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RadCom

The Radio Society of Great Britain Members' Magazine

£3.95 Vol 81 No. 2 February 2005

BEGINNERS

How one newly-licensed amateur took his first steps in VHF portable contesting. See 'Down to Earth' p40

RSGB MATTERS

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REVIEW

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THE PETER HART REVIEW

Peter Hart takes a close look at the Icom IC-756ProIII p26

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All finance subject to status written quotation on request.

ICOM IC-756 PRO III £2099 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 SPECIAL OFFER £539 C

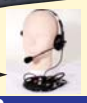
HF/ 50MHz Transceiver 0.1-10W Portable, Mobile, Base-Station. Ideal for Foundation Licence/QRP. Auto ATU, DSP memory keyer. External batt **BP-228 £71.76.** B

FREE Icom IC-703 Logbook with every IC-703 - While Stocks Last!

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 dual VFO, SWR meter etc. Options include extnl ATU DSP & filters.

KENWOOD TS-2000 £1389 C

New Lower Price!

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-910HX 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 £1099 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-480HX

Exclusive to W&S

Complete 200W Station Save £335!

TS-480HX

Buy Now pay 12 months later available!

A mighty 200W output on 160m to 6m plus digital power supply and Heil Mic

Comprises: TS-480HX transceiver, W-40SMS 40A power supply, Heil MH5 mic, cable kit and mount.

List price ~~£1434~~

Note: Heil Mic will be sent direct from Kenwood UK

£1099.95

YAESU FT-897D £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 £999 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-857D £Phone 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 £489 C

160m - 70cms. Up to 5W output all modes.

Ours includes **battery and charger.**
Add £90 for DSP version

Carriage Charges: A=£2.75, B=£6, C=£10

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ICOM IC-E208 Lower Price! £219 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 C

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

MOBILE SPEAKER + FILTERING

Amazing value. **£12.95 A**

Mobile speaker with noise filter and volume control. 3m lead with 3.5mm plug. 8 x 7 x 3 (cm) approx.

KENWOOD TMD-700E £449 C

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

Totally waterproof! Wide Frequency coverage from 500kHz to 900MHz AM/FM. Dazzling 132x64 dot matrix display providing easy-to-read frequencies and information plus pictorial graphics.

YAESU VX-150 Handheld £125B
VX-2E Handheld £169B
VX-110 Handheld £119B

BASE MIC EXCLUSIVE

Base Mic Just £59.95!A

Suits all all SSB HF base transceivers. Locking electronic PTT. Supplied open ended lead for soldering. **Ready-made lead - add £10** extra.
Code: WM-308

SPEAKER MIC EXCLUSIVE

Speaker Mic Just £16.95!A

Available for all handhelds (ex VX-7). Curly cord and genuine manufacturer's type plug. State model when ordering.
Code: QS-112

Exclusive to W&S

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.

Earpiece + Lapel Mic

Mobile telephone style for all handhelds (ex VX-7). State model.

Just £19.95A

Code: WCT-321

KENWOOD TH-G71E £179 B

KENWOOD TH-F7E £239 B

• 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.

At Last - A DX Indoor Antenna!

Can you work VK, ZL and W from indoors?

We did and You can!!
Using a wire loop less than 4ft square!!

MFJ-935 Loop Tuner **80m - 10m 100 Watts**

This is the most amazing antenna we have seen in years. Fot optimum results take a wire around 1/5th wave long, bend into square loop (14ft on 20m = 3.5ft square) and attach to MFJ-935. Result: Ultra low indoor noise and VK, ZL & W all on SSB! That's what we achieved in one day's operation! 20m loop works on 15m as well. We hung an 8ft loop over a curtain rail and worked all over Europe on 40m & 30m with S9 reports. And reception is better than most outdoor dipoles. Available around March. Great for QRP and portable as well.

NEW YAESU FT-60R 5 Watts Dual Band For Just £179.95B

*Wide band Reception 108-520MHz & 700-999.990MHz (Cellular blocked)
*New Emergency Automatic ID System
*Huge LCD
*High 5W Power Output
*Ni-MH Long-Life Battery FNB-83 (7.2V, 1400mAh)
*Overnight Charger
*Programmable Keys for user convenience
*Split CTCSS/DCS and DCS Encode-Only Capability.

The FT-60E is a new dual-band FM handheld transceiver from Yaesu. It provides versatile 2-way comms with unmatched monitoring. This is a rugged design that is happy in all weathers. And its wide receiver range makes it an ideal companion for the traveller.

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VERTICAL MOBILE ANTENNAS

Out performs all other single banders by up to 3dB!

Purchase the **MO-3 base** (137cm) for **£25.95** or the **MO-4 base** (68cm) for **£22.95**.

Then add the **coil + 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** (all 200W)

Resonator

If you want **1kW power** handling and even better bandwidth choose: **RM-10S £24.95, RM-15S £26.95, RM-20S £29.95 RM-40S £37.95** or **RM-80S £49.95**

Base section (MO-3 or MO-4)

Carriage £6 on any combination.

CUSHCRAFT HF BASE ANTENNAS

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
R-8	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.

MA5B	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 - CAROLINA WINDOMS

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	**£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

MFJ-1701 6-Way Coax Switch

*Range 1.8 - 30MHz
*50 - 75 Ohm
*2kW PEP, 1kW CW
*6-Way
*SO-239
*Size 220 x 75 x 40mm

£52.95 B

BR-210 Antenna Analyser

The BR-210 professional grade analyser from Kuranishi measures resonance, VSWR and impedance.

**1.8 - 170MHz in 6 bands *VSWR 1:1 to infinity *Impedance 12.5 - 300 Ohms *Termination: SO-239 *Slow motion tuning dial *6 x AA or ext. 12V DC *Size: 80 x 177 x 60mm *Weight: 850g*

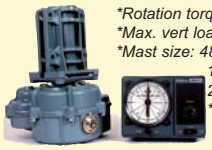
£359.95 C

DCI-145 Filter

**Passband: 144-146MHz *Loss: less than 1dB *Selectivity: -68dB at 136MHz, -55dB at 155MHz *Power: 200W *VSWR 1.5:1 *Sockets: SO-239 (N-type available) *Case size: 304 x 76 x 127mm *Weight: 1.21kg*

DCI-145-2H £99.95 B DCI-145-2HN £109.95 B

RC5-1 Rotator



**Rotation torque: 6kg/m *Brake torque: 80kg/m *Max. vert load: 400kg *Max. horiz load: 800kg *Mast size: 48-63mm *360 Rotation time: 60-150sec/50Hz *Power requirement: 230V AC 80VA *Weight: 5kg *Cable: 7 core*

£329.95 C

MFJ-125 Clock

**24 Hour Quartz clock *Full 24 Hour dial format *Separate Day, Month and 12 Hour movements *All dials independently set *Size 305mm *Supply 1xAA cell (Not supplied)*

£37.95 B

MP1-SA Antenna

**40 - 70cm (Inc WARC) *Coil 27cm x 3cm (not extended) *Lower mast 29cm *Upper whip 110cm *Total extended length 185cm approx. *Power handling 150W (75W CW) *Base connection 3/8" stud (male). *Kit comprises: lower mast, universal clamp & radial kit (not shown), coil assembly and telescopic whip.*

£139.95 B

RigRunner DC Distibution Box

Tidy up those wires! *Outputs: 2 x 25A, 1 x 10A, 1 x 5A, 1 x 1A - all fused. Over and under voltage warning. Includes crimp terminals, car-type plug-in fuses plus 2m DC input cable.*

£59.95 B

Coax Cable by the Drum

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This is the real thing as supplied by us to government bodies. Low loss and Long Life
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DRG-213 100m wood drum.	***£69.95c***
DRG-58 100m wood drum	***£22.95b***
DW-103 (WesFlex) 100m	***£89.95c***

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**1.905mm (0.075in) diameter *60.96m (200ft) spools *Colour black *181.4kg (400lb) strain *By weight it is stronger than steel *Has outer protective layer of Dacron *Will not stretch and not affected by sunlight*

£25.95 A

WEP-501 Headset

**Adjustable headset with boom mic. *Swivel boom adjustment *Lightweight earpiece *Adjusts for right or left ear. *PTT in-line switch with belt clip *2 pin connectors for Yaesu, Kenwood and Motorola *32 Ohm earpiece *1k Ohm electret mic capsule*

£24.95 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.
£169.95 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).
£229.95 C

WISP-150DC £22.95 B

No more expensive DC Adaptors! ***Plugs into cigar socket.***

Powers you Handheld AC charger, Lap Top, Shaver and any other device up to 150W 230V AC. **Great Money Saver**

£22.95B

PORTABLE ANTENNAS

MIZUHO (FOR FT-817)

ATX-WBN	Walkabout 80-6m Whip 1.5mBNC	**£44.95** B
ATX-WPL	Walkabout 80-6m Whip1.5mSO-239	**£44.95** B
ATX-W38	Walkabout 80-6m Whip 1.5m 3/8in	**£44.95** B

New **ATX-MkII** **£49.95 B**
The new ATX-MkII Walkabout includes 3 different connections, PL-259, BNC & 3/8th.

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

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

RSGB matters

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THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

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Details of the Society's volunteer officers can be found in the RSGB Yearbook 2005

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TROPHIES PRESENTED AT RSGB AGM

The RSGB's Annual General Meeting took place in London on Saturday 4 December. After the formal business was over, presentations were made to individuals who have made an outstanding contribution to amateur radio.

A Life Vice-Presidency was bestowed on Hans Berg, DJ6TJ, in recognition of his long and outstanding contribution made to IARU Region 1 and the hand of friendship he has extended to the RSGB over many years.

The Founder's Trophy was awarded to John Gould, G3WKL, for his outstanding work for the Society, including the 'Foresight review', the 5MHz project and his role organising the HF Convention.

Roger Brown, G3LQP, won the Calcutta Key for outstanding service to international friendship through amateur radio, including his contribution to 'Project Albania'.

Other trophies were awarded to John Share, G3OKA, for his significant contribution to training and amateur radio development as part of 'Project Albania'; to John Linford, G3WGV, for the establishment of the 'Summits on the Air' scheme; and to Lancashire Raynet in recognition of many years work with the Emergency Planning teams in Lancashire.

Andre Saunders, GM3VLB; Peter Rhodes, G3XJP; Ian Braithwaite, G4COL; Peter Martinez, G3PLX; and Peter Hart, G3SJX, also received awards for their excellent contributions to *RadCom* during the course of the year.

The Society's Annual Meeting continued with the President's 'Review of the Year' speech and, after lunch, the premiere of the new film, *RSGB Today*. The day concluded with a question and answer session. Further details will be published in the March *RadCom*.

Hans Berg, DJ6TJ, is made a Life Vice-President by Jeff Smith, MI0AEX.

NEW RSGB VIDEO / DVD

Following *What is Amateur Radio?*, the short film made by the RSGB about amateur radio in general, the RSGB has commissioned a new film, RSGB Today, which gives an insight into the workings of the Society. The new film, produced by Grindelwald Productions, is 22 minutes long and covers activities such as the Society's UK and international presence, the production of *RadCom*, the activities of the various departments at HQ and the RSGB Regional structure. Shown for the first time at the RSGB AGM on 4 December, the film shows the modern vibrant organisation the Society has become following the many changes in amateur radio in recent years.

The RSGB Regional team is being issued with copies and will be playing it at various club meetings and rallies: contact your RSGB Regional Manager or Deputy Regional Manager if you would like to make a booking. It is available in both VHS and DVD formats. In due course the video will be released into the RSGB video library where it will be available for clubs to borrow.

The new video, *RSGB Today*. It is also available in DVD format.

RSGB VIDEOS TO BE BROADCAST VIA SATELLITE TV

The two RSGB videos are to be broadcast on the 'Club TV' amateur radio programme transmitted by digital satellite TV. *What is Amateur Radio?*, intended for the general public and giving an oversight of what amateur radio is all about, will be broadcast on **19 February**, while *RSGB Today*, the new video intended for radio amateurs showing how the Society is run, will be broadcast on **19 March**. Both transmissions are at 1000UTC.

The broadcasts are made via the Sirius 2 satellite at 5 degrees east and the downlink frequency is 12,588MHz, vertical polarisation, SR 3400, FEC 3/4. A test card or promotion appears 10 minutes before the scheduled broadcast time for line-up purposes, ie at 0950UTC.

This monthly amateur radio magazine programme is sponsored by the Swedish firm Parabolic AB, run by Ben, SM6CKU. Further information can be found on www.parabolic.se under 'Club TV'.

HELP THE RSGB GAIN EXTRA MEMBERS

The Society is making an appeal to its members to help in the ongoing fight against PLT and the threats posed by the spectrum review (see January *RadCom*). We are asking our members to join up friends and family members to the RSGB: they need not be licensed amateurs, just anyone who has an interest in the future of amateur radio in the UK. In doing this the Society's swelled ranks will give us the strongest possible voice with government.

To help the recruitment process the Society is providing a special offer to 'join the Society for free' and 'get the *RSGB Yearbook 2005* free of charge!' We enclosed a form in last month's *RadCom* making this offer and we would like our members to help us by using the form to join people up. This is also an opportunity for you to encourage new Foundation licensees to join the Society, interest young people to take up the hobby, or entice someone who has lost interest to rejoin the Society. The only stipulation in order to take part in the special offer is that the applicant can't have been a member in the last three months. The offer only lasts until the end of March so please help the Society and 'join a friend'.

If you didn't get a form or would like some more please phone the RSGB Sales Office on 0870 904 7373 (or e-mail sales@rsgb.org.uk) who will be happy to send one to you.

OFCOM LOOKS AT POSSIBLE NEW USE FOR 24 AND 77GHz

Further to the Spectrum Review consultation document reported in 'RSGB Matters' January 2005, another consultative document was published on the Ofcom website. This was entitled 'Notice of Ofcom's proposal to exempt automotive short range radar users at 79GHz from wireless telegraphy licensing', and proposes to use 77 - 81GHz for licence-free car radars. The document states that "Designating the 79GHz band for licence exempt use by SRR equipment does not result in any exclusion of other uses of this band in the future. In other words, when we make exemption regulations users should bear in mind that users are quite likely to be sharing the relevant spectrum with present and future users." The Amateur Services currently have a Primary allocation at 77.5 - 78.0GHz.

On 24GHz, the consultation document reads: "The European Commission, Member States and the automotive industry are also currently considering allowing limited use of the 24GHz band, covering 21.5 - 26.5GHz for SRR equipment. A final decision on the 24GHz band has not yet been reached. This may be the subject of further exemption regulations in due course." The Amateur Services have a Primary allocation at 24.0 - 24.05GHz. Comments on this document were due by 14 January.

DCC ANNUAL REPORT

The RSGB Data Communications Committee report was omitted from the Annual Report published with the November 2004 *RadCom*. It can be found on the RSGB members-only website at www.rsgb.org/membersonly (follow the links 'RSGB Information', then 'RSGB Regional Manager, Committee & Honorary Officer Reports 2003-2004').

VACANCY - EMC MEMBERSHIP SERVICES ADMINISTRATOR

A vacancy exists for a member to act as EMC Membership Services Administrator (MSA). This is an important volunteer post and much of the role is concerned with liaising with the EMC Co-ordinators and managing the Technical Aid scheme. The MSA is a member of the EMC Committee and works with the Committee on EMC literature and EMC advice for members. An EMC website is also used as an information source for members. An interest in EMC issues and a desire to help RSGB members to follow the path of good radio house keeping will be important, together with an interest in IT and website techniques. The duties will be by agreement with the EMC Committee and those interested are invited to contact the Chair, Angus Annan, MM1CCR, as soon as possible by e-mail to: a.annan@iee.org

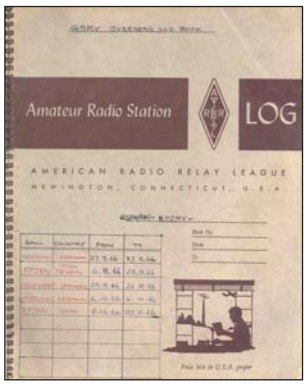
'SERVICING VALVE EQUIPMENT' - CORRECTION

The author of the article published in *RadCom* January 2005, Harry Leeming, G3LLL, writes: "Regarding Fig 1, showing the FT-101E PSU, I wrote the first draft of my article using the PSUs of the FT-901 and FT-101ZD, which use true voltage-doubler circuits, and then for some reason, substituted the FT-101E circuit without noticing that this does not. The FT-101E 'doubles' the voltage by using the whole 480V of a centre-tapped 240-0-240V winding. Sorry to those who may have found this confusing, and thanks to those readers who pointed out the error. Readers also spotted that D3, D4, D7 and D8 are wired in reverse!

"Alan Slaughter has also written to advise that, due to their use in switch-mode power supplies, Farnell and RS Components have now reintroduced high-voltage electrolytic capacitors to their catalogues, and so readers may want to look here for replacements." The second and final part of the article starts on page 80 this month.

RSGB MUSEUM RECEIVES G5RV OVERSEAS LOGBOOK

On page 14 of the January *RadCom*, we reported how G5RV's final logbook was bought in an eBay auction by the Chelmsford ARS. Now, one of G5RV's overseas logbooks has been presented to the RSGB museum. During 1966, the late Louis Varney spent a lot of time in the Lebanon and Iran. While there, he took the opportunity to get on the air as G5RV/OD5 from Beirut and as EP2RV from Tehran. The contacts he made between March and November 1966 are recorded in a logbook which was purchased from *eBay* by Patrick Gillen, G4GVW, and kindly donated by him to the Society. The logbook is now held safely in the National Amateur Radio Library and Museum at RSGB HQ.



Patrick writes, "It is my hope that when similar artefacts of significant historical interest to the hobby can be saved for the museum collection, every effort should be made to preserve such 'heritage' items in this way, either by gift or perhaps by permanent loan. The danger is that in the disposal of an estate historical items may be lost through lack of knowledge of executors and others involved."

HAVE YOU A QUERY OR A TECHNICAL PROBLEM?

Or are you trying to find a circuit for that old piece of kit?

Depending on the nature of your question, there are four main routes to an answer:

- If you need an individual response to a specific technical query, write to the Chairman of the RSGB Technical Committee, Tony Plant, G3NXC (QTHR or technical@rsgb.org.uk);
- If you have a more general technical question, and think the answer would also be of interest to other radio amateurs, write to G3SEK's 'In Practice' column (e-mail and postal addresses are given every month);
- If you need obsolete manuals, obscure spare parts etc, you can ask all *RadCom* readers through 'Helplines' (write or e-mail to *RadCom* at the addresses on p9);
- If you have an RF interference problem, you can use the EMC Technical Help scheme; send your question to your local representative, or a contact specialising in your problem area; addresses can be found on pp108 / 109 of the current *RSGB Yearbook*.

CONGRATULATIONS!

Congratulations go to the following RSGB members who successfully upgraded to the **Intermediate licence** by taking the exam on 6 December: **Philip Beier, M3DYF; Harold Blackburn, MD3HEB; Colin Buchanan; Kevin Buxey, M3KBX; David Douglas, MM3FKQ; Edward Erbes, M3HDK; Ross Etchells, M3FPA; John Hammond, M3HMD; Thomas Hardwick, MD3FMN; James Hume, MM3JHS; Colin Ingles, MD3CFZ; Ralph Kelly; James Kincell, M3KPJ; Thomas Leece, MD3TRL; Stuart Leslie, MD3STL; Justin Lindermann, MM3HXV; Clive Martin, M3FCP; Peter Orme, M3IAZ; Steve Palmer, M3HBQ; Martin Rees, M3HBJ; Nigel Sheridan, M3DIH; Michael Shurley, M3CPZ; Paul Smith, MM3HRU; Frederick Squires, M3LAF; Robert Stokes, M3XRS; John Sweatman, M3FJG; Jackie Taylor, MM3JTA; Carl Taylor, MM3TYR; Michael Waistell, M3ZMW; John Wardle, MD3JKW; Tony Woods; Trevor Woods, MM3FGC.**

In the 'Congratulations' box in 'RSGB Matters' last month we stated that Darren Simmons, M3DWV, had passed the Intermediate exam and Kenneth Hull, 2E0LKH, passed the Advanced exam. Unfortunately Mr Simmons and Mr Hull did not pass the exams; apologies to them for this error.

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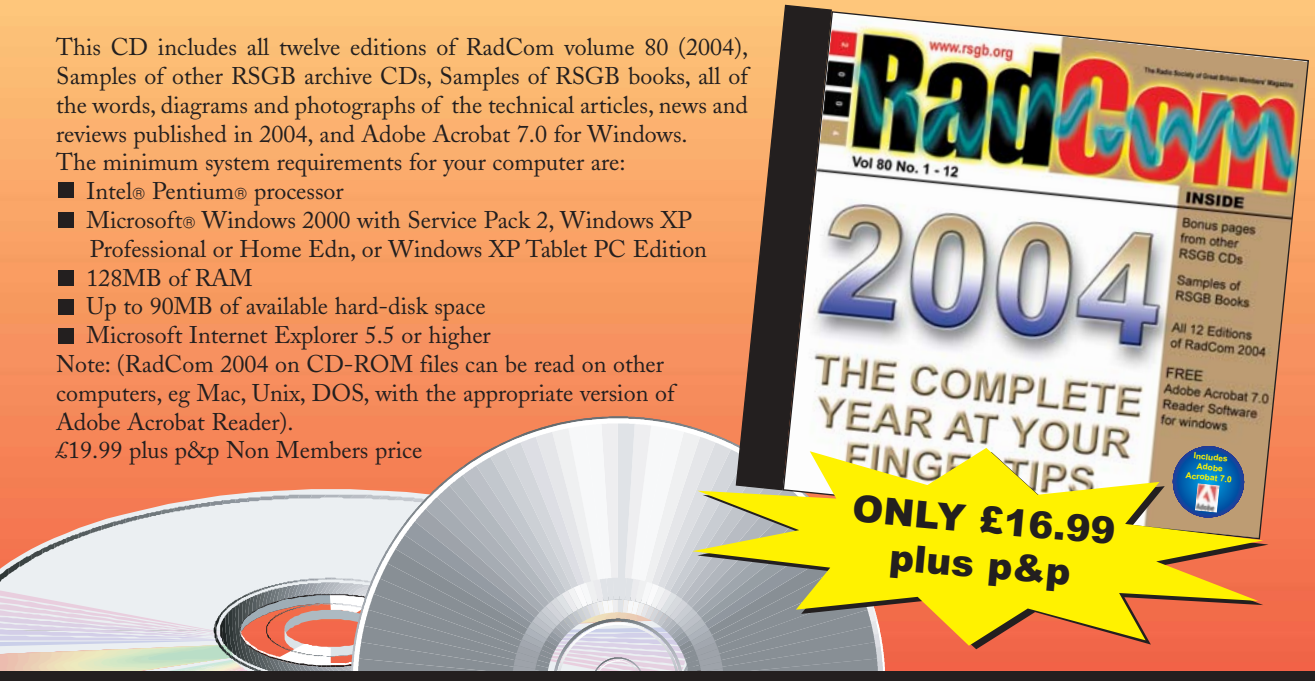

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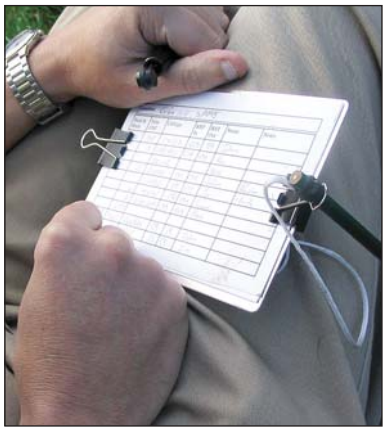


p58 – The 'Waterlog'. See 'QRP'.

p70 – An ADSL filter tested. See 'EMC'.

NEWS AND REPORTS

REVIEWS

DOWN TO EARTH – AMATEUR RADIO FROM THE GROUND UP

TECHNICAL FEATURES

REGULARS

Amateur radio to the rescue across Asia

The Asian tsunami disaster

As we go to press in early January, the death toll in the Indian Ocean earthquake and tsunami disaster had risen to over 150,000. Amateur radio played a key role in providing emergency communications, especially in the hours and days immediately after the devastating tidal waves hit the coastal communities, and especially in the more remote parts of the region where normal communications were destroyed.

In the remote Andaman and Nicobar Islands, amateur radio had been banned by the Indian authorities on security grounds. But by coincidence five Indian amateurs led by Bharathi Prasad, VU2RBI, had received operating permission earlier in December, the first licences issued for the islands since 1987. Almost as soon as the earthquake struck, the DXpedition swapped to emergency traffic. One of the DXpedition radios was set up about 30 minutes after the quake on a table outdoors and, using a combination of generators and car batteries, numerous messages were relayed from islanders to worried relatives on the mainland. The local authorities asked for the team's help to provide all forms of radio communications and two of the team were sent to Car Nicobar island in the centre of the worst-hit region, to provide whatever assistance they could. Far from being a security risk, amateur radio turned out to be a lifeline for the thousands of displaced people on the islands.

Bharathi Prasad, VU2RBI.

Mayuree Chotikul, HS1YL.

The story was the same throughout the region, with amateurs in Sri Lanka, Thailand, India, Indonesia and elsewhere in the forefront of providing vital links in the devastated areas.

In Sri Lanka, three amateurs took a 4WD with amateur transceiver and food and water for the displaced to the coastal town of Hambantota. They set up an HF link to the Prime Minister's official residence in Colombo which was manned by RSSL president Victor Goonetilleke, 4S7VK. He said, "It was wonderful even at such a tragic time to link up the south of Sri Lanka with the Prime Minister who comes from there, and that is where his people are. When all the cellular and other means failed, short-wave stood bold and proud."

The worst-hit country in the region was Indonesia but following offers of assistance from the IARU, Musa Suraatmadja, YB0MOS, secretary general of Indonesian national society ORARI, said: "Thank you very much for your sympathetic message and offer to help, but so far we can still manage. Our ORARI members are out there doing emergency communications, helping rescue operations, distributing foods and clothing and other things."

A message from Mayuree Chotikul, HS1YL, the President of RAST, forwarded by Tony Waltham, G4UAV / HS0ZDX, stated: "Thai hams are helping to relay information between the affected areas along the west coast in the south to government agencies, mostly on VHF and 40m, as well as disseminating news and information over VHF frequencies in Bangkok. *Echolink*, too, has played a role in enabling radio amateurs here to relay information to concerned friends and relatives of those holidaying in the affected areas."

Individual amateurs wishing to help are encouraged to make a donation to the Disasters Emergency Committee (DEC) appeal, tel: 0870 60 60 900 or online: www.dec.org.uk A more detailed report on amateur radio's role in the relief operation can be found at www.rsgb.org

♦ Waters & Stanton are making a donation of £1 for every sales order received during January. Mail order customers are also being asked if they want to make an additional donation which will be added to the W&S fund. The total accumulated fund will be passed to Oxfam [part of the DEC appeal - *Ed*] in February.

More countries on 7.1-7.2MHz

The following ITU Region 1 countries have now granted radio amateurs early access to 7.1-7.2MHz on a Secondary (non-interference) basis: UK, Republic of Ireland, Croatia, San Marino, Norway, Iceland, Serbia & Montenegro (situation not clear although in the national allocation table), Switzerland and Denmark. Chairman of the RSGB Spectrum Forum, Colin Thomas, G3PSM, reports that Poland, Belgium, the Czech Republic and the Netherlands have also approached their authorities for such permission.

ML&S Open Day

Over 500 people attended the Martin Lynch & Sons Open Day on 4 December. Representative of Yaesu, Icom, Kenwood and bhi were on hand to demonstrate their products, while the RAIBC and Royal Naval ARS were there to greet members and sign up new ones. The earliest traders at the 'first come, first served' car boot fair, organised by the Whitton ARC, turned up at 6.30am! This year Martin and his team will be holding two Open Days, in July and December.

With over 500 visitors, it was a busy day at the ML&S Open Day.

RSGB at the Stevenage show

The RSGB will be providing the lecture programme for the Stevenage Radio & Electronics Show on 20 February. At 11.30am there will be a presentation by *RadCom* editor Steve Telenius-Lowe, G4JVG, on how the magazine is produced, followed at 12.30pm by General Manager Peter Kirby, G0TWW, introducing the new film *RSGB Today*. At 1.30pm, *RadCom* columnist Steve White, G3ZVW, will present 'Whatever Next: Live', with ideas for the design of the next generation of transceiver. See the advertisement on p64 for further details of the show.

NEWS BRIEFS

- From 1 January 2005 those undertaking electrical work in dwellings must ensure that the work complies with Part P of the Building Regulations. Full details are at www.odpm.gov.uk/stellent/groups/odpm_buildreg/documents/page/odpm_breg_029960.pdf We hope to cover this subject in more detail in a future RadCom.
- The annual Guides' 'Thinking Day on the Air' (TDOTA) takes place this year on 18 / 19 February. A TDOTA pack is available on request from RSGB HQ: please contact Rod Wilkinson, tel: 0870 904 7373 or e-mail: ar.dept@rsgb.org.uk by 4 February at the latest.
- The BA's (www.the-ba.net/the-ba) National Science Week takes place this year between 11 and 20 March. If you would like to organise an event to promote amateur radio during this period, please write to Mark Allgar at RSGB HQ or e-mail: mark.allgar@rsgb.org.uk
- The 18th annual International Marconi Day will take place on 23 April this year. Full details are at www.gb4imd.co.uk. For a station to be counted towards an award by applicants, that station must be registered by contacting the webmaster (webmaster@gb4imd.co.uk) prior to the event.
- The Worthing Radio Club raised £2700 in November's 'Children in Need' appeal, a record amount for the club. Since it started operating GB2KIN ('Kids In Need') several years ago, the Worthing club has raised over £12,000 for the charity.
- Congratulations to John McCullagh, GI4BWM, who was awarded an MBE in the New Year Honours for his services to the public. John is also a Raynet controller in Northern Ireland.
- The website of NW *DXCluster* GB7MBC has started a forum for *DXClusters* users, open to anyone who enjoys working DX or contests. Go to: www.gb7mbc.net/forum/
- A new amateur radio forum has been launched at www.euronium.de It is free and currently has over 200 members. The site is in English and welcomes new members.

Record attendance at Microwave Roundtable

There was a record attendance at the 2004 Martlesham Microwave Roundtable held over the weekend of 13 / 14 November. The venue is organised by the Martlesham Radio Society and the talks programme by the UK Microwave Group (www.microwavers.org). Attendees and lecturers came from as far as the US and Germany. Antenna and equipment test ranges, bring and buy stalls, a raffle / prize draw and a very well-attended Saturday evening dinner in a nearby hotel all contributed to one of the most successful events ever.

PHOTO: RAINER, DF6NA

Back row: Tano, ZB2IH; Ernie, ZB3F; Ronald, ZB3B; Alan, ZB2IF; Jim, ZB2JW. Front: Jack, G3PWK; Louis, ZB2IT; Spike, G4AKQ.

A visit to Gib

Two retired Sappers, who had previously served to the Rock, returned for a week at the invitation of the government of Gibraltar. Jack Braithwaite, G3PWK, and 'Spike' Bernard, G4AKQ, were invited as part of Gibraltar's celebrations of 300 years of British sovereignty. Ronald, ZB3B, and Joe, ZB3D, arranged for an HF station to be made available in their accommodation in the old Sergeants' Mess at Europa Point.

Jack and Spike visited club station ZB300 followed by the Yacht Club, where they were advised that their money was not acceptable over the bar! They wish to thank the government of Gibraltar and the amateurs there for making their stay so memorable.

Raynet in action

On 19 November a fire in a barn in Wray, Lancashire, caused an evacuation of the village, including the local primary school. Raynet was brought to standby in case the evacuation became prolonged. Stand-down was initiated some hours later and the villagers returned to their homes. Thanks to Fred Charnley, G4RPW, the Deputy County Controller of Lancs Raynet for this report.

♦ The Greater Glasgow Raynet Group was active from late on 4 December until the early hours of the next morning, proving communications links on 2m and 70cm through the Clyde Tunnel for the City Emergencies Planning Officer and the Clyde Tunnel Master. The work was in preparation for an update to the Tunnel's Emergency Contingency Plan and all tests were completed satisfactorily.

♦ On 14 December, Trevor Groves, G4KUJ, representing the Radio Amateurs' Emergency Network on the National Voluntary Sector Working Group, attended a reception hosted by Helen Jackson, MP, at the House of Commons. The reception marked the passing of the Civil Contingencies Act. The inclusion of the voluntary sector is significant and recognises the contribution made in responding to emergency situations. Trevor was impressed by the knowledge of many of the parliamentarians about the work that Raynet does across the country.

Slow Morse transmissions

Ian Keyser, G3ROO, and others have formed a slow Morse group. They call "CQ QRS QSO" at 12WPM every evening possible between 3562 and 3570kHz. Operators are G3ROO from 1830 to 1900 and GW3SB from 1900 to 2000UTC every evening. On Monday nights GM3WUX starts at 1930 and on Thursdays G3JRX starts at 2000UTC. If other operators would like to join the roster please contact G3ROO (QTHR). The Royal Air Force Amateur Radio Society also has slow Morse transmissions on 3515kHz at 1900UTC on Thursdays.

Marconi Collection finds new home in Oxford

The historic Marconi Collection (www.marconicalling.com) is to be transferred to The Bodleian Library and the Museum of the History of Science, both part of the University of Oxford. Marconi has agreed to gift the collection to the university, where it will have a safe and secure future. Through the generosity of the Wireless Preservation Society a full time archivist will be appointed to catalogue the collection. Oxford University is planning a major exhibition of items from the collection in the spring of 2006.

The Chelmsford Amateur Radio Society made use of some of its artefacts when it ran special event station 2MT in 2001 to celebrate the 100th anniversary of spanning the Atlantic by radio. Many contacts were made using original Morse keys dating from the 1890s / 1900s.

Club and regional news

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.

1 Scotland South & Western Isles

COCKENZIE & PORT SETON ARC
11, Radio check night, John, MM0JXI. Bob, GM4UYZ, 01875 811723.
LOTHIANS RS
14, 'Squeakies Unlimited', Lawrence, GM1BKF. 28, Digital Signal Processing, Dave, GM4ZNH. Toby, MM0TSS, 07739 742367, tobysigouin@onetel.net.uk
PAISLEY (YMCA) ARC
2, 'What are decibels?', GM4GZQ.
16, 'Has the RSGB reached the 21st Century yet?' Jim, GM3UWX.

