of the transceiver (so it appears as a 'one-piece' radio) or so you can remote-install the radio body in a more convenient location either in the car, caravan or even a small sized shack.

As with all Kenwood products the quality, performance and styling is up with the best of them. Even the radio body looks like it is on a styling mission proudly wearing an anodised plate bearing the Kenwood name & logo.

Performance is extremely good and user operation is simple. However, the TS-480 boasts advanced features like being able to control the transceiver over the internet using the ARHP-10 radio host control program. Brilliant.

For more detailed information on the TS-480 or any other Kenwood product, please take a look at our web site, www.hamradio.co.uk

Finance example: TS-480SAT RRP: £949.
Payment illustration: Zero deposit and 48 payments of £28.08. Total amount payable: £1347.84. APR: 19.9%. ML&S is a licenced credit broker. Finance offered subject to status. Full written details on request. E&OE

ML&S martin lynch & sons
Suppliers of Communications Equipment

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fax: 0845 2300 339
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RadCom

RADIO COMMUNICATION

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RSGB MEMBERSHIP – Annual Rates

Home Corporate	£42.50
Overseas Corporate	£42.50
Corporate (Senior Citizens) (Applications should provide proof of age at last renewal date)	£33.50
Corporate (50 years membership)	50% DISCOUNT
Corporate (60 years membership)	FREE
Family member (Must reside with existing member. Does not include RadCom)	£18.50
Student Members (Applications should include evidence of full-time student status)	£28.50
HamClub (under 18)	£18.50
Affiliated Societies (UK or Overseas)	£42.50

Subscriptions include VAT where applicable.
Special arrangements exist for blind and disabled persons. Details and membership application forms are available from RSGB HQ.

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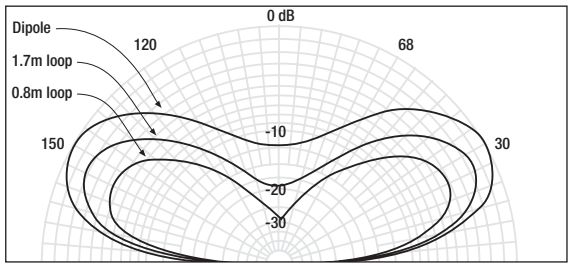
p36 – The 60th anniversary of D-Day takes place on 6 June. Here are details of events and activities.



p64 – Part One of a new series by John S (Jack) Belrose, VE2CV, looking at electrically-small transmitting loops.

ARDF competition fully integrated with conventional orienteering event

Basingstoke ARDF group promotes IARU-rules ARDF

Orienteers David Williams and Michael Dunbar both negotiate the electronic start control.

On 21 March a trial 144MHz ARDF event (www.ardf.btinternet.co.uk) was hosted by the Basingstoke Amateur Radio Club (BARC) and, for the first time in the UK, was fully integrated with a regular orienteering event. The event in Harewood Forest near Andover, was organised by G4WIZ and G3ZOI, in conjunction with the Basingstoke and Andover District Orienteers. The start and finish of the five 'fox' ARDF course was shared with other orienteering courses, as was the electronic registration and time keeping.

A course was provided specifically to appeal to newcomers and to orienteers wanting to try out the radio version of their favourite pastime. Despite the shortness of the course (2.8km), the eventual winner, ARDF veteran Bob Titterington, G3ORY, commented, "It was great fun, particularly because the larger wood made it possible to have a non-trivial selection of the best sequence in which to take the transmitters. With the benefit of 20/20 hindsight, I see that I did not get it right and had to run an extra 0.4/0.5km as a result." The results are at http://www.ardf.btinternet.co.uk/trial.html

Further details of 2m and 80m IARU ARDF events can be found at www.barc.uklinux.net/ardf.php

Easier licensing in Kenya

Ted Alleyne, 5Z4NU, the Chairman and Secretary of the Amateur Radio Society of Kenya, ARSK, has informed us that the Communications Commission of Kenya (www.cck.go.ke) announced on 2 April a new and more relaxed policy towards amateur radio licensing. Until now it was "practically impossible" for most visitors to obtain an amateur radio licence in Kenya. All applicants' countries must have diplomatic relations with Kenya, at any level. The previous stumbling blocks for reciprocal agreements, Security and Police vetting, have been dropped entirely. Ted says that the ARSK will be happy to supply the new licence application forms and further information will be published on the ARSK website at www.qsl.net/arsk

100th amateur for 100th anniversary

Katherine, M3MTK; Richard, G3XWH, and Sarah, G6GGH, operating the TS-950 at GB2HC.

Since 1981 Harrogate Ladies' College, through Richard Horton, G3XWH, has produced 100 radio amateurs. The 'centenary girl' is Katherine, M3MTK, who is pictured here with Dr Sarah Thompson, G6GGH, the College's first radio amateur. Sarah studied A level physics under Richard and then gained her doctorate at Durham. She is now senior lecturer in physics at York University, specialising in magnetic materials.

The GB2HC club station will be active for 24 hours from 1201UTC on 1 July to celebrate the College's 100 years on the present Duchy of Lancaster site in Harrogate. The club's TS-950 transceiver is a generous gift to GB2HC by Dr Marcus Sleightholm, G8HDN

Raynet news

Raynet groups in Cheshire, Greater Manchester and Derbyshire were put on standby following a fire in a BT underground tunnel in central Manchester in the early hours of 29 March. The fire disrupted more than 130,000 telephone lines in Lancashire, Mersey-side, Derbyshire and further afield. Cheshire Police were concerned about the effects on communications, and via the Cheshire Emergency Planning Department requested the availability of Raynet operators to cover the affected area.

The Greater Manchester ambulance service lost land-line and radio communications with their vehicles, but were able to use mobile phones as a means of contact. Other difficulties included a loss of 999 calls and disruption to the broadband data network. Large areas of the High Peak area of Derbyshire were without landlines or mobile phones.

The majority of Raynet members were stood down by Monday evening, but the Cheshire Group and County Controllers were stood down on Wednesday afternoon when the 999 service appeared to have been restored to the worst-affected area of Cheshire.

♦ The work of the members of West Devon Raynet, based in Plymouth, has been recognised by Plymouth City Council, which has awarded them the Lord Mayor's Shield for Outstanding Community Assistance for 2003. The shield is awarded by the council to show its appreciation of the work undertaken by the voluntary sector in the city, especially at large public events. Ian Harley, G6BJJ, the Group Controller, accepted the shield on behalf of the group. He said: "It is an honour to receive this award as it shows just how much the work of the whole team is appreciated. They put in a lot of time and effort, much of it in the background at these events, but that is a testimony in itself that the work is done quietly and efficiently with no dramas."

NEWS BRIEFS

- The Stevenage & DARS is considering running a rally in the early spring of 2005 and wishes to investigate the likely interest from traders. Ken, M0KPB, asks that any traders or manufacturers who are interested should please contact him QTHR, tel: 0208 358 1275, fax: 0208 358 1108 or e-mail ken.m1dda@ntlworld.com
- Following the 7Q7MM DXpedition in April, a station complete with beam antennas is now available to rent in Malawi for holiday operations, DXpeditions and contests. Further details will be published in RadCom next month or can be obtained from G4JVG (g4jvg@ntlworld.com) or G4AXX (g4axx@ntlworld.com)
- Special event station OE80XRW (www.qsl.at/oe80) will be on the air on all bands and modes from 1 June to 31 December to commemorate 80 years of broadcasting in Austria. QSL via ORF (OE80XWR), A-1136 Wien, Austria.
- We are aware of the following countries that have dropped the Morse code test as a requirement to obtain an HF amateur radio licence: UK, Switzerland, Belgium, Germany, Norway, the Netherlands, Ireland, Singapore, Luxembourg, Papua New Guinea, Denmark, Hong Kong and Sweden. New Zealand has announced its intention of dropping the Morse requirement, but the change has yet to be ratified by Parliament. Austria has also announced its intention to drop Morse code tests, but when the change will be implemented is not yet known.

Tony chalks up 100% ATC success

Over the weekend of 20 / 21 March Tony Chalk, MW0BXJ, ran a Foundation course at the 1340 Sqn ATC headquarters at Rhyl. A total of 43 cadets and staff from 1340 Sqn and 271 Sqn Colwyn Bay - plus one civilian - attended. Wing Staff Officer Sqn Ldr Foster and Flt Lt P Roberts ATC, the Commanding Officer of 1340 Sqn, were among the students, 100% of whom passed the exam. Many indicated an interest in progressing to the Intermediate licence and it is hoped to be able to fit this into their ATC training schedule.

Tony was assisted by Roger Dallimore, MW0IDX; his father Brian Dallimore, MW0YDX, both of the North Wales Radio Society, and his daughter Rhian Chalk, MW3RHI, who is a flight sergeant in 271 Sqn ATC.

Prof Colin Pillinger at AMSAT-UK Space Symposium

The AMSAT-UK (www.uk.amsat.org) 'Space Symposium' takes place at the University of Surrey, Guildford, from Friday 30 July to Sunday 1 August. On the Friday, Prof Colin Pillinger has been invited to give a presentation of the Beagle 2 project. This was designed to look for life on Mars and arrived on the Red Planet last December. After his talk there will be a question and answer session. The Symposium also features special beginners' sessions to teach newcomers how to get started in amateur radio space communications. There will be guided tours of the Surrey Space Centre with the satellite mission control centre and the satellite assembly facility in addition to an extensive lecture programme. The GB4FUN van will be present and there will be an antenna test range and microwave equipment test facilities.

The event is open to everyone, not just AMSAT-UK members, and new Foundation and Intermediate licensees as well as SWLs are especially welcome. A day pass costs £10 and more extensive two and three day packages, including meals and accommodation in the University grounds, are available. For further information contact Jim Heck, G3WGM, tel: 01258 453959; e-mail: g3wgm@amsat.org

Prof Colin Pillinger of the Open University, guest speaker at this year's AMSAT-UK 'Space Symposium'.

Beacon news

5MHz beacon GB3RAL is now operational using a temporary aerial, and awaiting a more permanent aerial installation. The beacon transmits every 15 minutes on channel FC, 5290kHz, based upon the hour as a datum. The sequence is a callsign, followed by a long tone at full power and then nine power steps, each -6dB relative to the last. The power steps are repeated twice, and then there is a 30-second sounder sequence of half-millisecond pulses at 200Hz repetition rate. Amateurs, with or without 5MHz NoVs, are invited to send reception reports using the station logging form, preferably electronically rather than handwritten; this is available, along with guidance on reporting, on the 5MHz website at www.rsgb-hfc.org.uk/5mhz.htm

♦ Members of the Blacksheep Contest Group have activated a new 50MHz propagation beacon - GB3BAA - located near Tring (IO91PS) as a replacement for the GB3NHQ beacon which closed down some years ago. The beacon became operational on 50.016MHz on 20 April, and ground-wave reception reports from Normandy and northern England have already been received. Further reports would be most welcome, and should be sent to the keeper, G0RDI (QTHR), or to gb3baa@77hz.com

♦ The WesseX Repeater Group's (www.twxrg.info) 4m beacon, GB3WSX at Yeovil (IO80QW), increased output power to 22dBW ERP (>150W) on 6 May. The beacon is keying its callsign and locator on a 60s cycle. Reception reports are welcomed to gb3wsx@twxrg.info

Project for ATV and Echolink on ISS

ARISS teams from around the world met in Noordwijk aan Zee, Netherlands, from 25 to 27 March to review progress of the programme, determine future steps, and to review projects submitted to the organisation for future use. Chairman Frank Bauer previewed the Roy Neal certificate from the special event held late last year (the certificates will be sent out shortly.)

Projects submitted for consideration include Amateur Television on the International Space Station. This project would allow the possibility of mounting an ATV camera on the outside of the ISS. A proposal was also made to incorporate the Internet Radio Linking Project and EchoLink (www.echolink.org) into school contacts.

The meeting gave team members the first opportunity in over a year to meet face to face and discuss the programme. The next meeting will be held in Alexandria, Virginia, after the AMSAT general meeting from 10 - 13 October.

Museums weekend

The fourth 'International Museums Weekend' special event will take place on 19 / 20 June. Everyone is welcome to join in from their local museum for this very enjoyable and friendly event. Those intending to take part are requested to register. Registration is free via the IMW website at www.ukradioamateur.org/imw The organiser, Harry, M1BYT, asks that you register so that everyone knows you are taking part and where you are located. Further details are on the website or can be obtained direct from Harry, tel: 0113 286 6897 or 07812 738 205.

Modern modem chips

Andy Talbot, G4JNT, says: "CML Micro Systems offers a huge range of chips and, amongst their offerings, is a wide range of modem chips to cover the whole range of CCITT modulations such as FSK, PSK and MSK used for telephone and radio links. Have a look at its web page for the complete range; datasheets can be downloaded, although you may be requested to fill out a registration form for their records. Perhaps a few ideas will spring to mind based around these devices. A future 'Data' column will, hopefully, cover the CML589 device for GMSK." The site is at www.cmlmicro.com/Products/Datasheets/download.htm

Club and Regional News

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19, Museums' weekend.
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KILMARNOCK & LOUDOUN ARC
8, Shack safety, John, GM3CTJ. www.klarc.org

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22, Bring and Tell.
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4, Members' favourite websites.
11, 'The Renaissance of Science', Chris, G4HON.
18, Elecraft K2 progress report, Bill, G3SMM.
25, 'The History of Medical Electronics', Dave, G0BJK. Ed, 0161 969 1964.
STOCKPORT RS
1, Construction: getting started, Bernard Naylor, G3SHF.
15, Visit Stockport Museum, Terry Mullaney, M0TEZ. David, M1ANT, 0161 456 7832.
THORNTON CLEVELEYS ARS
7, On air, Morse operating protocols.
14, Discussion on VHF Field Day & Tram Sunday.
21, RAF police dog handling.
28, BBQ at John's, G4FRK, QTH (no meeting at Townend Centre). Jack, G4BFH, jack.duddington@btinternet.com

4 North East

GOOLE R & ES
9, BBQ at Barmby Tidal Barrage.
16, Social Evening at *The Black Swan* Asselby.
23, Contest planning at *The Black Swan* Asselby.
30, Contest preparation at Lionel Winder Selby. Richard, G0GLZ, 01405 769894.
GREAT LUMLEY AR & ES
16, 'Making the most of your broadband connection', Steve Townsley, G7SPN. Also Intermediate course. Nancy, 0191 447 0036, 07990 760920, Nancybone2001@yahoo.co.uk
HALIFAX & DARS
15, BBQ. Tom, M0TKA, 01484 715079.
KEIGHLEY ARS
24, BBQ. Kath, G0OSA, 01535 656155.
SHEFFIELD ARC
7, 'Simple Wire Aerials', Peter Day, G3PHO.
14, Portable evening.
19, International Museums Weekend, Sheffield Millennium Galleries, GB2SMG.
21, Video: DXpeditions.
28, HF radio. Nick, G4FAL, 0114 255 2893.
WAKEFIELD & DRS
1, QTH closed, meet in *Queens Arms*, Denby Dale Rd. 8, 2m DF 'foxhunt'.
15, Wine / beer and cheese evening.
22, On air.
29, Ten-pin bowling. Rick, G4BLT, 01924 255515, www.wdrs.org.uk
YORK ARS
8, SES in the Hospitium Museum Gardens. Keith, G3WVO.

5 West Midlands

CHELTENHAM ARA
4, Weather sat pictures, Ron, G3SZS, and Tony, G8JAY. Ron, G3SZS, 01452 713761.
COVENTRY ARS
4, On air, licence course, CW practice.
11, BBQ, on air, licence course, CW practice.
18, Night out by the water.
19, 20, Museums on Air at Midland Air Museum.
25, On air, licence course, CW practice. John, G8SEQ, 024 7627 3190, johng8seq@ntlworld.com
GLOUCESTER AR & ES
7, Bring and show: miniature radios.
14, On air HF / workshop.
21, 160m DF exercise.
28, On air HF / workshop. Tony, 01452 618930 office hours.
HILLCREST ARS
3, Natter night.
17, Paul and the stars (bring your coat just in case). Stuart, M0SJV, m0sjvstuart@supanet.com
KIDDERMINSTER & DARS
1, Summer outdoor activity, BBQ, kite antenna demo. Tony, G1OZB, 01299 400172.
MID-WARWICKSHIRE ARS
8, Technical Topic: dip meters.
22, Low power / short range DF tests at Bidford-on-Avon. Bernard, M1AUK, 01926 420913.
SALOP ARS
10, Talk by Stan Brown MBE, G4LU.
24, 3rd 2m 'foxhunt'. John, G0GTN, 01743 249943.
ST LEONARD'S ARS
3, Shack night.
6, 60th anniversary of D-Day special event.
10, How to raise the club's portable masts.
17, Cannock Chase sights, G0RLA.
24, Planning meeting. Derek, G0EYX, 01785 604904.
STRATFORD UPON AVON DRS
5, 6, HF NFD, G3MXH.
14, VHF / HF 'foxhunt', G4OHJ.
28, BBQ & on air, M0AYA. Terry, G3MXH, 01789 294387.
TELFORD & DARS
2, Open evening, on air.
9, Astronomical evening after the Venusian transit of the sun.
16, Surplus equipment sale.
19, 20, 50MHz Trophy at Bridgnorth, GB0IBG at Iron Museum.
23, Summer BBQ.
30, NFD Contest Planning. Mike Street, G3JKX, 01952 299677, mjstreetg3jkx@aol.com

6 North Wales

CONWY VALLEY ARC
2, AGM. Wynne, GW6PMC, 01745 855068.
DRAGON ARC
7, 'Marine communications', John Parry, GW3VVC.
21, Talk by Stewart Rolfe, GW0ETF. Les Hayward, MW0AQZ, 01407 760986.
WREXHAM & DARS
1, 'Radio Basics', soldering PL259s etc, Glyn, MW0BNB. Mark, MW3MDH, www.qsl.net/wars

7 South Wales

ABERYSTWYTH ARC
4, 'EMC', Robin Page-Jones G3JWI, at the Wales Information Society Trailer in MFI car park. Ray mwmg01@aber.ac.uk

8 Northern Ireland

BANGOR & DARS
2, BBQ & QRP evening at Scout Camp in Crawfordsburn County Park. Mike, GI4XSF, 028 4277 2383.

9 London & Thames Valley

CHESHAM & DISTRICT ARS
2, General meeting.
9, Pedestrian treasure hunt around Chesham, G3XZG.
16, Shack & rig training session.
23, On air.
30, VHF Field Day planning. Terry, G0VFW, terence.thirlwell@eds.com
COULSDON ATS
14, Linear acceleration, Brian Edwards, G6HIE (TBC). Steve, G7SYO, 01737 354271.
CRAY VALLEY RS
3, 9, Special event station.
17, Annual DF hunt. Bob, BRS32525, 020 8265 7735 after 8pm & weekends.
CRYSTAL PALACE R & EC
4, Morse and club projects.
18, German aircraft radios, G8DIU. Bob, G3OOU, 01737 552170 or Victor, G1PKS, 020 8653 2946.
DORKING & DRS
22, VHF Field Day planning, Walter, G3JKV. John, G3AEZ, 01306 631236.
ECHELFORD ARS
24, *PW*, Rob Mannion, G3XFD. Robin, G3TDR, 01784 456513.
MILTON KEYNES ARS
14, BBQ.
21, Show and tell: Icom IC-706. Malcolm, M0MBO, 01525 874075.
RS OF HARROW
11, Social event at De Havilland Heritage Museum.
19, 20, International Museums Weekend, stations at both GB2DHH and the Harrow Museum.
25, G3EFX/P at Old Redding. Jim, G0AOT, 01895 476933 or 020 7278 6421.
READING & DARC
10, Sporadic E, Al Bolton, G4VSQ. Pete, G8FRC, 01189 695 697, www.radarc.org
SHEFFORD & DARS
3, NFD VHF planning.
10 Hi-fi in the 60s.
17, Cambridge Observatory Visit.
24, Flying at RAF Henlow. David, G8UOD, 01234 742757.
SILVERTHORN RC
4, Informal.
11, Essex Repeaters, talk.
18 Informal.
25, On air. Les, G0CIB, 07980 275081.
SOUTHGATE ARC
10, Visit by RSGB General Manager Peter Kirby, G0TWW. Mike, M0ASA, 020 8366 0698.
SURREY RCC
7, Construction contest. Ray, G4FFY, 020 8644 7589.
SUTTON & CHEAM RS
17, Visit by Mark Francis of Waters & Stanton. John, G0BWV, 020 8644 9945.
WIMBLEDON & DARS
11, Desert Island Radio, Reg, M1EEK.
25, Letter from Devon, live with Clive, G7APM. Jim, M0CON, 020 8874 7456

10 South & South East

ANDOVER RAC
1, 'Foxhunt' from Topliss Hill.
22, 'Kites re-visited', Dave, G4YVM. Terry, G8ALR, 01980 629346.
BASINGSTOKE ARC
20, ARDF, radio-orienteering at NADARS Newbury Boot Sale.
26, 27, New Forest 'foxhunt' weekend. Frank, M0AEU, barc@2lo.info
CRAWLEY ARC
20, CARC table sale.
23, Dayton Hamvention report with slides / video. John, G3VLH, 01342 714402.
FAREHAM & DARS
8, The International Beacon Project.
15, Fault finding, Andrew, G0AMS, & Mick, G4ITF.
22, Video.
30, Portable on Portsdown Hill. Steve, G7HEP, 01329 663673.
FARNBOROUGH & DRS
9, EMC, Bob, G3HZV.
23, Backyard Moonbounce, Paul, G4DCV. Norman, G0VYR, 01483 835320.
HARWELL ARS
8, Contesting, Tim, G4VXE. Angus, G0UGO, hars.g3pia@tiscali.co.uk
HASTINGS E & RC
16, History and working of Raynet and its future, John Rivers, G0GCQ. Mike, G8OGO, 01424 882283, mikew@g8ogo.fsnet.co.uk
HORNDEAN & DARC
1, Social evening.
22, Talk TBA. Stuart, G0FYX, 023 9247 2846.
HORSHAM ARC
3, 'Enigma'. David, G4JHI, 01403 252221.
ITCHEN VALLEY RC
11, Special evening.
25, Treasure hunt, Lyndhurst. Sheila, G0VNI, 023 8081 3827, sheila.williams@ivarc.org.uk
SOUTHDOWN ARS
7, Local commercial radio, Ian, G7HFS, and GB2PW Polegate Windmill results. John, G3DQY, 01424 424319.

Items for club news should be sent to the *RadCom* Office at HQ to arrive by the 26th of the month, ie approximately a month before publication (eg 26 January for the March Issue). News items should be sent in writing (fax, letter or e-mail: gb2rs@rsgb.org.uk) by the club secretary or the person responsible for publicity. Post cards for this purpose are available from RSGB HQ. A database of all meetings is shared between *RadCom* and GB2RS, so information only needs to be sent once.

SWINDON & DARC
3, AGM.
10, BBQ.
24, 'Contests, IOTA & Curacao: My involvement', Chris, G0HFX. Mike, M5CBS, 01793 826465.
TROWBRIDGE & DARC
2, Working the International Space Station, Charles Riley, G4JQX. Ian, G0GRI, 01225 864698, evenings / weekends.
WORTHING & DARC
2, Bring and buy.
6, Special event Newhaven Fort D-Day Anniversary.
9, Planning for *PW* contest.
16, 'My work as an SOE agent', Mrs Coco McCloud MBE.
19, 20, GB2NFM museums on air weekend at Newhaven Fort.
23, DF hunt. Roy, G4GPX, 01903 753893.

11 South West & Channel Islands

APPLEDORE & DARC
21, Apollo Space Missions. Brian, M0BRB, brian.jewell@ic24.net
CORNISH RAC
3, 'Marconi at Sea', David Barlow, G3PLE.
14, Computer section.
27, West of England Radio Rally at Frome, Somerset. John, G4LJY, 01872 863849.
POLDHU ARC
8, 'Computers in the printing industry', Dave, G1LNA. Keith, G0WYS, 01326 574441.
SOUTH BRISTOL ARC
2, Computer & software clinic.
9, Peter's video diary.
16, Summer bring & buy.
23, On air.
30, Preparing for VHF NFD. Len, G4RZY, 01275 834282.
SOUTH DORSET RS
8, 'AROS', Barry Scarisbrick, G4ACK.
13, BBQ / car boot sale at *Ferrybridge* pub, Portland Road. Carol, 2E1RBH, 01305 820400, carolonfraggle@tiscali.co.uk
TORBAY ARS
5, 6, HF NFD from Churston School.
13, *PW* contest.
18, Slide show: forgotten times and men of Newton Abbot, John Ellis, chairman of St John Ambulance. Dave, G6FSP, dave.helliwell@tesco.net
WEST SOMERSET ARC
1, 'Foxhunt'. Jean, G0SZO, 01984 633060.
WESTON-SUPER-MARE ARS
7, DF hunt & BBQ. D Welch, G0ATD, QTHR.

12 East & East Anglia

BRAINTREE & DARS
7, Aerial clinic.
21, Operating evening. John, M5AJB, 01787 460947.
CAMBRIDGE & DARC
4, Around the world on bikes, the Wooldridge family.
11, Informal.
18, Wimpole Hall field day preparation.
25, Informal. Ron, G3KBR, 01223 501712.
CHELMSFORD ARS
4, Annual Constructors' Competition. George, G3UTC, 01277 622707, george3utc@btopenworld.com
DOVER ARC
5, 6, Special event station at Dover Castle. David, G0DQI.
FELIXSTOWE & DARS
13, East Suffolk Wireless Revival radio rally.
28, Quiz vs local radio club. Paul, G4YQC, paul.whiting@bt.com
HARWICH ARIG
9, 'Working the Rare Ones', James, M0ZZO. Tony, G4EYE, 01255 886065.
LOUGHTON & EPPING FOREST ARS
11, VHF on air / preparation for GB2AVF & GB2BHM.
13, Abridge Village Fete, GB2AVF.
19, 20, International Museums Weekend from Blake Hall Museum, GB2BHM.
25, Review of GB2AVF & GB2BHM. Marc, G0TOC, 020 8502 1645.
MORSE RADIO CLUB OF SWANLEY
24, Mid-summer junk sale. Ken, M1CZA, 0208 306 3544 www.morseclub.co.uk
NORFOLK ARC
2, Norfolk Repeater Group AGM, Mark, G0LGJ. CW Field Day final preparations, Malcolm, G3PDH.
5, 6, CW NFD.
9, DF contest equipment testing.
16, Members' friendly DF contest, Andrew, M1EOX.
23, Tuition / construction / informal.
30, Final preparations for Barford Rally. Reg, G0VDO, 01603 429269.

13 East Midlands

EAGLE RADIO GROUP
8, Talk by Lincoln Cathedral's stained glass expert Thomas Kupper about restoration work and some of the problems encountered. Terry, G0SWS, 01507 478590.
LEICESTER RS & CC
5, 6, HF National Field Day.
7, Quiz and station operation.
14, Video and station operation.
21, Lecture and open evening: introduce a friend to the club.
28, Video, station operation, construction. T Christmas, G1IUT 0116 286 3949, tomchristmas@ukonline.co.uk
LINCOLN SW CLUB
2, On air.
6, D-day special event.
12, 13, Vintage steam rally, Brockelsby Park nr Grimsby.
23, Video. Baz, 01636 612440, m3dmv@btopenworld.com
LOUGHBOROUGH & DARC
1, Aerial experiments on the college field.
8, Vintage radio & equipment evening: bring something along.
15, 3rd DF 2m.
22, On air.
29, 'Let's fly a kite' on the college field. Chris, G1ETZ, 01509 504319.
MELTON MOWBRAY ARS
18, Annual DF 'foxhunt', G4RPS Memorial Trophy. Phil, G4LWB, Phil@croxtonkerr.fsnet.co.uk
RAF WADDINGTON ARC
10, 'Digimodes for the Technically Challenged', Martin, M0MDF.
19, 20, Special event station at Wickenby Airfield GB0WAM.
26, 27, Special event station at RAF Waddington Air Show. Martin Farmer, M3MDF, martin@farmer4.freeserve.co.uk

DEBBIE AND RICHARD GET MARRIED

The new Mr and Mrs Pollard leaving church under an arch of aerials.

2004 being a leap year, Debbie, M3DRP, sprung a surprise on her partner Richard, M0RJP, by proposing to him just a few days prior to the wedding that she had already arranged. If that wasn't a big enough surprise, some of the members of the Eagle Radio Group got together to pay for them to spend their first night in the Honeymoon Suite at the Local Grange and Links Country Hotel. There was another big surprise when, unbeknown to Richard, Debbie also arranged a social evening complete with buffet and wedding cake at the Eagle Radio Group meeting in May. The meeting was disguised by Nev, G3VDV, as a talk on "The importance of matching and coupling in physical relationships, and the benefits and gains which can be achieved" (how many *RadCom* readers spotted this in the club news?!)

CIVIC SEND-OFF FOR N WAKEFIELD CLUB

Members of North Wakefield Radio Club were delighted to receive the Mayor of Morley, Councillor Joseph Tetley, at their meeting on 1 April. Councillor Tetley wished the members *bon voyage* for their trip to the Farne Islands (EU-109), and heard about the readiness of radio amateurs throughout the world to put on emergency communications. He enjoyed a demonstration in the club shack given by John, G4RCG, and spent some time with the younger members. He thanked club members for putting Morley 'on the map' and requested information on the club which he could distribute locally. Articles and pictures of the event were carried in two local papers with contact details, and the club hopes that this local publicity will help to attract interested people to their next M3 course.

Councillor Joseph Tetley operates GX4NOK under the watchful eye of John, G4RCG.

NEW LEASE OF LIFE FOR NORTHAMPTON CLUB

Northampton Radio Club was founded 90 years ago but at the end of last year members were devastated to be given very short notice to leave their club premises. Newspaper and radio appeals were quickly organised and, as Davina Williams, M0LXT, the club's press and media officer, puts it: "We fell completely on our feet!" A trades club in Northampton offered four rooms at their premises for the Northampton Radio Club's exclusive use, seven days a week. The only drawback was that club members had to completely gut, renovate and decorate them. Davina said, "This is where the club members came completely into their own. They gave up their spare time and worked solidly to turn the rooms into a ▶

lovely club environment. We even put out an appeal for carpets and had 12 donated." The club now boasts a meeting / training room, two radio rooms and a storage room with ample space for coffee-making facilities, a fridge, TVs and a library - plus use of the bar downstairs.

The official opening of the new premises was to have taken place on 19 April by Patricia Kent, a local author who has written a biography of Frank Wright, one of the founder members of the Northampton Radio Club 90 years ago.

The Northampton Radio Club meets on Monday evenings at 8.00pm. It is currently running a Foundation course on Wednesday evenings and plans to follow this with an Intermediate course. Visitors and new members are very welcome. The address is the Reform Club, Balmoral Road, Northampton. Further details from Davina, M0LXT, tel: 07870 434931 or e-mail: davina.williams@ntlworld.com

WANT TO SELL YOUR EQUIPMENT?

The Chelmsford Amateur Radio Society (www.g0mwt.org.uk) is holding a radio and electronics tabletop sale on Tuesday, 3 August, starting at 7.30pm. The venue is the Marconi Athletic and Social Club in Beehive Lane, Chelmsford. All radio amateurs, SWLs and other electronic enthusiasts are invited to attend as sellers, buyers or just viewers. All good condition amateur, audio, electronic, electrical, photographic, computer and associated equipment may be offered for sale. Tables cost £3 and there is free entry to buyers and viewers. Entry for sellers is from 6.30pm with no entry to buyers until 7.30pm. Refreshments available and free car parking. For further details contact: Colin Page, G0TRM, tel: 01245 223835 or e-mail colinpage@ukgateway.net

ESSEXAMATEURRADIO YAHOO E-MAIL GROUP

An e-mail reflector has been set up to enable Essex Radio Amateurs and SWLs to keep in contact with each other. (In addition to radio which is the real way to do it!) It will also help foster co-operation between the local clubs. Amateurs from outside the county are more than welcome to join to find out what's happening in Essex. To join the group go to: http://uk.groups.yahoo.com/group/EssexAmateurRadio

FORT ON THE AIR LOUD AND CLEAR

A new exhibition of radio equipment and permanent special event station GB2NFM was opened by Admiral of the Fleet Sir Henry Leach on 25 April (see *RadCom* news, April 2004, page 10.) The day was the culmination of 15 months volunteer work by members of the Worthing & DARC to display the lifetime radio collection of the late Cyril Fairchild, G3YY, and restore an old signals room at Newhaven Fort Museum. The room high up overlooking the Channel now houses the collection and the GB2NFM demonstration station.

Sir Henry explained that Cyril had been an interceptor during WWII, listening in and reporting enemy Morse code transmissions to Bletchley Park, where the intelligence gathered had a major impact on winning the war. Cyril's great-granddaughter, 10-year old Scarlett Paine, assisted Sir Henry in unveiling a plaque commemorating the opening.

Photo: Matthew Wilson, G8XIT

Admiral of the Fleet Sir Henry Leach giving the opening speech just before cutting the ribbon. To his right is 10-year old Scarlett Paine, great-granddaughter of the late Cyril Fairchild, G3YY.

Newhaven Fort Museum is open to the public seven days a week and members of the Worthing & DARC are on hand to talk to visitors and put the station on the air.

NORTH, SOUTH, EAST AND WEST: FOUNDATION LICENCE SUCCESS ACROSS THE COUNTRY

Bishop Auckland . . .

. . . Shefford . . .

. . . the Chelmsford 13 . . .

. . . and Tiree.

We are grateful to members of the Bishop Auckland Radio Amateurs Club, the Shefford and District Amateur Radio Society, the Chelmsford Amateur Radio Society, and the Cockenzie & Port Seton Amateur Radio Club for sending in details of their successful Foundation licensing courses held recently.

In Bishop Auckland, five candidates gained their Foundation licences on 28 March under tutor Tim Bevan, M0AVC, and invigilators Ian Bowman, G7ESY, and Brian Phillips, G7OCK.

It was the first Foundation licence course run by the Shefford & DARS, and seven candidates took the test: all passed. The lead instructor there was Stewart Baker, G3RXQ.

It was a case of *lucky* 13 for the Chelmsford ARS. Their recent Foundation course started with 13 candidates and all of them passed first time.

The Cockenzie & Port Seton Amateur Radio Club made a trip to the island of Tiree, the outermost island of the Inner Hebrides, to deliver a Foundation course. The trip consisted of a 300 mile round road trip, an eight-hour round ferry trip and a weekend on the island! There were eight students in the class and once again everyone passed. This now increases the island's amateur radio population to nine, so look out for increased activity from IOTA EU-008!

Congratulations to these, and all other clubs around the country doing such a great job of introducing amateur radio to the people.

INTERNATIONAL MARCONI DAY 2004

Members of the Cornish Radio Amateur Club once again activated GB4MBP for International Marconi Day on 17 April. The Lizard Radio station at Bass Point is one of the 35 or so historic sites around the world that were activated to celebrate Marconi's birthday. This year, Richard, G3MRT; Geoff, G0FHT; and Roger, G3TDM, made over 455 contacts ranging from inside the Arctic Circle to the southernmost tip of Australia. Worsley Communications kindly loaned a portable tower, Cushcraft beam and an IC-775DSP for use on 20 / 15m. Richard Strafford, G3MRT, said, "Several local hams stopped by in the course of the day - whether that was because of the fabulous view from Bass Point or just to see what we were up to is debatable! Our biggest disappointment was that we didn't make any Stateside contacts - perhaps because they were all too busy with their contests. A very big thanks from the Cornish Radio Amateur Club to everyone who took part and made it such a success; for both the official award stations and those who were chasing them, it was a great day, even the weather was glorious."

It was from this location that in 1901 Marconi conducted some of his early experiments, receiving signals from Niton on the Isle of Wight 186 miles away, proving that radio waves could be transmitted over the horizon. Today, the station is the sole surviving Marconi historic building in the UK, thanks to the National Trust which has renovated it, and now maintains it as a wireless museum. David Barlow, G3PLE, manages the building and regularly puts GB2LD on the air, and during the summer months, visiting amateurs are encouraged to stop by and use the rig.

Photo by G0LPW.

The Marconi Hut and antenna with Bass Point in the background.

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Expiry Date ___ / ___ Signature: _____

Name _____

Address _____

_____

_____ Postcode _____

Please send me details of Gift Aid ☐ BWBF will not pass on information to any other organisations

The RSGB QSL Bureau

A request by the Board of the RSGB for members' opinions

The RSGB QSL Bureau is an excellent method for saving costs when exchanging QSL cards. Members are generally aware of the procedure: cards are sent to RSGB HQ, sorted, and then distributed to overseas bureaus for transmission, or sent out to UK sub-managers for collection (usually by mail). Foreign bureaus operate in a similar way, collecting cards in their own countries, then sending UK cards to RSGB HQ, where they are sorted and distributed to sub-managers. The system is described fully in the *RSGB Yearbook* and in the members-only part of the RSGB website at www.rsgb.org/membersonly/qsl

IS CHANGE NEEDED?

The RSGB Board thinks that there are reasons for looking at changes now. Costs creep up year by year; service levels become harder to maintain. Members sometimes say that the QSL Bureau is a good reason to be in the RSGB, but this is certainly not the case for everyone.

The main goal of the QSL Bureau is to offer an efficient service, improving over time if possible. Achieving improvements requires consideration of cost, technical issues, and fairness to all members. And we should be aware of the fact that QSL Bureaus around the world do not necessarily operate in the same way: there may be things to learn from elsewhere.

CURRENT QSL BUREAU OPERATION

Here are some factors relating to the current situation.

1. The RSGB QSL Bureau costs around £35,000 per year. This is significant, and the Board considers that savings might be possible.
2. Around 10% of members use the Bureau to any great extent. This is an estimate from HQ and sub-managers' statistics, and has remained roughly constant over many years.
3. Non-members can collect cards by sending envelopes to sub-managers. However, they may not send cards to RSGB HQ for outward distribution, although this is not always checked rigorously. It could be said that non-members are being subsidised by members, or at least, are free to clog up the system.
4. The majority of Bureau users send under 1000 cards a year: in fact, most send just a hundred or two. A small number send several thousand cards annually; many are contesters and DXpeditioners. A recent DXpedition sent over 15,000 cards through the Bureau, for operations using a non-UK callsign; this is perfectly legitimate under current rules, but naturally raises questions.
5. Some operators, particularly at Special Event and DXpedition stations, send Bureau QSL cards for 100% of QSOs, requested or not. By printing labels from computerised logs, and sending in bulk, QSL requests are met before they are made! QSL managers can thereby avoid the onerous task of verifying their incoming Bureau cards; however, in a sense this burden shifts to the RSGB, resulting in increased card volume.
6. A major bottleneck and expense is sorting inbound foreign bureau cards. Even if they are already well classified, each one must be sorted by hand into sub-manager categories.
7. About 10% of cards going through the Bureau are for UK-to-UK QSOs.
8. Various on-line schemes may reduce future QSL volumes: *Logbook of the World* and *eQSL* are eventually likely to replace cards, but over a period of many years.
9. Most serious DXers and award chasers send QSLs directly, enclosing self-addressed envelopes with postage. Any amateur who aspires to achieve top levels in DXCC or IOTA (for instance) will always QSL direct. But a significant number of members always QSL via the Bureau, and they still successfully collect awards.
10. The sub-managers are volunteers, and their workload can be heavy. We are lucky to have members willing to undertake this not-very-rewarding work, and should try to make their lives as easy as possible.

Hilary Whittington and Linda Christofides sorting cards in the RSGB QSL bureau.

POSSIBLE INITIATIVES

Here are some changes that we might consider. They are simply ideas for consideration: *nothing will be done without assessing members' views.*

a. Bureau usage, both outgoing and incoming, could be strictly restricted to members. QSL Bureaus in many countries apply a similar policy (eg France, Germany and Italy).
b. Usage of the Bureau could be restricted to (for example) 500 incoming and 500 outgoing cards per year, exact numbers being a matter for discussion. Additional usage might be available at a price that covered costs.
c. A possible method of implementing (a) and (b) would be to issue members on request with two sets of labels each year. One set would be attached to cards going out, and the other would be sent to the sub-manager with envelopes. Only correctly-labelled cards would be processed, with extra labels being purchased for a charge.
d. Using the methodology of (c), members could perhaps use the 'free' allowance only to send and receive cards printed with their own callsigns. Operations outside the UK, or with special calls, could use the Bureau with chargeable labels. This would help to alleviate delays occurring with large numbers of DXpedition cards; or at least the charges might pay for extra staff.
e. A more extreme measure is to remove the 'free' allowance: make everyone pay for *all* QSL Bureau usage, with members receiving a discount. Bureau users would then be purchasing a service, much as they do when buying books from the RSGB.
f. The sorting of cards from foreign bureaus could be mechanised and speeded up. A machine would display each card, from which a part callsign could be entered. The card is then routed to the correct sub-manager box. This would reduce costs over time, but require an initial expenditure of several thousand pounds. The same machinery could also sort cards destined for other bureaus around the world.
g. In the longer term, agreement might be sought with overseas bureaus to pre-sort cards by QSL sub-manager. This would have to be a reciprocal arrangement, also requiring more pre-sorting from our own Bureau on outgoing cards.
h. The Bureau could restrict or prohibit cards sent for UK-UK contacts. Some other Bureaus (eg in the USA) do not handle 'local' cards. It could be argued that awards generally are concerned with overseas QSOs, so UK-UK cards should fall outside the Bureau's remit.
i. More encouragement internationally could be given to award-issuing bodies to accept electronic QSLs.

HAVE YOUR SAY!

Nothing will be implemented until members have been consulted. Please let us know what you think on anything related to the RSGB QSL Bureau. If you can be concise, that would be helpful. Please refer to the numbered and lettered points above if you are commenting on them.

Send e-mails to qslopinion@rsgb.org.uk, or write to 'QSL Opinion' at RSGB HQ. ♦

Reviewed by Peter Hart, G3SJX

The Willows, Paice Lane,
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Ten-Tec Orion HF

Ten-Tec has acquired a reputation for making radios with a good RF performance and catering particularly for the needs of the CW operator. Over the years, their top-end flagship models have excelled, particularly when it comes to handling the challenging competitive environment of hectic contest or DX working. The Corsair and Omni series, culminating in the Omni-VI, were developed to provide an impeccable adjacent channel performance at the expense of broadband coverage, whereas other manufacturers had taken the broadband 'bells and whistles' approach.

Ten-Tec has now launched a new top-end radio pushing the state of the art to a higher plateau and combining the very best of both narrow band and broadband approaches. The new Orion is targeted as a home station radio with a 100W transmitter and two independent and fully-featured receivers. One receiver covers amateur bands only and is optimised for highest performance whereas the second receiver provides general coverage operation.

Although the Orion has been available in the USA since early in 2003, it has only recently received CE approval for sales within Europe. It is available in two versions, model 565 without auto ATU and model 565AT with internal auto ATU fitted.

BASIC FUNCTIONS

The Orion is a large table-top sized 12V operated radio measuring 432W x 133H x 476Dmm and weighs about 9.2kg. Although, from the amount of space inside the cabinet, the radio could have been made significantly smaller, the larger format makes for an easy to use and clearly laid out panel with spacious buttons and good-sized controls. The main receiver and transmitter tune the 160m to 10m amateur bands (including the new 60m allocation) with a little overlap. The second or sub receiver tunes from 100kHz to 30MHz, although the sensitivity drops sharply below 1MHz making the receiver unusable at the lower frequencies. Modes covered are USB, LSB, CW (upper and lower sideband), AM, FM and FSK.

In common with the Jupiter transceiver [see review in January 2004 *RadCom - Ed*], the firmware in the Orion may be upgraded from the Ten-Tec website so the transceiver need never be out of date. To support this approach, all controls on the front panel are software addressable, either push buttons or rotary encoders. An array of 27 buttons around the LCD panel provides a high level of customisation and adjustment to suit different operating conditions and preferences. In some cases these are menu selectable and in other cases dependant on mode or other context but all are easy to access; never more than a couple of button presses are needed. Up to five user profiles may be stored and recalled at the press of a button.

The rear panel carries an extensive array of interface connectors. There are two main antenna sockets and a receive-only antenna socket and these may be freely assigned to any receiver / transmitter combination and stored against the band selection settings. There is a transverter output (+15dBm) with control, audio line output, auxiliary interfacing to PC sound cards and for FSK keying, RS-232 serial data port for computer control and firmware upgrading and extensive support for both QSK and non-QSK linears. Control for two separate linears is provided, one associated with each antenna socket, and there are two separate band data output controllers. Linear control is very comprehensive, supporting hardware QSK keying loops and user control of sequencing delays and drop-back times.

The Orion transceiver is provided with various plugs and leads including a full accessory jack lead and a microphone plug, although the microphone is an extra. The radio accommodates most microphone types including electret and Ten-Tec supplies hand and desk models. The radio is shipped with a 60-page operator's manual which covers the set-up and operation of the controls. Circuit schematics are freely downloadable from the Ten-Tec technical support website together

with various application notes, firmware upgrades and a software programmer's guide.

RADIO DESIGN

Both receivers in the Orion use a triple superhet architecture. The main receiver covering just the amateur bands has IFs of 9MHz, 450kHz and 14kHz. Although the main channel selectivity is achieved by DSP at the 14kHz IF, a range of narrow roofing filters is selectable immediately following the first mixer, which ensures the very best close-in dynamic range is achieved. Narrow preselection filters are used in the front end, a separate filter for each band, a switchable bipolar RF amplifier and a quad of four JFETs for the first mixer. The main receiver's synthesiser uses a PLL operating in the 400 - 500MHz region with a DDS driven reference. This is then divided down to the required first mixer local oscillator frequency using high-speed dividers. This technique ensures very low close-in phase noise.

The Sub receiver has IFs of 45MHz, 455kHz and 14kHz and uses circuitry similar to the Jupiter. The receiver front end uses half octave switchable bandpass filters, a push-pull FET first mixer and three parallel FETs in the RF amplifier. The RF amplifier is in circuit all the time but there is a switchable attenuator for very strong signal situations. Conversion to the second and third IFs uses diode balanced mixers. The local oscillator drive for the first mixer is derived from a single loop PLL tuning in 2.5kHz steps. The smaller tuning step sizes are

"Truly awesome performance" says Peter Hart. Find out what precisely he was enthusing about in this, the first UK full technical review of Ten-Tec's long-awaiting new flagship model, the Orion.

transceiver

accommodated within the DSP. Hence the signals within the IFs move by up to 2.5kHz.

Both receivers use identical DSP IF and back-end circuitry with identical features. 24-bit A/D converters are used to drive the two 32-bit floating point DSPs. AGC is applied mainly within the DSP but a separate second loop around the first and second IFs comes into operation with strong signals. A built-in TCXO reference ensures good frequency accuracy and stability.

The radio is constructed around a sheet aluminium frame with four compartments top and bottom. The PA unit on the rear panel is fitted with a heatsink but no fan. The radio runs sufficiently cool under normal circumstances without a fan. The 4in high quality speaker in the case top is a much larger and more substantial unit than is fitted in most radios.

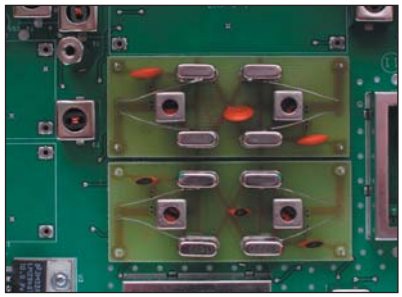
DUAL RECEIVERS

The radio is fitted with two VFOs which may be assigned to either receiver or transmitter in any combination. The two 50mm diameter tuning knobs tune in a variety of step sizes from 1Hz to 100kHz at 62 or 250Hz steps per knob revolution and a button press increases the step size normally by a factor of 10 for rapid band navigation. Individual buttons select the amateur bands, but only for VFO A. Changing bands for VFO B is less convenient, involving swapping back and forth between A and B: this must surely be something for Ten-Tec to address in a future software upgrade. The band buttons scroll through four separate settings per band which can be useful if you operate regularly on several different modes.

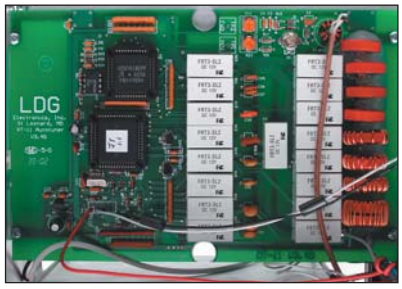
Both VFO frequencies are continuously displayed to 1Hz resolution and both can be entered directly from the band buttons which double as a numeric keypad. 200 simple memories store frequency and mode associated with either of the VFOs and are easy to scroll and select. The main receiver is fitted with a conventional analogue S-meter which indicates power on transmit but the Sub receiver is only provided with a small uncalibrated bargraph on the LCD panel.

Most of the receiver functions can be set independently for the two receivers. This includes all the bandwidth and noise reduction facilities, RIT / XIT, RF gain, switchable input attenuator, squelch and AGC. The AGC has three preset settings of fast, medium and slow and a fully programmable setting. In all cases the decay rate, hang time and threshold level are all adjustable. The threshold level is in effect an IF gain control and can be set as low as 0.37µV. This shows potentially a very high gain in the signal path, sufficient for AGC to act on noise alone. The manual goes into great detail about the importance of setting the AGC parameters to enhance signal readability under extreme conditions. It is true that carefully tweaking the AGC parameters can noticeably enhance readability but I am sceptical about the reasons for this. It seems to me that the AGC can be made to introduce an element of non-linear signal slicing.

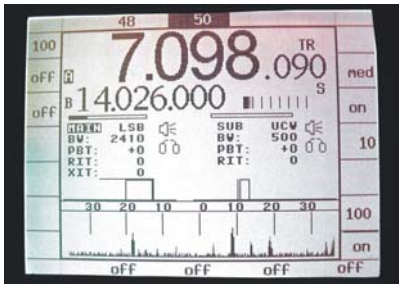
The two receivers have separate audio gain controls and the audio outputs can be routed in a number of ways, either combined or kept separate to headphone or auxiliary outputs. One interesting feature is the binaural panoramic stereo feature when used with stereo headphones. This can be used with either receiver and helps in a CW pileup by presenting a spatial separation of signals within the audio passband. Diversity reception is also possible by setting the two receivers on the same frequency, eg using a common VFO, and having separate antennas for the



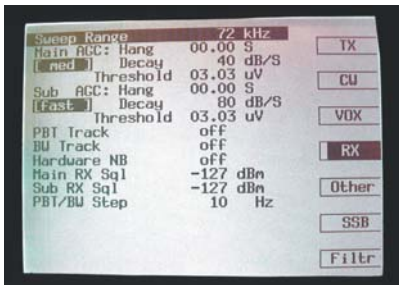
The Orion's IF roofing filters.



The LDG automatic ATU board.



The LCD panel showing the spectrum display.



Orion LCD panel showing the receiver menu.

A plethora of sockets on the rear panel.