2 Scotland North & Northern Isles

ABERDEEN ARS
3, Junk sale.
10, Technical topics: 5min talks.
17, Talk by Graeme Knight, GM8FFX.
24, On air, Morse practice. Ellis, GM4JLZ, 01224 580594.

3 North West

SOUTH MANCHESTER R & CC
4, Discussion on aerials.
11, 'Antennas for Wireless Internet', Chris, G3ZDM.
18, 'The Renaissance of Science', Chris, G4HON.
25, Construction of a multiband receiver, Robin, G3RJQ. Ed, 0161 969 1964.
STOCKPORT RS
1, Building a dipole part 2, Richard Newstead, G3CWI.
15, Contest & events planning meeting. David, M1ANT, 0161 456 7832.
THORNTON CLEVELEYS ARS
7, On air.
14, Auction.
21, Winding transformers.
28, The trawler Jacinta. Jack, G4BFH, jack.duddington@btinternet.com
WARRINGTON ARC
1, Discussion on Ofcom Spectrum Consultation Document.
8, Review of Warrington ARC's test equipment. John, G0RPG, 01925 762722.
WIRRAL & DARC
2, 'D&W', Harp, Little Neston.
9, Cellular comms today, G6IIM.
16, 'D&W', Black Horse, Lower Heswall.
23, 'Contentious debate', G6IIM. Tom, G4BKF, 07050 291850.

4 North East

GREAT LUMLEY AR & ES
2, 9, On air.
16, Talk.
23, On air. Nancy, 0191 447 0036, 07990 760 920, nancybone2001@yahoo.co.uk
HALIFAX & DARS
15, The World Wide Web, Peter, G0PQB (please note this is at Rishworth School). Tom, M0TKA, 01484 715079.
KEIGHLEY ARS
10, On air.
24, Summits on the Air, Rod, 2E0PIW. Kath, G0OSA, 01535 656155.
WAKEFIELD & DARS
1, RSGB video.
8, WDRS 2005 Northern Cross Rally meeting.
15, Rally debrief.
22, On air.
26, WDRS 2005 club dinner. Charles, M3ZYZ, 01226 726434, 07900 500775.

5 West Midlands

CHELTENHAM ARA
4, Sale of surplus equipment. Ron, G3SZS, 01452 713761.
GLOUCESTER AR & ES
7, 'Cradle to steeple', Mike Rogers.
14, 21, On air HF, workshop.
28, DF exercise. Tony, 01452 618930 daytime.
HILLCREST ARS
3, Bring your TS-570 for opening up for operation on 7.1 to 7.2MHz.
17, On air. Stuart, M0SJV, 01384 232457, m0sjvstuart@supanet.com
MID-WARWICKSHIRE ARS
8, Gas turbines, Brian, G4DF. 22, Members' test equipment and gadgets. Bernard, M1AUK, 01926 420913.
ST LEONARD'S ARS
10, The club oscilloscopes, G4NVH & G0FXS.
17, RSGB video.
24, Build a SOTA 2m beam, Derek, G0EYX. Derek, G0EYX, 01785 604904.
STRATFORD UPON AVON DRS
14, On air.
28, Skittles and buffet. Terry, G3MXH, 01789 294387.
TELFORD & DARS
2, Open evening, HF on air.
9, Internet Gateways: how to use, M1IHM.
16, Club purchases: what do we need?
23, Under £5 construction competition. Mike, G3JKX, 01952 299677, mjstreetg3jkx@aol.com
THORNBURY & SOUTH GLOS ARC
2, Programme planning for April to October.
9, Video.
16, On air.
23, Power supply tests. Stan, G0RYM, stang@talkgas.net

6 North Wales

No club details received.

7 South Wales

ABERYSTWYTH & DARC
10, 'Lighthouses on the Air', Chris, GW7HAE.
27, Visit to Swansea rally. Ray, mwmg01@aber.ac.uk
MID GLAM ARG
3, Bring and buy sale. Mike, MW0CNA.

8 Northern Ireland

BANGOR & DARS
2, 'Radio old timers', Dave, GI3OBO. Mike, GI4XSF, 028 4277 2383, www.bdars.com

9 London & Thames Valley

CRAY VALLEY RS
3, Meet the members.
17, D-Day, G3NPS. Richard, G7GLW, 07831 715 797, rcains@btinternet.com
HODDESDON RC
1, Windows XP Q&A, John, G4VMR.
15, Echolink Q&A, Don, G3JNJ. Don, G3JNJ, 020 8292 3678.
NEWBURY & DARS
23, Vintage radio, Malcolm Franks. Kevin, G6FOP, 01635 826397, g5xv@ntlworld.com
RS OF HARROW
25, Product talk, Mark Francis, G0GBY. Jim, G0AOT, 01895 476933 or 020 7278 6421.
READING & DARC
10, Aerial workshop.
24, Talk TBA. Pete, G8FRC, 01189 695 697.
SHEFFORD & DARS
3, 'What are you going to build this year?', Stewart, G3RXQ.
10, History of VHF Comms magazine, Andy, G8ATD.
17, Construction results.
24, Quiz night. David, G8UOD, 01234 742757.
SILVERTHORN RC
4, Informal evening.
18, Star gazing with G0LWS.
25, On air. Les, G0CIB, 07980 275081.
SURREY RCC
7, German WWII radios, Brian, G8DIU. Ray, G4FFY, 020 8644 7589.
SUTTON & CHEAM RS
17, PSK31, Martin, M1MRB. John, G0BWV, 020 8644 9945, info@scrs.org.uk
WIMBLEDON & DARS
11, Operating above UHF, Jim, G4WYJ.
25, PicATUne construction, on air. Jim, M0CON, 020 8874 7456.

10 South & South East

ANDOVER RAC
1, Video: Basic Radio Measurements.
15, Identifying meters and their uses, G8ALR. Terry, G8ALR, 01980 629346.
BASINGSTOKE ARC
27, 'Foxhunt', Frank, M0AEU, & Peter, M1DGQ. Frank, M0AEU, barc@2lo.info
FARNBOROUGH & DRS
9, Video.
23, Switch Mode Power Supplies, Alan, M5AMN. Norman, G0VYR, 01483 835320.
HASTINGS E & RC
16, AGM. Gordon, 01424 431909, gordon@gsweet.fsnet.co.uk, www.g4cus.freeserve.co.uk
HORNDEAN & DARC
22, Annual bring-and-buy sale. Stuart, G0FYX, 023 9247 2846.
HORSHAM ARC
3, 1950 radio station, Brian, G3GDU. David, G4JHI, 01403 252202.
MID-SUSSEX ARS
4, Computing in the shack, Chris, G4ZCS and Tony, G3XQM.
11, Construction evening.
18, Radio night.
25, Silent key sale, Len Killip, G0APZ. Alan, G8YKV, 01273 844511.
SOUTHDOWN ARS
7, What the world wide web can do for amateur radio, Peter, G6GVM. Bring and buy sale. John, G3DQY, 01424 424319, vaughdqy@aol.com
SWINDON & DARC
10, WWII army radio intelligence, Don, G3BGM.
24, Construction competition. Mike, M5CBS, 01793 826465.
TROWBRIDGE & DARC
2, Chippenham DARC mini DXpedition to Lundy, Ian, G0GRI. Ian, G0GRI, 01225 864698 evenings / weekends.
WORTHING & DARC
2, Video.
9, Trains and electronics.
16, Practical construction evening.
23, Computers and your problems. Roy, G4GPX, 01903 753893.

11 South West & Channel Islands

APPLEDORE & DARC
3, GB3DN, Don, G0RQL. Brian, M0BRB, brian.jewell@ic24.net
BOURNEMOUTH RS
4, Repeaters, John, G0APl. Chris, M5AGG, 01202 893126, www.brswebsite.freeserve.co.uk
CORNISH RAC
3, Main meeting.
14, Computer section meeting. John, G4LJY, 01872 863849.

FLIGHT REFUELLING ARS
13, Wireless LAN in amateur radio, Paul, M0EYT. Tony, G3PFM, 01202 622262.
NORTH BRISTOL ARC
4, Kenwood evening, David Wilkins, G5HY. Dick, G0XAY, 01454 218362, Jon, 0117 941 4602.
PLYMOUTH RC
1, 'Your Radio Plymouth', Graham Gilbert.
5, Rooster Breakfast, TBA.
15, AGM. Frank, G7LUL, frank@foxonezero.fsnet.co.uk
POOLE RADIO SOCIETY
11, Contesting, Colin, G6MXL. Phil, G0KKL, 01202 700903.
SOUTH BRISTOL ARC
2, Computer and software clinic.
9, Cassette, video & CD exchange.
16, Mid-winter bring and buy.
23, On air. Len, G4RZY, 01275 834282.
SOUTH DORSET RS
8, 'How it works, or how it should, or how it will'. Carol, 2E1RBH, 01305 820400, carolonfraggle@tiscali.co.uk
TAUNTON & DARC
4, On air.
18, The Buddipole portable antenna, G3WNI. William, G3WNI, 01823 666234, g3wni@btinternet.com
TORBAY ARS
18, AGM. No meeting on 18 March. Dave, G6FSP, g6fsp@tars.org.uk

12 East & East Anglia

BRAINTREE & DARS
7, VHF rigs old & new.
21, Receiver testing. John, M5AJB, 01787 460947.
CAMBRIDGE & DARC
4, DDS Sig gen project.
11, New aerial, G0GKP.
18, DDS Sig gen project cont.
25, Construction competition, bring your homebrew boxes. Ian, G4AKD, 01954 782974.
CHELMSFORD ARS
1, Summits On The Air, James, M0ZZO.
6, South Essex ARS Rally, The Paddocks, Long Rd. Martyn, G1EFL, 01245 469008.
COLCHESTER RADIO AMATEURS
10, Pedestrian mobile in Netherlands, Peter, G8BLS.
24, Constructors' club, Morse practice, on air. James, M0ZZO, 01255 242748.
EAST KENT RS
7, GB3EI repeater, Don, G4TKR.
21, Shipping in the English Channel, George, M3GFN. Paul, G3VJF, 01227 365384, g3vjf@paulnic.com
HARWICH ARIG
9, Wireless, computer and communications networks, Jonathan, G0DVJ. Tony, G4EYE, 01255 886065.
HAVERING & DRC
2, Informal.
9, G3SVK's UK topband expeditions of the 60s.
16, 2m on air.
23, DF antenna construction. Oliver, G3TPJ, 01708 746677.
NORFOLK ARC
2, Radio workshop, informal.
9, Members' portable / mobile aerial tests.
16, Radio workshop, informal.
23, Science into practice, Arnold, G3PTB. Reg, G0VDO, 01603 429269.

13 East Midlands

EAGLE RADIO GROUP
8, History and development of thermionic valve, Eddie, G3WNQ. Terry, G0SWS, 07979 733640.
HUCKNALL ROLLS-ROYCE ARC
4, AGM.
11, RSGB film.
18, Debate on operating.
25, Two years of ham radio, Bryan, M0OIC. Keith, G6NHY, 07929 916642, hrrarc@ntlworld.com
LEICESTER RS & CC
7, Junk sale, on air.
14, Video, on air.
21, Video, construction, on air.
28, Talk on 'foxhunting' / DF, Adam, G0ORY. Tom, G1IUT, 0116 286 3949, tomchristmas@ukonline.co.uk
LOUGHBOROUGH & DARC
1, On air, 2m contest.
8, Open Forum: RadCom topics.
15, Darts and eats at Black Swan.
22, 'The other man's shack', Art, G3KWY. Chris, G1ETZ, 01509 504319.
MELTON MOWBRAY ARS
18, Radio astronomy for radio amateurs, Jeff Lashley, National Space Centre. Phil, G4LWB, phil@croxtonkerr.fsnet.co.uk
RAF WADDINGTON ARC
10, Talk on the Red Arrows by a former member. Martin, M3MDF, martin@farmer4.freeserve.co.uk
SOUTH NORMANTON, ALFRETON & DARC
7, Table top rally.
14, RNLI, Don Crossland.
21, Junk sale.
28, Inter-club quiz. Mike, M0RMJ, 01949 876523, mike.jeffs@ntlworld.com

FRANKLIN RADIO GROUP

At the November meeting of the Franklin Radio Group three new members sat the Foundation licence course and all passed. Congratulations to Bruce, Brendan and Jason, whom we hope to hear on the air soon with their new callsigns. Thanks to Robert, G0OTH, for his time and effort teaching the candidates and to Brian, G0CHB, the exam invigilator.

Anyone in the Spilsby / Skegness area wishing to take a Foundation or Intermediate course should please contact Robert, G0OTH, tel: 01754 765408, or go along to the club which meets on the last Wednesday of every month at The White Hart hotel, the Market Place, Spilsby (opposite the Franklin Statue).

NEWS FROM BISHOP AUCKLAND

The Bishop Auckland Radio Amateur's Club (BARAC) held its AGM on 25 November at which the committee was re-elected and Tim Bevan, M0ACV, and Mark Hill, G0GFG, were made Honorary Members. An Intermediate exam was held recently at which four of the five candidates passed. Foundation, Intermediate and Advanced instruction is on-going; contact the secretary, Mark Hill, G0GFG, on 01388 745353 for further details.

SALTASH & DARC CELEBRATES 40 YEARS

At a celebration dinner on 11 November at the Rodney Inn, the Saltash and District ARC celebrated 40 years of continuous operation. Present was the Mayor of Saltash, councillor Mrs Sue Hopper MBE, the principal guest of honour, with local newspaper correspondent Audrey Miller and Deputy RSGB Regional Manager for Cornwall Mike Prowse, G7ERQ. Past members and friends joined members in the celebration.

The chairman, John Painter, welcomed the mayor, guests and two founder members, Colin Squires, G3XCS, and John Tozer, G3XLZ. He thanked Colin, G3XCS, for a photographic display of club activities from the start to the present day.

The secretary, Brian Giles, M0BHG, gave a brief history of the club. The first official meeting was held on 6 November 1964 at the Burration at Toc H, where the club still meets on the first and third Thursday of the month.

On behalf of the RSGB, Mike Prowse, G7ERQ, presented a certificate of congratulations to the club.

The evening concluded with the Mayor presenting the President's Cup to the joint winners of the 2004 Constructor's Competition, Peter Cole, G3JFS, and Brian Giles, M0BHG. She congratulated the club on its 40th anniversary and thanked the club for a wonderful evening and excellent hospitality.

Club chairman John Painter receives the RSGB certificate from DRRM for Cornwall Mike Prowse, G7ERQ.

MORSE PROFICIENCY SCHEME IN WEST MIDLANDS

The St Leonard's ARS is running Morse proficiency assessments in order to further and maintain interest in CW at its HQ in Stafford, or at local clubs by arrangement. The Morse test, which was the traditional division between Class A and Class B licences, has now passed into oblivion, but Morse code as a means of communication is very much alive. This is not a test, but a means of measuring a candidate's proficiency in receiving and sending Morse, and gives encouragement to practice so as to achieve greater enjoyment from the mode. The Morse Proficiency Awards are free and can be taken at speeds of 5, 10, 15, 20 and 25WPM.

If any radio club within a radius of about 25 miles of Stafford has a number of members wishing to try for the awards, St Leonard's ARS would consider making a visit. It would be necessary for the club in question to provide a suitable room. The programme is run in conjunction with the RSGB. For more details, please contact Stan, G0BYA, on 01785 612106 or e-mail stafford.morse @ntlworld.com

MORE COURSES AT CHARLIE DELTA CLUB

The Charlie Delta ARC in the West Midlands will be running an Intermediate course towards the end of February. If there is sufficient demand the club will run another Advanced course later in 2005. Anyone requiring further details of these, or the club's Foundation courses, should contact Dave, M0DCM, tel: 01902 635244 or e-mail: m0dcm@blueyonder.co.uk

RADIO CONSERVATION OPPORTUNITIES AT IWM DUXFORD

The Duxford Radio Society (DRS, www.duxfordradiosociety.org) is seeking to attract new members to work on the conservation of military communications equipment and to operate permanent special event station GB2IWM. The Imperial War Museum (IWM, www.iwm.org/duxford/index.html) at Duxford, Cambridgeshire, is well known for its spectacular flying displays, but there is always a significant amount of other conservation and restoration work going on behind the scenes.

DRS is the radio section of the Duxford Aviation Society (DAS), the organisation which supplies a volunteer workforce of over 600 specialists to the IWM for the restoration of aircraft, vehicles and radio equipment. Applications for

The famous No 19 set being tested at the Duxford Radio Society. Could you do this?

membership of DRS are welcomed from those actively interested in military wireless communications, radio navigation and radar, and who wish to contribute to its conservation, operation and display. DRS particularly seeks those who are competent to work safely on high voltage valve electronic equipment, especially those who worked on similar equipment in the armed services or radio communications companies. DRS also seeks licensed amateurs who can operate GB2IWM on a regular basis.

For details of how to become an associate member of DRS contact: The Secretary, Duxford Radio Society, c/o The Imperial War Museum, Duxford, Cambs CB2 4QR or e-mail: gb2iwm@thersgb.net

It is also possible to become a DRS/DAS 'working volunteer' at IWM Duxford. Details from the Volunteer Co-ordinator, The Imperial War Museum, Duxford, Cambs CB2 4QR.

COCKENZIE & PORT SETON'S FIRST INTERMEDIATE EXAM

The Cockenzie & Port Seton ARC recently held its first Intermediate course and exam. The club has been running Novice, then Foundation and now Intermediate courses since March 1995. A total of 24 people passed the Novice courses, 66 passed the Foundation courses and now 10 the Intermediate course, nine of whom were former Foundation course pupils. The club is a registered examination centre and has also invigilated for four people whilst they sat their Advanced exam.

Courses are organised and run on demand; the next is an Intermediate course starting on 5 February. Anyone interested in taking one of the club's courses should please contact Bob, GM4UYZ, on 01875 811723 or e-mail bob.gm4uyz@btinternet.com The club takes a break from training between May and August due to other club commitments.

Standing, left to right: Graham, MM3TRT; Jack, MM3JTA; Peter, MM3FBC; Justin, MM3HXV; Colin, MM3ENM; Danny, MM3CDO; Graeme, MM3ZEB; Alan, MM3SLK; Dave, MM3FKQ, and Jim. MM3JHS. Front: Campbell, MM0DXC (Invigilator); Bob, GM4UYZ (Instructor).

NEWS FROM MAIDSTONE

Bill Walker, M0WTW, the new club secretary of the Maidstone ARC, GX3TRF, reports that the club shack re-build project is about 90% complete and a project to build an extension to the shack is about to get under way. He adds, "I've been delighted with the help and interest in contests this year. We've entered RSGB AFS CW, AFS SSB, Club Calls Contest, IARU Region 1 CW Field Day, IARU Region 1 SSB Field Day, and also helped out BRATS with CQ WW RTTY. We've not won anything yet, but we're learning lots. Next year, building on the interest we've had, the plan is to enter several contests alongside BRATS under the 'handle' Medway Radio Contest Group and to apply for a short contest call."

BRIGHT SPARKS

Kilmarnock & Loudoun ARC held its 22nd annual 'Bright Sparks' quiz and social evening on 15 December, at the Foxbar Hotel, Kilmarnock. Around 42 lively souls from seven surrounding clubs attended the bash and competed fiercely for the highly-coveted Bright Sparks trophy. After seven thrilling rounds of amateur radio and general knowledge questions the eventual winners were the 'Central Belters' team, the Mid-Lanark ARC.

Bright Sparks all. The winning team, left to right KLARC quiz master Barry, GM3YEH, Jim, GM3UWX; Jim, GM0SYV; Gordon, GM3ULP, and Ken, GM3JIG.

PHOTO BY ALLAN, GM3OZB.

BRICKFIELDS ARS 20th BIRTHDAY

The Brickfields Amateur Radio Society on the Isle of Wight recently celebrated its 20th anniversary with special event station GB2OTH at the club's headquarters. On 18 December members received a special visitor who presented them with a 20th birthday cake at a celebration held in conjunction with the Brickfields Equestrian Centre's Christmas Show in Binstead.

Left to right: D Long, G0PRJ; R Pratt, M0CGO; Chic Tutt, G0RNN and A Gardner, G0NTH receiving the 20th anniversary birthday cake from Father Christmas.

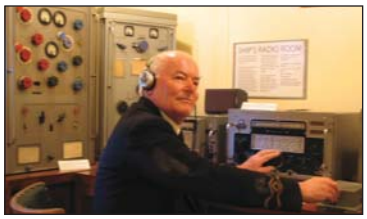
BRAINTREE CLUB'S CHRISTMAS SOCIAL

The Braintree and District Amateur Radio Society (www.badars.org.uk) held its annual Christmas social event on 20 December. A superb buffet was laid on by Melvin, G0EMK; members tucked in and then participated in the club quiz. Magazine editor Dean, G4WQI, was caught cheating on his mobile phone, as 'phone a friend' was strictly prohibited! There was again more controversy when most of the raffle prizes were won by committee members. The event was a great end to a busy year for the club and they are all looking forward to an even better year in 2005.

NEW SHIP RADIO ROOM

One of the recent additions to the Sandford Mill Science and Industrial Museum has been a recreation of a typical ship's radio room. Advice on setting up the room was given by Peter Watkins, a retired ship's Radio Officer, and Geoff Lovegrove, G7KLV, and Don Manning did most of the construction (see www.g0mwt.org.uk/eventfold/shipradio/shipradio.htm)

The Sandford Mill Science and Industrial Museum is open to the public about six times a year: the next occasion is International Marconi Day (IMD) on 23 April. The Chelmsford Amateur Radio Society (CARS) will be running a station from the 2MT Hut in the museum throughout IMD.



Peter Watkins at the controls of the new radio room display at the Sandford Mill Science and Industrial Museum.

TEST EQUIPMENT DISPOSAL RAISES FUNDS FOR CHARITY

Trowbridge DARC is pleased to report that £625 has been donated to charity following the disposal of redundant test equipment. The test equipment was made available to the club for disposing to the local amateur community on the understanding that all proceeds would be donated to charities. Those benefiting are Cancer Research UK, British Heart Foundation, CLIC, Multiple Sclerosis Society, Wireless for the Blind, National Autistic Society and UNICEF. Radio clubs now with access to the test equipment include the Bristol RSGB Group, Swindon, Andover and Trowbridge ARCs and Steve Hartley, G0FUW, for the Bath amateur radio training classes.

Grand Raffle raises £9600 for RCF charity

The names and callsigns of the winners of the RCF raffle are announced.

The 12 winners of the Radio Communications Foundation Grand Raffle were drawn at the Annual General Meeting of the RSGB, held at the English Heritage Lecture Theatre in London on 4 December 2004. The raffle raised a total of £9600 for the Radio Communications Foundation charity.

Congratulations to all the winners, whose names and callsigns are shown in the table below, and thanks for supporting the RCF.

Once again, the RCF and the RSGB would like to extend sincere thanks to Yaesu (UK), Icom (UK) and Kenwood (UK) for their kind donation of the three star prizes - a Yaesu FT-817, an Icom IC-703 and a Kenwood TM-D700E transceiver - and the 'goody bags'. The other prizes were donated by the RSGB.

Left: A stand displayed the three star prizes at the RSGB AGM.

Right: RSGB President Jeff Smith, MI0AEX, prepares to draws the winning ticket.

Right: "And the winner is…" Peter Kirby, G0TWW, reads out the winning name and callsign.

GB4FUN CONTINUES TO SPREAD THE WORD

It has been a while since we have reported on GB4FUN's on-going mission. We can do no better than to quote from a letter received from Alec Gaffin, G0MWO.

Alec writes: "For some time now I have donated a little extra when renewing my subscription to help fund GB4FUN, but have not been too involved. Earlier last month [November 2004] I was invited to a Primary school in Shenley where GB4FUN was to give a demonstration to the older children, ie 9 to 10 year olds. They were invited into the van in groups of 10 for a short introduction to the world of radio and wireless communications. The starting point was the mobile telephone and so on to satellites. Thanks must also go to those amateurs that helped to provide the QSOs.

"I have not met Carlos [GB4FUN project coordinator Carlos Eavis, G0AKI - Ed] before and I was very impressed by the rapport he immediately had with each group. He is a born teacher and I feel that I must congratulate the RSGB for providing the opportunity of bringing the hobby to these students, they are the future of our hobby.

"Keep up the good work." ♦

WINNERS OF THE RADIO COMMUNICATIONS FOUNDATION GRAND RAFFLE	
D Palmer, G7URP, Gt Ellingham, Norfolk	(Icom IC-703 transceiver)
B E Cox, G0DMH, Loughborough, Leics	(Yaesu FT-817 transceiver)
N Whitside, G4HUN, Cambridge	(Kenwood TM-D700E transceiver)
G M Murray, G8XEC, Thatcham, Berks	(One Hundred Years of Amateur Radio book)
T Law, VA7EZ, Nanaimo, BC, Canada	(One Hundred Years of Amateur Radio book)
B B Nelson, GJ4KBM, St Ouen, Jersey	(RSGB 2005 Yearbook)
J E Lacey, G3GLB, Byfleet, Surry	(RSGB 2005 Yearbook)
P D Gaskell, G4MWO, St Helens, Merseyside	(Backyard Antennas)
A C E Germaney, G0LGT, Chesham, Bucks	(Icom 'goody bag')
C J French, G8ZAJ, Aldershot, Hants	(Icom 'goody bag')
R M Campbell, GM6OQN, Glasgow	(Kenwood 'goody bag')
E G Oliver, M0AEO, Oxford	(Yaesu 'goody bag')

Supporters of the Radio Communications Foundation

We asked members when renewing their membership to include a donation to help to continue 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.

RCF 'Big Hitters'
J M Whitcomb, G7DLY
Prof F Floyd, GW5AF

R M Powell, 2E0VCT
P Fletcher, 2E1ECM
H Buettig, DL1VDL
M R Cremet, F6BGI
J E Sidnell, G0DFF
J Denovan, G0DYN
N Vuong, G0ESV
D G Jones, G0KSG
A M Lifton, G0PEH
J M Brown, G0PIA
J H C Bridge, G0RGC
J H Allcroft, G0TMN
J R Hacker, G1DER
P A Van Falier, G1VAN
T I Lundegard, G3GJW
M C Hately, G3HAT
M P Morrissey, G3HUK
N B Valentine, G3KWJ
K G Sullivan, G3KYF
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Dr J E Larson, G3NBL
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I M Fraser, G3TVT
M S Turner, G3VYN
A L Wragg, G3WEX
Mid-Cheshire ARS, G3ZTT
A Scarsbrook, G4AIW
J F Grieve, G4ARZ
M Bryan, G4DTB
D Warwick, G4EEV
A E Johnson, G4EFH
D G Campbell, G4ELG
G C L Parker, G4EMK
R P Rawle, G4FPJ
M J Linda, G4GTH
D A R Consitt, G4HUT
G F Mayne, G4IPV
K C Mason, G4JIO
G V Jarrett, G4PPV
M W Stoneham, G4RVV
R J Smith, G4TBJ
R Percival, G4VCJ
A J Glynn, G4WZS
I Parker, G4YUZ
J H Rawson, G4ZJY
N B Wiltshire, G6AQW
I N Barraclough, G7DWY
H Arrowsmith, G7KNK
K Peacock, G7TLN
A J Nunn, G8AXO
F E Wyer, G8RY
C I Mobbs, G8UHW
D C W Hewitt, G8ZRE
E H Brooks, GD4HOX
P R Daniells, GJ4CBQ
W G Rattray, GM4NDV
D Sims, GM7UED
P W Eunson, GM8YEC
R E Knott, GW4VZJ
U Bianchi, I1BIN
T Arakawa, JA3AER
G E Ashton, M0AUG
D S Jones, M0BLQ
R A Barden, M0CCE
R I Tingay, M0DLE
D M Hayes, M0GDX
J C Symons, M0GUN
R Meech, M0IJZ
T Higginson, M1GXL
P G Howell, M1PGH
R S J Bayliss, M1RSJ
P A Braidwood, M1TCP
P Harris, M3FPH
L Igali, M3IGA
M P Reilly, M3MPR
P Hanagan, M3PCY
B McSherry, MM0SMB
T Woods, MM3FGC
Dr W D Henderson, RS187631
F H Brindley, RS19063
B Taylor, RS192037
Dr J E Egleton, RS192177
P J Dawson, RS193916
D Boyd, RS193950
G W Hunt, RS32661
B C C Cawrse, RS39832
B A Emson, RS43610
C J Dodd, VK6DV

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

MOONRAKER

Manufacturers of radio communication antennas and associated products

Log Periodic

MLP32 TX & RX 100-1300MHz one feed, S.W.R. 2:1 and below over whole frequency range professional quality (length 1420mm) **£99.95**

MLP62 same spec as MLP32 but with increased freq. range 50-1300 Length 2000mm **£169.95**

Mobile HF Whips (with 3/8 base fitting)

AM-PRO 6 mt *(Length 4.6' approx)* **£16.95**
AM-PRO 10 mt *(Length 7' approx)* **£16.95**
AM-PRO 17 mt *(Length 7' approx)* **£16.95**
AM-PRO 20 mt *(Length 7' approx)* **£16.95**
AM-PRO 40 mt *(Length 7' approx)* **£16.95**
AM-PRO 80 mt *(Length 7' approx)* **£19.95**
AM-PRO 160 mt *(Length 7' approx)* **£49.95**
AM-PRO MB5 Multi band 10/15/20/40/80 can use 4 Bands at one time *(Length 100")* **£69.95**
SPX-100 'plug n go' multiband 6/10/12/15/17/20/30/40/80mtrs. Band changing is easy via a flylead and socket and adjustable telescopic whip section 1.65m when fully extended **£49.95**

Slim Jims

SJ-70 430-430MHz slimline design with SO239 connection. Length 1.00m **£19.95**
SJ-2 144-146MHz slimline design with SO239 connection. Length 2.00m **£24.95**

VHF/UHF Mobile Antennas

MICRO MAG Dual band 2/70 antenna complete with 1" magnetic mount 5mtrs of mini coax terminated in BNC **£14.95**
MR700 2m/70cms, 1/4 wave & 5/8, Gain 2m 0dB/3.0dB 70cms Length 20" 3/8 Fitting **£7.95**
SO239 Fitting **£9.95**
MR 777 2 Metre 70 cms 2.8 & 4.8 dBd Gain (5/8 & 2x5/8 wave) (Length 60") (3/8 fitting) **£16.95**
(SO239 fitting) **£18.95**
MRQ525 2m/70cms, 1/4 wave & 5/8, Gain 2m 0.5dB/3.2dB 70cms Length 17" SO239 fitting commercial quality **£19.95**
MRQ500 2m/70cms, 1/2 wave & 2x5/8, Gain 2m 3.2dB/5.8db 70cms Length 38" SO239 fitting commercial quality **£24.95**
MRQ750 2m/70cms, 6/8 wave & 3x5/8, Gain 2m 5.5dB/8.0dB 70cms Length 60" SO239 fitting commercial quality **£39.95**
MRQ800 6/2/70cms 1/4 6/8 & 3 x 5/8, Gain 6m3.0dBi/2m 5.0dB/70 7.5dB Length 60" SO239 fitting commercial quality **£39.95**
GF151 Professional glass mount dual band antenna. Freq: 2/70 Gain: 2.9/4.3dB. Length: 31" ..... New low price **£29.95**

Single Band Mobile Antennas

MR 214 2 metre straight stainless 1/4 wave 3/8 fitting .. **£4.95**
SO239 type **£5.95**
MR 258 2 Metre 5/8 wave 3.2 dBd Gain (3/8 fitting) (Length 58") **£12.95**
MR 268S 2 Metre 5/8 wave 3.5dBd gain Length 51" S0239 fitting **£19.95**
MR 290 2 Metre (2 x 5/8 Gain: 7.0dBd) (Length: 100"). SO239 fitting, "the best it gets" **£39.95**
MR 625 6 Metre base loaded (1/4 wave) (Length: 50") commercial quality **£19.95**
MR 614 6 Metre loaded 1/4 wave (Length 56") (3/8 fitting) **£13.95**
MR 644 6 Metre loaded 1/4 wave (Length 40") (3/8 fitting) .. **£12.95**
(SO239 fitting) **£15.95**

Single Band End Fed Base Antennas

70 cms 1/2 wave (Length 26") (Gain: 2.5dB) (Radial free) **£24.95**
2 metre 1/2 wave (Length 52") (Gain 2.5dB) (Radial free) **£24.95**
4 metre 1/2 wave (Length 80") (Gain 2.5dB) (Radial free) **£39.95**
6 metre 1/2 wave (Length 120") (Gain 2.5dB) (Radial free) **£44.95**
6 metre 5/8 wave (Length 150") (Gain 4.5dB) (3 x 28" radials) ... **£49.95**

Mini HF Dipoles (Length 11' approx)

MD020 20mt version approx only 11ft **£39.95**
MD040 40mt version approx only 11ft **£44.95**
MDO80 80mt version approx only 11ft **£49.95**
(slimline lightweight aluminium construction)

VHF/UHF Vertical Co-Linear Fibreglass Base Antenna

SQ & BM Range VX 6Co-linear:- Specially Designed Tubular Vertical Coils individually tuned to within 0.05pf (maximum power 100 watts)

BM100 Dual-Bander **£29.95**
(2 mts 3dBd) (70cms 6dBd) (Length 39")
SQBM100 Dual-Bander **£39.95**
(2 mts 3dBd) (70cms 6dBd) (Length 39")
BM200 Dual-Bander **£39.95**
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")
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.