TEN-TEC ORION MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

	SENSITIVITY SSB 10dBs+n:n			INPUT FOR S9	
FREQUENCY	PREAMP IN	PREAMP OUT	SUB RX	PREAMP IN	PREAMP OUT
1.8MHz	0.35µV (-116dBm)	0.90µV (-108dBm)	0.70µV (-110dBm)	25µV	100µV
3.5MHz	0.28µV (-118dBm)	0.70µV (-110dBm)	0.40µV (-115dBm)	18µV	80µV
5.4MHz	0.25µV (-119dBm)	0.70µV (-110dBm)	0.45µV (-114dBm)	20µV	80µV
7MHz	0.32µV (-117dBm)	0.90µV (-108dBm)	0.35µV (-116dBm)	20µV	90µV
10MHz	0.35µV (-116dBm)	0.90µV (-108dBm)	0.45µV (-114dBm)	22µV	90µV
14MHz	0.28µV (-118dBm)	0.70µV (-110dBm)	0.40µV (-115dBm)	20µV	90µV
18MHz	0.32µV (-117dBm)	0.90µV (-108dBm)	0.45µV (-114dBm)	25µV	100µV
21MHz	0.40µV (-115dBm)	1.3µV (-105dBm)	0.45µV (-114dBm)	32µV	125µV
24MHz	0.50µV (-113dBm)	1.6µV (-103dBm)	0.50µV (-113dBm)	28µV	125µV
28MHz	0.50µV (-113dBm)	1.8µV (-102dBm)	0.45µV (-114dBm)	22µV	100µV

AM sensitivity (28MHz): 3.5µV for 10dBs+n:n at 30% mod depth
FM sensitivity (28MHz): 1.8µV for 12dB SINAD 3kHz pk deviation
AGC attack time: 2 - 3ms
AGC decay time: 250ms (fast), 500ms (med), 1.5s (slow) + variable
Max audio at 10% distortion: 2.0W into 4Ω
Inband intermodulation products: -35dB to -50dB

S-READING	INPUT LEVEL SSB	
(7MHz)	PREAMP IN	PREAMP OUT
S3	0.8µV	3.2µV
S5	2.2µV	10µV
S7	7.0µV	28µV
S9	20µV	90µV
S9+20	125µV	560µV
S9+40	1.4mV	5.6mV

BANDWIDTH	IF BANDWIDTH			
SET TO	-6dB	-60dB	-70dB	-80dB
6000Hz	5236Hz	6322Hz	6363Hz	8491Hz
4000Hz	3974Hz	4362Hz	see text	see text
2400Hz	2364Hz	2746Hz	2773Hz	3023Hz
1800Hz	1766Hz	2151Hz	2545Hz	2640Hz
1000Hz	965Hz	1338Hz	1365Hz	1403Hz
500Hz	444Hz	843Hz	1162Hz	1237Hz
250Hz	225Hz	682Hz	883Hz	1281Hz
100Hz	131Hz	623Hz	1262Hz	1337Hz

receivers. However, the effectiveness was marred by a slow beat (about 1Hz) when both receivers were set to the same frequency.

FILTERS

Two DSP circuits provide identical and separately controllable filtering and noise reduction facilities for the two receivers. A front panel rotary control allows the channel bandwidth to be set from 100Hz to 6kHz in 10Hz steps. The upper and lower passband edges can also be individually set and passband tuning allows the entire passband to be moved up or down in frequency.

Two notch filters are provided. A manual notch with adjustable centre frequency and width is particularly effective and deep. An auto-notch for voice modes will track and notch out multiple carriers and is also very effective. Both notches operate at IF up-front of the DSP AGC circuitry and prevent the receiver AGC being captured by strong carriers.

Adjustable DSP noise reduction is also provided and this can be effective in lowering background noise but does impart a synthetic sound to the audio. Adjustable DSP noise blanking is also included and for the main receiver only an additional hardware noise blanker of the traditional type operating at the 9MHz IF.

Adjustable audio equalisation is also provided for both receivers and transmitter. This can tailor the audio response by boosting or cutting the bass and treble frequencies.

The main receiver is fitted with a selection of roofing filters at the 9MHz IF and careful use of these filters is key to achieving the very best in adjacent channel performance. 20, 6, 2.4 and 1kHz bandwidth filters are provided as standard but additional filters of 1.8kHz, 500Hz and 250Hz bandwidth are available as options. All filters can be fitted at the same time and may be selected manually or automatically according to the setting of the bandwidth control.

OTHER GOODIES

Transmit features include variable output power (5 - 100W), VOX and a speech processor. The transmit filter bandwidth is adjustable from 900 to 3900Hz as well as for equalisation and low frequency roll off allowing for different microphone characteristics, hi-fi audio, DX punch etc. On CW the rise and fall characteristic of the keying envelope is adjustable and a keyer is built in with adjustable weighting and speed range of 10 to 60WPM. Three memory stores are provided for both CW and voice modes, easy to access via dedicated front panel buttons. The CW stores operate only in conjunction with the built-in keyer and seem to hold quite long messages but the manual does not cover their capacity. Two of the voice stores hold only 4.54 seconds maximum of audio and the third 28.1 seconds but this third store is not saved on power down.

The Orion also provides a spectrum sweep showing signals up to ±36kHz on either side of the main receiver frequency. This is displayed on the lower part of the LCD and unlike other implementations of this feature it is continuous and does not interrupt the operation of the receiver.

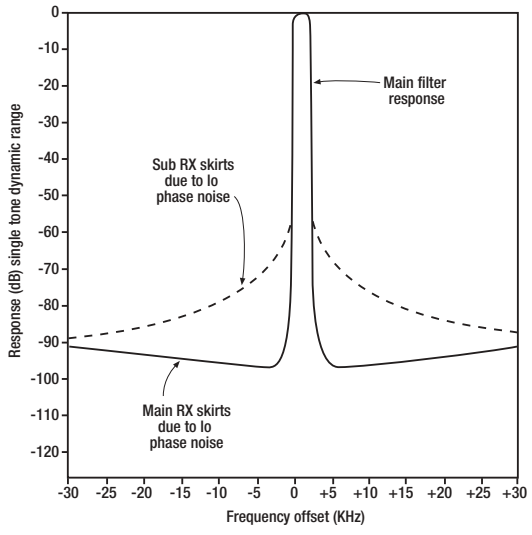
The optional tuner fitted into the Orion, which can be retrofitted at a later date, is an LDG design using an LC ladder network with latching relays and with a particularly wide impedance matching range of 6 to 800Ω (up to 10:1 VSWR). There are no frequency stores so changing bands requires a retune but this only takes a second or two.

MEASUREMENTS

Measurements shown in the table were made with the review radio powered from a 13.8V supply and in most cases with the receiver bandwidth set to 2400Hz. Close-in dynamic range measurements were made with a 500Hz receive bandwidth. Receiver measurements relate to the main receiver unless sub-receiver is stated.

The measured figures for third order intercept and dynamic range of the main receiver are very good but lower than the Orion published specification. The sub-receiver, however, has a rather better performance than the specification. Intermodulation within the test equipment is often the limitation in measuring the dynamic range of high performance radios. My measurement set-up has been carefully evaluated in this area and is capable of measuring receivers to at least +45dBm third order intercept so I have a good degree of confidence in the accuracy of the dynamic range results. The close-in results with the

FIG 1 © RADCOM 169



WEB SEARCH

Ten-Tec	www.tentec.com
Ten-Tec technical support	www.rfsquared.com
Ten-Tec Direct (UK)	www.aoruk.com/tentec

INTERMODULATION

(50kHz Tone Spacing) 2400Hz bandwidth USB

	PREAMP IN		PREAMP OUT		SUB RX	
FREQUENCY	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
1.8MHz	+9dBm	90dB	+16.5dBm	90dB	+14dB	89dB
3.5MHz	+9.5dBm	92dB	+20.5dBm	94dB	+12.5dB	92dB
7MHz	+9dBm	91dB	+19.5dBm	92dB	+14dB	93dB
14MHz	+9dBm	91dB	+20dBm	93dB	+18dB	95dB
21MHz	+11dBm	91dB	+22.5dBm	92dB	+18dB	95dB
28MHz	+8dBm	87dB	+20dBm	88dB	+7.5dB	88dB

CLOSE-IN TWO TONE DYNAMIC RANGE

ON 7MHz BAND 500Hz bandwidth CW

FREQUENCY SPACING	SUB RX	MAIN RX ROOFING FILTER BANDWIDTH 20kHz	6kHz	2.4kHz	1kHz
1kHz	not meas	78dB	79dB	83dB	77dB
2kHz	not meas	79dB	83dB	89dB	83dB
3kHz	70dB	78dB	89dB	92dB	86dB
4kHz	72dB	80dB	88dB	94dB	89dB
5kHz	74dB	80dB	89dB	94dB	91dB
7kHz	77dB	78dB	90dB	94dB	93dB
10kHz	82dB	83dB	90dB	94dB	93dB
15kHz	90dB	89dB	91dB	94dB	93dB
20kHz	92dB	92dB	91dB	94dB	93dB
25kHz	92dB	94dB	93dB	93dB	93dB
30kHz	92dB	94dB	94dB	93dB	93dB

	MAIN RX			SUB RX	
FREQUENCY OFFSET	RECIPROCAL MIXING FOR 3dB NOISE	BLOCKING PREAMP IN	BLOCKING PREAMP OUT	RECIPROCAL MIXING FOR 3dB NOISE	BLOCKING
2kHz	97dB	-18dBm	-6dBm	not meas	-24dBm
3kHz	97dB	-9dBm	>0dBm	65dB	-24dBm
5kHz	96dB	>0dBm	>0dBm	72dB	-24dBm
10kHz	95dB	>0dBm	>0dBm	77dB	-13dBm
15kHz	94dB	>0dBm	>0dBm	81dB	-11dBm
20kHz	93dB	>0dBm	>0dBm	83dB	-4dBm
30kHz	90dB	>0dBm	>0dBm	87dB	0dBm
50kHz	88dB	>0dBm	>0dBm	92dB	0dBm
100kHz	96dB	>0dBm	>0dBm	98dB	0dBm
200kHz	104dB	>0dBm	>0dBm	104dB	0dBm

TRANSMITTER MEASUREMENTS

	CW POWER		INTERMODULATION PRODUCTS	
FREQUENCY	OUTPUT	HARMONICS	3rd order	5th order
1.8MHz	104W	-64dB	-40dB	-48dB
3.5MHz	105W	-64dB	-40dB	-44dB
5.4MHz	100W	-64dB	-38dB	-42dB
7MHz	101W	-56dB	-36dB	-42dB
10MHz	102W	-60dB	-38dB	-42dB
14MHz	102W	-65dB	-34dB	-40dB
18MHz	103W	-52dB	-30dB	-44dB
21MHz	103W	-60dB	-22dB	-38dB
24MHz	104W	-66dB	-22dB	-36dB
28MHz	105W	-60dB	-26dB	-41dB

Two-tone transmitter intermodulation product levels are quoted with respect to PEP.

Carrier suppression: 35dB approx
Sideband suppression: >80dB @ 1kHz
Transmitter AF distortion: 2%
Microphone input sensitivity: 15mV
FM deviation: 5kHz
SSB data T/R switch speed: mute-TX 26ms, TX-mute 10ms, mute-RX 36ms, RX-mute 14ms

NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on USB, preamp switched out, 2400Hz bandwidth, 6kHz roofing filter and with a 13.5V supply.

narrower roofing filters are very impressive indeed, results with the 2.4kHz filter being significantly better than with the 1kHz filter.

The reciprocal mixing results are very interesting (see **Fig1**). At 50kHz offset the results for the main receiver are uninspiring and indeed somewhat bettered by the sub-receiver. However, the performance improves markedly closer to the carrier and at 2kHz offset surpasses any other radio measured previously, with the possible exception of the Ten-Tec Corsair. These results equate to an oscillator phase noise of -131dBC/Hz at 2kHz offset, but still a little short of the Orion published specification of -136dBC/Hz. The sub-receiver reciprocal mixing results are rather mediocre for a high performance radio and identical to the Jupiter results.

The very low phase noise in the main receiver made it possible to measure 80dB down the IF filter skirts with excellent results. Filter bandwidths below about 300Hz started to exhibit wider skirts and ripples in the stopband which limited their ultimate performance. A weak spurious signal limited measurements of the higher bandwidth filters. Rejection of IFs and images was better than 75dB for the main receiver but only better than 60dB for the sub receiver. The main receiver exhibited a spurious response 6KHz off tune about 60dB down but only on SSB modes and only with the 6kHz roofing filter selected. If this proves a problem, select a different roofing filter.

The blocking results shown in the table were measured with the 6kHz roofing filter. With the 2.4 and 1kHz filters it is possible to get even closer to the carrier before any desensitisation occurs. With the 1kHz filter, measurements showed that it was possible to copy an S1 signal with an interfering signal 90dB greater only 500Hz away. This is truly awesome performance.

Transmit SSB intermodulation products were generally quite reasonable but were degraded by the speech processor. CW keying had well-shaped edges but exhibited some character shortening and delay only of real significance at high keying speeds. The auto ATU matched well and exhibited very low loss of only 1 - 2W at the 100W level. Occasionally a second attempt was needed as the first try gave an erroneous match. The front panel power meter was rather inaccurate at mid range, reading significantly on the high side.

ON THE AIR

It takes a little time to get the best out of the Orion and become fully acquainted and at home with all its facets. However, as you use the radio, understand its philosophy and tweak its many adjustable features to match best your operating style you will find that the radio grows on you more and more. The RF performance is really excellent and unsurpassed in crowded band conditions. The ease of varying the bandwidth is a real boon, the quality of the filters, notches and audio is excellent and similarly the AM broadcast performance. However, being able to receive very close to strong stations is only possible if the strong station itself has a clean signal. In a transceiver, the phase noise characteristic of the transmitter largely mirrors that of the receiver and unless the strong signal is also an Orion, the strong signal is likely to be the limiting factor.

Audio quality reports were excellent. My first QSO with the Orion was with a VK2 station who immediately gave an unsolicited report of excellent audio quality. CW also generally performed well both on the internal and external keyers. The receiver QSK drop back delay and the linear drop back delay are totally separate adjustments. I had some difficulty with my non-QSK linear achieving a suitable balance between the two. On CW you do not want the linear dropping back to receive between words but on SSB when you release the PTT you want the linear to drop back to receive immediately. The linear drop back delay is applied to all modes but on CW should really only take effect after the receiver delay has finished. (A possible candidate for a software update maybe?)

The control ergonomics are generally very good. One minor comment, however, is that rapid frequency navigation is generally better implemented on many Japanese radios. Some roughness on fast tuning was resolved when I upgraded the firmware from version 1.367 to version 1.369. The upgrade file from the website was 877kB which installed the Flash Update Utility on my PC. Connecting the radio to the PC COM port then installed the upgraded code in about five minutes.

CONCLUSIONS

The Orion lives up to its claim as a high performance radio with exceptional close-in dynamic range. It is likely to appeal particularly to the serious and technically-minded DX chaser or contest operator or someone who desires the very best in terms of performance. With its large format panel, clearly laid out controls, well-implemented features and internet upgradeable software it is a truly excellent radio.

The Orion is available in the UK from Ten-Tec Direct, 4E East Mill, Belper, Derbyshire DE56 2UA; tel: 01773 880788, with a list price of £2499, or £2799 if fitted with the auto antenna tuner. My thanks to Ten-Tec Direct for the loan of the review radio. ♦

By Tom Robinson, GOSBW

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HF backpacking, or operating

"Well, Tom, I've been a ham for many years and you are the first pedestrian mobile operator I have ever worked - tell me about your station." Statements like this occur frequently when Tom Robinson is operating pedestrian mobile. The QSOs typically include discussion of the equipment he is using and the results he achieves. This article similarly describes his pedestrian mobile experience.

At my home QTH, using 100W and low-height wire antennas, I work little DX. But experiments operating 'static mobile' close to salt-water marsh showed I could work DX with low power and simple verticals. Suitable sites, easily accessible by car, were limited so I considered walking to them and using my mobile equipment (an Alinco DX-70 and Hustler whips) in a portable configuration. It was then just a short step to thinking "if the equipment has to be physically carried to the sites why not operate pedestrian mobile?"

I made a backpack frame from steel angle iron, equipped it with a mount for the Hustler whips and shelves to hold a manual tuner and 7Ahr gelcell battery. I slung the Alinco DX-70 around my neck and used a dragged, quarter-wavelength counterpoise to complete the antenna system. It worked, I obtained DX contacts, but it was heavy and uncomfortable. The backpack also had to be taken off in order to change bands and re-tune the antenna. Experiments to develop a more efficient pedestrian mobile system started.

Such a system has five parts:

- Transceiver
- Power supply
- Antenna system
- A backpack to hold these items securely, and comfortably, to the fifth part
- The operator.

THE TRANSCEIVER

Initially I used the rig I had available. The Alinco proved very suitable and I still enjoy using this rig when operating pedestrian mobile. In fact, almost any rig designed for mobile use can be used for pedestrian mobile although some of them use a lot of current on receive, quickly draining batteries just by listening.

Many pedestrian mobile operators suggest 20W is required for reliable HF SSB communications (be wary of RF radiation close to your body when operating at power levels above this). I prefer operating at this level as I have found the 5W from my Yaesu FT-817 insufficient for working DX on a regular basis. The addition of a Tokyo Hi-Power HL-50B amplifier results in 25W output from the 817's 2.5W input. I recently purchased an Icom IC-703 which, although only 10W output, has an internal antenna tuner (see later) and is the basis for my QRP pedestrian mobile backpack.

The ideal rig should not be too heavy or big, have low receive current (remember batteries have to be carried), a detachable control head, allow about 25W output and have a wide-range, internal autotuner (nice but not essential). Several transceivers designed for mobile use satisfy some, but not all, of these attributes. However, most are capable of giving a taste of the fun and excitement of working pedestrian mobile.

For those people who have deep pockets and / or renovation and repair skills there are also some excellent commercial (Vertex 1210) and ex-military radios available.

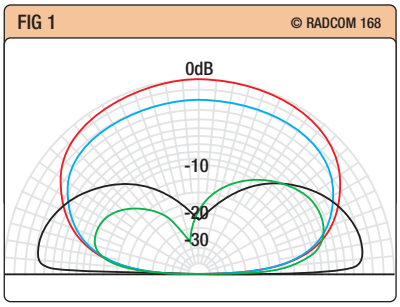

Fig 1
EZNEC plots: over salt marsh the vertical has a much better DX plot than the dipole. Over average ground the dipole is better than the vertical.

BATTERIES

For a long time I used 7Ahr 12V gelcell batteries to power my rigs. I now use 3.3Ahr 12V NiMH battery packs. Two of these are half the weight of the gelcell and give about the same operating time (some two hours with the Alinco at 50W output, 60:40 Rx:Tx ratio). Lithium Polymer (LiPo) battery packs are now being marketed. Several amateurs are experimenting with these as this type of battery pack has potential for reduced weight. Currently there are dangers inherent in the charging and use of LiPo battery packs so I regard them more as a future power source than technology for everyday use now.

ANTENNA CONSIDERATIONS

Early in my pedestrian mobile operations I was struck by the ease with which I was working DX and its geographical distribution (North, Central and South America, Southern Africa and the South Atlantic). No doubt one reason was that my favoured time of operating was the afternoon but I reasoned there must be other factors.

I therefore used W7EL's *EZNEC* antenna modelling program to look at the performance of two antennas I had made for pedestrian mobile operation based on ex-army 12ft 6in (3.80m) whips. One was a vertical fed against a quarter-wave trailing counterpoise, the other was a dipole made from two of the whips placed back-to-back and supported by an extendable, 11ft (3.35m) decorator's pole.

The modelling assumed (a) average ground, and (b) saltwater marsh, typical of areas where I operate pedestrian mobile. The results (**Fig 1**) show that over salt marsh the vertical has a low angle of maximum radiation and a lot of gain at that angle, compared with the low height dipole. It is particularly suited to working DX. The lack of high-angle radiation suggests a poor performance for NVIS-type working. However, over average ground the dipole easily outperforms the vertical in almost every respect.

A major problem of the dipole is the difficulty of carrying it whilst walking.

Typical power sources for pedestrian mobile use. The two battery packs together have about the came capacity as the gelcell but their combined weight is just less than half that of the gelcell.

"California is that way!" Tom's wife Lilian indicates the great circle path to California and models an ex-military backpack holding a Z11 autotuner, HL-50B amplifier, NiMh battery packs and a 12ft antenna. A Yaesu FT-817 is around her neck.

Lilian with the homemade conduit backpack standing on the salt marsh. Note the gelcell battery, Alinco DX70, Z11 and 18ft whip antenna.

'pedestrian mobile'

These theoretical results confirm field performance.

Although the modelling demonstrated the importance of type of ground it did not explain the directionality of the DX I was working. To examine this I overlaid a tracing of a great circle map on the area where I normally walk and operate pedestrian mobile. It became clear the 'easy DX' areas lie on paths which have a salt marsh / sea water take off. I also make my CQs interesting by adding "operating pedestrian mobile - transmitting whilst walking" or some such words into the initial call. Why else would rare DX such as Madagascar, Seychelles, Kenya, and Falkland Islands reply to my CQs?

As a result of these investigations I use vertical antennas when operating pedestrian mobile in my local salt marsh estuary areas in Essex. These modified ex-army whips are 13ft 8in (4.16m) and 18ft (5.48m) long and they are not resonant on any amateur band. I use an LDG Z11 QRP autotuner (except with the IC-703) to tune them, via a 4:1 balun. They tune from 20 to 10m (40 to 10m for the longer one) using an appropriately-sized quarter-wave counterpoise (see the HFPack Yahoo Group for correct sizing of dragged counterpoises).

A very effective pedestrian mobile antenna is a coil shortened, end-fed, half-wave vertical. Such an antenna can be easily made using a 6 or 7m fishing rod blank for support. This antenna has some gain over a quarter-wave vertical and has its point of maximum radiation better placed - half-way up its length - compared with a quarter-wave.

Several commercial antennas are suitable for pedestrian mobile operating. The HFPack Yahoo Group has many postings discussing the pros and cons of these antennas and a number of them have competed against each other in the HFPack 'Antenna Shootouts'.

Given declining sunspot activity 40 and 80m antennas are being used more often. They are normally coil-loaded, quarter-wave verticals, based on fibreglass fishing poles for DX or coil shortened, low height dipoles for NVIS working. A problem of fishing rod based antennas more than 5m long is that in medium to high winds they are difficult to manage.

BACKPACKS

Walking for any length of time carrying a rig, batteries, antenna etc can be uncomfortable. I therefore spend much time developing, making and improving backpacks. Backpacks need to be comfortable and lightweight and provide safe, weatherproof accommodation for rig, tuner etc, as well as being a stable support for a relatively large HF antenna.

The backpacks I use are either home made, ex-army or modified hiking rucksacks. One successful home made one is made of PVC electrical conduit. To save weight and increase rigidity the bottom section of an 18ft whip antenna forms part of the backpack frame. This is the only one of my packs that can easily deploy a 7Ahr gelcell. It is open frame construction, but has a cover for protecting the electronics from rain.

I have three British army backpack radio frames which, when used with normal amateur equipment, allow easy access to the component parts of the pedestrian mobile gear. However, they are rather heavy and need weather protection (waterproofed nylon, bicycle pannier covers). A US Army ALICE pack frame is currently awaiting conversion to an 80m pedestrian mobile pack.

Currently I am experimenting with converting low cost, fabric, hiking rucksacks. Key issues are ensuring the rig, batteries and other bits of hardware are adequately secured and ventilated and making sure that a largish HF antenna (which can generate a lot of swing momentum whilst walking) can be held firmly in position. I expect a backpack of this type will be my lightest and most comfortable yet, with a total weight less than 12lb (5.5kg) for a system, including 18ft antenna, capable of 50W on 40m to 10m.

I consider ergonomics - ease of control, comfort etc - to be the most important aspect of pedestrian mobile operation. I like the control part of the rig on my chest so that I am able to change bands and retune the antenna without taking off the backpack. When using the FT-817 / HL-50B system the FT-817 is on my chest and the amplifier and autotuner are on the backpack. Unfortunately it is necessary to remove the backpack to change some band settings on the amplifier.

COMPUTER LOGGING & APRS

There is one last item I now find indispensable. This is my computer logging system. Until 12 months ago I kept records of QSOs on scraps of paper. I now use the G4FON logging program on a Palm M105 PDA. This is secured to the control head / FT-817 on my chest so that I can log at the same time as talking and walking. This allows me to tell the person on the other side of the QSO the date, time and band used when we last worked - much to their surprise.

Occasionally, for fun, I take a Ken-wood TH-D7 and a GPS unit along on my pedestrian mobile walks. These allow interested people to follow my track via APRS and provide a means of contacting others via the APRS system.

PHOTO COURTESY OF K6ACJ

G0SBW taking part in the 2003 HFPack 'Antenna Shootout'. He is using the FT-817 / Z11 / HL-50B ex-army backpack fitted with a 6m fishing rod antenna which has a coil tapped for 40m, 60m and 80m. (Clearly the test range is warmer than his normal salt marsh environment.)

Ex-military backpacks. These are typical of what can be found at rallies, boot sales etc. The one on the left is a US ALICE pack. The other two are ex-British Army.

INTERNET HELP

Two Yahoo Groups have been a great help and encouragement to me in my pedestrian mobile activities. These are HFPack and EPRG (European Portable Radio Group). Anyone interested in this type of amateur radio activity should have a look at these groups where they will find lots of useful information and tips.

Pedestrian mobile operating has given me QSOs with stations that would have been difficult to work from my home QTH. Using SSB I have had some 850 pedestrian mobile QSOs, worked all continents except Antarctica (just missed it - I have worked the Falkland Islands three times) and 101 DXCC countries.

For the enquiring mind it provides a fascinating opportunity to study the interaction of propagation, antenna type, soil conductivity and landform. The late Les Moxon, G6XN, in Chapter 10 of his book *HF Antennas for all Locations* discusses some of these issues and says that he "hopes that readers in suitable locations will be encouraged to experiment on these lines". It seems to me there is potential for achieving excellent results by such study / experimentation.

Why not give pedestrian mobile working a try? It's great fun, good exercise and quite addictive. If you operate /M you already have most of the equipment that you will need. ♦

WEB SEARCH

EZNEC	http://www.eznec.com
HFPack group	http://groups.yahoo.com/group/hfpack/
European Portable Radio Group	http://groups.yahoo.com/group/european-portable-radio-group/?yguid=7908614

KENWOOD

VoIP INTERNET operation with optional Kenwood Network Command software

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HF/50MHz ALL-MODE TRANSCEIVER

TS-480HX

200W Model

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100W Model with Built-in Antenna Tuner

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- 200W output (50MHz: 100W) DC 13.8V operation
- 100W model available with built-in antenna tuner
- TX/RX AF DSP
- Compact construction for easy carrying
- Separate LCD control panel with speaker
- Continuous RX: 500kHz (VFO: 30kHz) to 60MHz
- TX: covers all Amateur bands 1.8MHz to 50MHz

Unique concept, brilliant execution. Kenwood's compact TS-480HX/480SAT is tailor-made for DX'ing. But its smartly designed standalone LCD control panel — featuring backlit keys to enhance operating ease — is equally at home on your desk, with the main unit up to 4 metres away. And wherever it is, this HF transceiver delivers an astonishing punch: 200W. Performance is equally impressive. For example, a quad-mixer provides RX dynamic range in the TS-950 class, while AF DSP processing offers many powerful features, including noise reduction, a speech processor, and AF filters. And of course you can enjoy all of the convenience of PC-based control. The TS-480HX/480SAT lets you enjoy the best of both worlds.

▮ Built-in automatic antenna tuner (100W model) ▮ Terminals for external antenna tuner, linear amp, PC ▮ Electronic memory keyer ▮ AF DSP features: ● AF DSP filters ● Beat-cancel, noise reduction ● TX/RX equalizer ● CW auto-tune ● Speech processor ▮ Optional 500Hz/270Hz band CW narrow IF filters, 1.8kHz band SSB narrow IF filter ▮ PSK31 compatible ▮ 5W minimum RF output, QRP compatible ▮ Electronic keyer ▮ Plug-in voice recording/synthesis unit available ▮ Packet cluster tune with TM-D700E ▮ Supplied with mobile panel bracket, tabletop panel bracket and carrying brackets

Available from all official Kenwood amateur radio dealers. For full details of our dealer network and all Kenwood amateur products contact your local dealer or Kenwood Electronics Ltd. 01923 655284 e-mail comms@kenwood-electronics.co.uk website: www.kenwood-electronics.co.uk

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Newcomers' news

This month's round-up of news for and from beginners includes a look at moving on from the Foundation to the Intermediate and Advanced levels of licence.

Summer's here and many readers may be taking to the hills for their first radio contest. The RSGB Backpacker series of contests are excellent for a first attempt at radio contesting. All that you need are a portable SSB transceiver, an antenna and a good hilltop location. The full rules are on the RSGB VHF Contest Committee's website (see 'Websearch' below), or they can be obtained on request by sending a large SASE to RSGB headquarters. Good luck if you enter!

CHELMSFORD SCOUTS

Scouting and amateur radio have a long history of working together and the Chelmsford Scout Amateur Radio Fellowship (SCARF) are keeping this relationship very active. The group was formed in September 1999 and the Essex Scout International Jamboree is held every four years. At this event SCARF supplies radio kits, which members assist the campers to build. Their excitement and enthusiasm is great to see and they go away with a completed project; a working radio, or other electronic gadget. This year the RSGB mobile radio classroom, GB4FUN, will be on site all week.

Another one of the group's activities is the running of Foundation and Intermediate courses for Leaders and Scouts. They have just run a weekend Foundation course for Scouts, Explorer Scouts and Leaders with 18 participants. Fourteen passed and the other four will be taking a resit shortly under the watchful eye of Lead Instructor, Chris Chapman, G0IPU.

Further information about SCARF can be had from Martyn Medcalf, G1EFL, e-mail: m3vammartyn@supanet.com Thanks for the report Martyn!

INTERMEDIATE PRACTICE

The offer of practice questions for the Intermediate exam in the April *RadCom* attracted one of the largest responses I have had to this column. I didn't realise just how many Foundation licence holders were busily studying for the next step. As well as Intermediate students from

Chelmsford's Explorer Scouts and Leaders who had just passed their Foundation course (see 'Chelmsford Scouts').

Sam Jones rather pleased at the news of his exam results! (see 'Exam Troubles').

England, Wales, Scotland and the Isle of Man, several tutors have had copies of the papers so hopefully they will help others in the future.

A few questions cropped up with the requests for papers that are worth clarifying here. First of all, students are required to know the resistor colour code, as shown in colour on the inside cover of *Intermediate Licence - Building on the Foundation.*

Secondly, there are a few minor errors in the Intermediate book and I am in the process of updating it. The latest print run has picked up the more important changes and other updates are available from the RSGB website (see 'Websearch' below).

ADVANCED PRACTICE

For a number of years Murray Ward, G3KZB, provided practice questions for the old Radio Amateurs Examination (RAE) through free software called *QRAE.* The programme has now been revamped to line up with the Advanced exam and *QADV*, as it is now known, is available as a free download from the Internet (see 'Websearch' below). For those with a computer but without Internet access, Murray will supply a copy on floppy disks, in return for two blank disks and an SASE. Murray is QTHR (listed in the *RSGB Yearbook*).

Most of my current Advanced students have used the software and I have given it a test drive. It seems to be just as interactive as its predecessor and it still allows you to choose which parts of the syllabus you want to test. Study buttons refer you to the relevant page in the textbook for those questions you get wrong.

Murray has added a note to remind students that they should not rely solely on *QADV* for their revision. It is too easy to get duped into thinking that the real exam will look just like *QADV*. Ray Petri, G0OAT, produced a couple of fine books for the old exam: *The Radio Amateurs' Question & Answer Reference Manual* and *The Radio Amateurs' Exam End of Course Practice Papers*. Even though the structure of the exam and the licensing conditions have changed, these books still contain some very good practice questions to help students prepare for the real thing.

EXAM TROUBLES

Waiting for exam results is stressful enough at any time but image how you would feel if you were told that the markers had never received your papers! That is what happened to Ray Jones, M3XRJ, and his son Sam, M3CKN, after they had both sat the final City & Guilds RAE in December.

After studying intensely, with some help from Dave York, G4RWO, at the Furness Amateur Radio Society, Ray and Sam sat the RAE and waited for their results. Once it became clear that the papers had gone astray, the exam centre, the Post Office and City & Guilds all set about searching for the lost envelope. It was tracked down at the local Post Office, never having left for the markers.

Once it was confirmed that the papers had been posted at the appropriate time City & Guilds agreed to mark the papers. The saga has a very happy ending because both father and son passed the exam and should now be on air with their M0 callsigns. Phew! ♦

WEB SEARCH

RSGB VHF Contest Committee	www.blacksheep.org/vhfcc
Intermediate Book Update	ww.rsgb.org/books/extra/intermediate.htm
QADV	http://freespace.virgin.net/murray.g3kzb

By Ian Poole, G3YWX

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Simple wire

The RadCom office has received some letters from beginners asking about setting up simple wire dipole antennas. Ian Poole gives the low-down on installing and using these antennas.

The antenna is a crucial element in any radio station. Upon its efficiency depends the operation of the whole station. Yet antennas do not need to be large and expensive to perform well. While a multi-element beam on a high tower in an ideal location is the dream of most hams, few of us are in the position to be able to erect such a system. For most, antennas need to be more modest. Gardens are not usually very large, and the visual impact of the antenna also needs to be considered. This limits the size and nature of any antenna that can be erected. Yet simple antennas can still be very effective and enable a good selection of stations near and far to be contacted.

Possibly the simplest antenna is an end-fed wire, but they do have a number of drawbacks, including a greater likelihood of causing interference to local domestic electronic equipment.

DIPOLES

A better choice is the dipole. They perform well, and are easy to install and erect. Dipoles are not nearly as likely to give rise to as many problems as end fed wires. As the name suggests, a dipole has two 'poles' or sections to the radiating element. In its most common form it is a half-wavelength long. This is its fundamental resonance, and from looking at the voltage and current waveforms (**Fig 1**) it can be seen that the voltage is at a minimum at the centre with the current at a maximum. By feeding the antenna at this point it provides a low impedance feed. Normally 50Ω or sometimes 75Ω feeder is used as this provides a good match.

The dipole in this format radiates most of its power at right angles to the axis of the wire. In this way it may be possible to angle the antenna to 'fire' in the direction where most contacts are wanted, although the dimensions of the garden are more likely to determine what is possible.

While the instance of a half-wave dipole has been shown, it is also possible to operate the antenna at a frequency where its length is three half-wavelengths, or any odd multiple of half-wavelengths long. This enables a dipole to be used on more than one band of frequencies. For example a half-wave dipole cut for operation on 40 metres (7MHz) will also operate as a three half-wavelength dipole on 15 metres (21MHz).

DIPOLE CONSTRUCTION

A dipole is quite easy to construct. However, before starting work, a few basic rules should be remembered, the main one being that safety should be considered at all times. While countless thousands of people experiment with antennas every day with no problems, occasionally accidents do occur. Most of these can be avoided by spending a little time taking precautions and not doing things that could lead to accidents. For example, antennas should never be erected in locations where they could fall on to power lines. The proper precautions should be taken when climbing ladders etc. The proper materials should always be used when erecting antennas so that they do not fall on people. These and other precautions are common sense and must be observed as the antenna is erected.

The length of a half-wave dipole might be thought to be the same as a half-wavelength of the signal in free space, but this is not quite the case. A number of effects, including the velocity factor of the wire, the length / diameter of the wire used for the radiating element and the capacitive end effect, mean that the actual length required is a little shorter than this. Without the end effect the length of a dipole could be calculated from the formula length (metres) equals 150 / f, where f is the frequency in MHz. With the foreshortening effects the length can be approximated from the formula:

Length (metres) = 143 / f (MHz)

The lengths calculated from this should only be considered as an approximate value. It is best to cut the wire slightly longer than this and then trim the length to give the best performance.

For a transmitting station one of the easiest ways is to monitor the reflected power on a standing wave ratio, or VSWR, meter. If operation is tried at different points on the band (taking care not to cause interference) it will be noted that the VSWR is higher at some points than others. A plot can be made and should look something like **Fig 2**. The length of the antenna should be adjusted to give the lowest overall level in the areas of interest of the band. For example if operation is envisaged in the CW section at the bottom of the band, the minimum can be adjusted so that it occurs in this section, whilst still maintaining an acceptable level in other sections of the band. If the minimum VSWR point occurs too low in frequency, the length of the

Fig 1
A half-wave dipole showing the voltage and current waveforms.

Fig 2
A typical VSWR plot for a dipole antenna.

FIG 1 © RADCOM 170

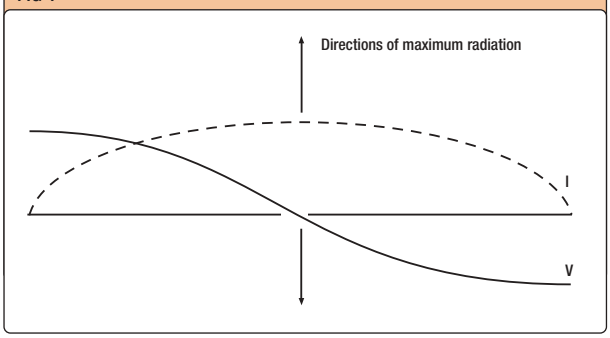
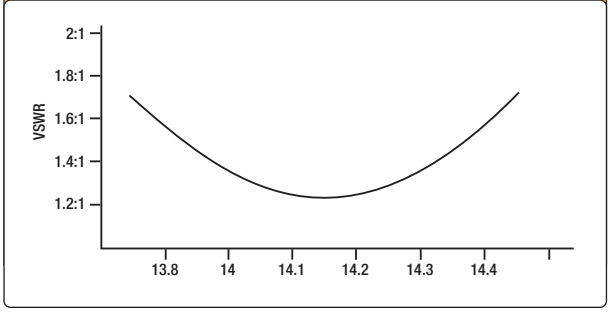


FIG 2 © RADCOM 171



dipoles

antenna can be shortened. If it occurs too high in frequency it means the antenna is too short and needs to be lengthened somehow. Putting wire back is not nearly as easy as taking some wire off!

Although using the VSWR is an acceptable way of noting the resonant frequency of the antenna, antenna analysers can also be used and these can give a better indication of the operation of an antenna.

CONSTRUCTIONAL TIPS

It is easy to construct a dipole. Basically it is simply a half-wavelength of wire cut in the middle. Typically it may be set up something like **Fig 3**. While this may be the 'standard' type of installation, rarely is it possible to make an installation exactly like this, and it is acceptable to make it fit the requirements of the location. It may be necessary to bend the wire somewhat or have it sloping, for example. These will affect the directional pattern to some degree, but for practical operation it is likely to make little difference.

The other points to note are the ways of fixing the ends of the wire and also connecting the feeder to the centre of the antenna. Ideally insulators should be used at the ends because these points are at a high voltage point. Small 'egg' insulators (**Fig 4a**) are ideal and they can be bought quite cheaply from antenna specialists. Egg insulators have the advantage that if they do fracture for any reason they will fall away, but the wire and securing rope will still be looped around each other, meaning that the antenna will not collapse.

The feeder can be attached to the centre of the antenna in a number of ways. Special dipole centre pieces can be bought. Another alternative is to use a ribbed or 'dogbone' insulator as shown in **Fig 4b**. It is also necessary to remember to seal the end of the coax to prevent moisture entering. If moisture does enter, losses rise considerably, rendering the coax useless. It is also worth trying to ensure that the end of the coax points downwards to prevent this moisture ingress even if it is sealed.

The feeder can be quite heavy and as a result it is sometimes convenient to anchor the coax to a suitable point to prevent too much weight hanging on the centre of the antenna. This also highlights the point that if at all possible hard drawn copper wire should be used. Copper has a low resistance and its use will result in lower resistive losses, but ordinary copper wire will stretch, and over time it may end up several percentage points longer.

Coaxial feeder is usually the most convenient form of feeder to use, but it is what is termed an unbalanced feeder, requiring the outer sheath to be earthed. A dipole is what is termed a balanced antenna in which neither of the halves is earthed. In an ideal world a balun should be used with coaxial feeder to make the transition between balanced and unbalanced systems. It is effectively a transformer, often with a 1:1 turns ratio. The use of a balun will prevent the coax radiating any power or picking any up. In many practical situations it is possible to operate the dipole satisfactorily without one, but there may be a slight increased risk of interference if one is not used. Simple baluns can be bought from antenna suppliers, or made.

INVERTED-V DIPOLES

The maximum radiation from a dipole takes place in the centre. Accordingly this is the most important area of the antenna to keep as high as possible. Coupled with the fact that in many situations it is only possible to have one high mast or high point on the antenna, this often makes an inverted-V dipole (**Fig 5**) an ideal choice.

The antenna is basically an ordinary dipole, but rather than keeping it horizontal, a single mast or anchor point is used in the centre and the two halves of the dipole are angled downwards away from the central mast. Although it does alter the radiation pattern, making it almost omni-directional, its basic operation remains the same. In view of its convenience and operational advantages this type of antenna is widely used and is a favourite with many operators.

The main point to note when using an inverted-V is that the lower ends of the antenna should be kept out of reach. The ends of the antenna will have a high voltage when used for transmitting and the installation should be such that it is not possible to touch them. The securing ropes should also be installed so that people cannot trip or stumble over them. A suitably-located tree or bush may help overcome this problem.

OTHER OPTIONS

There are many other variations on the basic theme of a dipole. Some use what are termed 'slopers' where the dipole has one end attached to a mast or pole, and the other to a low anchor point so that the whole antenna slopes, typically at an angle of between 30° and 45°. Others feed the antenna with open wire feeder and use an antenna tuning unit at the end of the open wire feeder. This gives the possibility of multi-band operation. Another possibility for achieving multi-band operation is to feed several different dipole radiating elements from a single feeder. All these variations have their own advantages, but with limited space here it is not possible to describe them all. ♦

FIG 3 © RADCOM 172

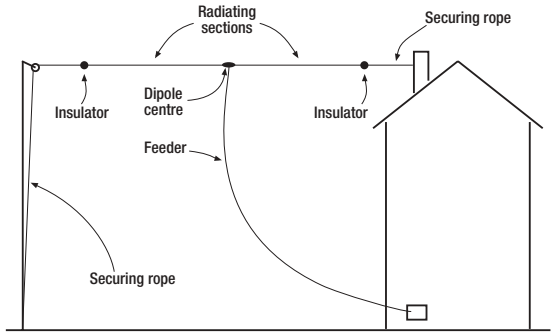


FIG 4 © RADCOM 173

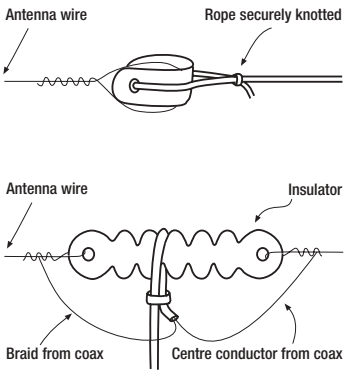
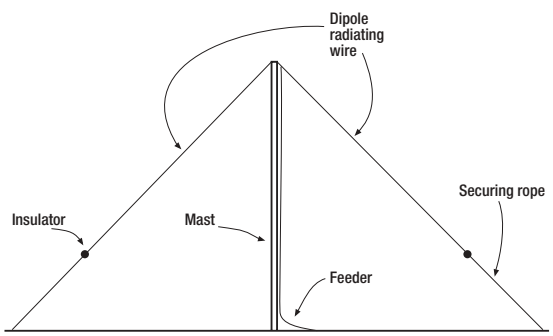


Fig 3
A typical dipole antenna installation.

Fig 4
Antenna insulators: (a) egg insulator, (b) 'dogbone' or ribbed insulator used here as a dipole centre piece.

Fig 5
An inverted-V dipole.

FIG 5 © RADCOM 174



NEW RELEASE

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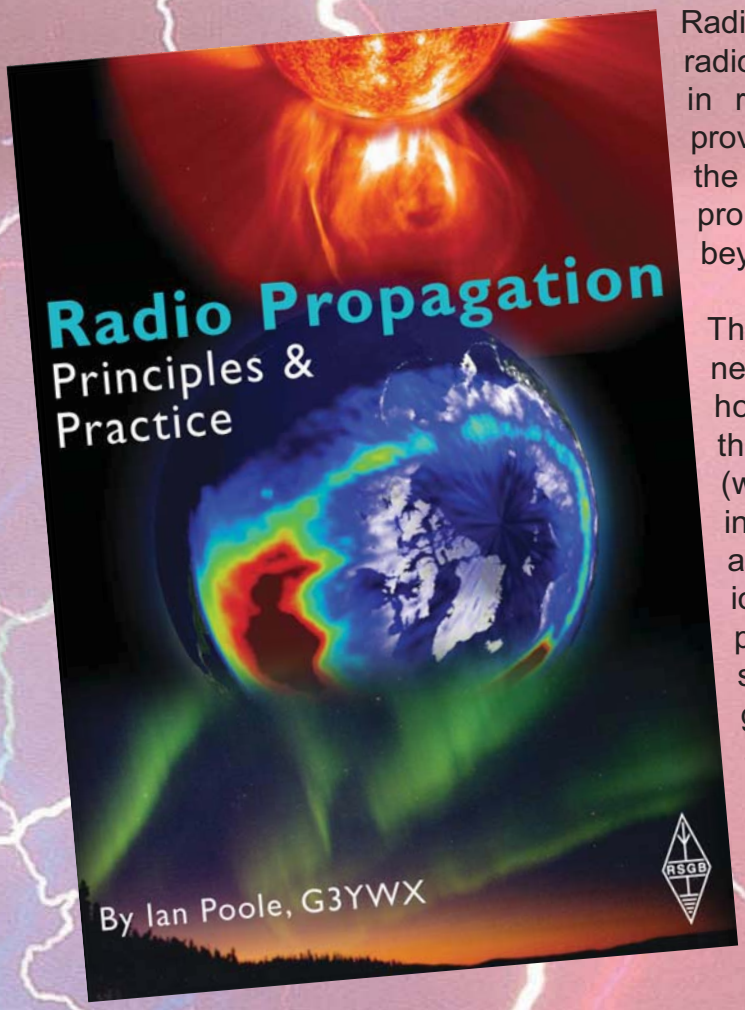
By Ian Poole, G3YWX



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Reviewed by Chris Lorek, G4HCL

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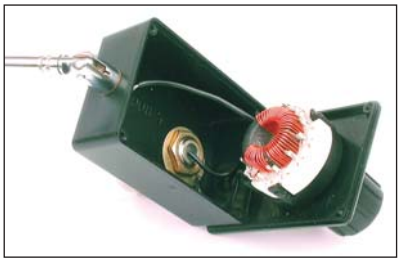
The 'Wonder Wand' HF - UHF portable antenna

Chris Lorek reviews this British-made portable rig-mounted antenna.

Rear of the 'Wonder Wand', showing the PL259 plug attachment.



Inside the Wonder Wand, a tapped ferrite-cored RF transformer.

The optional tuned counterpoise system.

There is now a growing number of portable-sized HF transceivers, often including VHF and UHF coverage; small, all-mode 'boxes of tricks' that would have been unimaginable a couple of decades ago. Rigs get smaller, but a usual stumbling block is the antenna that's required. A compact loaded whip is certainly possible given an adequate ground plane like a car roof, or a wire counterpoise. But when you rely on the metalwork of the tiny set itself you'll often get disappointing results. Full-sized 'Zepp' antennas have been in use for a considerable length of time, these being a 'free space' end-fed antenna via a suitable balun. The 'Wonder Wand' goes a few steps further, by adding a tapped ferrite-cored RF transformer to a telescopic whip, the result being a multi-band end-fed compact whip.

The Wonder Wand consists of a 113.5cm long telescopic whip (retracted 33cm), terminated by a compact black plastic-cased box on which are fitted a PL259 plug plus a band-change knob. To use the whip on the bands from 7MHz to 28MHz or 50MHz, all you need to do is to plug it into your set's antenna socket, extend the whip to its full length, select the band you're operating on, and off you go! The Wonder Wand can also be used on 2m and 70cm on the 'VHFUHF' switch position, where it acts as a simple whip with the internal matching section shorted out. On these bands you just adjust the telescopic whip length to match the band you're operating on.

I tested the antenna with a variety of transceivers, ranging from an almost-handheld sized HF multi-mode transceiver through to a 'Liner 2' in portable mode on 2m SSB (who remembers the Liner 2 then? The first time I used one portable was in the 1970s from the top of Blackpool Tower!) A long weekend in the highlands of Scotland amid 20cm of snow also gave the antenna a good test in rural conditions.

On HF, my conclusions were that the Wonder Wand gave around the same performance as a car-mounted mobile whip of the same length. In other words, don't expect the performance of a 'throw it in the trees' full-sized wire dipole (which I often also had with me). But then, when you're sitting on a harbourside pub patio enjoying a cool drink as the sun goes down, the other occupants could get a little annoyed if you were to string up a long wire across the tables! But the Wonder Wand was extremely easy to 'plug in and go', and I had plenty of contacts as a result on HF and 2m, as well as a quick FM contact on 6m whilst I was operating portable in Portsmouth.

I found the antenna gave a very acceptable VSWR of better than 3:1 on all HF bands up to 21MHz and in the CW/SSB section of 28MHz. Going higher into the 29MHz FM section, retracting the whip by one section length gave me a better VSWR, likewise on 6m where shortening the whip by a couple of section lengths gave the best performance. Due to the nature of base matching, I usually found that adding an additional ground plane made little difference in practice to signal levels. However, the Wonder Wand distributors, bhi, can also supply a tuned counterpoise unit utilising a 4m wire as an optional extra, which could be especially useful if you're using a transceiver in a 'ground plane-less' mode, with a set-top whip for example.

All in all, I found the Wonder Wand very easy indeed to use, it can be carried around easily, and with its hinged whip base even left permanently connected to the rig's antenna socket ready for instant use.

The Wonder Wand is priced at £99.95 plus P&P, with the tuneable counterpoise at £59.95 (or both together at £149.90) and our thanks go to bhi Ltd, PO Box 136, Bexhill on Sea, East Sussex TN39 3WD; tel: 0870 240 7258, for the loan of the Wonder Wand for this review. ♦

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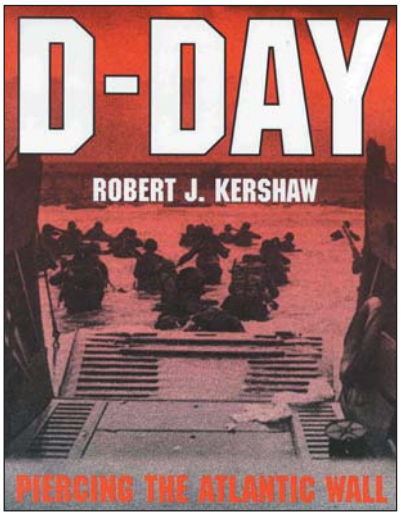
Book review

D-DAY – PIERCING THE ATLANTIC WALL
by Robert J Kershaw
Published by Ian Allan Publishing, 1993, 2004
Reviewed by RSGB Staff



This book provides a vivid evocation of the events before and after D-Day, from Allied and German eyewitness accounts.

As the Preface tells us "The Battle of D-Day was not, as Cornelius Ryan suggests, *The Longest Day*, it is rather concerned with the nine days it took for the Allies to dominate the foreshore upon which they had landed". It was not a single day's battle, but a prolonged vicious conflict which would decide if the Allied lodgement would hold or if the Germans push the invaders back into the sea.

The story is told in a mixture of explanatory text, eyewitness accounts and photographs. Personally, I found the eyewitness accounts to be the most telling and poignant. Combatants are not renowned for their literary eloquence, but some of the excerpts quoted in the book are very moving. The excerpts are just that – only a few lines at most but, for those of us who cannot imagine the full horrors of war, provide a picture which cannot be painted adequately at second- or third-hand.

"What use are rattling machine-gun salvoes, hand grenades and rifles when they are surrounded by

attackers five times their number? The howitzers can fire no more, the hand grenades have been thrown, the machine guns are silenced. The enemy breaks into the position."