Single Band Vertical Co-Linear Base Antenna

BM33 70 cm 2 X 5/8 wave Length 39" 7.0 dBd Gain ... **£34.95**
BM45 70cm 3 X 5/8 wave Length 62" 8.5 dBd Gain **£49.95**
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**

MFJ Antenna Tuning Unit

MFJ-941E **£129.95**
MFJ-945 ..... **£119.95**
MFJ-948 ..... **£139.95**
MFJ-949E **£159.95**
MFJ-969 ..... **£199.95**
MFJ-971 ..... **£99.95**
MFJ-993 ..... **£249.95**
MFJ-974 ..... **£159.95**
MFJ-974H **£179.95**

Rotative HF Dipoles

RDP-3B 10/15/20mtrs length 7.40m **£119.95**
RDP-4 12/17/30mtrs length 10.50m **£119.95**
RDP-40M 40mtrs length 11.20m **£169.95**
RDP-6B 10/12/15/17/20/30mtrs boom length 1.00m. **£239.95**

HF Delta Loops

DLHF-100 10/15/20mtrs (12/17-30m) Boom length 4.2m. Max height 6.8m. Weight 35kg. Gain 10dB **£449.95**

Hand-Held Antennas

MRW-310 Rubber DuckTX 2 Metre & 70 cms Super Gainer RX 25- 1800 Length 40cm BNC fitting **£14.95**
MRW-232 Mini Miracle TX 2 Metre 70 & 23 cms RX 25-1800 Mhz Length just 4.5cm BNC fitting **£19.95**
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**

HB9CV 2 Element Beam 3.5 dBd

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 (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 (fittings stainless steel)

2 metre 4 Element
(Boom 48") (Gain 7dBd) **£24.95**
2 metre 5 Element
(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**
4 metre 3 Element
(Boom 45") (Gain 8dBd) **£49.95**
4 metre 5 Element
(Boom 128") (Gain 10dBd) **£59.95**
6 metre 3 Element
(Boom 72") (Gain 7.5dBd) **£54.95**
6 metre 5 Element
(Boom 142") (Gain 9.5dBd) **£74.95**
70 cms 13 Element
(Boom 76") (Gain 12.5dBd) **£49.95**

ZL Special Yagi Beams (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

MSS-1 Freq RX 25-2000 Mhz, TX 2 mtr 2.5 dBd Gain, TX 70cms 4.0 dBd Gain, Length 39" **£39.95**
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 (10-40/80m) (Fittings stainless steel)

	HALF	FULL
Standard (enamelled)	£19.95	£22.95
Hard Drawn (pre-stretched)	£24.95	£27.95
Flex Weave (original high quality)	£29.95	£34.95
Flexweave PVC (clear coated PVC)	£34.95	£39.95

Deluxe 450 ohm PVC Special ..... **£44.95** **£49.95**
TS1 Stainless Steel Tension Springs (pair) for G5RV **£19.95**

G5RV Inductors

Convert your half size g5rv into a full size with just 8ft either side. Ideal for the small garden **£19.95**

Reinforced Hardened Fibreglass Masts (GRP)

GRP-150 1.5" OD Length: 2.0m Grade: 3mm **£19.95**
GRP-175 1.75" OD Length: 2.0m Grade: 3mm **£24.95**
GRP-200 2.0" OD Length: 2.0m Grade: 3mm **£29.95**

Guy Rope 30 metres

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**

Don Field, G3XTT

105 Shiplake Bottom, Peppard Common, Henley on Thames RG9 5HJ.

E-mail: iotacontest@rsgbhfcc.org

The 2004 RSGB IOTA Contest

Despite poor propagation in 2004, this contest continues to attract an enormous following, with over 1200 entries, as Don Field reports . . .

PHOTO: CHRIS WHITMARSH, G0FDZ

"Abysmal", "Worst ever". Fortunately, not words describing the contest, which remains as popular as ever with, yet again, well over 1200 entries, but the propagation. It really was dire over the contest weekend. My thanks to RSGB propagation guru, Gwyn Williams, G4FKH, for his explanation of what happened (see box). The effect was to make this the most Euro-centric IOTA contest for some years, with North American, Japanese and Oceania participants feeling somewhat out on a limb. This is a shame, and hopefully conditions will favour them more next year. But there were some interesting repercussions on the results. For example, some European QRP entrants were able to achieve extremely competitive scores. Where their very low power might have disadvantaged them in working strings of Japanese stations, for example, this didn't happen because no European was able to do that. Instead, high scores came from chasing European multipliers on every band / mode combination. Intra-Europe signals were strong, with some Sporadic E about, and the sharp QRP operator could be quite competitive in this situation.

RESULTS

Anyway, to the results. As always, the multi-op sections were the most competitively fought, and several stations changed places during the adjudication process. Once again, Croatia seems to be the ideal spot for IOTA Contest success, and 9A0R ended up taking the honours. UU7J/P have to be content with second place, but win the Expedition trophy. The LZ1KSL team were leading Low Power (and Low Power Expedition) station. The World Multi-op category, introduced fairly recently, is rapidly gaining in popularity. RL3A and HA0KID are the High and Low Power winners respectively.

There are too many Single-Operator categories to go through them all individually. Suffice to say that some great scores were achieved, and no specific area dominates. For example, in the Island High-Power categories, OH9A wins for Mixed mode, G3TXF for CW and 5B/GM4AFF for SSB, Northern, Western and Southern Europe (or Asia) respectively. As ever, the Low Power and 12-hour categories are hugely popular, demonstrating that contests really do need to cater for the more 'casual' participants as well as the 'big guns'. Mind you, the leading entrants in each of these more limited categories achieve some excellent results. The number of QRP entrants is also increasing year on year and, as mentioned earlier, some great results were posted with RA3CO's trophy-winning score of particular note.

The number of SWL entries fell yet again, by almost 50%, due partly to some previous SWL participants now having obtained their transmitting licences. Well done, for example, to Bob Treacher, M3RCV, winner of the Island QRP SSB category, but previously a regular SWL participant. Reluctantly, the HF Contests Committee has come to the conclusion that the amount of effort involved in maintaining an SWL section (given that the logs cannot be standardised for automatic checking in the way that transmitting logs can) is out of proportion to the number of participants, and there will be *no* SWL section from 2005.

Soapbox comments and a comprehensive set of photographs, as well as the full list of Expedition participants, all appear on the website.

LOGGING AND ADJUDICATION

A very high proportion of entrants now send in Cabrillo logs, a level of standardisation which makes life much easier for the adjudication team. Our thanks to those log program authors who have added Cabrillo support for this contest. However, although the QSO format is usually correct, the header information doesn't always correspond to the IOTA contest categories (which are different from many other contests), so this year we introduced a two-stage submission process whereby, after e-mailing their log, entrants were directed to a web page where they could complete a form with all the necessary information.

We appreciate that this may have seemed like overkill for those whose logs contained all required information, but it did save a huge amount of correspondence with those who may have omitted vital information (operating time, power, etc), which has been the case in the past. The good news is that, even if you have to go through the loop a couple of times (for example, if the contest robot initially rejects your log for some reason), the overall submission process should take dramatically less time than in the 'bad old days' when you would have had to copy out and score your log by hand, and write out a dupe sheet. And the adjudicators are spared the challenge of trying to decipher poor handwriting or badly photocopied log sheets.

One specific plea - do open your contest log file up in a text editor first, before submitting it, and take a quick look. You'd be surprised what gets sent to us - empty logs, logs for a different contest entirely, etc. A quick visual check before clicking the 'Send' button would prevent this.

My thanks go especially to Marios, 5B4WN / G0WWW, who masterminded a completely new set of web-based sub-

HF propagation conditions during the IOTA contest weekend, 24/25 July 2004

Anyone can come up with suitable adjectives to describe the general propagation conditions during this weekend, so we'll discuss the cause and effect situation. On 24 July the geomagnetic field was at 'unsettled' to 'minor storm' levels. A minor shock was observed at the ACE spacecraft at approximately 0600UTC and minor storming occurred shortly afterwards. The quoted Ap index was 47 and the K-index ranged between 3 and 5. The Rutherford Appleton Laboratory (RAL) recorded an MUF (Maximum Usable Frequency) of 7.81MHz at 0250 and an MUF of 24.48MHz at 1400. The previous day was 'disturbed', which exacerbated conditions on the 24th. On the 25th the geomagnetic field was at 'active' to 'severe storm' levels. The previously mentioned shock was followed by a prolonged period of southward IMF Bz that lasted through midday on 25 July. The solar wind speed was elevated in the 550 - 700km/s range. It is likely this activity was associated with a complex series of Coronal Mass Ejections observed on 22 / 23 July. The Ap index was 122 and the K-index ranged between 6 and 8. No record is to hand but auroral activity should have been observed. RAL recorded a MUF of 5.17MHz at 0320 and an MUF of 19.69MHz at 1700, but by 1820 the MUF was below 14MHz (the MUFs quoted would be valid for the same latitude paths, those paths to the south would experience higher MUFs and those to the north and especially those via the auroral oval much lower). On the 25th the geomagnetic storm conditions were prevalent throughout all latitudes.

Gwyn Williams, G4FKH

Opposite page: "Just don't drop it!" G0VJG's car is loaded on the Scillonian for the journey to the Isles of Scilly (EU-011). The M8C team's gear completely filled the car, even with the back seats removed.

Left: Stewart, 5B/GM4AFF (AS-004), asleep at the keyboard. He couldn't have slept for long because he went on to win the high-power 24hr SSB section.

Above right: It's not always plain sailing. Operators of BW9W on AS-155 examine the damage after one of their towers fell down.

mission and adjudication tools (initially converting logs to XML format, then importing them to a *MySQL* database for checking and scoring). These tools should allow the adjudication process to be shared more effectively across a team of log checkers in future.

We had enough logs (including checklogs) to be able to cross-check some 57% of total QSOs, which is an encouragingly high proportion. Entrants should be aware that all QSO data is now checked. The good news is that, despite a fairly complex exchange (RS(T), serial number and, where applicable, IOTA reference), logging accuracy is generally of a remarkably high standard. As always, it seems to be the multi-operator entrants who lose the greatest number of points, often due to mislogging mode or band for their multiplier station. This is easily done, so care needs to be taken to get it right. Some calls get mislogged more often than others. Probably the most frequently broken call this year was UR5WCQ, logged as UR5W for understandable reasons! Other misloggings often appeared to be the result of a bad *Cluster* spot - multi-ops and Assisted entrants should be sure they have the correct call logged, rather than simply believing the *Cluster*!

Unfortunately, some log irregularities do occur. The most common appear to be working SSB multipliers in the CW band segments (and vice versa), claiming Unassisted where the evidence strongly suggests that *Cluster* assistance was used, and misunderstanding the time-off rules for 12-hour entrants (several entrants who exceeded their claimed 12 hours were reclassified or had their score significantly reduced). The Committee has, to date, tended to penalise only the contacts concerned, or to reclassify entrants, but is prepared to take a stronger line in future years if such irregularities continue. Please also ensure that you understand the rules of the IOTA awards programme itself. The IOTA contest is very much based around that programme and uses the standard island references. This year RZ0IWZ/P operated from an island that isn't listed in the *IOTA Directory* and, strictly, should be classified as a World, rather than Island station. It is unlikely that contacts with that station will be valid for IOTA awards. Please check beforehand, especially if you are mounting an expedition, and do please ensure that you specify the island name with your contest entry.

There was one disqualification this year, MJ0DLQ/P.

RULES

The rules remain essentially as 2004, except that, as mentioned above, the SWL section will be dropped for 2005. Multi-ops will also have to operate all their stations within a 500m diameter circle or within the licensee's property limits, whichever is the greater, similar to the CQWW contests, to avoid the possibility of multiple, networked locations. Do check the rules nearer the time, to ensure that you have the very latest version. This will always be found on the RSGB HFCC website. And do please note the correct address for logs, which continue to be sent to a wide variety of e-mail and physical addresses. E-mail logs to iota.logs@rsgbhfcc.org and paper logs to IOTA Contest, PO Box 9, Potters Bar, Herts EN6 3RH, England.

THANKS

My thanks to all who took part, and to those who helped behind the scenes to ensure that the results were out so quickly. Also to those who translated various material for the benefit of overseas entrants, and to the various logging software authors who responded to our requests regarding log formats. These include (apologies to any I have omitted): 9A3A, DL7AKC, EI5DI, G0WWW / 5B4WN, G3SJJ, G3VAO, G3YMC, GM4FDM, GM4UYZ, K1EA, M0BLF, MM0BQI, UA3AGW and WA7BNM.

Thanks also to those who provided checklogs. These are invaluable, though we would be even happier to include them in the listings; there is no need for you to score them as all logs can be scored by our software. ♦

WEB SEARCH

RSGB HFCC:	www.rsgbhfcc.org
IOTA Awards Programme:	www.rsgbiota.org

RSGB IOTA CONTEST TROPHY WINNERS 2004

Compiled by John Dunnington, G3LZQ

MULTI-OPERATOR

ISLAND High Power

Geoff Watts Memorial Trophy CDXC	9A0R (EU-136)
IOTA Committee Trophy (Expedition)	UU7J/P (EU-180)
UK High Score Plaque (Non-expedition)	MD4K (EU-116)
UK High Score Plaque (Expedition)	M8C (EU-011)
USA High Score Plaque (Expedition)	N1DX (NA-137)

ISLAND Low Power

Roger Balister G3KMA Trophy	LZ1KSL (EU-181)
UK High Score Plaque (Expedition)	MM0Q (EU-092)
NA High Score Plaque (Expedition)	HI3/ON4QX (NA-096)

WORLD (Non-Island) High Power

High Score Plaque CDXC	RL3A

WORLD (Non-Island) Low Power

High Score Plaque CDXC	HA0KID

SINGLE OPERATOR

ISLAND

Summer Is Trophy (www.summer-isles.com)	
Island SO Expedition High Score	OH9A (EU-173)
W9DWQ Trophy NA SO (Expedition)	V31MX (NA-073)

High Power Sections

12hr Mixed High Score	9A4W (EU-016)
12hr SSB High Score	V01TA (NA-027)
12hr CW High Score	9A6NL (EU-170)
24hr Mixed High Score	OH9A (EU-173)
24hr SSB High Score	5B/GM4AFF (AS-004)
24hr CW High Score	G3TXF (EU-005)

Perhaps YM0T (AS-159) knew he would have Victory in the low-power 24hr SSB section?

Low Power Sections

12hr Mixed High Score	JA6LCJJ/6 (AS-012)
12hr SSB High Score	SV9/G4DHF (EU-015)
12hr CW High Score	DJ0IF/P (EU-047)
24hr Mixed High Score	OZ/DL2JRM/P (EU-030)
24hr SSB High Score	YM0T (AS-159)
24hr CW High Score	SP4JWR/P (EU-132)
QRP Plaque	M3RCV (EU-005)

UK RSGB Trophies

12hr CW High Score
M0SDX (EU-005) Cyril Leyden Memorial (Otley ARC)
12hr SSB High Score
G0TSM (EU-005) Dave King G3PFS Trophy
24hr CW High Score
G3TXF (EU-005) Ross Carey G3DYY Trophy

WORLD (Non-Island)

High Power

12hr High Score	OM4JD
24hr High Score	DL5AWI

Low Power

12hr High Score	HA1CW
24hr High Score	YZ1SG
QRP Plaque	RA3CO

World (Non-Island) Assisted

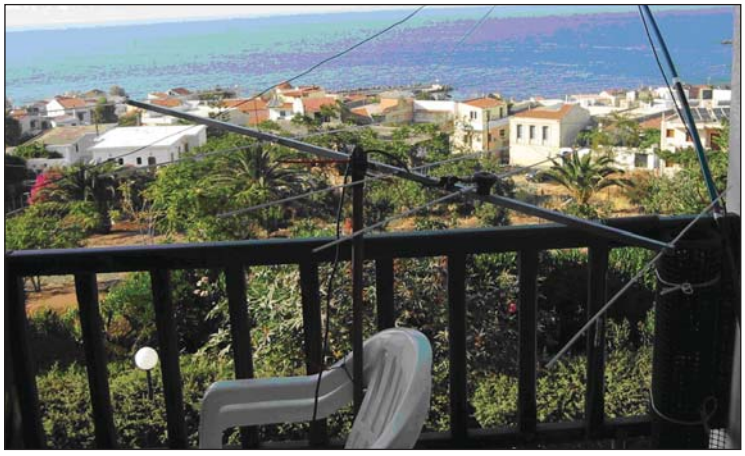
High Power High Score	W1NG
Low Power High Score	HA1DAE

ISLAND - MULTI-OPERATOR

Pos	Callsign	QSOs	Mults	Score	Power	IOTA Ref	Island Name
1	9A0R	2527	518	9564870	HP	EU136	Krk
2	UU7J/P	3084	471	9071460	HP	EU180	Tuzla I
3	9A0CI	2319	452	7668180	HP	EU110	Sveti Nikola
4	EJ2MT	2508	416	7378176	HP	EU121	Bere I
5	MD4K	2793	401	6670635	HP	EU116	Isle of Man
6	GU8D	2529	368	5702160	HP	EU114	Guernsey
7	M8C	2327	350	5673150	HP	EU011	Scilly Isles
8	OH0Z	2613	322	5051214	HP	EU002	Åland Is
9	G5XV	1913	340	4321740	HP	EU120	Isle of Wight
10	G5W	1938	373	4169394	HP	EU005	UK Mainland
11	LZ1KSL	1949	312	3748680	LP	EU181	Sveta Anastasia
12	CT9M	2288	263	3733548	HP	AF014	Madeira
13	9A7T/P	1550	330	3573900	LP	EU016	Korcula
14	GM2T	1631	269	3491889	HP	EU008	Tiree
15	CS7T	1727	283	3395151	LP	EU040	Berlenga
16	SM3S/P	2257	262	3386874	HP	EU176	Grimskär
17	9A1TA	1661	275	3215025	LP	EU136	Cres
18	IH9/IQ2CJ	2336	233	2983332	HP	AF018	Pantelleria
19	SK6M	1702	267	2744226	HP	EU043	Tjorn I
20	5B4PRC	2114	221	2738190	HP	AS004	Cyprus
21	UW0G	1647	258	2519370	LP	EU179	Kalanchakskiy Is
22	CT9X	1574	238	2300508	HP	AF014	Porto Santo
23	IC8OZM	1694	212	2033928	HP	EU031	Procida I
24	G6PZ	1520	252	2032128	HP	EU005	UK Mainland
25	M2C	1263	261	1941057	HP	EU005	UK Mainland
26	9A2004YC	1081	237	1911879	LP	EU110	Sveti Andrija
27	M4A	1588	236	1886112	HP	EU005	UK Mainland
28	9A1CFN	1448	207	1843128	HP	EU016	Brac
29	PB2T/P	1489	196	1766940	HP	EU146	Goeree Overflakkee
30	G8A	1383	227	1622823	HP	EU005	UK Mainland
31	TM4Z	1216	179	1522932	HP	EU065	Ouessant
32	DL0KWH/P	1089	191	1460577	HP	EU129	Usedom
33	IK7QMJ/P	1350	175	1412250	LP	EU091	Grande
34	GW8K	1088	183	1361520	HP	EU124	Flat Holm
35	EJ5E	1110	180	1325160	HP	EU006	Inisheer
36	IQ3GO/P	1268	178	1283736	HP	EU130	Isola del Campo
37	RZ3DYG/1	1219	179	1262487	HP	EU133	Mshnyy
38	PA6Z	1143	157	1048917	HP	EU146	Goeree Overflakkee
39	DF0TX/P	810	181	989346	LP	EU057	Rügen
40	EJ4F	952	170	973080	LP	EU103	Little Saltee
41	OH2ABB	1176	141	905220	LP	EU097	?
42	M5BFL/P	1093	154	820974	HP	EU005	UK Mainland
43	DL3KZA	663	169	802581	HP	EU057	Rügen
44	EI2JD	988	145	791700	HP	EU115	Ireland
45	ZL6QH	949	134	780282	HP	OC036	North Island
46	G6M	1372	127	743712	HP	EU005	UK Mainland
47	ES2U	1067	130	737490	LP	EU149	Rammu
48	MM0Q	585	145	691215	LP	EU092	Tanera Mor
49	DL0HGW/P	765	134	624306	LP	EU057	Vilm I
50	OD5RMK	1535	93	604593	LP	AS108	Ramkin I
51	DJ7YT/P	700	135	584820	LP	EU128	Fehmarn
52	M0B	921	124	556884	HP	EU005	UK Mainland
53	FK/KM9D	656	87	508428	LP	OC032	New Caledonia
54	F6KHI/P	735	112	475440	LP	EU048	Ile aux Chevaux
55	GN0ADX/P	687	108	467532	LP	EU122	Rathlin I
56	N1DX	754	118	462324	HP	NA137	Bailey I
57	G4FOX/P	525	118	410994	HP	EU005	UK Mainland
58	RK3AWK/1	1052	81	397548	HP	EU133	Big Birch
59	PA0ABM/P	861	91	378105	HP	EU146	Schouwen Duiveland
60	RI0MC	481	84	357084	HP	AS066	Chihachev I
61	SN1A	579	99	331155	HP	EU132	Wolin
62	G8SRC/P	458	111	328338	HP	EU005	UK Mainland
63	SK7MQ	491	85	300645	LP	EU138	Tjurkö
64	SK7DX	434	107	295962	HP	EU138	Hanö
65	PA/OM1KW	536	86	264192	LP	EU038	Texel
66	BW9W	591	60	263340	HP	AS155	Peng Chia Yu
67	M0W	777	75	262125	HP	EU005	UK Mainland
68	YE1P	463	74	245754	HP	OC237	Peucang I
69	F6KOP/P	390	91	239694	LP	EU064	Nourmoutier I
70	RI1NU	619	73	226665	LP	EU147	Zelenaya Iudy
71	M5S	435	89	218673	HP	EU005	UK Mainland
72	RK0FWL/P	295	61	204777	LP	AS149	Moneron Is
73	IC8M	593	57	168435	LP	EU031	Licosa I
74	RZ0IWZ/P	225	56	164808	LP	AS059	Nedorazumenya Is
75	HI3/ON4QX	748	51	161568	LP	NA096	Hispaniola
76	M3S	375	76	159372	LP	EU005	UK Mainland
77	J49LH	310	78	154908	LP	EU015	Crete
78	ZX7XX	911	37	150849	HP	SA046	Itamarac I
79	K4QCD/P	467	38	85158	LP	NA058	St Simons
80	GM3HAM/P	229	53	72663	HP	EU005	UK Mainland
81	G0TLA	173	53	65031	LP	EU005	UK Mainland
82	AT0BI	360	36	63504	LP	AS169	Elephanta I
83	OZ8MW/P	207	42	53802	LP	EU088	Anholt
84	TF7/LX9EG/M	283	32	50208	LP	EU071	Heimaey
85	RI0BDI	194	36	47736	LP	AS005	Dickson I
86	KU8E/P	222	29	31494	LP	NA085	St George I

ISLAND - SINGLE-OPERATOR - MIXED MODE

Pos	Callsign	QSOs	Mults	Score	Power	Hrs	IOTA Ref	Island Name
1	OH9A	1943	239	2683731	HP	24H	EU173	Sandström Reef
2	9A6A	1378	181	1432434	HP	24H	EU016	Hvar
3	9A4W	506	211	1196370	HP	12H	EU016	Brac
4	TK5EP	987	135	955395	HP	24H	EU014	Corsica
5	AA4V/P	991	121	653037	HP	12H	NA110	Isle of Palms
6	OZ/DL2JRM/P	886	112	562464	LP	24H	EU030	Bornholm
7	EI4BZ	686	118	441084	HP	12H	EU115	Ireland
8	DK8OL	591	101	417837	HP	12H	EU042	Sylt
9	DL5XAT/P	591	105	380205	LP	24H	EU128	Fehmarn
10	IM0A	769	78	326898	LP	24H	EU165	?
11	JA6LCJ/6	467	83	270663	LP	12H	AS012	Kami
12	ZL1TM	492	73	261924	LP	12H	OC036	North Island
13	G4FAL	310	103	237930	HP	12H	EU005	UK Mainland
14	KG6DX	238	80	199200	HP	12H	OC026	Guam
15	9V1GO	231	84	193284	LP	12H	AS019	Singapore
16	GJ4DBL/P	468	76	190608	LP	12H	EU013	Jersey
17	JA1BPA	292	89	177288	LP	12H	AS007	Honshu
18	G0PSE	217	95	175845	LP	12H	EU005	UK Mainland
19	W2WB	448	68	159936	HP	24H	NA111	Long Beach I
20	G3RSD	314	78	158652	LP	24H	EU005	UK Mainland
21	CU3AA	388	66	144144	HP	12H	EU175	Terceira
22	IT9VDQ	594	51	139842	LP	24H	EU025	Sicily
23	RA0FF	184	67	134268	LP	12H	AS018	Sakhalin
24	K1VSJ	298	69	127926	LP	24H	NA046	Martha's Vineyard
25	VR2JN/P	222	45	127170	HP	12H	AS006	Hong Kong I
26	9A2V/P	424	56	123648	LP	12H	EU170	Vrgada I
27	E21EIC/P	306	57	115938	LP	12H	AS107	Si Chang I
28	LA4WKA	481	42	112014	LP	24H	EU055	Sotra I
29	SM0ELV/5	316	37	86136	LP	24H	EU177	Lilla Olsön
30	N6NF	439	41	80565	LP	12H	NA092	Padre I
31	9A4RV	135	60	79020	LP	24H	EU016	Korcula
32	NC2N	249	52	77532	LP	12H	NA111	Long Beach I
33	JA7IC	166	61	72102	HP	12H	AS007	Honshu
34	GM5C	149	49	69531	LP	12H	EU123	Great Cumbrae
35	G4FVK	151	53	64077	HP	12H	EU005	UK Mainland
36	CO8ZZ	288	43	62436	HP	12H	NA015	Cuba
37	G3JJZ	115	58	61074	QRP	12H	EU005	UK Mainland
38	MM3AWD	170	50	56700	QRP	24H	EU005	UK Mainland
39	9A/OK1FBH/P	290	36	56376	HP	24H	EU136	Cres
40	N2US/P	226	39	49842	LP	12H	NA139	Assateague I
41	SX8J	373	25	39675	LP	12H	EU075	Aegina
42	VO1AU	154	37	37074	HP	12H	NA027	Newfoundland
43	TF4MM	270	24	28944	HP	12H	EU021	Iceland
44	K2KQ	106	29	21750	LP	12H	NA046	Martha's Vineyard
45	7S5A	199	22	21318	LP	12H	EU177	Stora Åla
46	VE2AWR/M	129	27	21141	LP	12H	NA128	Ile d'Orleans
47	G0MRH	90	30	18900	LP	12H	EU005	UK Mainland
48	NP3CW	133	25	17475	LP	12H	NA099	Puerto Rico
49	JE1REU	47	33	17325	HP	12H	AS007	Honshu
50	JG1OWV	33	31	14973	LP	12H	AS007	Honshu
51	JG1VGX	70	27	14418	LP	12H	AS007	Honshu
52	JK2VOC	40	28	13104	LP	12H	AS007	Honshu
53	CU3EJ	27	20	6420	HP	12H	EU175	Honshu
54	JA1XPU	27	19	5415	LP	24H	AS007	Honshu
55	G4XPE	19	17	4437	LP	12H	EU005	UK Mainland
56	M0BGR	35	14	3654	HP	12H	EU005	UK Mainland
57	SM1T	13	13	2535	HP	12H	EU020	Gotland
58	JN6RZM	9	8	984	LP	24H	AS077	Kyushu
59	JD1BIA	14	4	792	LP	24H	AS031	Ogasawara
60	JA1XUY	11	6	630	LP	12H	AS007	Honshu
61	N7XY	11	4	324	LP	12H	NA065	Bainbridge I
62	7K2PBB	7	4	276	LP	12H	AS007	Honshu



Simple antennas, coupled with good operating and a great location, can make an award-winning score: David, SV9/G4DHF (EU-015), was winner of the low-power 12hr SSB section.

ISLAND - SINGLE-OPERATOR - CW

Pos	Callsign	QSOs	Mults	Score	Power	Hrs	IOTA Ref	Island Name
1	G3TXF	1382	196	1358280	HP	24H	EU005	UK Mainland
2	SP4JWR/1	827	176	1030128	LP	24H	EU132	Wolin
3	SV8/OL8R	1560	122	916464	LP	24H	EU067	Santorini
4	M0SDX	819	160	757920	HP	12H	EU005	UK Mainland
5	OY1CT	1086	120	753840	HP	24H	EU018	Faroe Is
6	9A6NL	824	137	718428	HP	12H	EU170	Pasman I
7	OZ4O	808	140	665280	HP	24H	EU029	Sjaelland
8	5B4AHA	984	103	567324	HP	12H	AS004	Cyprus
9	M7M	820	126	530712	HP	12H	EU005	UK Mainland
10	G4BVJ/P	609	107	366261	LP	24H	EU120	Isle of Wight
11	ES0MC	690	93	354330	LP	24H	EU034	Saaremaa
12	N2GC	561	100	332700	HP	24H	NA026	Long Island
13	SV8/OK2WH	1063	70	325710	LP	24H	EU174	Thassos
14	G3KZR	411	116	322596	HP	12H	EU005	UK Mainland
15	DJ0IF/P	417	110	322410	LP	12H	EU047	Juist
16	DL5KUD	298	105	282870	LP	12H	EU057	Rügen
17	OZ8SW	444	95	282720	HP	24H	EU029	Sjaelland
18	ZL/G3SQX	494	62	253332	HP	12H	OC201	Waiheke
19	9A/HA8KW/P	384	96	247680	LP	12H	EU136	Rab
20	OZ8AE	307	99	238491	LP	12H	EU029	Sjaelland
21	9A/HA6PS	541	75	218025	LP	12H	EU170	Pasman I
22	VY2/W1MO	705	61	216123	HP	24H	NA029	Prince Edward I
23	DL5AUA/P	463	74	209346	LP	12H	EU127	Neuwerk I
24	DJ5DT/P	238	91	193830	LP	12H	EU042	Sylt
25	UA0FAI	307	65	193245	LP	24H	AS018	Sakhalin
26	IT9ORA	441	72	192888	LP	12H	EU025	Sicily
27	DL4FCH/P	461	68	181356	LP	12H	EU042	Pellworm
28	SV9/OK2ZU/P	608	56	167328	LP	12H	EU015	Crete
29	9H1ZA	512	61	158112	HP	12H	EU023	Malta
30	G3LHJ	374	74	155844	LP	12H	EU005	UK Mainland
31	SP3BJK/1	344	70	150360	LP	12H	EU132	Wolin
32	M3C	484	60	138240	HP	12H	EU005	UK Mainland
33	OZ4FF	362	60	137160	LP	12H	EU030	Bornholm
34	GM4SID	409	66	134838	HP	12H	EU005	UK Mainland
35	VK4TT	300	51	113832	LP	12H	OC001	Australia
36	GM3CFS	232	70	110880	LP	24H	EU005	UK Mainland
37	G0UKX	200	64	96768	LP	12H	EU005	UK Mainland
38	G3YMC	215	65	94185	QRP	12H	EU005	UK Mainland
39	G4HZV	182	64	91008	HP	24H	EU005	UK Mainland
40	JH6WHN	251	53	89517	LP	12H	AS077	Kyuahiu Is
41	EI4CF	165	65	88335	LP	12H	EU115	Ireland
42	RK6CZ	514	35	87570	LP	24H	EU185	Dzendzik I
43	IT9RZU	384	45	83160	LP	24H	EU025	Sicily
44	PI4HQ	474	42	82404	HP	12H	EU146	Schouwen Duiveland
45	JA2KVB	136	61	77592	LP	24H	AS007	Honshu
46	G4DDL	173	61	77043	LP	12H	EU005	UK Mainland
47	SV3SJ/P	599	30	73710	LP	24H	EU158	Proti
48	SM3/DL5AXX	228	47	71064	LP	12H	EU087	Harnön
49	JA1BNW	155	56	67704	HP	12H	AS007	Honshu
50	JA8AJE	144	46	61272	LP	24H	AS078	Hokkaido
51	JH3AIU	79	59	58587	HP	12H	AS007	Honshu
52	G3GLL	187	46	52854	HP	12H	EU005	UK Mainland
53	IS0SDX	267	35	52815	LP	12H	EU024	Sardinia
54	YB0ECT	180	29	43500	LP	24H	OC021	Java
55	GM2Z	306	28	43176	LP	12H	EU123	Isle of Bute
56	J45C	444	24	40896	LP	12H	EU001	Kos
57	G3VQO	127	40	34920	LP	12H	EU005	UK Mainland
58	JA5APU	162	30	31140	HP	12H	AS076	Shikoku
59	G3GMS	80	36	24192	LP	12H	EU005	UK Mainland
60	G3ZRJ	154	28	21672	LP	12H	EU005	UK Mainland
61	W2JU	182	23	19182	LP	12H	NA046	Marthas Vineyard
62	YB0WWW	117	23	17457	LP	12H	OC021	Java
63	UA6CW	174	17	17034	LP	12H	EU185	Dzendzik I
64	G3YEC	95	25	14325	LP	12H	EU005	UK Mainland
65	GW3SB	65	28	14196	LP	12H	EU005	UK Mainland
66	JA2KKA	54	27	13770	LP	12H	AS007	Honshu
67	G2AFV	75	25	13125	LP	12H	EU005	UK Mainland
68	OZ5RM	126	19	12426	LP	12H	EU029	Sjaelland
69	HS0EHF/P	54	20	11640	LP	12H	AS107	Si Chang
70	VA7LC	190	15	11250	LP	12H	NA036	Vancouver I
71	JN1MSO/1	98	21	10710	LP	12H	AS007	Honshu
72	JE1COB	39	23	10419	LP	24H	AS007	Honshu
73	DS5DNO/P	116	12	10080	LP	12H	AS081	Namhae
74	G4DBW	57	22	9834	QRP	12H	EU005	UK Mainland
75	DL5CX/P	134	15	9810	LP	24H	EU129	Goermitz
76	9A/HA7JJS	86	21	9702	QRP	12H	EU170	Pasman I
77	SV5/SP6RLK	162	13	8658	LP	12H	EU001	Dodecanese
78	K8CQ	47	18	6642	LP	24H	NA058	Saint Simons I
79	ZL3TE	49	9	5211	LP	12H	OC036	North Island
80	JA2KPV	25	15	3825	LP	12H	AS007	Honshu
81	IS0UWX	41	11	3333	HP	12H	EU024	Sardinia
82	JS6OFT	20	13	3276	LP	24H	AS017	Okinawa
83	TK/IK1RAC	26	9	2214	QRP	12H	EU014	Corsica
84	VK2WL	11	11	1815	LP	12H	OC001	Australia
85	G4ZME	20	9	1404	QRP	12H	EU005	UK Mainland
86	YB2DGR	18	6	900	LP	12H	OC021	Java
87	ZL3TE/P	10	6	756	LP	12H	OC201	Waiheke I
88	VY2/W1OH	10	5	510	LP	24H	NA029	Prince Edward I
89	JA1AAT	6	4	264	LP	12H	AS007	Honshu
90	4S7NI	11	3	207	LP	24H	AS003	Sri Lanka
91	OZ0J	4	3	108	LP	12H	EU029	Sjaelland
92	VE2OWL	8	2	96	LP	12H	NA128	Isle-aux-Coudres

ISLAND - SINGLE-OPERATOR - SSB

Pos	Callsign	QSOs	Mults	Score	Power	Hrs	IOTA Ref	Island Name
1	5B/GM4AFF	1876	215	2613540	HP	24H	AS004	Cyprus
2	EI8IR	2091	217	2546061	HP	24H	EU115	Ireland
3	OH0R	1887	200	2260200	HP	24H	EU002	Åland Is
4	YM0T	1397	129	933831	LP	24H	AS159	Kefken I
5	SV9/G4DHF	878	104	575952	LP	12H	EU015	Crete
6	IM0/IZ0EJQ	987	80	397200	LP	24H	EU165	San Pietro
7	SV8CYV	562	109	372126	LP	24H	EU049	Samos
8	MM0CWJ	387	105	344925	HP	24H	EU010	South Uist
9	IT9VCE	675	82	300858	LP	12H	EU025	Sicily
10	EI7IQ	444	92	276000	LP	24H	EU115	Ireland
11	GM0FGI	352	93	262260	LP	24H	EU123	Bute
12	SK0HS/5	391	84	255780	LP	24H	EU084	Vassarö
13	M0PDC	289	94	207834	LP	24H	EU005	UK Mainland
14	SV1BRL/8	617	63	191457	LP	12H	EU052	?
15	IF9ZWA	591	64	191040	LP	24H	EU054	Marettimo I
16	9H4JB	529	64	186048	LP	12H	EU023	Gozo
17	G0TSM	244	90	182520	LP	12H	EU005	UK Mainland
18	F/PC2T	256	81	165240	LP	12H	EU032	Ile d'Oléron
19	IS0LLJ	340	64	152832	LP	24H	EU024	Sardinia
20	CU2YK	433	62	152706	LP	12H	EU003	Sao Miguel
21	IT9ESW	486	51	140454	HP	24H	EU025	Sicily
22	IC8WIC	882	39	131274	LP	12H	EU031	Capri
23	TM8N	262	66	123948	LP	24H	EU064	Noirmoutier I
24	DU9RG	438	55	119790	HP	24H	OC130	Mindanao
25	SV8DTP	267	63	117747	LP	12H	EU049	Lesvos
26	OZ1ACB	166	70	114660	LP	12H	EU029	Sjaelland
27	M3RCV	173	69	110331	QRP	24H	EU005	UK Mainland
28	5B4AFB	138	73	109062	LP	12H	AS004	Cyprus
29	MM0LSB/P	167	61	107421	LP	12H	EU010	Great Bernera
30	G0THF	107	74	100122	HP	24H	EU005	UK Mainland
31	GI0KVQ	265	60	99540	LP	12H	EU115	Ireland
32	DF6QC	192	61	92964	LP	12H	EU127	Helgoland
33	EA6XD	386	35	82950	LP	12H	EU004	Mallorca
34	GM7TUD	77	66	73854	LP	12H	EU005	UK Mainland
35	V31MX	523	33	68805	LP	12H	NA073	Caye Caulker
36	MU3GSY	120	51	67320	LP	24H	EU114	Guernsey
37	9V1UV	268	40	67200	LP	12H	AS019	Singapore
38	DF1LON/P	205	46	65274	LP	12H	EU057	Rügen
39	IH9YMC	413	32	63840	LP	12H	AF018	Pantelleria
40	M5KJM	146	55	63690	LP	24H	EU005	UK Mainland
41	VO1TA	269	32	62688	HP	12H	NA027	Newfoundland
42	G3TTC	137	54	62370	LP	12H	EU005	UK Mainland
43	OH1TD	293	38	62130	LP	12H	EU096	Korpo Jst
44	VE1JS	276	39	60372	LP	12H	NA127	Brier I
45	RV6ASX/P	407	31	60171	LP	12H	EU185	Dzendzik
46	G0VAX	114	54	56700	LP	24H	EU005	UK Mainland
47	G4WGE/P	142	50	56100	LP	24H	EU005	UK Mainland
48	M0CNP	110	47	45966	LP	12H	EU005	UK Mainland
49	G0WBR	108	46	43608	LP	12H	EU005	UK Mainland
50	N5LYG	268	33	43560	HP	24H	NA143	Galveston I
51	P3B	89	46	42642	LP	24H	AS004	Cyprus
52	MM0GOR	64	49	40572	LP	12H	EU005	UK Mainland
53	OZ7VEA	158	34	36516	LP	12H	EU172	Langeland I
54	M0BAO/P	85	42	35910	LP	12H	EU005	UK Mainland
55	9A1CPB	199	25	32025	LP	12H	EU016	Brac
56	GI4AAM	99	36	31428	LP	12H	EU115	Ireland
57	YC2ECG	170	23	29946	LP	24H	OC021	Java
58	OZ4PAX	120	35	28980	LP	24H	EU171	Vendsyssel
59	EI7CC	100	32	24192	LP	12H	EU115	Ireland
60	GW6HOU/P	60	36	23328	LP	12H	EU005	UK Mainland
61	G0GFQ	82	32	23232	HP	24H	EU005	UK Mainland
62	K2SGH	63	33	22473	LP	24H	NA026	Long Island
63	5R8FU	175	24	21816	HP	12H	AF013	Madagascar
64	IT9DTU	79	30	20790	LP	12H	EU025	Sicily
65	N2MUN	192	23	20700	LP	12H	NA026	Long Island
66	EA6TU	140	25	20100	LP	12H	EU004	Mallorca
67	G3VYE	67	33	19701	LP	12H	EU005	UK Mainland
68	DU7/G4DUM	126	25	19650	LP	12H	OC129	Cebu
69	LU8XW	217	17	16167	HP	12H	SA008	Tierra del Fuego
70	9V1RH	40	28	14448	HP	12H	AS019	Singapore
71	M0WTD	42	30	14220	LP	12H	EU005	UK Mainland
72	IT9/ON4CEZ	132	19	13680	LP	12H	EU025	Sicily
73	SM1CXE	36	27	13284	LP	12H	EU020	Gotland
74	JA3AOP	55	26	12402	LP	12H	AS007	Honshu
75	VK2GWK	81	22	12210	HP	12H	OC001	Australia
76	EA6AFE	127	19	11799	HP	12H	EU004	Mallorca
77	SP3FUK/M	52	22	11616	LP	12H	EU132	Wolin
78	GI4TSK	49	22	10362	LP	24H	EU115	Ireland
79	IT9SGC/P	136	15	9360	LP	12H	EU166	Porri
80	F8CFE/P	85	18	8694	LP	12H	EU156	Tombelaine
81	G4FFN	44	20	8400	HP	24H	EU005	UK Mainland
82	G8GHD	54	19	8322	LP	12H	EU005	UK Mainland
83	WA4JA/P	161	12	7956	LP	12H	NA142	Okaloosa
84	CU3AD	25	21	7371	HP	12H	EU175	Terceira
85	DC1HPS/P	41	18	6750	LP	12H	EU042	Pellworm
86	KP4JRS	135	10	5490	HP	12H	NA099	Puerto Rico
87	N1XC	125	8	4152	LP	12H	NA141	Hutchinson I
88	7N2UQC	27	15	3735	LP	12H	AS007	Honshu
89	JH4FKX	20	14	3696	LP	12H	AS041	Oki I
90	G4JVG	16	16	3648	LP	12H	EU005	UK Mainland
91	G8YTC	28	13	3120	LP	12H	EU005	UK Mainland
92	YC3MM/M	59	10	2970	LP	12H	OC237	Madura
93	5B/I2JJR	25	10	2070	QRP	24H	AS004	Cyprus
94	G6CSY	15	8	1224	LP	12H	EU005	UK Mainland
95	MM3JHS	32	7	1092	QRP	12H	EU005	UK Mainland
96	JA3AER	20	7	1092	HP	12H	AS007	Honshu
97	JH3DMQ	20	5	540	QRP	12H	AS007	Honshu
98	WP3GW	15	5	525	LP	12H	NA099	Puerto Rico
99	CU3FT	5	5	375	LP	12H	EU175	Terceira
100	OZ1DAE	9	4	300	LP	24H	EU029	Sjaelland
101	JG1GCO	5	4	252	LP	24H	AS007	Honshu
102	M1MAJ	7	4	228	LP	12H	EU005	UK Mainland
103	JA3PYH	5	4	204	LP	12H	AS007	Honshu
104	SO1RE	13	2	150	LP	12H	EU132	Wolin
105	WA0WHT	3	3	135	LP	12H	NA083	Chincoteague

WORLD - MULTI-OPERATOR

Pos	Callsign	QSOs	Mults	Score	Power
1	RL3A	2064	390	5826600	HP
2	RY4J	1852	286	3329040	HP
3	YL4U	1443	286	3105102	HP
4	HA0KID	1176	309	3007188	LP
5	EA5KB	1368	208	1929408	HP
6	DK0MM	599	285	1801485	LP
7	S57L	936	231	1574496	HP
8	SO6Y	1007	209	1396329	HP
9	SN2N	744	212	1256736	HP
10	RK3MWD	1051	178	1221258	HP
11	UZ1P/P	794	194	1221036	LP
12	RK0AXX	525	151	627405	HP
13	LU1NDC	1007	114	601578	HP
14	9A7P	512	130	488280	LP
15	S53P	326	140	447720	LP
16	RK9CWW	329	130	388830	LP
17	DJ0IP	552	88	291456	HP
18	9A3ND	245	104	276120	LP
19	N6VR	212	91	199836	HP
20	OK2KYD	244	82	167280	LP
21	PY2TEL	626	51	143514	LP
22	UT2IWT/P	502	59	139830	LP
23	UY5LQ	204	45	63180	LP
24	OL9S	176	41	46740	HP
25	OT4N	91	31	25575	LP
26	LA1K	93	29	22707	LP
27	OK2RDI	74	34	22644	LP
28	UT5UKY	36	24	10080	LP
29	VE7FO	55	15	5895	LP

IOTA CONTEST EXPEDITIONS

Top 20 High-Power / Yagis		Top 20 Low Power / Single-element antennas	
UU7J/P	9,071,460	LZ1KSL	3,748,680
9A0CI	7,668,180	9A7T/P	3,573,900
EJ2MT	7,378,176	CS7T	3,395,151
M8C	5,673,150	9A1TA	3,215,025
GM2T	3,491,889	UW0G	2,519,370
SM3S/P	3,386,874	9A2004YC	1,911,879
IH9/IQ2CJ	2,983,332	IK7QMJ/P	1,412,250
OH9A	2,683,731	SP4JWR/1	1,030,128
9A1CFN	1,843,128	DF0TX/P	989,346
TM4Z	1,522,932	EJ4F	974,100
DL0KWH/P	1,460,577	YM0T	933,831
9A6A	1,432,434	SV8/OL8R	916,464
GW8K	1,361,520	ES2U	737,490
IQ3GO/P	1,283,736	MM0Q	691,215
RZ3DYG/1	1,262,487	DL0HGW/P	624,306
RI1CGG	729,810	OD5RMK	604,593
9A6NL	718,428	DJ7YT/P	584,820
M0B	556,884	SV9/G4DHF	575,952
N1DX	462,324	OZ/DL2JRM/P	562,464
RK3AWK/1	397,548	FK/KM9D	508,428

WORLD - SINGLE-OPERATOR - MIXED MODE

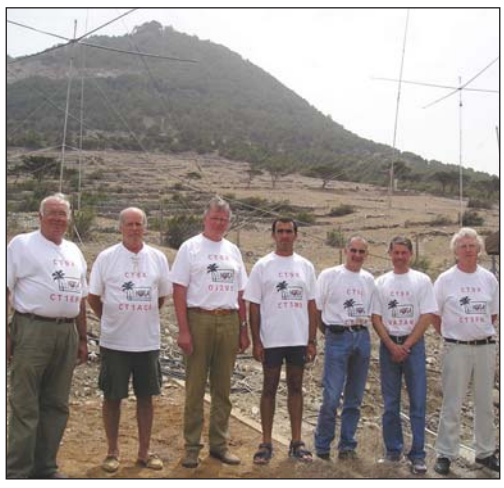
Pos	Callsign	QSOs	Mults	Score	Power	Hrs
1	DL5AWI	583	357	2586465	HP	24H
2	YZ1SG	505	373	2547963	LP	24H
3	UW5Q	1252	256	2328576	HP	24H
4	UR3HC	806	299	2323230	LP	24H
5	RK1AM	1481	230	2277690	HP	24H
6	UR3QT	992	248	1901664	HP	24H
7	UA3AGW	651	279	1817127	HP	24H
8	HA1CW	737	263	1761837	LP	12H
9	RV3FF	614	257	1608306	LP	24H
10	ES1AJ	1043	209	1474077	HP	24H
11	UY0ZG	791	229	1463997	HP	24H
12	OM7JG	582	210	1122660	HP	24H
13	S58MU	651	174	934902	LP	24H
14	OK2BYW	374	195	859950	LP	24H
15	OK1TN	535	182	851214	LP	24H
16	9A3B	680	163	813696	HP	24H
17	RU4HP/4	1060	119	772548	HP	24H
18	OM4JD	404	173	720372	HP	12H
19	OM7CA	384	179	702396	LP	24H
20	DJ2QV	356	182	668304	HP	12H
21	HA6IAM	303	175	644175	LP	24H
22	OK2SG	278	183	631350	HP	24H
23	UY0IX	525	150	614250	HP	24H
24	RA3CO	396	160	606720	QRP	12H
25	DL3ZAI	419	161	594573	LP	24H
26	RT0Q	401	123	570105	HP	24H
27	UW5U	642	130	554580	LP	24H
28	F5KEQ	441	149	551151	LP	24H
29	A45WD	1074	95	524970	LP	24H
30	LZ1NG	537	130	518310	LP	24H
31	OM3PA	483	136	498984	LP	12H
32	LZ3SM	309	148	495948	LP	12H
33	UR5FAV	408	143	494208	LP	24H
34	RU4SS	380	139	492060	LP	12H
35	DL8DXL	334	148	483960	LP	24H
36	N8II	341	143	448305	HP	12H
37	LZ2BE	463	131	444483	LP	12H
38	DL2KUW	229	159	433593	HP	24H
39	RK3DH	321	134	424914	LP	24H
40	RX3AEX	506	109	407442	HP	24H
41	US7IGF	391	118	400374	LP	12H
42	UA9CDC	428	120	391680	LP	12H
43	UR7EU	439	106	359658	HP	24H
44	UA1QV	332	117	341172	HP	12H
45	RA6AAW	355	114	332082	LP	24H
46	PA0JNH	303	125	331125	HP	24H
47	US6IMA	500	105	328860	LP	24H
48	SM3W	725	81	309339	HP	24H
49	LY2UF/P	296	108	305856	LP	24H
50	EU2MM	257	109	301167	LP	12H
51	DF0CI/P	216	118	291696	LP	24H
52	OH2FS	156	117	266760	LP	24H
53	ER2RM	222	105	242550	QRP	24H
54	YO4AAC	298	95	235410	QRP	24H
55	S50R	471	70	232470	HP	12H
56	SP3OL	277	92	227700	LP	24H
57	SP3KRF	297	94	220242	LP	24H
58	OM7YC	285	94	220242	LP	24H
59	OK1XC	149	106	211470	QRP	24H
60	OK2PBM	249	92	210036	LP	12H
61	RZ3DA	235	94	207270	LP	24H
62	US2WU	126	110	198660	LP	24H
63	UA9CDV	589	66	191862	HP	24H
64	UA0ZDA/6	286	88	189552	LP	24H
65	IK2UCK/7	200	96	185472	LP	12H
66	RA6DB	491	62	185070	LP	12H
67	UY9IF	288	75	175500	HP	12H
68	SP9KRT/9	223	86	173118	LP	24H
69	Z36W	207	83	151143	LP	12H
70	RW3GU	197	78	148122	HP	12H
71	UR5E	151	84	145908	HP	12H
72	OK2BEM	112	85	139740	LP	12H
73	SM6XKB	234	74	138972	LP	24H
74	YU1ZZ	204	77	136752	LP	12H
75	K9YC	322	64	130944	HP	24H
76	RX4YY	272	63	127008	LP	24H
77	SM7BJW	193	67	118389	HP	24H
78	SP6CZ	109	81	114939	LP	12H
79	DL3BRA	175	68	108324	LP	12H
80	DK3KD	233	62	108066	QRP	12H
81	RN9RZ	198	69	104742	HP	12H
82	4Z5FW	395	47	104199	LP	24H
83	OK2SWD	185	63	103761	LP	24H
84	3Z8Z	101	74	98790	LP	24H
85	EX2M	423	42	93114	HP	24H
86	SP1DTG	128	65	92040	LP	12H
87	EA4DUT	98	70	89460	LP	12H
88	OK1KZ	153	62	82770	LP	24H
89	ON5WL	130	64	81792	LP	12H
90	SQ9MZ	140	59	81420	LP	24H
91	OK1ARO	156	60	80640	LP	12H
92	OK1ANN	136	61	79056	LP	12H
93	UA0ACG	212	53	76956	HP	12H
94	OZ0F	172	55	76560	LP	24H
95	RK9CR	213	51	74205	LP	24H
96	K1HT	121	61	74115	LP	12H
97	IK2QPR	106	57	73530	LP	12H
98	SM6BSK	71	68	71604	LP	12H
99	K0DEQ	119	60	71100	HP	24H
100	9A4RC	160	52	69264	LP	12H
101	ZA/Z35M	138	55	68310	HP	12H
102	UT8EL	131	52	67236	LP	24H
103	YU1LM	247	48	66096	QRP	24H
104	SP9FT	154	48	63648	LP	24H
105	RW0UM	137	46	63066	HP	12H
106	PY2NY	234	44	62568	LP	12H
107	EA2BNU	159	51	60435	LP	12H
108	UA4NCI	167	49	60417	HP	24H
109	UA0SR	129	50	57750	LP	12H
110	W3AWU	81	56	54600	HP	12H
111	YO3APJ	83	48	52272	QRP	12H
112	UU2JA	66	53	49926	LP	12H
113	SP3KCL	116	46	48576	LP	12H
114	F5ROW	81	49	44247	LP	12H
115	F6BFH	117	47	43569	QRP	24H
116	RX3MM	98	42	43092	LP	24H
117	S51DX	96	45	42660	LP	12H
118	PA0B	60	47	41172	LP	12H
119	UN4PG	114	42	38556	QRP	12H
120	ES4RD	161	36	38556	HP	24H
121	SP5CGN	66	43	37926	LP	12H
122	DL5AWJ	72	45	36180	LP	24H
123	VE1DX	95	40	34920	LP	12H
124	UR7MA	52	45	34560	LP	24H
125	N4PN	147	30	33030	LP	12H
126	W2UDT	96	39	32292	HP	24H
127	PA5A	206	31	32178	HP	12H
128	DL3HSC	65	39	30069	QRP	12H
129	UT7GX	66	37	29970	LP	12H
130	OM1AW	59	38	26334	LP	12H
131	K9NW	75	35	25935	HP	12H
132	KR4M	72	34	23256	HP	12H
133	RX9WN	59	33	22869	LP	12H
134	RA6AR	79	31	22599	LP	24H
135	SM3Q	49	34	22542	LP	24H
136	K3TW	57	35	21525	QRP	12H
137	DL7UXG	43	34	19482	LP	24H
138	LY3BY	88	26	18408	QRP	24H
139	EA7CA	78	28	17640	LP	12H
140	OH2NAF	35	32	16800	HP	12H
141	RA4FJV	66	27	14094	LP	12H
142	US1IV	54	26	13884	LP	24H
143	ZA/UT7DW	42	27	13770	LP	12H
144	N4UH	52	25	13500	HP	12H
145	DL4NT	39	25	11625	LP	12H
146	RA9UN	103	16	10896	LP	24H
147	PY2BRZ	98	19	10602	LP	24H
148	EW6OO	27	26	10218	LP	24H
149	SP8JUS	30	23	9246	LP	12H
150	WB0YJT	40	19	7752	LP	12H
151	DL1EV/P	24	22	7392	LP	12H
152	K8GT	20	19	5700	LP	12H
153	RZ3VA	50	13	5694	LP	12H
154	LZ1PJ	39	16	5520	LP	12H
155	W9AEM	20	17	4692	LP	12H
156	UA9SAW	67	12	4140	QRP	24H
157	VA3JFF	28	14	4032	QRP	12H
158	OH1UP	33	12	3924	LP	12H
159	WA4OSD	19	15	3915	LP	12H
160	UA3VFI	35	10	3330	LP	12H
161	AD4AX	27	13	3237	LP	24H
162	W2RDS	18	14	3108	LP	12H
163	UA3TCJ	17	13	3003	HP	12H
164	VA3IX	24	10	2160	LP	24H
165	VE3MGY	22	10	2100	LP	12H
166	UA9OS	14	10	1620	HP	24H
167	NF8M	10	10	1500	LP	12H
168	YL3FW	22	7	1386	LP	12H
169	DL7FA	44	6	1296	LP	24H
170	W7SST	12	5	540	LP	12H

SWL SECTION

Mixed	Call	Hrs	QSOs	Mults	Score
1	I2-008	24	710	211	1236882
2	LYR-794	24	743	144	691200
3	UU-J-1	12	126	73	87600
4	OH1-688	12	91	24	15672
5	R3A-847	12	43	23	9315
CW					
1	DH2URF	12	382	111	351093
2	UA1-143-1	24	281	79	175617
3	JA4-4665/1	12	114	43	39474
4	VU-0020	12	74	44	33000
SSB					
1	SP-0142-JG	24	542	133	560994
2	ONL383	24	175	137	359625
3	SP2-0534-BY	12	111	44	42636
4	ONL-3647	12	52	45	35100
5	3V4-002	12	78	35	22890

CHECKLOGS

2E1SIS, 4Z5FL/M, 8S0F, 9A/SP2MKI, 9A2YC, 9A3GX, 9A3KS, DG1BQC, DJ0IF, DL1DTC, DL1DVN, DL2JFN, DL5KVV/P, DL5RBR, DL6JAN, DL6RCK, DL7EUO, DL7VMM, DL7VRG, DL8MBS, EA2AGV, EW6GL, F6IRF, G0RCI, G0ZMC, G3JTO, G3RR/P, G3XTT, G4BGW, G6OKU, GW3YVC, GW4BLE, HA5AF, HA7VK, HA8VK, IK3XTY, IZ1DFI, IZ8FCA, JA3YBK, K7CHC, KF3CV, KH6XT, LY3BA, LZ1FJ, M0OIC, M0OKT, MU0FAL, N1NN, OH1BOI, OH5PA, OK1ABB, OK1DSU, OK2DFD, OK2HZ, OK2OU, OM4AA, OZ5MJ, PA1V, PA9TT, PY3AJB, PY3AU, PY5JO, PY7OJ, RA3AD, RA3TYL, RA9DZ, RN6FK, RU2FK, RU4HD, RU6MM, RV1OO, RV3NA, RV4HC, RV6HA, RW3PN, S53EO, SM0BXT, SM3X, SM5BAX, SM6DUA, SM6Z, SP1BLE, SP1DOT/1, SP1EGN/1, SP2HYO, SP2IU, SP3XR, SP4ICD, SP5BLI, SP5ECC/5, SP5ELW, SP5GH, SP7XK, SP8PAB, SQ7B, SQ9CAQ, UA1ZZ, UA3TN, UA3UCD, UA4NAL, UA4PVN/3, UA4RC, UA6LP, UA9MQR, UN6G, UR0UL, US1RCH, UW7W, UX1IL, VE3IGJ, VP8NO, VP9HW, YA0Y, YL2GTD, YL2PN, YL2RM, YO2ADQ, YO2CJX, YO6CFB, YT1AT, YZ1EW, YZ1ZI, YZ9A, ZL2UO, ED5OTA, HG3M, RV6YZ, T94LW, WB8YJF/4.



Operators and antennas at CT9X on Porto Santo, AF-014.

WORLD - SINGLE-OPERATOR - CW

Pos	Callsign	QSOs	Mults	Score	Power	Hrs
1	I3MLU	1105	224	1704864	HP	24H
2	OL6P	681	181	1019211	LP	24H
3	DL6KVA	331	216	950616	HP	24H
4	YL2PQ	1007	131	801327	HP	24H
5	YU1WC	406	181	765630	LP	24H
6	UA3QDX	726	151	751074	LP	24H
7	S58A	801	141	739827	HP	12H
8	HB9CZF	375	174	667638	QRP	24H
9	OK1HX	563	150	658350	LP	24H
10	UT1FA	621	137	616911	LP	24H
11	YZ1V	390	144	527904	LP	12H
12	LZ7X	437	140	519540	LP	12H
13	LP0H	968	98	512736	HP	24H
14	OK1WF	635	113	453921	HP	24H
15	UX0ZX	546	114	448020	LP	12H
16	OL4M	524	116	421776	HP	24H
17	DL4WA	326	134	420492	HP	24H
18	HA5JP	336	131	413436	LP	24H
19	S52QM	421	120	399240	HP	12H
20	HA6NW	354	120	382320	LP	24H
21	EA4DRV	590	96	355392	LP	12H
22	RK4HD	357	111	332001	LP	24H
23	UW2F	366	109	326346	LP	12H
24	OK1CZ	353	111	325341	LP	12H
25	OK2DU	322	109	321114	LP	12H
26	OK1VD	340	108	316224	LP	12H
27	YU1KT	417	101	310575	LP	24H
28	DL9EE	236	117	293436	LP	24H
29	OK1DOR	480	89	281952	LP	24H
30	UA0JQ	344	89	281952	LP	12H
31	YU1AAV	253	107	278949	LP	12H
32	UT2FA	567	76	260604	LP	24H
33	SP8BAB	160	107	255516	QRP	24H
34	I2WIJ	257	100	246300	LP	12H
35	HA3PW	440	80	232320	HP	12H
36	HA5W	244	95	222300	LP	12H
37	F5IN	713	62	216690	HP	12H
38	RT3T	291	91	215943	HP	12H
39	OM4DN	318	87	213498	LP	12H
40	SP5CJQ	204	97	211848	QRP	12H
41	YL2CV	150	95	211470	LP	24H
42	HB9ARF	191	97	206901	LP	12H
43	VR2BG	264	79	204768	HP	24H
44	YO5CBX	403	78	204750	LP	12H
45	YZ80AA	336	77	194964	QRP	12H
46	OK1ZP	261	83	193473	LP	12H
47	OK1FCA	249	85	187935	LP	24H
48	SP2QG	304	78	183456	HP	12H
49	UR7EQ	297	81	182979	LP	12H
50	LZ6C	201	87	181917	LP	24H
51	SM4GIB	264	81	181764	HP	24H
52	UA9SP	448	71	180624	HP	24H
53	UX5EF	222	87	179046	HP	24H
54	RA3NZ	305	74	175158	LP	12H
55	OK2BNC	217	84	173628	LP	24H
56	IK2NUX	198	85	161670	LP	24H
57	DF1IAQ	394	66	158796	LP	12H
58	SQ9FMU	243	77	156849	LP	24H
59	UA3QG	288	70	155400	LP	12H
60	RV3LO	221	78	154674	LP	12H
61	UR7ET	141	88	152328	HP	24H
62	EW6EW	269	68	150348	LP	24H
63	4K9W	303	68	148308	LP	24H
64	UY5ZI	217	76	140676	LP	24H
65	EA4FL/P	497	53	140079	LP	24H
66	OK2QX	182	77	132594	LP	12H
67	UR5WX	153	72	131544	LP	24H
68	UT4EK	213	70	129570	LP	12H
69	OK2PDT	197	69	121923	HP	12H
70	SQ1EUG	291	58	120234	LP	24H
71	F5QF	182	72	119664	LP	12H
72	PA0RRS	208	71	119280	LP	24H
73	SP5MBA	184	67	114168	LP	12H
74	PA3BFH	187	69	111573	LP	24H
75	UR5WCQ	306	56	111216	LP	24H
76	OK1MZO	132	72	110592	LP	12H
77	EX2X	276	60	109440	LP	12H
78	OK1KI	201	63	104517	LP	24H
79	DL3BZZ	108	75	103500	LP	12H
80	RX3AP	258	51	99450	LP	12H
81	OM7AG	160	67	98088	LP	24H
82	UA9FGJ	214	60	97560	LP	12H
83	SP9EMI/9	156	63	96768	LP	24H
84	YO4GDP	351	49	92169	LP	24H
85	SP4GFG	179	58	91698	QRP	24H
86	RA0LQ	121	60	90900	LP	12H
87	I0JFE	229	50	90750	LP	24H
88	SP3LWP	174	59	87438	LP	12H
89	UA3QCB	177	55	87285	LP	12H
90	UA6HON	176	59	84960	LP	12H
91	HL5UOG	113	54	74034	HP	12H
92	W5FO	196	51	73440	HP	12H
93	LZ4GL	145	54	71442	LP	12H
94	UA6AKD	200	50	70800	HP	12H
95	UA9AOL	201	47	68949	HP	12H
96	OK1HCG	84	55	66660	LP	12H
97	OH4MFA	180	50	63600	QRP	12H
98	RX9TX	310	37	60162	LP	24H
99	SN6A	248	40	59040	LP	12H
100	LZ1QV	72	55	58740	LP	12H
101	UX7QD	330	33	58014	LP	12H
102	TI3M	345	32	56928	LP	12H
103	UA1PAC	100	47	55272	LP	12H
104	RA3FH	143	46	54510	LP	12H
105	UA4QK	118	49	54390	HP	24H
106	OM2SM	74	50	52500	QRP	12H
107	IK0YVV	143	44	51612	HP	12H
108	UX6FZZ	200	36	50976	LP	12H
109	RZ6AE	71	48	50544	LP	12H
110	K5ZD	157	42	50526	HP	12H
111	DL3JON	58	58	50460	LP	24H
112	EA5EOH	96	48	49536	LP	12H
113	YO2IS	136	40	49440	QRP	12H
114	VE1RGB	125	45	48195	LP	12H
115	SP7FGA	91	45	46845	LP	12H
116	LZ1PM	61	53	46587	LP	12H
117	UA6LFQ	78	48	45792	LP	12H
118	OM7AT	138	40	44880	LP	12H
119	OK2SJ	126	39	43758	LP	24H
120	RD4WA	158	38	43548	LP	12H
121	OM4DA	142	40	43440	LP	12H
122	ES4MM	72	44	42240	QRP	24H
123	OK2BYH	119	41	41697	QRP	12H
124	UR3IQO	117	40	40920	LP	12H
125	UN4PD	161	35	40425	LP	24H
126	UR7EZ	59	48	40176	HP	24H
127	HB9DAX	97	41	40098	QRP	24H
128	YO7ARZ	105	40	38520	LP	24H
129	UT3EK	127	37	38073	LP	24H
130	SM0GNS	172	31	37572	QRP	12H
131	SM6CRM	80	38	36936	QRP	24H
132	RA9AE	176	36	35856	LP	12H
133	UA3URD	116	37	34632	LP	12H
134	OK1AYY	96	38	34200	HP	12H
135	UA3DOM	68	39	34164	LP	12H
136	OK2BJ	56	45	34020	LP	24H
137	UA3AKI	75	39	33111	LP	24H
138	YO7BGA	96	39	32760	HP	12H
139	UU4J	86	39	32526	QRP	24H
140	UT3NK	215	29	31929	LP	24H
141	SP3DOF	97	35	30345	LP	12H
142	OK2FB	85	37	29415	LP	12H
143	PA5GU	68	39	28548	LP	24H
144	LZ1EP	107	31	27063	LP	24H
145	OK1FMG	93	32	25824	LP	12H
146	EA3FHC	106	29	25578	QRP	12H
147	RA3XCW	105	32	25440	LP	24H
148	RA9KM	92	33	25344	LP	12H
149	RU2FM	111	28	25116	QRP	12H
150	YO3BWK	99	30	24750	LP	12H
151	EA1WX	140	28	24528	LP	12H
152	DL8DWW	59	36	24516	LP	24H
153	UA9BX	138	29	23838	LP	12H
154	PA0JED	72	36	23760	LP	12H
155	DL1LAW	91	31	23343	QRP	12H
156	OK1FVD	56	36	23328	QRP	12H
157	RA9XU	158	26	23244	LP	24H
158	DL4JYT	85	32	22752	LP	12H
159	DL0PCK	65	33	22671	QRP	24H
160	RA6MS	117	27	22437	LP	12H
161	DL7AXM	39	38	22230	HP	12H
162	SP5KP	258	16	21792	HP	12H
163	SM3AVW	104	25	21600	LP	12H
164	PY7EG	194	22	21516	LP	12H
165	YO8RIX	97	27	21465	LP	12H
166	UA3PPP	98	26	21372	LP	24H
167	OK2ABU	82	28	21000	LP	12H
168	UA3DEE	105	30	20970	HP	12H
169	WB2AA	90	28	20328	LP	12H
170	RK3BA	136	22	19800	HP	12H
171	DL3EBX	102	26	18564	LP	12H
172	OK1JOC	43	32	17952	QRP	12H
173	I1/IT9LNH	81	26	16614	QRP	12H
174	RW4AD	122	23	15870	LP	12H
175	LZ3PZ	98	23	15870	LP	12H
176	EA2AHZ	35	31	15531	LP	12H
177	EW2EG	118	20	15240	LP	24H
178	VE3KP	102	24	15120	LP	12H
179	EA5GFK	49	26	14742	LP	12H
180	PY4FQ	127	20	14340	LP	24H
181	RW6AH	89	22	14322	LP	24H
182	SP8FHJ	72	24	14112	LP	12H
183	F2NZ/P	62	25	13950	LP	12H
184	PA0ATG	68	23	12696	LP	12H
185	RA3UAG	30	28	12600	LP	12H
186	RD3AB	58	23	12006	LP	12H
187	YO4CSL	72	23	11868	LP	12H
188	AA1CA	57	24	11304	QRP	24H
189	EA7GV	170	14	11172	LP	12H
190	SM7ATL	53	21	10143	LP	12H
191	DL1KUR	68	19	10032	LP	12H
192	KI4FDF	75	20	10020	LP	12H
193	RW9UVB	107	15	9315	LP	12H
194	RV3DBK	79	18	9234	QRP	24H
195	W2LHL	33	23	9177	LP	12H
196	VE3TAZ	54	20	9000	LP	12H
197	XQ4ZW	127	14	8862	LP	12H
198	DL5SVB	72	17	8364	LP	12H
199	IZ2EJU	48	19	7752	LP	12H
200	SM6PVB	48	19	7296	LP	12H
201	EU4LY	55	17	7293	LP	12H
202	ON4KVA	76	16	6912	LP	12H
203	UA1QBE/P	53	16	6384	LP	12H
204	OK1AKB	44	17	6324	LP	24H
205	4Z5MO	69	14	6258	QRP	12H
206	RV9CLF	72	15	6120	LP	12H
207	K9QVB/9	50	16	6048	LP	12H
208	LY2BNL	51	16	5904	LP	12H
209	RA3XEV	42	16	5856	LP	12H
210	PY8MGB	124	10	5760	LP	12H
211	UA3RF	47	15	5535	LP	12H
212	SP4AVG	50	14	5124	HP	12H
213	VA3XRZ	34	16	5088	LP	12H
214	VE3UKR	28	17	4896	LP	12H
215	AA3B	48	15	4860	HP	12H
216	RV9XM	74	11	4686	HP	12H
217	T93R	34	15	4590	LP	24H
218	W1END	35	13	4329	LP	12H
219	SP9MDY	19	15	4275	LP	12H
220	HB9AYZ	46	13	4134	QRP	12H
221	RW3TA	21	15	4005	LP	12H
222	WA3AAN	35	13	3861	HP	12H
223	PA0WDG	17	15	3825	LP	24H
224	SM3EAE	64	10	3480	LP	12H
225	N5VI	36	11	3432	QRP	12H
226	WA2VQV	16	15	3420	LP	12H
227	SM3AF	42	11	3234	LP	12H
228	SP7FBQ	31	9	2565	LP	12H
229	SM2YIZ	13	13	2535	LP	12H
230	VA7ST	39	10	2370	LP	24H
231	US5EEK	47	8	2280	HP	24H
232	SP5AHR	14	11	2046	HP	12H
233	N7BF	17	10	1830	HP	12H
234	K4AQ	27	9	1701	QRP	12H
235	UN7CN	38	8	1680	QRP	24H
236	UA4AGO	60	6	1584	LP	12H
237	N5PU	18	9	1566	LP	12H
238	SP3JIA	29	8	1464	LP	24H
239	DL5SWB	32	7	1260	LP	12H
240	PA3AFF	15	8	1128	QRP	12H
241	LY2LF	43	4	1092	LP	12H
242	UR8RF	18	6	900	LP	12H
243	UR5XDB	19	6	846	LP	12H
244	K9WJU	11	7	819	LP	12H
245	EA3NO	29	5	795	LP	12H
246	EA1FBJ	8	6	720	LP	12H
247	RK1NA	19	5	705	HP	12H
248	PY4CEL	15	5	525	LP	12H
249	OK1FAO	21	4	492	QRP	12H
250	OH3TZ	22	3	378	LP	12H
251	K1EP	10	4	312	LP	12H
252	W3GRX	4	1	24	LP	12H