Military historians will welcome the book, as it gives, in the most graphic detail, a description of what *really* happened in the sea and on the beaches, backed up with a generous supply of photographs.

"Any notion that we were fighting for our country, or to free Europe from Hitler, or to make a better world, is largely romantic. We were fighting in order to stay alive, and our loyalties were not to our country, not to our regiment even, but intensely to one another."

This is truly an engrossing book.

D-Day – Piercing the Atlantic Wall
Ian Allan Publishing, 2004
Hardback, 200 x 255mm, 254 pages
ISBN 0 7110 2176 6
Members' price £18.74 (non-members £24.99) plus p&p
Available from the RSGB Shop.

THE ROYAL CORPS OF SIGNALS – UNIT HISTORIES OF THE CORPS (1920-2001) AND ITS ANTECEDENTS
by Cliff Lord and Graham Watson
Published by Helion & Company Limited, 2003
Reviewed by RSGB Staff

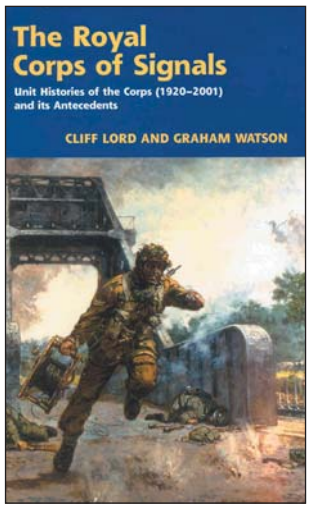
The publisher makes no bones about the intended readership of this book. It is for "historians, genealogists, and those who served". As the reviewer falls into none of these categories, I hope the expert *RadCom* reader will be tolerant of my layman's précis of text from the book.

The book is intended to provide an insight into the complexity and diversity of the Royal Corps of Signals. This is done by delving into unit history rather than campaign history, thus offering a different perspective for the historian. Undoubtedly, this is true, but it makes the book less riveting to the interested reader than it might otherwise have been.

As new technologies are developed, new signal units are raised; for example, during WWII, the Golden Arrow Detachments were created as independent, mobile, high-speed transmitting and receiving stations to provide links to Britain, and thus provide High Command with the information from commanders in the field. These units also passed intercepted enemy signals back to England for the code-breakers at Bletchley Park.

While not being lavishly illustrated, the book covers: overviews of the Signals Order of Battle at specific times; detailed coverage of special signal units including Commando and Para; the history of 35 Commonwealth and related Signal Corps; photographs of many rare signal badges; scores of unit histories, both Regular and Territorial.

The book is a limited edition of 1000 copies, individually-numbered.



The Royal Corps of Signals – Unit histories of the Corps (1920-2001) and its antecedents
Published by Helion & Company Limited, 2003
Hardback, 143 x 230mm, 409 pages
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Members' price £25.45 (non-members £29.95) plus p&p
Available from the RSGB Shop.

By John Alexander, G7GCK

148 Leicester Road, Groby,
Leicester LE6 0DP.

E-mail: jalex_uk@ntlworld.com

Enigma-E

A fully operational electronic

From left
The alpha-numerical displays of the electronic Enigma machine.

A close up of the plug board.

Two views of the lamp section.

On a recent trip to Bletchley Park I was introduced to Marc Simons and Paul Reuvers from Holland. They had with them a kit of parts that, with a little care and time, transforms into exactly what it says on the box - a fully operational electronic Enigma machine.

BACKGROUND TO THE ENIGMA

The German Enigma is perhaps the best known of many mechanical cipher systems developed during the 20th century. The Enigma was produced by Dr Arthur Scherbius's company Chiffriermaschinen Aktien Gesellschaft of Steglitzerstrasse 2, Berlin, in 1923 as a commercial machine. Commercial Enigma machines? Oh yes, the Enigma was originally intended as a cipher machine for commercial use by banks, insurance companies - for any company that needed security for its business messages.

Spain, Italy and Switzerland bought commercial Enigmas and Sweden decided to build its own machine. The UK and USA each bought examples to evaluate.

The rare Abwehr Enigma - like G312 that was stolen from Bletchley Park - is a version of the commercial Enigma. The version (K) used by the Swiss from 1935 is a particularly sought-after machine. From 1935 the British used a machine very similar to Enigma - the Type X or Typex. So similar is Enigma to Typex that Typex could be set up to decipher Enigma messages once the settings had been discovered. Apparently one German operator converted an incomplete captured Typex so that it operated as an Enigma - as a spare machine.

The Enigma, a glow-lamp machine, was based upon work carried out by several other people working on mechanisation of ciphers using rotors or enciphering wheels. It is called a 'glow-lamp' machine because pressing a key causes the rotor(s) to turn and allows a current to flow through the rotor wirings, through the reflector and back for a second time through the rotors before lighting up a bulb below to indicate an alphabet character.

Scherbius made little money from the system and was killed before it was taken up by the largest potential customer of all - the German military. Germany was restricted by the Treaty of Versailles and one thing they had to do was to stop their potential enemies from reading their mail - the Enigma appeared to be just the thing they needed.

The system was potentially a good one, and has been strongly defended at times, but it ultimately failed through:

- Poor operational instructions given to users - these could have been better thought out to reduce the chance of anyone 'breaking in'.
- A well-placed (and expensive) spy in the German cipher office. Hans Thilo Schmidt (codename Asche), who also had a high ranking brother in the German army.
- German operators making errors in the way they set up and used Enigma. These were often very basic mistakes and the Luftwaffe were thought particularly bad. That was later a blessing for Bletchley Park.
- The application of sheer genius - the Polish made amazing advances through the genius of Marian Rejewski, Jerzy Rozycki and Henryk Zygalski. This expertise was later gifted, along with Polish-made Enigma machines, to the British and French. The genius of others, like Alan Turing, also came into play.

By the way, those Polish Enigma copies were built by AVA of Warsaw, a company producing short-wave radio equipment for military and amateur use.

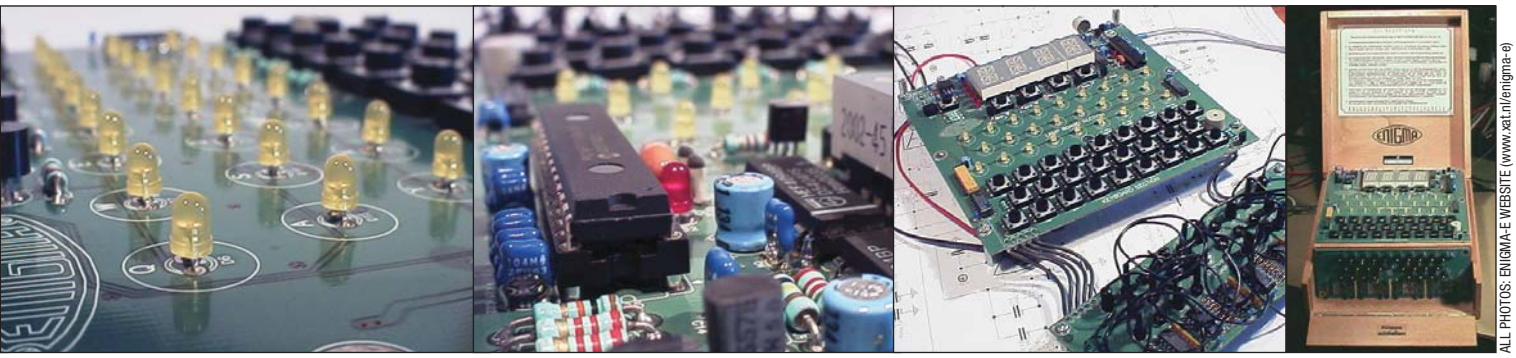
THE ELECTRONIC ENIGMA

Original Enigma machines, in good condition, are expensive to buy and an electronic version is a fine alternative - it illustrates the original working system and is more interesting (tactile) than a computer simulation.

Marc and Paul demonstrated their finished machine and I knew immediately I would have to have one. On my next visit to Bletchley Park I saw the kit on sale and paid out my own hard-earned cash. I walked away with it feeling just a little apprehensive. After all, how long had it been since I last touched a soldering iron?

I'm a certain age now and, through accumulated experience, I chose to spend some time reading the comprehensive manual and locating all parts. That was to help make the construction easy and straight-forward. Oh, and I first brushed up

Enigma machine



ALL PHOTOS: ENIGMA-E WEBSITE (www.xat.nl/enigma-e)

on those soldering skills too - soldered a few old parts to scrap circuit boards.

Over two afternoons, with breaks for tea and biscuits, I built the finished article. The instructions were carefully read, followed closely and the board checked for bad soldering before any power was applied.

It's a great feeling when a new project works perfectly first time - as mine did. Immediately I e-mailed a friend or two to see how they got on with theirs. One had a problem that turned out to be due to a poor solder joint. Once fixed, his worked perfectly too. Paul and Mark do provide a help service too if needed.

The manual is well laid out - that helped me enormously. The contents include an introduction, component recognition section, building instructions, a section on using the Enigma, excellent circuit layouts, plans for a suitable box, a history of the Enigma and some real messages (genuine intercepts) to work on.

USING THE ENIGMA-E

The Electronic Enigma beautifully emulates the German M4 (four rotor) Naval Enigma and the three-rotor version used by the Luftwaffe and Heeres (Army).

All settings can be made as for the real Enigma machine. Rotors and rotor order can be selected, 'crowns' and other initial settings made by pressing 'up' and 'down' buttons on the board. You can even store several settings in memory. That helps to switch ultra (pun intended) fast between predefined settings. There's no reason why you could not use the Electronic Enigma with the real thing and send messages between them.

There is a fully functional plugboard too - this had the effect of swapping pairs of letters. By 'Steckering' letters 'A' and 'T' for example, whenever an 'A' should appear, a 'T' will be produced instead - and *vice versa*. The plug board was an addition for military machines and did not appear on the commercially-sold Enigma machines.

There are some important additions to the kit version. The kit can be connected to a PC via a standard serial port or configured to send Morse automatically. If you wish, you can enter plain text and send cipher text to a simple text editor - and vice versa. Paste your enciphered text into an e-mail and you have a degree of security although it might be best not to send your most important secrets this way.

For portability, power is selectable, flicking a switch changes from battery (9V) to external power supply. I have included both options into my box - it makes it so simple to carry out and show off. I just need to finish the letter screen now - that helps you to read the plain text and cipher text character by character as you tap out messages on the keyboard.

The kit contains all necessary parts to build a working Enigma. Tools required to build it include a decent soldering iron, a wire stripper, side-cutters and a small screwdriver-that's about it. Just basic soldering kit.

Above
The Enigma-E machine completed.

Right
The completed electronic Enigma machine in a home-made wooden case.

THE BOX

A good box really sets this Enigma off so I spent some time looking for a suitable box to convert or build from scratch. My woodworking skills are even worse than my soldering and so I took the conversion route.

In an art shop I found a wooden box, designed to carry paint, brushes, and canvas, and converted that to my needs. Plenty of room for the power brick, a battery pack, spare leads and the (yet to be added) serial port connector. This kit can go anywhere.

Since then I have found an old rosewood box that I fancy converting so I may yet move it, or build another kit up. For the purists, the box design provided in the manual will give a much more realistic look and feel to the system.

CONCLUSION

As a collector of code and cipher systems from 1936 up to the 1970s, this kit was a 'must have' for me and comes highly recommended. Strangely, perhaps, it does not look out of place beside an original Enigma.

The Enigma-E costs £119.99 and is available from the Bletchley Park shop or from their website (see 'Websearch' below). ♦

WEB SEARCH

Bletchley Park museum and shop	www.bletchleypark.org.uk
Enigma-E	www.xat.nl/enigma-e
'Enigma Variations'	http://frode.home.cern.ch/frode/crypto/CSG

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SQBM200 Dual-Bander.....**£49.95**
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")
SQBM500 Dual - Bander Super Gainer.....**£59.95**
(2 mts 6.8dBd) (70cms 9.2dBd) (Length100")
BM1000 Tri-Bander.....**£59.95**
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")
SQBM1000 Tri-Bander.....**£69.95**
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")
SQBM 100/200/500/800/1000 ***are Polycoated Fibre Glass with Chrome & Stainless Steel Fittings.***

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BM33 70 cm 2 X 5/8 wave Length 39" 7.0 dBd Gain...**£34.95**
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BM55 70cm 4 X 5/8 wave Length 100" 10 dBd Gain...**£69.95**
BM60 2mtr5/8 Wave, Length 62", 5.5dBd Gain.....**£49.95**
BM65 2mtr 2 X 5/8 Wave, Length 100", 8.0 dBd Gain.....**£69.95**

MINI HF DIPOLES (length 11' approx)

MD020 20mt version approx only 11ft.....**£39.95**
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(aluminium construction)

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RDP-3B 10/15/20mtrs length 7.40m.....**£119.95**
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RDP-40M 40mtrs length 11.20m.....**£169.95**
RDP-6B 10/12/15/17/20/30mtrs boom length 1.00m. Length 10.0m.....**£239.95**

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MRW-250 Telescopic TX 2 Metre & 70 cms RX 25-1800 Mhz Length 14-41cm BNC fitting.....**£16.95**
MRW-200 Flexi TX 2 Metre & 70cms RX 25-1800 Mhz Length 21cm SMA fitting.....**£19.95**
MRW-210 Flexi TX 2 Metre & 70cms Super Gainer RX 25-1800 Mhz Length 37cm SMA fitting.....**£22.95**
All of the above are suitable to any transceiver or scanner. Please add £2.00 p+p for hand-held antennas.

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70cms	(Boom 12")	**£19.95**
2 metre	(Boom 20")	**£24.95**
4 metre	(Boom 23")	**£29.95**
6 metre	(Boom 33")	**£34.95**
10 metre	(Boom 52")	**£64.95**
6/2/70 Triband	(Boom 45")	**£64.95**

HALO LOOPS

2 metre (size 12" approx).....**£14.95**
4 metre (size 20" approx).....**£19.95**
6 metre (size 30" approx).....**£26.95**
These very popular antennas square folded di-pole type antennas

CROSSED YAGI BEAMS All fittings Stainless Steel

2 metre 5 Element
(Boom 64") (Gain 7.5dBd).....**£74.95**
2 metre 8 Element
(Boom 126") (Gain 11.5dBd).....**£94.95**
70 cms 13 Element
(Boom 83") (Gain 12.5dBd).....**£74.95**

YAGI BEAMS All fittings Stainless Steel

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(Boom 48") (Gain 7dBd).....**£24.95**
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(Boom 63") (Gain 10dBd).....**£44.95**
2 metre 8 Element
(Boom 125") (Gain 12dBd).....**£59.95**
2 metre 11 Element
(Boom 185") (Gain 13dBd).....**£89.95**
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(Boom 45") (Gain 8dBd).....**£49.95**
4 metre 5 Element
(Boom 128") (Gain 10dBd).....**£59.95**
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(Boom 72") (Gain 7.5dBd).....**£54.95**
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(Boom 142") (Gain 9.5dBd).....**£74.95**
70 cms 13 Element
(Boom 76") (Gain 12.5dBd).....**£49.95**

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ALL FITTINGS STAINLESS STEEL

2 metre 5 Element (Boom 38") (Gain 9.5dBd)...**£39.95**
2 metre 7 Element (Boom 60") (Gain 12dBd)....**£49.95**
2 metre 12 Element (Boom 126") (Gain 14dBd)**£74.95**
70 cms 7 Element (Boom 28") (Gain 11.5dBd)..**£34.95**
70 cms 12 Element (Boom 48") (Gain 14dBd).....**£49.95**
The biggest advantage with a ZL-special is that you get massive gain for such a small boom length, making it our most popular beam antenna

MULTI PURPOSE ANTENNAS

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MSS-2 Freq RX 25-2000 Mhz, TX 2 mtr 4.0 dBd Gain, TX 70cms 6.0 dBd Gain, Length 62".....**£49.95**
IVX-2000 Freq RX 25-2000 Mhz, TX 6 mtr 2.0 dBd Gain, 2 mtr 4dBd Gain, 70cms 6dBd Gain, Length 100" **£89.95**
Above antennas are suitable for transceivers only

G5RV Wire Antenna (10-40/80 metre)
All fittings Stainless Steel

	FULL	HALF
Standard	**£22.95**	**£19.95**
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Flex Weave	**£32.95**	**£27.95**
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Convert your half size g5rv into a full size with just 8ft either side. Ideal for the small garden.....**£19.95**

REINFORCED HARDENED FIBRE GLASS MASTS (GRP)

1½" Diameter 2 metres long.....**£19.95**
1¾" Diameter 2 metres long.....**£24.95**
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MGR-3 3mm (maximum load 250 kgs).....**£6.95**
MGR-4 4mm (maximum load 380 kgs).....**£14.95**
MGR-6 6mm (maximum load 620 kgs).....**£29.95**

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6" Stand Off Bracket *(complete with U Bolts)*.....**£6.00**
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Dog bone insulator.....**£1.00**
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5ft POLES H/DUTY (SWAGED)

Heavy Duty Aluminium (1.2mm wall)
1¼" single 5' ali pole.....**£7.00**
1¼" set of four (20' total approx).....**£24.95**
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1½" set of four (20' total approx).....**£34.95**
1¾" single 5' ali pole.....**£12.00**
1¾" set of four (20' total approx).....**£39.95**
2" single 5' ali pole.....**£15.00**
2" set of four (20' total approx).....**£49.95**
(All swaged poles have a push fit to give a very strong mast set)

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RG58 best quality standard per mt.....**35p**
RG58 best quality military spec per mt.....**60p**
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10 amp red/black cable 10 amp per mt.....**40p**
20 amp red/black cable 20 amp per mt.....**75p**
30 amp red/black cable 30 amp per mt.....**£1.25**
Please phone for special 100 metre discounted price

CONNECTORS & ADAPTERS

PL259/9 plug (Large entry).....**£0.75**
PL259 Reducer (For PL259/6 to conv to P1259/6).....**£0.25**
PL259/6 plug (Small entry).....**£0.75**
PL259/7 plug (For mini 8 cable).....**£1.00**
BNC Screw type plug (Small entry).....**£1.00**
BNC Solder type plug (Small entry).....**£1.00**
BNC Solder type plug (Large entry).....**£2.50**
N-Type plug (Small entry).....**£2.50**
N-Type plug (Large entry).....**£2.50**
SO239 Chassis socket (Round).....**£1.00**
SO239 Chassis socket (Square).....**£1.00**
N-Type Chassis scoket (Round).....**£2.50**
N-Type Chassis scoket (Square).....**£2.50**
SO239 Double female adapter.....**£1.00**
PL259 Double male adapter.....**£1.00**
N-Type Double female.....**£2.50**
SO239 to BNC adapter.....**£1.50**
SO239 to N-Type adapter.....**£3.00**
SO239 to PL259 adapter (Right angle).....**£2.50**
SO239 T-Piece adapter (2xPL 1XSO).....**£3.00**
N-Type to PL259 adapter (Female to male).....**£2.50**
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Please add just £2.00 P&P for connector only orders

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G.A.P.12 1/2 wave alumimum (length 18' approx).....**£24.95**
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S27-3 3-element yagi. Freq: 27-28MHz. Length: 2.5mtrs. Gain: 8.5dB.....**£59.95**
S27-4 4-element yagi. Freq: 27-28MHz. Length: 3.8mtrs. Gain: 10.5dB.....**£69.95**

BALUNS

MB-1 1:1 Balun 400 watts power.....**£24.95**
MB-4 4:1 Balun 400 watts power.....**£24.95**
MB-6 6:1 Balun 400 watts power.....**£24.95**
MB-1X 1:1 Balun 1000 watts power.....**£29.95**
MB-4X 4:1 Balun 1000 watts power.....**£29.95**
MB-6X 6:1 Balun 1000 watts power.....**£29.95**
MB-Y2 Yagi Balun 1.5 to 50MHz 1kW.....**£24.95**

TRI/DUPLEXER & ANTENNA SWITCHES

MD-24 HF or VHF/UHF internal duplexer (1.3-225MHz) (350-540MHz) SO239/PL259 fittings.....**£22.95**
MD-24N same spec as MD-24 but "N-type" fittings.**£24.95**
MX2000 HF/VHF/UHF internal Tri-plexer (1.6-60MHz) (110-170MHz) (300-950MHz).....**£59.95**
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CS201-N Same spec as CS201 but with N-type fittings.....**£28.95**
CS401 Same spec as CS201 but4-way.....**£49.95**

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AR-31050 Very light duty TV/UHF.....**£24.95**
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RC5-1 Heavy duty HF.....**£349.95**
RG5-3 Heavy Duty HF inc pre set control box.....**£449.95**
AR26 Alignment Bearing for the AR300XL.....**£18.95**
RC26 Alignment Bearing for RC5-1/3.....**£49.95**

MOBILE MOUNTS

Turbo mag mount 7" 4mtrs coax/PL259 3/8 or SO239.....**£14.95**
Tri-mag mount 3 x 5" 4mtrs coax/PL259 3/8 or SO239.....**£39.95**
Hatch Back Mount (stainless steel) 4 mts coax/PL259 3/8 or SO239 fully adjustable with turn knob.....**£29.95**
Gutter Mount (same as above).....**£29.95**
Rail Mount (aluminium) 4mtrs coax/PL259 sutiable for up to linch roof bars or poles 3/8 fitting.....**£12.95**
SO259 fitting.....**£14.95**
Gutter Mount (cast aluminium) 4mtrs coax/PL259 3/8 fitting...**£9.95**
SO259 fitting.....**£12.95**
Hatch Back Mount 3/8 4mtrs coax/PL259.....**£12.95**
Roof stud Mount 4mts coax/PL259 3/8 or SO239 fitting.....**£12.95**

ANTENNA WIRE & RIBBON

Enamelled copper wire 16 gauge (50mtrs).....**£11.95**
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Equipment wire Multi Stranded (50mtrs).....**£9.95**
Flexweave high quality (50mtrs).....**£27.95**
PVC Coated Flexweave high quality (50mtrs).....**£37.95**
300Ω Ladder Ribbon heavy duty USA imported (20mtrs).....**£15.00**
450Ω Ladder Ribbon heavy duty USA imported (20mtrs).....**£15.00**
(Other lengths available, please phone for details)

HF BALCONY ANTENNA

BAHF-4 FREQ:10-15-20-40 Mtrs LENGTH: 1.70m HEIGHT: 1.20m POWER: 300 Watts.....**£159.95**

MISCELLANEOUS ITEMS

CDX Lightening arrestor 500 watts.....**£19.95**
MDX Lightening arrestor 1000 watts.....**£24.95**
AKD TV1 filter.....**£9.95**
Amalgamating tape (10mtrs).....**£7.50**
Desoldering pump.....**£2.99**
Alignment 5pc kit.....**£1.99**

TELESCOPIC MASTS (aluminium & fibreglass options)

TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ Approx 20ft erect 6ft collapsed.....**£99.95**
TMA-2 Aluminium mast ★ 8 sections 170cm each ★ 65mm to 30mm ★ Approx 40ft erect 6ft collapsed.....**£189.95**
TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ Approx 20ft erect 6ft collapsed.....**£99.95**
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★Approx 40ft erect 9ft collapsed.....**£189.95**

HF YAGI

HBV-2 2 BAND 2 ELEMENT TRAPPED BEAM FREQ:20-40 Mtrs GAIN:4dBd BOOM:5.00m LONGEST ELEMENT:13.00m POWER:1600 Watts.....**£399.95**

ADEX-3300 3 BAND 3 ELEMENT TRAPPED BEAM
FREQ:10-15-20 Mtrs GAIN:8 dBd
BOOM:4.42m LONGEST ELE:8.46m
POWER:2000 Watts.....**£329.95**

ADEX-6400 6 BAND 4 ELEMENT TRAPPED BEAM FREQ:10-12-15-17-20-30 Mtrs GAIN:7.5 dBd BOOM:4.27m LONGEST ELE:10.00m POWER:2000 Watts.....**£599.95**
40 Mtr RADIAL KIT FOR ABOVE.....**£99.00**

HF VERTICALS

VR3000 3 BAND VERTICAL
FREQ: 10-15-20 Mtrs
GAIN: 3.5dBi HEIGHT: 3.80m POWER: 2000 Watts (without radials)
POWER: 500 Watts (with optional radials).....**£99.95**
OPTIONAL 10-15-20mtr radial kit.....**£39.95**

VR5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 4.00m RADIAL LENGTH: 2.30m (included). POWER: 500 Watts.....**£189.95**

EVX4000 4 BAND VERTICAL FREQ:10-15-20-40 Mtrs GAIN: 3.5dBi HEIGHT: 6.50m
POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials).....**£119.95**
OPTIONAL 10-15-20mtr radial kit.....**£39.95**
OPTIONAL 40mtr radial kit.....**£14.95**

EVX5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 7.30m POWER: 2000 Watts (without radials) POWER: 500 Watts (with optional radials).....**£169.95**
OPTIONAL 10-15-20mtr radial kit.....**£39.95**
OPTIONAL 40mtr radial kit.....**£14.95**
OPTIONAL 80mtr radial kit.....**£16.95**

EVX6000 6 BAND VERTICAL FREQ: 10-15-20-30-40-80 Mtrs GAIN: 3.5dBi HEIGHT: 5.00m RADIAL LENGTH: 1.70m(included) POWER: 800 Watts.....**£299.95**

EVX8000 8 BAND VERTICAL FREQ:10-12-15-17-20-30-40 Mtrs (80m optional) GAIN: 3.5dBi HEIGHT: 4.90m RADIAL LENGTH: 1.80m (included) POWER: 2000 Watts.....**£319.95**
80 MTR RADIAL KIT FOR ABOVE.....**£89.00**
(All verticals require grounding if optional radials are not purchased to obtain a good VSWR)

TRAPPED WIRE DI-POLE ANTENNAS

(Hi Grade Heavy Duty Commercial Antennas)

UTD160 FREQ:160 Mtrs LENGTH:28m POWER:1000 Watts.....**£49.95**
MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts..**£44.95**
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts.....**£49.95**
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts.....**£89.95**
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts.....**£44.95**
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts.....**£79.95**
(MTD-5 is a crossed di-pole with 4 legs)

PATCH LEADS

STANDARD LEADS
1mtr RG58 PL259 to PL259 lead.....**£3.95**
10mtr RG58 PL259 to PL259 lead.....**£7.95**
30mtr RG58 PL259 to PL259 lead.....**£14.95**
MILITARY SPECIFICATION LEADS
1mtr RG58 Mil spec PL259 to PL259 lead.....**£4.95**
10mtr RG58 Mil spec PL259 to PL259 lead.....**£10.95**
30mtr RG58 Mil spec PL259 to PL259 lead.....**£24.95**
1mtr RG213 Mil spec PL259 to PL259 lead.....**£4.95**
10mtr RG213 Mil spec PL259 to PL259 lead.....**£14.95**
30mtr RG213 Mil spec PL259 to PL259 lead.....**£29.95**
(All other leads and lengths available, ie. BNC to N-type, etc. Please phone for details)

SPX-100 'PLUG N GO'

Normally £49.95. This month **£39.95**!! Plus £6.00 P&P
6mtrs through to 80mtrs.
Change band by using a simple fly lead and socket at the base coil and fine tune with the adjustable telescopic whip.
Standard 3/8 thread 1.65mtrs fully extended.

ALL PICTURES ARE FOR REFERENCE ONLY

D-Day 60th

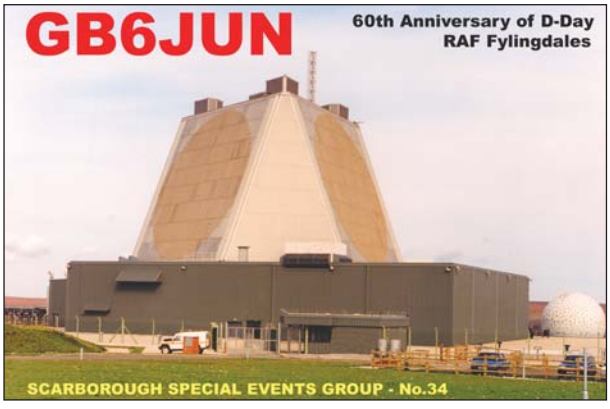
The 60th anniversary of D-Day takes place on 6 June 2004. D-Day is normally commemorated by radio amateurs with special event stations, often located at sites connected with the events surrounding D-Day in 1944. This year being the 60th anniversary it is likely that there will be more special event stations on the air than during the last few years. The following is a compilation of events and activities of which the RadCom editorial office had been informed as of our publication deadline.

SCARBOROUGH SPECIAL EVENTS GROUP

The Scarborough Special Events Group (SSEG) will operate GB6JUN on 5 / 6 June to celebrate the 60th anniversary of D-Day. D-Day saw the greatest air and seaborne invasion in history as operation Overlord was launched on the beaches and drop-zones of Normandy, where Allied Forces combined to launch the liberation of Europe. Vital to the allied invasion was the 'Chain Home' system of early-warning radar which covered the south and east coast, allowing Britain to track aircraft for the first time. Later development resulted in the ability to detect German V2 missile launches.

The SSEG GB6JUN QSL card shows one of Britain's modern Solid State Phased Array Radar Pyramids at RAF Fylingdales, from where GB6JUN will be operating. The pyramid houses the most sophisticated radar in the world-wide chain of Ballistic Missile Early Warning Station (BMEWS) sensors. Each 84ft diameter array contains hundreds of active antenna elements allowing all-round coverage with the capability of tracking 800 objects simultaneously, averaging 6000 satellite tracks per week.

Roy Clayton, G4SSH, the Chairman of SSEG, said, "We are grateful to the Officer Commanding RAF Fylingdales, Wing Commander Phil Cox, for allowing the Scarborough Special Events Group to mark this special anniversary by operating from inside Britain's BMEWS." Declared operational in 1964, RAF Fylingdales is celebrating its own 40th anniversary this year.



NORMANDY

TM6JUN will be on the air from the blockhouse at the Utah Beach Museum in Ste Marie du Mont, Normandy, from 1 to 11 June. The station will be operated by members of REF-50, the REF (French national amateur radio society) branch of La Manche *département*. Recommended frequencies are, approximately, CW: 3526, 7026, 14026, 18078, 21026, 24900 and 28026kHz, and SSB: 3644, 7074, 14174, 18160, 21174, 24940 and 28574kHz.

Direct QSLs can be obtained from Denis Villemin, F5RJM, Le Flaquet, F-50470 Tollevast, France, or via the REF QSL bureau. A special Utah Beach Certificate is also available from F5RJM for those who have three QSLs from different years from the D-Day special event stations at Utah Beach. Previous years' callsigns include TM4JUN, HY6JUN, HW6JUN as well as the TM6JUN call which is being used again this year. The certificate costs $5 but is free to veterans of the 1944 landings.

Also, the special event callsign TM60GM will be activated from 3 to 7 June for the 60th anniversary of the landings on the Normandy beaches. QSL direct to Jean-Marie Monplot, F5NLX, 409 Faubourg Montmelian, F-73000 Chambéry, France or via the French QSL bureau.

DOVER CASTLE

The Dover Radio Club is liaising with the management of Dover Castle and will be putting on special event station GB6OFS (standing for 'Operation Fortitude South') at Dover Castle on 5 and 6 June. Operation Fortitude South was the successful deception operation mounted in the area, leading the Nazis to believe that Allied landings would be launched from south-east England. Part of that deception was the decoy radio traffic, much of which was transmitted from the war-time tunnels beneath Dover Castle.

GB6OFS will include activity with operational WWII radio equipment. There will also be a display of WWII radio equipment and photographs in the grounds of Dover Castle. The event is open on both 5 and 6 June and large numbers of the general public are expected to visit.

MONTROSE AIR MUSEUM

The Montrose Air Museum will be on the air as GB2MAS on the 6th of June to commemorate the D-Day anniversary. A demonstration station at the Montrose Air Museum radio station was established in October 2003 and has been active since then using the club callsign GM3KC, which is held by Brian Murray, MM0ERK.

On 6 June there will also be military vehicles of display to members of the public at the Montrose Air Museum. GB2MAS hopes to make contact with radio hams across in Normandy. Further details from Brian Murray, MM0ERK, 1 Powis Farm Cottages, Powis, by Montrose, Angus DD10 9LL.

RNARS STATIONS

GB60DD will be active during the period 1 to 28 June inclusive to commemorate the 60th anniversary of D-Day. The station will be operated by members of the RNARS London Group from *HMS Belfast* moored in the Pool of London. This museum ship is owned by the Imperial War Museum and is open seven days a week.

The HQ station of the Royal Naval

anniversary: 6 June

BLETCHLEY PARK MEDAL

Christine Large, Director of the Bletchley Park Trust, has announced that the New Opportunities Trust, as part of its 'Home Front Recall' project, has agreed to support the coining of a Bletchley Park medal to be presented to all of the WWII veterans involved, inside and out, with Bletchley Park. The medal and citation will identify whether, for example, the individual was working in Hut 4, Hut 8, B Block, the 'Y' service, the Radio Security Service (RSS) etc. The medal is also to be available to widows, widowers and close relatives of those deceased and will be launched along with the Bletchley Park Roll of Honour.

On 10 June, as part of its D-Day 60th anniversary programme, the National Codes Centre, Bletchley Park, will be opening the first phase of a new exhibition centre to tell the WWII Enigma codebreakers' story. This will be located in B Block, where Baroness Trumpington and other BP veterans carried out Churchill's top secret intelligence mission. 10 June is also the day when the first presentation takes place of the commemorative metals in recognition of the contribution made by BP veterans and those who worked in outlying message interception stations.

Amateur Radio Society, GB3RN, located at the School of Weapon Engineering and Communications at HMS Collingwood in Fareham, Hants, will also be celebrating D-Day with special event call GB60DDL and a special commemorative QSL card. Contacts made during the period 1 to 12 June will qualify. Activity will generally be on SSB on weekdays, with CW on Thursday evenings and weekends, on all the HF bands.

ROYAL SIGNALS

The Royal Signals Amateur Radio Society is running a series of special events stations this year, commencing with GB6OL, standing for 'Operation Overlord', in June. (The other stations are GB6LOG in July and GB6LOP in August). Each station will run for 28 days and a free certificate is available from the RSARS for all stations worked on receipt of an A5 SASE with stamps to the value of 50p sent to M I Humphrey, G0SWY, 4 Bluebell Road, Bassett, Southampton SO16 3LQ. For further details please e-mail: g0swy@aol.com

THE MUCKLEBURGH COLLECTION

Members of the North Norfolk Amateur Radio Group (NNARG) will be at the Muckleburgh Collection Military Museum, Weybourne, in North Norfolk, on 6 June. The museum houses the NNARG club station and permanent special event station GB2MC. The club members will be providing accompanied tours of the vintage / military radio collection at the museum.

During the course of the war, the part played by clandestine radio equipment in maintaining contact with British spies in France, Holland and other parts of Europe, is inestimable. NNARG is proud to own a working example of a B2 spy set type 3, and it is planned to have this operational throughout the day, transmitting CW on 80m. It is hoped that the frequencies will be available on http://oh2aq.kolumbus.com/dxs All contacts made with the GB2MC callsign are confirmed by sending a QSL card via the bureau. (GB2MC will be active again during the 'Museums on the Air' weekend on 19 / 20 June.)

HISTORICAL ELECTRONICS MUSEUM ARC, BALTIMORE, MARYLAND

Each year on or about 6 June, the Historical Electronics Museum Amateur Radio Club, W3GR / W3HEM, located in Linthicum, just south of Baltimore, Maryland, USA, operates a special event station to commemorate the role of electronics in the D-Day invasion. This year the special event will be held on 5 and 6 June from 1200 to 2000UTC each day. The club members will be operating as W3HEM, mainly on 20m SSB, on or near 14244kHz.

Certificates and QSL cards are available to all who request one or both. This year the certificate will feature a montage of electronic contributions to Operation Fortitude, the plan to deceive the enemy into believing the main invasion would be in the Pas de Calais area. In the past, certificates have featured the SCR-584 anti-aircraft radar system, an example of which is featured in the museum. The 8 x 10in colour certificate is sent if a large enough SAE is enclosed - otherwise a QSL is returned. The address is HEMARC, PO Box 746, MS 4015, Baltimore, MD 21203, USA.

RSGB member Nick Yokanovich, K3NY, writing on behalf of the Historical Electronics Museum Amateur Radio Club, said: "We hope the bands will allow trans-Atlantic contacts. A few years ago almost all of our QSOs were with G and F stations, but last year we had very few. We will be sure to point our beam in your direction, especially in the morning." An alphabetically-sorted list of callsigns contacted will be posted on the club's website (see 'Websearch' below) within 24 hours of the end of the event. ♦

GB0BDD:	Bourne D-Day, Lincolnshire.
GB2BMR:	Beaumanor Radio, Leicestershire.
GB2DDL:	D-Day Landings, Stafford Castle, Stafford.
GB2MAS:	Montrose Air Station.
GB2MC:	Muckleburgh Collection, North Norfolk.
GB2NFM:	New Haven Fort, nr Worthing.
GB4FAA:	RNARS Fleet Air Arm.
GB4OL:	Operation Overlord, Wiltshire.
GB60DD:	60th Anniversary of D-Day, *HMS Belfast*, London.
GB60DDL:	D-Day Landings, HMS Collingwood, Hampshire.
GB60NL:	Normandy Landings, Sandown Airport, Isle of Wight.
GB60OL:	Operation Overlord, 21 Signal Regiment (Air Support), Azimghur Barracks, Colerne Airfield, Nr Chippenham, Wilts.
GB60RE:	Royal Engineers, D-Day veterans' weekend at RE Museum, RSME Chatham, Kent.
GB6DD:	D-Day. St Margaret, Norfolk.
GB6JUN:	RAF Fylingdales, Scarborough, N Yorkshire.
GB6OD:	Weymouth, Dorset.
GB6OFS:	60th anniversary of Operation Fortitude South, Dover Castle.
GB6OL:	Operation Overlord, RSARS, Hampshire.
TM6JUN:	Utah Beach, Normandy.
TM60GM:	Normandy Beaches.
W3HEM:	Historical Electronics Museum, Baltimore, Maryland.

Table 1: Summary of special event stations on the air for the D-Day anniversary (as of time of going to press).

WEB SEARCH

A recommended general (non-amateur radio) website, with a huge amount of historical detail concerning the D-Day landings and links to other sites is at www.dday.co.uk
Scarborough Special Events Group www.princ7.demon.co.uk
Dover Radio Club www.darc.org.uk
RNARS HQ www.rnars.org.uk/index.html
RNARS London, HMS Belfast www.stahlhammer.btinternet.co.uk/BELFAST.html
RSARS www.rsars.org.uk
North Norfolk ARG www.northnorfolk.org/nnarg
David Edwards, M0CNP (NNARG) www.qsl.net/m0cnp
Muckleburgh Collection: www.muckleburgh.co.uk
Historical Electronics Museum Amateur Radio Club (USA) www.qsl.net/w3gr
Historical Electronics Museum, Baltimore, Maryland www.hem-usa.org
Bletchley Park Museum www.bletchleypark.org.uk

By Pat Hawker, G3VA

37 Dovercourt Road,
Dulwich,
London SE22 8SS

To commemorate the 60th anniversary of D-Day, RadCom asked Pat Hawker, G3VA, to write about his personal recollections of the day and of some of the radio amateurs who played such an important role on and around D-Day.

60 years - a D-Day to remember

There are days that one always remembers. For my generation, 6 June 1944 - D-Day - was such a day. I confess that I spent an entirely un-heroic day playing French cricket in an antenna-littered field alongside the SIS Section VIIIP clandestine control station at Weald, near Bletchley. I was with a small group of fellow radio operators who had recently been formed into SCU9, destined to go to Normandy as a mobile unit to provide special communications between SIS and the Army Command, particularly the reports from the 'Sussex' two-man teams of secret agents dropped into France from April onwards. Sussex was the largest single SIS / OSS / BCRA (British / American / Free French) combined Intelligence operation of WWII. The redoubtable 'Remy' (Gilbert Renault) - one of de Gaulle's best secret agents - represented BCRA and recruited the French teams. He accompanied SCU9 / 2I(U) Section to France.

Earlier Remy had set up an Intelligence network (CND) one of whose agents stole the plans of the Atlantic West Wall defences, brought to the UK by Remy on one of the Secret Flotilla boats that for a time worked directly to Weald during their trips off the coast of Brittany. Remy had organised radio links to Weald that continued after he came to Britain, although his main operator was 'turned' by the Germans.

But to return to D-Day. At 8.30am on 6 June, while I was at the Section VIII Tattenhoe hostel, the BBC news bulletin announced that the Allied Command had issued a statement that a new phase of the bombing offensive had begun and warning the peoples of occupied Europe to expect heavy bombing at short notice. The bulletin continued with a German report that Allied parachutists were dropping in the Seine area and that German Naval forces were in contact with Allied landing craft.

It was not until we had arrived at Weald that at 9.30 came Official Communique No 1 from SHAEF (Supreme Headquarters Allied Expeditionary Force) confirming that the landings had begun, along with statements from Eisenhower and leaders of the occupied countries. One of our signals vehicle's HRO receivers was soon carrying the 7MHz SAS broadcasts with the Desert Rats' version of *Lilli Marlene* as a tuning signal.

The main SCU9 party July 1944 just before leaving for Normandy. Nine Section VIIIP radio operators (including G2ALM, G3VA, G3AVI (SK), and G4NY (SK) plus GM3AVA (SK, missing from photograph), four transport drivers and despatch riders, under the command of Major R H Tricker (centre seated). The earlier advance party of three had reached Normandy earlier.

OPERATIONS IN FRANCE

As a result of the stormy weather, the loss of one of the two floating Mulberry harbours, the stiff German resistance that bogged down the Allies, it was not until D + 50 that I, together with the other eight operators (including Roy Wilkins, G2ALM; Watson (Bill) Peat, GM3AVA; Johnny Bowers, G4NY, and Stewart (Chick) Francis, G3AVI) forming the main party of SCU9, finally arrived. For me, it was to prove the beginning of some 18 months in north-west Europe, a story recounted in Geoffrey Pidgeon's *The Secret Wireless War* [see *RadCom* December 2003 p321 - *Ed*].

But if the main party of SCU9 was late in getting across to Normandy, at least one amateur, Douglas Brewer, G4LJ, had already been in France for almost a year. He had been one of the CWR 'Early Birds' called up in April 1939. With a French mother and experience of radio, he was a natural for recruitment into SOE in early 1942. There followed a string of SOE Special Training Schools including parachute training at Ringway and the finishing school (STS31) at Beaulieu in the New Forest. A tussle between the radio and industrial sabotage sections followed with sabotage winning, although Douglas did some radio operating on his first mission in February 1943 to deliver one of the then new B2 (Type 3 MkII) suitcases sets (designed by John Brown, G3EUR). This mission lasted only 'one moon period' and he came back to Tangmere on a Lysander pick-up operation on the night of 17/18 March 1943.

G4LJ returned to France in July 1943, joining the important Wheelwright sabotage circuit headed

PHOTO BY G2ALM

The Section VIIIP control station at Weald as it appeared in 1945. It was then working not only to agents but to the SCU9 'Liberation' group in France, Belgium and Holland.

by George Starr, with his radio traffic carried by Yvonne Cormeau who in just over a year from August 1943, until overrun, handled more than 400 messages. Douglas returned to the UK two days after D-Day by a USAAF aircraft pick-up. Wheelwright played an important part in delaying the transfer of elite German troops from the south to Normandy.

G4LJ was soon back in the Paris area ferreting out German-placed explosive charges in key buildings, rendering them useless in the days before the Liberation. I arrived in Paris on 27 August so our paths crossed but we did not meet. G4LJ's third mission came to an end in September 1944, after the Liberation of Paris, and over two years of hazardous service with F Section and EMFFI. He was one of the few members of SOE Section F to receive a *Croix de Guerre avec palme* and the *Médaille de la Résistance* from the prickly General de Gaulle who usually had little liking for SOE Section F. His story has remained untold for many years apart from one short account in a provincial newspaper at the time of the 50th anniversary of D-Day. After this had been brought to my attention, G4LJ kindly furnished me with a much fuller account that deserves to be published in full one day. Happily he is still listed in the *RSGB Yearbook*.

Wartime photograph of John Brown, G3EUR (SK), designer of many of the SOE suitcase radios including the well-known B2 (Type 3 Mk III).

Some of the 32 double-banks of HRO receivers in the Hanslope Park station. The photo was taken by G4NY (SK) in 1946 after the station had been vacated by SCU3 (RSS) with its many 'Amateur' intercept operators.

AROUND EUROPE & MIDDLE EAST

Other RSGB members played covert roles in the years leading up to the Normandy D-day. For SOE, Stan Ingram, G6ZY (now EA6ZY), delivered a clandestine radio into Algiers in the days leading up to 'Torch'; John Hunt, G2FSR, went to Sweden to instruct Norwegian clandestine operators; Bert Allen, G2UJ (later the first *Bulletin* VHF columnist), another of the 'Early Birds' was also in Stockholm on a covert mission (possibly to monitor the rocket launching from Peenemunde). Dave Williams, G3CCO, was a covert SIS operator in Spain, reporting German shipping using Spanish ports (at least two of them sunk by British submarines as a direct result of this traffic). An Abwehr assassination attempt on him was frustrated, almost certainly as the result of Box 25 (RSS) intercepts.

DOUBLE CROSS

Less hazardous to those concerned, but of supreme importance, were the brilliant plans mounted to deceive the German High Command that the main landings would come in the Calais area. If these had not succeeded, it is entirely possible that the Allied beachheads would have been repulsed, as had the earlier attack on Dieppe in which so many Canadians were lost. Several British amateurs, recruited first into the Radio Security Service and then seconded to MI5B acted as operators / minders to the double-agents under the control of the joint Twenty (XX, double-cross) Committee.

In respect of D-Day, the most important of these double-agents was the Spaniard 'Garbo' who in the UK, working for the XX Committee, 'notionally' recruited and set up radio links with the Abwehr station in Spain. In fact, the radios were operated by Ronnie Reed, G2RX, and Russell Lee, G6GL. As it became clear that the Germans were accepting as genuine the messages from Garbo, more and more responsibility was placed on maintaining these contacts, many of them made from the then Curzon Street HQ of MI5 using an American BC610 (militarised Hallicrafters HT4) transmitter capable of an output of 500 watts but run in its low power mode (100 watts). G2RX was later to write (anonymously) Appendix 3 *Technical Problems affecting Radio Communications by the Double-Cross Agents* in Vol IV of *British Intelligence in the Second World War - Security and Counter-Intelligence* (HMSO 1990). Ronnie once showed me his Iron Cross (Second Class) that had been awarded to 'Tate' who gave it to Ronnie as his operator / minder when later he was awarded an Iron Cross (First Class)!

RSS (SCU3 and the VIs) and the Y-services were able to monitor and Bletchley Park decipher the onward transmission of these messages to Germany and then the resulting information passed back to the German Army command in France.

The success of Garbo in convincing the Germans that the main landings would be in the Pas de Calais (even after the Normandy campaign had been in progress for several weeks) has been recognised as a vital contribution to the Allied invasion, saving thousands of lives and indeed the possible failure of the whole operation. Both G2RX and G6GL stayed with MI5 post-war as senior security officers.

Incidentally, it was a photograph of G2RX that was used in the fake identity card for 'Major Martin' the corpse floated ashore in Spain as a Twenty Committee deception plan that helped conceal the intention to invade Scilly in 1943.

RSS & Y SERVICE

Part 2 of my potted history of the Society (*RadCom* August 2003) noted the important wartime roles of Kenneth Morton-Evans, G5KJ (Deputy Controller RSS with its many Society members as VIs or SCU3/4/10), and Harold Kenworthy, G6HX (in charge of Foreign Office 'Y' Service). Needless to say, none of the above activities were reflected in the pages of the *Bulletin*, which was reduced in size to about 16 pages per monthly issue. At the time of D-Day the Society had some 7170 members (1800 of whom had joined since September 1943).

Many of the wartime BRS members were recruited from the RAF, in part due to encouragement by Squadron Leader Len Newnham, G6NZ, at RAF Cranwell. G6NZ was a lifelong enthusiast (President, 1958) whose callsign is even inscribed on his headstone. Regrettably not all of them survived to obtain their own calls. The nightly bombing raids over Germany and hard-fought air battles during the months following D-day by the 2nd Tactical Air Force all took their toll.

Nor should we forget that the Allied entry into Rome in the hard-fought Italian campaign occurred just two days before D-Day, or the September disaster at Arnhem, or the civilian casualties of the V1 and later V2 missiles, or the 'forgotten' 14th Army in Burma. The role of the Resistance has occasionally been overplayed, but we should never forget the help given to us by their members, some of them pre-war amateurs, in the occupied countries including France, Belgium, Holland, Norway, Denmark, Poland, Czechoslovakia, Italy, Greece and the then Jugoslavia.

I am acutely aware that this story has concentrated on the covert side of D-Day but the outcome finally depended on those who waded ashore that day and the Navy and RAF that succoured them. The war would not have been won without the sacrifices of our Servicemen and those of our Russian and American allies. The war was not won on D-Day, major stepping stone though it was! ♦

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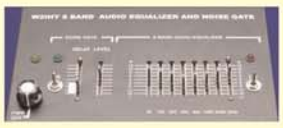

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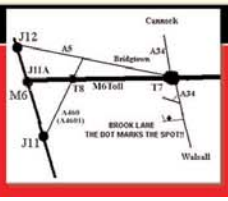

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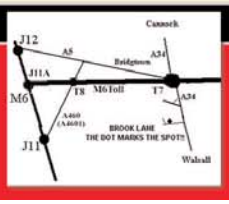

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TT

G3VA looks more closely at super-regenerative receivers. He also describes I7SWX's new simple double-balanced mixer-demodulator using only a single transformer, yet capable of achieving more than adequate performance. In a follow-up to his item on repairing and restoring old receivers, he covers different valve cathode types and gives words of caution on replacing thermionic diodes with solid-state types. More enigmas surrounding the HRO are aired, and an improved design of signal-frequency crystal filter is described.

HYBRID SELF-QUENCHING SUPER-REGEN

The recent 'TT' items on simple super-regenerative detectors (January and March, 2004) encouraged me to have another look at the book *Super-Regenerative Receivers*, by J R Whitefield (CUP 1950) which, as G3NRT has pointed out, is still in the IEE Library basement store, although seldom borrowed by members. One arrangement the author gives for a self-quenching detector is shown in **Fig 1.** In this hybrid arrangement, the super-regenerative oscillator acts as its own quench oscillator by virtue of a separate feedback circuit that provides the quenching frequency using coupled low-frequency quench coils. Whitefield writes: "This circuit is more controllable than that using the relaxation type of self-quenching, but is more expensive in components" [but using fewer components than with a separate quench oscillator – *G3VA*]. The 9002 valve shown in the diagram was a miniature UHF triode akin to the acorn types, but with a conventional seven-pin base. It would probably be quite simple to use a basically-similar hybrid arrangement with a solid-state device.

Whitefield also points out: "When reasonably faithful reproduction is desired from a super-regenerative receiver, it is necessary to maintain it in the linear mode. This mode has the added advantage of better selectivity and offers much greater scope to the designer because of its extreme flexibility. These advantages are offset by the necessity to use automatic gain-stabilisation (AGS), at least where it is necessary to tune over an appreciable band of frequencies. In a serious attempt to compete with other types of receiver, on a basis of performance alone, the designer must inevitably employ the linear mode." His book provides a circuit illustrating the essentials of linear receiver design with AGS.