WORLD - SINGLE-OPERATOR - SSB

Pos	Callsign	QSOs	Mults	Score	Power	Hrs
1	DL4MCF	1047	240	2320560	HP	24H
2	LY2WJ	937	194	1481190	HP	24H
3	SP9LJD	699	135	890595	HP	24H
4	IN3XUG	664	173	859464	HP	24H
5	EA4PL	823	130	787410	HP	24H
6	YT1RA	765	118	616314	LP	24H
7	UX0FF	597	134	574458	HP	12H
8	RK3WWA	584	123	557928	LP	24H
9	UR5MNZ	440	127	463296	LP	24H
10	CT1DHM	378	132	453816	LP	24H
11	I2AT	213	150	436050	HP	12H
12	9A2BD	501	110	430650	HP	12H
13	RA3OU	362	120	399600	LP	24H
14	YO3CZW	457	109	356103	LP	24H
15	DJ1AA	429	101	350571	HP	12H
16	WZ3AR	422	100	299400	HP	24H
17	ON5GQ	322	110	292380	HP	24H
18	UA3BM	260	105	264600	LP	12H
19	YO5CRQ	217	91	202293	LP	12H
20	SP9TCC	192	95	194940	LP	24H
21	SO5M	186	88	192720	HP	12H
22	3Z6V	143	95	186675	LP	24H
23	SP3GHK	202	90	185220	LP	24H
24	OE1WEU	175	93	183861	LP	12H
25	UT5ECZ	313	80	181680	LP	24H
26	EA3GHQ	305	79	176565	LP	12H
27	EA1ACP	169	85	169575	LP	12H
28	IZ7EDQ	268	81	169128	LP	24H
29	F4BKV	152	93	168516	LP	12H
30	PT7CB	342	72	166320	HP	24H
31	RK3SWB	216	79	165900	LP	24H
32	SP4SHD	190	81	164754	LP	24H
33	ON4ACA	252	73	162936	LP	12H
34	DL4RCK	151	84	150948	LP	12H
35	SP5GMM	110	86	141900	HP	24H
36	RV6BC	229	70	140490	LP	24H
37	9A6AJK	268	64	139776	LP	24H
38	SP3JHY	145	80	137520	LP	12H
39	OM3YK	133	75	125325	LP	24H
40	US0YW	208	67	124620	LP	12H
41	DL2FK	114	80	116640	HP	12H
42	DL1JGO	150	73	113442	LP	24H
43	EA3LS	94	77	108570	LP	24H
44	PA2SWL	148	72	107136	LP	24H
45	IZ8CCW	205	62	100626	LP	12H
46	YO5OED	203	55	97515	LP	24H
47	US1MM	177	63	96201	HP	24H
48	PY6KW	221	57	89775	HP	12H
49	SP1I	98	70	88620	LP	24H
50	DM2SR	149	64	88512	LP	12H
51	HA5OAF	155	59	86907	LP	24H
52	RZ6APF	208	53	86496	LP	24H
53	F5JY	120	65	82680	LP	24H
54	W6AFA	289	41	81795	HP	12H
55	UR7EM	140	57	80712	HP	12H
56	HS0ZEE	151	47	79947	LP	24H
57	OK2BRX	126	60	78120	LP	24H
58	DK7OM	117	60	75780	LP	24H
59	IZ0EHL/0	122	56	75600	LP	12H
60	IK1BBC	106	58	75516	LP	12H
61	OK1TFH	112	55	70620	HP	24H
62	RA6AFB	150	54	69660	HP	12H
63	OE7AJT	90	56	69552	LP	24H
64	UR5WDQ	156	51	67320	LP	24H
65	UR5ZMK	117	53	66303	HP	24H
66	PA0IJM	117	53	65031	HP	12H
67	SP6NVK	124	50	64800	LP	12H
68	SP1DTE	132	51	61200	LP	12H
69	SP3GXH	111	50	58650	HP	12H
70	ER3GS	71	59	57879	LP	24H
71	UR5ZTH	120	50	56400	LP	24H
72	OK1VHV	97	49	56007	LP	24H
73	EA4YK	91	49	55125	LP	12H
74	DF5BX	120	48	54720	HP	24H
75	UA9AFA	177	43	51213	QRP	24H
76	EA5BWR/M	122	47	51042	LP	12H
77	EA1ET	110	48	50976	LP	12H
78	PA3GNZ	106	49	49686	LP	12H
79	F8ADY	78	51	46818	HP	12H
80	SM7DXQ	91	49	45717	HP	12H
81	F6FJE	90	49	45570	LP	12H
82	DB7TF	99	46	45126	LP	24H
83	PY6KY	151	43	44763	LP	12H
84	YO2LPC	122	38	42636	QRP	24H
85	SP8EDD	86	44	42504	LP	12H
86	PG2D	102	42	42084	LP	12H
87	W3TN	90	42	41076	LP	12H
88	EA1AAW	70	47	39762	LP	12H
89	US5WEP	67	44	39468	LP	24H
90	SP5XSD	99	40	39240	LP	12H
91	OK2BEN	78	43	38958	LP	24H
92	RX3MX	91	37	38517	LP	24H
93	EA1CNF	92	42	38304	LP	12H
94	YO3FYS	80	41	35916	LP	24H
95	SP2JSS/2	73	42	35910	LP	12H
96	DL4NN/P	70	42	35532	LP	12H
97	9A2GA	88	40	35520	LP	12H
98	SP2ATF	65	38	34770	LP	24H
99	F8DFN	106	35	32970	LP	12H
100	IK2VUC	53	44	32340	LP	24H
101	CT1EGW	46	46	31740	HP	24H
102	RZ9OQ	149	33	30591	HP	12H
103	RA3DCT	63	39	30303	QRP	12H
104	RA6HCN	70	39	30186	LP	24H
105	RX3RC	109	32	29280	LP	12H
106	EA1OT	131	30	29070	LP	12H
107	UT6IS	227	25	27825	HP	12H
108	SP7TEX	96	30	26280	LP	24H
109	SP8OOB	80	32	26112	LP	12H
110	RU0SU	111	28	24780	HP	24H
111	OE8WOQ	79	30	24030	LP	12H
112	SP3BVI	84	29	23316	LP	12H
113	LT0H	258	19	21774	HP	12H
114	ES8SW	80	31	21576	QRP	12H
115	PT2BW	100	28	21504	LP	12H
116	RK9XX	102	28	21336	LP	24H
117	W1DAD	89	31	21297	LP	12H
118	EA1BZP	102	25	20850	LP	12H
119	HB9VID	55	32	20640	LP	12H
120	F4EFI	38	35	19950	LP	12H
121	OL7C	72	31	19716	LP	12H
122	EA1HV	66	29	19314	HP	24H
123	4Z5LZ	50	33	19206	LP	12H
124	YU1EQ	47	33	18909	LP	12H
125	ON5SWA	50	33	18810	LP	12H
126	LS7D	110	24	18288	LP	12H
127	IV3AJZ	43	30	17550	LP	24H
128	CT1AVC	34	34	17340	LP	24H
129	UT7MD	45	28	16548	HP	12H
130	OK1MJA	50	27	15714	LP	24H
131	UR6MX	43	28	15708	HP	12H
132	EA2RU	49	28	15540	LP	12H
133	SP5DRE	43	24	15480	LP	12H
134	DB1WDA	54	26	15444	LP	24H
135	PT2CSM	55	28	14700	HP	12H
136	UA9AK	101	21	14679	QRP	12H
137	SP1RW	55	25	14625	LP	12H
138	SP1EK	54	26	14508	QRP	12H
139	OK2KOD	37	28	14196	HP	12H
140	IK2WFN	62	25	13650	LP	12H
141	VU3DJQ	93	18	13446	LP	12H
142	HB9OCR	32	26	12480	LP	24H
143	SP8ONB	48	23	11868	LP	24H
144	IK0OTJ	46	25	11850	LP	12H
145	RV9BI	59	22	11286	LP	12H
146	4Z5KZ	59	22	11022	LP	12H
147	DL8AXJ	29	26	10374	LP	12H
148	SP5AHY	52	22	10296	HP	12H
149	EA5BY	28	26	10296	HP	12H
150	IK5ZTT	46	21	10206	LP	12H
151	UA3AGU	26	26	10140	LP	24H
152	K2RET	51	22	9966	LP	12H
153	RV0AR	32	22	9240	LP	12H
154	SM4W	49	19	8265	LP	12H
155	UA1AFZ	56	18	8208	LP	12H
156	DJ5KX	40	20	8160	LP	24H
157	EU6PW	64	18	7992	LP	24H
158	SM6YEC	50	19	7866	LP	12H
159	HB9DWU	56	17	7548	LP	12H
160	PY3PA	117	13	6747	HP	24H
161	SP7AWG	33	17	6579	LP	12H
162	PF9A	65	14	5754	LP	12H
163	VE3GHK	21	18	5670	LP	12H
164	SP1RW/1	25	18	5670	LP	12H
165	DL7CU	38	14	5292	LP	12H
166	SP4AAZ	31	16	5136	HP	24H
167	DM3KTO	19	18	5130	HP	24H
168	9A1DL	34	14	4788	LP	24H
169	SP2LQP	26	15	4770	LP	12H
170	OE4WWL	20	17	4692	QRP	12H
171	EA1DBC	19	17	4437	LP	12H
172	KA5EYH	21	16	4272	LP	12H
173	RA4LFQ	53	13	4095	LP	12H
174	DD7ZE	31	14	3990	QRP	12H
175	K2NUD	19	15	3735	LP	12H
176	EA7FRX	23	15	3735	LP	12H
177	PT2OP	24	14	3696	LP	12H
178	RZ9OW	22	12	3384	QRP	12H
179	EA3EYD	23	13	2925	LP	12H
180	PA2NJC	17	12	2916	LP	24H
181	UA0WL	23	11	2739	HP	12H
182	PY8AZT	46	8	2160	LP	12H
183	EA3FHP	19	11	2079	LP	12H
184	SM3AF	24	10	2040	LP	12H
185	SP6PCM	15	10	2010	LP	12H
186	ES5CX	28	9	1944	LP	12H
187	IV3PCF	12	11	1848	LP	12H
188	F5CQ	11	11	1815	HP	24H
189	4J7WMF	31	8	1704	LP	12H
190	PR7ZZ	19	9	1593	LP	12H
191	W7KID	18	8	1584	HP	12H
192	SP9OJQ	10	9	1350	LP	12H
193	EA1DFP	10	9	1242	LP	12H
194	PA1PAT	19	8	1224	LP	12H
195	IK2UVR	9	9	1215	LP	12H
196	WA6NOL	14	7	966	LP	12H
197	DL1HWH	13	6	882	LP	12H
198	DL6AKC/P	8	7	756	HP	12H
199	EA7HE	14	6	684	LP	12H
200	N2LQQ	14	4	552	LP	12H
201	EZ8CW	8	5	420	HP	12H
202	PP2JP	12	4	336	LP	12H
203	KV2M	5	4	300	LP	12H
204	SP1MVG/8	4	4	240	LP	12H
205	K5VG	5	3	153	LP	12H
206	DL8BTE	4	3	144	LP	12H
207	UA9LAU	37	1	123	LP	12H
208	WD9EWK	2	2	60	LP	12H

SINGLE-OPERATOR ASSISTED

Pos	Callsign	QSOs	Mults	Score	Power	Hrs	Mode	IOTA Ref	Island Name
1	HA1DAE	541	256	1490688	LP	24H	Mix	-	-
2	W1NG	725	199	1077585	HP	24H	Mix	-	-
3	GW0GEI	1006	170	1021020	HP	24H	SSB	EU124	Ynys Môn / Anglesey
4	RD3A	984	148	912864	HP	24H	CW	-	-
5	RI1CGG	1459	106	729810	HP	24H	Mix	EU133	Gogland I
6	YL2TW	543	151	671799	LP	24H	Mix	-	-
7	OH6NIO	721	116	547404	HP	12H	Mix	-	-
8	OK1AOV	205	171	517617	HP	24H	Mix	-	-
9	UU2JQ	324	143	451308	HP	12H	Mix	-	-
10	RZ3AZ	587	98	381906	HP	12H	CW	-	-
11	9A5KV	431	109	351525	LP	12H	Mix	EU016	Sipan
12	PA9ZZ	263	122	340746	HP	24H	Mix	-	-
13	HG4I	330	98	247548	HP	12H	CW	-	-
14	OH4RH	607	75	241875	HP	24H	Mix	-	-
15	LX5A	252	102	238680	LP	24H	SSB	-	-
16	UX2IQ	206	105	221130	LP	24H	Mix	-	-
17	SM7BHM	214	95	213750	HP	12H	SSB	-	-
18	P43E	553	70	199290	LP	12H	Mix	SA036	Aruba
19	DL3APO	121	107	185217	HP	24H	Mix	-	-
20	OH2LU	398	69	183402	HP	12H	CW	-	-
21	SP9GFI	166	99	181170	LP	24H	Mix	-	-
22	DL3YBM	291	85	179265	HP	12H	CW	-	-
23	DH5HV	188	92	178848	LP	12H	SSB	-	-
24	JE1ZWT	308	86	177504	HP	24H	Mix	AS007	Honshu
25	RW1QD	282	74	145188	HP	24H	CW	-	-
26	DL7VSN	96	96	138240	LP	12H	CW	-	-
27	HK3JJH	307	67	130851	LP	24H	SSB	-	-
28	SM2LIY	156	79	127980	HP	24H	Mix	-	-
29	JM1NKT	185	75	119925	LP	24H	Mix	AS007	Honshu
30	K3MD	293	62	119226	HP	12H	Mix	-	-
31	EW1CQ	102	76	116280	LP	12H	CW	-	-
32	OM7PY	129	70	106050	LP	12H	CW	-	-
33	J48DOV	359	44	100716	LP	12H	SSB	EU052	Zakynthos
34	PT2ADM	309	52	99372	HP	12H	SSB	-	-
35	GM0CLN	231	64	91968	LP	12H	CW	EU005	UK Mainland
36	N4MM	112	70	91560	HP	12H	Mix	-	-
37	SM6EQO	201	55	85305	QRP	24H	CW	-	-
38	EA1BVP	124	61	78324	HP	12H	SSB	-	-
39	K6III	114	53	64554	HP	12H	Mix	-	-
40	W9OL	101	55	63525	HP	12H	Mix	-	-
41	IZ8DMZ	71	58	60378	LP	24H	SSB	-	-
42	RA0BA	212	42	59472	HP	12H	Mix	-	-
43	OH0Y/6	302	39	59202	HP	12H	CW	-	-
44	SM5D	64	58	53592	HP	24H	Mix	-	-
45	N4GG	112	49	52920	HP	12H	Mix	-	-
46	DL8UAT	58	49	42630	LP	12H	CW	-	-
47	ON5ZO	199	36	40932	LP	24H	Mix	-	-
48	K9UQN	102	41	36654	HP	12H	Mix	-	-
49	K5NZ	153	37	35187	LP	12H	Mix	-	-
50	ON4AEK	365	24	34344	HP	24H	CW	-	-
51	N9GKE	77	41	33087	HP	12H	SSB	-	-
52	GM4T0Q/P	103	38	29070	LP	12H	SSB	EU123	Isle of Bute
53	DM3PKK	57	41	27183	LP	24H	Mix	-	-
54	EA5FID	47	36	25380	LP	24H	CW	-	-
55	OZ1ADL	162	27	25110	HP	24H	SSB	-	-
56	PR7AB	317	18	25110	LP	12H	CW	-	-
57	PA7RA	114	31	23994	LP	24H	Mix	-	-
58	DJ6TK	101	32	23904	LP	12H	CW	-	-
59	IT9/ON7JA/P	261	19	22173	LP	12H	Mix	EU025	Sicily
60	ER2AR	86	30	21780	HP	24H	SSB	-	-
61	W1AJT/VE3	39	37	21201	HP	12H	Mix	-	-
62	JO7KMB	79	33	20889	HP	24H	CW	AS007	Honshu
63	FO5RJ	193	21	19719	HP	24H	SSB	OC046	Tahiti
64	OH2CI	76	24	15264	LP	12H	CW	-	-
65	K0CIE	44	29	14616	LP	12H	Mix	-	-
66	RW0BG	73	22	14058	HP	12H	Mix	-	-
67	EA5OL	62	25	12750	LP	12H	Mix	-	-
68	W1EBI	51	23	11247	LP	12H	Mix	-	-
69	G4BJM	188	15	10980	HP	12H	CW	EU005	UK Mainland
70	DJ5GG	31	20	6660	LP	12H	Mix	-	-
71	UR5WBQ	19	19	5415	LP	24H	SSB	-	-
72	JA1HTG	24	18	5184	LP	24H	CW	AS007	Honshu
73	DL1AY	28	17	4896	LP	12H	SSB	-	-
74	OZ4RT	18	18	4860	HP	12H	Mix	-	-
75	SP3FAR	17	16	4080	LP	24H	Mix	-	-
76	SP6IHE	24	14	3864	QRP	12H	Mix	-	-
77	EA5YJ	33	13	3783	LP	12H	SSB	-	-
78	SM4XIH	23	14	3486	LP	24H	Mix	-	-
79	KI6MX	17	9	1755	LP	12H	SSB	-	-
80	CT1CXP	6	6	540	LP	12H	SSB	-	-
81	K5WW	8	4	288	LP	12H	SSB	-	-
82	SP7GAQ	2	2	60	HP	12H	Mix	-	-

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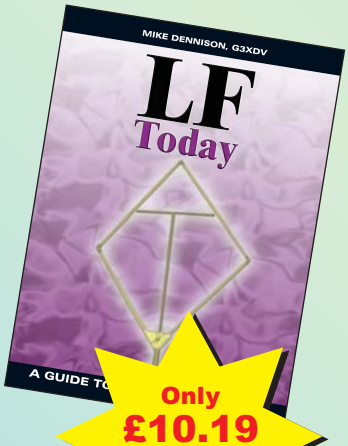

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Peter G3SJX

The IC-756PROIII is the latest version of Icom's popular high-end HF / 6m transceiver. Peter Hart gives it his usual thorough examination.

Icom IC-756PROIII HF / 50MHz transceiver

The IC-756 transceiver line has been Icom's high-end HF + 50MHz base station now for around eight years. It has been re-launched on two separate occasions as the IC-756PRO and IC-756PROII to include performance enhancements and added features and to ensure that this model remains as one of the highest performance and feature packed transceivers available. It has more features than any other transceiver marketed with the exception of Icom's new IC-7800 'super radio'.

Icom have now unveiled the IC-756PROIII with a significantly improved front-end dynamic range and a number of 'tweaks' and enhancements to the existing features. Much of the knowledge learnt from developing the IC-7800 and some of the circuit elements have been utilised to advantage in the design of the IC-756PROIII.

SUMMARY OF FEATURES

A full review of the IC-756PROII was published in the June 2002 *RadCom* (pages 28-31). As the feature set of the PROIII is virtually identical to the PROII, only a summary of the features is included here and the reader should refer to the earlier review for more detailed information.

The IC-756PROIII is a 12V operated radio and a matching compact switched-mode PSU, model PS-125, is available if needed for mains operation. The receiver tunes continuously from 30kHz to 60MHz with the transmitter enabled for the amateur bands only at 100W nominal maximum power output. The version sold in the UK transmits to 7.2MHz. SSB, CW, RTTY, AM and FM modes are covered. The voice modes, SSB, AM and FM may be switched to AFSK data for analogue interfacing to PC sound cards etc whereas RTTY is intended for digital transmit drive in FSK mode.

The usual comprehensive frequency selection and tuning arrangements are provided with twin VFOs (Main and Sub) and individual buttons to select the bands with a triple band stacking register employed, useful if you operate frequently on three modes, eg SSB, CW and Data. 101 memory channels are provided with alphanumeric tagging and a memo-pad for rapid storing and recalling of up to 10 frequencies. Repeater offsets with access tones and full scanning facilities are all catered for.

Although the radio does not contain two separate receivers, it can receive on two frequencies simultaneously in the same band. Separate first mixers and synthesisers are used and a common signal path for all RF, IF and AF circuitry. A balance control sets the gain of the two signal paths via PIN diode attenuators following the mixers. A single tuning control is used, assignable to either receive frequency and both VFO frequencies are continuously displayed together with the separate selected memories whether these are active or not. Whilst not quite so convenient to use as the dual receivers on stereo headphones with two tuning knobs, it is nevertheless quite effective. I find dual receive capability indispensable these days for cracking DXpedition split-frequency pile-ups.

Unlike the original IC-756 that used conventional crystal / ceramic IF filters, the PRO versions achieve all channel selectivity using IF DSP. The receiver is a triple conversion superhet with a first IF of 64.455MHz, a second IF of 455kHz with fairly broad (15kHz) selectivity and a third conversion to 36kHz to feed the DSP. The 32-bit floating point DSP is interfaced to the analogue circuitry through very high-resolution 24-bit A/D and D/A converters which are calibrated each time the radio is turned on. The DSP provides all the IF filtering, demodulation and audio processing functions. The channel filtering is impressive, providing passband widths down to 50Hz with shape factors superior to any crystal filters and both sharp and soft filter profiles are selectable on CW and SSB modes. See **Fig 1**.

Included in the armoury of weapons to combat QRM are a manual IF notch filter and auto AF notch filter, twin passband tuning, DSP noise reduction, IF noise blanker for ignition type noise and additional sharply tuned filters for RTTY mode. The AGC time constants are fully customisable over a wide range for different modes.

On transmit the power is adjustable from about 2 - 100W on all bands. VOX and an IF speech processor are provided on SSB and a built-in keyer on CW. Full and semi break-in is available on CW with a front panel control for adjustable delay. It is good to see this as a front panel control; so many radios relegate this to the back panel or as a menu-controlled item.

The CW message keyer includes some useful features for contest operation including four 70-character memory stores, a provision to send automatically incrementing serial numbers and auto-repeat after a time delay. The message stores are programmed in text from front panel pushbuttons and now includes the @ character in Morse code.

The IC-756PROIII also includes a digital voice recorder with four mem-

FIG 1 © RADCOM 422

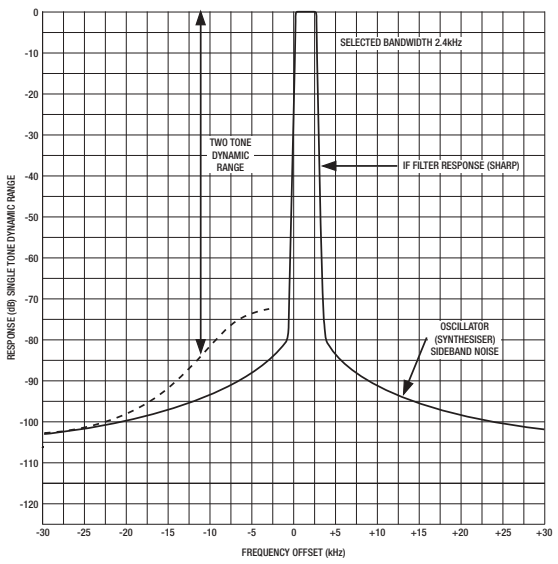


Fig 1: IC-756PROIII selectivity curve (see text).

ory channels on receive and four on transmit, useful for contest CQ calls. Each receive memory store is limited to a maximum message length of 15 sec and a total of 90 sec for the transmit stores. Continuous recording of the receiver audio is possible, and playback of the last 15 seconds.

One of the major features of the radio is the use of a large (5-inch) full colour TFT LCD panel. Buttons down the side and along the bottom select most of the context dependent parameters with labels displayed on the LCD panel. This makes the radio easy to use with the appropriate buttons always on display. The top part of the panel indicates all the frequencies, modes, IF filters etc at all times. Two clock times for different time zones may be displayed. The lower part of the display is used for a number of functions. It shows set-up screens for the filters, voice and CW keyers, a scrollable section of the memory bank, decoded RTTY messages or a spectrum plot on either side of the receive frequency. The spectrum scope span is selectable and shows the current sweep and stored peaks in different colours. Peak hold can be useful for monitoring transient openings on 50MHz. A new feature with the PROIII is to enable a mini-scope function which continuously shows a compressed view of the spectrum plot at the same time as the set-up screens, memory screen or RTTY decoder screens are also in use. A similar mini-scope function is also provided in the IC-7800.

The outward appearance and construction is identical to the PROII, measuring 340W x 111H x 285Dmm and weighing about 9.6kg. The construction is very sturdy indeed and excellently screened, based on a die-cast multi-partitioned chassis with an internal axial fan to provide cooling when the radio is hot. The usual rear panel interface connectors are fitted with two selectable antenna sockets plus receive only and a built-in auto ATU covers all bands from 1.8 to 50MHz. The radio is provided with a comprehensive and detailed 118-page manual and a full set of schematics. This is 30 pages more than the PROII manual.

ENHANCEMENTS AND NEW FEATURES

In developing the IC-7800, Icom have evidently learnt much about the design of high performance receivers. This has enabled them to reappraise and optimise the front-end circuitry of the IC-756PROIII to make a significant improvement to the overall dynamic range.

The receiver front-end configuration may be optimised to suit different requirements with two selectable pre-amplifiers and three levels of signal attenuation. Preamp 1 has a gain of about 10dB and preamp 2 a gain of about 16dB for use on all frequencies above 1.6MHz. This arrangement was also provided with the PROII. However, in the PROIII the design of the preamplifiers has been taken from the IC-7800. Preamp 1 is a noiseless feedback design with push-pull bipolar amplifiers. Preamp 2 is a single ended bipolar design with feedback.

Larger inductors have been used in the front-end bandpass filter as small inductors can suffer from magnetic core saturation with large signals. Lower distortion diodes (presumably with higher switching currents) are used for filter switching and also relays in parts of the signal path. A fundamental-mode monolithic crystal filter is used for the 64MHz roofing filter instead of the usual overtone-mode filter. This has improved strong signal handling characteristics and is the same 15kHz filter as used in the IC-7800.

Other changes introduced with the PROIII are relatively minor. The mini-scope function and twin time zone clock have already been mentioned and a screen saver function is provided for the LCD (this can be switched off). More comprehensive tailoring of the SSB transmit bandwidth is provided and for RTTY an eight channel transmit memory store is now included. A built-in RTTY decoder was first included with the IC-756PRO model, displaying decoded 45 baud / 170Hz shift RTTY signals on the LCD screen. The RTTY transmit memories in the PROIII each store up to 70 characters as in the IC-7800, but with the universal use of PC driven RTTY applications I really don't see much need for these stores.

MEASUREMENTS

The full set of measurements is given in the table when powered from the PS-125 mains PSU. Additional comments are as follows.

RECEIVER MEASUREMENTS

The sensitivity was some 10dB better than the PROII on 136kHz, 4dB better on 50MHz and similar on most of the HF bands. The sensitivity on LF was good down to below 50kHz. With the higher gain preamp in circuit, preamp 2, the sensitivity is about 2 - 3dB better than with preamp 1. Note that no preamp is selectable on 136kHz. The S-meter reading is independent of mode. The rejection of images, IFs and other spurii was exceptionally good, in excess of 100dB in most cases except for the second mixer image at about 80dB. AGC decay times were as specified and although the initial AGC attack time was fast, it took around 200ms to settle the last dB, similar to the PROII.

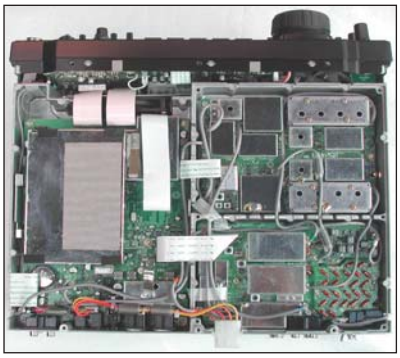
The filter bandwidths shown in the table are just a small selection from the filters available and the shape factors and steep skirts are excellent in most cases. However, the skirts measured with 500Hz and 250Hz filters (and probably other bandwidths in this region) were noticeably wider than the PROII and similar to the PRO figures, for reasons unknown. The response was clean and measurable down to -70 to -80dB.

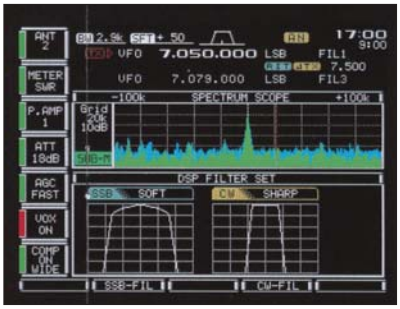
The third order intercept has been improved substantially over the PROII with a third order intercept measured

Left to right: IC756PROIII top view with cover removed.

The IC-756PROIII transmitter PA.

The IC-756PROIII's automatic ATU.





Left, top to bottom: Bottom view with the cover removed.

The TFT LCD screen display.

The preamplifiers and bandpass filters.

with 50kHz generator spacings in excess of +30dBm over most of the HF range giving a dynamic range in excess of 104dB in SSB bandwidths. This is an outstanding result. The front-end blocking figures were also improved by a similar margin. The close-in dynamic range and reciprocal mixing figures are similar to the PROII. The roofing filter bandwidth appeared slightly wider than the PROII. The inband intermodulation figures were outstanding, even better than the excellent PROII results.

TRANSMITTER MEASUREMENTS

The power output figures in the table were measured with the ATU out of circuit. The ATU introduced an additional loss of about 10%. The CW rise and fall times were fairly sharp at the default 4ms setting. However, with 8ms the envelope was optimally rounded. There was about 30% character shortening at 40WPM with full break-in but no character shortening on semi break-in. The SSB results were clean with reasonably low distortion and the speech processor resulted in very little degradation of the distortion products.

ON-THE-AIR PERFORMANCE

Similar to the PROII, the first thing you will see when you turn on this radio is the start-up screen saying that the DSP is calibrating. This takes 10seconds and you can add your call-sign or other short message to the start-up screen. Overall I found the radio an excellent performer, easy and intuitive to use with all the features that anyone could possibly want and well implemented. The filtering features were excellent, the IF filter performance, PBT and notches all performed extremely well. I generally preferred the sharp filter setting on SSB in most cases as the fidelity was improved but the soft setting perhaps had advantages when signals were very weak. On CW there appeared to be less difference in practice between the sharp and soft filter settings.

The receive performance was exceptionally good on all modes and there was no trace of any strong signal problems observed even with the preamps switched in circuit. The receiver sounded quiet and yet was very sensitive pulling in the weakest of signals. This resulted in excellent audio quality particularly on headphones or external speaker, the internal speaker gave good communications quality. The performance extended well down into the VLF region and sounded good on medium wave broadcast AM. The built-in RTTY decoder performed effectively as did the voice recorder, memory keyer and spectrum display. The transmit performance was good overall and CW break-in effective. The audio transmit quality was good and tailorable to many different microphones.