Bob Harry, G3NRT, writes: "Recent references in 'TT' to super-regenerative receivers made me look back through my files to an article I wrote for *Short Wave Magazine* (July 1993) which charted the history of 'The Super-Regenerative Receiver' and may still be of interest to readers. Re-reading it, I got the feeling that the creative hand of pre-war radio amateurs played a large part in many of the wartime designs and the post-war CB units. My copy of Whitefield's book – it contains some good photographs of war-time equipment – was borrowed from the IEE Library. I wonder if it has been out since 1983?" [Once, about 1997, although it may, as in my case, have been consulted at the Library without being borrowed – *G3VA].*

In his *SWM* article, G3NRT mentions the 1930s National 'One-Ten' receiver which, with an acorn and conventional valves plus six plug-in coils, covered 30-300MHz. It was probably the only pre-war factory-made super-regenerative receiver and one used to be on display at the London Science Museum; like so many other historic exhibits it seems to have vanished into store. In *Practical Wireless* (May, 2004, p54, Ben Nock, G4BXD, describes and illustrates a surviving One-Ten but, for some inexplicable reason, refers to it as a variant of the HRO, captioned as a 'HRO 1-10'. The only thing in common with the HRO was that later versions used the PW epicentre tuning drive (see later)!

G3NRT also recalls that some of the HF W/S 10 tank sets contained a second unit for short-range inter-tank working based on the super-regen. True also of SOE's 350MHz 'S-Phone' for ground-air etc duplex communications, using separate transmitter-receiver circuits. Germany used the super-regen in the 'Liechtenstein' series of air-to-air radar units that was responsible for the loss of many RAF night bombers. G3NRT emphasised once again that the super-regenerative detector should not be confused with the straightforward regenerative detector.

FIG 1 © RADCOM 187

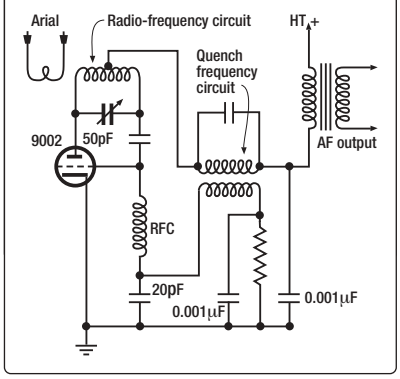


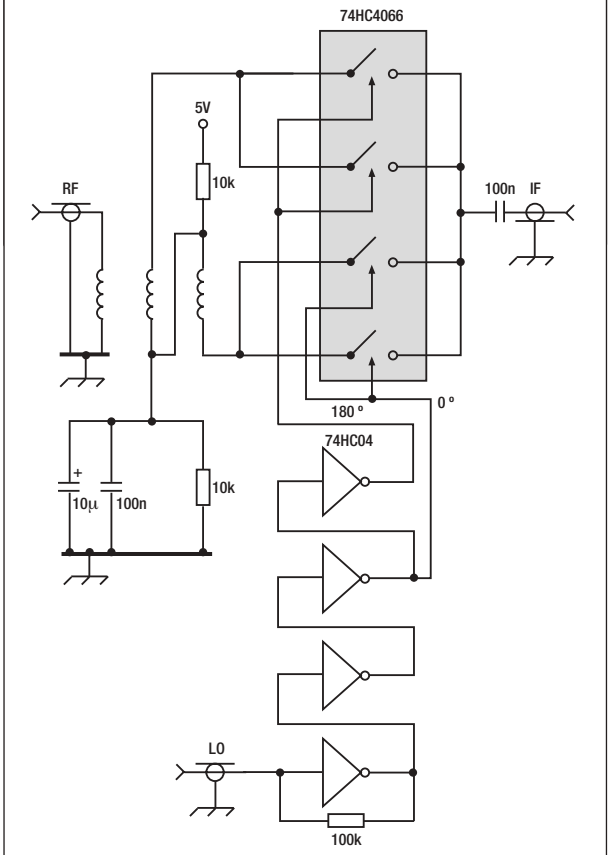
Fig 1
A self-quenching super-regenerative detector circuit claimed in J R Whitefield's book to be more controllable than when using the relaxation type of self-quenching detector. Quenching frequency is at VLF requiring large-inductance quench coils – suitable quench coils used to be available pre-war from Eddystone, but I am not aware of anyone still offering them. They can be home-made.

I7SWX'S FST3125 DOUBLE-BALANCED MIXER

For several decades, a serious limitation to the performance of receivers was their performance in the presence of very strong signals, such as those from HF broadcast stations, or local amateur transmitters. This was recognised and led, for example, to the development and use of improved double-balanced mixers such as the packaged- diode units marketed by Mini-Circuits or the discontinued Plessey SL6440 IC based on cross-coupled bi-polar devices, the active FET mixers developed by Ed Oxner for Siliconix and then in the mid-nineties the H-mode mixer developed by Colin Horrabin, G3SBI, using the SD5000 with three transformers, later improved still further when I7SWX suggested using fast–switching bus devices such as the FST3125. This mixer remains state-of-the-art, providing probably the maximum dynamic range available from any solid-state HF mixer.

However, the use of frequency-synthesis has underlined that currently, the prime limitation to receiver performance is now reciprocal mixing arising from oscillator noise. This permits some relaxation from the highest standards of mixer dynamic range without reducing overall receiver performance. It has led I7SWX to

FIG 2 © RADCOM 189



describe ('TT' April 2003) his development of a two-transformer version of the H-mode mixer and more recently ('TT' March 2004) a 3.5V two-transformer version.

He believes that the radio 'homebrewing' community is formed of three groups. First, those looking for the highest possible performances, where 0.1dB becomes significant. His second group seeks good performance but accepts compromises and thinks in unit steps of one or two dB. His third and largest group seek designs that are simple, inexpensive and easy to implement, with improved performance an added bonus.

[Of radio amateurs as a body, there is, of course, the large number who eschew homebrewing and home-modification of complex transceivers and who simply accept that manufacturers know best, and regularly update their latest models to take advantage of recent technical developments - despite all the evidence that this is seldom the case – *G3VA*].

For the benefit of the 'brewers' and 'modifiers', I7SWX has recently investigated the use of a simple double-balanced mixer-demodulator using only a single transformer, yet

Fig 2
Basic configuration of the ZS6BZP switched mixer-demodulator described in 'TT' January 1996. It used a 74HC4066 and 74HC04 squarer. The 'TT' item included details of an adapted version used by I7SWX to replace the original JFET mixer in his Yaesu FT-726.

Fig 3
Single-transformer, double-balanced mixer/demodulator as developed by I7SWX using FST3125 fast bus switches, for details see text.

capable of achieving more than adequate performance. His approach is to adapt a mixer configuration that was first described in *RF Design* (June, 1995) by Hannes Coetzee, ZS6BZP. This was derived from the classic four-diode ring double-balanced mixer, but with the diodes replaced by IC switches with one of the two ring-mixer transformers replaced by the commutating gates. I7SWX brought this simple mixer (**Fig 2**) to the attention of 'TT' readers in January 1996 (see also *Technical Topics Scrapbook, 1995-1999*, pp72-74). ZS6BZP used a 74HC4066 device as the mixer, but I7SWX also suggested that there would be scope for improved higher frequency performance when CMOS devices with higher switching speeds became available.

Recently, during his review of various high performance mixers, he has revisited this simple one-transformer double-balanced switching mixer, this time using the FST3125 fast bus switch and with the 74AC86 squarer that he used in his two-transformer H-mode mixer described in 'TT' March 2004.

Fig 3 shows the revised circuit diagram. I7SWX writes: "As can be seen, the mixer is similar to Fig 2 but there are differences. In particular: (a) the squarer is the 74AC86 as used in the two-transformer H-mode mixer; (b) the FST3125 replaces the 74HC4066 but with the IF output taken from the centre-tap of the transformer secondary. With this arrangement, the FST3125 switches have connection to (virtual) ground. This avoids positioning the switches in such a way that the RF signal, switched by each MOS, cannot modulate the voltage gate source of the switches. In effect, it is thus similar to half of the G3SBI three-transformer H-mode mixer.

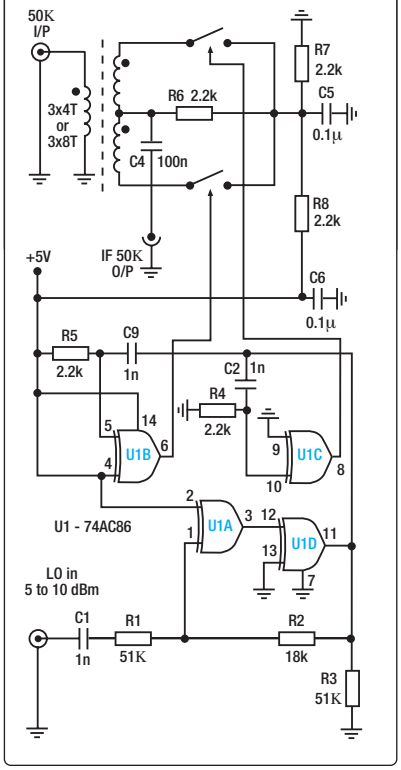
"Switching is controlled by the 74HC/AC86 balanced squarer (0 - 180º). The transformer is wound on a ferrite balun core (No 43 or similar). The winding has four trifilar turns, when used as an HF mixer and with an IF output between 4MHz and 45MHz. A trifilar winding of eight turns is suggested when used as a 455kHz demodulator. It can also find application as a low IF mixer, eg 15kHz, to drive a DSP unit. For both of these, capacitor C4 should be about 1µF, non-polarised. Experimenters could try different numbers of turns and core material while nothing prevents the use of commercial transformers as specified for previous projects or in commercial equipment using ring diode mixers.

"In this mixer there is a bias of Vcc/2 as used in the various H-mode designs. Vcc can be between 5V and 6.8V. A simple PSU could use the 78L05 or78L06 ICs. With an 8V receiver rail, two diodes in series (1N4001 or similar) with a parallel 10nF capacitor can be used to lower the voltage to about 6.7V. Working details of the 78HC/AC86 squarer are given in 'TT' April 2003."

I7SWX gives the performance of this simple mixer as an IP3 between +22 to +26dBm and conversion loss of around -6dB for IF output between 455kHz and 70MHz. With a home-brew two-tone generator at 10.160MHz, tones spaced at 20 and 10kHz and signal output at -10dBm (both spacings showed similar results); LO signal +7dBm, the conversion loss was about -6dB up to 45MHz, 7dB at 70MHz. IP3 IMD measurements with HP8562B spectrum analyser: IF 455kHz, +25.5dBm; 4MHz, +26; 9, +25; 10, +25.5; 21, +22.5; 30, +21.9; 45, +26; 70MHz +24.5dBm.

This mixer thus represents a useful improvement on the commercial ring-diode packages such as the SBL- 1, TUF-1 and SAM, which provide an average IP3 of about +10dBm with some going up to +15dBm, driven with a +7dBm LO signal. It is somewhat better than the no-longer readily available SL6440. While not as good as the earlier H-mode mixers, this is not critical,

FIG 3 © RADCOM 191



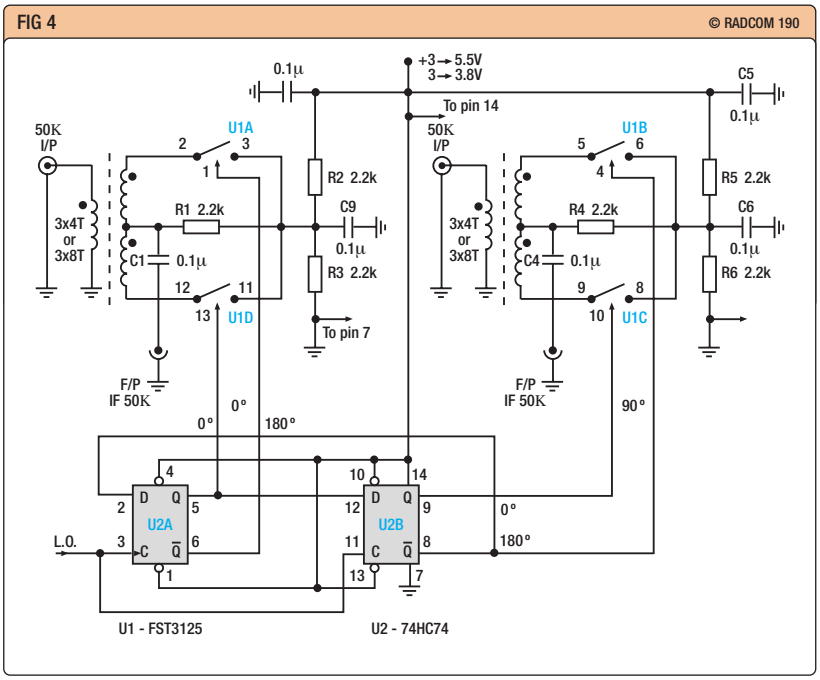


Fig 4
I7SWX's suggested arrangement for an image-rejection mixer or demodulator using two single-transformer FST3125 mixers.

since receiver performance is likely to be limited by oscillator phase noise, particularly with frequency-synthesised oscillators.

I7SWX believes that this form of mixer/squarer has much going for it. It can be used in direct conversion receivers as a mixer/demodulator as well as a simple mixer. He also suggests, although not proved in practice, that it could be used as an up-conversion mixer for the 137kHz band, swapping the input and output; in this case the output is taken from the transformer primary with the input to C4, now 0.1µF.

Another possible application would be as an SSB high performance modulator. In this case, C4 should be at least 1µF, non-polarised. Other possible applications include phasing-type receivers and modulators, and also image rejection mixers, demodulators and modulators. Notes on image rejection mixers appeared in 'TT', April 1993 (see also *TTS 1990-94*). **Fig 4** shows a possible image-rejection application. The circuit has two mixer-demodulators, driven by a 'digital quadrature generator' that produces two square-wave group signals that are out of phase by 90°. This provides two signals for each mixer, each pair 180° out-of-phase. I7SWX is planning to try this in one of his projects, but had not tested it at the time of writing.

Finally, I7SWX notes that the 'Tayloe mixer', used as demodulator in phasing receivers, is in reality a 'sampling switch' and works like a filter. The Tayloe mixer has found important applications following on the suggested use by I7SWX, of FST 3125 fast-bus switches and with the FST3253 to replace the 74HC4053. It is possible that the principle of the Tayloe mixer was foreseen by Chris Bartram, G4GDU, and first described in the item 'CMOS Third-Method SSB Generator' ('TT' November 1975, p847) in which he described how the CD4016 CMOS quad bilateral switch devices could be used in a third-method SSB generator. I7SWX suggests "It would be interesting to compare the Tayloe sampler and the I7SWZ demodulator in the same application."

In respect of this latest work on mixers, I7SWX, who has recently retired back to his native Italy, acknowledges his debt to his friend Stefan Petrov, LZ1OV, for help in preparing the technical drawings and Maurice Cavat, F5NRZ, for use of his HP8562B spectrum analyser, adding: "I may have completed my 'infinite story' on mixers or… Maybe not."

REPAIRS REVISITED

My 'TT' item in the April issue on repairing and restoring old valve receivers etc needs a little clarification. First, in a slip of the keyboard, I suggested that the 'heater' of valves slowly loses emission. I should have said 'cathode' or, for-directly heated valves, 'filament'. Valve cathodes improved over the years using various chemicals associated with low-temperature emission such as barium and strontium oxides. The oxide-coated cathode has a coating of alkaline-earth metals, mostly barium, deposited by dipping or spraying, The operating temperature could be as low as 700°C, with an emission of up to some 200mA/W of cathode heating. For receiving valves, a mixture of barium oxide and strontium oxide is common, and the average DC cathode current for class-A operation should not exceed about 20mA/W of cathode heating. Power valves using thoriated tungsten filaments are more demanding of care, as the tungsten layer has the disadvantage that the thin layer of thorium may be easily destroyed, if only temporarily, by overheating or excessive emission. Fortunately, it can usually be reformed by running the heater/filament for a short time without drawing HT current. Thoriated tungsten operates at around 1600°C. Although this has emission of up to 30mA/W, the average emission should be of the order of 7.5mA/W. Even the 813 as used in my old LG300 transmitter with its 50W heater, is specified for a maximum anode current of only some 100mA.

More significant is the comment made by Dr Dick Biddulph, M0CGN, who writes: "I must take issue with you on one minor point in the April 'TT' – that is on replacing valve rectifiers by silicon diodes. You say, rightly, that there will be 15V more on the HT line. But, at switch-on, the instantaneous voltage is 1.4 times the RMS voltage applied, ie for a 300-0-300V power transformer, there will be 400V peak applied until the valves forming the load heat up. This can, as you say, cause the reservoir capacitor to explode (don't ask!) although it may have a surge rating above its running rating."

Dick continues: "I have never worked out how to reform electrolytic reservoir capacitors by using a Variac in the mains lead, since quite a high AC input voltage is needed before the rectifier conducts at all. What I have done with success is to touch solder a silicon diode in series with a 15W bulb across the rectifier valve holder, having removed the valve. On switching on, the bulb lights as the capacitor charges up, then goes out but returns to a low brilliance when the load (the other valves) heats up."

LAST WORD ON THE HRO?

Although the HRO (Army R106) was not the only widely used high-performance receiver of WWII – the AR88, CR100 (B28), Super-pro (BC779), were others – it is one that stays in the memory and still excites interest and curiosity. There is the designation 'HRO'. There are still those who question the explanation that it derived from the National workshop catchphrase: "Hell Of a Rush", later transposed to HRO

because of the marketing fear that HOR comprised a pronounceable word! Some amateurs have questioned whether this was really the case – but there is solid evidence from at least two sources that James Millen, the chief designer, gave this account on several occasions. It really does stand up.

But there is also an enigma surrounding the development of the ingenious HRO PW dial mechanism providing 500 clear logging points on the main tuning knob. I once quoted in a letter to *Radio Bygones* (No 40, April/May 1996) a writer in *Radio-ZS* who claimed: "If you haven't spun the Sperry-invented PW epicyclic dial of an HRO receiver then you haven't lived". But who really invented the PW dial – William George Harding, a British subject working in west London for the Sperry Gyroscope Company (UK Patent 419,002 applied for May 8, 1933) or Grayson Smith, a mechanical engineer working for National (US Patent 2,000,537 applied for in June 1936)?

It was in March 1994 that Eric Sandys, GI2FHN, drew my attention to the Sperry Patent 'Improvements Relating to Angular Motion Indicators', that clearly covered an 'HRO-type' dial shown applied to a gyro-compass repeater. When the British firm Muirhead marketed a near-replica of the PW dial mechanism, this was always acknowledged as licensed by Sperry quoting Patent 419,002. John Teague, G3GTJ, subsequently pointed out that the Muirhead dial was used on a British-made S-band cavity wavemeter of wartime vintage to count the turns on the micrometer-type plunger, adding "The dial is different from the HRO dial in being thicker and possibly a little larger in diameter." Stan Brown, G4LU, pointed out in a letter to *RB* that many of the Muirhead clones were used in the latter days of Post Office transmitter construction and recalled that the leaflet enclosed with each unit said that they were made under licence from the Sperry Gyroscope Company. Apparently, Muirhead catalogues continued to carry two versions (D-206-A single-spindle extension and D-115-A with double-spindle extension) until at least 1961 according to Howard Miles in a letter to *RB*.

Why then did National not require a Sperry licence and Jim Millen claim (*QST*, January 1935) that the PW dial was an in-house development by Graydon Smith? Certainly National held the US patent. It seems possible that Sperry never applied for a US Patent. It is also possible that Smith had the same idea some years later and saw its application to communications receivers without ever seeing details of the Sperry patent. The original illustration of the prototype HRO in 1934 did not feature the famous PW dial – it was added before the set reached the market in 1935. Clearly, priority for the basic idea belongs to Harrison and the Sperry UK patent.

One HRO mystery remains unsolved. Was the HRO ever manufactured or assembled in the UK either during or after WWII? It is clear that the HRO was meticulously examined by the Marconi Company while they were developing the CR100, but there is no firm evidence that they ever produced any themselves. However, Hans Zimmermann, HB9AQS, in an *RB* letter (No 43, October/November 1996) reported that he had purchased an HRO 5-T model with original National nameplate that had received 'Moisture and Fungus Resistant Treatment' on January 2, 1945. While most components were made by National or other American firms, all of the larger capacitors were 'Made in England' by TCC – and these all appeared to have been fitted during original manufacture, as they were covered by the fungus resistant lacquer.

Additionally, the associated external PSU was (British) 'Supply Unit Rectifier No 5 CZT No ZB0179' made by PSEI Ltd. Interestingly, the coil set identifies the receiver as 'H 881'. A number of the Marconi post-war communications receivers and transmitters, some of the receivers made for them by Eddystone (even before Eddystone was taken over by Marconi in the 1960s) were marketed as H models (eg Marconi H 2301 was a version of the Eddystone S880/3 receiver). So did Marconi market HRO-5 receivers in the immediate post-war period? And why were TCC capacitors fitted in some HROs made by National in the USA?

SIGNAL-FREQUENCY CRYSTAL FILTERS

A long-running saga over many years has been the experimental work by Peter Haylett, G3IPV, on signal-frequency crystal filters, see for example 'TT' February 2003, with follow-up comments by G3JIR, May 2003. G3IPV has recently supplied notes on "a high performance signal frequency crystal filter using combined crystals in series and parallel modes of operation" suitable for use between the antenna and receiver input and usable with suitable crystals for any narrow band between 3.5 and 21MHz. He writes: "Experimenting with many crystals operating in series-resonant modes, no satisfactory arrangements could be found. However, further tests using crystals in series and parallel modes combined have shown extremely good results.

FIG 5 © RADCOM 188

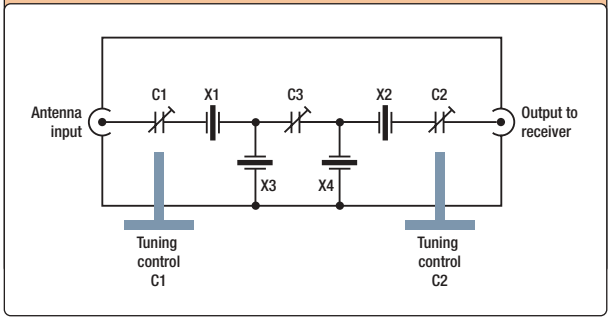


Fig 5 Experimental signal-frequency filter tunable over narrow band for use between antenna and receiver input as implemented by G3IPV. Such filters can be used at frequencies between 3.5 to 21MHz to provide much improved front-end SF selectivity but require sets of four identical frequency crystals (two series-mode, two parallel-mode) for each required narrow-band.

"This new filter is better than all those previously attempted, giving sharper response curves and higher attenuation throughout the HF radio spectrum. It can be used between the antenna and front-end of either a superhet or a TRF receiver, giving advanced performance on most receivers, especially those of limited dynamic range and selectivity, when using large antenna systems. The filter shown in **Fig 5** has a bandwidth of about 500Hz with a tuning range of approximately 3kHz at 7MHz. Much narrower pass-bands and tuning ranges occur below 7MHz, with wider pass-bands and tuning ranges above 7MHz."

Component details for Fig 5: C1, C2 -15pF max air-spaced-vane input and output tuning capacitors; X1, X2 - series-mode crystals; X3, X4 - parallel-mode crystals; all crystals showing identical frequency calibration; C3 coupling between input and output filter sections – this varies with antenna size and filter frequency; minimum capacitance provided by empty H6CU crystal socket, plug-in capacitors for higher values. ♦

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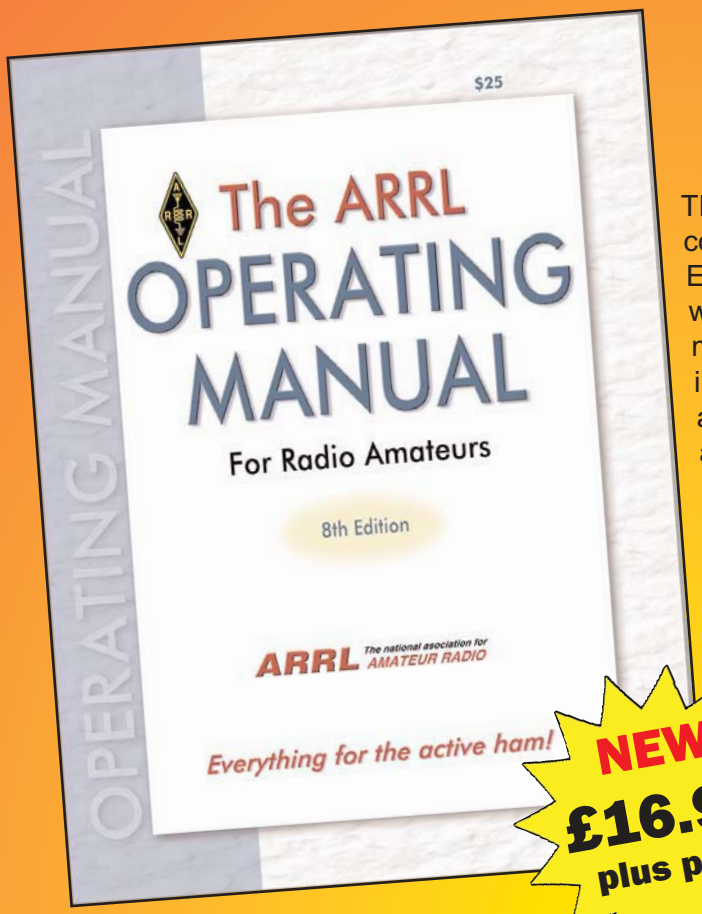

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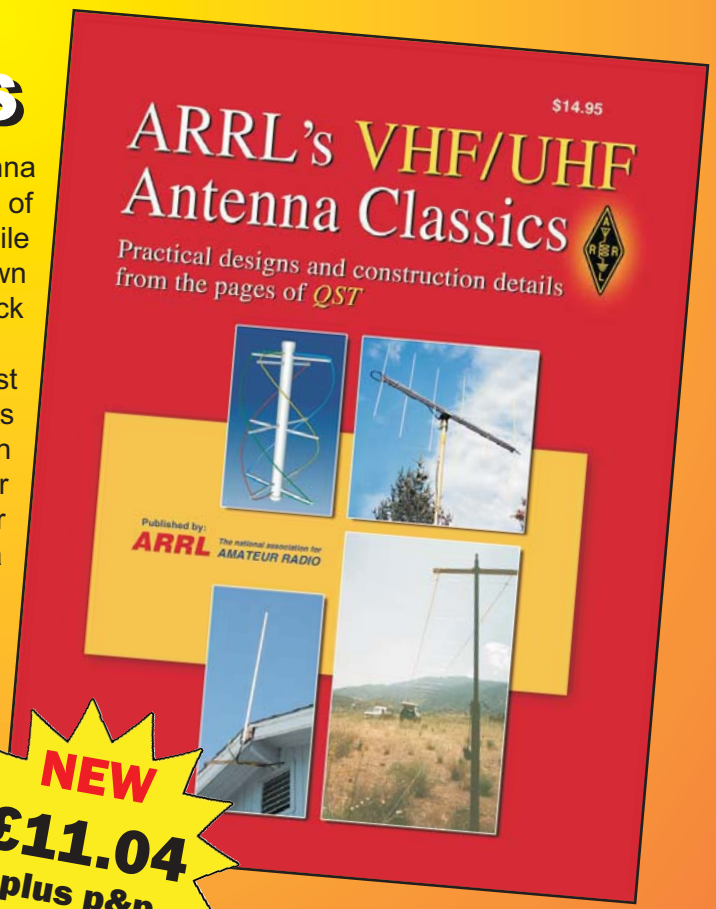

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Whatever next

About five years ago Charles Brain, G4GUO, made it known that he was working on a project to design and construct a modem to transmit digital voice over HF radio. Subsequently, the first amateur contact using Charles's system took place, *RadCom* 'Data' columnist Andy Talbot, G4JNT, being at one end of the link. Things seemed to go quiet for a while, but the system proposed by Charles has now become a commercial reality with the launch of the ARD9800 fast radio modem from AOR (see photo). This item of equipment was mentioned briefly by Andy in his column in April. I see the launch of a digital voice modem as significant, and especially so now that it is being adopted by a number of American operators. Its significance lies in the fact that HF is King in America, and if it takes off there it is inevitable that we will hear a lot of it over here.

The G4GUO system is based around an AMBE1000+ speech vocoder operating at 2400b/s plus 1200b/s of forward error correction. Thirty-six 50-baud tones are transmitted using Phase Shift Keying (PSK). These occupy the same bandwidth as a normal SSB signal. The block diagram is shown in **Fig 1**.

The ARD9800 benefits from the fact that it is a plug-in unit, so no modifications are needed to transceivers. It can transmit and receive voice, SSTV and data – all digitally. Transmitted data sounds similar to the output of many other parallel-tone modems – basically noise – but it commences with a 1s burst of synchronisation and training data that has a characteristic sound rather like the ringing of a mobile phone. This will be heard from the loudspeaker at the receive end even if you have an ARD9800, but as soon as digitised audio commences the unit mutes the data and the voice is heard. Samples of decoded voice that I have heard are almost as good as you would get from having a local contact using a narrowband FM radio – ie there is no interference at all.

Now that commercial equipment for HF digital voice has come to market, it leads me to raise the following questions:

The ARD9800. AOR recommends that a proper linear power supply be used, rather than a switching type. Also beware that the duty cycle of your HF transmitter is going to be a lot higher when transmitting digital voice than it would be transmitting SSB. Chris Lorek, G4HCL, will be reviewing this modem in the July issue

How long will it be before another manufacturer follows suit and produces an alternative external 'fast' modem?

How long will it be before one of the mainstream manufacturers includes digital voice as a standard mode in one of their transceivers?

And finally, how long will it be before someone sits down and writes a program for a PC that emulates G4GUO's system and allows one to operate digital voice via a soundcard? After all, I seem to recall that it didn't take long for packet radio TNCs to be emulated within a PC.

Fig 1
Block diagram of the 'fast' modem developed by Charles Brain, G4GUO.

Fig 2
Innovative car functions that could be implemented using short range radar sensors.

FIG 1 © RADCOM 188

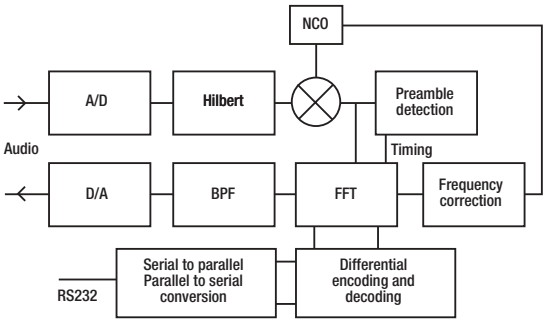
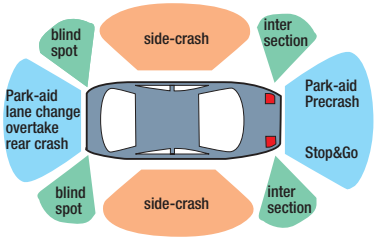


FIG 2 © RADCOM 189



SHORT RANGE RADAR

These days, a lot of cars have parking sensors, to inform the driver when he or she is getting close to the vehicle behind whilst reversing. These work using ultrasound and can often be seen in the bumpers of cars as coat-button-sized studs, but the next generation of sensors will use Short Range Radar (SRR) and will form part of an Intelligent Vehicle Safety System (IVSS). As **Fig 2** illustrates, SRR modules will not only be able to provide more accurate information when reversing a car into a parking space, they will look into the blind spots and inform the driver that he is moving into someone else's path, sense that there is going to be a collision and inflate the airbags before it happens, and 'see' further round the corners at road intersections than any driver can. They will also be completely invisible, because they can be mounted behind the plastic of bumpers; they will also provide more reliable information in wet or foggy weather than ultrasonic or laser diode systems.

The European Union is giving IVSS its full support, because it wants to cut the number of accidents, injuries and fatalities on the roads by 50% by the year 2010. At the moment, SRR operates at 24GHz, but the European Radiocommunications Office has recently published a document that says migration to 77GHz should take place. However, the automotive industry isn't happy about migrating to 77GHz at this time, because the system has never been tried and 77GHz technology is too expensive. It wants to stick with 24GHz until the concept of IVSS has been 'validated in the marketplace', which I take to mean 'until we have got used to it'. ♦

WEB SEARCH

Digital voice (AOR fast radio modem)	www.aorusa.com/ard9800.html
	www.rfelectronics.com/
Short Range Radar	www.ero.dk/E2CB05D9-6A63-41FB-8D02-05D293E0053A?frames=0
	www.stereoscopicscanning.de/Portrait/ILM99P.PDF

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In practice

This month, G3SEK looks at the common problem of monitoring your own transmission. He also discusses the way relay contacts behave, and how to choose the correct contacts for your application.

TRANSMISSION QUALITY MONITORING

Q I have only one transceiver. How can I listen to the quality of my transmissions?

A We all need to recognise that there are two completely different aspects of 'transmission quality':

- The quality of your signal as heard by the station you're working, who is obviously tuned to the same frequency as yourself.
- The quality of your signal as heard by other band users who are *not* listening to you!

Some transceivers have a built-in 'monitor' function but, at best, this only checks the first aspect of transmission quality (and in some cases it does not monitor the true outgoing signal). The second aspect - how much your signal interferes with other band users - is arguably the more important; and to check this, you need something outside of the transceiver itself. Fortunately there are options to suit all tastes, ranging from WWII surplus through simple home construction to modern PC/DSP techniques.

Fig 1 shows a simplified block diagram of the venerable BC-221 'wavemeter'. This was originally designed for frequency measurement, but can also be used for transmission monitoring [1]. Since these units are now seen at rallies for as little as £10-15, they are a very realistic option... especially if you like collecting old surplus equipment. The heart of the BC-221 is an accurately-calibrated VFO with two switched ranges, 125-250kHz and 2.0-4.0MHz. These ranges were chosen such that either the fundamental frequencies or several reasonably strong harmonics can be tuned across the entire LF-MF-HF frequency spectrum from 125kHz to beyond 20MHz. The original application was to measure the carrier frequency of your CW or AM transmission by zero-beating it with one or more harmonics of the calibrated VFO. The transmitter signal is sampled by connecting a short wire aerial to the input terminal, and this signal is loosely coupled into the mixer stage. When the VFO signal is close to the transmitter carrier frequency, the output of the mixer is an audio beat note which is amplified for headphones. To measure a carrier frequency you would normally tune the VFO for zero-beat (a frequency difference of zero). However, by listening also for other signal characteristics such as hum, key-clicks and audio distortion, you can use the BC-221 to monitor your signal quality. In particular, tune away from the transmission frequency to listen at either side of your signal, where you should hear *nothing*. This monitoring technique also works for SSB, but it doesn't tell you much about the signal quality of FM or modern digital modes.

The 1MHz crystal oscillator in the BC-221 was mainly intended to set the VFO accurately on frequency at the nearest marker point, where a VFO harmonic coincides with a harmonic of 1MHz. However, you can switch off the VFO and monitor your signal quality by tuning the transmitter instead, to any harmonic of the crystal frequency. This opens the way to a much simpler transmission quality checker that could make a very good home construction project.

Fig 2 shows the circuit developed by Drew Diamond, VK3XU [2]. A crystal oscillator (TR1) and the signal input are both loosely coupled into the diode mixer D1, and the rest of the circuit is simply an audio amplifier. Comparing this with Fig 1, at the block diagram level it is basically the same as a BC-221 without the VFO. VK3XU suggests using the readily-available 3.580MHz TV colour-burst crystal which provides harmonics in most HF amateur bands, but any other crystals in the range from about 2 to 25MHz are said to be usable so you have plenty of options. Note that the exact crystal frequency doesn't matter, because your transmitter does the tuning. For example, by tuning the transmitter away on either side of the crystal frequency (or harmonic), you can monitor an SSB signal for splatter, or a CW signal for key-clicks. Obviously you should use a dummy load for all of these tests!

The major requirement for any transmission quality checker is that it doesn't introduce imperfections of its own. Simplicity has some advantages - for example, both the BC-221 and VK3XU's circuit can use battery power, so they don't introduce any hum problems - but do remember that these instruments are receivers of only a very basic kind. You may not be able to hear spurious signals that other people using 'real' receivers will find very noticeable. Also, any problems that you hear with very strong signals could be arising in the test equipment rather than the transmitter. The next step up the scale is something like **Fig 3**, which is a frequency down-converter intended for use with sound-card spectrum analyser software [3]. You may recognise Fig 3 as the heart of a high-class direct conversion receiver. It uses a diode ring mixer with good strong-signal handling properties, and is intended to be used with a very clean local oscillator (LO) signal

Fig 1
Simplified block diagram of the BC-221 'wavemeter', which can also be used for transmission monitoring.

Fig 2
VK3XU's transmission quality monitor has a very similar oscillator-mixer-audio layout to the BC-221.

FIG 1 © RADCOM 176

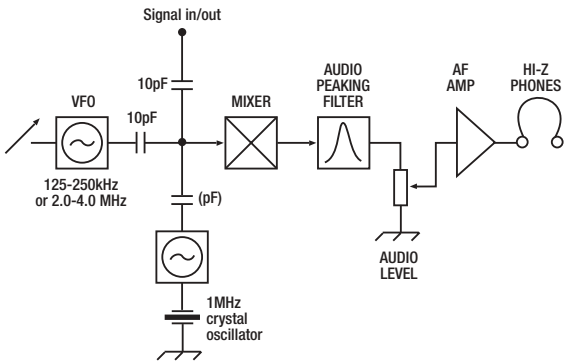
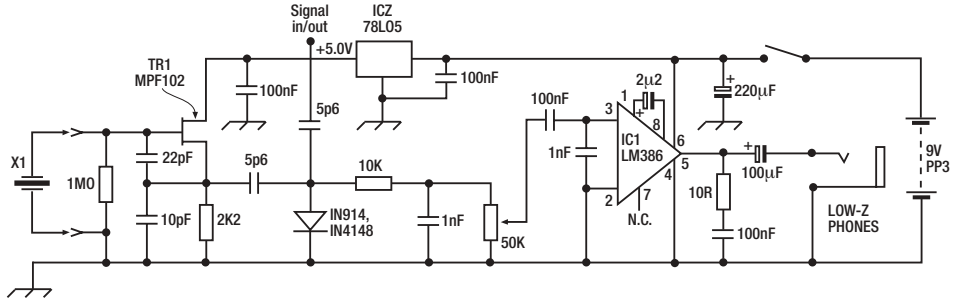


FIG 2 © RADCOM 177



from an external source. The audio amplifier also has a good dynamic range, and a flat frequency response to match that of the sound card (a few Hz to at least 22kHz). The spectrum analyser software then allows you to see very weak spurious signals on-screen that you could never detect by ear. The circuit of Fig 3 comes from *Experimental Methods in RF Design* [3] which gives a further introduction to this more advanced technique. With care, it can be extended far beyond routine signal monitoring and into the realm of lab-quality measurements.

FIG 3 © RADCOM178

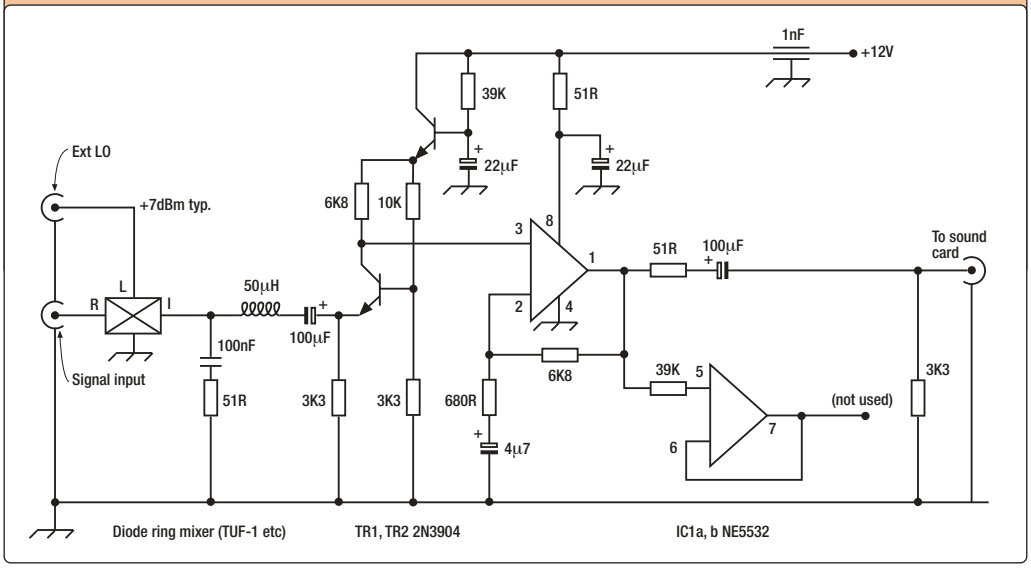


FIG 4 © RADCOM 179

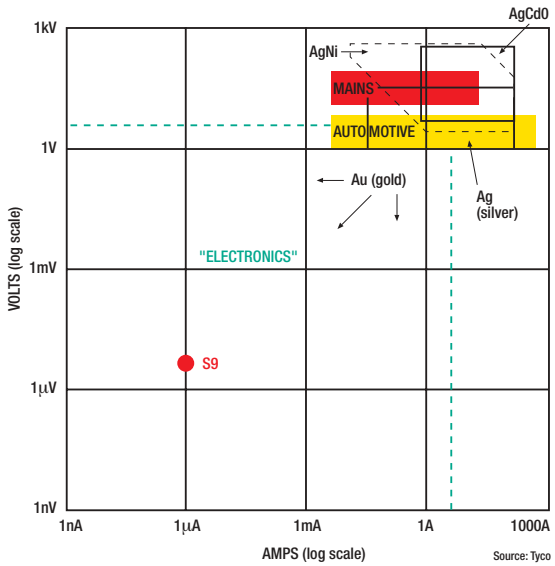


Fig 3 Down-converter (direct conversion receiver) for transmission quality monitoring using sound-card spectrum analyser software.

Fig 4 Ranges of application for relay contact materials.

RELAY CONTACT MATERIALS

Q I use small power relays for switching my two transceivers between various antennas. These relays have become intermittent on receive, and cleaning the contacts doesn't seem to help much. What contact materials should I choose for the replacement relays?

A The choice of contact material can make or ruin the performance of a relay. Your changeover relays are being used for two very different applications, transmitting and receiving, which ideally would require different contact materials. However, standard commercial changeover relays always use the same material for both contacts, normally-open and normally-closed, so there is no perfect solution.

The intermittent contacts on receive will be due to a combination of problems that conspire to keep the two contacting surfaces apart. Under the microscope, even polished contact surfaces are full of hills and valleys. All we need for receive purposes is a single good contact, no matter how tiny. Normally there would be several such contacts in parallel, so you don't notice a problem until the very last one becomes intermittent. These microscopically small contacts can very easily be disrupted by tiny particles of grit, or by the very thinnest of insulating films caused by oxidation or other chemical reactions - or indeed by nicotine tar.

Fortunately there are also some factors that work in our favour. One is the mechanical force holding the relay contacts together. Although that force may be only a few grams, it is being applied over very small localised areas, and this can help to break down any insulation between the contacting surfaces. Most relays with spring contact arms also provide a wiping action that drags the mated contacts across each other, again breaking down any insulating film. The other major factor that helps to promote good contact is the electric current itself. At the scale of individual microscopic contacts, the local potential gradients and current densities can be very high. As the contacts come together, the potential gradient helps to break down any insulating film, and then the high current density forces its own way through. This electrical 'self-cleaning' effect means you are unlikely to find relay contact problems on transmit, unless the contact surfaces are either damaged by arcing or corrosion, or completely worn out.

The bad news is that most of these favourable factors do not apply in RF receiving applications. In particular, the voltages and currents involved are too small to have any electrical self-cleaning effect. That leaves us very dependent on the quality of the contact surfaces - and some of the commonly available contact materials are not really suitable for small-signal applications.

Fig 4 is a map of the voltages and currents involved in typical applications for commercial relays, together with the applicable contact materials. Note the logarithmic scales of voltage and current, which reduce the typical ranges of mains and automotive applications into two small areas at the upper right. All the rest of this map is the territory of 'electronics'. In particular, the signal levels at the input of radio receivers are far down towards the lower left - an 'S9' signal is only 50µV at 1µA.

The voltage and current levels have a large effect on the optimum choice of contact materials. For mains and automotive power applications, the important requirements are resistance to mechanical wear or damage by contact arcing, and freedom from risk of contacts welding together. Silver (Ag) has long been a favoured material for relay contacts, often alloyed with nickel (AgNi) to improve hardness, but the relatively low melting point leaves some risk of welding. The more modern silver cadmium oxide (AgCdO) material offers a better combination of properties for power relays.

For low signal levels, gold (Au) reigns uncontested. This is because gold does not oxidise or corrode, and its softness means that at the microscopic level the opposing contact points squeeze together to make excellent electrical contact. However, gold is typically applied as a very thin surface layer over a more substantial base material, which makes it all the more susceptible to mechanical wear and electrical damage.

Balancing all of these factors together, the best contact material for a relay that has to handle both receiving and transmitting signal levels is probably gold plating on silver. The gold is particularly good for the receive side, and both sides have the underlying silver as backup.

(Continued next month) ♦

REFERENCES

[1] Follow the links from the 'In Practice' website (URL above).
[2] 'A Transmission Quality Checker' by Drew Diamond, VK3XU, *Amateur Radio* (Australia), February 2004.
[3] *Experimental Methods in RF Design* by Wes Hayward, W7ZOI, Rick Campbell, KK7B, and Bob Larkin, W7PUA (ARRL, available from RSGB Shop).

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Antennas

G3LDO looks at the effect of the magmount on various types of HF mobile antenna, showing how the reactance of the mount affects the matching.

The variable inductive loading of the High Sierra Sidekick shown with weather protection shield removed. The coil is moved in and out of the lower tube with a motor-driven lead screw.

The three-magnet type of magmount.

In the May 'Antennas' column, I discussed some aspects of mobile antennas and promised to give some information on magmounts, which use an antenna base with a magnet to fix the antenna to a horizontal flat surface of the ferrous metal vehicle body. They have the advantage of simplicity and require no special fixing arrangements, enabling them to be used with a vehicle on a temporary basis if necessary. The coax feeder is routed, either through the door seal (if you are using thin coax), or through a partly-opened window (if you are using thicker coax).

For larger HF antennas, the surface area contact between the vehicle body and magnetic base is insufficient to hold the antenna when travelling at any speed. You could use a much larger diameter magnetic base, but this is rather impractical. The solution is to use three or four magnets held together in a frame. This arrangement spreads the load over a much wider area than a single magmount and can be used to support larger HF mobile antennas. The most common multiple-magnet magmounts use three magnets. An example of one of these is the WMM-3401 series (now superseded by the W-300 series) made by Watson, and is shown in the photograph; it can support an average-size HF mobile antenna. It can also support a large antenna if operating from a stationary vehicle.

Because magmounts are not directly connected to the body of the vehicle and rely on capacitive coupling, the antenna tuning may be different from other methods of mounting the antenna. For example, the capacitance of the magmount shown in the photo is 400pF, which gives a series reactance of 14Ω at 28MHz and 110Ω at 3.6MHz. This aspect does not appear very often in amateur radio antenna literature.

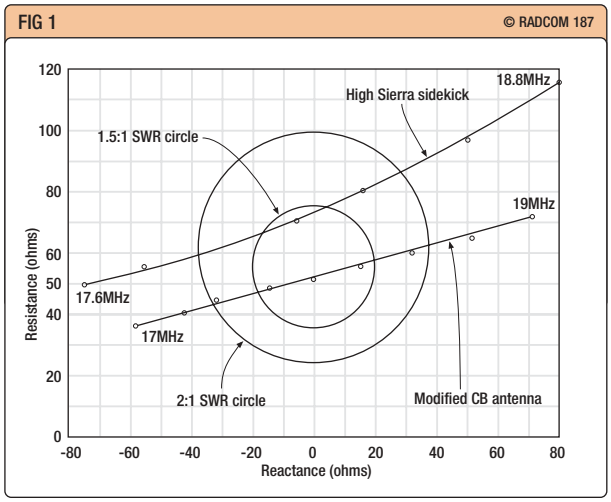
Tests were carried out at 18MHz, where the capacitive reactance was 22Ω. I normally use a modified CB 'Firestik' antenna for this band, which gives a near 1:1 VSWR near resonance. When used with the magmount shown in the photo, the resonant frequency is shifted up about 200kHz but the VSWR remained low. However, when the magmount is used with the High Sierra 'Sidekick', shown in the photo and described in [1], the lowest VSWR obtainable was just under 2:1.

GROUND CONNECTION

The handbook on the Sidekick has some interesting comments on this subject. It recommends that a copper strip ground strap be used to connect the magmount to the metal body of the vehicle. It also says that braiding or wire is inadequate for this purpose. Originally, I used a 2mm wide copper strip, and close-woven braiding was then tried, which gave an improved VSWR performance, although I found no difference between the strip and the braid (although corrosion in the braid might affect its performance after a while). With the magmount grounded using the method described, the lowest VSWR obtainable was 1.6:1.

Such connections to the vehicle might be difficult to find and make. The method I used is to scrape away the paint just under the tailgate hinge. The antenna ground strap is then fixed to the vehicle with a self-tapping screw and a washer, protected against corrosion with a thin film of grease. If you don't like the idea of scraping paint off your vehicle, try a magnetic coupler. Lack of space precludes its description here but you will find it in [2], pp57/58.

Fig 1
Cartesian impedance plot of the modified CB antenna and the High Sierra Sidekick antenna, measured using a HP-4085 vector impedance meter.



IMPEDANCE MATCHING

I have described the High Sierra Sidekick because it seems to be one of the best HF multiband antenna solutions if you are using a magmount on a moving vehicle. The handbook on this antenna advises that a VSWR of 2:1 or better is satisfactory. It also advises the use of at least 15ft (4.6m) of coax between the transceiver and the antenna because short runs can affect the VSWR. It doesn't say why.

I found that the Sidekick antenna worked fine, provided that the VSWR level was not shutting down the transceiver power. The shunt capacitance matching method [1] didn't work; neither did [2] pp45/46, so I decided to try to find out why. A series of impedance measurements was made as described in [3], (which can tell you more than VSWR ever can) and the results are shown in **Fig 1**. This shows the impedance at resonance of the smaller antenna to be higher than the larger one. This higher impedance could be matched to give a VSWR of 1:1 using one of the inductive matching arrangements described in [2], pp46/47.

The construction of the variable loading of the High Sierra Sidekick is shown in the photograph. The high current portion of the antenna below the active part of the inductance is 360mm long and 50mm in diameter, and is ruggedly constructed.

My thanks to Waters & Stanton for the loan of the High Sierra Sidekick. The Watson magmount, described above, was also obtained from Waters & Stanton. ♦

REFERENCES

[1] RadCom May, 2004, 'Antennas'
[2] The Amateur Radio Mobile Handbook, Peter Dodd, G3LDO
[3] The Antenna Experimenter's Guide, Second Edition, Peter Dodd, G3LDO, Chapter 2.
Note: updates on [2] and [3] can be found on http://web.ukonline.co.uk/g3ldo

YAESU

Choice of the World's top DX'ers

Buy this summer... ...Pay next summer!

Full detaisl of our Buy-Now-, Pay-Later are on the inside front cover of this magazine

FT-817ND

Now with NiMH Battery!

Pay nothing for 12-months!
See inside front cover for details

160m - 70cms

The FT-817 package now includes a longer lasting NiMH battery. But the price remains the same. With summer coming, this is the ideal time to invest in an FT-817 and enjoy the benefit of all-mode all-band (160m - 70cms) coverage in a package that is small enough to be carried anywhere. Peter Waters, G3OJV, has used this radio extensively on his travels around Scotland and says "it has no equals. I have bumped it around as a mobile and portable radio, and it has never let me down. *Yes it now has a few scratches, but inwardly it performs faultlessly.*" The FT-817 runs from its internal battery delivering 2.5 Watts or a very effective 5 Watts when run from an external 12V supply. With a comprehensive menu system, built-in electronic keyer and provision for an additional IF filter, the radio can match many base stations for performance. It has a great receiver and the package includes microphone, NiMH battery, VHF/UHF antenna and AC charger. And you don't need to pay anything for a full twelve months! **£499.00 C**

VX 2E

2m / 70cms

2m/70cms handheld up to 1.5W on internal battery (up to 3W on external supply). This tiny hand-held fits in your shirt pocket yet has massive performance. It also offers wide-band receive up to 999MHz AM FM WFM.

This radio is not available on FREE credit. £169.00 B

VX 7R

6m/2m/70cms

Pay Nothing for 12-Months

There is nothing more rugged than this tri-band 6m/2m/70cm radio. You can even plunge it into water and it will still work! The receiver covers AM FM WFM up to 999MHz and there are a host of features. You can even add an optional barometer. Available in black or silver. **£299.00 B**

FT 7800

Pay Nothing for 12-Months

Here's a great deal on dual-band mobile. Up to 50 Watts output and a removable head unit, and all this at a really great price. Whether you admire its beautifully clear display, its 1000 memories or 5 one-touch hyper memory keys. And if you are an airband fan you will be glad to know that the radio covers the VHF AM section. This really is the radio to put into your car for superb VHF / UHF coverage as well as being a wide-band scanner covering AM/FM up to 999MHz. **£239.00 C**

FT-897

160m - 70cms

Pay nothing for 12-months!
See inside front cover for details

Here's a great way to enjoy 160m to 70cm portable and mobile operation with a radio that you can also use indoors as a main-station rig. Capable of delivering up to 100 Watts (HF), this radio can also deliver 20 Watts (10W 70cm) output from an optional internal battery. A great 20W mobile radio that can run on optional internal battery (two can be fitted) so you can go mobile in minutes and no direct noise from car electrics! It's a rugged radio with a lovely tuning dial and bright, clear display. We have used it as a base station transceiver and found it to perform superbly well. On its internal batteries it is absolute magic! For true QRP you can easily reduce power to 5 Watts and with full DSP, you can cope easily with QRM. CW operators will love the break-in and memory key features, and SSB operators can make use of the DSP microphone equaliser. Call us today and arrange your 12-months FREE credit. **£899.00 C**

FT 8900

10m/6m/2m/70cms

Pay Nothing for 12-Months

This radio gives you 4-band coverage in a package that will fit easily into any car. The detachable front panel makes it so easy. With 4 bands including ten metres, you are sure of some fun with this radio. The radio operates as if you have two separate transceivers so you can operate full duplex and it is easy to set up for satellite operation. With power outputs up to 50 Watts and DTMF mic, this is a real ready-to-go package. **£339.00 C**

WATERS & STANTON

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E-mail: data.radcom@rsgb.org.uk

For the older generation (of TNC and PC)

Andy has feedback and advice for those using older generations of TNC and PC, and has a quick user review of some multi-mode software.

Two modems for packet radio, dating from more than a decade ago, but still perfectly usable now. On the left is a small stand-alone unit, the AR-21, which is compatible with most stand-alone TNCs of the era. On the right is a home-built modem for the Baycom system, which uses dedicated (DOS-based) software for packet operation.

Referring to the comments in February's column about software supporting the 'older' modems, Terry, G7UWA, wrote in to say "I have used for quite some time now two bits of software, one being *Logger* and the one I use now which is *RCKRTTY*, which I use on a daily basis with my two modems, the MFJ-1278B and the AEA PK-900. I find it suits me very well for all modes except PSK, in which I need the sound card and the modem as the PTT switch unit. Many thanks for the good read I have from your column."

WINDOWS XP

The perennial problem of trying to use well-established software with the latest PC operating systems keeps recurring. John, G0PJU, comments "One reason I have found for doing so little on data is that I have upgraded my PC. The new, or not so new *Windows XP*, does not support my *DOS* data programs. I know some may work, but the majority don't. Despite buying an extra hard drive to install *Windows 98* or *95*, it still is too complicated to get up and running. Maybe an article on running *DOS* in new *Windows* will help us all getting back into a great communications mode."

Well, John, running '*DOS* in new *Windows*' is not really an option. Microsoft in its infinite wisdom seems to have decided to remove a lot of the older compatibility - presumably because it believes that no one wants to use computers properly these days! The only solution as far as I can see is *do not get rid of your older machines* just because they (or your teenage children) say they are obsolete. All the software you used to run is still valid, and *Word* running on a 90MHz machine is still as good a word processor as when it is running on the latest microwave-speed-clocked version.

On the same subject, Clive, G3YTQ, handed me his Motorola 56002EVM the other day, saying "this won't work with my new computer - can you take it home and test it out for me please?". Needless to say, it worked fine chez 'JNT on my 486 *DOS* / *Win*3.11 machine, and the problem was the new *Windows XP* operating system he had installed on his new machine. Unfortunately, Clive had already thrown away his old PC (a Pentium running *Win 98*) - he is now looking for an older laptop on which to run *DOS*. Perhaps I can sell him one of my five old laptops bought for a few pounds from rallies, or have been given over the last few years.

MultiPSK

A the same time as handing over his 56002EVM, Clive also told me about *MultiPSK* - a soundcard-based package written by F6CTE that will cope with nearly all the amateur data-modes in use today. He said of it "I found *MultiPSK* to be a very easy-to-use program, although I have only used it in the receive mode. It is stuffed full of features that make the reception of digital modes easy and it includes a log. I particularly like the ability to copy many PSK stations at once and then point and click to display only the one of interest. The other modes are just as easy to use. I have tried a few HF fax-decoding programs before, but this one was a doddle and, just as in other modes, the 'hint box' is very helpful when it comes to placing the cursor (so as to have the demodulator correctly aligned). The only minor criticism I have of the program is the use of garish colours in the HCI, but perhaps I just haven't found how to change them, yet."

A couple of days later, I downloaded the software, which is free of charge for limited use. A few features are not available until a 'user key' is paid for - but most of the functionality is still there on the free version.

After unzipping the file, I discovered it did not need further installation (unusual for *Windows* software) and immediately started playing. Clive's comments about garish colours was almost an understatement, but the ability to copy RTTY, PSK31 immediately and, best of all, SSTV, was very impressive. There were no transmissions to be heard in the other modes it can 'see', such as *Hell*, *Throb* and variants within these. During this testing it was, in fact, the first time I have *ever* seen Slow-Scan TV decoded from HF. And, as for the ability to copy up to 23 PSK31 signals simultaneously in a 3kHz bandwidth, then simply click on any one to transfer it to the working window…

The box shows information taken from the *MultiPSK* web page. ♦

MultiPSK Version 3.0 PROGRAM SPECIFICATIONS

Modes catered for : BPSK31, QPSK31, PSK63, PSK63F, PSK10, PSKFEC31, PSKAM, CW (Morse between 10 and 54 words per minute), CCW (Coherent CW) at 12, 25 and 50 words per minute, MFSK8, MFSK16 with SSTV capacity, THROB, THROBX (evolution of THROB 1 and 2 baud), RTTY at 45, 50, 75 and 100 bauds, AMTOR ARQ, SITOR A, AMTOR FEC, SITOR B, NAVTEX, FELD HELL, PSK HELL, HF FAX and SSTV (Martin1 and 2, Scottie1, 2 and DX, Robot 36 and 72, B/W24). The pseudo mode filters allows AF processing with filters low-pass, band-pass, rejector, noise reduction…

- Automatic detection of BPSK modes (from PSK10 to PSK63F) is available.
- Panoramic reception of 23 channels in three different modes (BPSK31, PSK63 and PSKFEC31).
- Supervision functions: beeps and blinking on reception (among one of the 23 channels) of a predefined text ('CQ CQ', for example) or automatic return to the main decoder.
- Possible working in beacon.
- Function 'Beeps on your call': beeps and blinking on reception of the operator's call.
- Possibility to transmit and to receive in two different modes (for non-graphical modes except PSKAM).
- Possibility to translate a sound file (.WAV) and to record one.
- Country determination according to a prefix.
- Selection of the transmission on an AF spectrum.
- Adjustment of the input and output levels with AGC.
- Possibility to create and transmit 12 sequences of 5000 characters.
- Macro system available.
- Storage of the 65500 first characters transmitted or received.
- Log book to record QSOs.

WEB SEARCH	
MultiPSK	www.members.aol.com/f6cte

David Lauder, G0SNO

20 Sutherland Close, Barnet, EN5 2JL.

E-mail: emc.radcom@rsgb.org.uk

EMC

EMC Committee members are involved in various standards committees and working groups on EMC standards for PLT. The European Commission is in favour of PLT and there is a risk that EMC standards will be adjusted to fit PLT systems.

Thanks to everyone who has e-mailed or written with useful information about EMC. If possible, please give full information about the make and model number of the equipment in question and the approximate date of purchase. Although full details may not be easy to find in the case of equipment that belongs to a neighbour, it is easy to find in the case of your own equipment.

OFCOM TV INTERFERENCE FORM

Since the Radiocommunications Agency became part of Ofcom at the start of 2004, Ofcom now deals with radio and television interference cases, for example where amateur radio transmissions affect a neighbour's TV set. The previous RA179 form is replaced by a new form called 'Interference to TV and Radio Reception', ref. No. Of 22 (Feb 04). Details can be found on the Ofcom website (see 'Web Search').

The new Ofcom form is a condensed version of the previous RA179 form. It includes some significant statements such as, 'If you have an aerial amplifier, please first contact an aerial installer, who may be able to help. Amplifiers can be affected by nearby transmissions'. It also states, 'Our service does not cover interference to other radio uses such as amateur radio, Citizens' Band radio or low-power radios such as baby alarms'.

There are new phone numbers and an address: 0845 456 3000 or 020 7981 3040; Ofcom Contact Centre, Ofcom, Riverside House, 2a Southwark Bridge Road, London SE1 9HA.

PLT IN A NUTSHELL

Although Power Line (Tele)communications (PLC/PLT) has been mentioned frequently in 'EMC' and elsewhere recently, little has been published in *RadCom* about the actual configuration of the network since the October 1997 'EMC'. The month's column aims to provide a concise answer to the question "What is PLT and how does it differ from ADSL?".

There are two types of broadband PLT. These are 'in-house' systems such as home computer networks using mains wiring and 'access' PLT, where an electricity company provides Internet access via the mains supply. **Fig 1** shows a typical 'access' PLT network as used in UK trials. An electricity substation in a built-up area typically serves 150 domestic customers, with about 50 on each of the three phases. With 'access' PLT, RF carriers are injected onto all three phases of the 230V supply cables. All UK PLT trials so far have used underground 230V cables. If PLT is ever used in areas where the 230V cables are on overhead poles along the street, these cables would radiate more signals than underground cables, which increases interference potential.

To achieve the desired data rates of 1 – 2Mb/s or more, PLT uses various frequencies from about 2MHz up to around 12MHz and over 20MHz in some cases. To achieve sufficient range in the presence of electrical interference on the mains, PLT signals are normally injected at a significantly higher level than the mains port limits of existing EMC standards such as EN55022. Some PLT systems use repeaters to reach the furthest points of the 230V network - for example, more than about 400m from the substation.

In the 'downstream' direction, the electricity company sends data from the substation to the users with some sort of addressing so that data is only received and decoded by the correct user. All the users can, in principle, receive all the data, although it is likely to be encrypted for security. In the 'upstream' direction, users send data to the substation. In both directions, the available capacity is *shared* by all PLT users on a particular substation, unlike ADSL where each user has a separate line to the telephone exchange.

The frequencies and signal levels used by PLT, together with the unbalanced nature of mains wiring, make PLT a far greater cause for concern to radio amateurs than ADSL. Current UK ADSL systems use frequencies up to about 500kHz in practice, although ADSL can go up to 1.1MHz. ADSL is unlikely to affect any amateur radio bands except 136kHz. Early plans for PLT involved filtering the incoming mains supply to each house, as described in October 1997 'EMC' but this idea seems to have been dropped so that PLT signals travel round the wiring of all houses to all mains sockets and can radiate from house wiring. It is sometimes claimed that the customer's electricity meter filters incoming PLT signals. Conventional electromechanical meters contain a series inductance which does introduce some RF loss but these are being replaced by modern electronic types that contain no series inductance.

PLT requires another communication path from the substation back to the electricity company or Internet Service Provider (ISP). This is called the 'back haul link'. This link could use copper telecommunication cables, optical fibre, a radio link or a satellite link. The use of the 11kV feed to the substations as the 'back haul link' has been suggested, although the practical range would be quite short, particularly if the 11kV cables are overhead. Overhead cables at 11kV and higher are quite widely spaced, so quite a lot of signal is radiated, leading to high loss and reduced range.

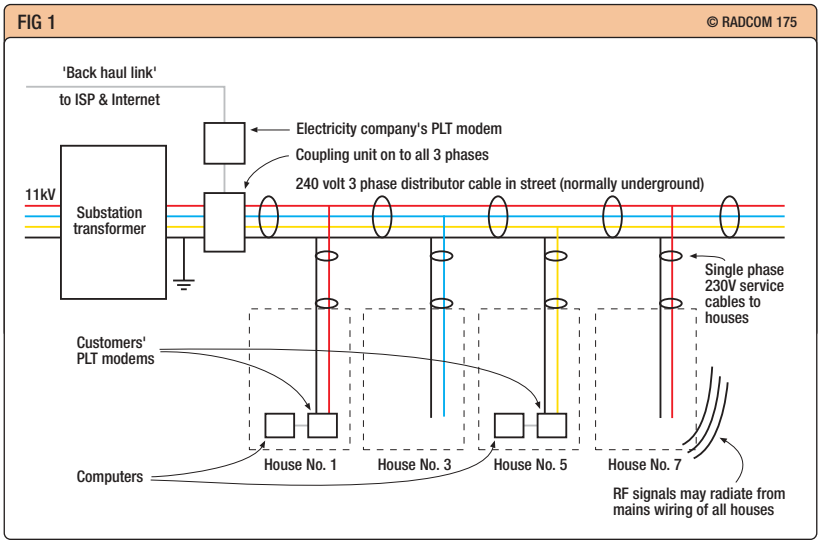

Fig 1
Block diagram of a typical PLT system.

A typical electricity substation transformer which could be the injection point for 'access' PLT systems.

High voltage electricity transmission lines on metal pylons are unlikely to be used for broadband PLT systems.

Pole-mounted 11kV to 230V transformers like this one are used in rural areas. Using the 11kV lines to carry PLT has been suggested.

INVASION OF THE SWITCH-MODE POWER SUPPLIES

A switch-mode power supply (SMPS) contains power transistors that switch a square wave at typically 35kHz or more through a small transformer and it is well known that square waves have many harmonics... Nowadays, when even a small plug-in 'wall wart' type charger for a mobile phone uses an SMPS, things are getting out of hand. EMC standards need to be tightened due to the cumulative effect of the ever-increasing use of SMPSs, as the following examples show.

Graham, G3XYX, had an old Samsung SF900 telephone / fax / answering machine that did not produce any QRM of which he was aware. When it broke down, Graham replaced it with a Brother T-96 but, when he checked noise levels on 1.8MHz and 3.5MHz, his comment was, "Oh Brother!". He reports that, on 1.8MHz, the noise level was S5 with a 60ft antenna to an Icom R-70 receiver. On 3.5MHz, with a 160ft antenna and an FRG-7D receiver, he says that he needed a 20dB attenuator to allow the 'S' meter to return from the end stop! Unplugging the BT phone line from the Brother T-96 reduced the QRM, but it was still easily detectable. He has returned the Brother T-96 and asks if anyone knows of a telephone/ fax / answering machine that is radio amateur friendly.

Fred, G3DVK, reports a crackling / frying noise from 1.8 - 25MHz with gaps that appeared to move. The strength was S9 plus and it was on 24 hours per day, causing havoc with his 5MHz 'skeds'. Fred used a portable short-wave receiver to search for the source of the QRM, which turned out to be the battery charger for a neighbour's mobile phone. The neighbour left the charger permanently plugged in and switched on, but he has agreed that in future, he will only switch the charger on when he is actually charging the phone. Fred believes that the charger is an SMPS, but he didn't manage to find out the make and model of the mobile phone, so we don't know to whom we should complain.

MORE LIGHTING QRM

Further to the item on low voltage lighting in April 2004 'EMC', there seems to be an outbreak of 'electronic transformers', which are a special type of SMPS for low-voltage halogen lighting and are often found in fitted kitchens

Bob, G3SHD, reports that he has just had a kitchen fitted by the John Lewis Partnership. This has four 12V halogen spotlights powered by an 'electronic transformer' that looks very similar to the one shown in April 2004 'EMC'. Bob reports a 'horrendous noise floor increase' on the 3.5MHz band when the kitchen spotlights are switched on. He has contacted John Lewis to explain the problem and they say they will get one of their electrical engineers to call him. Bob asks where conventional iron-cored transformers can be obtained.

TridonicAtco, which manufactures electronic transformers for low-voltage lighting also supplies conventional iron-cored transformers including the TMDD series and the OMT series. Its catalogue is available online (See 'Web Search' in April 2004 'EMC'). A company that supplies various brands of iron-cored (and electronic) transformers for low voltage lighting is CPC of Preston (08701 202 530 or see 'Web Search'). It is possible to place an order without having an account with CPC. Another supplier is RS Components.

We have also received a report about QRM from compact fluorescent lamps (CFLs) from Stewart, G1HHO. He reports QRM at a level of S8 on the 50MHz band when his aerial points towards a neighbour's house about 50m away. The neighbour has fitted low-energy bulbs upstairs and leaves them on for hours at a time. The QRM has lost Stewart many contacts when beaming towards the US. He realises that amateur radio is not a protected service, but with more and more low-energy light bulbs coming on the market, he asks what can be done.

In the short term, the only solution would be for Stewart to offer to buy his neighbour some new low-energy lamps with low emissions of RF interference. The EMC Committee would be pleased to receive one of the old noisy ones for testing. As reported in August 2003 'EMC', some CFLs radiate RF noise with a broad peak at around 170MHz and with significant levels on 144MHz. We have not heard of excessive emissions on 50MHz from CFLs, but some other types of fluorescent light fittings with conventional fluorescent tubes and electronic ballasts are known to radiate RFI on 50 - 70MHz. At the moment, interference emissions above 30MHz do not need to be tested but, in the longer term, radiated tests above 30 MHz are likely to be introduced. Changing EMC standards is a slow process however.

PLT TRIALS IN IRELAND AND IoM

PLT trials have begun in Ireland, in a town called Tuam in north County Galway. The system is reported to be a multi-carrier type with carriers at intervals of approximately 1.1kHz. This suggests it may use the Spanish DS2 chip set. More information about DS2 systems, including audio and video clips can be found on the web site of URE, the Spanish national amateur radio society (see 'Web Search').

The trial system in Ireland is reported to use frequencies that include the 3.5MHz, 10MHz and 21MHz amateur bands. Initial results show that this system does radiate on the HF amateur bands and broadcast bands.

We also have a report from GD3LSF that the Manx Electricity Authority plans some PLT trials on the Isle of Man in May/June 2004. ♦

WEB SEARCH

Ofcom, the Office of Communications www.ofcom.org.uk

Radio and TV interference page
www.ofcom.org.uk/consumer_guides/tv_and_radio/interference/

Suppliers of electrical/electronic products including transformers for low voltage lighting - CPC PLC www.cpc.co.uk
and RS Components http://rswww.com

URE, Unión de Radioaficionados Españoles, the Spanish national amateur radio society. PLC/PLT Information with audio and video clips
www.ure.es/plc/

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Electrically-small

In Part 1 of his contribution, VE2CV looks at the performance and computer modelling of loops of different sizes.

Two compact loops, the AMA 7 and the AMA 8 (3.4m and 1.7m-diameter loops) and the author's tunable all-band (TABA) mobile antenna, in operational use during a simulated emergency communications exercise.

Pat Hawker, G3VA, in his 'TT' column in *RadCom*, December 2002, discussed a difference of opinion concerning the performance of small tuned transmitting loops. The reason for his commentary was a contribution to *Electronics Letters* by Mike Underhill, G3LHZ, and Marc Harper [1]. G3VA maintains a good standard of comment over an extremely wide range of radio topics and, in this 'TT' column, he challenged the 'antenna establishment' to comment on the claims made by G3LHZ. This two-part article is in response to that challenge.

The loop antenna's *Q*-factor can be determined by measuring the operating bandwidth of the antenna system, from which we can calculate the loop antenna's series resistance (to be discussed), but we cannot estimate radiation efficiency. To calculate the antenna's radiation efficiency, we need to know the radiation resistance for the loop in its operating environment. It is this parameter that the controversy is all about, so I will begin this part with measured field strengths, for ground-wave and for sky-wave (received NVIS signal). The experiments to be described measure directly the antenna's radiation efficiency, and validate *NEC-4D*, the numerical analysis program that I use.

PERFORMANCE - MEASURED AND SIMULATED

In November1993, I wrote an article in *QST* entitled 'An Update on Compact Transmitting Loops' [2]. Since then, many radio amateurs have written about compact loops, describing various versions that they have fabricated. Questions have been asked concerning expected performance; concerning the ability of *NEC* to model small loop antennas; and, concerning practical aspects, *viz* why some loops do not work very well, whereas other loop antenna arrangements (are said to) work even better than *NEC* predicts; and, surprisingly, whether a compact loop behaves like a magnetic loop or a small folded dipole? The author has evaluated the performance of a number of commercially-available compact transmitting loop antennas, in particular a series of loops manufactured by Christian Käferlein, DK5CZ [3], his AMA loop antennas. The loop antennas available for this study are: a 3.4m-diameter loop (AMA 7, which tunes from 1.75 to 8MHz); a 1.7m-diameter loop (AMA 8, which tunes from 3.4 to 15MHz); and a 0.8m-diameter loop (AMA 9, which tunes from 9.8 to 29.7MHz). The loops are circular, and the conductor is an aluminium tube 32 mm in diameter (see the photograph).

Electrically-small loop antennas (perimeters 0.03λ to 0.3λ) are characterised by very small radiation resistances, and therefore such loops must be fabricated from large diameter tubes (25 - 100mm-diameter aluminium tubing has been used) to keep conductor losses small. Since the loops are inductive, they can be readily tuned by capacitors, and power coupled into them by means of small coupling loops. This is a convenient and efficient method of tuning and matching (see **Fig 1(a)**).

The resistive component of a small loop antenna depends on its height above ground and, to a certain extent, on how it is tuned and fed. 'Tuning' has a small effect on the current distribution on the loop conductor, since the loop is not tuned and fed at the same place. For the discussion to follow, we assume that the loop is tuned and mounted vertically. The loop is, in effect, fed at the bottom and tuned at the top (by a low-loss high-voltage capacitor).

The author uses the computational electromagnetic code *NEC-4D* (double precision), the *EZNEC-Pro* version by Roy Lewallen, W7EL. The wire model for the circular loop is a 20-sided polygon which is very similar (see **Fig 1(b)**). The symmetrical split-source is shown by two circles, and the symmetrical split load (tuning capacitor) by two squares.

FIG 1 © RADCOM 181

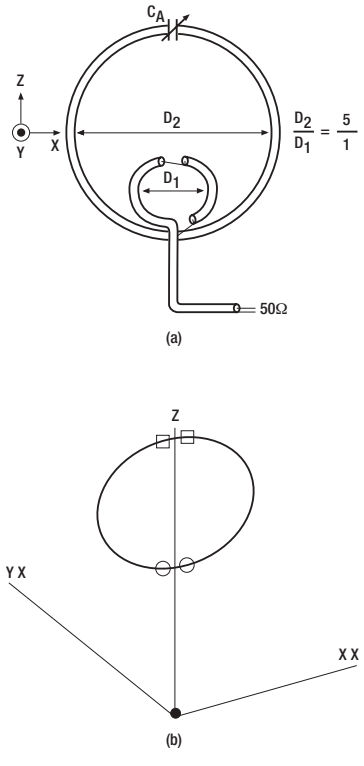


Fig 1(a) Diagrammatic representation of a magnetic loop with inductive coupling;

(b) a wire model for numerical analysis - a 3.4m-diameter AMA-type loop 2m over ground (see text for explanation of symbols).

Over the coming months, we present two two-part articles on another controversial antenna in use by radio amateurs – the electrically-small transmitting loop. The opposing viewpoints are presented by Dr Jack Belrose, VE2CV, and by Professor Mike Underhill, G3LHZ.

transmitting loops Part 1

RADIATION EFFICIENCY MEASURED

GROUND-WAVE FIELD STRENGTH

For an electrically-small vertically-polarised-monopole-type of antenna over real ground, the power radiated, Pr, is traditionally determined by measuring the inverse-distance (ground-wave) field strength, Eu, at unit distance (1km) for a transmitter power of 1kW, and referencing this measured field strength for the antenna under test (AUT) to that which we could obtain for a theoretical electrically-small vertical lossless antenna.

The inverse-distance field strength (FS) for an electrically-small lossless antenna at a distance of 1km, and a transmitter power of 1kW, over a perfect electrically-conducting ground (PEC) ground, is 300mV/m (109.54dBμV/m). Hence, for the purposes of determining the radiation efficiency of an AUT, we can compute Pr from the expression in **Equation 1**, where Eu is the measured inverse-distance field strength in mV/m for the AUT, referenced to 1km and for a transmitter power of 1kW, by assuming that FS varies as 1/distance. That is, suppose we measure the field strength at 100m (E(100m)), then the inverse-distance field strength at 1000m is determined by dividing that measured value by 10 (or subtracting 20dB if FS is measured in dBμV/m). Except for the case where the ground conductivity is very poor, the inverse distance FS determined in this way is essentially identical to the FS that would be measured at 1km, for MF and below. But, for higher frequencies in the HF range, even for distances less than 1km, FS can decrease with increase in distance more quickly than 1/d.

FIG 2 © RADCOM 182

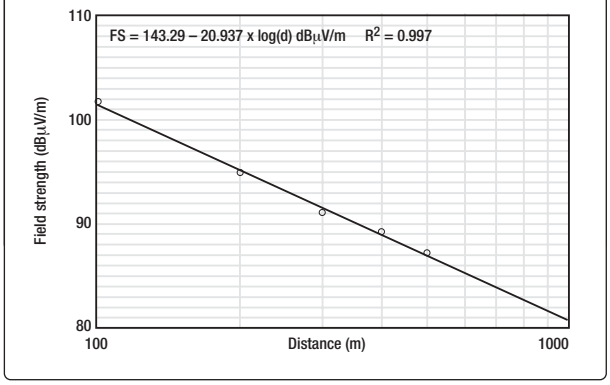


Fig 2
Field strength versus distance for a reference antenna under test, measured on a flat test site (average ground). R^2 is the least square standard deviation between this equation and the measured values.

EQUATION 1

$$P_r = 1000 \left(\frac{Eu}{300}\right)^2 \text{ watts}$$

EQUATION 2

$$\eta = \left(\frac{Pr}{Pt}\right) 100$$

EQUATION 3

$$\eta = \left(\frac{Rr}{Rr + Rc + Rg}\right) 100 = \left(\frac{Rr}{Ras}\right) 100$$

EQUATION 4

$$5.13 \left(\frac{30}{33}\right) = 4.66\% \text{ (-13.3dB)}$$

The radiation efficiency, η, is therefore as shown in **Equation 2**, where Pt is the transmitter power delivered to the antenna terminals.

An important parameter (to be discussed in detail in Part 2) is the antenna's radiation resistance, Rr, referenced to the input terminals of the antenna. Rr is the resistance that accounts for the power radiated. Hence, for a real antenna over finite ground, with losses, we can calculate the radiation efficiency of the antenna system from the ratio given in **Equation 3**. All resistances are referenced to the input terminals of the antenna: Rr is the radiation resistance; Rc is the conductor loss resistance; Rg is a ground-induced loss resistance; Ras is the resistive component of the antenna system's impedance in its operating environment (over real ground).

The performance of an AMA 8 loop (1.7m-diameter), was measured at the same time, and with reference to the performance of an antenna under test (AUT), a short whip antenna (a tunable all-bands mobile type), see [4].

Let us look first at the reference field strengths (FSs) measured for the whip. The FSs for a frequency of 3762.5kHz were measured in dBμV/m using a Singer model NM-26T FI meter and an Electro-Mechanical Company (EMCO) Passive Loop Antenna, model 6512, calibrated for FS measurement. The FS was measured along a measured baseline in a flat open field site (my simulations assume average conductivity of 5mS/m, at 100, 200, 300, 400 and 500m distances (see **Fig 2**)). The continuous line is the least-square logarithmic fit to the data. Note that the values shown in Fig 2 are referenced to 1kW, and that the FS falls off (even for this short range) slightly faster than 1/d.

The FS E(100m) = 101.42dBμV/m (in accordance with the equation in Fig 2), and therefore the inverse-distance FS Eu (1000m) = 101.42dBμV/m - 20dB = 81.42dBμV/m.

A FS Eu = 81.42dBμVm corresponds to a FS of 11.77mV/m, hence the radiated power (Equation 1) for the reference whip can be quite accurately determined as 1.54W. Hence the radiation efficiency, since the actual transmitter power was 30W, is 5.13%.

For the 1.7m diameter loop (frequency 3852kHz), base height 1.4m, a transmitter power of 33W gave the same FS value as that for the whip at a distance of 200m. Therefore, the radiation efficiency for the loop, referenced to that for the whip, is given by **Equation 4**.

According to *NEC-4D*, the loop's radiation resistance in free space, Rr = 4.2mΩ, and the antenna system resistance (loop height 1.4m) over average ground, Ras = 70.07mΩ. The

FIG 3 © RADCOM 183

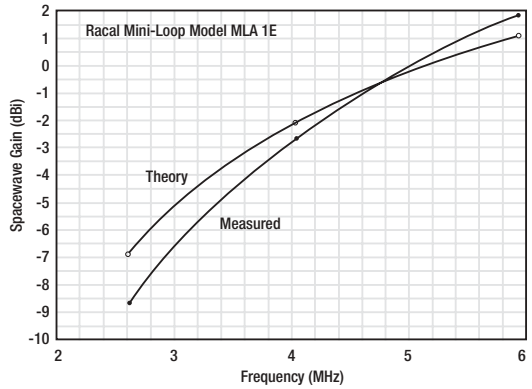


FIG 4 © RADCOM 184

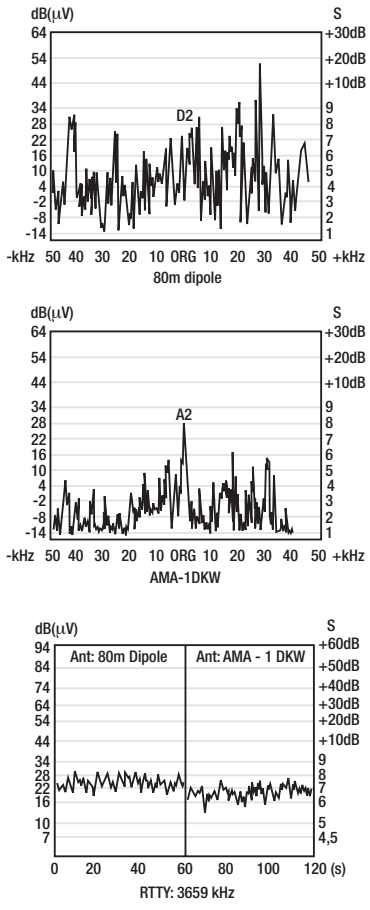


Fig 3
Measured space wave gain for a Mini Loop compared with predicted gain (dBi), over a NVIS daytime skywave link (100 km). The estimated ground conductivity at the transmitter site is 10mS/m; 1mS/m at the receiver site.

Fig 4
Signal strength and selectivity comparisons produced by a half-wave 80m dipole as compared to an AMA-1 DKW (3.4m-diameter) compact loop (after Käferlein, [6]).

radiation efficiency (η in Equation 3), is thus η = 6%.

But, more directly for comparison, we can compare FSs measured and predicted. The radiation efficiency, -13.3dB (measured), as determined above, is referenced to the field strength Eu for a lossless electrically-small monopole (300mV/m, or 109.54dBμV/m). The measured inverse distance FS for our loop therefore corresponds to Eu = 109.54dBμVm - 13.3dB = 96.3dBμV/m.

The actual FS measured for the loop was referenced to the distance 200m. According to *NEC-4D*, FS E(200m) = 384mV/m, and therefore the inverse distance FS, Eu = 76.8mV/m (97.7dBμV/m) for a transmitter power of 1kW. Compare with the measured value of 96.3dBμV/m. The theoretical FS assumes no antenna system matching loss, matching the loop to the 50Ω impedance of the transmitter, but this loss should be small (<0.5dB?), in which case measurement agrees with prediction to within a fraction of a decibel.

NVIS PERFORMANCE

The gain of a Racal Mini-Loop, model MLA 1E, was measured [5] over a near-vertical-incidence sky-wave (NVIS) link (100km distance), with reference to a resonant dipole at 9.1m. For transmitting the HF signals, horizontal dipole antennas were employed, arranged in line to minimise the number of support poles and to minimise coupling between them. All antennas were arranged in a direction broadside to the receiving antenna. A similar arrangement for the reference dipoles was employed at the receiver location.

Measurement of the signal strength received on a calibrated FI meter for the reference dipole, and the AUT (the Mini-Loop), was conducted over a three- to five-minute period, when the short-term fading rate was not greater than one fade every 20s. A coaxial switch enabled the selection of the signal from either the reference antenna or the AUT. In order to minimise errors when the signal was fading rapidly, the signal strength expressed in dB above 1μV was alternately measured on the reference antenna and the AUT by recording the signal just prior to switching and just after switching. The difference in signal strength between the AUT and the reference dipole antenna was computed from at least 30 measurements, and a median value determined. The median value was rejected and measurements repeated if the upper and lower quartile values differed by more than 1dB from the median value. Account was taken of the different lengths of the coaxial cables used with the various antennas.

The ground conductivity at the receive site was estimated, based on experience and, using this conductivity, the gain of the reference dipole antennas at the three frequencies used for the measurements was calculated (using *NEC 3*). Using this calculated gain (dBi), and the actual (measured) gain difference in dB of the AUT (a Mini-Loop), the gain in dBi for the Mini-Loop could be could be estimated, see **Fig 3**. This measured gain is compared on the graph with the predicted gain (according to *NEC 3*) for the Mini-Loop. The agreement between measured and predicted gain is clearly within experimental error.

The Racal MLA 1E Mini-Loop is not an antenna intended for the radio amateur (far, far too expensive). The loop dimensions are 1.53m x 2.1m (an oval shape), conductor diameter 100mm. It was designed to handle 1kW, using a vacuum variable capacitor to tune it. At a frequency of 4MHz, this loop would have a radiation resistance equal to 5.4mΩ (according to *NEC 3*), and a conductor loss resistance equal to 8.5mΩ. Compare with the circular AMA 1.7m diameter loop, conductor diameter 32mm, where the conductor loss resistance (according to *NEC 4D*) is 43.4mΩ. But our purpose here is not to compare performance of a commercial antenna with the more practical antenna for the radio amateur, an AMA loop, but to validate *NEC*, which Fig 3 does (in my view).

OPERATIONAL PERFORMANCE

Clearly, compared with a full size antenna such as a half-wave dipole, the radiation efficiency of a small (compact) transmitting loop is less, and the bandwidth (to be discussed) is much narrower. The narrow bandwidth can, however, be an advantage in reducing adjacent-channel interference (QRM), and the closed configuration of the loop can be a help in reducing the effect of certain types of man-made noise. Hence, from the point of view of reception, the signal-to-noise ratio may be better, comparing a loop with a dipole.

Christian Käferlein, DK5CZ, has compared the performance of his two larger loops (3.4m-diameter and 1.7m-diameter) 2m above ground, with half-wave dipoles at 12m above ground [6]. Here we reproduce one of his comparisons, see **Fig 4**. This shows the difference between an AMA-1 DKW loop (3.4m-diameter loop) and a half-wave dipole on the 80m band, for reception of a RTTY

FIG 5 © RADCOM 185

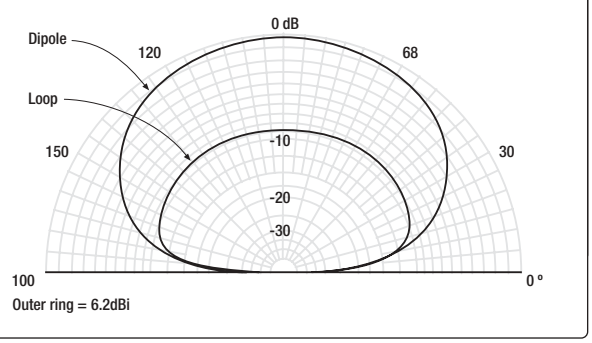
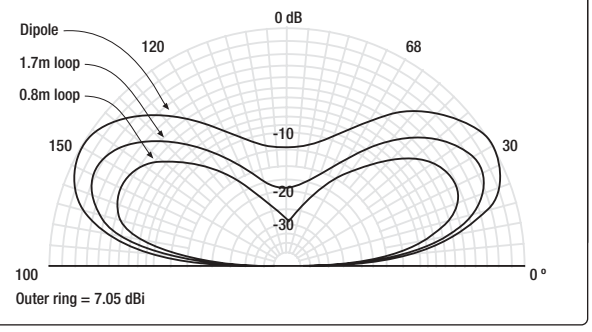


FIG 6 © RADCOM 186



station on 3659kHz. Notice that the signal strength received by the loop is less than that received by the dipole by about one S-unit (6dB); notice also the effect of the very narrow bandwidth of the loop (difference in adjacent channel interference).

In **Fig 5** we show the principal plane vertical radiation patterns (VRPs) for the loop and dipole (according to *NEC-4D*). Clearly, the above experiment, which showed that the signal received by the loop was about 6dB down compared with the dipole, is not inconsistent with prediction (we cannot say exactly what difference we should expect, since the distance (elevation angle) of the station frequency is not known).

A comparison between signal strengths received on the loop and a dipole depends on the distance to the sender (angle of arrival of downcoming sky-wave), and on azimuth (azimuthal patterns not shown).

But a word of caution when comparing two antennas located in close proximity. Because of the restricted area about an amateur's home, we have to be concerned about possible coupling between resonant antennas. Coupling between the loop and the dipole is negligible for the case where the loop is directly beneath the dipole, and the planes containing the loop and the dipole are orthogonal.

Fig: 5
Vertical radiation patterns (principal plane patterns) for a 3.4m-diameter loop at 2m and a dipole at 12m, frequency 3775kHz, average ground.

Fig 6
Vertical radiation patterns (frequency 14.15MHz) for horizontal loops (diameters 1.7m and 0.8m) compared with a 20m horizontal half-wave dipole (according to NEC-4D). Antenna height is 10m over average ground.

This is the desired orientation for comparing signal strengths since the directions of fire are then in the same direction (but the vertical radiation patterns are different). If the loop and dipole lie in the same plane, coupling is very strong. Clearly, this degree of coupling can significantly affect the observed performance comparisons.

PERFORMANCE ON THE HIGHER FREQUENCY BANDS

Most radio amateurs consider that vertical polarisation should be used for DX, because of the low angle of radiation. Certainly, for operation on the lower frequency amateur bands (160m, 80m and even 40m), the loop should be vertical, since the height of the loop (measured in wavelengths) is low.

As frequency and height are increased, the VRP starts to develop (multiple) high-angle lobes, and the launch angle for the low-angle lobe decreases. When the launch angle for this lobe is <15°, the ground in front of the antenna affects its performance, and when the launch angle is <10°, the low-angle lobe is so strongly attenuated [7], that the higher-angle lobes become dominant.

For operation on the higher bands (30m and above) the loop should be mounted horizontally as high as possible. The ground in front of the antenna has a very much smaller effect on the VRP if the polarisation is horizontal. Thus, while vertical polarisation ideally offers the possibility of a low radiation angle, horizontal polarisation is preferred, for a loop over real ground. However, height is important - as height increases, the radiation angle reduces.

In **Fig 6** is shown a comparison (according to *NEC-4D*) between the principal plane VRPs, at a frequency of 14.15MHz, for a 1.7m- and 0.8m-diameter horizontal loops, height 10m, and a half-wave horizontal dipole at the same height. It should be noted that the azimuthal pattern for the horizontal loops is omnidirectional, whereas the horizontal dipole has directivity (Front/Side 10dB). This difference accounts in part for the gain differences shown.

CONCLUSIONS

In this article, I have compared measured with predicted field strengths on both ground-wave and NVIS links, and I have compared measurement with prediction. Clearly, in accordance with my studies, the characteristics of a small loop antenna (perimeter/wavelength 0.03 – 0.3) can be predicted by *NEC-4D*. In my view, the radiation parameters of the loop are characteristic of a small circular loop, not of a small folded dipole.

While the radiation efficiencies of a small compact loop may be low, a few percent compared with that for a horizontal dipole (radiation efficiency >90%), performance as a communications antenna depends how the loop antenna is used, and the antenna system performance to which it is compared. The advantages of a loop are its small size, its portability, and the fact that a particular loop can be tuned by a low-loss (but high-voltage) capacitor over a wide frequency range; and no other antenna tuning unit (ATU) is needed. Depending on the loop size and configuration, the gain can approximate, or be not much less than, that for a half-wave dipole (certainly judged by comparing signal reception using a communications receiver with an S-meter scale). For reception, the signal-to-noise ratio (loop versus dipole) may, in fact, be better. ♦

NEXT TIME...

The conclusion of this two-part article will be concerned with bandwidth - a parameter that a radio amateur can easily measure. Radiation resistance will be covered in more detail (to counter claims made by G3LHZ).

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HF

Has the availability of the Internet and the PacketCluster diluted the skills that HF DXers used to spend years honing in order to practice their art? Do present-day DXers expect to be 'spoon fed' their DX? Don Field discusses these matters and brings the latest HF operating news.

Well, I'm back from Rodrigues and, with over 153,000 contacts in the log, including 8582 with UK stations, many of you must have managed to fill the slots you were looking for. It's interesting to note how demand for RTTY and PSK continues to grow apace, perhaps not surprisingly given that most amateur stations now have a PC with soundcard, and that suitable software is readily available, free of charge.

As I write this, the T33C Banaba Island expedition is also drawing to a close. This has been a tough one to work from the UK, a victim of falling solar activity, but there have been times when the signals have been quite strong, especially on 20, 17 and 15m. As of 9 April there were 36,000 contacts in the log, but the final total should be substantially higher than this.

We were also treated to another expedition by UK team G3SXW and G3TXF during March. They showed up as TJ3G from Cameroon, CW only, and made 25,500 contacts. Direct QSL requests were being answered within two weeks of their return to the UK.

Lee Marsland, GODBE, with the antenna and generator used at the St Helens & DARC GHOSTH/P Jersey DXpedition site.

PHOTO: LAWRENCE WOOLF, GJ3RAX.

SKILL OR SPOON FED?

One of the tasks that fell to Bob Beebe, GU4YOX, and me during the 3B9C trip was to read incoming e-mails and summarise their contents for the daily team meeting. Most e-mails were helpful, many were complimentary. Some, though, left me wondering about those who had sent them. A week or so into the operation, for example, with something like 80,000 contacts in the log, and one e-mail asked for detailed information on when and on what frequencies we would be working the UK. Well, quite apart from the fact that we didn't look for the UK as a special case, but worked UK stations along with the rest of Europe, a look at the *PacketCluster* system would immediately show when 3B9C was workable from Europe, on whatever band was of interest. Given that our correspondent had e-mail access, it must be assumed that he could also locate this *PacketCluster* information.

Another e-mail chastised us for, on occasion, announcing that we were "listening up", rather than giving our exact listening frequency. Agreed that the 3B9C operator should probably have announced something like "listening up 5 to 8kHz" or whatever, but the danger in announcing a single frequency is that everyone will descend there, and all the 3B9C operator would have heard would be a cacophony of noise.

It seems to me, though, that both these e-mails are symptomatic of DXers who wanted to be spoon-fed (no harm in asking, of course!) Surely the joy, and the skill, is to listen to a DX station over a period of time and determine when the best band openings are likely to be, maybe also using published propagation predictions. And then, when the time comes to try for a contact, tuning to find the stations being worked and calling intelligently. This will put you one step ahead of those who haven't figured out the DX station's listening frequency.

Another example of wanting to be spoon fed, and of not engaging brain, was when a Japanese station I worked on one of the high bands at 1100UTC asked me to go to 160m and work him there and then. Presumably the timing was convenient to him, and it was dark in Japan. However, he had apparently failed to notice that we still had three hours of daylight in Rodrigues which is not conducive to topband propagation!

It does worry me sometimes that tools such as *PacketCluster* have deskilled DXing to the extent that many DXers don't do the basic homework any more, like understanding propagation or actually tuning the bands rather than simply waiting for a DX spot to appear. Of course, in some instances it is simply a lack of experience, and only the passage of time will permit that to be put right.

QTH Corner

3XDQZ:	Sebastien Lebrun, F8DQZ, Rue des Ecoles, 49260 Antoigne, France.
5V7C:	Savoldi Franck, F5TVG, Box 92, 94223 Charenton Cedex, France.
7Q7MM:	Roger Brown, G3LQP, 262 Fir Tree Road, Epsom KT17 3NL.
9V1GO:	Petr Gustab, OK1DOT, PO Box 52, Cesky Brod, 282 01 Czech Republic.
EA7JX:	Rodrigo Herrera, PO Box 47, 41310, Brenes, Sevilla, Spain.
T33C:	Flo Moudar, F5CWU, 25 Rue du Castel Salis, 37100 Tours, France.
TJ3MC:	Jack Mainguy, F6BUM, Brouquet, 47160 Buzet/Baïse, France.
ZL7II:	Dominik Weiel, DL5EBE, Johannes-Meyer-Str 13, D-49808 Lingen, Germany.

DX NEWS

Several European countries have already been given limited access to 40m frequencies above 7100kHz, following the recommendations of last year's World Administrative Radio Conference. The latest is **Norway**, whose amateurs may now 7100 - 7200kHz on a secondary basis, and with a maximum power of 100 watts.

Ray, HS0ZDZ (G3NOM), reports that RAST (the **Thai** radio society) has been issued with special event callsign HS72B to celebrate Her Majesty the Queen of Thailand's 72nd anniversary. Special permission has been given to use all three

9 BAND TABLES No 50

MIXED MODE

CALL	1.8	3.5	7	10	14	18	21	24	28	TOTAL
W1JR	268	314	331	320	335	326	332	325	329	2880
G3KMA	257	303	329	323	334	330	335	324	332	2867
G4BWP	253	306	333	322	335	328	335	316	326	2854
G3XTT	236	281	320	287	334	317	333	300	314	2722
GW3JXN	193	264	301	291	328	320	322	298	305	2622
G3GIQ	153	248	305	269	334	320	333	308	328	2598
G4OBK	192	236	288	295	330	311	320	304	303	2579
G3SED	234	263	296	280	314	295	302	275	287	2546
G3TXF	143	245	304	301	329	304	326	287	306	2545
G3SNN	185	242	293	246	333	297	326	283	305	2510
GM3YTS	150	247	302	292	334	296	324	261	301	2507
G3TBK	143	241	285	269	331	305	319	293	293	2479
G3LAS	121	215	269	280	322	309	319	301	302	2438
G3YVH	139	172	267	290	325	314	314	280	287	2388
G3IFB	65	229	291	249	327	255	307	250	289	2262
G4PTJ	52	197	261	222	326	281	323	272	305	2239
GM3PPE	148	210	255	273	320	270	279	247	229	2231
G0JHC	3	161	249	285	290	310	318	300	310	2226
G3VJP	107	187	260	190	329	277	316	248	286	2200
G3AKU	115	173	245	254	303	270	277	268	276	2181
G5LP	75	228	287	227	312	248	286	189	254	2106
G3VKW	50	173	239	148	328	249	324	263	310	2084
G3IGW	129	198	318	242	289	246	264	137	238	2061
M0AWX	48	127	168	26	298	266	292	241	253	1719
G4WFQ	55	154	222	197	254	216	231	175	186	1690
G4OWT	58	118	207	114	311	150	299	122	271	1650
G4NXG/M	26	60	145	0	296	232	292	203	255	1509
G4BGW	10	81	181	166	228	199	229	167	221	1482
G0PSE	49	67	137	133	222	140	181	155	188	1272
MU0FAL	27	32	162	151	163	104	203	150	167	1159
G0LRX	4	105	127	0	241	66	260	82	234	1119
G4FVK	44	79	108	63	191	109	194	87	176	1051
MM0BQI	39	77	136	54	201	86	186	66	175	1020
M0CNP	11	57	86	9	168	103	152	80	123	789
M5AEF	0	20	9	7	67	92	72	30	33	330
AVERAGE	108	180	238	202	288	244	281	225	260	2026

CW ONLY

W1JR	264	291	330	320	333	320	326	308	322	2814
G3KMA	251	284	326	323	334	324	332	312	322	2808
G4BWP	232	241	310	320	309	310	314	287	269	2592
G3XTT	227	257	307	287	310	301	310	279	290	2568
G3TXF	143	242	302	301	324	301	321	286	296	2516
GW3JXN	190	241	288	291	315	308	312	277	279	2501
G4OBK	184	221	280	295	314	302	298	287	287	2468
GM3YTS	150	247	300	292	329	290	318	250	289	2465
GM3POI	216	246	295	279	309	272	287	241	259	2404
G0NXX	177	239	282	294	300	292	278	269	270	2401
G3SED	233	249	291	280	288	264	267	230	226	2328
G3YVH	138	172	262	290	317	301	300	265	272	2317
G3SXW	97	209	267	271	318	292	303	260	286	2303
G3LAS	120	162	251	280	285	290	292	267	268	2215
G3AKU	115	173	245	254	293	260	266	251	260	2117
G3NOH	51	124	211	263	303	292	300	258	272	2074
G5LP	75	224	286	227	301	248	277	189	247	2074
G4PTJ	50	152	236	222	283	264	292	253	267	2019
G3VJP	106	150	249	190	301	254	287	222	254	2013
G3VKW	44	114	195	146	254	196	276	207	221	1653
G4OWT	51	112	182	114	250	107	241	96	218	1371
G4BGW	7	79	175	166	170	188	197	155	192	1329
G4WFQ	29	130	196	179	174	159	166	131	115	1279
G0PSE	48	67	136	133	212	140	175	151	183	1245
MU0FAL	26	21	159	151	141	98	179	126	120	1021
GM4FAM	41	73	102	120	137	109	148	123	124	977
MM0BQI	26	57	100	54	121	54	119	34	117	682
AVERAGE	**122**	**177**	**243**	**235**	**271**	**242**	**266**	**223**	**242**	**2021**

Next deadline: 8 July 2004. Prepared by G3GIQ, 8 April 2004 henry@topdx.com

COUNTRIES WORKED, 2004

(Sorted by Datamodes totals)

CALL	CW	SSB	DATA	MIXED
W1JR	216	211	129	242
G3XTT	187	91	74	222
G3LHJ	87	12	62	114
MM1APX	0	57	62	73
G4OBK	118	82	59	175
GM8OEG	24	21	58	61
M0CNP	4	56	48	72
M0BKV	0	61	29	72
G0GFQ	0	43	12	45
G4DDL	37	5	10	38
GM0TGE	118	142	0	178
G3SXW	148	0	0	148
G4WXZ	78	68	0	115
G3TXF	113	0	0	113
G4IRN	112	0	0	112
G3YVH	98	21	0	111
G4KFT	110	0	0	110
M0BVE	86	0	0	86
MU0FAL	73	41	0	80
VK4BUI	60	31	0	77
G4FVK	32	61	0	71
G3YMC (QRP)	64	0	0	64
G0LGJ/M	0	54	0	54
G4FVK	28	41	0	49
G7CLY	0	38	0	38
M5AEF (1W)	9	20	0	25

WARC bands plus 80 and 160m in addition to the usual bands. The first operation was in mid-April from **Koh Chang Island, IOTA AS-125.** The QSL Manager for all HS72B operations will be Supote Saripan, E20NTS, PO Box 5, Klongtanon, Bangkok 10222, Thailand. Arrangements are being made to use HS72B at the new HS0AC club station which was scheduled to start operations on 1 May, and the callsign is likely to be used for several other events in the course of the year.