The default setting for the LCD panel gave a rather dim display. Increasing the brightness to maximum and adjusting the contrast gave a much better result. The viewing angle is very good for a LCD. The overall ergonomics of the LCD, the set-up screens and the context sensitive buttons makes the radio very friendly to use.

CONCLUSIONS

The IC-756PROIII improves still further on an already well-respected design for HF and 50MHz. With all the features anyone could wish for, an outstanding electrical performance and being easy to use this radio should continue to prove a popular choice. It is currently available discounted for around £2100.

I would like to thank Martin Lynch & Sons and Icom for the loan of the equipment. ♦

ICOM IC-756PROIII MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

	SENSITIVITY SSB 10dBs+n:n		INPUT FOR S9	
FREQUENCY	PREAMP 1 IN	PREAMP OUT	PREAMP 1 IN	PREAMP OUT
136kHz	-	1.4µV (-104dBm)	-	180µV
1.8MHz	0.14µV (-124dBm)	0.32µV (-117dBm)	14µV	45µV
3.5MHz	0.13µV (-125dBm)	0.32µV (-117dBm)	13µV	45µV
7MHz	0.11µV (-126dBm)	0.32µV (-117dBm)	13µV	45µV
10MHz	0.14µV (-124dBm)	0.35µV (-116dBm)	16µV	50µV
14MHz	0.14µV (-124dBm)	0.35µV (-116dBm)	16µV	50µV
18MHz	0.16µV (-123dBm)	0.40µV (-115dBm)	16µV	50µV
21MHz	0.16µV (-123dBm)	0.40µV (-115dBm)	16µV	50µV
24MHz	0.16µV (-123dBm)	0.40µV (-115dBm)	18µV	56µV
28MHz	0.16µV (-123dBm)	0.45µV (-114dBm)	16µV	56µV
50MHz	0.16µV (-123dBm)	0.35µV (-116dBm)	11µV	40µV

AM sensitivity (28MHz): 0.9µV for 10dBs+n:n at 30% mod depth. FM sensitivity (28MHz): 0.22µV for 12dB SINAD 3kHz pk deviation. AGC threshold: 0.7µV. 100dB above AGC threshold for +1dB audio output. AGC attack time: see text. AGC decay time: see text. Max audio before clipping: 2.0W into 8Ω, 2.3W at 10% distortion. Inband intermodulation products: typically better than -60dB

S-READING	INPUT LEVEL SSB	
(7MHz)	PREAMP 1 IN	PREAMP 1 OUT
S1	1.0µV	3.5µV
S3	1.6µV	5.6µV
S5	2.8µV	10µV
S7	5µV	20µV
S9	13µV	45µV
S9+20	110µV	400µV
S9+40	700µV	2.5mV
S9+60	5mV	18mV

	SHARP IF BANDWIDTH		SOFT IF BANDWIDTH	
FILTER	-6dB	-60dB	-6dB	-60dB
10kHz	10.8kHz	16.8kHz	-	-
6kHz	6.6kHz	10.8kHz	-	-
2.4kHz	2525Hz	3540Hz	2370Hz	3520Hz
500Hz	514Hz	1015Hz	541Hz	1130Hz
250Hz	248Hz	673Hz	261Hz	622Hz
100Hz	108Hz	204Hz	112Hz	243Hz
50Hz	63Hz	142Hz	65Hz	165Hz

	INTERMODULATION (50kHz Tone Spacing)			
	PREAMP 1 IN		PREAMP OUT	
Frequency	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
1.8MHz	+18.5dBm	102dB	+28.57dBm	104dB
3.5MHz	+20.5dBm	104dB	+33dBm	107dB
7MHz	+21dBm	105dB	+33dBm	107dB
14MHz	+21.5dBm	104dB	+32dBm	105dB
21MHz	+19dBm	101dB	+30.5dBm	104dB
28MHz	+18dBm	101dB	+29dBm	102dB
50MHz	+12dBm	97dB	+23.5dBm	100dB

	CLOSE-IN INTERMODULATION ON 3.5MHz BAND			
	PREAMP 1 IN		PREAMP OUT	
Spacing	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
3kHz	-29dBm	71dB	-18dBm	73dB
5kHz	-27.5dBm	72dB	-16.5dBm	74dB
7kHz	-24.5dBm	74dB	-13.5dBm	76dB
10kHz	-15.5dBm	80dB	-4.5dBm	82dB
15kHz	-0.5dBm	90dB	+10.5dBm	92dB
20kHz	+13dBm	99dB	+24dBm	101dB
30kHz	+16dBm	101dB	+28.5dBm	104dB
40kHz	+19dBm	103dB	+31.5dBm	106dB
50kHz	+20.5dBm	104dB	+33dBm	107dB

FREQUENCY OFFSET	RECIPROCAL MIXING FOR 3dB NOISE	BLOCKING PREAMP 1 IN	BLOCKING PREAMP OUT
2kHz	81dB	-38dBm	-25dBm
3kHz	83dB	-38dBm	-25dBm
5kHz	87dB	-38dBm	-25dBm
10kHz	93dB	-36dBm	-23dBm
15kHz	97dB	-29dBm	-16dBm
20kHz	99dB	-18dBm	-5dBm
30kHz	103dB	-2dBm	+9dBm
50kHz	106dB	+2dBm	+13dBm
100kHz	113dB	+2dBm	+13dBm
200kHz	118dB	+2dBm	+13dBm

TRANSMITTER MEASUREMENTS

	CW POWER		INTERMODULATION PRODUCTS	
FREQUENCY	OUTPUT	HARMONICS	3rd order	5th order
1.8MHz	102W	-60dB	-35dB	-50dB
3.5MHz	104W	-64dB	-36dB	-48dB
7MHz	103W	-70dB	-35dB	-50dB
10MHz	104W	-70dB	-36dB	-52dB
14MHz	104W	-70dB	-30dB	-44dB
18MHz	104W	-63dB	-31dB	-46dB
21MHz	104W	-67dB	-34dB	-41dB
24MHz	104W	-70dB	-34dB	-48dB
28MHz	104W	-69dB	-28dB	-48dB
50MHz	101W	-64dB	-28dB	-40dB

Intermodulation product levels are quoted with respect to PEP.

Carrier suppression: >60dB. Sideband suppression: >70dB @ 1kHz. Transmitter AF distortion: <1%. Microphone input sensitivity: 2mV for full output. SSB T/R switch speed: mute-TX 12-30ms, TX-mute 1ms, mute-RX 24ms, RX-mute 1ms.

NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on SSB with receiver preamp switched in and with 2.4kHz bandwidth sharp filter selected.

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The completed kit with a Morse hand key for size comparison.

The Walford Brent single-band CW transceiver kit

Keen constructor Steve Hartley, GOFUW, reviews one of the latest kits from Tim Walford's 'Somerset' range.

I have been building radios for over 20 years now but I still get a buzz from putting a new bit of kit together and using it on the air. I know it is not everyone's cup of tea but, contrary to popular belief, quite a number of amateurs do still build their own equipment.

My shack is a mixture of commercial and 'homebrewed' gear, including a number of items built from commercially-available kits. I was therefore very pleased to be asked to review one of the latest kits to hit the market, the Brent transceiver from Tim Walford's Somerset range. The range includes receivers, transmitters, test equipment and a host of station accessories, each one graded as 'simple, 'intermediate' or 'advanced'.

WHAT DOES IT DO?

The Brent is a single-band transceiver specifically designed for Morse code (CW) operation. The version I built was configured for 3.5MHz (80m) but it can be supplied for use on any band up to 14MHz with an additional mixer kit. It features adjustable sidetone volume, so you can hear what you are sending, and full break-in, which means that you can listen between your 'dits' and 'dahs'.

The direct conversion receiver has a narrow audio filter built in and provides lots of output into 64Ω headphones, the type normally supplied with personal stereos. The transmitter is rated at 1.5 watts of RF output but the one I built produced a full 2 watts with a 13.8V DC supply. The transceiver will work with a 9V supply but the transmitter output is reduced by about 50%.

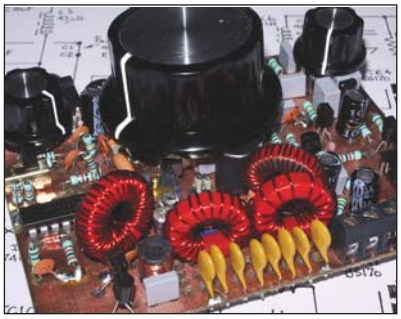
HOW DOES IT WORK?

Direct conversion receivers normally employ a variable frequency oscillator (VFO) that drives both the transmitter and the receiver. In the receiver it acts as a beat frequency oscillator to produce the audio signals that are then amplified. Some designs suffer from lots of broadcast breakthrough (BCI) but the Brent has lots of filtering at both RF and AF stages to minimise that risk.

Another feature of direct conversion receivers is that you can tune in each signal twice, once when the VFO is above the signal frequency and once below it. This can be a disadvantage as it effectively doubles the number of signals you can hear, but is counteracted here with a very narrow audio filter. The ability to tune either side of the wanted signal can be an advantage in avoiding other stations (QRM).

If the VFO is on exactly the same frequency for transmit and receive you can miss-tune, putting your replies a couple of kHz away from where you want them to be. The provision of receiver independent tuning (RIT) solves this problem and the Brent has very effective RIT. The trick is to set the RIT to 'zero' (ie no offset) whilst you tune around the band, zero beat the station you want to work, then use the RIT to fine tune the CW tone. That means that when you transmit, your signal will be on exactly the right frequency. I have used this kind of system on several direct conversion transceivers. It sounds a bit tricky but it is easy to use and works extremely well.

The instructions supplied with the kit include an excellent technical description of the circuits. I do not have room to repeat them, but here is a brief run-down. The Brent's VFO is actually a 3.58MHz ceramic resonator that is pulled across a 100kHz range. A 74HC04 integrated circuit is used as oscillator, buffer amplifier and keying stages. A single 2N3819 acts as product detector and 8 BS170s make up the rest of the AF and RF circuits. I was rather sceptical at the thought of two BS170s, wired in parallel, producing over a watt of RF output, but they do.



Close-ups, showing the density of components to be mounted on the PCB.

WHAT DOES THE KIT INCLUDE?

The Somerset range of kits all use an 'open' style of construction - they use a printed circuit board as a base and do not need to be boxed. Some have front panels on which to mount the tuning controls, switches, etc. If you haven't seen this format before there are some very clear pictures on the Walford Electronics website (see 'Web search' below).

The Brent does not have a front panel but lays flat on the tabletop. This means that the kit can be used within seconds of completing the soldering (many of my projects have taken longer to box up than populating the PCBs and testing the circuits!) You can put the Brent in a box if you wish and the instructions include advice on the best way to do this.

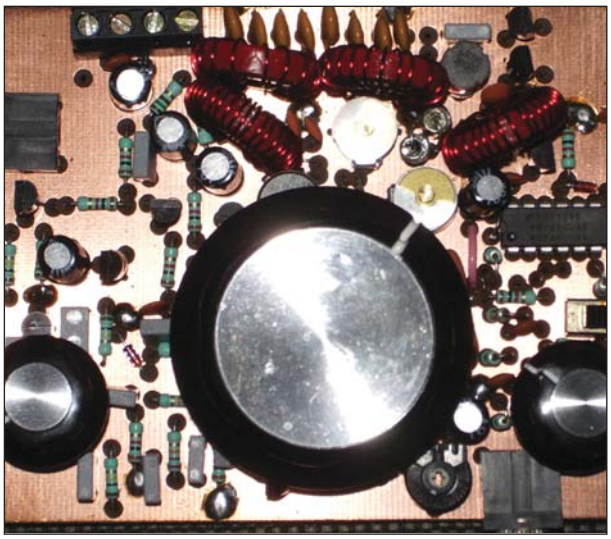
The kit comes as a complete set of brand new top quality components, wire, a PCB (80 x 100mm), three knobs and rubber feet to sit it on. Not bad for under £40. The only things you need to supply are some solder and the tools to do the work - a soldering iron, a pair of side-cutters and a small screwdriver. You will of course need a power supply, a Morse key and an antenna to operate the transceiver once it is finished.

There are several add-ons that you can also build; a 10W linear amplifier, a digital frequency display, an S-meter etc. The circuit itself has scope for personalisation with many hints and tips within the instructions.

HOW EASY IS IT TO BUILD?

This kit is rated as an 'intermediate' project, meaning that it may not be the best choice for a first attempt at kit building. I would endorse that, as the PCB is quite densely populated (see photograph) and positioning the parts takes quite a bit of skill and patience. That said, if the instructions are followed carefully, there is no reason why a conscientious student on an Intermediate Radio Communications course could not successfully complete one for their assessment project. Apparently the PCB is deliberately kept to half of a 'standard' card to minimise wastage and keep the costs down.

The construction is split into 10 stages, each one followed by simple tests to ensure that it works before you move on to the next step. This is an excellent way to progress and allows any faults to be spotted and rectified very quickly. I have seen some instructions that require you to complete the whole project before any test is carried out, making fault-finding and reworking very tricky.



The receiver is completed in the first six stages and mine worked straight away with a solid 579 signal from a Scottish station clearly heard. Coil winding is often seen as 'the hard bit' of any radio project, but I am never sure why. The Brent has four inductors to wind, two in the receiver front end and two in the low pass filter that is used both on transmit and receive. These are wound on T68 toroids, like big red Polo mints, and if you follow the instructions the process is quite straightforward.

Adding the transmit circuitry follows much the same routine with more tests in between each of the four stages. There is nothing to set up once the final stage is complete but a test into a dummy load and power meter will confirm that all is well. My kit gave a full 2W out and monitoring on the main shack receiver showed the keying action to be very clean.

I don't have a major test laboratory but I did build myself a Simple Spectrum Analyser (SSA) last year (see *Test Equipment for the Radio Amateur* for details). Monitoring the Brent's output with the SSA showed no signs of harmonics or any other spurious emissions, so I decided to give an on air test.

HOW DOES IT WORK ON AIR?

My first test was carried out by arranging to meet my good friend Brian Davis, 2E0BGD, for a 'sked'. Brian lives less than a mile away and not surprisingly, we managed a solid contact. I was more interested in the quality of the signal, rather than the strength and Brian confirmed that the Brent sounded good over the air. I was very pleased with the full break-in – no transmit switching or noisy relays clicking over.

Next day I ventured on to the band proper - and found it to be devoid of signals. A hastily-arranged sked with fellow instructor Peter, G4OST, some 20 miles away, produced a noisy QSO but we did exchange callsigns and reports. Just before 1600 I heard a station calling CQ and called in. Peter, G3ICH, in Eastleigh came back with 539 and we had a steady contact for about 20 minutes.

That evening I joined Ian, G3ROO, during his slow Morse practice. Ian lives near Dover and gave me 579. Tuning around I found Brian, 2E0BGD, just finishing with F6GEO so I tail-ended and Mike gave me 559 from near Lille. By the way, my 80m antenna is a 1/4λ inverted-L, fed against ground and just 5m above the ground.

SO WHAT'S YOUR CONCLUSION?

I think the Brent is a fine little kit. Using it reminded me of my early days on the HF bands when my only rig was a home-brewed 3.5MHz CW transceiver. However, the Brent has a much better receiver circuit than my old radio and the transmitter has a bit more power too.

The only adverse comment I have is that the PCB has lots of parts in a very small space and some constructors may find this tricky. If you have never built anything before you could find it hard going. However, the kit is not sold as a 'simple' beginners project and as such there should be no surprises.

If you are looking to get started on the HF bands, or you want to try operating with low power, then you could do a lot worse that trying the Brent. I can see this kit gaining much favour with Summits on the Air (SOTA) activators - it is very portable!

WHERE CAN I GET ONE?

The full kit of parts for the Brent transceiver costs £34, plus £2 postage and packing, and is available from: Walford Electronics, Upton Bridge Farm, Long Sutton, Langport, Somerset TA10 9NJ; tel: 01458 241224; e-mail: walfor@globalnet.co.uk ♦

FURTHER READING

Test Equipment for the Radio Amateur by Clive Smith, G4FZH, 3rd Edn, RSGB 1995. Available from RSGB Shop at a members-only special price of just £5.00 (non-members £12.99).

WEB SEARCH

Walford Electronics:	www.users.globalnet.co.uk/~walfor

Book & CD review

RADCOM 2004 (VOLUME 80) CD

RSGB Publications

Reviewed by RSGB HQ Staff

What a busy year 2004 was! Down the year *RadCom* reviewed its usual array of equipment from the formidable Icom IC-7800 to the humble 'Wonder Wand' HF / UHF portable antenna. *RadCom* also carried reports of the 3B9C and 7Q7MM DXpeditions along with articles covering diverse subjects from the D-Day 60th anniversary commemorations to Project Goodwill Albania. There was much talk about small loops and Internet linking NoVs . . . in fact far too much to list here! With the arrival of 2005 the *RadCom 2004 CD* has now become available. So has the time come to replace your 12 dog-eared copies of *RadCom* 2004 with the *RadCom 2004 CD*?

As you would expect, the *RadCom 2004 CD* contains all 1224 pages of *RadCom* published last year in easily-readable form. On inserting the CD into your drive, you are presented with a clear and easy to use interface. The interface provides a list of each monthly edition alongside an index section and a 'welcome' file, plus links to bonus material on the CD. Clicking on any link opens individual monthly *RadCom* files in the user-friendly PDF format. The CD is compatible with versions of *Adobe Acrobat Reader 4.05* onwards, making files readable on even quite old machines.

The 2004 *RadCom* monthly PDFs each represent the 100 (or more) pages of the magazine. A small vertical strip down the left side of the screen is used for 'thumbnail' images of each page to help you to navigate through each issue. You can jump to any page you want or simply start at page 1 and work your way through to the end. Once a page is displayed on the screen, you can reduce it in size to view the whole page or, more likely, zoom in to a particular part of the page so that it fills the screen. This is ideal for the partially-sighted who require a very large print size to read articles comfortably. Any page can be printed out, for example if a diagram is needed for a construction project.

One advantage of *RadCom* 2004 being on CD is that you can find words or phrases such as "Foundation" or "M3 licence" and the first instance that word or phrase is found will be displayed, followed by any or all subsequent instances.

As with previous editions of the *RadCom* annual CD there is special bonus material included. There are samples from other *RadCom* archive CDs (*The T & R Bulletin, RSGB Bulletin* etc) which cover from July 1939 to January 1991. These samples provide a fascinating look back at the RSGB over nearly 80 years of the Society's magazine. Also included are sample chapters from two of the latest RSGB books *LF Today* and the *RSGB Amateur Radio Operating Manual 7th Edition.*

In order to read the PDF files you will need to have *Adobe Acrobat Reader* software installed on your PC. Not only is this included free of charge on the *RadCom* 2004 CD, but that supplied is *Adobe Acrobat Reader 7.0* which is the very latest version of this hugely popular program. The CD provides clear instructions of how to install the program and its system requirements.

If you no longer have all the copies of *RadCom* from 2004 or perhaps are a new member of the Society, if you regularly search through your *RadCom*s for specific items, or if you simply want to store your magazines in a small space, the *RadCom 2004 CD* comes highly recommended as a way to look back on amateur radio in 2004. [All the years from 1939 to 2003 are also currently available on CD - contact RSGB Sales for more details.]

Minimum system requirements
Pentium PC with CD-ROM drive, Windows 98 (second edition), ME, XP, or NT 4.0 (with Service Pack 5) or later, 16MB RAM, Adobe Acrobat Reader 4.05 or greater.

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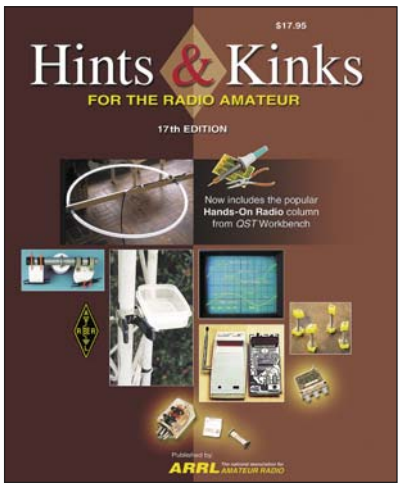
'Hints & Kinks' is a popular monthly column in the ARRL members' magazine, *QST*. It brings together the best of amateur radio tips and techniques - antennas, weekend projects, shack accessories and operating. This 17th edition of *Hints and Kinks for the Radio Amateur* includes all of those contributions published in the 2003 and 2004 *QST*s. *Hints and Kinks for the Radio Amateur* is the first place many American amateurs turn for information about new modes, new projects, and the latest tips. You'll find something on every page to solve problems, improve your operating, and simply have more fun on the air.

In addition, you'll find articles included from the *QST* columns 'The Doctor is IN' and 'Hands-On Radio'. Use these items to learn more about a new mode, or to find your next construction project. The new book has a greater emphasis on mobile and portable stations than previous editions. The book also includes an updated list of abbreviations.

The contents comprise: Equipment Tips and Mods, Batteries and Other Power Sources, Mobile and Portable Stations, Software and Computers, Troubleshooting / Test Gear Restoration, Construction / Maintenance, Antenna Systems, Operating, Around the Shack, Interference (RFI / EMC), Hands-On Radio by Ward Silver, N0AX (a new feature), Units of Measurement and Equivalents, Schematic Symbols.

HINTS & KINKS FOR THE RADIO AMATEUR - 17TH EDITION
The American Radio Relay League, Inc. 2004
160 pages, 276 x 209mm, paperback.
ISBN: 0-87259-936-1
Members' price £10.19 (non-members' price £11.99) ♦



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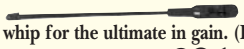

BNC 40cm flexible whip for the ultimate in gain. (Rx:- 25MHz-2GHz).

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887K (fits Kenwood) £24.95.
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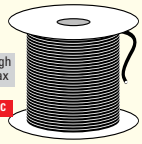

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A contact too far?

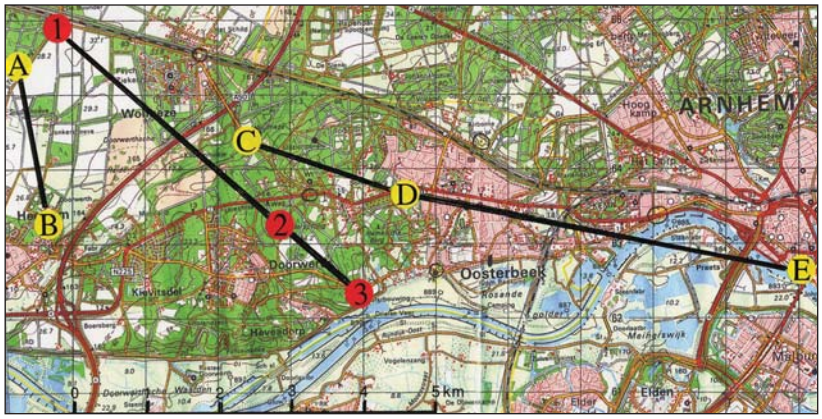


Fig 1: Map of the Arnhem battlefield area (see text).

Practical trials of Arnhem battlefield communications

UK amateurs re-enact radio communications links during the Battle of Arnhem for the Battlefield Detectives TV documentary, as Tom Robinson describes . . .

Poor battlefield communications are often cited as contributing to the British defeat at the Battle of Arnhem in September 1944 [1]. The *Battlefield Detectives* TV series, which examines the reasons for success and failure in major world battles, wanted to re-enact the communications links at Arnhem using wartime radios. Because working WS68Ps (the radios used by the infantry at Arnhem) could not be found, this part of their investigation was about to be shelved when Dr Brian Austin, G0GSF, their radio consultant, read my HF Backpacking article in *RadCom* [2]. He considered equipment similar to mine could simulate the wartime sets. I quickly accepted an invitation to join the investigation team.

EARLY TRIALS

Two backpacks needed to be assembled and field-tested prior to the filming which was to take place in 18 days. Thankfully Peter, G8BLS, readily agreed to help with backpack development and the battlefield trials.

Brian, G0GSF, assured us that 11ft ex-army whip antennas, when base loaded, would work on topband (close enough to the 2.2MHz used by the WS68Ps) without dragged counterpoises (not used with the WS68P during the battle). Tubular steel backpack frames and 11ft antennas were available so remaining decisions centred on choice of transceiver and design and construction of suitable loading coils. My Icom IC-703, with its internal auto tuner and built in SWR meter, proved so useful during coil building and testing we decided to use IC-703s for the trials. Following an appeal for help, Icom (UK) delivered a loan IC-703 in three days.

An available homebrew 80m coil connected to an 11ft whip suggested a similar coil with 10 additional turns would be suitable for both 160m and 80m. With the coil shorted the antenna was resonant in the 6m band. Two coils were made.

During coil testing the resonant frequency at any tap varied wildly as the degree of coupling of the frame and body to ground changed. The resonant frequency was most sensitive to the nature of the footwear worn. Experiment showed that bare feet gave the best result: almost 1:1 SWR and little variation with movement! Bare feet being impractical, I compromised with a pair of old working boots with anti-static soles. Peter chose high ankle parachutist's boots.

The second backpack was put together with the newly-arrived loan IC-703. Preliminary field-tests on open heathland showed it to be a good replica of the first pack. Both put out readable AM signals on topband. Clearly we had a realistic chance of meeting the requirements for the work to be done at Arnhem. These requirements were to operate AM on 160m and 80m at 0.25W and 1.0W respectively using an 11ft antenna and no counterpoise, thereby simulating the operation of the WS68P and WS22. Additionally we wanted to operate with 0.5W FM on 6m to simulate the VHF sets that were beginning to be used in 1944 [3]. The IC-703s proved easy to adjust and calibrate accurately.

After calibration we carried out a few tests over 3km of open land near salt marsh. Using 1W and 0.25W AM the signal reports were respectively 59+40dB and 59+20dB each way, on both 160m and 80m. This was a gratifying reward for the work done developing the backpack systems. We were easily able to change bands, modes and power levels at will, as required. As a final touch we waterproofed the backpacks by adapting bicycle pannier covers to slip over the packs, with antennas deployed, thereby allowing operation in the rain.

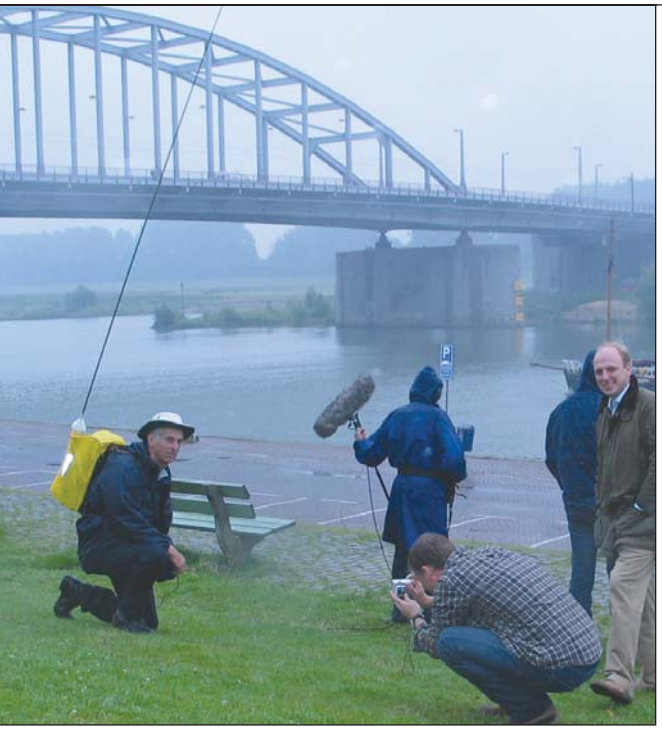
IN ARNHEM

We flew to Schipol and drove to Arnhem. Over dinner we met the *Battlefield Detectives* producer / director, assistant producer, cameraman, soundman and the consultant military historian. We were told a whole day was to be devoted to the 'radio topic'. A working WS68P had just been located 20km away from Arnhem. It would be able to take part in the radio trials operated by Dutch amateur Gerrit Siebers, PA0GSB, and military radio enthusiast Jan v d Riet, the owner of the WS68P.

Next morning we met Gerrit and Jan and drove to **position A** on the map (see **Fig 1**). This is in the middle of the area of landing zones for the gliders which brought troops, jeeps and light artillery to the battle, and the dropping zones for the parachutists.

Peter, Gerrit and Jan were filmed setting off to **position B**, from where two of the Para battalions set out towards the bridge at Arnhem. Radio communications between **A and B** were tested to examine the difficulty of communicating around the area of the landing zones. The IC-703s had no problems at all and a link was also established with the ageing WS68P although this was not on par with that between the modern radios. During the 1944 battle there was little difficulty communicating over this route.

Peter, Gerrit and Jan (now called 'mobile station') then moved to **position C** near Wolfheze, the area where the Air Landing Brigade had its HQ during the battle, while Tom



Left: Peter, G8BLS, at 'the bridge too far', Arnhem. He is being photographed by the Battlefield Detectives director. The military historian looks on whilst cameraman and sound recordist turn their backs to the rain. Centre: Gerrit and Jan don the WS68P. Bottom: Tom, G0SBW, and Peter, G8BLS, with their backpacks outside the Airborne Museum (originally the Hartenstein Hotel, the 1st Airborne Division's HQ in 1944) at Oosterbeek.

('base station') went to **position D** at the Airborne Museum in Oosterbeek. In 1944 this was the Hartenstein Hotel which was used as 1st Airborne Division's HQ. The two IC-703s had no difficulty communicating over this relatively short distance and it was also possible to hear the WS68P, though this seemed to be having some problems. During the battle the WS68Ps also had difficulty communicating over this route.

'Mobile station' then went to **position E**, at the north end of the bridge at Arnhem, the site made famous by Lt Colonel John Frost and 2 Para. 'Base station' remained at the Divisional HQ site. At the bridge, in the centre of a busy town, Peter suffered from a high level of background noise and could not hear Tom's AM transmissions. Tom, in a quieter radio environment, could just hear Peter and, for a short period, Gerrit and Jan with their WS68P.

Throughout the trials Peter and Tom were used as the film crew's 'signals unit' and easily communicated with 0.5W of FM on 6m.

Apart from the noise problem at the bridge there was little difficulty using 0.25W of AM from the IC-703s. At the end of this first day Peter and Tom considered that something other than propagation might have caused the communications problems experienced during the battle.

It took a whole day to shoot a relatively small piece of the overall programme. We had left the hotel at 9.00am and did not return until 7.30pm. However, it was interesting to work with a professional film crew. We noted filming continued despite the onset of rain. Peter and I were pleased we had made the rain covers for the backpacks. We would not have enjoyed being the reason for calling off the shoot.

ADDITIONAL TESTS

After discussion with the programme's military historian Peter and I set out to the next morning to examine propagation along part of the route followed by 2 Para. Unfortunately time was against us and we only managed to transmit from **points 1 to 2 to 3**, marked by the red dots on **Fig 1**. Tom remained at 1 and Peter operated from 2 and then 3. The results were interesting:

* **From point 1 to 2**, RS 51 and 41 for 1.0W and 0.25W AM respectively on 1970kHz, with very similar reciprocal reports. However, with 0.5W FM on 6m the reports were 57 in each direction. The distance from **1 to 2** is 4km.

* **From 3 to 1** Peter could not hear Tom at all on 1970kHz AM due to strong background noise. Tom, at **1**, received Peter's signals from **3** at 51 (just above the noise level) at 1.0W AM but could not hear him at the 0.25W AM level. Switching to 0.5W FM on 6m resulted in 55 reports each way. The improvement using 6m FM was expected and quantified the subjective assessment made the day before.

Distance, ground clutter and background noise appear to be the major factors affecting AM propagation over the paths studied. Variation in the RF nature (conductivity, dielectric constant) of the ground paths would also have been very important, comparing the Arnhem results with those obtained during the final field tests in England, where excellent, long-distance signal reports were achieved over clay, salt marsh and salt water. Unfortunately we were not able to assess ground variation at Arnhem (I believe a geologist did examine this the day after we returned home but I am unaware of his findings).

Route A to B is 2.3km, flat and almost treeless. **C to D**, also 2.3km, is full of trees. **D to E** although 5.5km long is 50% over built-up areas and 50% over river and associated wet ground. **Route 1 to 2** is 4km, has 40% flat, open ground followed by dense, tree-covered ground rising 20m. From **2 to 3** is mainly dense forest, the distance is 1.5km and there is a marked 20m drop in elevation.

The fall off in propagation was, generally, proportional to the length of the path. Ground clutter (buildings and forest), and maybe topography, also seemed to have major negative effects. However, theory suggests ground wave should not be particularly attenuated by passing through forest or by minor topographical undulations.

As might be expected, in areas of weak signal, background noise level was a limiting factor to comprehension. At **E** it was assumed the high noise level was from offices etc in the town centre, close by the bridge. However, at **point 3** there is only a restaurant building - maybe the noise was somehow associated with the river which was very close at both **points E** and **3**?

CONCLUSIONS

The second day test results changed our earlier view that there did not seem to be any major problems in using low power AM on 160m for communications. We clearly experienced the same problems as the airborne troops in 1944 as they moved from open ground to wooded areas, even though we used excellent, modern transceivers. We agree with the findings of the *Battlefield Detectives* that bad communications during the battle was more due to poor choice of equipment than poor performance of the operators.

It seems more study and practical field trials are required to develop a better understanding of low power, short range, 160m propagation.

One thing not in doubt is that for Peter and me the *Battlefield Detectives* experience was one of the most interesting amateur radio projects we have undertaken. It required quick development and testing of equipment systems to operate in fields not normally explored by amateurs, gave exposure to the worlds of the film-maker and military historian and provided a great introduction to practical propagation study.

My thanks to Peter, G8BLS, for being an excellent partner; Brian, G0GSF, for assisting our understanding of what was required; Icom (UK) for the loan of the IC-703; and the *Battlefield Detectives* team for providing the opportunity to take part in their venture. ♦

REFERENCES

[1] 'RadCom News', September 2004 (page 10).
[2] 'HF backpacking, or operating 'pedestrian mobile", Tom Robinson, G0SBW, *RadCom* June 2004.
[3] 'Evolution of near vertical incidence skywave communications and the Battle of Arnhem', Dr Brian Austin, G0GSF, IEE Proc-Sci Meas Technol, Vol 149, No. 2, March 2002.