Rod, **EA7JX**, writes that he is QSL manager for LW9EOC(L59EOC), LU5FF(LQ0F, L45FF, AY5FF, L24FF, L73F), YV1DIG (YW1D, YX1DIG), CO3JO, YN9HAU, VK3FY/DU8, VK3FY, YW6P and now for D2U (CT1BFL) and D2DB (CU3BW). These last two are working in Luanda, **Angola**, for the next six months. They will be on all modes including PSK, RTTY and SSTV, and will be active in the major contests.

As I write this, ZS8MI (**Marion Island**) is active once more, with two South African amateurs working on the island. These are Barry, ZS2H, who has operated from there before, and Ludwig, who holds a ZR (restricted privileges) licence. They are on the island to undertake scientific work, and have limited time for the amateur bands. This has led to frantic calling whenever they appear, by amateurs desperate to work this rare one and no doubt worried that there will only be a limited number of opportunities. However, the incessant calling only slows things down and is likely to encourage the ZS8MI operator to switch off and find something else to do. Patience and good manners appear to be the recommended order of the day.

BANABA AWARD

From the T33C team: "The Banaba Trophy will be awarded to the station who makes the highest number of band-mode contacts with T33C. In parallel, we intend to operate an awards scheme, where a very colourful certificate can be obtained. The rules are very simple; try to make contact with us on as many of the

qualifying band slots as possible. The Banaba Bronze Award is for stations who make contact with us on a minimum of 5 band / slots; the Banaba Silver Award is for stations who make contact with us on a minimum of 10 band / slots; the Banaba Gold Award is for stations who make contact with us on a minimum of 15 band / slots. To level the playing field, only the following band-modes will apply. Contacts on other band-modes will not count for the trophy or awards. CW:160m to 6m (10 bands); FM: 10m only; SSB: 160m to 6m excluding 30m (9 bands); RTTY: 40m, 20m, 15m and 10m (4 bands); PSK: 20m, 15m and 10m (3 bands). Certificates will cost $5 (US) each plus $2 (US) post and package. Proceeds from the certificates will go into the expedition fund. Applications for the certificates should be made to Tom Wylie, GM4FDM, 3 Kings Crescent, Elderslie, Renfrewshire PA5 9AD. Applications should also include a QSO list for the specific award.

CORRESPONDENCE AND TABLES

I am preparing this column a little earlier than usual, as *RadCom* editor G4JVG is about to head off to 7Q7, so some of your correspondence may have arrived after this had been submitted. I also had a hiccup in receiving e-mail during March when I was in Rodrigues and my mailbox overflowed with spam. Hopefully normal service will be resumed next month. Meanwhile, welcome to several newcomers to both the annual and all-time tables. Joe, W1JR, goes straight to the top of the all-time table, with an excellent set of totals. I'm still trying to work out whether his achievement is because the US East Coast is a good spot to DX from, or because Joe is a first-rate DXer with a great station. I suspect it's very much a case of both! Joe's in-year score is also very impressive and he notes that he has probably missed some 20 or so entities which have been active so far this year. I would concur that, by mid-April, something like 260 DXCC entities had been active and workable, not only from the US but also from the UK. This is really quite remarkable and underlines the fact that the DX is still around, even when the sunspots start to decline. We just have to be prepared to chase it on 20, 30 or even 40m if necessary, rather than on the higher bands.

WEB SITES

Since subscribing to broadband Internet access, I tend to use it to access *PacketCluster*, rather than relying on the somewhat flaky 4m link I have had to use in recent years. My preferred site is the OH2AQ DX Summit, but that site has had quite a lot of downtime recently. If you are having similar problems, a useful alternative is the DXscape site, see WWW. Of course, you can also use Telnet to access many *PacketCluster* nodes directly. Telnet is available under your Windows operating system, but you may prefer to use DX Telnet, which is a Telnet-compatible program but designed specifically for handling DX spots. See the Telnet Directory (WWW) for a list of *Cluster* nodes available via Telnet.

There is a new Scottish ham portal, with lots of useful information and links. Well worth a look.

THANKS

Special thanks go to the authors of the following for information extracted: OPDX Bulletin (KB8NW), The Daily DX (W3UR) and 425 DX News (I1JQJ). Please send items for the **August** issue by **19 June**. ♦

WEB SEARCH

DXscape	www.dxscape.com
DX Telnet	www.qsl.net/wd4ngb/telnet.htm
Scottish Ham Portal	www.scotham.net
Telnet Directory	http://telnet.dxcluster.info

HF F-Layer, Propagation Predictions for June 2004

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe							
Moscow	1.....23	62.....256	55.1....2456	.2653332466.	.....67..	.....	.....
*** Asia							
Yakutsk	.....	.....	11.....12232	654443456666	..1232221...	.....	.....
Tokyo	.....	.....	.....	.....11..	.....11111.	.....	.....
Singapore	.....	.....11.	.....121.	.....121..	.....21...	.....1...	.....
Hyderabad	.....	1	233	1.....13555	.12111126764.	..1221133...	.....
Tel Aviv	6.....455	75.....3777	363....26787	..342.12674.	...1.....	.....	.....
*** Oceania							
Wellington	.....	.....	.....	.....	.....	.....	.....
Well (NZ) (LP)	.3.....	793.....676	997.....799	886.....599	6.....88	87	.....
Perth	.....	.....1.1	.....1.2	1	.....	.....	....1.....
Sydney	.....	.....1..	.....11..	.....	.....2.	.....	.....
Melbourne (LP)	.....	.67.....	5782.....1	5572.....6	16	.....	.....
Honolulu	.....	.....	.....	..111.....	...11.....	.....	.....
Honolulu (LP)	.....	.....	.....	.3....12...	.32....5211	..31.1..5321	...11...43..
W. Samoa	.....	.....	.....	...11.....	...111.....	.....	.....
*** Africa							
Mauritius	.....	111	.....121.	.....11..	.....1...	.....	.....
Johannesburg	23.....22	46.....3676	6531	.....161...	..1....21...	..11..2.....	...32235....
Ibadan	.....	12.....111	552.....1555	2272..125766	..875456886.	..74....67..	.....
Nairobi	.....	1.....111	31.....122	.3.....2344	.131..12562.	..4211345 3...	...111126...
Canary Isles	43.....154	664.....1666	6641....3556	4361...36677	..3766677784	...53333684.	.....2..
*** S. America							
Buenos Aires	1.....	661.....15	431.....14	21.....23	565	1553	.....14..
Rio de Janeiro	.....	22.....12	22.....23	1.....122	....1...1776	....111.2763	.....1116..
Lima	.....	21.....1	111.....2	..1.....11	165	.....14.	.....2..
Caracas	.....	.....	.....	1.1.....1	....1....1.	.....1..	.....1..
*** N. America							
Guatemala	.....	.....	.....	.....	.....	.....	.....
New Orleans	.....	.....	.....	.....	1323351	.....12.	.....
Washington	.....	1.....	321.....1	41..1....124	1223262	.....2.	.....
Quebec	2.....	63.....16	21.....12	1121	.....3..	.....	.....
Anchorage	.....	.....	.....	..1.....111	.....3.	.....	.....
Vancouver	.....	.....	.....	.....	.....111.	.....	.....
San Francisco	.....	.....	.....	.....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.....1....111...	.....	.....221..	.....221..

Key: Each number in the table represents the expected circuit reliability, e.g. '1' represents reliability between 1 and 19% of days, '2' between 20 and 30% of days, etc. No signal is expected when a '.' is shown. **Black** is shown when the signal strength is expected to be low to very low, **blue** when it is expected to be fair and **red** when it is expected to be strong.

The RSGB Propagation Studies Committee provides propagation predictions on the Internet at http://members.aol.com/g4fkhgwyn The page is updated monthly. The provisional mean sunspot number for April 2004 issued by the Sunspot Data Centre, Brussels, was 39.3. The daily maximum / minimum numbers were 63 on 19 April, and 13 on 10 and 11 April respectively. The predicted smoothed sunspot numbers for June, July and August are respectively: (SIDC classical method - Waldmeier's standard) 43, 42, 41 (combined method) 50, 49, 48. Longpath predictions are shown with (LP) following the path name. Higher input power and superior aerials have been used for these predictions; less well-equipped stations may find the longpath predictions somewhat inaccurate.

By Tim Kirby, G4VXE

Willowside, Bow Bank, Longworth, Abingdon, Oxfordshire OX13 5ER.

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Contest

Tim Kirby forwards some important advice when working on antenna towers and encourages all readers to take part in National Field Day, taking place on 5 / 6 June.

Ralph, 2E0ATY, on the left and Nobby, G0VJG, using the Cray Valley RS club callsign M8C in the multi-two section of the CQ WPX Phone Contest in March 2004.

Both Steve Cole, GW4BLE, and Reg Woolley, G8VHI, wrote to comment on some pictures they'd recently seen in the amateur radio press of someone climbing an extended telescopic tower - and apparently - without a belt. Steve and Reg point out that under *no* circumstances should a telescopic tower be climbed whilst it is extended in case the cable breaks or slips - in which case the tower sections may move with disastrous effects on the person climbing the tower. When climbing free-standing towers, you should always use a full body harness - and be attached at all times.

Good advice from Steve and Reg. Please heed their comments when you're working on your antennas and don't be tempted to cut corners.

SD

News from Paul, EI5DI, is that he has made his very popular suite of contest loggers available to everyone as Freeware. So, if you weren't using SD before, you can now download the latest versions for free from www.ei5di.com Thanks to Paul for this generous move and also, of course, for all his work in supporting RSGB and other contests by making the software so widely available.

FIELD DAYS

RSGB's National Field Day, one of the flagship CW contests in our calendar, takes place on 5 / 6 June. The event is co-ordinated with other European Societies' field days so there's plenty of activity. It's a good opportunity to improve your CW contesting skills. The ARRL Field Day takes place on 26 / 27 June. We can't enter from Europe, but it's good to show support by working a few stations. The exchange is a little complex, but if you fancy flying the flag, you can work out what you need to send by looking at the rules at www.arrl.org/contests

RESULTS

Not much more room for editorialising this month as we have built up a backlog of results again. Unfortunately, some of the results had been sent to me but had never arrived in my inbox, making it difficult to publish them! Nevertheless, my apologies to both competitors and adjudicators for the delay in these results appearing. ♦

CONTEST CALENDAR

HF Contests

Date	Time	Contest	Mode	Bands	Exchange
5/6 Jun	1500-1500	RSGB National Field Day	CW	1.8-28	RST+SN
7 Jun	2000-2130	RSGB 80m Club Championship	DATA	3.5	RST+SN
12/13 Jun	0000-2359	ANARTS RTTY	DATA	3.5-28	RST+Time+CQ Zone
16 Jun	2000-2130	RSGB 80m Club Championship	CW	3.5	RST+SN
19/20 Jun	0000-2359	All Asia	CW	1.8-28	RST+Age of Op
24 Jun	2000-2130	RSGB 80m Club Championship	SSB	3.5	RST+SN
26-27 Jun	1400-1400	Marconi Memorial	CW	1.8-28	RST+SN
26/27 Jun	1800-2100	ARRL Field Day	ALL	1.8-28	See www.arrl.org

VHF Contests

Date	Time	Contest	Mode	Bands	Exchange
1 Jun	2000-2230 Local	RSGB 144MHz / Club Championship	ALL	144	RST+SN+Locator
8 Jun	2000-2230 Local	RSGB 432MHz activity	ALL	432	RST+SN+Locator
13 Jun	0900-1600	PW 144MHz QRP	ALL	144	RST+SN+Locator
13 Jun	0900-1300	RSGB 144MHz Backpackers	ALL	144	RST+SN+Locator
15 Jun	2000-2230 Local	RSGB 1.3GHz/2.3GHz activity	ALL	1.3G/2.3G	RST+SN+Locator
19/20 Jun	1400-1400	RSGB 50MHz Trophy	ALL	50	RST+SN+Locator
20 Jun	1100-1500	RSGB 50MHz Backpackers	ALL	50	RST+SN+Locator
22 Jun	2000-2230 Local	RSGB 50MHz activity	ALL	50	RST+SN+Locator
29 Jun	2000-2230 Local	RSGB 70MHz activity	ALL	70	RST+SN+Locator

432MHz AFFILIATED SOCIETIES, 2003

When we published the individual listings of this contest earlier in the year, we unfortunately omitted the Affiliated Societies Section. Apologies, and we have pleasure in including it here.

Pos	Club	Call	Score	Norm	Call	Score	Norm	Call	Score	Norm	Total
1*	Five Bells CG	G4ODA	17573	1000	G1ZJP	15344	1000	G4KIY	1294	619	2619
2*	Harwell ARS A	M0CUL	7391	421	M0DDT	6676	435	M1PIA	2028	970	1826
3	Sutton & Cheam RS	G3WHK	7016	399	G3OLX	3564	232	G0TXL	2091	1000	1631
4	Chesham & DARS	G3MEH	11359	646	G0ODQ	3609	235	-	-	-	881
5	South Birmingham RS	G8OHM	10416	593	-	-	-	-	-	-	593
6	Surrey RCC	G4WYJ	4909	279	G8IYS	2996	195	G4FFY	83	40	514
7	West Kent ARS	G0GCI	4947	282	G6UBM	659	43	-	-	-	325
8	Wythall CG	G1WAC	2456	140	G4VPD	1542	100	-	-	-	240
9	Reigate ATS	G8JXV	2518	143	G8FBG	745	49	-	-	-	192
10	Harwell ARS B	G4HLX	1797	102	-	-	-	-	-	-	102
11	Colchester RA	2E1GUA	942	54	-	-	-	-	-	-	54
12	Cray Valley RS	G3JJZ	439	25	-	-	-	-	-	-	25

SLOW SPEED CUMULATIVE MARCH/APRIL 2003

Activity during the five sessions was average and there was a slight increase in the number of logs received. It was good to see a few Foundation licensees having a go. Congratulations to Maureen Taylor, M3AGI, winner of the Foundation / Intermediate class and to Dick Sellen, G3YAJ, winner of the Advanced class using a modified Corsair II at 10 watts and a doublet. Second was Mick, G3LIK, using a FT-1000MP at 10 watts and a W3DZZ. Leading first timer was Maureen, M3AGI, and second was Peter Clifford, M0PTR.
Derrick Webber G3LHJ

Pos	Call	24 Mar	1 Apr	9 Apr	17 Apr	25 Apr	Total
1*	M3AGI	-	**	200	320	400	920
2*	G3YAJ	235	**	**	240	265	740
3	G3LIK	**	-	255	220	265	680
4	G2HLU	**	180	220	205	**	605
5	G3ZRJ	**	**	185	190	195	570
6*	M0PTR	200	**	175	**	190	565
7	G4BJM	110	185	225	-	-	520
8	G3SET	**	175	170	150	-	495
9	G0TMT	**	145	145	160	**	450
10	G0VYR	150	150	-	145	-	445
11	G4BLI	150	-	60	-	205	415
12	M0DHO	-	90	-	145	175	410
13	GW4LZP	**	125	170	110	-	405
14	G3ZDD	**	145	130	**	115	390
15	G3ZGC	-	155	155	130	-	390
16	G0IBN	-	-	165	65	150	380
17	G4KNO	-	**	115	120	105	340
18	G4PTE	70	-	130	-	120	320
19	G0FYX	**	-	130	85	85	300
20	G4KEW	80	95	-	**	90	265
21	M5ACR	-	-	100	110	45	255
22	G0WWD	**	**	65	60	45	170
23	G0ROT	-	80	-	80	-	160
24	G0UHM	65	-	-	5	60	130
	M3MYK					**	-

* = Certificate of Merit. ** = Checklog.

144MHz TROPHY, 2003

After the aurora excitement in 2002, conditions were rated as very average this year. QSB was evident and entrants struggled to complete long-distance contacts. The best conditions were into France and a good number of DX contacts took place in that direction. Activity was poor and there were many comments about a lack of UK activity. This could have been due to the HF SSB Field Day contest which took place at the same time and allowed many former class B licensees to take part for the first time.

A number of groups were affected by equipment failures and there were some isolated reports of poor quality signals. Apparent faults with signals should be reported to the 'offending' station. However, contests place high demands on receivers and the problem could lie in your receiving system.

Logging standards were generally high with the leading stations losing less than 3% of their claimed scores. However, a number of entrants lost over 15% of their scores by careless logging of callsigns and locators.

Congratulations go to: the Parallel Lines Contest Group who returned after a year's break to win the multi-operator section and reclaim the Mitchell-Milling Trophy; Allan, GM4ZUK/P, who repeated his win in the Single Operator (Others) section; Andy, G4PIQ, operating as M6T, for winning the Single Operator (Fixed) section and hence the Thorogood Trophy; Bryn, G4DEZ, who won the six hour single operator fixed section; The Forth Valley Contest Group, GM4V, who overcame equipment problems to win the six-hour others section; Mike, M5MUF, who was the highest place low power fixed station; James, 2E1GUA, who was the leading Intermediate class licensee; and M3KGC who was the leading Foundation class licensee. These stations together with those marked * will receive certificates.

Roger Dixon, G4BVY

Section M

Pos	Call	Loc	QSOs	Score	ODX	km	Pwr	Ant	Group
1*	G8P	JO01QD	821	316791	EA2DR/P	959	400	8*17	Parallel Lines CG
2*	G4ZAP/P	JO02QV	394	132869	HB9FAP	830	400	4x12+2x12+4x9	A1 CG
3	G0VHF/P	JO01HW	415	127437	TM8MB	812	400	4*9 +2*9	Colchester CG
4	G5B	JO03CE	249	95432	OL3Y	970	400	6*12 + 2*18	Five Bells
5	G8NJA/P	IO80DQ	232	73547	TM8MB	946	200	2*17	Torbay ARS
6	GM3HAM/P	IO85VV	121	46203	DF0OL	900	400	17	Lothians RS
7	G2XV/P	JO02CE	183	45030	DL0GTH	753	200	2*17	Cambridge & DARC
8	M8Y	IO93DV	132	15207	F8KTH/P	710	25	9	Otley ARS
9	G4LPD/P	IO93RA	50	12802	DF0OL	651	100	9	East Notts CG

Section SO

Pos	Call	Loc	QSOs	Score	ODX	km	Pwr	Ant
1*	GM4ZUK/P	IO86RW	224	90770	DF0OL	988	400	4*13 ele
2*	GW8ASA/P	IO81FP	63	16077	DK0LT	716	150	9 ele
3	M0COP	IO92BK	42	8905	PI4FRG	527	100	17 ele
4	G3UFY/P	IO91XF	9	1246	PA6NL	300	2.5	8 ele

Section SF

Pos	Call	Loc	QSOs	Score	ODX	km	Pwr	Ant
1*	M6T	JO01MU	624	215355	DK0OG	907	400	4*15+3*9 ele
2*	G3MEH	IO91QS	248	66089	TM8MB	852	400	2*10 ele
3	M5FUN	JO00DX	107	24387	TM1Y	644	100	12 ele
4*	M5MUF	IO92JP	57	13871	DK0LT	554	25	2 ele
5	M0ZZO	JO01PW	52	13708	DL0BL	615	50	8 ele
6	G0GJV	IO91OK	50	13315	DK0BN	625	100	9 ele
7	M1DUD	JO02QC	49	11867	TM9R	577	5	5 ele
8*	2E1GUA	JO01FR	41	8013	DF0OL	547	20	13 ele
9	G8HGN	JO01FO	17	7279	TM8MB	789	150	2*15 ele

Section 6S

Pos	Call	Loc	QSOs	Score	ODX	km	Pwr	Ant
1*	G4DEZ	JO03AE	102	31344	DK8SG	768	400	2*12
2*	G3YJR	IO93FJ	46	8965	DF0CI	830	25	9 ele
3*	M3KGC	IO93FJ	3	207	G4DEZ	108	2.5	9 ele

Section 6O

Pos	Call	Loc	QSOs	Score	ODX	km	Pwr	Ant	Group
1*	GM4V	IO85RU	88	25725	DK0PU	777	400	17 ele	Forth Valley CG
2*	GW8ZRE/P	IO83JA	84	18414	F6KSL	793	10	7 ele	
3	G0MWT/P	JO01GP	78	17707	DL0GTH	723	100	11 ele	
4	G4ADV/P	IO70JH	52	15261	TM1Y	928	400	2*9ele	Newquay & DARS
5	GM4VVX/P	IO78VB	45	14314	G4RRA	811	300	9 ele	
6	G1KHX/P	IO81MH	50	9874	GM4ZUK/P	626	150	9 ele	
7	G1WAR/P	IO92IO	33	6661	F6HPP/P	490	2.5	9 ele	
8	G6GVI/P	IO81RJ	17	4064	GM4ZUK/P	616	25	HB9CV	
9	GM4IJE/P	IO67WN	7	2858	G8SRC/P	732	50	9 ele	
10	F/G3VQO/P	JO00SQ	7	771	ON4KHG	171	20	Whip	

LOW POWER CONTEST, 2003

The conditions were pretty tough at times, especially on 80 metres, which is pretty normal, with most of the contacts being on 40 metres. The QRN on 80 metres was one of the reasons that most stations moved up to 40 after a couple of hours. The weather conditions seemed to be perfect for portable operation. Not having strict times on band changes and varying information on contest web pages, is causing some confusion on operating times, and this has been duly noted.

This was the first time that nearly every entry had submitted a computer log, and unfortunately not everyone checked the logs before they were sent. This caused some resubmission of logs, and with the help of Paul, EI5DI, we were able to decipher all the logs. Thanks to all concerned.

Congratulations to Tim, G4DBL, who wins section A and receives the 1930 Committee Cup; G6KQ (operated by Keith, G3RPB) wins section B and receives the Houston-Fergus Trophy. The 3W Portable section D was won by G4ARI and receives the Southgate Trophy. Congratulations to Ron, G4DDX, for winning the 3W fixed section (Section C). Also, congratulations to G4ARI, G4DDX and G4DBL for having error-free logs, a tremendous achievement for a low power contest. Many thanks to G3ICO, G3VQO, G0DVJ/P, PA0FAW, DL5FCO for submitting checklogs, and thanks to those overseas stations who were operating QRO and sent logs in.

Dave Mason, G3RXP

10W Fixed

Pos	Call	Score
1	G4DBL	1020
2	G3RSD	942
3	MM3BRR	874
4	G3GMS	475
5	G3ZRJ	390
6	G0MRH	355
7	G4XPE	275
8	ON5JD/A	264
9	PA3ELD	195
10	SP6LV	187
11	DL1LAW	180

10W Portable

Pos	Call	Score
1	G6KQ/P	1311
2	G4AYM/P	1015
3	G2CP/P	925
4	G3KKQ/P	915
5	G3IZD/P	891
6	G4HRC/P	808
7	G0VYR/P	727
8	MM0BQI/P	190

3W Fixed

Pos	Call	Score
1	G4DDX	795
2	G3VIP	700
3	G3KZR	606
4	GW3SB	570
5	G3YMC	495
6	G0VQR	35

3W Portable

Pos	Call	Score
1	G4ARI/P	1125
2	G4AON/P	842
3	GM3JKS/P	835
4	G4BLI/P	830
5	G4DDL/P	560
6	G4TSH/P	555
7	GU4YBW/P	528
8	G3HKO/P	411

1st 1.8MHz CONTEST 2003

Sixty-two logs and two checklogs were received for the first topband contest of 2003, all except six of them by e-mail or disk, which saves the adjudicator's time and temper typing them into contest software. The number of entrants was one more than last year with a slight increase in UK entries balanced by a slight decrease in the overseas entry.

Congratulations once again to Clive Penna, GM3POI, for winning the Somerset Trophy for the leading UK station. Fraser Roberston, G4BJM, was second and Dave Cree, G3TBK, third. The leading overseas station was Algirdas Uzdonas, LY2BW. There seems to be keen competition in Lithuania for best Overseas station in the RSGB topband contests, which is encouraging.

Sid Will, GM4SID

UK Section

Pos	Call	QSO	Bonus	Pts
1	GM3POI	225	83	1079
2	G4BJM	206	77	1000
3	G3TBK	195	81	981
4	GU4YOX	203	73	960
5	G0CKP	190	73	926
6	G3BJ	181	75	918
7	GM6NX	179	74	908
8	G3TJE/P	177	77	904
9	G3GLL	175	69	864
10	G3OLB	158	71	796
11	G3KLH	156	65	784
12	G4VGO	151	66	753
12	GW4GEI	147	67	753
14	G4CWH	144	61	728
15	G3VYI	137	63	705
16	G0JQN	137	54	670
16	G4OGB*	125	59	670
18	GM4SID	130	58	666
19	M0AJT*	120	53	625
20	G2HLU	117	55	599
21	G4CZB	101	55	578
22	G3HZL	100	52	546
23	G4EBK	101	50	544
24	G0VQR	97	49	533
24	G3SET	93	53	533
26	G3LIK	93	50	515
27	G3YEC	98	49	514
28	G3YAJ	100	43	506
29	G3SVL	92	48	505
30	G3GMS	70	42	412
31	G3GMM	63	39	365
32	GM3UM*	59	36	357
33	G0MBQ*	58	35	349
34	G3RSD*	56	34	338
35	G3ZGC*	50	31	305
36	G3JJG	50	32	302
37	G4BUO*	45	32	295
38	G3TXF	44	31	284
39	G3XTT*	32	24	216
40	G3VQQ*	26	21	183
41	G0MTN*	21	17	148
42	G0/N9LYE	14	14	80

* = Error-free log. Checklogs from G2FSR and MM3BRR.

Overseas Section

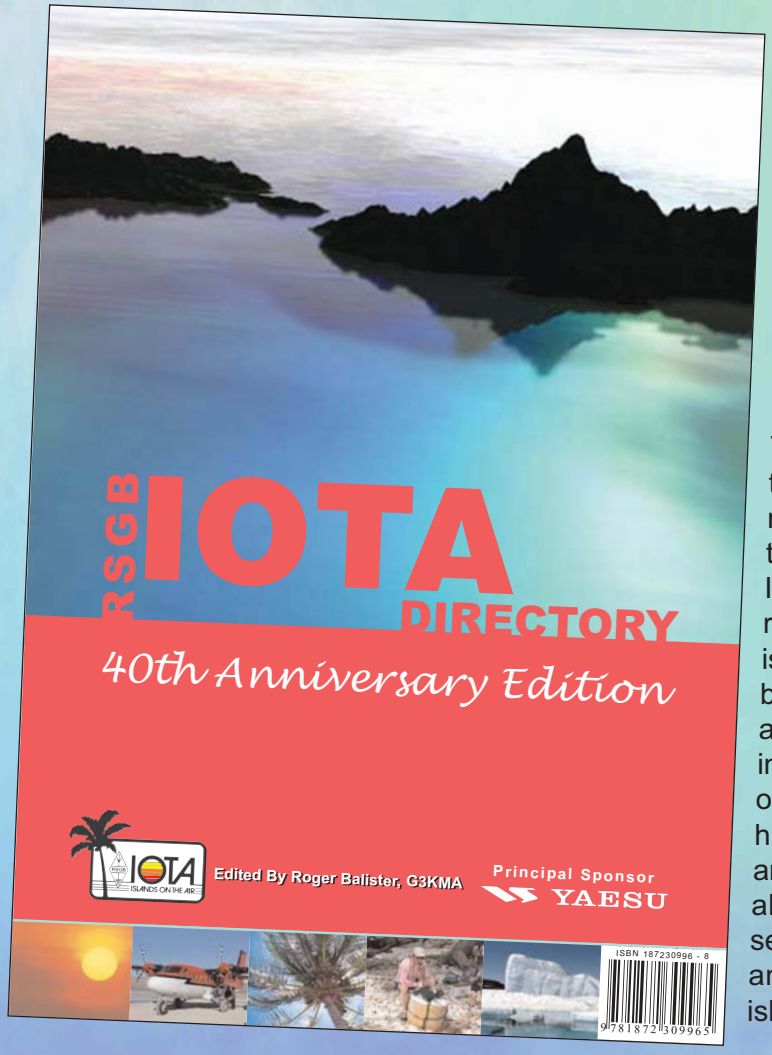
Pos	Call	QSO	Bonus	Pts
1	LY2BW	65	45	409
2	OK1RI	65	44	388
3	LY3BA	51	38	332
4	LY2OX	47	34	308
5	LY2OU	48	33	295
6	PA0MIR*	37	30	261
7	OK1AYY*	33	28	239
8	UX5NQ	28	25	185
9	F2NZ/P	30	24	182
10	EW8DX	27	24	174
11	OM7VF	25	22	169
12	PA0INA	24	17	133
13	UA4PT	17	16	123
14	PA3FZZ	23	14	117
15	YU1WC	14	14	112
16	3Z0PRK	16	14	107
17	HF70I	15	15	96
18	EA1AK/7	11	11	80
19	SP3MY	9	9	48
20	DL1LAW*	5	5	40

NEW RELEASE

IOTA DIRECTORY

40th Anniversary Edition

Edited by Roger Balister, G3KMA



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Dave Pick, G3YXM

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E-mail: lf.radcom@rsgb.org.uk

LF

G3YXM discusses some LF tests from near Vladivostok, and some surprising trans-Atlantic signals. He prepares to welcome more newcomers to LF, while reporting, with some trepidation, a new commercial transmission on 135.6kHz.

From 16 – 27 March, RU6LA and friends took a trip to the far eastern part of Asiatic Russia. The site, in locator square PN63CH near Vladivostok, had a 90m tower from which they could hang a pretty efficient wire aerial. They decided upon a 220m folded long wire with a maximum height of 80m (see **Fig 1**) and two 2km-long Beverage receive aerials.

The transmitter was the trusty valve unit based on an old audio amplifier which they have used on previous expeditions. It produced the (Russian) regulation 100W very reliably.

The operators were, Ed, RU6LA, Vic, UA9OC, Vlad, UA0LE (whose callsign they used), and Andy, RA0LGH.

The transmit mode of choice was 60s QRSS, and the intention was to run beacon transmissions in order to judge conditions, and then try for contacts with both Western Europe and New Zealand. As it turned out, the path to New Zealand seemed to be much more favourable than that to the west, and a contact with the ZL6QH club station, at Quartz Hill near Wellington, took place at the first attempt. The New Zealand station was using the special call ZM2E, which had the advantage of taking considerably less time to send on DFCW than ZL6QH! The distance of 10,311km is a new record for a two-way 136kHz contact.

During the expedition, many LF operators in New Zealand reported a good copy of the transmissions from Vladivostok, so the largely sea-path to ZL seems to be quite reliable, given favourable conditions.

To the West however, things were not so easy. Good contacts were made with RU6LWZ at 6,800km and RN6BN at about 6,900km, but there was no full identification of the signal in the UK. The short period of mutual darkness made things more difficult, as it coincided with the noisy early-evening period at this end of the path.

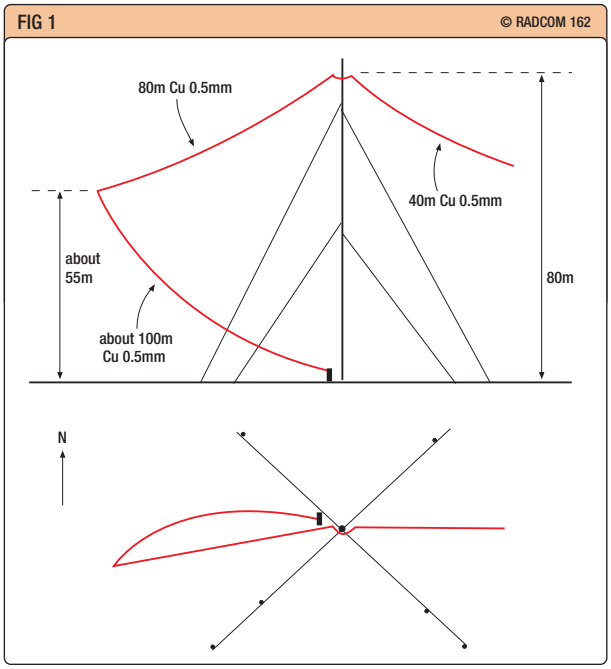

Fig 1
Details of the aerial near Vladivostok, in elevation and plan views.

TRANS-ATLANTIC NEWS

Meanwhile, the trans-Atlantic tests have continued, with Jack's regular transmissions from VO1NA being received throughout Europe. The best distance achieved so far is to Sam, RN6BN, at about 6,600km.

Jack has managed to make several contacts with British stations using various speeds of QRSS, G3LDO and M0BMU being the most recent stations to make a two-way contact. On one occasion, Jack's signal was received in QRSS1 (1s dot length) which is only a few dB short of an audible CW signal! This is all the more remarkable, considering the low power used at VO1NA. Jack's 100W transmitter is not very big for LF, the low efficiency of most amateur aerials means that 1000W is usually necessary to get anywhere near 1W ERP.

One evening in March, 'Part 5 Permit'-holder John Andrews, W1TAG, had a surprise when airing his newly-acquired callsign, WD2XES. He chose a frequency close to that of VO1NA, so that anyone looking for Jack's signal would have a chance of picking up his. To his amazement, he saw his signal on CT1DRP's live screen-grab at about 0300UTC. This was the same time that VO1NA's signal peaked.

UA0LE, UA9OC, RU6LA and RA0LGH during the ZM2E contact.

On this first attempt, John was only running 75W of RF into his big loop, an even lower ERP than VO1NA, and at a greater distance from Europe. He has since been received by G3LDO.

NEW ON THE BAND

The new experimental permits continue to be issued in the states but, as most of these are not permitted to make contacts, they only give scope for listener reports.

Laurence KL1X/5 is now installed in his new location in Bartlesville, Oklahoma and able to listen on LF. He reports that the noise levels are low and the ground conductivity is good, but there's no news yet of the reissue of his WD2XDW permit at the new site.

Over here we have the prospect of a new influx of stations on the band as the old 'Class Bs', who still have a love of experimenting at the margins of feasibility, come on to 136kHz. I have heard statements of intent from several people but no signals yet...

It is interesting that a high proportion of LF enthusiasts seem also to operate on 6m, microwaves, or even laser communications!

Over the last few months, John, G3JRL, in Weymouth, has been steadily improving his LF setup. His persistence is at last being rewarded with some CW contacts. Listen out for him during evenings and weekends.

Returning to the band after an enforced absence is Whitton club station, G0MIN. The trees that had grown around their long-wire aerial have had to be cut down as they were causing cracks to appear in the building. Every cloud has a silver lining!

MORE QRM ON THE WAY?

Geri, DK8KW, sends the following worrying information: "It seems that Hungary plans to set up a remote control transmitter similar to DCF39 on 135.6kHz by end of this year. It is planned to make use of an old 314m-high tower near Budapest known as 'the cigar' because of its shape.

"The planned protocol will be similar to the DCF39 transmissions. It is not yet clear if the quoted frequency of 135.6kHz is the mark, the space, or the centre of the transmission. I hope that we will not suffer from the planned 100kW transmissions, but benefit from them in the same way as we do by using DCF39 as a beacon and propagation indicator."

This is very close in frequency to the Greek transmitter which causes some interference around the eastern Mediterranean area; let's hope it doesn't have a similar effect across Eastern Europe. ♦

Rev George Dobbs, G3RJV

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G3RJV reports a QRP contact from Shoreham beach, and gives information of another product from Cumbria Designs. He talks about another QRP addict, Hans, G0UPL, and quotes the rules for the Original QRP Contest 2004.

QRP

Hans Summers, G0UPL, shows off his valve CW transmitter for 40 and 80m to G QRP Club members after the last Rochdale QRP Convention.

No sooner had the last edition of this column appeared, with information on some QRP contacts, than I received an e-mail from Paul, G7RSG, about his first-ever QRP contacts on an HF band.

"Today (17 March 2004) sitting on Shoreham beach (Sussex) using only 5W from my FT-817, I replied to two CQ calls on 20m SSB and got responses from both S51GL, Slovenia, and EA3FEB, Barcelona, one being a 5/4 report with QRN on his end. I nearly fell over in shock as these were my first QRP contacts on HF. I was using a compact, tunable whip made by bhi called the Wonder Wand (an antenna I often use for receiving at home, as it also seems to have remarkable receive performance) with the radio powered from a 12A, 12V, sealed lead acid battery."

NEW PRODUCT - CUMBRIA DESIGNS MINI-COUNTER KIT

Following the success of their FD-01 transceiver display, Cumbria Designs, the Penrith-based kit company, has launched a new kit, the Minicounter. This compact processor-based module uses standard parts and is easily assembled by anyone with basic tools and soldering skills. Whilst frequency counter kits are not new, the functionality that the Minicounter offers is likely to find many applications in both radio and general electronics. Originally designed as an alternative to mechanical dials in radio transceivers, the Minicounter is also suited for use as a stand-alone frequency counter, operating to over 100MHz with 10Hz display resolution. Features include two fully-programmable IF offsets from 10Hz to 999.999 99MHz in 10Hz steps, offset sum and difference computation, two programmable multiplier factors to compensate for pre-scalers or oscillator multiplier chains, a delta offset mode for measuring relative frequency shift or oscillator drift, adjustable hang time to reduce display disturbances during T/R transitions under RIT etc., and eight mode indicators including USB, LSB and CW. All functions can be changed during normal operation and are controlled by grounding control pins on an 8-way connector on the module. User programming is via three small push switches on the PCB; once programmed, the user settings are stored in EEPROM with a volatility of over 40 years! The Minicounter kit includes a 16 x 2 backlit LCD and comprehensive assembly and operating instructions. For more information visit www.cumbriadesigns.co.uk or send a SAE to Cumbria Designs, The Steading, Penrith, Cumbria CA11 0ES.

THE ORIGINAL QRP CONTEST 2004

For several years Dr Hartmut Weber, DJ7ST, has organised the 'Original QRP Contest' twice a year. An interesting and friendly contest, it has attracted many QRP operators. The rules are as follows.

The idea of the contest is to promote creative or unconventional QRP operating like home-building or operating without the 'luxury' of QRO equipment from time to time. This event is as much a QRP meeting event as a contest. The previous results lists show that many operators take part on only one band for just an hour or two and without the intention of high scoring or even winning.

Participants: Operators of original QRP rigs, commercial or homebrew, including commercial QRP rigs exceeding 5W output like Elecraft K2, QRP Plus, SG 2020, FT-7 and QRP-versions of QRO-transceivers like TS-130 V, FT-707S etc. Stations with QRO-equipment (>20W out) temporarily tuned down to QRP will be listed as a 'non-original' in the checklog.

Date: 3/4 July and 1/2 January 2005.

Time: Saturday 1500UTC till Sunday 1500UTC, rest period of nine hours minimum in one or two parts.

Frequencies: CW segments of the 80-, 40-, and 20m bands

Call: "CQ OQRP" (Original QRP)

Categories: VLP (1W out or 2W in); QRP (5W out or 10W in); MP (20W out or 40W in); no QRO category!

New: From now on there will be 'handmade' and 'open' subcategories, ie VLP/handmade and VLP/open, QRP/handmade and QRP/open… etc. Contestants who want to be listed in a 'handmade' subcategory *must* declare: "All my transmitters operated in this contest were homemade by myself. I was coding and decoding the CW signals by head and hand without computer assistance and did not use DX-cluster or other third-party support." Any log without a declaration like this will be listed in the 'open' subcategory.

Operation: Single-op CW. Various transmitters and transceivers may be operated, but only one at any instant.

Exchange: RST, serial-no/category, eg 559001/VLP.

QSO-points: The log checker will count four points for a QSO with another contest station whose log has come in. All other contacts count one point. Exchange of RST is sufficient with stations not in the contest.

Multiplier: The log checker will count two multiplier points for each DXCC-country from a contact with a station whose log has come in. Otherwise each DXCC-country counts one multiplier point.

Final score: Sum of QSO-points multiplied by the sum of multiplier-points. (Calculated by the log checker). Please do *not* try your own calculations. So every log is welcome and important, even if just three contacts on a picture postcard.

Logs: List contacts sorted band-wise, please. Add the DXCC prefix if you claim a multiplier for a QSO.

Deadline: 31 July to 31 December to: Dr Hartmut Weber, DJ7ST, Schlesierweg 13, D-38228 Salzgitter, Germany.

A QRP EXPERIMENTER

It is always good to meet anyone who enjoys the practical side of amateur radio. It has long been my pleasure to know a lot of QRP-inclined radio amateurs who enjoy their hobby through building and experimenting with low-power and low-cost equipment. One of the visitors to my shack after the Rochdale QRP Convention last autumn was Hans Summers, G0UPL. I had come to know Hans through his website (www.hanssummers.com), a lively and interesting site which describes his enjoyment in building equipment. Hans's site has information, and practical details for a wide range of projects including his valve CW transmitter for 40 and 80m, A polyphase 80m SSB receiver, information on Huff-and-Puff oscillator stabilisers, 'crystal penning' to vary the frequency of crystals, using common diodes as varicap diodes, and practical building information for a useful antenna tuning unit. It is a useful place for any radio amateur to point a web browser. ♦

By Norman Fitch, G3FPK

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VHF / UHF

Norman Fitch explains the use of some of the abbreviations found in the 'VHF / UHF' column and reports on a month of generally poor conditions on the VHF / UHF bands.

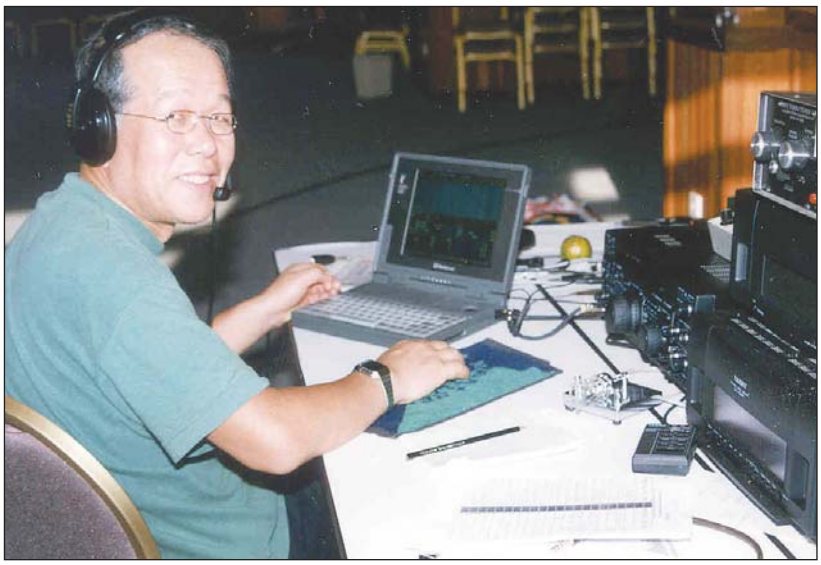
In the June 2003 'VHF/UHF' column the topic of the month was the jargon associated with amateur radio so for the benefit of new readers I thought it appropriate to mention the abbreviations used in this column. All the times quoted are in UTC unless otherwise stated. The Q-code 'QRG' is used instead of writing "frequency". The term 'QTHR' means that the licensee's address is correct in the current *RSGB Yearbook*. In the Moonbounce section a hash (#) indicates the callsign of a station worked for the first time. EME means 'Earth-Moon-Earth', otherwise known as 'moonbounce'.

A CW contact is identified by an asterisk (*) after the callsign. 'QRV' is used to indicate that a station or beacon either will be or is in operation, eg "The Svalbard 6m beacon JW7SIX has been QRV again since 25 March." In the Meteor Scatter section, referred to as 'MS', the term 'ZHR' means the predicted Zenithal Hourly Rate of meteors. I adopt the term 'QTE' to indicate a beam heading or azimuth, even though QTF is more commonly used.

VALE G3IMV

Another fine UHF operator has become a Silent Key and I am saddened to report the passing of John Hunter, G3IMV, from Bletchley in Buckinghamshire, who died in hospital on 10 April. John was a very dedicated VHF operator and you only have to look at his entries in the All-time Squares Table over the years to appreciate that. He was, perhaps, best known for his 2m MS activity and, whenever there was an operation from a rare grid, you could be sure that G3IMV's callsign would figure in the DX station's log, so it's not surprising that he was consistently in first place. Since it became generally available to British amateurs, he was an enthusiastic operator on the 6m band and his final grids total was second only to that of Neil Carr, G0JHC.

What may not be generally known is that John was one of the many people involved with the then highly secret intelligence operations at Bletchley Park. This vital WWII mission has since been written about and there have been TV documentaries about the work of the Enigma code-breakers. We extend our sympathies to his wife Joyce and to John's immediate family in their loss.



Kazu Ogasawara, JA1RJU, who recently made the first-ever EME QSO on 6m from Rodrigues Island as 3B9C.

SOLAR AND GEOMAGNETIC DATA

The 10.7cm solar flux in the 30 days to 13 April varied from a maximum of 129 units on 28 and 29 March to a minimum of 88 on 10 April, averaging at 106.8. The sunspot number was below 100 on 19 days, the minimum being 16 on 11 April and the maximum of 169 occurring on 29 March. 19 new regions were observed. The middle latitude A-index at Fredericksburg was below 10 on 19 days, the minimum of just 1 occurring on 24 March. The maximum value was 21 on 3 April. So it's not surprising that no auroral activity was reported.

BEACON NOTES

Remi Vaicius, LY2MW, reports that the 6m Lithuanian beacon was switched on again at 1700 on 11 March. LY0SIX (KO24PS) is on 50.063MHz and runs 7W to a 6-ele Yagi beaming 250°. Stefan Heck, LA0BY, reports that the Svalbard 6m beacon JW7SIX has been QRV again since 25 March. It is on 50.047MHz and runs 10W to a 3-ele Yagi beaming towards Europe. The strong winds had broken off the centre lead in the coax feeder but that's now been fixed.

DXPEDITIONS

Olli Droese, DH8BQA, writes that the North Eastern Contest Gang is off on tour again on another Baltic DXpedition. The team, comprising DF2EA, DH8BQA, DL1EJA, DL2BZE, DL3BQA, DL5UH and DL5YYM proposes activity from Bornholm Island (JO74MX) which, for IOTA fans is EU-030, between 10 and 22 June. The equipment will be an FT-847 and 5-ele Yagi on 6m; 350W to a 15-ele Yagi on 2m; 250W to a 21-ele Yagi on 70cm and 10W to a 44-ele Yagi on 23cm.

So far they haven't planned on any MS activity, either HSCW or WSJT, but that might change if there is sufficient interest. E-mail them at dh8bqa@necg.de if you would welcome this with a message like, "DF0TEC, JO73CF, needs JO74+75, active on FSK441, all evenings and weekends." Otherwise they will only be QRV on tropo plus, hopefully, aurora and Es. They plan to be QRV in the 23cm NAC from either JO74 or 75. There is a website for the latest information - see the list.

Keith Tatnall, G4ODA, is going back to Iceland this summer from 10 to 24 June, accompanied by Paul Bradfield, G1GSN. As last year, this will be a holiday rather than a full DXpedition, but they will be monitoring 6m. They will also have WSJT capability on 2m. The main target area is the north-west part of the island but, as the ferry port is in the east, they could operate from various sites on the way round. From 26 June to 4 July they will be somewhere in Shetland and may also be QRV on 4m from there.

MOONBOUNCE

Howard Ling, G4CCH (IO93), has improved the frequency stability of his 23cm system so that he can operate JT44 and JT65 modes. He is

LOCATOR SQUARES TABLE

Starting date: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1296MHz	Total
G3XDY	-	34	261	179	130	604
G4YTL	11	56	560	141	14	782
G3IMV	846	20	619	125	53	1663
G6TTL	405	-	140	94	28	667
G4DEZ	665	30	196	87	41	1019
G1SWH	448	42	242	81	30	843
G8VHI	-	-	217	76	40	333
G8HGN	346	-	206	74	-	626
G8TOK	419	39	145	57	29	689
M5BXB	423	15	177	57	-	672
G3FIJ	278	29	108	51	23	489
G0FYD	717	9	294	48	17	1067
GW3HWR	478	31	187	34	-	730
G4ZHI	107	17	280	33	-	437
G4APJ	184	-	61	29	-	274
G0ISW	231	6	100	22	-	359
M3CLY	262	-	285	20	-	567
G4OBK	469	25	79	10	-	583
MU0FAL	503	-	28	9	3	543
M1DUD	272	1	50	9	-	332
G4FUJ	111	20	28	6	5	170
G0JHC	1040	26	48	4	-	1118
GM4VVX	357	22	170	2	-	551
MM1FEO	50	-	13	1	-	64
GW7SMV	675	-	250	-	-	925
G7KHF	510	-	18	-	-	528
GW3EJR	313	-	-	-	-	313
G3FPK	30	-	246	-	-	276
M5MUF	155	23	70	-	6	254
EA7IT	69	-	108	-	-	177
G8RWG	-	-	108	-	-	108

No satellite, repeater or packet radio QSOs.
If no updates received for a year entries will be deleted. Band of the month 430MHz. Next deadline is 15 June.

now using a G8ACE oven-controlled crystal oscillator in the local oscillator of his transverter and intends to phase lock it to 10MHz from a Hewlett-Packard HP Z3901A GPS clock using CT1DMK's Reflock board. Currently he has stability and precision at less than 100Hz.

He was QRV in the *Dubus*/REF Worldwide EME Contest over the 27/28 March weekend completing 41 QSOs for a claimed score of 41x29x100 = 118,900 points. K9SLQ on the 28th was initial number 189 and his multipliers included nine US states and two Canadian provinces.

Chris Bartram, GW4DGU (IO71), has been on 2m and on 23 March K7MAC, (DN13 in Idaho), was a new initial using JT65b mode. On 6 April he completed with SP6GWB (JO80), DL7UAE (JO62) and DL1GGT (JN58), the latter his 38th initial on the band from Wales and who was using just two 9-ele Yagis. Sky noise was high during the first leg of the *Dubus*/REF contest and his only QSO was with KB8RQ on JT65b. On 7 April he monitored Leigh Rainbird, VK2KRR (QF34NR), testing with a PE1 station. Both Chris and Leigh were profiting from good antenna ground gain, it being moonrise in Wales and moonset in New South Wales.

On 70cm Chris spent a lot of time listening for 3B9C and is fairly sure he copied signals during one of their skeds. At the end of his sked with them on1April he was called by OH2DG (KP30) and they completed on JT65b, after which they used CW. On 29 March he completed with G4YTL# (IO91 and 6-Yagis) and on 1 April with EA3DXU# (JM11 and two 38-ele Yagis) and ES6RQ# (KO28 and 12 short Yagis). He thinks that may be the first GW/ES QSO on 70cm on any mode so any challengers?

The following news is taken from the April *432 and Above EME News*, edited by Al Katz, K2UYH. He reports that conditions on 70cm in the first leg of the EWW (European World Wide) EME Contest over the 6/7 March weekend were much better than during either weekend in last year's ARRL contest. F6KHM appears to have the lead with 58x34 followed by HB9Q with 54x28. Activity on 23cm was reasonable. With most scores received for the February 23cm SSB event he says that OE9XXI gave the most contacts, Peter completing 19 QSOs in 10 sectors for a score of 370 with G4CCH in second place with 168.

On the home front, Simon Freeman, G3LQR (JO02), was QRV on 70cm for a time in the EWW event with his 8-Yagi array and completed on CW with HB9Q, DL3WG and F6KHM on the first day and with OZ4MM, VK3UM, VK4AFL, JA6AHB and DF3RU next day. He also operated on 13cm. Dave Dibley, G8RGK (IO91), worked a dozen stations on 70cm in the *Dubus*/REF contest but was plagued with intermittent sequencer relay problems, which destroyed one preamp, before the problem became permanent.

On 6/7 March Stuart Jones, GW3XYW (IO71), completed 70cm QSOs with UA3PTW, OH2DG, K4QI, F6KHM, K1FO, SM3AKW, OZ4MM, S52CW, SP6JLW, DJ6MB and DL1YMK on CW and with HB9Q on SSB. He has been using JT44 and JT65 modes on 23cm, 70cm and 2m.

Up to 12 April the following European operators had registered to attend the EME Conference in Trenton over the 6-8 August weekend: DL1YMK, DL4MUP, F5SE, G4YTL, HB9BBD, OK1DFC, ON4UB, ON6JY, ON7VN and SM2BYA and from Australia, VK4AFL. See p82 in the April *RadCom* for further details.

The 3B9C DXpedition group was QRV on EME from Rodrigues Island. Kazu Ogasawara, JA1RJU, made the first-ever EME QSO from the island, on 6m with SM7BAE at 1807 on 28 March. On 70cm they used four stacked Yagis and the first QSO on that band was on CW at 1200 on 31 March with HB9Q. The operators were Dave Robinson, G4FRE, and David Bowman, G0MRF. By 4 April a total of four QSOs had been completed on 70cm.

12/13 June is the next activity weekend when London latitude stations will have about 26.5 hours of Moon time. The declination varies from +5.08° to +13.61° and the signal degradation, referred to perigee, ranges from -1.30dB to -1.59dB. The 144/432MHz sky temperatures vary from 322/25K to 366/27K. The Sun offset is -53° at Saturday midnight.

METEOR SCATTER

There are a couple of useful showers in June, the first being the Arietids, which OH5IY's software predicts should peak around 0410 on the 7th with a ZHR of 60. Reflections are above 50% of the maximum for six days and the radiant is above a mid-UK horizon between 0100 and 1800. The second is the zeta-Perseids, which should peak around 0350 on the 9th with a ZHR of 40. This shower is active for three days and is 'available' for the same time span as the Arietids.

BAND REPORTS

50MHz

March was a pretty appalling month for 6m operators if Ted Collins's, G4UPS (IO81), report is anything to go by. He sums it all up with, "Not a peep heard on 6m, not even a G or GW station. Have not experienced a complete month without a contact on 6m since I worked from ZD8TC in 1981!"

John Palfrey, EH7IT, finally got around to assembling a 5-ele Yagi for 6m and for the first few days, the only way he knew it was working was by copying meteor pings from the Cornish beacon GB3MCB. On 22 March he was monitoring 50.110MHz beaming to the south-east when he heard 5T5KN (IK28) calling CQ so they had an SSB QSO at a distance (QRB) of 2527km. A few minutes later beaming south-west he worked EH7KW (IM67) on some kind of scatter mode. Later that day he copied the FY7THF beacon in French Guiana on 50.039MHz at up to S8 for half an hour but CQ calls went unanswered. John will concentrate on 6m this summer now that he has a decent set up, but he is only permitted 10W with a maximum antenna gain of 6dB. The Spanish allocation is 50.000-50.200MHz, which is a bit limiting.

Clive O'Hennessy, GM4VVX (IO78), has not heard a lot up in the far north even when there were auroral conditions, so he thinks that very few operators consider this mode. The only 'opening' was way back on 24 February and when he switched on at 1830 the band was full of what sounded like FM broadcasts from 50.0 to 51.70MHz with signals up to S9+40dB. The transmission was in English about the political and judicial system in Bulgaria. It was coming from the direction of "the lower east of Europe" but ended abruptly at 1847.

The Rodrigues DXpeditioners operated 3B9C on 6m and made 1440 QSOs on the band but none with British Isles stations, which is hardly surprising considering the geography and current state of the sunspot cycle. Before and throughout the operation, they maintained an excellent website giving a daily account of activity on all bands from 160m to 6m plus the 70cm and satellite working. Well done everyone.

70MHz

Phil Catterall, G4OBK (IO94), lost part of his Yagi in the strong gales in late March but has since repaired it. So he managed a couple of hours in the RSGB contest on 11 April completing 32 QSOs into 11 grids. He didn't hear any EI, GI or GM stations and ODX were G4ADV (IO70) at 511km and G3YJX (IO70) at 497km. He was using an FT-847 with 75W amplifier and 5-ele Yagi 15m AGL. His QTH is in the Vale of Pickering at only 25m ASL.

GM4VVX tried to go to the top of the little hill looking south from his QTH for the Cumulative sessions but it snowed just enough each Saturday to make the tracks impassable for his car. In four tries he only made one contact so writes, "I do not think the big boys will be worried!"

144MHz

Geoff Grayer, G3NAQ (IO91), was QRV in the RSGB 144/432MHz Contest on 7 March in poor to average conditions with occasional rain showers. He completed 28 contacts on 2m with DL, F, G and ON stations, ODX being F6KMF/P (JN36) at 813km. Other contacts over 600km were with DK0BN (JO39), DL0PVD (JN49), F6HJO/P and F1ERG/P (JN27), DL3DAO (JO31) and F6KFH (JN39).

A tale of woe from GM4VVX who intended to operate /P in the 6-hour section of the contest but the field he intended to use had cattle in it and he got bogged down in mud. So he moved 70m down the hill, got the antenna up only to discover that the little plug for the masthead amplifier relay control had parted company with the cable. He tried for an hour with just 25W but heard nothing apart from local GM4ILS, who confirmed that conditions were awful, so he gave up. Then on 9 March, as he and GM7ASN with their wives were driving to a previously-booked dinner date, there was a big aurora lasting all evening. By Sod's Law, it fizzled out 15min before they arrived home as the last of the beacons were disappearing into the noise.

COMIC RELIEF

Peter Blair, G3LTF, spotted this gem on the Moon-net website. It originated from Joel Harrison, W5ZN. He quoted an e-mail from a friend who moved from his area about two and a half years ago. "When we moved, the town would not let me put up any antennas. So I ran for city council, got elected, fired the planning director, revised the antenna ordinance and now have my tower and antenna permitted. A hard way to do it, but it worked. 73, Jerry, W7QX". As Joel concluded, "Now that's what I call democracy!"

THANKS

Thanks to Neil Clarke, G0CAS, for copies of the January and February issues of *SunMag*; to the UK Six Metre Group for the April edition of the quarterly magazine *Six News* and to the DUBUS Organisation for the 1/2004 issue of the quarterly *DUBUS* magazine. The UK agent for *Dubus* is Roger Blackwell, G4PMK (QTHR) whose e-mail address is dubus@marsport.demon.co.uk

DEADLINES

Once again not a very inspiring month for VHF/UHF propagation so let's hope for better things next time. The deadline for July is **11 May** and for August the date is **15 June**, by which time we ought to have had some Es to report on 6m at least, and hopefully on 2m as well. *Please* can I have a few more entries for the annual table, however modest? The telephone answering and fax machine is on 020 8763 9457 and my CompuServe ID is G3FPK. ♦

WEB SEARCH	
Bornholm operation	www.necg.de/bornholm
G0CAS	www.g0cas.demon.co.uk
UKSMG	www.uksmg.org
DUBUS	www.DUBUS.org

HELPLINES

♦ R Sharp, G4MNB, needs information on the Grundig TK24, which he is trying to refurbish. He will refund any costs. G4MNB, QTHR.

♦ Jim, EI4HH, would welcome the circuit diagram of the Daiwa PS-304 PSU. He will reimburse all expenses. EI4HH, QTHR.
E-mail: holohaj2@hotmail.com

♦ Nigel, G7URW, requires a manual for a Sony ICF-2001D receiver. G7URW, QTHR.
E-mail: ursulamt@aol.com

♦ Derek, GW0ZDL, has lost the instructions to set up the calibration routines for the Hands DDS1 Synthesiser (V2). Can anyone supply a copy? GW0ZDL, QTHR.
E-mail: derek.driftwood@btinternet.com

♦ Harry, G3NGX, is researching Leslie McMichael, G2FG, (MXA), a founder of the London Wireless Club and first Secretary of the RSGB. He made the first radio transmissions from a train, and founded a wireless factory in Slough bearing his name. The July radio rally in Reading continues the link. It is hoped to set up a display of his achievements and show a McMichael domestic set at the McMichael Rally on 18 July. Pictures, company literature, old sets, anecdotes, etc, will be welcome. G3NGX, QTHR.
E-mail: g3ngx@radarc.org

♦ Bruno, PA3AGR, wonders if someone still possesses the booklet stored in the top of Tektronix oscilloscopes type 585 or 545B. PA3AGR, tel: 0031 294 416 182 or
e-mail: b.a.zijp@hccnet.nl

♦ John, ZL3TR, is searching for a service manual for the Yaesu FT-101ZD. If anyone can help, please write to Mr J Haynes, Pacific Haven Retirement Home, 365 Marine Parade, South New Brighton, Christchurch, New Zealand 8007.

♦ Karl, SM0AOM, is looking for the following modules for the Racal RA1217/6217 receiver: first VFO, part number CA28120; first IF amplifier unit, part number BA28103; 13kHz band-pass filter, part number BD38733/A; IF module with one or more IF filters, part number DA38580/A or B. Any help would be very much appreciated. SM0AOM, QTHR.
E-mail: sm0aom@telia.com

♦ Dave, G8GKQ, is looking for a circuit diagram or service manual for the Yaesu FT-2F 2m transceiver. All costs will be refunded. G8GKQ, QTHR.
E-mail: thecrumps@bigfoot.com

♦ Ray, G3RSB, would like to obtain either an MC1414L or LM1414 chip to make possible the repair of a Gould oscilloscope. G3RSB, QTHR.
E-mail: ray@gersb.karoo.co.uk

♦ Bob, G4DBW, needs a circuit diagram or any information for the Datong D-75 speech processor. All expenses will be paid. G4DBW, QTHR, e-mail: bobatbay@beeb.net

♦ Mr C H Bullivant, G3DIC, requires a circuit diagram and components list for the Daiwa DC power supply, PS-304 II. Any photocopying and postage costs will be met. G3DIC, QTHR. Tel: 01460 65760.

♦ Hugh, G3JDO, is looking for information (circuit diagram, service manual) on the Sony Short-Wave Radio, ICF-PRO80. All expenses will be fully reimbursed. G3JDO, QTHR. Tel: 0191 489 8239 or e-mail: hugh@martin7569.fsnet.co.uk

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IARU
Region 3 conference in Taiwan

Don Beattie, the IARU Region 1 Secretary, reports on the work of the recent Region 3 meeting in Taiwan.

General view of one of the working groups in session at the Conference.

In this month's column, I can report on the recent IARU Region3 Conference, held in Taipei, Taiwan. Each year, one of the three Regions holds its triennial conference, and this year the Region 3 Conference took place. It had been scheduled to be held last year, but was deferred because of the SARS outbreak.

Region 3 extends from Iran in the west to the Pacific Islands in the east, from China and Japan in the north to New Zealand in the south, and contains an interesting mix of cultures, and countries with widely different histories of amateur radio. This makes a lively environment for discussion.

The Conference was hosted by CTARL (the Chinese Taipei Amateur Radio League), which provided excellent hospitality, and a varied social programme, in addition to good conference arrangements. The Conference examined some 80 papers, and as is normal, discussions were divided into two streams, one covering the political and administrative aspects of the agenda, the other the technical aspects.

POLITICAL / ADMINISTRATIVE

In Working Group 1, discussion included such topics as the strategies and objectives of the Region, matters of implementation of the decisions of WRC-03, the direction for licensing in the Region, the possible ways of creating greater portability amongst licences between Region 3 countries, support to amateur radio in developing countries, planning issues for antennas and the problems of diminishing amateur radio numbers. On this last topic, it was interesting to see the polarisation of positions in different countries. Whilst the longer-established amateur radio populations are diminishing (for example in New Zealand and Australia), there is significant growth in Asia, perhaps most significantly in China and Korea.

Notable also was the progress in New Zealand in quickly taking the outcome of WRC-03 into national legislation. Licence categories have been streamlined, and as part of a rework of all the provisions for amateur radio in the country, a new LF band from 130 - 190kHz is to be released. Whilst this is of somewhat academic interest for those of us in Europe, with the presence of long-wave broadcasting, it is interesting that this part of the spectrum has been made available to amateurs in this region.

OPERATIONAL / TECHNICAL

Working Group 2 covered a review of band plans, EMC, EMR, the IARU Monitoring system, International Beacons, Data transmission,ARDF and emergency communications. One of the more specific proposals to come out of this Working Group concerned the actions member societies were urged to take in the EMC area. This was initiated by the issues around PLT, and measures that each national society should be taking to ensure it was in touch with PLT developments, urging them to actively inform other HF users about the EMC issues raised by this technology.

In some countries in Region 3 (Australia is a good example) regulation is now in the air to require proper assessment to be made of Electromagnetic Radiation from radio transmitters. Region 3 decided to create an EMR co-ordinator post, whose role it will be to share information and advice in this potentially difficult area. The Working Group also proposed a new basis for ARDF championships in Region 3. Because of the hot humid climate in many countries in the Region, there had been serious concerns that the form of ARDF championship held in, for example, Region 1, was simply too risky for the Region 3 environment. Conference therefore adopted new rules which place less emphasis on physical stamina, and more on technical competence.

Another outcome from Working Group 2 was the creation of a focus in the Region for Disaster Communications. This reflected the emphasis now given in Article 25 of the radio regulations to preparedness for communications in emergency / disaster situations.

A special working group also undertook some work during the conference to handle some rather sensitive issues arising from papers submitted by delegates acting on behalf of Pitcairn Island Amateur Radio Association (PIARA) and American Samoa Amateur Radio Association (ASARA). The background to these issues was a claim for IARU membership for ASARA, which met some opposition. One rationale for the claim appeared to be a wish to establish ASARA so that (under the now discontinued DXCC rule) a remote island off American Samoa could be considered as a new DXCC entity. In the end, harsh words were mellowed by suitable interventions and diplomacy, and the situation was resolved amicably, with a commitment to review further some of the issues raised in the various papers presented.

NEW DIRECTORS

Finally, a new Board of Directors was elected at the meeting. Fred Johnson, ZL2AMJ, a long time RSGB member, retired from the Board and the Administrative Council. Fred's commitment to the work of IARU was duly recognised by Conference. Fred has been involved in IARU matters for decades, and the whole amateur radio movement owes him a debt of gratitude for his vision, commitment and sheer hard work. We wish him a long and happy retirement.

Chandru, VU2RCR, was elected to fill the vacancy created by Fred's retirement. Peter Naish, VK2BPN (formerly G3EIX, and another RSGB member) takes on the role of Chairman of the Board and Keigo Komuro, JA1KAB, remains as Region secretary.

This was also the last official duty as IARU Vice President for David Wardlaw, VK3ADW. David Sumner, K1ZZ, made a presentation to David, recognising his long and active service to IARU, both in Region 3 and the Administrative Council.

All in all, this was a useful conference and, as with all such meetings of amateurs from various countries, a remarkable opportunity to exchange experiences and plans, and help build a better future for amateur radio. ♦

In voting completed on 16 March, the member societies of the International Amateur Radio Union overwhelmingly ratified the re-election of Larry Price, W4RA, as president, and the election of Timothy Ellam, VE6SH / G4HUA, as vice president. Both will serve five-year terms beginning May 9. There were 82 votes cast for Price, with one abstention, and 81 votes for Ellam, with two abstentions. Ellam succeeds Dr David A. Wardlaw, VK3ADW, who has served as vice president since 1999 but was not available for another term.

Peter Martinez, G3PLX

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E-mail: peter.martinez@btinternet.com

A digital SSB phasing network

Following on from GJ3RAX's recent series comparing SSB phasing methods, Peter Martinez, G3PLX, presents another design, but based on DSP techniques. This design is capable of far better performance than any described so far.

In his recent series of *RadCom* articles [1], Lawrence Woolf, GJ3RAX, described the different kinds of audio phasing network which are an essential part of the technique of generating SSB by the phasing method. I would like to add a new one to this list. This uses digital signal processing (DSP) techniques to make a pair of 300-3000Hz band-pass filters which have identical amplitude responses, but phase responses which differ by 90°. There is no need for the separate band-pass filter which the existing phasing methods must have in order to suppress out-of-band signals. The performance of this DSP phasing network is also far better than any of those analysed by GJ3RAX.

In this article I will describe how such a pair of filters can be built up from fundamental DSP filter building blocks, illustrate the typical performance, and provide some programming information for those wishing to experiment with the technique. This SSB phasing network can easily be implemented in PC-based software using the ubiquitous soundcard interface for the audio input and output functions. As an alternative, a dedicated DSP chipset could be used, perhaps based on an existing hardware design such as the PIC-A-STAR recently described [2] by Peter Rhodes, G3XJP. An SSB phasing network for a transmitter is described here, but the same network can be used in an SSB receiver.

THE PARALLEL FILTER BANK IDEA

Suppose I sample my input audio 8000 times per second, and feed the resulting stream of digital samples down two parallel paths. By the end of this article, these will go to two digital-to-analogue converters (DACs) and become the two outputs of my phasing network. To start with, I will feed a 1kHz tone into the input and take one output via a 250µs delay and the other direct. This gives a 90° phase shift between the two outputs, which is exactly what I want, but it only works at 1kHz. At 2kHz, for example, I would need a 125µs delay to get 90°. How can I vary the delay so that I have a constant phase-shift at all frequencies? The answer is to split the input band into a number of narrow sub-bands using a bank of band-pass filters, apply the required delays separately to each sub-band, and then combine all the outputs together again. The complete block diagram might look like **Fig 1**.

Fig 1
Block diagram showing how a bank of narrow band-pass filters, each feeding a pair of direct/delayed paths, could be used to make an SSB phasing network.

Fig 2
Block diagram of a Finite Impulse Response filter.

DIGITAL FILTER BASICS

This process is much easier with DSP than with analogue signal processing. To explain how it's done, I need to introduce some DSP filter theory.

One form of DSP filter, known as a Finite Impulse Response (FIR) filter, has the input fed along a delay-line, with taps along the line at one-sample intervals. The output is formed by summing the slider voltages of a set of potentiometers across each tap. The simplest example is a basic low-pass filter, in which the output is formed from the sum of all the taps. That is to say, the potentiometers are at maximum, or in DSP terminology, the tap coefficients are all unity. This is shown as a block diagram in **Fig 2**, and gives a frequency response as shown by the black curve of **Fig 3**. The first null is at the frequency which results in exactly one cycle of the input frequency appearing along the length of delay-line. For example, a 10ms delay-line will put the first null at 100Hz. Further nulls appear where a whole number of cycles of the input frequency fills the delay-line, that is, at multiples of 100Hz.

If I were to change the coefficient pattern so that it was itself a single cycle of a sine wave along the length of the coefficient array, this would change the filter to one which peaked at 100Hz, and had a null at zero and at all other multiples of 100Hz. By changing the coefficient pattern to 2, 3, and more cycles of a sine wave, I can make filters centred on all 'harmonics' of the fundamental 100Hz frequency of the basic filter. The frequency responses for the first few harmonics are shown by the coloured curves in Fig 3, and the corresponding coefficient patterns are shown in **Fig 4**. To cover the 300 - 3000Hz band, I will need 28 of these.

I can now design a set of sub-band filters for my proposed phasing network. Each one could be followed by a delayed path and a direct path, the delay chosen to give the required 90° phase-shift for that sub-band. However, there's a problem here, because in a sampled data-stream, the only delays available are multiples of the sample interval. Many of the sub-bands will need intermediate values; for example, the 300Hz sub-band will need a delay of 833.33µs, which is 6.66 samples. The solution is to make two filters, one for each path, and to generate the required delay by sliding the coefficient pattern of one filter along the delay-line by the required amount. It's the overall pattern that matters, not the individual coefficient values.

For reasons which will become clear shortly, rather than have one filter 'straight' and the other shifted by 90°, I make one filter lead by 45°

FIG 1 © RADCOM 163

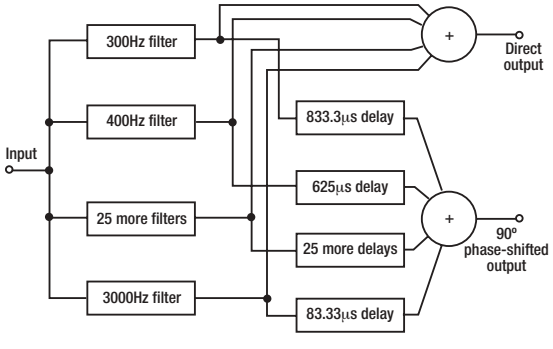


FIG 2 © RADCOM 164

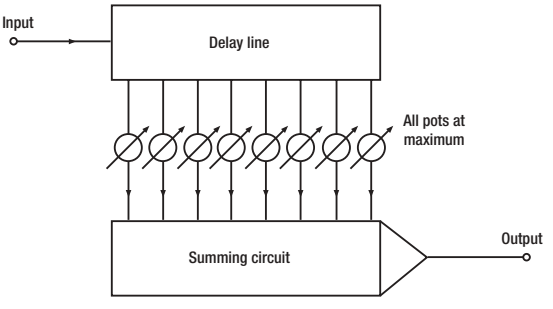


FIG 3 © RADCOM 165

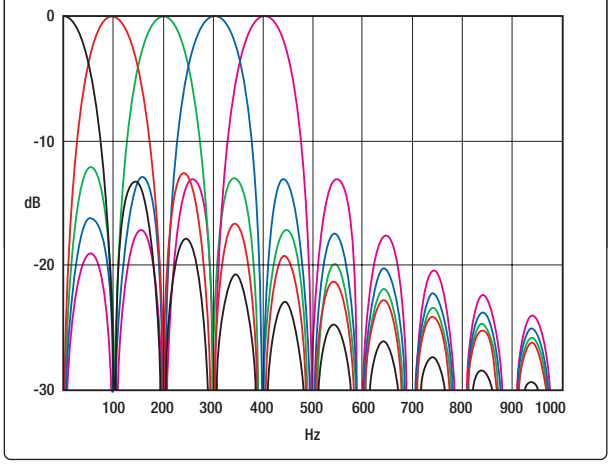


FIG 4 © RADCOM 166

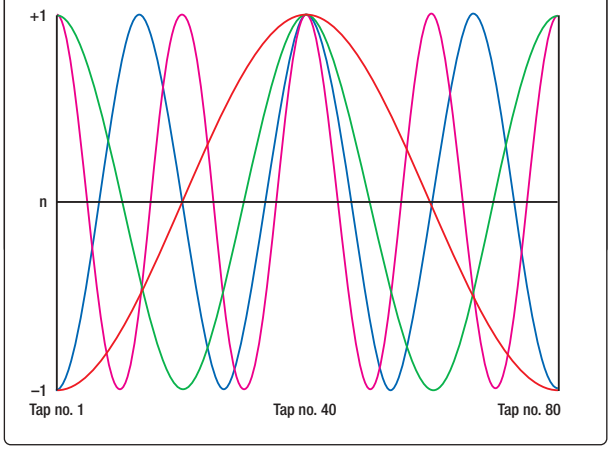


FIG 5 © RADCOM 167

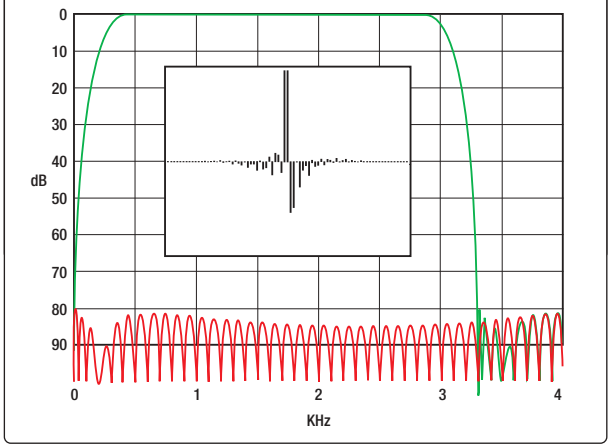


Fig 3
Frequency responses of low-pass and narrow band-pass filters, using a basic DSP delay-line filter.

Fig 4
Coefficient patterns for the series of narrow band-pass filters shown in Fig 3.

Fig 5
Pass-band and stop-band response of a complete SSB generator, designed for 300 - 3000Hz using a 79-tap delay-line and a sample-rate of 8kHz, with an inset showing the shape of the finished coefficient array.

and the other lag by 45°. Fig 4 shows the coefficient patterns all lined up at the centre, but to build the bank of 28 filters for the 45°-leading path, I slide each coefficient pattern to the left by the appropriate amount for each sub-band. For the 28 lagging filters I slide the patterns to the right.

This complex network can be considerably simplified. For a start, I only need one delay-line, not 56, because all the signals I need are delayed from the one input. Since I am going to add the sub-band filter outputs together at the end, I can also save computation by adding the coefficients of each sub-band filter together for each tap position *before* multiplying by the delay-line signal. In fact I can do that when I design the filter, and don't need to do it for every audio sample. Therefore, I only need two real-time multiply-and-add processes, not 56. The entire network simplified to two simple delay-line filters on a common delay-line.

There's a well-known rule in DSP filter theory which says that reversing the sequence of coefficients in filters of this type changes the sign of the phase response while keeping the amplitude response unchanged. By choosing ±45° rather than 0° and 90°, I therefore only need one coefficient array, which I use 'normal' in one filter and 'reversed' in the other. The perfect amplitude balance also improves the sideband rejection. The computer code for the whole process appears on p86.

THE SIDELOBE PROBLEM

There is one final problem to solve. The basic low-pass filter had its first null at 100Hz, then a sidelobe at 150Hz which is only 13dB down, then another null, then a smaller sidelobe, and so on. This undesirable characteristic also appears in the sub-band filters and the composite 300-3000Hz filter bank, where the sidelobes effectively 'spill over' into the unwanted sideband. The solution is to use a DSP technique known as 'windowing', in which the coefficient values at the ends of the array are reduced to zero, those in the centre are left at their original values, and those in between are progressively reduced in a smooth curve. This reduces the sidelobes considerably at the expense of a slight rounding-off of the passband edges. I experimented with the window shape to get the best overall result. The computer code for the calculation of the finished coefficient array is also shown on p86, while the finished coefficient pattern is shown in the inset to **Fig 5**.

To implement a network like this in a soundcard-based PC program, we would arrange for the operating system to deliver to our program a constant stream of audio samples from the soundcard input at the 8kHz rate. Our program would calculate the next pair of output values and pass these back to the operating system, which would send them to the stereo outputs of the soundcard, again at the 8kHz rate.

THE PERFORMANCE

I have calculated the performance using a 10ms delay-line, a wanted response of 300 - 3000Hz, and an 8kHz sample rate. The result is illustrated in Fig 5, which shows the wanted and unwanted sideband responses of a complete SSB generator. The sideband rejection is more than 80dB. The response near and above 4kHz will be further attenuated by the filters in the DAC hardware.

A longer delay line can give even better performance but, in the limit, this might need a faster processor. The envelope delay through this network is half the delay-line length, so a very long delay-line might be unsuitable for some time-critical applications.

PRACTICAL RESULTS

I have built this design into a breadboard low-power direct conversion SSB transceiver using the hardware of the SDR1000 kit [3] designed by Gerald Youngblood, AC5OG, which contains a DDS system to generate the 90°-phased RF oscillators, a pair of RF mixers, and the associated amplifiers, filters, and switching circuitry. I have run the software both in a PC with soundcard and on a Motorola DSP56002 development kit. I can detect no unwanted products worse than the 65dB limits of my simple test equipment. I had no problems with amplitude-balance but, had I needed to trim it to optimise the sideband rejection, I could have done it in software. The PC/soundcard method suffers an annoying 200ms time-delay due to the *Windows* operating system, but the dedicated DSP method is free of this problem.

By Steve Telenius-Lowe, G4JVG

Editor, RadCom, c/o RSGB HQ

Jimmy Porter, GI3GGY, is presented with a Certificate of Merit by RSGB President

Half a century of

RSGB President Jeff Smith, MI0AEX (right), presents an RSGB Certificate of Merit to Jimmy Porter, GI3GGY, to commemorate Jimmy's 50 years of reading the RSGB news.

The 16-element HF log-periodic towers over Jimmy's house and VHF antennas.

When Jimmy Porter, GI3GGY, wrote to RSGB HQ in March to say that he had been reading the RSGB news for 50 years, it came as something of a surprise to RSGB HQ staff and GB2RS news manager Gordon Adams, G3LEQ. We had been anticipating the celebration of the 50th anniversary of GB2RS next year, because *World at their Fingertips*, by John Clarricoats, G6CL, says (on page 260) "On Sunday, September 25, 1955. . . the first RSGB News Bulletin was broadcast from the station of Council member Frank Hicks-Arnold, G6MB, of Walton-on-Thames, Surrey, using the Headquarters call-sign GB2RS."

However, further investigations revealed that it was John Clarricoats himself, then the Secretary of the RSGB, who requested Jimmy Porter, GI3GGY, to read an experimental RSGB news as early as 14 March 1954.

To mark the half-century, Jimmy was presented with a Certificate of Merit on 1 April 2004 by RSGB President Jeff Smith, MI0AEX. I was pleased to be able to go along to photograph the presentation and to meet Jimmy at his station, located right on the border between Northern Ireland and the Republic of Ireland.

THE MAN BEHIND THE CALL

Jimmy was born in Gillingham, Kent, in 1920, and he came to live in Ireland at six weeks of age. At nearly 84 he could easily pass for a man 10 years younger, almost bounding over a gate to gain access to the field behind his house in order to photograph the antenna system.

From 1946 he taught radio and electronics at the Londonderry Technical College and in 1949 took out the GI3GGY callsign.

A digital SSB phasing network continued

THE PHASING PROCESS

Here is the computation which carries out the phasing process, as it could be implemented in a PC with a soundcard, or a dedicated DSP system. This is not a complete program, but it would be of interest to those already experimenting with DSP programming. It is written in Pascal and takes the form of a function which runs 8000 times per second, takes one audio sample (here called *input*) and returns two values for the next pair of 'stereo' output samples, here called *TxSSB.left* and *TxSSB.right*. The array *delayline* is of length 81. The variable *dptr* is a pointer which indicates the location in the delay line which is to receive the next input sample. *Dptr* is incremented each time, and when it gets to the end of the array it is forced back to the start again, so that the oldest sample is overwritten and the whole array always contains the most-recent 81 input samples. This is more efficient than physically moving 80 samples along the array. There is only one coefficient array (called *coeffs*), because the values for one filter are the sequence-reversed values for the other filter. The *coeffs* array is numbered from -40 to +40, and the variable *tap* is used to step both forwards and backwards through this array as the computation proceeds through the FOR…NEXT loop. Note that the pointer *dptr* completes exactly one complete 'circuit' of the delay-line array while carrying-out the FOR…NEXT loop, leaving it in the right position to take the next sample. To swap sidebands, change the sign of one of the output values or do it in hardware.

```
function TxSSB(input:mono):stereo;
var leftsum,rightsum:extended;
 tap:integer;
begin
  delayline[dptr]:=input;
  dptr:=(dptr+1);
  if dptr=81 then dptr:=0;
  leftsum:=0;
  rightsum:=0;
  for tap:=-40 to 40 do
  begin
   leftsum:=leftsum+coeffs[tap]*delayline[dptr];
   rightsum:=rightsum+coeffs[-tap]*delayline[dptr];
   dptr:=(dptr+1);
   if dptr=81 then dptr:=0
  end;
  TxSSB.left:=leftsum;
  TxSSB.right:=rightsum
end;
```

COEFFICIENT ARRAY DESIGN

This fragment of Pascal shows the calculation for the design of the coefficient array. The counter variable *harmonic* steps through the values 3 - 30 to generate each sub-band filter, and within this loop the pointer *tap* steps through the coefficients in each filter. The '+π/4' term in the cosine is the 45° phase shift and the "/40" on the end gives the network a gain of one. The factors 0.431, 0.496, and 0.073 in the window process have been found empirically to give the best compromise between passband shape and sideband rejection. The window process reduces the end values to zero, so there are really only 79 coefficients.

```
 procedure makefilter;
var tap,harmonic:integer;
begin
  for tap:=-40 to 40 do coeffs[tap]:=0;
  for harmonic:=3 to 30 do
    for tap:=-40 to 40 do
      coeffs[tap]:=coeffs[tap]+cos(harmonic*π*tap/40+π/4)/40;
  for tap:=-40 to 40 do
      coeffs[tap]:=coeffs[tap]*(0.431+0.496*cos(tap*π/40)+
                  0.073*cos(2*tap*π/40))
end;
```

REFERENCES

[1] 'Comparison of SSB Phasing Methods', Lawrence Woolf, GJ3RAX. *RadCom* Feb – May 2004.
[2] 'A Software Transmitter and Receiver', Peter Rhodes, G3XJP. *RadCom* Aug 2002.
[3] 'A Software-Defined Radio for the Masses', Gerald Youngblood, AC5OG. QEX Jul 2002.

news reading from GI3GGY

In 1950 Jimmy bought two RCA ET4336 AM ex-broadcast transmitters at an MoD auction and it wasn't long before the superb audio quality and strength of the GI3GGY signal was recognised far and wide. Jimmy was introduced to John Clarricoats, G6CL, at an RSGB Regional Meeting in Belfast early in 1954 by the late Bill McGonigal, GI3GXP, the then Northern Ireland Regional Manager. 'Clarry' had heard how well the GI3GGY signal was received across the UK and he invited Jimmy to transmit the experimental news broadcast in March of that year. Jimmy's first newsreading, made under his own callsign, therefore preceded the official start of GB2RS by some 18 months. GI3GGY has been reading the news on Sunday mornings ever since.

During a period of 40 years Jimmy taught the RAE syllabus, putting hundreds of students through the RAE. As well as his interest in, and deep knowledge of, radio and electronics, Jimmy has also had a lifelong love of music, particularly the operas of Wagner and Puccini.

He married and has four sons and four daughters. Three of the sons went on to take out amateur radio licences: John, GI4JVP (who had a successful career as a BBC engineer in the UK and Oman); Jimmy, GI0GGY, and Brendan, MI0GGY.

Jimmy also had a thriving radio and TV business but lost the premises during the troubles in 1972. The visual impact of the GI3GGY antennas, and their location within metres of the Irish border, also caused Jimmy to receive several visits from British security forces during the period of the troubles. Those officers with a love of music often found an excuse to revisit Jimmy's home, knowing that they were likely to be treated to a performance of *Madama Butterfly* or *La Boheme* on Jimmy's superb hi-fi system!

Tragically, Jimmy's wife Dolly was killed in a traffic accident on the busy road outside their home five years ago. Jimmy says that music proved to be a "great healer of the soul" during this and other difficult times in his life.

A GREAT STATION

Once you have seen the GI3GGY station it is not hard to understand why Jimmy has such a 'rock-crushing' signal across the whole of the UK (and beyond) on 40 metres. His main antenna is an APC LPH-9 16-element log-periodic Yagi made by the All Products Company in Mineral Wells, Texas, and covers 6.5 to 32MHz. It provides 14dBi gain and exhibits a front-to-back ratio of 20dB. The boom is 66ft long and is of a lattice tower construction. The antenna is mounted on a rotatable 10.75in diameter 80ft high galvanised steel mast. The mast mounts on to a rotator that pivots between two 80ft galvanised steel towers. The whole system is hinged at the base and weighs in at a massive 6100 pounds! The LPH-9 is fed with 3.125in air pressurised coaxial cable using copper tubing as the inner conductor.

Jimmy received the LPH-9 antenna system from the Clooney US Naval Base in Northern Ireland in 1978. Two of the LPH-9s were used, back-to-back, for the President Kennedy to Khrushchev 'hot-line', with the scrambled HF voice signal received from Washington being relayed on a different frequency to Moscow by the Londonderry station. Jimmy has two 'spares' stacked at the bottom of his garden.

A second tower supporting antennas for 4m to 70cm is completely dwarfed by the LPH-9, but is actually a major 60ft construction that most radio amateurs would be delighted to have as their main antenna support!

Jimmy's shack is also a wonder to behold. In a converted garage, yards of shelves and cabinets are stacked floor to ceiling with valves, components, ex-government equipment: Rohde & Schwartz polyscopes, Collins, RCA AR88, National HRO receivers, and four ex-BBC VHF transmitters, even a WWII Telefunken E52b receiver 'liberated' from a German U-boat. When Jimmy read that first experimental RSGB news in 1954 he did so on 7047.5kHz AM, using one of the RCA ET4336 broadcast transmitters that he bought in 1950. That transmitter still stands in Jimmy's shack, but the second was converted into a linear amplifier for use on SSB. The driver is an old Yaesu FT-101EE and this, with the ET4336 amplifier and LPH-9 antenna, forms the basis of Jimmy's station today.

GI3GGY now reads the GB2RS news every Sunday morning at 10.00am local time on 7048kHz LSB. On the rare occasions when he is unable to read the news himself, his reserve newsreader, June Dunne, GI4MJD, having already read the news on 2m at 9.00am, drives the five miles to Jimmy's station and stands in for him on 40 metres.

After being presented with the Certificate of Merit, Jimmy said, "It has been a pleasure and a privilege to serve radio amateurs for the past 50 years. Through my news-reading I have met and made many friends both nationally and internationally. I look forward to the next 50 years!"

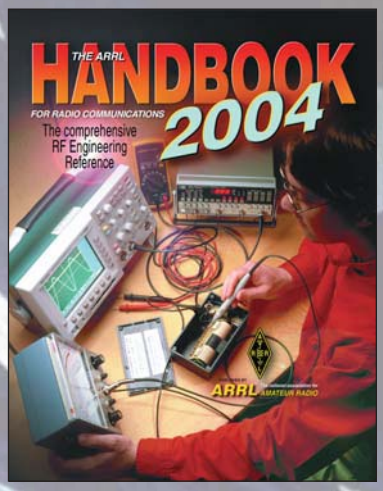
Our thanks go to Jimmy Porter, GI3GGY, for his great efforts over the past half-century. Sincere thanks too to Jimmy, June, and Jimmy's daughters Nuala and Lesley for their hospitality on 1 April. ♦

Jimmy gets ready to read the GB2RS news on Sunday morning.

Yellowed with age, the GI3GGY log book entry for 14 March 1954.

June Dunne, GI4MJD, and Jimmy's daughters surprised Jimmy with a celebratory cake to follow the presentation of the Certificate of Merit.

THE AMERICAN



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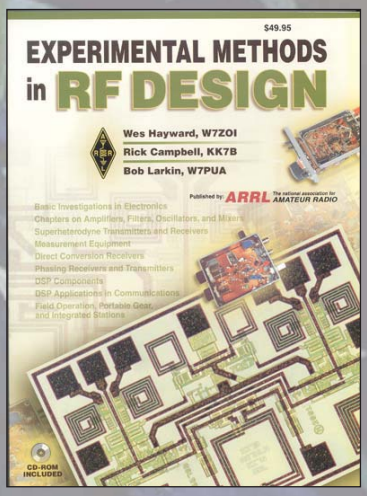

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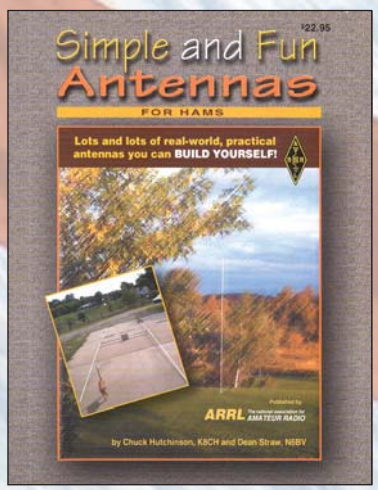

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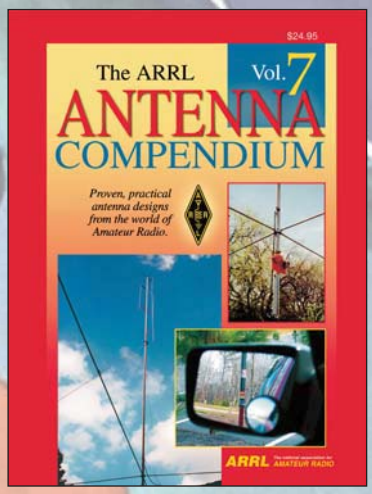

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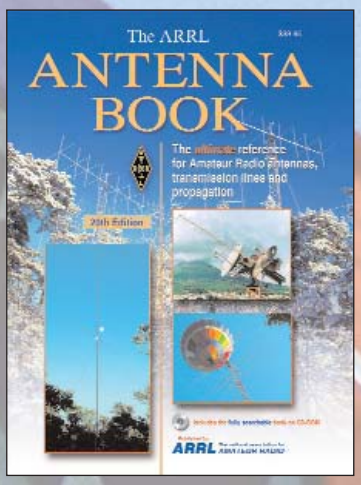

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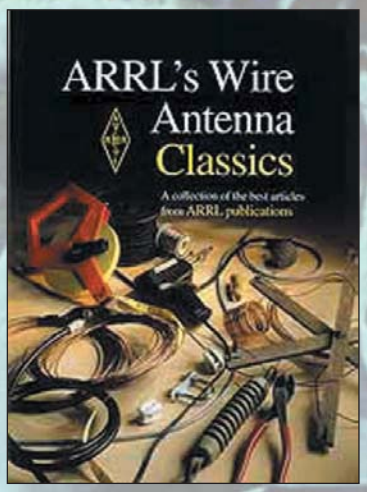

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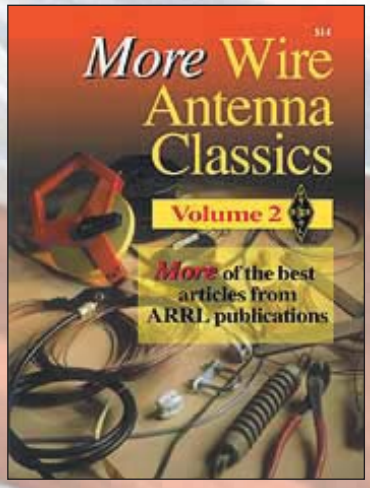

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FT-290 MkII, linear, mobile mount, head set, £200. Jaybeam 11-ele parabeam, 2m, £10. Buyer collects. G0MCE, QTHR, 01902 785 599 (Wolverhampton). E-mail: robdaw@blueyonder.co.uk

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KENWOOD TS-8505 man, boxed, may be seen working. Buyer collects or pays postage, £550. Shure desk mic, £50. Dennis, M0CYN, 07791 105 184 (York).

KENWOOD TS-850S with man, £550. Kenwood MC-85 control mic, £90. Kenwood SP-820 filtered speaker, £80. Manson 13.5V (variable) PSU, £30. Morse auto Telereader CWR-880, £60. Cushcraft A-3S 3-ele triband beam, £110. Daiwa rotator/controller DC-7011, £90. Galvanised wind-up 40ft wall mast, £110. Cushcraft R5 multiband vertical aerial, £100, complete with wall mast. All equipment in vgc. G0RMP, 01262 676 786 (Humberside).

KENWOOD TS-870S, DSP, auto ATU, variable filters, new Nov 2002 unused this year, exc cond, box and man, £825. Kenwood TS-60 50MHz multimode about 5 yrs old, £275. Trio TS-430S 1.8MHz and 250kHz filters FM board and PSU PS-430, £350. G0CHK, QTHR, 01243 779 479 after 13th June (Chichester). E-mail: sleepers56@btopenworld.com

LAST chance to acquire superior hillsite site in Welsh border country. 5-bed, $2\frac{1}{2}$-bath bungalow in 6 acres of grounds. Good DXing site. Including aerials, towers and masts. Swimming pool, garage and outstanding views. Near 1000ft ASL, £365,000. GW3JSV, 01686 640 388 (Welshpool). E-mail: GW3JSV@btinternet.com

MARCONI R-1155, covers 75kHz to 18MHz and direction finds from 75kHz to 8MHz. It is clean, unmodified and working well, a star in any collection. Phone for details. 01845 567 519 (N. Yorks).

PAIR mint Icom 50MHz IC-alpha 6a tcvrs with leather cases. Small simplex/duplex units. Unique, £50. Pair very good Icom 2m sophisticated tcvr's IC-2ia, £70. Pair collectable Robot model 400 SSTV units. One immaculate, one good. One original Mizuho 40m SSB/CW hand portable tcvr – great fun. One excellent and unmarked Kenwood 570DG plus unfitted and new crystal filter unit YK-88C-1, new TCXO unit SO-2, new digital recording unit DRU-3AM, new Kenwood VS-3 voice synthesiser unit. Also new Kenwood hand mic and desk mic MC-60. If wanted, one immaculate SCS PTCII DSP multimode controller for most digital modes, cabled for Kenwood above. Extensive mans and data. All mans/data for above units. Unmarked as new Garmin e-maps GPS unit with UK Metroguide, 16MB cartridge, PC interface, cables etc. New, unpacked, portable Hex-Beam for 20 and 15m with carry case - original cost only. All priced to sell, postage extra. G3LYD, QTHR, 01983 840 588 (Godshill, Isle of Wight). E-mail: g3lyd@thersgb.net

PAIR Mullard 4X150A equ, Eimac bases and chimneys, unused, £50. G3SKI, QTHR, 01273 506 418 (Brighton). E-mail: ron@bravery53.freeserve.co.uk

RARE EKCO U319 Innvicta 33 1950-57, good clean cabinet valve radios, new valve sets, servicing sheets with circuits, will profit keen repairer, buyer collects, what offers? Andrew, G4RCY, 01934 842 797 (Avon).

SILENT Key – (G1HFR), Non smoker. Yaesu 726R (2m + 70cm), £325. Yaesu FT-200, £120. Trio TS-530SP, £250. Trio 9130 + mobile bracket, £175, all above with mics and h/books. BNOS 50MHz 10 to 50W lin amp, £20. 2m Yaesu FL-2050 lin amp, £15. MFJ VersaTuner II (949-D), £75. Yaesu DL-600 200W dummy load, £12, Jaybeam VR3 2kW 3-band HF vertical, £25, BNOS 12V 12A PSU, £15. Brand new unstarted CM Howes kits: HTX-10, VF-10, DFD5, total £105, offers? Trevor, G4IRH, QTHR, 0150 956 9746 (Leicestershire).

SILENT Key (G3JMB). Yaesu FT-920AF 100W HF+ 50MHz, Palstar PS-30m PSU approx 3 yrs old, £750. Icom IC-275E 25W 2m m/m base inc Histab option, £350. Altron wall mount 3-section tiltover mast, £150. G8GHH, QTHR, 01843 224 700 (Haywards Heath). E-mail: gibbs@elmstone50.fsnet.co.uk

SILENT key sale (G0FWM). Yaesu FT-707 HF SSB transceiver, with man, £200 ono. Drae 24A PSU, £35 ono. SEM TranZmatch ATU, £25 ono. Mrs M Riley, 01254 884 068 and 07977 588 147 (Blackburn).

SOMMER XP507 multiband antenna, 10m to 40m. Purchased 1997, unused still in original boxes, £500. Buyer collects. GW3JSV, 01686 6403 88 (Welshpool). E-mail: GW3JSV@btinternet.com

SPARE virtually-unused Icom 775DSP, one of the last ones. Full of filters, as new with matching speakers and filters. Also SM-20 desk mic. No dreamers or time wasters, £1800, no offers. G2KF, 07974 892 179 (Cornwall).

TB1 rotary dipole 10/15/20 HF, £30. Commercial 40m l/wire, £50. Rotator 3-core h/duty, £75. All good cond, & working. Tono-550, CW, RTTY, ASCII. TV keyer reader, £75. Man for terminal unit. Eddie, G4RWP, 01992 763 051 (Waltham Abbey).

TRIO TR-9130 2m mobile multimode, 25W, fwo, original box and man, used as regular contest rig until recent purchase of IC-706, hence sale, £200. MML 144/30-LS 2m 30W linear, preamp, 1 or 3W drive, vgc, £50. G0KYS, QTHR, 01626 895 122 (Dawlish). E-mail: bob@transmitter.freeserve.co.uk

TS-930S c/w built-in ATU. New MC-60 mic, both mint, £380. New in box, Jaybeam PBM 14/2M, £50. Cushcraft A-430-11S Yagi, 18months old, £30. 2E0BOT, 01789 764 889 (Alcester).

VERSATOWER P60, must go. All parts, brand new base section, all cables, new bolts, but no winches. Includes head unit, rotator, cable and controller, £100 ono, buyer collects. Bill, G0OPL, 07887 622 077 (N Norfolk).

W9GR DSP-3 unit, professionally assembled, £80. Realistic DX-302 quartz synthesised digital LED-readout rcvr, freq range 10kHz to 30MHz, £50. Carriage extra. Dave, 01442 683 912 (Porth).

YAESU FT-290RII, FM SSB/CW, Nicads, mic etc. Never mobile, hence no mtg bkt. Orig box, £200. Geoff, G4FAS, QTHR, 0161 437 7784 (Stockport). E-mail: geoff.royle@lineone.net

YAESU FT-840, boxed, mans, used twice, mint cond. Still under guarantee, £395.

SILENT KEYS

We regret to record the passing of the following radio amateurs:

G0NJE	Mr P R Hutchings	17/04/04
G0NOA	Mr J Clark	
G1AWP	Mr W Scott	10/04/04
G1FXP	Mr G H Newman	06/04/04
G2DDS	Mr W A Brooks	10/03/04
G3DKO	Mr J Stevenson	04/04/04
G3FCV	Mr E L Bartholomew	04/04/04
G3LNT	Mr J R Ambrose	
G3NJM	Mr E Philp	01/03/04
G3UFH	Mr T J Moss	13/04/04
G3ZGF	Mr B M Bailey	01/09/03
G4IOP	Mr A J Cousins	04
G4XLF	Mr B J Sandford	25/03/04
G8BCT	Mr F H Townsend	05/04/04
GM3DSD	Mr A Trayler	07/04/04
GM3LCP	Mr J Hughs OBE	03/04/04
GW1VYT	Mr T M H Randall	18/03/04
M0ITW	Mr I Gibbs	
M3YMB	Mr B Quinn	16/03/04
MM0BXI	Mr J A L Jordan	07/04/04
RS179926	Mr D A Naisbitt	29/03/04
RS183992	Mr C R Bradley	03/04

CONGRATULATIONS

to the following, whom our records show as having reached 50 or 60 years' continuous RSGB membership this month:

60 years

G2DGB	Mr A G Short

50 years

G8CJ	Mr F Ellesmere
RS20249	Mr M Harrington
G3JPU	Mr D G Plant

MFJ-969 ATU, used twice, £140. MFJ artificial ground, never used, £60. Heil FS-2, PTT foot switch, never used, £25. Yaesu MH-31B8 fist mic, never used, £25. OTT-817, W4RT one-touch tune for Z-11 and Yaesu FT-817, never used, £50. AT-11MP auto tuner remote assembly, never used, £55. Toyo meter wide band dummy load, 200W, £27.50. Yaesu FT-221R 2m multimode base station exc cond, £150. Microwave Modules ML-144-25, 2m linear, up to 5W input, £45. RigBlaster Plus, complete with leads, man, software, used twice, £89. AEA PK-900 multimode data controller compete with man, leads, £150. All items buyer inspect/collect or carriage at cost. Ron, G4YYH, QTHR, 01209 718 021 (Camborne).
E-mail: g4yyh@tiscali.co.uk

YAESU FT-847 tcvr, £800. Yaesu FC-20 antenna tuner, £150 or both for £850. Both as new (boxed). Trio TR-2400 h/held with extras, £90. MFJ-1798 antenna, £150. GI4FCW, QTHR, 028 4372 2941 (Newcastle).
E-mail: guigan@btinternet.com

YAESU FT-847, £825 ono. Maxon PM-150 16ch ex-PMR on 4m, £50 ono. Realistic DX-394 HF rcvr, £70 ono. Realistic Pro 2026 100ch scanner, £40 ono. Sandpiper 2m 5-ele crossed Yagi, £30 ono. Mark, M1EOP, QTHR, 01785 603 400 (Stafford).
E-mail: m1eop@ntlworld.com

YAESU FT-920 with 2.1kHz filter unit. Buyer collects, £650. G8WXU, QTHR, 01277 623 019 (Billericay).