EDITOR'S NOTE

Look out for the *Battlefield Detectives* programme on the History channel soon. At the time of going to press it is expected to be broadcast during February but we do not have a precise date.

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Steve Hartley, G0FUW

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

Newcomers' news

This month, a detailed account of what it is like to attempt all three Radio Communications Examinations in one weekend - and pass!

Lots of input from readers this month, so without further ado let's start with news from the Peterborough and District Amateur Radio Club.

Alan Ralph, G8XLH, is the Lead Instructor for the Peterborough club and he has been working very hard to run classes for some time now. So much so that the final course of last year saw the club's 100th successful student. Congratulations to every one of them and, of course, to Alan and all the club members who help out with the training, assessment and examination work.

Due to circumstances beyond the club's control, its exam centre was not available for the agreed exam date. It looked like the course and exam might need to be cancelled. However, the local Air Training Corps (ATC) offered the use of their facilities and the RSGB fast-tracked the centre registration to ensure the course and exam went ahead. Teamwork at its best!

I have had reports of other clubs finding it difficult to comply with the requirement to hold exams in 'a public place' due to low student numbers and high room rental costs. Peterborough's example is one possible route for others to consider, assuming you have a friendly neighbourhood ATC, that is.

NEWCOMERS AHOY!

Geoff Spurr, G0PFH, has written with some information in response to the appeal for information about off-shore amateur radio nets from Paul Clark, M3FPC, (see December 2004 'Newcomers' news'). Whilst Geoff cannot offer off-shore platform radio activity, the callsign of the Halifax Radio Society will be used Maritime Mobile (/MM) for the first time in March. Listen out for sea-going newcomers G2UG/MM operating from the Mediterranean between 16 and 20 March. Operation is planned for 14MHz but other bands may be used as conditions allow. Good luck!

FAST TRACK FULL LICENCE

Gavin Andrews, M0ETA, was one of the first candidates to sit all three UK Radio Communications Examinations (Foundation, Intermediate and Advanced) in one weekend. I asked Gavin about how he became interested in amateur radio and his experience of self-training.

"My interest in amateur radio stemmed from my telemetry experiments for orienteering radio controls and an interest in telegraphy from family fun on PMR-446 (licence-free hand-helds). A number of '446 users pointed me towards the amateur licence but I found it impossible to find a local course for the Foundation. Eventually I was pointed at the RSGB HF Convention as a place to take the exams and so I surfed off to Ofcom to establish exactly what was involved.

One of these fine chaps was the 100th successful student at the Peterborough & District ARC (see opening paragraphs).

"It looked good; the Foundation would give me access to the VHF and UHF bands for the digital modes that I was after. Then I noticed that my telemetry hardware would qualify as a radio project for the Intermediate assessment and after that it all got a bit out of hand. I realised that Advanced was the qualification to aim for, as it bestows international recognition. I printed out the syllabus, joined the RSGB, bought the textbooks, downloaded the brilliant *QADV* training tool by G3KZB [see 'Web search' below] and signed up for all three exams.

"In order to lighten the load at the Convention I wanted to have the Foundation practicals done in advance. G4FON of Newbury DARS allowed me to join in their Foundation course at the last minute. I was not able to take the Foundation exam at Newbury since I had not given sufficient notice of my plan to attend . . . so onwards to the Convention.

The beginners FM receiver by HL2DUS (see 'It's in the can').

"Despite having dabbled in electronics since an early age I set out to study hard and spent at least two hours a day for six weeks supported by an ever-increasing network of helpful contacts.

"Totally crammed I arrived at the HF Convention into a calm world of experts with the buzz of the Convention in the air. The whole experience was great. We worked through the remaining sign-offs for the Intermediate and my RF plug was eventually crafted to a level that was deemed suitable by an examiner whose own experience and enthusiasm was awesome! [Take a bow Brian Reay, G8OSN].

"A minor crisis caused by the fact that I was unaware that I needed to memorise the resistor colour code was overcome by a chance meeting with Billy Brown and Violet Grey. Then the exams . . . Foundation OK . . . Intermediate OK . . . Advanced . . . a four week wait . . . A PASS!"

A great account of what can be achieved in a fairly short timescale. Gavin now has his Full licence, a second hand FT-890 and he has started running the Koch CW Trainer (see 'Web search' below). He has even been on his first ARDF fox-hunt! I am not sure how many others will want to follow in Gavin's footsteps but it is intended to repeat the 'three exams in a weekend' at the HF Convention 2005. See you there?

IT'S IN THE CAN

Park Khy-Ho, HL2DUS, in Korea, and I exchange correspondence from time to time. Park is a keen constructor and he sent me word of his latest 'beginners' project, an FM receiver based on the TDA7000 integrated circuit.

He says that it works well but he would like to improve the audio amplifier (currently an LM386). Park's picture shows how he recycled an empty tuna tin to make an unusual radio enclosure. Any other good ideas out there? ♦

WEB SEARCH

Koch CW Trainer (updated): www.g4fon.co.uk
QADV Advanced Questions Software: http://freespace.virgin.net/murray.g3kzb

Hilton Willott, MW0OPS

1 Sycamore Avenue, Chepstow, Monmouthshire NP16 5RH.

E-mail: HWILLOTT@aol.com

Where was the sun and the beer, then?

MW0OPS's first forays into /P contesting

The peak of Twmbarlwm is exposed to winds from all directions.

Newly upgraded from an MW3 call to MW0OPS ("how appropriate", he says), Hilton Willott decided to try a 2m contest from a portable location in the Welsh mountains. Sheep, fell runners and Pentecostalists become his bemused companions in a series of adventures which are all part of the fun of VHF portable contesting.

Firstly, an introduction. I class myself very much as a newcomer to amateur radio, having received the Foundation call MW3HNW in July 2002 and then MW0OPS in February 2004. In order to improve my operating skills and to take a more active part in the hobby I thought I would have a go at a contest. Seduced by the idyllic photos in *RadCom* of operators sat in lush green fields in warm sunshine sipping a glass of cool beer, I thought this would be for me so I duly resolved to take part in the RSGB 144MHz Activity Contest in May 2004.

MY FIRST CONTEST

I made what I thought were the necessary preparations with the gear. The Icom IC-706 MkIIG was put in a nice aluminium case and a 10AH sealed lead acid battery charged. I found part of an old marine SSB whip to use as a mount for the Tonna 9-element antenna and made up some lengths of coax to mount it away from the car. I had copied the contest forms from the RSGB VHF Contest Committee website (thanks for a great site), put my specs, pens, compass and string in a box and duly altered my watch to UTC. This lot plus a few tools were loaded into the car. I had previously picked out a very quiet site not far from my home at about 200m ASL, where I had spotted a remote gateway with a nice post by it to which to lash the pole. The location was not ideal, as the line of sight to the east was obstructed, but it would certainly fit the bill for a first foray into the black art of contesting.

BE PREPARED . . .

I arrived on site just as the Welsh monsoon was doing is worst, 30 knots of wind and torrential rain - where was the sun and the beer? The rain abated for a few minutes so I started to set up the antenna but fell into the newly lubricated mud. My hands were filthy so in the absence of any towel or rags I resorted to wiping my hands in the long grass to clean them. The hands were cleaned but my feet were soaked by the water-laden grass. No worries, the antenna was up and with the aid of the compass I pointed it in the general direction of human habitation more in hope than expectation. I was tempted to turn it towards a curious pigeon in a nearby bush and study the effects of RF but as I only had a few minutes to the start I had to focus on the task in hand.

1903UTC and my first QSO. Excellent, things were working out OK. I made another few contacts in the next half hour and things dried up a bit so an alteration in beam heading was called for. Not learning from the previous incident I had another dive into the mud. More hand wiping in the grass, another load of water into the shoes. Back to business and a few more QSOs. At this point it got dark so the pen I had lost in the fall would have to stay lost. No-one warned me of this and to make matters worse the moon was subject to a total eclipse that evening. No bother, the car interior light would be OK. At the next change of beam heading I realised that the council had failed to provide a convenient street light to find the antenna. It gets ever so dark in the countryside. I continued to make some more contacts and by 2015UTC I had 21. Not bad, not good, but I was pleased.

. . . FOR ANY EVENTUALITY

At this point things took a turn for the worse. The farmer whose gateway I was blocking arrived with a load of sheep. In exiting the car to communicate with the farmer I had forgotten to remove my headphones and was jerked back towards the car - he laughed. I apologised profusely and hurried to sort out the antenna to vacate the gateway. In

WEB SEARCH

RSGB VHF Contest Committee: www.blacksheep.org/vhfcc/index.html
Black Sheep Contest Group: www.blacksheep.org

Author Hilton Willott, MW0OPS, at the start of the 20-minute walk to the top of Twmbarlwm.

the pitch dark I again fell victim to the mud, this time falling forwards into the hedge. At least it made a change. The farmer was very patient but I can't say the same for the sheep. I eventually cleared the gate, made my peace with the farmer and left to the sound of much baaing and bleating. The sheep sounded none too pleased either.

I moved to a site nearby, next to a steep bank. The first trip to the top of the bank to fix the antenna was not too bad but the polished mud I had left whilst slipping down on the first occasion thwarted any subsequent attempt to climb it. I made a few more contacts and decided to call it a day 20 minutes prior to the end of the contest. This was in some measure due to the action of the water on my log sheet, changing many of the entries to a blue mush. I had a long walk through a field to recover the antenna and shipped another couple of gallons of water into my shoes.

To everyone with whom I made a contact – my sincere thanks. My technique was nothing less than abysmal but the friendliness of the operators made it all worthwhile. I promise I will improve. I have already begun a checklist for the next contest. Some of the essentials are: waders, crampons, arc lights, kitchen sink (hand washing) and a sheep dog . . .

THE NEXT CONTEST

Since that occasion, I have done a few more low-key 144MHz contests. The last one was bizarre. Twmbarlwm, the Welsh mountain (Welsh for hill) that I now go to, is at 430m and it is quite a climb with the gear. The last 30m is a barren outcrop, circular in shape and 10m across. I got up there well before the start at 1930UTC and managed to get the antenna up a couple of metres in 30 knots of wind. At this point I was seriously thinking of coming down as in the dark it would be a different prospect. I had my £4.99 shelter from Lidl and by sitting in it I could keep it down. They sold it as a kid's play shelter - no change there then. It provides very good shelter from the wind but the nylon makes a lot of noise.

I was tempted to stay by hearing a DK station, the first that I had heard, let alone worked. Note the frequency and wait for the off. Just one DK would make it all worthwhile.

At this point 10 fell runners arrived and took an interest. The problem with fell runners is that having run up a hill they spit a lot and drip sweat all over the place. A nice bunch though . . . Having removed the sweat from the rig, with 30 minutes to go I settled down for a listen around.

A head appeared in the shelter. "Do you believe in Jesus?" Sat on the top of a mountain in the best part of a gale it would be churlish not to. This chap and his mates then related how he was saved whilst in prison for dealing crack cocaine. They were Pentecostalists and they then proceeded to do what Pentecostalists do on the tops of mountains, only very noisily. I could even hear them over the sound of the wind. They eventually left but the wind strengthened.

With a bit of luck on a really good day I can make 40 QSOs in a contest, so with my usual optimism I took log sheets for 60. The mayhem then ensued. 145 QSOs, 26 of them over 1000km, and 41 squares. This was my first proper pile-up on any band. It was chaos. Even just keeping the paper on the clip board was a fight, hearing a call over the noise of the wind was really challenging. I lost 30 QSOs due to inaccurate logging as the wind was so strong I had difficulty hearing many of the quieter contacts. I hope they will understand now my reasons for asking for repeated information. Hardcore ham radio. I love it! ♦

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Butternut HF-6V 80-10m	£299.95
Butternut HF-9V 80-6m	£349.95
Butternut HF-5B 20-10m	£319.95
30-MRK 30m ad for HF2V	£89.95
A-17-12 17&12 ad for HF6V	£49.95
A-6 6m ad for HF6V-X	£14.95
TBR-160S 160m HF2/6/9V	£114.95

Hustler Antennas

Hustler 5-BTV
5 Bands - 80-10m
Height 7.64m - Weight 7.7kg
SWR 1.15:1 - Power 1kW
£179.95

Hustler 4-BTV 4 Band Vert	£149.95
Hustler 6-BTV 6 Band Vert	£209.95

West Mountain Radio

RIGblaster Models

RIGblaster Pro	£209.95
RIGblaster Plus	£119.95
RIGblaster M8	£89.95
RIGblaster M4	£89.95
RIGblaster RJ	£89.95
Nomic 8P	£59.95
Nomic 4P	£59.95
Nomic RJ	£59.95

Tonna Antennas

Tonna - 20655
23cms (1296 Mhz) 55 element 21.5 dbi gain "N" 4.64m long.

Tonna 20505 6m 5el	£89.95
Tonna 20809 2m 9el	£54.95
Tonna 20811 2m 11el	£79.95
Tonna 20817 2m 17el	£99.95
Tonna 20909 70cm 9el	£45.95
Tonna 20919 70cm 19el	£59.95
Tonna 20921 70cm 21el	£74.95
Tonna 20635 23cm 35el	£64.95
Tonna 20655 23cm 55el	£89.95
Tonna 20745 13cm 25el	£69.95

Diamond Antennas

HF10FX 10m Mobile	£39.95
HF15FX 15m Mobile	£39.95
HF20FX 20m Mobile	£39.95
HF40FX 40m Mobile	£39.95
HF80FX 80m Mobile	£42.95
CR8900 10/6/2/70	£72.95
CP6 Base 6m-80m	£239.95
X50 Base 2/70	£54.95
X200 Base 2/70	£84.95
X300 Base 2/70	£99.95
X510 Base 2/70	£124.95
X700 Base 2/70	£249.95

Cushcraft Antennas

X-7 - 20/15/10 7el Yagi	£669.95
A3S - 20/15/10 3el Yagi	£499.95
A4S - 20/15/10 Yagi	£569.95
A3WS - 12/17 3el Yagi	£379.95
ASL-2010 13-32MHz Log	£749.95
MA5B - Mini Beam	£369.95
D3 - 20/15/10 Dipole	£249.95
D3W - 30/17/12 Dipole	£249.95
D4 - 40m Rotary Dipole	£349.95

Sharman Antennas

M-150GSA 1/4 2m Mobile	£11.95
M-285 5/8 2m Mobile	£13.95
NR-770H 2&70 Mobile	£23.95
SG-7900 2&70 Mobile	£31.95
CR-627 6&2&70 Mobile	£33.95
X-200 2&70 Base	£58.95
X-300 2&70 Base	£63.95
X-510 2&70 Base	£98.95
V-2000 6&2&70 Base	£68.95

Radioworks Wire Ants

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CWS-160 160-10m (133ft)	£114.95
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CWS-80 80-10m (66ft)	£109.95
CW-40 40-10m (66ft)	£84.95
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Radioworld G5RV Fullsize	£29.95
Radioworld G5RV Halfsize	£27.95

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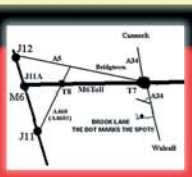

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LDG Electronics

AT-1000

1KW Auto ATU - 1.8-54MHz - 1-8 secs
Tune - Approx SWR Rating of 10:1

£499.95

LDG Z-100

100w Auto ATU - 1.8-54MHz - 0.5 - 6 secs

£129.95 ***BEST SELLER****

LDG AT-11MP

100w Auto ATU - Covers 1.8-54MHz
1-5 secs Tune - Cross needle meters

£199.95

LDG AT-100Pro *New*

100w Auto ATU - 1.8-54MHz
1-5 seconds Tune - 2 Pos Ant switch

£169.95 ***New****

LDG RBA 1:1 & 4:1

1:1 or 4:1 Balun - Covers 1.8 - 30Mhz
Power rating 200w

£29.95

LDG AT-897

100w Auto ATU for FT-897 - 1.8-54MHz

£199.95

Accessories:

K-OTT Kenwood Interface	£49.95
Y-OTT Yaesu Interface	£54.95
Icom-IC1 Icom Interface	£29.95
Alinco-IC1 Alinco Interface	£29.95
AC-1 Cable	£19.95

W4RT Electronics

One-Plug-Power

One-Plug Power is the internal FT-817 battery solution you have been waiting for until now.

OPP-817
£54.95
NEW! 2300 mAh Large Capacity FT-817 Internal Battery Soluion Still use Internal 817 Charger

OPP-897
£99.95
One Plug Power for the FT-897
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One-Plug Power is the internal FT-817 battery solution you have been waiting for until now. One-Plug Power comprises a 1800 mAh NiMH battery pack, both over-temperature and over-current protection, connection to the FT-817 Molex connector, and a modified Yaesu battery cover door featuring a power jack that allows connection of a battery charger such as the Maha MH-C777 or MH-C888.

One-Big Punch

One BIG Punch (OBP) is a custom add-on accessory for the Yaesu MH-31 microphone commonly used with many Yaesu amateur radios

OBP
£49.95
Speech Compressor for the Yaesu MH-31 mic and FT817 FT857, FT897. Improve the TALK POWER.

Hand Mike
£57.95
W4RT Electronics Microphone with One BIG Punch Speech Compressor included.

The One BIG Punch is an AF-based speech compressor specifically configured to provide remarkable increase in talk power while maintaining good audio quality. The OBP is NOT a clipper, but a compressor providing great voice compression, high-level limiting, and noise gating. The unit can be mounted inside the MH-31, requires no additional electrical power, and can be turned on or off by using the MH-31's TONE switch.

One-Board-Filter

The One-Board Filter (OBF) affords you the opportunity to have both the Collins CW and SSB mechanical filters available in your FT-817 together!

OBF
£229.95
Replace two filters in the space of one. OBF includes the two optional filters and fitting.

Collins Mechanical Filters
for the Yaesu FT-817, 857 & 897.

500 Hz CW - £94.95 ***2.3kHz SSB - £94.95***

This is the option that many, many FT-817 owners have requested. The OBF utilizes Collins Mechanical Filters that are the same as used in the optional Yaesu filters for the FT-817. The bandwidth of the 7-pole CW filter is 500 Hz and the 10-pole SSB filter is 2.3 kHz. The One-Board Filter is NOT available for installation by FT-817 owners. This is not a "do-it-yourself" option. The One-Board Filter must be installed by RADIOWORLD, or a competent engineer . If in doubt please call for details.

One-Touch-Tune

At the touch of a button, you have the carrier needed for tuning. One-Touch Tune (OTT) is totally transparent to the FT-817 and to any external equipment that you have attached to the rig.

OTT-817
£54.95
It requires no external power and works with both manual and automatic tuners.

W4RT OTT-FT817	£54.95
W4RT OTT-FT100/857/897	£54.95
W4RT OTT-FT847	£54.95
W4RT FT817 One Fast Charger	£Call
W4RT Antenna Boss	£139.95

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Professional-Grade FT-817 Stand

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For arm chiar or DX audio tailored to *your* own specifications.

Adapter cables to fit Icom - Kenwood - Yaesu £22.95

ATX Walkabout

ATX Walk--about PL-259

£47.95

The ATX Walkabout covers all bands (including WARC bands) from 80-6m, 5W guaranteed, 25W max. When fully telescoped it is about 65 inches long. This makes it ideal for the FT-817 or any other portable HF radio.

ATX Walkabout BNC	£47.95
ATX Walkabout PL259	£47.95
ATX Walkabout Universal	£54.95

The Miracle Whip

RX - 0.6 to 460 Mhz
TX - 40,30,20,17,15,12, 10, 6, 2m & 70cm

Power Limits 25W PEP 10W Cont.

£127.95

In Stock*

* The Miracle Whip will transmit on almost any frequency you are licensed to use including WARC, MARS/CAP, Alaska Emergency, Citizens Band, Marine, and most commercial HF SSB and VHF/UHF channels

** The Miracle Whip is optimized for for best receive rather than lowest swr on 80 and 160, as no short antenna will present good transmitting opportunities at these frequencies

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Small 17' 6"	£55.95
Medium 26' 0"	£65.95
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TRI-MAG

£39.95

An extremely strong magnet base which actually consists of 3 x 5" chrome magnets that are interconnected with metal strips to form one very large mount. Suitable for very large mobile antennae such as ¼ wave tank whips.

Siro MAG125 3/8	£17.95
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Siro MAG 145 3/8	£22.95
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£359.95

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SGC-235 HF-500w	£749.95
SGC-237 HF+6m	£299.95
SGC-237 Porta	£589.95
SGC-237 PCB	£299.95
SGC-239 HF	£185.95
MAC-200	£339.95

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YAESU

G-2800SDX Rotator	£999.95
G-450C Rotator	£379.00
G-550C Rotator	£309.00
G-650C Rotator	£499.00
G-1000DXC Rotator	£599.00
G-5500C Rotator	£569.00

Feeders & Wire

Military Spec High grade
50 Ohm coaxial Cable
£69.95 A 100m Drum

RG58U	£0.50 per Metre
RG8 Super	£0.70 per Metre
RG213	£0.90 per Metre
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RG-8 75 Metre Drum Special	£39.95
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Flexweave-PVC-50 50m	£39.95
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Rotator Cable: - Color coded Cable

3 core	£0.45 per Metre
7 core	£0.79 per Metre
8 core	£1.09 per Metre

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5A DC Cable	£0.50 per Metre
10A DC Cable	£0.75 per Metre
20A DC Cable	£1.00 per Metre
25A DC Cable	£1.10 per Metre

Second Hand List

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Cushcraft A3S 10/15/20 3ele	£299.00
Butternut HF6V Vertical	£175.00

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Kenwood YK88SN	£40.00
Yaesu XF114SN	£60.00
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Alinco DJ-G5EY Dual Band Handheld £199.00
Alinco DJ-V5 Handheld £99.00
Alinco DJ-X2000 Scanner 0.1kHz-2.1GHz £299.00
Alinco DJ-X10 Wide Band Receiver £200.00
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Alinco DR-605 2m/70cms £175.00
Alinco DR-M10 10 Metre Transceiver £99.00
Alinco DX-70 HF & 6m Transceiver £389.00
Alinco DX-70TH HF & 6m Transceiver (100W Output) £475.00
Alinco DX-77 HF Base £399.00
Ameritron QSK-5 Amplifier Switch / Pre Heat £200.00
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AOR 5500 Display As new display model £450.00
AOR AR-3030 HF Receiver, Including PSU £350.00
AOR AR5000+A AR5000+A £1,599.00
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Bearcat UBC-780XLT RX Trunktrack £220.00
Bearcat UBC-9000 RX Scanner £179.00
BHI BHI Noise Eliminating Module £89.00
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Bnos LPM144/10/100 2m 100w Amp £119.00
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Commtel Comm-225 Receiver £150.00
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Diamond SX-100 SWR & Power Meter - 1.6 - 60MHz £65.00
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Icom IC-7400 HF/6/2 Band / All mode Tranciever £949.00
Icom IC-746 HF / 6m / 2m Built In ATU £875.00
Icom IC-756 PRO HF/6 Base £1199.00
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Icom IC-901 2m/70cms £175.00
Icom IC-910H 2m/70cms Base £899.00
Icom IC-775 DSP 200w Base £1,499.00
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Yaesu FP-700 Power Supply £100.00
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Yaesu FP-757GX 757 PSU £99.00
Yaesu FR-101 HF, 2m, 6m Base Rx £399.00
Yaesu FRG-100 HF Receiver £299.00
Yaesu FRG-8800 RX £199.00 or inc Converter £299.00
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Yaesu FT-100 HF/6m/2m/70cms Mobile Transceiver £499.00
Yaesu FT-107 HF Trx £375.00
Yaesu FT-1000MP AC HF Base £1,199.00
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Yaesu FT-200 FT200 £175.00
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Yaesu FT-290R Mk II 2m multimode £250.00
Yaesu FT-290R MkI 2m Multimode Mobile Transceiver £125.00
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Yaesu FT-736R 2/70 Base £550.00 or 6/2/70 £750.00
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Yaesu FT-77 HF inc FM £275.00
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Yaesu FT-7800 2/70 mobile £199.00
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Yaesu FT-8100R 2m / 70cms Mobile Transceiver £220.00
Yaesu FT-817 Mobile HF, VHF, UHF Transceiver £379.00
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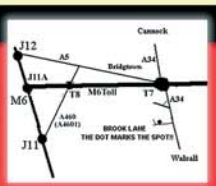

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By Don Field, G3XTT

105 Shiplake Bottom, Peppard Common, Henley on Thames RG9 5HJ.

E-mail: don@g3xtt.com

HF

Much DX news and plenty of correspondence on matters HF from newcomers to the short-wave bands and experienced operators alike, all summed up by Don Field.

The DX community has been avidly following the Andaman Islands activity during December (see last month's column). By late December the team of operators at VU4NRO and VU4RBI had made over 30,000 QSOs, using all modes including PSK and SSTV. Their signals were weak to start with, but some US amateurs shipped additional antennas, with immediate benefits. Certainly their signals on 17 and 12m improved significantly here in the UK. Given that this operation was put together at almost zero notice, that the Indian operators had to arrange time off work, borrow money to make the operation possible, and that the logistics were by no means trivial, it is sad that most of the comments I have seen on the *Cluster* system have been negative. While such comments generally say more about the frustration, perhaps even the selfishness, of the person posting the comments, they must be extremely disheartening to the VU4 operators themselves. Would DXers rather there had been no operation at all? Sadly, some of these ill-judged comments originated from the UK.

As it happens, the terrible tsunami coincided with the last week of the VU4 operation, leading to significant disruption and loss of life in the Andamans, and the operators were able to turn from DXing to carrying health and welfare communications back to the Indian mainland (using battery power at first), after most of the commercial communications systems had been knocked out. The Indian army also airlifted two of the operators to the Nicobar Islands, so it is clear that their efforts were appreciated by the powers-that-be and hopefully this will be recognised by further Andaman operations being authorised over the coming months and years.

For those of you who did work the VU4 team, QSL information should be available by the time this appears – efforts were being made to arrange a manager in Europe and / or the USA. I will post details on my website.

DX NEWS

G3SWH, G3RTE, ON8RA and 5T5SN will be active from **Mauritania** on CW only, all bands 160 to 10, as 5T0CW between 24 February and 4 March. Propagation permitting, they plan to have at least one station on the air 24 hours a day. QSL via G3SWH either direct with SAE and return postage, via e-mail for a bureau reply or via the bureau.

PHOTO: WWW.ZK1SDE.CO.UK

A view of Manihiki Atoll, ZK1, North Cook Islands.

Nicolas, F4EGX, and Jean Paul, F5BU, will be working in the **Crozet Archipelago** at the beginning of 2005 and hope to do some operating during their spare time. They are scheduled to arrive on Possession Island (AF-008 and DIFO FT-009) around 5 February. They expect to begin their activity on the 12th and stay until the end of March. At the time of writing it was not clear whether F4EGX, who has a VHF-only licence, will be able to operate on the HF bands, but F5BU expects to be active on SSB, mainly 14278kHz. QSL cards go via F5BU.

I2YSB, IK1PMR, IK2DIA, IK2GNW, IK2WXV and IZ5BRW will operate with two stations on 160 - 10 as 6O0G (SSB) and 6O0CW (CW and RTTY) from **Somalia** from 3 to 17 February. QSL 6O0G via IK2GNW (direct) or M5AAV (bureau); QSL 6O0CW via I2YSB (direct) or M5AAV (bureau). Further information via the website. "One of the main aims of this DXpedition", says Silvano, I2YSB, "is to bring ham equipment to the Somali radio amateurs, fostering in a concrete way the development of amateur radio in the country. To this end, we shall donate Yagi antennas, verticals, dipoles, HF and VHF / UHF transceivers, power supplies, a laptop, coax and accessories for the operation of one or two stations at the local radio club. We are investing all our efforts to make such a difficult and exotic country regularly active on the bands, so as to provide all hams world-wide a better possibility to get a rare new one. Donations towards the expenses of the DXpedition and helping in the procurement of the equipment to be donated are highly welcome".

S21AM and EI3IO will activate Char Dakhin Shahbazpur (Bhola) island, AS-140, (**Bangladesh**, S2) from 4 to 7 February. The callsign has yet to be allocated. They hope to be on all bands, with two 100 watt transceivers. QSL to EI3IO (and Dave mentions, in common with many other recent operations, that logs will also be uploaded to LoTW, though you will obviously need actual QSL cards for IOTA awards' credit).

Rich, PA0RRS, will be on from **Malaysia** again, 3 - 13 February from East Malaysia, 9M6/PA0RRS, 13 - 26 February from Sarawak, OC-088, East Malaysia, as 9M8/PA0RRS, and 27 February to 29 March from Penang Island, AS-015, West Malaysia, as 9M2/PA0RRS. QSL to his home call.

XE1HPT and a group of XE ham operators will be operating from **Ixtapa Island** (NA-183) as 6F1IHF from 6 to 13 February. Activity is planned for all HF bands CW / SSB.

ZK1WET (SM6WET), ZK1XMY (SM6XMY), ZK1SDE (M3SDE), and ZK1SDZ, plan to be operating with up to four stations from Aitutaki Atoll (OC-083), **South Cook Islands** between 1 and 17 February. Part of the team (SDE and SDZ) will go to the **North Cook Islands** where they will be active until 24 February. They will be back on Aitutaki for more activity from 25 February to 3 March. They plan to have monobanders on 10, 15, 17 and 20 and a full-sized vertical on 40. They have not decided about 80 / 160. Activity will be on SSB, RTTY and PSK31 with an effort in the CQWW WPX RTTY Contest. QSL via M3SDE. Tim has a web page where you can find more details.

Bill, W9VA, will be on **Fernando de Noronha** during February, mainly for the ARRL DX CW contest, but outside the contest he will try to be active on the 'WARC bands' using the callsign PY0ZFO. QSL via W9VA.

Four operators plan to be on from Chile's **Rennell Islands** in the Ultima Esperanza Province South Group (SA-New) from 11 to 15 February. The callsign will be CE8A. See the web page for up-to-the-minute information.

Rick, PJ4/NE8Z, will be on the air from Bonaire, **Netherlands Antilles**, from 4 to 13 February. He will be equipped with a Kenwood TS-680S, Ameritron AL-84 amplifier and Cushcraft R7 (40-10m) vertical. He plans to be mostly on CW and SSB on the WARC bands. QSL to his home call.

AWARDS NEWS

During the first 60 days of 2005, you will hear stations signing "/60". The reason is that the US *CQ Amateur Radio* magazine is celebrating its 60th anniversary with a special '*CQ* Gang'

COUNTRIES WORKED, 2004
(sorted this month by datamodes totals)

CALL	CW	SSB	DATA	MIXED
W1JR	256	246	180	273
G3TBK	253	206	142	262
MM5DWW	121	249	137	254
G6HOU	0	0	132	132
G3LHJ	194	76	121	210
G4OBK	176	119	105	206
M0CNP	36	118	89	142
GM8OEG	83	126	88	150
G3XTT	243	215	79	266
MM1APX	87	109	70	134
G3URA	0	0	60	60
M0BKV	38	163	45	167
G0GFQ	32	109	33	117
G4JZO (QRP)	104	0	15	119
G4DDL	98	10	14	98
G3TXF	206	13	4	206
M3TBK	9	120	3	124
G0KBL	224	0	0	224
GM4FAM	204	147	0	217
G4WXZ	156	152	0	204
G4KFT	201	0	0	201
G4NXG/M	0	200	0	200
VK4BUI	175	155	0	194
G4IRN	192	0	0	192
G3SXW	187	0	0	187
G3VDL	185	0	0	185
MU0FAL	162	113	0	170
M5GUS	0	163	0	163
M1DDD	0	152	0	152
G3YMC (QRP)	148	0	0	148
G6CSY	0	144	0	144
G1VDP	0	142	0	142
G4FAL	103	111	0	141
M0BVE	131	0	0	131
G4FVK	63	94	0	115
G0LGJ/M	0	107	0	107
G1UGH	0	100	0	100
2U0GSY (MU3GSY)	21	89	0	89
G3WP	66	0	0	66
M5AEF (1W)	28	41	0	49

on-air event (*CQ*'s first issue was published in January 1945). *CQ* invites all amateurs around the world to join in the celebration and take part in the on-the-air event between 1 January and 1 March. Who can sign "/60"? Any ham ever associated with *CQ* as a staff member, contributing editor or author, as well as current subscribers to *CQ*, *CQ VHF* and *Popular Communications* may sign "/60" after their callsigns (though I would question whether UK amateurs may legitimately do so). An endorsable certificate will be available. Also, a *CQ* club station, WW2CQ, will be active from various parts of the US during the event. There will be separate certificates available for working WW2CQ in all callsign districts from which it is active. The complete rules for the '*CQ* Gang 60th Anniversary' activity appear in the December 2004 issue of *CQ* magazine and on the *CQ* website.

Charles, M3ZYZ, writes asking me to publicise two awards that he is involved with. Firstly, The World Lighthouse Foundation awards programme which deals with lighthouses world-wide and appeals to the Activator, the Chaser and also the SWL. There are many parts and categories to the awards which range from the relatively easy to the somewhat more challenging, according to the number of lighthouses worked / activated / heard. Awards include Diplomas, Medals, Trophies and Plaques of Excellence. Secondly, Charles mentions the Croatian Islands Award which I have covered here before and details of which appear on my website. Details of all can be found on the website of founder member and President Kresimir Juratovic, 9A7K. Application forms for membership are on the website or from M3ZYZ, UK checkpoint for both award programmes.

I have also received details of the first MDXC member's trophy. Points are gained for contacting members of MDXC (Mediterraneo DX Club) over the weekend of 4 to 6 February. I am afraid the English translation left me rather confused, but readers may wish to refer to the MDXC website for further details. I will also be posting the material on my own website (under *RadCom*, Awards).

CORRESPONDENCE AND TABLES

Mike, GW3UOF, writes with the results of his recent operation from the Dominican Republic (HI3). Mike made just over 3000 contacts, almost all on CW, using 100 watts and wire antennas. Surprisingly, 20m was just about his worst band, while 40m went very well indeed. Mike has plans to return, and maybe even to buy a permanent QTH out there.

David, M0CNP, caught a few rare ones recently, such as S9BB (20 and 17 SSB), 9N7CQ (20 RTTY) and 5U5Z (15 CW). He mentions that a group of enthusiasts in Norfolk have set up the Bittern DX Group which already boasts its own web page (see 'Web search').