YAESU FT-990DC 10-100W HF bands. Rcvr 100kHz-30MHz. Auto ATU. Electronic keyer. Digital filter. IF shift. Man. Daiwa PSU. Two mics, headphones. MFJ-941E ATU, SWR/PWR meter. Himound HK-707 man key. All as new. Advancing years forces sale. Collect. £720 complete. G3HQT, 01489 573 436 (nr Southampton).

YAESU rcvr FRG-8800 fitted with VHF converter. Matching ATU. All mans, mint cond, £250. Mike, G0LNV, 0114 258 5937 (Sheffield). E-mail: tnealapple@onetel.com

WANTED

ALL Racal or Watkins Johnson items wanted by enthusiast and collector in any cond. Any receivers, accessories, spares or manuals. What have you? Especially looking for RA1772, RA1778 or RA6790, also RA17 LF converter and SSB adapter, Cubic 3030, Collins HF-2050, and tall 19in equipment racks to house my radios. Can arrange collection from anywhere. G8WKA, QTHR, 01252 795 234 (Surrey).
E-mail: richardreich@aol.com

COLLINS 51J-4, & 75A-4, receivers required by collector/enthusiast. Good price paid, other models considered, also required 6V PSU for WWII spy set 'A' Mk3.
Tony, G8AQN, 01788 571 066.
E-mail: tony.hibberd@ntlworld.com

CTCSS unit and battery case. Also programmable modifications for Standard C-528 h/h. G0ASP, QTHR, 01308 456 463 (Bridport).
I am looking for the head unit and the mic for a Yaesu FT-8100 to replace one stolen from the ATC. Ralph Bateman, M5EHG, QTHR, 07973 309 656.

ICOM IC AT-100 auto ATU including cable. Must be good cond, fwo, h/book. Des, G0JCF, 01895 633 118 (Ruislip).
E-mail: gonedes@aol.com

MORSE keys wanted please. Early brass keys, especially by Marconi, GPO etc, but all considered. John, G0RDO,
01626 206 090 (Newton Abbot).
E-mail: john@morsemad.com

SILENT key clearout or just not needed. I collect QSL cards for their historic interest, preferably from periods before 1970. Please don't throw them away. I can collect or arrange collection. Tony, G4UZN, 01132 693 892 (Leeds). E-mail: g4uzn@qsl.net

WANTED good quality rotator and control unit etc. 01706 211 339 (Rawtenstall, Lancs)

EXCHANGE

DX-301 comms rcvr plus handheld 7-band rcvr for QRP tcvr which works! Andrew, G4RCY, 01934 842 797 (Avon).

RALLIES

1 – 12 JUNE 2004

ROYAL NAVAL AMATEUR RADIO SOCIETY, GB3RN, D-Day Commemoration. The RNARS HQ station will be celebrating D-Day with a special commemorative QSL card. Contacts made during this period will qualify. Modes: SSB on weekdays with CW on Thursday evenings and weekends. QSL to GB3RN or direct to G0VIX. Dave, G4ZMP, g4zmp@butler95.freeserve.co.uk

6 JUNE 2004

ANGLO-SCOTTISH REPEATER GROUP Radio Junk Rally – Cumwhinton Village Hall, 1 mile E of jn 42 of M6 on B6263. TI, C, DF. Mick, M0AOH, 01228 526 436, mickbarber@zetnet.co.uk

SPALDING & DARS Annual Rally – Sir John Gleed Technical School, Halmer Gardens, Spalding. OT 10am, £2. CP, TI on 145.550MHz, TS, C, DF, CBS. John, G4NBR, 07946 302 815, or Alan, 2E0HGV, 07767 797 296. [www.sdars.org.uk]

WEST MANCHESTER RC 8th Red Rose QRP Festival – Formby Hall, Alder Street (off High Street), Atherton, Manchester. OT 11am, £1.50. TS, Clubs, RSGB, G QRP low-cost B&B, MA, CP free, DF, C, LB, TI on 145.550MHz. Les, G4HZJ, 01942 870 634, or g4hzj@ntlworld.com

13 JUNE 2004

East Suffolk Wireless Revival – Suffolk Showground, Felixstowe Road, Ipswich. OT 9.30am. CBS, B&B, bookstall, MA, HF station, club stalls, C. John, G3XDY, 01473 717 830, or Steve, M1ACB, 07720 412 648. [www.btinternet.com/~thomassg/eswr.htm]

NUNSFIELD HOUSE ARG 35th Elvaston Castle National Radio Rally – Elvaston Castle Country Park, Elvaston, Derby, on the B5010 between the A6 and A52, 5 miles SW of Derby. OT 8am, £5 per car, £12 per coach. Radio, computers & electronics, FM, B&B, crafts, FAM, C, etc. Les, G4CWD, 01332 559 965, les@g4cwd.demon.co.uk

19 JUNE 2004

Reddish Rally – St Mary's Parish Hall, South Reddish, Stockport, at the jn of Reddish Road and Broadstone Hall Road South. OT 11am, £1. TI on 145.550MHz.
John, G4ILA, 0161 477 6702,
john@mckae.freeserve.co.uk

20 JUNE 2004

BANGOR & DARS Summer Radio Rally – Crawfordsburn Country Club, nr Bangor, Co Down. OT 12 noon. TS, B&B, LEC. Pete, GI4VIV, 028 4273 8270,
gi4viv@hotmail.com [www.bdars.com]

LIVINGSTON RC Bring & Buy – Crofthead Centre, Templar Rise, Dedridge, Livingston, W Lothian. OT 10am, £3. Basil, GM0CBA, ba011a6145@blueyonder.co.uk

NEWBURY & DARS Car Boot Sale – Cold Ash, nr Newbury. [www.nadars.org.uk]

25 – 27 JUNE 2004

HAM RADIO 2004 – New exhibition grounds, Friedrichshafen, Germany. OT 9am. [www.messe-friedrichshafen.de]

27 JUNE 2004

SEVERNSIDE TV GROUP West of England Radio Rally – *Cheese & Grain*, Market Yard, Frome, Somerset, four miles from site of former Longleat Rally. OT 10am, £2, or £1 for accompanied under-14s. Entry fee halved after 1pm. CP free, TS, SIG, RSGB, LB, C, DF, TI on 2m. Shaun, G8VPG, 01225 873 003 (OH), 01225 873 098.
[www.westrally.org.uk]

4 JULY 2004

MILTON KEYNES ARS Annual Rally – St Paul's School, Chaffron Way, Leadenhall, Milton Keynes. OT 9am. TI on 145.550MHz and 433.550MHz. Venue 3 miles from jn 14 M1 and 1/4 mile from local Maplin store. Malcolm, M0MBO 01525 874 075, or rally@bletchley.net [www.mkars.org.uk]

GB CALLS

These callsigns are valid for use from the date given, but the period of operation may vary from 1 – 28 days before or after the event date. Operating details are provided in an abbreviated form as follows: T = 160m; L = 80 or 40m; H = HF bands (30 – 10m); V = 6 and/or 4m; 2 = 2m; 7 = 70cm; S = satellite and P = packet. Please send operational details of your special event station to the RadCom office at least five weeks before publication. The only QSL Bureau sub-manager for special event station callsigns is as follows: GBxAAA-MZZ – Mike Evans, 322 Heol Gwyrosydd, Penlan, Swansea SA5 7BR, e-mail mw0cna@ntlworld.com. Will organisers of special event stations please ensure that they lodge plenty of envelopes with their sub-manager?

1 Jun	GB2CAV: Cavalier. Chatham, Kent. L (G0TAR)
	GB60DD: 60th Anniversary of D-Day. HMS Belfast, London. (G0TBD)
	GB60DDL: D-Day Landings. HMS Collingwood, Hampshire. LHV27 (G4ZMP)
	GB6DD: D Day. Norfolk, St Margaret. LH (G4OHX)
2 Jun	GB6OD: GB6 Oscar Delta Force OonD Day. Weymouth, Dorset. TLH27 (G0EVW)
3 Jun	GB4OL: Operation Overlord. Wiltshire. TLHV2 (GW4XKE)
4 Jun	GB2PCC: Portishead Cruising Club. Bristol. TLH2 (G4WBV)
	GB4ESM: Eutria Steam Museum. Staffordshire. LHV2P (M1IRM)
5 Jun	GB0BDD: Bourne 'D' Day. Lincolnshire. TLH2 (G4NXN)
	GB0GPF: Grey Point Fort. Co Down. LHV27 (GI0USX)
	GB4FAA: Fleet Air Arm. Pembs. LHV2 (GM4XQK)
	GB60NL: Normandy Landings. Sandown, Isle of Wight. LH (G0MWU)
	GB60RE: Royal Engineers. Chatham, Kent. LH (G4AKQ)
	GB6JUN: 6th June. Scarborough, N Yorkshire. LHV27 (G4SSH)
	GB6OFS: 60th Anniversary of Fortitude Sth. Dover. LH27P (G0DQI)
6 Jun	GB2BMR: Beaumanor Radio. Leicestershire. TLH27 (G1YVR)
	GB60OL: Operation Overlord. Colerne, Nr Chippenham. TLHV2 (GW4XKE)
	GB6OL: Operation Overlord. Hampshire. LHV2 (G0SWY)
7 Jun	GB2ECR: Elvaston Castle Rally. Derby. TLHV27P (G4JGA)
	GB5TOV: Transit Of Venus. Chorley, Lancs. LH2 (G3UCA)
11 Jun	GB0MAC: Macmillan Nurse. Higher Whitley, Warrington. TLHV27P (G1ZBU)
	GB0RAF: Royal Air Force. Derbyshire. LH27 (G0DAM)
12 Jun	GB0AOR: Aldham Olde Tyme Rally. Colchester, Essex. LH2 (G4JIE)
	GB2AVF: Abridge Village Fete. Abridge, Essex. LH2P (G0TOC)
	GB2SFW: Summer Fair Winterslow. Winterslow, Salisbury. L2 (G7RSO)
13 Jun	GB4ATC: Air Training Corps. Nuneaton, Warcs. LH27 (G6EGO)
	GB4SWR: Suffolk Wireless Revival. Ipswich. LH2 (M0DNJ)
	GB5AC: Air Cadets. York. LH2 (G0VRT)
	GB6OL: Operation Overlord. New Romney, Kent. LHV2 (G4WYG)
17 Jun	GB200RBC: Rail Bicentenary. Preston, Lancs. LH (G0FQN)
18 Jun	GB0AWS: All Wales Scouts. Wales, Builth Wells. LH2 (GW7VJK)
	GB0NOP: Nil Obstare Potest. Cambridge. L (G4KCF)
	GB2BHM: Blake Hall Museum. Ongar, Essex. LH2P (G0TOC)
	GB8CC: Conisbrough Castle. Doncaster, S Yorks. LHV27 (G8LGC)
19 Jun	GB0BAB: Burtonwood Air Force. Warrington, Cheshire. LH2P (G4VSS)
	GB0BOH: Airport code for BMTH Airport. Hurn, Christchurch. LH27 (M5BMW)
	GB0FP: Fort Paull. Nr Hull. TLH2 (G4ASA)
	GB0IBG: Ironbridge George Museum. Shropshire, Telford. LH (G0VXG)
	GB0MAM: Midland Air Museum. Warwickshire. LH2 (G4GEE)
	GB0MLL: Museum Of Linclnshire Life. Lincoln. TLH27 (G0EJQ)
	GB1WSM: Welsh Slate Museum. Gwynedd. LH2 (GW1MVL)
	GB2APM: Abbington Park Museum. Abbington Park, Northampton. LH (M0DMD)
	GB2GTM: Grampian Transport Museum. Aberdeenshire, Alford. TLH2 (GM4JLZ)
	GB2HAM: Harrington Aviation Museum. Northants, nr Kettering. TLHV27PS (G7CZZ)
	GB2MMA: Maritime Museum Appledore. North Devon. LH2 (M0BRB)
	GB2MOF: Museum Of Flight. East Lothian. LH (GM4UYZ)
	GB2NLC: National Lighthouse Centre. Penzance. LH (G3UUZ)
	GB2NSA: Norfolk & Suffolk Aviation. Flixton, Bungay. TLH (M1TES)
	GB2SHS: Stockport Heritage Centre. Stockport. LH27 (G3SHF)
	GB2SMG: Sheffield Millennium Galleries. Sheffield. LH27 (G4FAL)
	GB2TBM: The Biat Museum. Northamptonshire. TLHV27 (M0DOL)
	GB2WMN: Wollaston Msm Northamptonshire. Wollaston. LH (M0LXT)
	GB4HMM: Holyhead Maritime Museum. Holyhead, Anglesey. LH2 (GW4WLZ)
	GB4SMH: Signals Museum Henlow. Henlow Beds. LH27P (G3WSD)
	GB6RW: Rail World. Peterborough. LH (M0NMQ)
20 Jun	GB0KRS: Kings Langley Rudolph Stnr Sch. Kings Langley, Hertfordshire. LHV27S (M0IMJ)
	GB4NBS: Newbury Boot Sale. Newbury, Berkshire. 27 (G7DXC)
	GB6OL: Overlord. East Sussex. LHV2 (G0BXV)
26 Jun	GB0CLC: Cardiff Lions Club. Cardiff. LH2 (GW0WHT)
	GB2RTB: Richard Trevithick Bicentenary. Mid Glamorgan. LH2 (MW0ATG)
	GB4SCL: Settle Carlisle Line. Ingleton, N Yorkshire. LH (G0FQN)
27 Jun	GB4BPM: Bromley Pagent of Motoring. Kent. LH2 (G0CRH)
	GB6OL: Overlord. Oxon. LHV2 (M0BTY)
10 Jul	GB4SKO: Isle Of Skye Opportunity. Nr Portree, Isle Of Skye. LH (G4FKH)

NORFOLK ARC Barford Radio Rally – Barford, 9 miles SW of Norwich, near A11 and A47. OT 10am CP, TI, CBS, B&B, C, TS. David, G7URP, 01953 457 322 or 01953 458 844, or radio@dcpmicro.com [www.norfolkamateurradio.org]

YORK RC Rally – York racecourse. OT 10.15 / 10.30am. C, CP free, B&B, DF, WIN, TI, SIG. John, G4FUO, 01937-832139, or Alex, G0WUY, 01904 423 871. [www.yorkradioclub.net]

10 JULY 2004

CORNISH RAC Radio Amateur and Computer Rally – Penair School, Truro. OT 10.30am. TS, B&B, C. John, g4ljy@dsl.pipex.com, or Ken, ken@jtarry.freeserve.co.uk

11 JULY 2004

SWINDON & DARC Steam & Radio Fun Day – Swindon & Cricklade Railway, Blunsdon. OT 10am, £3.50, £2 children/OAP, £10 family. CP, C, DF, FAM, CS, TI on 145.550MHz, steam engine trips. Ian, 2E0ZVG, ibrowne2@ntlworld.com [www.swindonradioclub.org.uk]

18 JULY 2004

FENLAND RG Horncastle Summer Amateur Radio Rally – Horncastle Youth Centre, The Old School, Cagthorpe, Horncastle, Lincs (nr Horncastle Police Station). OT 10.30am, £1. C, DF, TI on 145.550MHz. Chris, G0PXB, 07749 715 165. [www.fenlandrepeater.org.uk]

McMichael Amateur Radio Rally & Car Boot Sale – Reading Rugby Football Club, Sonning Lane, Sonning, Berks, just off the A4 at Sonning. Min, G0JMS, 0118 972 3504, g0jms@radarc.org

24 JULY 2004

ALTON & DRC Rally – Valley Nurseries, Basingstoke Road, Alton. OT 10am, £1. CP free, C, DF, TI on 145.475MHz. Richard, G4IBW, 01428 717 524, g4ibw@uku.co.uk, g4ibw1@aol.com

25 JULY 2004

COLCHESTER RAC Rally 2004 – St Helena School, Sheepen Road, Colchester. OT 10am. TS, B&B, CBS, RSGB stall, clubs and associations, C. James, M0ZZO, 01255 242 746, james@mcginty.net, or Gary, M0JJH, 01621 818 620, gary@garycavie.com

30 JULY – 1 AUGUST, 2004

AMSAT-UK Space Symposium – University of Surrey, Guildford. Day pass £10; 2 - 3-day packages inc meals and university accommodation also available. LEC, tours of satellite control centre, beginners' sessions, antenna testing up to 24GHz, GB4FUN available for visitors' use, B&B, etc. Jim, G3WGM, 01258 453 959, or g3wgm@amsat.org [www.uk.amsat.org]

1 AUGUST 2004

LORN ARS Radio & Computer Rally – * New venue ***** – Crianlarich Village Hall, 12 miles N of Loch Lomond at jn A82 & A85. £1. TI, TS, B&B. Shirley, GM0ERV, 01631 566 518, or John, GM8MLH, 01838 200 304.

7 AUGUST 2004

RUGBY ATS Rally – Stanford Hall, Lutterworth, Leics (follow the signs for Stanford Hall from M1 jn 20). OT 10am, TI on 145.550MHz. Please note that this is a Saturday event! Tony, G0OLS, 01455 552 519, thumph3426@aol.com

8 AUGUST 2004

FLIGHT REFUELLING ARS Hamfest – Cobham Sports and Social Club Sportsground, Merley, Wimborne, off A31 (signposted). OT 10am, £3 - correct money please. TS, CBS, LB, C, TI on 145.550MHz. Overnight camping on Saturday, but caravans require booking. Mike, M0MJS, 01202 883 479, or hamfest@frars.org.uk [www.frars.org.uk]

13 AUGUST 2004

COCKENZIE & PORT SETON ARC 11th Annual Junk Night – Cockenzie & Port Seton Community Centre, South Seton Park, Port Seton. OT 6.30pm, £1. Tables free – first come, first served, WIN, C, DF. Bob, GM4UYZ, 01875 811 723, gm4uyz@btinternet.com

29 AUGUST 2004

HUNTINGDONSHIRE ARS Rally – Ernulf Community School, St Neots (nr Tesco superstore on A428). OT 10am, £1.50. CBS on hard standing, indoor hall, C, TI on 145.550MHz. Peter, M5ABN, 01480 457 347 (6 – 10pm), peteherbert@aol.com

TORBAY ARS Communications Fair – Churston Ferrers Grammar School, Churston, Brixham. OT 10am, £2. CP free, TS, C, DF, WIN, No B&B, but private sale noticeboard. Anna, M3LMG, 01803 812 117, rally@tars.org.uk

5 SEPTEMBER 2004

Telford Rally – Bob, M0RJS, bob@somervilleroberts.co.uk

12 SEPTEMBER 2004

Vintage Valve Technology Fair – Trevor, 01274 824 816. [www.myciunka.supanet.com/VVTF2003 (case-sensitive)]

19 SEPTEMBER 2004

LINCOLN SWC Hamfest – Baz, 01636 612 440, m3dmv@btopenworld.com [www.hamfest2004.secretbunker.org.uk and www.lswc.co.uk]

1 / 2 OCTOBER 2004

LEICESTER Amateur Radio Show – Geoff, G4AFJ, 01455 823 344, fax 01455 828 273 or g4afj@argonet.co.uk

1 – 3 OCTOBER 2004

WACRAL 2004 Conference – Geoff & Jan Grundy, 01323 721 352, g4yjw@wacral.org

10 OCTOBER 2004

GREAT LUMLEY AR & ES Rally – Nancy, 0191 477 0036 or 07990 760 920, nancybone2001@yahoo.co.uk

17 OCTOBER 2004

BLACKWOOD & DARS Rally –George, 2W1JLK, 01495 724 942, or Dave, GW4HBK, 01495 228 516.

HORNSEA ARC Annual Rally – Richard, G4YTV, 01964 562 498, g4ytv@aol.com

22 - 24 OCTOBER 2004

RSGB International HF & IOTA Convention (HFC2004) – nr Gatwick Airport. John, G3WKL, chairman@rsgb.org.uk

24 OCTOBER 2004

GALASHIELS & DARS Annual Rally – Jim, GM7LUN, 01896 850 245.

6 / 7 NOVEMBER 2004

18th North Wales Radio, Electronics & Computer Show – [www.nwrrcw.org.uk]

14 NOVEMBER 2004

SOUTH YORKSHIRE REPEATER GROUP Great Northern Hamfest – Ernie, G4LUE, 01226 716 339 or 07984 191 873.

5 DECEMBER 2004

BISHOP AUCKLAND RAC Rally – Mark, G0GFG, 01388 745 353, or Brian, G7OCK, 01388 762 678.

21 - 23 JANUARY 2005

CONTEST CLUB FINLAND 10th Anniversary – [www.qsl.net/ccf/]

RSGB MEMBERS' ADVERTISEMENTS

RSGB Members wishing to place an advertisement in this section should use the official form printed in *RadCom* each 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. 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 callsigns and QTHR, provided their addresses in the current edition of the RSGB Yearbook are correct. RS members will have to provide their names and addresses or telephone numbers. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition. Please do not send members' advertisements to Manning Publishing Ltd (advertising agents). The closing date for copy is the first day of the month prior to publication, eg the deadline for the May issue is 1 April.

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. Members' Ads also appear on the members-only website: www.rsgb.org/membersonly/membersads***

The Member's Ads order form is published below. If members do not wish to cut the form out of the magazine, photocopies will be accepted, as will recent copies of the form from previous months, or recent copies of the carrier sheet. As a last resort, members may also send in their advertisements on seperate sheets of paper, but if you choose to do this, you must supply an accurate word count–and, of course the correct fee in the normal manner.

RSGB MEMBERS' ADS ORDER FORM

Application form for one For Sale, Exchange or Wanted advertisement. Do not mix classifications on this form; seperate applications must be made.

Please ensure you read and understand the conditions of acceptance of these subsidised Members' Advertisements, printed at the top of the Members' Ads page of Radcom

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Signed Date

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Free Entries

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E-mail

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The last word

Let's hear it for the G5RV

From: Geoff Stainton, G1MQQ

Everyone knows how important correct aerial dimensions and alignment are, so I was somewhat dismayed to find that in the recent gales one half of my half-size G5RV had come down and was hanging vertically down the outside of the shack wall. True to the spirit of experimentation I fired up my TS-570 anyway and was astounded to find acceptable SWR on all bands. On my first attempt I was given 59 by a 9A station on 18.13MHz although I could only give him 53. Has anyone else used a half-size G5RV in a centre-fed inverted-L configuration? It takes up very little space and seems to perform admirably. I bet Louis Varney is turning in his grave.

Letters published in 'The Last Word' do not necessarily reflect RSGB policy. 'Last Word' letters may be e-mailed to radcom@rsgb.org.uk Please note that letters submitted for 'The Last Word' may not be acknowledged. The RSGB reserves the right to not publish any letter, with no reason being given. It is a condition of publication that all letters may be edited for grammar, length and / or clarity. Due to the limited space available, please keep letters as short as possible. Some letters not published in RadCom may be published on the RSGB members-only website at rsgb.org/membersonly/lastword

Definitely the last word . . .

From: Brian Summers, VE7JKZ, and Mike Holley, VE7AVM / G3CIL

The letter from Dave Goodwin, VO1AU, ('The last word', March) prompted both myself and Mike Holley, VE7AVM / G3CIL, to comment on re-issued callsigns. To our dismay we observed in the April *RadCom* that the subject is now closed. Those of us who live in the colonies do not receive our *RadComs* until several weeks after they are delivered in the UK. Hence we do not have the opportunity to respond to items as rapidly as might otherwise be the case.

With that in mind, and believing that the contents of our letters show a perspective on the subject that might be of interest to UK amateurs, we two colonials request you review the decision to close the subject and give consideration to publication of our letters.

[How could an editor refuse an appeal like that? Brian's and Mike's letters are published below. This definitely does close this correspondence, though! - *Ed.*]

From: Brian Summers, VE7JKZ

The letter from Dave Goodwin, VO1AU, in the March *RadCom* made me realise I'm not the only one who cannot understand the fuss over reissued callsigns. Sometimes I wonder if it's part of the class-ridden social structure that was one of the reasons I emigrated from the UK almost 40 years ago. It's as if the callsign is some form of honour that was bestowed by royalty eons ago and can only be passed down through the male lineage. And first born at that.

Come on guys and gals, as we'd say over here, "get with the program".

From: Michael Holley, VE7AVM / G3CIL

I was recently listening to a recording of Tony Hancock's 'The Radio Ham'. Even after 40 or more years it still brought tears to my eyes. At the end of the programme, disenchanted with the hobby, Tony decides to hold an on-air auction for his equipment. It reminded me that periodically I receive letters from UK amateurs asking if I'd like to sell my G3CIL call that was issued in 1946. Would the RSGB kindly investigate and let me know if this is a legal practice? If so, then I will auction my callsign on e-bay. Bids can start at £1000. To paraphrase the final words of Tony's the radio ham, "eyes down for a full house".

MI3s disliked?

Name and callsign withheld

I am an MI3 station living in Northern Ireland and I have only been on the air since October of last year. However, there seem to be one or two people in Northern Ireland who for some reason do not like Foundation licensees on the air and who use a website here to try to make as much trouble as possible for MI3 stations. I enjoy this hobby, but when you get people who are just out to cause as many problems as possible on the bands this does not help. I cannot understand why some operators want to do this? I have met many people through this hobby and I intend to stick with it and get my full ticket. But not when there are people around who are out to cause problems.

RadCom layout changes

From: Colin Page, G0TRM

The April *RadCom* was another excellent issue, with again some very good interesting articles. I have noted the changes that you have made and I find the modified layout easier to read. I have talked to some members [of the Chelmsford ARS - *Ed*] and discussion has arisen both in phone calls and during a recent club net, when the changes were noted and appreciated.

Poor operating standards

From: Kevin Dawson, MW0KEV

It is now a couple of years since the introduction of the Foundation licence and in many ways it may be considered highly successful. The syllabus is ideal for the complete novice to the hobby and young people who may wish to put a tentative foot on the ladder to a communications technology qualification. Many people who may never have had the opportunity to study for a Full licence and who may have considered the original Novice licence too restrictive have entered the hobby and get immense pleasure from their amateur radio experience. This, after all, is what the hobby is all about!

However, here in Wales we have had the unfortunate experience of attracting a less than desirable ele-

ment into the hobby. Many newcomers seem not to value their radio privileges and treat the hobby with utter contempt. The local repeater is constantly abused and rife with CB-type jargon, microphone keying and music playing, and on HF these Foundation licensees do not respect band plans or operating conventions.

I don't know if there is a similar problem throughout the UK, but it seems to me that while there is a great deal to merit the Foundation licence and opening up the hobby generally, we should not have to put up with poor standards as a consequence.

It is also true that there are good and bad operators regardless of licence class, and 2m has had its share of abusers in the past, but here in Wales many Foundation licensees seem to believe that their licence and BR68 are just pieces of paper with little weight or relevance. When asked about amateur radio, its heritage, history or technical advances, they do not know, and worse still, the do not care.

These operators may be the minority, but they are an extremely destructive minority. Like the council housing policy that once proffered: If an antisocial family is housed amongst good families, the antisocial family will improve its behaviour. The actual outcome is that all the good families move out and more antisocial elements move in. Is this the future of amateur radio?

From: Victor Waddington, G4JSS

There has been much discussion about the rights and wrongs of the abolition of the Morse test - that cannot be changed. It happened. Amen. That is OK for me (100% CW) because very few of the new licence holders will appear in the CW segment of the bands.

But the true (SSB) ham will suffer - for a time - until the fad is replaced. What we have just created is not a local but a world-wide CB net. Whether that is good or bad I don't know but we shall see.

Yes, a cynical view but realistic. I do not understand why they didn't go the whole hog (Class A) if they were so keen to get on HF.

[There are good and bad operators around now as there always have been. Many of the former Class B and Foundation licensees are superb operators, while if one wants an example of the worst type of operating you only have to listen to a certain European operator holding forth on 14195kHz most days. Having to take a Morse test didn't make him, or anyone else, a good operator on SSB - *Ed.*]

Thanks to Icom

From: Bill Slater, G4YWY

May I through you column say a thank you to Icom (UK). Recently I was in contact with ZB2JO in Gibraltar, and he asked if I could get him a grub screw for the tuning knob on his Icom IC-735. I got in touch with Icom (UK) who they sent me two screws which turned out to be the wrong ones. After getting in touch again, they e-mailed Japan for a part number and eventually sent me the right one, all at no cost. Result: one happy ham in Gibraltar. On behalf of Alex, ZB2JO, and myself, may I say thank you to the guys at Icom (UK) for a nice lesson in customer relations. "Well done boys."

QTH for sale ads

From: Eric McFarland, G3GMM

From time to time - more frequently in recent issues - amongst the 'For Sale' ads one now sees 'QTH for sale'. Nothing wrong with that, and one wishes good luck to the vendor - I might one day within the near future think of inserting just such an ad myself. However, I wonder just how much feedback, leading to possible success, such an independent advert attracts?

[Would all members who have recently had a 'QTH for sale' ad in RadCom please let us know whether it was successful or not? - *Ed.*]

Early transistor transmitters

From: R G (Danny) Dancy, G3JRD

Seeing the interesting note of the 50th anniversary of the first transistorised QSO on 21 February 1954 (*RadCom* April 2004, page 13) prompted me to look up my old logbook for an entry on 6 June 1954. At 1530BST I worked G3IYH with signals 569 both ways on topband. 'Jock', G3IYH, was using 100mW DC input to a transistor transmitter. His QTH was Wolverton, Bucks, 85 miles from my QTH near Lamberhurst, Kent. I am fairly sure that he had made his own transistor using a germanium diode which he had opened up, inserted a fine wire as close to the 'cat's whisker' connection as possible, pulsed it with current, and after a number of attempts produced a workable transistor. This technique had been written up, probably in the *RSGB Bulletin* of the day.

The size of modern rigs

From: Michael O'Beirne, G8MOB

G3NRQ and G4OWY ('The last word' March & April 2004 respectively) are both right - most Japanese rigs are far too complicated to use, and their knobs and push buttons are hopelessly small. Readers should look at modern military kit and professional receivers such as the Racal 1792 for a sight of what good design can achieve. There is a truism that is worth repeating here - that it is easy to make a radio's panel complicated but distinctly difficult to make a good performer with a simple front panel. The Army's VRC321 SSB transceiver for example (dated now but still an excellent performer) has just nine controls of which five are the frequency decade setting knobs. The RA1792, one of the finest professional receivers of the 1980s, has only three rotary controls, three rocker switches and 25 push buttons, and they are all of a decent size. The build cost was spent not on umpteen dozen useless LEDs and poxy knobs but on a bomb-proof front end, a superb frequency standard, excellent crystal filters and solid physical construction. It will still easily outperform most modern rigs. I gave up using 'ham' equipment many years back with the exception of my trusty Yaesu FT-221R, and that has a decent professional muTek front end fitted in place of the mediocre original device. Who knows, perhaps manufacturers will revert to proper panels if we apply enough pressure.

ID cards

From: Reg Moores, G3GZT

I am just one of hundreds of thousands who posses a very unique identity, by which no other person in the world can be identified! This identity is denoted by just a few letters and a number, which immediately gives fullest details, from media, web etc instantly!

What is this 'one off' form of Ident? - Our radio callsign!

The CFA controversy

From: Stewart Revell, G3PMJ

Well done on publishing the two conflicting points of view on the CFA antenna, by G3PLX and G3HAT (*RadCom* May, pages 53 - 56). Will the controversy ever be resolved? Can they *both* be correct in differing ways? Who can be appointed to provide a definitive answer? Is there an 'independent' and qualified authority out there, who could give some 'simple' explanations?

Soldering PL259s

From: Stephen Gilbert, G3OAG

I am writing to endorse the words of my experienced neighbour, Michael, G3TCA ('The last word', May), about the correct way to deal with PL259 plugs. He rightly says that most of the plugs we see for sale on rally stalls and by advertisers are of poor manufacture and do not readily accept solder. However, there are advertisers in *RadCom* who can pro-

vide high quality silver or gold plated plugs by well known manufacturers. As the use of low impedance cables and connectors seems to be almost universal, most amateurs forget that several amps of current can pass to the antenna, and therefore only the best connectors will do to minimise losses. Pushing the coax braid into the plug can only give rise to trouble. We should be promoting excellence to our newcomers, and of course any reader of *RadCom*.

The correct way to install a solderable PL259 has been shown for nearly half a century in the classic *Handbooks*, but several 'modern' obstacles may give rise to concern. A relatively high wattage soldering iron is needed, and this is not always in the amateur's toolbox these days. You can get away with the use of two 25W irons, using them together, or a gas-powered iron of equivalent power to a 50 - 80W iron. Modern colophony free solders and low flux solders may certainly be good for our lungs, but they do not flow properly. Good old fashioned solder with lots of flux always does the trick! Tinning the braid before assembly, always makes for a good job.

I must take issue with the point G3LDO raised in his reply, in that while he does not intend to write an instructing article, many readers will want to learn from him. I'm sure we all have the utmost respect for the work that Peter has done, and hope that he continues to provide us with many good articles.

QRP Mobile

Guy Moser, G3HMR

On 17 April with my friend M0DCZ, operating from my Clio near Flookburgh with 5 watts from an FT-301S and a G-Whip Multimobile 71 Antenna (bought about 1977)mounted on the roof I was pleased with a report of 55 from 9K2YM/P on 20m SSB. His QTH was the island of Faylaka off Kuwait City. The combination of QRP and /M is a good discipline for a 75 year old!

Less whining, please?

From: R Peters, G1YRV

Re Peter Swinbank's "Could we have less whining on the letters page?" ('The last word, May) - I completely agree with his request. Having only recently rejoined the RSGB and now that I am active on the HF bands, it really is a pity there is still so much whining and moaning going on, whether it is the thorny issue of Class B access to the HF bands or that the RAE is too easy.

Let's have a look at what this hobby means to everybody. It has so many facets to it that you have a choice of band / mode / analogue / digital / satellite / ATV / mobile / base, and of course, home construction of any equipment or aerial, whether simple or complex. This is entirely up to you and your abilities. All of us have had to pass an exam or two that meant a stint at study maybe. This alone is all about personal achievement, we have all gained the privilege to enjoy any part of this vast and varied hobby of ours. Yes, we are all entitled to our opinions, but reading or hearing the same old moans and groans can get a tad boring. Newcomers may be put off by what amounts to us kicking each other in the shins over some minor and out of date issues. So come on: there *is* room for everyone, so let's get on enjoying what we have.

From: Tony Crake, G0OVA

Can we award a prize to Peter Swinbank, G8AHB, for the best letter ever written or published in 'The last word'! Some of the groaning, moaning, whining style of letters has become quite depressing- are they all like this- or is the editorial selection so disposed?

I decided to seek out my very first *RadCom* to see what a bright funny collection of sparkling wit was lain before us . . . It took a bit to find as it was called 'Members' Mailbag' back in November 1983. I read it eagerly but was soon disappointed: it's all very much the same. Bring back 'RF Byrne' I say! (I suppose not, that *really* made them whinge!)

Off topic?

From: Arnold Matthews, G3FZW

In attacking your reporting of the awards to two gallant gentlemen, M Bilton, M0BST ('The last word', May), takes the opportunity to express his own political views on a contentious subject, contrary to accepted amateur behaviour. Is he not guilty of seeking to take out the mote (if any) in the editor's eye while failing to perceive the beam in his own?

From: Herbert M Humphreys, GI3EVU

I write to express astonishment at the publication of the letter by M Bilton, M0BST. When I became interested in amateur radio many years ago, one of the first things my mentors taught me was that there are two taboo subjects: politics and religion.

M0BST's letter is both political and controversial, and irrespective of whether his comments are acceptable or objectionable to the reader, they are totally out of place in a publication dedicated to amateur radio and the activities of radio amateurs.

Whilst I congratulate the editor on the restraint of his footnote, I would urge the editorial board to reject any and all material which offends against the unwritten rules of acceptability which for generations have governed amateur radio so effectively.

'Poor business policy': the mystery deepens

From: Alan Stanley, G1OMH

There may be more to this anomaly ('The last word', April and May 2004) than is being disclosed by the Internet Service Providers involved. As a member of the Federation of Small Business I use the FSB negotiated services of CobWebb Solutions. I am able to receive *any* e-mails from other ISPs but unable to send *any* e-mails to btopenworld or AOL with attachments. The returned e-mail notices from btopenworld claimed an "I/O error" - whatever this may be. AOL e-mail attachments were 'lost' and only the basic header forwarded to the recipient.

When I raised the query with the technical department at CobWebb Solutions, I was informed that they were aware of e-mails being 'blocked' by certain ISPs, including BT. It would appear that it is not just a case of 'spam policies' but more with trying to increase market share by 'persuading' blocked users to change ISP.

I was going to raise this point in the national press - but *RadCom* has beaten me to it - well done.

Generating publicity for amateur radio

From: Nigel Knapton, G1JKE

Reading the March edition of *QST* I noticed an article on a local US club who had devised an amateur radio display for their local library. Apparently in the US display cabinets are available in libraries for use by local clubs for a month. Wouldn't it be good if these were available here in the UK? Another idea for publicity would be a way of allowing local clubs to sponsor, through the RSGB, a copy of *RadCom* to be delivered to their local library. The library could be supplied with stickers giving contact details of the club secretary and the club's website address. Even in this digital age people still do visit the library to read the newspapers and periodicals.

Most clubs now have websites and though these are a great way of recruiting new members perhaps a more tangible display of our hobby would be of benefit. The whole idea may equally work in a local school library. ♦

CLASSIFIED

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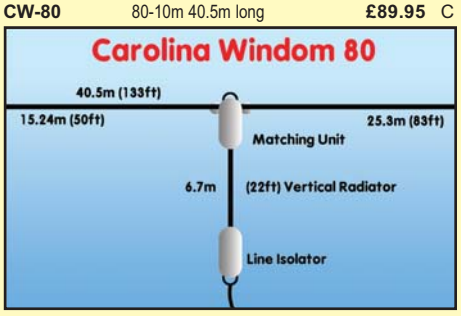
FS-2 PTT FOOT SWITCH

£39.95 B

Ergonomically designed to require less effort to operate. The hinge is under your heel instead of away from your foot. It can control two devices from a single operation.

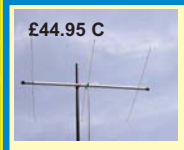
RADIOWORKS CAROLINA WINDOMS

CW-160	160-10m 76.8m long	£129.95	C
CWS-160	160-10m 40.5m long	£119.95	C
CW-80	80-10m 40.5m long	£89.95	C



CWS-80	80-10m 20.1m long	£109.95	C
CW-40	40-10m 20.1m long	£84.95	C
CW-20	20-10m 10.36m long	£89.95	C
CW-620	20-6m 9.7m (32ft) long	£89.95	C
G5RV PLUS	80-10m with balun 31m (102ft) long	£59.95	B
Baluns and Isolators			
T-4 Plus	Line Isolator1.8 - 54MHz 4kW	£39.95	B
T-4-500	Line Isolator1.8 - 30MHz 500W	£32.95	B
T-4G Plus	Line Isolator 1.8-54MHz + gnd4kW	£39.95	B
REM-BAL	Ladder line 4:1 balun 1.8-30MHz	£45.95	B
B1-2K Plus	1:1 current balun - for inverted V 's	£28.95	B
B4-2K	4:1 voltage balun loops/folded dipoles	£39.95	B
Y1.5K Plus	1:1 current Yagi balun 1.8- 54MHz	£39.95	B
Sundries			
KEVLAR	200ft 400lb strain guy line	£22.95	A
LADDER	450 Ohm ladder line - per metre	£0.90	A

SOTA-3 PORTABLE 2M BEAM & MAST



£44.95 C

With the summer coming, here is the ideal portable Yagi for trekking. Weighing just 200g you get a complete package for "Summits on the Air" operation.

144 - 146MHz
9dBd gain
F/B 12dBd
Weight 200g

V. or horizontal
Fibre glass mast
5m coax
No bolts to drop!

bhi NES10-2 DSP SPEAKER £99.95 B

Combined speaker and programmable DSP unit. Offers dramatic noise reduction, even reduces annoying hetrodynes. 8 Ohms, 8 filter settings, 3.5mm plug, 12-24V DC

bhi NES-5 DSP SPEAKER £79.95 B

Combined speaker and fixed setting DSP unit. Offers same dramatic noise and hetrodyne reduction. (Formally NESCB) 8 Ohms, 3.5mm jack plug, 12-24V DC 500mA

WATSON HP-100 HEADPHONES £19.95 B

Excellent lightweight communication headphones with tailored response ideal for the modern tranceiver or receiver.
**8 Ohms 200-9,000Hz *Adjustable headband *3.5mm stereo plug *1/4" stereo adaptor.*

WATSON HP-200 HEADPHONES £22.95 B

Superb headphones with tailored response for radio comms. Excellent sound proofing, can pull in the weak DX.
**Mono 8 Ohm 200-10,000Hz *Padded Ear pieces *3.5mm stereo plug *1/4" stereo adaptor.*

SGC SPECIAL OFFER

Buy an SG-2020 or SG-2020ADSP transceiver with any SGC Coupler (except SG-239) and receive a *FREE* SGC Multimeter (worth £19.99) *PLUS* £30 (inc Vat) *OFF* the price of the pair.

SG-2020 £499.95 C
1.8-30 MHz 1W-20W

SG-2020ADSP £589.95 C
1.8-30 MHz 1W-20W + DSP

PRICES DOWN!

SG-237 Auto ATU

1.8 - 60MHz. 3 - 100W pep (40W CW). Min wire length, 7m. 50 Ohm feed. Needs 12V at approx 300mA.

£299.95 c

SG-231 Auto ATU

1 - 60MHz. 3 - 100W pep (50W CW). Min wire length, 7m. 50 Ohm feed. Needs 12V at approx 900mA.

£349.95 c

SG-230 Auto ATU

1.6 - 60MHz. 3 - 200W pep (80W CW). Min wire length, 7m. 50 Ohm feed. Needs 12V at approx 500mA.

£339.95 c

High Sierra "Sidekick" from USA

New 80m-6m Hi-Q variable tune Mobile antenna.

Mounts on 3-way magnetic mount Handles 200 Watts

Supplied with cables and switch box - can run from cigar lighter.

£239.95 C

This fabulous mobile antenna is superbly constructed and offers extremely high efficiency. It will tune all bands from 80m to 6m, and being variable means the VSWR is always low. Designed to be mounted on our Watson **W-300T** 3-way mag mount (£39.95 B), you simply run the DC cable back to cigar socket and control tuning with the supplied switch. Approx tuning can be achieved by listening to received signals peak, and fine tuning is achieved by minimum VSWR. Works great with QRP as well! Typical VSWR 1.5:1. max height approx 1.37m.

WEB ORDERING
www.wsplc.com

PRICE MATCH

THE ONLY THING WE WON'T DISCOUNT • CUSTOMER SERVICE •

WATSON W-25XM PSU NEW £99.95 B

A compact sized switch mode power supply that will run your base HF station with ease. *Output voltage 10-18V *Output current 22A/25A peak *Over current protected *Switchable dual Voltage input

WATSON W-25SM PSU £79.95 B

Very popular budget switch mode power supply. *Output voltage 13.8V DC *Output current of 22A (25A peak) *Front panel output terminals *Over current & voltage protection *Quiet operation

WATSON W-25AM PSU £89.95 C

DC power supply for the shack & esp. for use with 100W transceivers. Separate voltage and current meters. *Output voltage 0-15V DC *Output current of 25A (30A peak). *3 sets of output terminals *10A cigar socket. *Over current protection

WATSON W-5A PSU £29.95 B

DC power supply for the shack and low power QRP transceivers. *Output voltage 13.8V DC *Output current of 5A (7A peak) *Front panel output terminals *Over current protection

MANSON EP-925 PSU £99.95 C

A general purpose 3-15V DC, 25A (30A peak) power supply able to provide the needs of the modern 100W HF transceiver. *Dual analogue meters *Over current protection *Large power terminals for rigs *Quick snap connectors for ancillaries

AVAIR VSWR Meters PRICEMATCH

AV-200 £49.95 B

Ideal for HF and VHF operation. It features high power handling up to 400W * 1.8-180MHz * 5W, 20W, 200W, 400W * Av or PEP

AV-400 £49.95 B

Ideal for VHF and UHF operation. It features high power handling up to 400W * 140-525MHz * 5W, 20W, 200W, 400W * Av or PEP

AV-600 £69.95 B

Two sensors used for HF and VHF/UHF operation. * 1.8-160MHz, 140-525MHz * 5W, 20W, 200W, 400W * Av or PEP

NEW SGC Master Antenna Controller

MAC-200 £339.95 C

* Automatic ATU
* 1.8-60MHz
* 5-Way Selector
* Coax or Balanced
* Long Wire

The MAC-200 will work with any HF transceiver up to 200W output. It has 3 outputs for coax and one each for wire and balanced - all switch selected. 168 revolving memory bins lets it remember for quick QSY. With an impedance range from 2 - 5000 Ohms, and built-in VSWR and power metering, it is all you are ever likely to need! Requires 12V DC.

WEST MOUNTAIN RIGBLASTERS

RIGblaster pro	Data interface 8-pin/mod, Cd & cables	**£229.95**	B
RIGblaster Plus	Data interface 8-pin/mod, Cd & cables	**£139.95**	B
RIGblaster M8	Data interface 8-pin, software & cables	**£109.95**	B
4T8-KIT *NEW*	Conversion Kit from M8 or Plus to 4pin	**£19.95**	A
RIGblaster nomic8P	Data interface 8-pin, software & cables	**£59.95**	B
RIGblaster nomicRJ	Data interface RJ, software & cables	**£59.95**	B
FT100-CBL	Adapts all units to FT100 input	**£12.95**	A
RB-CD	Standard RIGblaster program CD	**£9.95**	A

FREQUENCY COUNTERS

WATSON

The **FC-130** is an ideal frequency counter for the shack, mobile or portable use. Supplied complete with Ni-Cads, charger and telescopic whip.

Super Searcher	RF finder & freq. cnter 10MHz-3GHz	**£99.95**	B
Super Hunter	Frequency counter 10Hz-3GHz	**£149.95**	B
Hunter	Frequency counter 10MHz-3GHz	**£49.95**	B
FC-130	Frequency counter 1MHz-3GHz	**£59.95**	B

OPTOELECTRONICS

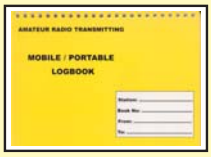
Top-of-the-range product from Optoelectronics, the **X-Sweeper** is a fully featured nearfield receiver that displays frequencies analogue signals in spectrum format on a 64x128 graphical display. It has 20 memory banks storing 100 freqs in each.

X-Sweeper *NEW*	Nearfield Receiver 30MHz-3GHz	**£1699.95**	C
Xplorer	Freq. cnter / CTCSS/DTMF decode	**£685.95**	B
Digital-Scout	Digital Freq. counter 60MHz-2.6GHz	**£459.95**	C
Scout	Freq. finder 10MHz-1.4GHz	**£349.95**	B
M1	Freq. cntr 50Hz - 40MHz	**£239.95**	B
M1-TCX0	M1 + temp controlled crystal oscillator	**£289.95**	B
Cub	Mini counter 1-2.8GHz	**£134.95**	B

TRANSMITTING LOGBOOK £4.99 A

Traditional Logbook for Radio Amateurs, A4 spiral bound for ease of use plus updated Prefix List and room for extra notes. A logbook is a legal requirement for any radio station.

MOBILE LOGBOOK £4.99 A



You've asked for one so here it is - the Radio Amateurs Mobile/Portable Logbook. A5 size, it also contains relevant repeater information. A mobile logbook is not a legal requirement.

Coax Switches

CS-600 2-way coax switch rated over 1kw (HF) and up to 600MHz @100W. Fitted SO-239 sockets. **£12.95 A**

MFJ-1704 4-way coax switch rated over 1kw (HF) and up to 600MHz @100W. Fitted SO-239 sockets. **£69.95 A**

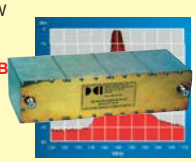
DCI High Performance Bandpass Filters

Razor sharp VHF & UHF filters

Simply place in antenna feed and clear up reception problems related to strong out of band signals. These are commercial grade filters with up to 68dB rejection.

DCI-145 2M Band Pass Filter. 200W handling. -68dB @ 136MHz, -55dB @ 155MHz. SO-239 **£99.95 B**
DCI-145-2HN "N" sockets **£109.95 B**

DCI-435 70cm Band Pass Filter. 200W. -47dB @ 415MHz, -50dB @ 455MHz. "N" sockets. **£119.95 B**



WATSON NEW W-25XM £99.95

Carriage £10

New compact, variable voltage, switch-mode power supply. About the size of an IC-706, this hunky low-noise supply will power any 100 Watt transceiver. Weighing just 1.65kg it operates from either230V or 115V AC.

*9.7 - 17V DC (13.8v notch)
*Input 230V or 115 AC
*25 Amps peak
*22 Amps continuous
*Fan cooled
*Dual output terminals

*Dual metering volts & current
*Over voltage & current protect
*Removable AC lead
*Illuminated metering
*Protection warning light
*1.65kg 170w x 180d x 65h mm

MFJ MFJ-993 Advanced Automatic ATU

With Built-in Frequency Counter!
1.8 - 30MHz 2000 Memories!
Coax - Wire - balanced Line

From the masters of ATU manufacturing comes the most advanced automatic ATU ever produced. Other models like LDG from USA have no memories, no digital data display and are not able to handle long wires or balanced feeder. The MFJ-973 handles wire, coax and balanced feeder, provides digital display of VSWR data and frequency, has an RS-232 rig interface (not needed for normal rig - atu operation) and and audible signal to aid adjustment. Unlike its competitors, it takes into account impedance when finding the best L/C ratio. And with optional leads you can operate this ATU remotely as well. Finally the 2000 memories make it up to ten-times as fast to tune as units like LDG that use.

£249.95

Carriage £10.00

BUILT BY US

FT-8900R

FM Quad Band Full Duplex Mobile
29/50/144/430MHz
50W HF,VHF/ 35W UHF
Cross Band Repeat Capabilty
Wide Receiver Coverage

FT-7800E

FM Dual Band Mobile
144/430MHz
50W VHF/ 40W UHF
One-Touch Operation
Wide Receiver Coverage

FT-2800M

Heavy Duty VHF Mobile
65W VHF FM
Extensive Memory System
Alpha Numeric Display
Versatile Scanning

FT-8800E

FM Dual Band Full Duplex Mobile
144/430MHz
50W VHF/ 35W UHF
Cross Band Repeat Capability
Wide Receiver Coverage

DRIVEN BY YOU

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Choice of the World's top DX'ers

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