John, G3VDL, worked TN6X for a new country and already has the QSL card, great service from Baldur, DJ6SI, who was both operator and manager for this one.

Dave, G3TBK, reports working the FO/M (Marquesas Islands) expedition on 80, 40 and 30 for three all time CW new ones, while he managed the VU4 on 20, 17, 15, 12 SSB and 20 CW. He laments the way the VU4 team have been castigated on the *Cluster* system (see my earlier remarks). Dave's son Edward, M3TBK, has had less success this month. By the time he comes home from school the HF bands have closed, and the low bands are very difficult with only 10 watts. Hopefully he will find some joy over the holiday. However, I am told he got a copy of the new *RSGB Operating Manual* [written by 'HF' columnist Don Field, G3XTT! - *Ed*] in his Christmas stocking and hopes to learn a lot (good man, Edward!)

Graeme, G6CSY, puts in his first appearance, having finally got himself set up on HF. He is using a TS-570 to a Hy-Gain 14AVQ vertical. An 80m dipole should be installed soon.

Dave, M0BVE, reports just two new ones this month, both on 10m, namely KP4KE and C56JHF. Derrick, G3LHJ, reports a quiet month on the bands, but nevertheless managed to catch V85GD and 6W8CK on PSK31 and PY0S/PS7JN on RTTY. Mark, M5MDH, writes for the first time, reporting contacts from his mobile station with VU2XO (10m), S9BB (17m) and ET3AA (15m). Not bad going.

Stan, G0KBL, says 30m has been the best band for him recently, with the FO/M expedition and V51AS. He heard the ZK1 and FO/M expeditions on 80m, but not at a level to be able to work them. As he says, this set him daydreaming about improving his 80m signal by 3dB, but he feels his neighbours and wife may not share his dream!

Andy, GM8OEG, says "Not a bad year for my first full one operating HF, particularly considering that my most elaborate antenna is a 40m dipole with a peak at about 25ft AGL! It's been fun spending time on HF again after quite a while. I started as a listener at about age 7 with the old radiogram in the front room finding all the 'funny music' on short wave. One Christmas I remember I put up a really smashing aerial system - we had a lot of tinsel on the tree so I joined it all up and hooked it to the aerial wire. What band do you reckon a 6ft tree is resonant on?" The CQWW CW contest proved very productive, including contacts with (10m) VP2MLA, VP5W, 5U5Z;

QTH Corner

6F1IHF	Porfirio Lomeli, PO BOX 7177, Morelia, Mich 58262, Mexico.
CE8A	PO Box 866, Temuco, Chile (also via bureau).
EI3IO	Dave Court, 'Connogue', River Lane, Shankill, County Dublin, Ireland.
I2YSB	Silvano Borsa, PO Box 45, 27036 Mortara - PV, Italy.
M3SDE	Tim Beaumont, PO Box 17, Kenilworth, Warwickshire CV8 1SF.
NE8Z	Rick Dorsch, PO Box 616, Hamburg, MI 48139, USA.
PA0RRS	Richard Smeets, Schoorveken 100, 5121NM Rijen, The Netherlands.

(15m) PJ2T, KP4KE; (20m) VP9I, J70J, ZF2NT, KP4KE and G3XTT for a rare one (!); (40m) 9Y4ZC, 5U5Z, and a few US, including KC1XX at the early time of 1843UTC. Andy has been thinking about goals for 2005, and is particularly keen to do more on 30m.

David, MM5DWW, continues to work some good stuff and has recently added TN6X (4 bands CW), PY0S/PS7JN (3 bands RTTY), XT2MF (RTTY), A22/JA4ATV (CW) and the VU4 (2 bands SSB), all being new ones for him.

Nick, M1DDD, becomes our first M1 participant. He uses a Hustler 6BTV vertical, TS-950SDX and 400W. Although at 1520ft ASL, the hill continues to rise to the north of him, making Pacific DX difficult. Best DX recently includes ZD9BV and the VU4. Nick will be operating as OY/M1DDD from 26 May 2005 for one week.

Joe, W1JR, comments that the VU4 has been a tough one from the US East Coast. Some others, like S2 and JD/O, which are usually easy ones, have also proved elusive this year. Nevertheless, Joe continues to add to his already impressive score.

Nick, G4FAL, has spent 20 weeks this year in Saudi Arabia, so is happy with the score he has amassed in the time he has been in the UK. His latest addition is the VU4, which will be his last new one for the year as he was off to VK on holiday. Les, VK4BUI, reports EP3PTT for a new one, this being one of the few stations currently active from Iran.

Cris, GM4FAM, comments on several excellent operations recently, for example TN6X, S9BB, ET3TK, 8Q7DV, 3E1A, HS72B and 9N7BCC, all worked on multiple bands. 9N7CQ, 6O0X, XT2MF, TN6X and VU4NRO were all new DXCC counters for Cris from his GM QTH (Cris was G4FAM for many years). Cris comments, though, on the lousy band conditions over the weekend of the ARRL 10m contest, albeit producing a very loud auroral signal from OY1CT in the Faeroes. Terry, G1UGH, has been avoiding the cold of his outdoor shack, though he did venture out there for the occasional new one.

This month's table is the penultimate one for 2004. The final standings will appear next month and the first for 2005 in the April issue.

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 April issue by 19 February. ♦

Who said DXpeditioning was all hard work? Tim, ZK1SDE, relaxes after the pile-up.

PHOTO: WWW.ZK1SDE.CO.UK

WEB SEARCH

60 expedition:	www.i2ysb.com/6o/
9A7K:	www.9a7k.com
Bittern DX Group:	www.bitter-dxers.org.uk
CQ Magazine:	www.cq-amateur-radio.com/CQ60 Award Dec04.pdf
G3XTT:	www.g3xtt.com
M3SDE:	www.zk1sde.co.uk
MDXC:	www.mdxc.org/trohpy2005.asp
Rennell Islands expedition:	www.ce6ne.cl

HF F-Layer, Propagation Predictions for February 2005

Compiled by - Gwyn Williams, G4FKH

	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe							
Moscow	4.1...277677	..4122476...	...55677....	...8999.....	....998.....	.....	.....
*** Asia							
Yakutsk	25443	...222.25...	...66.......	.....	.....	.....	.....
Tokyo	.......1111.	......111...	.....	.....	.....	.....	.....
Singapore	.......11...	......131...	......23....	.....142....	.....13.....	.....11.....	.....
Hyderabad	.....	.......222..	......132...	...11266....	...33573....	....121.....	.....
Tel Aviv	6.4....57767	..31..377...	...54467....	...2554.....	....1.......	.....	.....
*** Oceania							
Wellington	.....1254...	...145662...	...16663....	....221.....	....11......	.....	.....
Well (NZ) (LP)	..5.........	125........1	33.1.....222	.....	.....	.....	.....
Perth	.....	.......1....	.......1....	.....143....	.....222....	...123......	...12.......
Sydney	.....	......11....	......21....	....2352....	....222.....	...1........	.....
Melbourne (LP)	...6........	...63.......	...47.......	.....	.....	.....	.....
Honolulu	.....	...111.1....	.....	.....	.....	.....	.....
Honolulu (LP)	.....	.....	........2...	.....	.....	.....	.....
W. Samoa	.....	....1221....	....243.....	.....21.....	.....1......	.....	.....
*** Africa							
Mauritius	1..........	3......34223	.......641.1	.......1....	.......1....	.....	.....
Johannesburg	67......2677	23......5655	26411	......133...	...111131...	...35666....	...23555....
Ibadan	331.....1222	676.....4554	...31..251..	...877678...	...888888...	...89999....	....8888....
Nairobi	11..........	77.....46777	..61..278834	...111245...	...322451...	...44454....	...22331....
Canary Isles	7761....7667	6723...26566	...5311357..	...625667...	.....6777...	.....535....	.....1.2....
*** S. America							
Buenos Aires	3313......23	...2........	...1........	....11..11..	....12111...	.....2111...	.....111....
Rio de Janeiro	.....	.....	.....	....31.121..	....42122...	....22.21...	....21.1....
Lima	.....	.....	.....	.....2111...	.....2111...	.....211....	.....111....
Caracas	111........1	...1......1.	....1.......	.....	.....1111...	.....453....	.....211....
*** N. America							
Guatemala	.....	.....	.....	.....	.....	.....	.....
New Orleans	1..........1	...1........	.....	......555...	......662...	......44....	.....
Washington	44.2......55	1........23.	.....2.125..	.....1355...	......562...	......11....	.....
Quebec	63.2.....486	.........31.	.....21122..	.....4778...	......885...	......67....	.....
Anchorage	5112....1123	........11..	.....	.....	.....	.....	.....
Vancouver	1...........	.....	.....	.....	.....	.....	.....
San Francisco	.....	.....	.....	.......1....	.....	.....	.....
San Fran (LP)	.....	.......1....	.......6....	.....	.....	.....	.....

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, **green** 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 December 2004 issued by the Sunspot Data Centre, Brussels, was 17.9. The daily maximum / minimum numbers were 32 on 1 December, and 8 on 15 December respectively. The predicted smoothed sunspot numbers for February, March and April are respectively: (SIDC classical method - Waldmeier's standard) 33, 31, 30 (combined method) 35, 34, 33. 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.

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No.11 ★★★★★★★★★★★★

Yaesu FT-7800
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RRP: £239, ML&S: £239

No.12 ★★★★★★★★★★★★

Yaesu FT-8800
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RRP: £289, or 48 x £8.26 p/m

No.13 ★★★★★★★★★★★★

Yaesu FT-2800M
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RRP: £179, ML&S: £159

No.14 ★★★★★★★★★★★★

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No.15 ★★★★★★★★★★★★

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Yaesu FT-840
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No.17 ★★★★★★★★★★★★

Kenwood TS-870S
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RRP £1999 ML&S £1199.00 or 36 x £43.59

No.18 ★★★★★★★★★★★★

Kenwood TS-2000E
Just superb on all bands 160m-2m with optional 23cm (X-Version).
RRP: £1699, ML&S: Call

No.19 ★★★★★★★★★★★★

Kenwood TS-2000X
As above but with 23cm fitted.
RRP: £1999, ML&S: Call

No.20 ★★★★★★★★★★★★

Kenwood TS-480SAT
The best selling Kenwood H.F. Can be used mobile or base. Includes ATU.
RRP: £1099 ML&S: £799

No.21 ★★★★★★★★★★★★

Kenwood TS-480HX
As TS-480SAT but 200 Watts, no ATU.
RRP: £1199, ML&S: £999 or 48 x £29.56 p/m

No.22 ★★★★★★★★★★★★

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No.25 ★★★★★★★★★★★★
Kenwood TH-D7E
A 2/7- Handie with TNC and APRS capability.
RRP: £359, ML&S: £299
or 48 x £8.85 p/m

No.26 ★★★★★★★★★★★★
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No.27 ★★★★★★★★★★★★
Icom IC-7800
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No.28 ★★★★★★★★★★★★
Icom IC-7400
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RRP: £1699, ML&S: £1299 with FREE SP-21 & SM20 (whilst stocks last)

No.29 ★★★★★★★★★★★★
Icom IC-706mkIIG
Eight years old and still going strong. HF/6/2/70 Idealmobile/base transceiver.
RRP: £939.00, ML&S: £769
or 48 x £22.75 p/m

No.30 ★★★★★★★★★★★★
Icom IC-703
10W Portable HF Transceiver with built-in PSU.
RRP: £703, ML&S: £589
or 48 x £17.43 p/m

No.31 ★★★★★★★★★★★★
Icom IC-718
Basic ready to go 100W HF Transceiver supplied with Microphone & DC Lead.
RRP: £649, ML&S: £449
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No.32 ★★★★★★★★★★★★
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No.33 ★★★★★★★★★★★★
Icom IC-R20E
The latest portable receiver with TWIN RX & digital record facility. For full spec see web.
RRP: £499, ML&S: £369.95
or 24 x £18.54 p/m

No.34 ★★★★★★★★★★★★
Icom IC-2200H
Just Arrived! 65W o/p 2M FM. The optional UT-115 provides digitally modulated and demodulated clear audio. It also allows you to send voice and data simultaneously.
RRP: £235, ML&S: £199.00

No.35 ★★★★★★★★★★★★
Icom IC-E208
2/70 mobile 50/55W Transceiver with host of additional features. Remote head leads included.
RRP: £365, ML&S: £239

No.36 ★★★★★★★★★★★★
MFJ-993
Tune any antenna automatically, balanced or unbalanced - ultra fast. Comprehensive automatic antenna tuning centre.
ML&S: £249.95

No.37 ★★★★★★★★★★★★
MFJ-949
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No.38 ★★★★★★★★★★★★
MFJ-902
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ML&S: £74.95

No.39 ★★★★★★★★★★★★
MFJ-259
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ML&S: £269.94

No.40 ★★★★★★★★★★★★
MFJ-269
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Contest

As we get into 2005, Tim Kirby asks "How many New Year resolutions have you broken so far?"

You'll be reading this in late January, so I wonder how many of your New Year resolutions are still intact? One of mine was that for all the contests that I dabble in this year, I'll send in an entry, no matter how small. I've always shied away from doing that before, because I really didn't want to see myself in last place if I only made five contacts! Perhaps it's age, but that doesn't seem to matter so much any more. And more importantly, it does show support for the contest in general and of course, provides the adjudicator with useful data to check other entries. With so much good contest software available - much of it free - it couldn't be easier to compile and submit your contest entries. If you're not sure which software to try, have a look at *N1MM Logger* for international contests (see 'Web search') and *SD* (and *SDV*) for domestic events.

It's so easy to generate *ADIF* and *Cabrillo* files from the logging programs that I've been making sure that I upload my logs from contest activities regularly into the ARRL's *Logbook of the World* and *eQSL* systems. It's fun to see the confirmations come in so quickly after a contest. Data contesters are particularly good at this: the hit rate is much better for RTTY and PSK than CW and SSB events.

Two members (Greg, 2E0FMS, and Dave, 2E0EBV) of the Havering and District Radio Club in the 144MHz Low Power contest, 2004.

A NEW TROPHY FOR THE COMMONWEALTH CONTEST

Thanks to the generosity of John Dunnington, G3LZQ, there's a new trophy to compete for in the RSGB Commonwealth Contest. Billed as a "new trophy for the modest station" it will be awarded each year to the highest-placed UK station in the Open Section who used not more than 100 watts and single-element antennas. Many UK stations use this contest to work some DX, but not so many send in an entry. This new trophy is designed to encourage these stations to enter the contest. Full details can be found at the HFCC website.

Contest Calendar

HF Contests

Date	Time	Contest	Mode	Bands	Exchange
7 Feb	2000-2130	RSGB 80m Club Championship	SSB	3.5	RST+SN
12/13 Feb	0000-2359	CQ WW RTTY WPX	RTTY	3.5-28	RST+SN
12/13 Feb	2100-0100	RSGB 1st 1.8MHz	CW	1.8	RST+Serial+District
16 Feb	2000-2130	RSGB 80m Club Championship	DATA	3.5	RST+SN
19/20 Feb	0000-2359	ARRL DX	CW	1.8-28	RST+Power
24 Feb	2000-2130	RSGB 80m Club Championship	CW	3.5	RST+SN
26/27 Feb	0000-2359	CQ WW 160m	SSB	1.8	RST+G

VHF Contests

Date	Time	Contest	Mode	Bands	Exchange
1 Feb	2000-2230 Local	RSGB 144MHz Activity & Club Championship	ALL	144	RST+SN+Locator
6 Feb	0900-1300	RSGB 432MHz Affiliated Societies	ALL	432	RST+SN+Locator
8 Feb	2000-2230 Local	RSGB 432MHz Activity	ALL	432	RST+SN+Locator
13 Feb	1000-1200	RSGB 70MHz Cumulative	ALL	70	RST+SN+Locator+QTH
15 Feb	2000-2230 Local	RSGB 1.3GHz/2.3GHz Activity	ALL	1.3G/2.3G	RST+SN+Locator
22 Feb	2000-2230 Local	RSGB 50MHz Activity	ALL	50	RST+SN+Locator
27 Feb	1000-1200	RSGB 70MHz Cumulative	ALL	70	RST+SN+Locator+QTH

The full rules of RSGB contests are published in the *RSGB Yearbook 2005* and are also available at www.contesting.co.uk/hfcc (HF Contests) and www.blacksheep.org/vhfcc (VHF / UHF Contests). Both sites are linked from www.rsgb.org

NFD 2004 RESULTS

Quin, G3WRR, who adjudicated the 2004 NFD writes, "an error in the HF NFD results as published in November 2004 *RadCom* has come to light. The score for the QRP section entry by the Bracknell ARC (G4BRA/P) was incorrect: their 20m score should have been 171 points, and not 71 as published, resulting in an overall score of 1688 points and not 1588 as published. Overall positions are not affected. The adjudicator offers apologies."

CONTESTS THIS MONTH

On VHF/UHF the main event is the 432MHz Affiliated Societies Contest on 6 February. This contest has developed into quite a closely fought battle between a few clubs. We hope to see some more entries this year. In February, conditions are often a bit flat, but with good activity anything's possible.

On 12/13 February, the *CQ* WW WPX RTTY event takes place which always brings out a few interesting RTTY operations. The same weekend sees the RSGB's 1st 1.8MHz contest, which has a District Code element, so if you're in a sparsely populated (amateur-wise) area, do come on: the serious contestants will appreciate the multiplier.

The 19/20 February weekend brings one of my favourite international contests, the ARRL DX CW. This is a great opportunity to work some interesting states, particularly on the low bands, and of course if conditions are good at HF there's hundreds of stations to work. Even with a simple station, a surprisingly big score can be made. I look forward to hearing from you how you get on.

The weekend of 26/27 February brings the *CQ* WW 160m SSB contest, which will demand real skill in winkling out the weak ones. Even if you don't have a big signal on 160m, it can be interesting to have a listen and see what you can hear, and of course it's a great opportunity to learn about topband propagation. If you're new to topband, have a listen through the dawn period: there are usually some surprises. ♦

ROPOCO 2, 2004

It's surprising how subjective the assessment of band conditions can be. For those that reported them to be bad there was a similar number who believed them to be reasonable. Against those who thought the band quiet there were others who were plagued with noise and QRN. In fact, entries were 20% up on the April event and a number of well-known stations were also active but did not submit logs. Yet the number of QSOs made by the leaders was about the same, which is indicative of poorer propagation. Another clue is given by the proportion of error-free logs, improved from 1-in-6 to 1-in-5 . . . . less-readable signals often mean more concentration, more repeats and, surprisingly, better accuracy!

A lot also depends on the quality (and speed) of the transmitted CW. Special acknowledgement is due to Andy Swiffin, G8YCM, who was visiting his parents over the weekend of the contest and, having no key with him, manufactured one out of an old relay screwed to a piece of wood. All the information he sent was received correctly!

Several entrants lost points (in one case, a substantial number) because they 'corrected' faulty incoming postcodes. The problem is that we know the format which postcodes take. It's all too easy to assume that a "4" received where a "V" would be expected is just a slip of the ear, so to speak, and record the "V". If in doubt, ask for a repeat. It is also worth bearing in mind that this event has been subject to the activities of 'pranksters' who introduce bogus (and sometimes ridiculous) codes. While such QSOs are not invalid, it does mean that one should be prepared for anything!

In the April contest we had to look to position 13 to find the first error-free entry. Things have changed, and how! Phil Catterall, G4OBK, and Fraser Robertson, G4BJM, tied for first position, both submitting faultless logs. They each made 63 QSOs, of which 50 and 49 respectively could be confirmed with other submitted logs. They will share the G3XTJ Memorial Trophy. John Muzyka, G4RCG, and Tony Roskilly, G3ZRJ, receive a certificate of merit for their entries, sharing third place.

The G5MY Memorial Trophy, awarded for the highest aggregate score over the year's two events, is won by G4BJM with a tally of 1220 points, only eight QSOs ahead of his nearest rival Lee Volante, G0MTN, who amassed 1140 points.

Steve Knowles, G3UFY

Pos	Call	Points	Errors	Pos	Call	Points	Errors
1= *~	G4BJM	630	0	30=	G3JSR	400	5
1= *	G4OBK	630	0	30=	G4XRV	400	2
3 = +	G3ZRJ	590	1	32	G3VQO	380	1
3 = +	G4RCG	590	0	33	G3LHJ	360	2
5	G0MTN	580	1	34=	G0WBC	350	6
6	G4CZB	570	0	34=	G0WHO	350	1
7	M0AJT	560	0	34=	G3MBN/P	350	5
8=	G3BJ	550	3	37=	G3TXF	310	0
8=	G3JJG	550	1	37=	GW3SB	310	5
8=	G3OOK	550	0	39	G0ADH	300	9
8=	GM3JKS	550	0	40=	G3KKJ	290	5
12=	G0VQR	530	2	40=	G3ZGC	290	1
12=	G3LIK	530	2	42	G4PTE	280	1
14=	G0ORH	520	1	43	G3CQR	250	6
14=	G3RSD	520	0	44=	G0LZA	240	2
16	G4OGB	500	0	44=	G3HKO	240	5
17=	G3JJZ	490	1	46	G8YCM	230	5
17=	G4CWH	490	4	47=	G4ARI/P	210	1
19=	G3KNU	480	6	47=	G4DBW	210	1
19=	G3TJE	480	2	47=	GM3UM	210	1
21=	G3IZD	470	6	50	GM4OSS	200	1
21=	G3VYI	470	2	51	G0GDU	120	5
23	G3HEJ	450	0	52	G3ZDD	110	3
24	G4BVY	440	2	53	G3XYF	80	2
25	G4EBK	430	2				
26	G3GLL	420	2				
27=	G3MA	410	6				
27=	G3SET	410	5				
27=	G4XPE	410	1				

* G3XTJ Memorial Trophy and Certificate of Merit,
~ G5MY Trophy,
+ Certificate of Merit.

WEB SEARCH

RSGB HF Contests Committee:	www.rsgbhfcc.org
RSGB VHF Contest Committee:	www.blacksheep.org/vhfcc
N1MM Logger:	www.n1mm.com
SD and SDV contest loggers:	www.ei5di.com
ARRLs Logbook of the World:	www.arrl.org/lotw
eQSL:	www.eqsl.org

LOW POWER FIELD DAY, 2004

Usual daytime conditions prevailed for this contest, with 3.5MHz noise increasing as the day progressed. 7MHz was best in the morning but, according to some stations the skip was always wrong! I am pleased to hear that everyone understood the rules this year, and I know it's slow going, but one station was chasing spiders. This contest requires lots of patience and tenacity to receive the complete contact with all the daytime band noise, it is therefore a good contest to try out those skills and have fun in setting up portable stations. This year it's a pleasure to welcome a lot of first time contesters, and also stations from Europe, who also enjoyed the contest. With the advent of the K2 and similar rigs, the contest is becoming popular, although from all the stations that were on, only a small number of logs were received. Once again, most logs would have benefited from a quick glance, and do not rely on the scoring of some logging programs.

Congratulations to Colin, GI0RQK, who wins the 1930 Committee Cup for Section A, Keith, G3RPB, using G6KQ/P for Section B and also the overall winner receives the Houston-Fergus Trophy, for the second year running. In the 3W sections congratulation go to Graham, G3VIP, for winning section C, a regular in these QRP events, and to Frank, GM3JKS, for winning Section D and the Southgate Trophy. Congratulations to GW4LZP and G3WKS/P (G4FDC) for error-free logs, and many thanks to G3PDH, PA0RBO, PA7KAT/P, SP7FBQ/P for check logs.

Dave Mason, G3RXP

Section A 10W Fixed

Pos	Callsign	Score
1	GI0RQK	884
2	G3OOK	804
3	ON5WL	296
4	G3XYF	275
5	DJ3XK	270
6	G3ZRJ	250
7	DL1IAW	240
8	DL0PCK	235
9	GU4YBW	130
10	DF5WI	115

Section B 10W Portable

Pos	Callsign	Score
1	G6KQ/P	1290
2	G4FOX/P	1071
3	G4AYM/P	962
4	G4AKR/P	913
5	G0VYR/P	725
6	G3WKS/P	545
7	DH3FAW/P	200

Section C 3W Fixed

Pos	Callsign	Score
1	G3VIP	682
2	G4DDX	622
3	G3KKQ	605
4	GW4LZP	585
5	G3CQR	267
6	DD1IM	185
7	G3YMC	70
8	DL6OCK	65

Section D 3W Portable

Pos	Callsign	Score
1	GM3JKS/P	1142
2	G4ARI/P	1015
3	G4BLI/P	995
4	G2CP/P	827
5	M5MDX/P	789
6	G5BK/P	650
7	G4HRC/P	543
8	G4AGE/P	245
9	M0BPQ/P	235
10	OZ7KDJ/P	190
11	G3HKO/P	165

432MHz AFS Contest, 2004

There was a reasonable number of entries to this contest despite lack of publicity and the uninspiring propagation conditions. In the AFS section the Five Bells CG had a commanding overall lead, while Sutton & Cheam RS improved their performance this year to put the Harwell ARS into third place. Cray Valley RS deserves special mention for gaining fifth place with all three of their team members using low power, 25W, 10W and 10W respectively. Frank Laanen, PE1EWR, provided many with their best DX contact and in doing so came close to leading the field in the Single Operator Fixed section. Bob Offer, G1ZJP, operating M1MHZ was the winner with David Gilligan, G1OGY, the second UK station so he receives the runner up certificate. Simon Treacher, M3CVN, receives the certificate for the highest-placed Foundation licensee. Thanks to James Beatwell, 2E1GUA, for a check log.

Roger Piper, G3MEH

AFS Section

Pos	Club	Call	Score	Call	Score	Call	Score	Total
1*	Five Bells Contest Group	M1MHZ	982	G4SIV	1000	G4KIY	1000	2982
2*	Sutton & Cheam Radio Society	G3WHK	371	G3OLX	469	G0TXL	681	1521
3	Harwell Amateur Radio Society 'A'	G3NNG	588	G3PIA	377	M0DDT	445	1410
4	Chesham & District ARS	G3MEH	652	G0ODQ	603	-	-	1255
5	Cray Valley RS	G3JJZ	249	M3CVN	306	M3RCV	484	1039
6	South Birmingham RS	G8OHM	1000	-	-	-	-	1000
7	Surrey Radio Contact Club	G4WYJ	462	G8IYS	532	-	-	994
8	Colchester Radio Amateurs	G1OGY	775	-	-	-	-	775
9	Wythall Contest Group A	G1WAC	395	G4VPD	76	M0VRR	11	482
10	West Kent ARS	G8SRL	480	-	-	-	-	480
11	Wythall Contest Group B	G0RQO	3	-	-	-	-	3

Section SF

Pos	Call	QSOs	Score	Best DX	km
1*	M1MHZ	37	6541	DF2VJ	632
2*	PE1EWR	24	5930	G0UWK	431
3*	G1OGY	35	5160	EI5FK	627
4	G4SIV	35	5030	DF2VJ	624
5	G3MEH	39	4343	DF2VJ	599
6	G4DEZ	26	4225	DF2VJ	642
7	G3NNG	32	3919	PE1EWR	358
8	G8SRL	26	3198	G0UWK	280
9	G4WYJ	33	3079	DF2VJ	553
10	G0ODQ	32	3032	PE1EWR	307
11*	G8IYS	31	2676	PE1EWR	243
12	G4KIY	20	2411	PE1EWR	278
13	G3OLX	30	2359	G0UWK	241
14	G3PIA	22	1895	PE1EWR	335
15	G3JJZ	22	1657	PE1EWR	243
16	G0TXL	24	1641	PE1EWR	255
17*	M3CVN	23	1540	G8OHM	171
18	M3RCV	19	1168	G8OHM	171
19	M0DDT	15	1073	PE1EWR	329
20	G4VPD	4	383	G8SRL	208
21	M0VRR	2	26	G1WAC	29
22	G0RQO	2	19	G1WAC	12
Section SO					
1*	G4CQR/P	27	4297	DF2VJ	506
Section M					
1*	G8OHM	43	6662	DF2VJ	710
2*	G1WAC	28	2632	G4CQR/P	235
3	G3WHK	33	2472	PE1EWR	260

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*4-Way *Connections S)-239 *Power 2.5kW *Range DC - >500MHz *Isolation 60dB at 30MHz / 50dB at 500MHz *Centre Earth Position *Static Discharge Protector

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£139.95 B

MFJ-1702C

*2-Way *Connections S)-239 *Power 1kW *Range DC - >450MHz *Isolation 60dB at 300MHz / 50dB at 500MHz *Centre Earth Position

£28.95 B

MFJ-260C Dummy Load

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.

£37.95 B

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RF Sense Transmit/Receive Switch

*Fitted with relay *Delay adjustment *3x SO-239 sockets *2x phono sockets *LED power indicator *Power off defaults to transmit mode *Power 12V DC *Size 102 x 72 x 40mm *Weight 200g

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E-mail: g4buo@compuserve.com

Making that first CW QSO

Dave Lawley looks at ways in which the newcomer to Morse code can take the plunge to make their first QSOs on CW.

Since July 2003 it has not been necessary to pass a Morse test in order to gain access to the HF bands in the UK. There has been an explosion in the numbers of former Class B and newer Foundation licensees exploring the HF part of the spectrum, and a consequent bonanza for equipment dealers. Less predictable, perhaps, has been the degree of interest that many of these newcomers to HF show in having a go at Morse code. As related in my first 'Morse' column in *RadCom* a year ago, the smaller station or antenna-restricted operator may find that CW offers the opportunity for many interesting contacts which would be impossible in the crowded phone segments of the bands.

The advantages of CW have also been realised by some former Class A licensees who passed the Morse test some time ago but then let their CW skills lapse. A local G0 friend of mine has dusted off his Morse key, practised with a friend and started to work on his countries total on 30m. This is a fascinating band, offering contacts over greater distances than 40m during daylight and often open for DX at night when 20m is shut. By agreement within IARU, wider modes such as SSB are not used in this band: great CW QSOs are possible on 30m with simple antennas and modest power.

THAT FIRST QSO

Perhaps the biggest hurdle in learning Morse is going from the clinical learning process, either with a 'personal trainer', or using a computer program, or combinations of the two, to the real world of making QSOs. It's a good idea if you can team up with someone who is in a similar position and practice having QSOs. Start off doing it with a key and oscillator and once you have gained some confidence, pick your first on-air QSO with some care. Make sure the person you're going to call has a strong clear signal, and is sending good Morse at a speed you are comfortable with.

Many QSOs are of the 'rubber stamp' variety, and follow a similar format to phone QSOs. The first over consists of RST, name and QTH. Each element is typically sent two or three times. On the second over you might give details of the weather, and a description of your rig and antenna. It's a good idea to have all this information written down in front of you before you attempt your first CW QSO. You might think you know how to spell the name of your home town, but in the excitement of the first contact you might easily fumble the spelling, or even forget how to spell your own name! There's nothing wrong with having a crib sheet to help you through those first nervous moments.

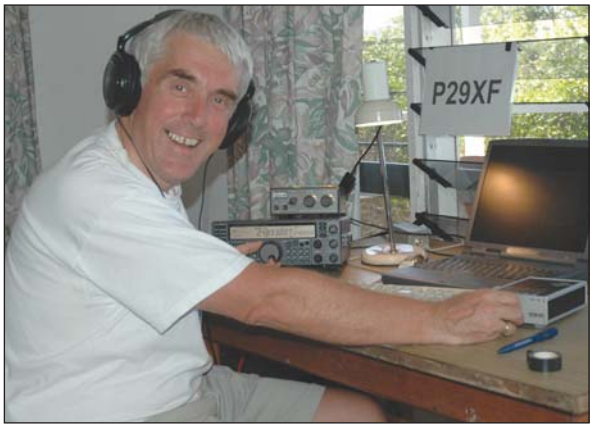


PHOTO BY NIGEL CAWTHORNE, G3TXF

When the Morse requirement was dropped in the UK it was unfortunate that the members of the Morse Testing Service were simply stood down, whereas with a bit of imagination this pool of volunteers could have been harnessed to help with the training and encouragement of those who still wanted to become proficient in the use of Morse code. After rather a long delay many of these volunteers have re-formed in the UK Morse Proficiency Programme, but as well as offering tests of Morse proficiency, they are keen to encourage the development and use of Morse code in as many ways as possible. To help people take their first steps in making real QSOs, MPP members will be active on 3562 - 3564kHz most evenings 7.00 - 8.00pm calling 'CQ QRS'. They will be sending CQ at a speed of 12WPM but can go slower on receipt of a request to 'QRS'.

3562kHz should give good coverage of most of the country but if you want help from MPP members with your first QSO at a different time or frequency, send an e-mail to morse.test@rsgb.org.uk and we will endeavour to help.

CQWW CONTEST

I wonder how many readers of this column took the plunge and made their first CW QSOs in the CQ World Wide contest in November? This is something of a baptism of fire, but whatever your level of competence in Morse, you will have ended the contest more proficient than when you started. Simon, M3CVN, had already dipped his toes into the water of CW contesting but this was his first attempt at CQWW, and in 37 hours operation he made 778 QSOs and raised his all-time CW country worked total to 101. Not bad for 10W to a multiband vertical and G5RV at 20ft.

The 5U5Z multi-multi station in Niger included several operators from the UK, and with good signals into the UK on this north-south path, the team reported a three-fold increase in the number of former Class B and Foundation stations worked this year compared with last.

P29XF / P29SX

The picture shows Nigel, G3TXF, who with regular DXpedition partner Roger, G3SXW, operated from Loloata Island in Papua New Guinea in early October. The pair have mounted numerous CW-only DXpeditions to exotic locations, and the IOTA chaser who wanted to get OC-240 this time had no option but to get on the key.

Once again the benefits of CW were apparent on this trip. In seven day's operation the pair made nearly 14,000 QSOs, using just 100W from a pair of Kenwood TS-570DG transceivers and simple vertical antennas. Make sure to catch up with Nigel and Roger on their next CW-only DXpedition! ♦

WEB SEARCH	
P29XF / P29SX:	www.g3txf.com/dxtrip/P29XF/P29.html

Dave Pick, G3YXM

178 Alcester Road South, Kings Heath, Birmingham B14 6DE.

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

LF

G3YXM gives his usual wide range of news on LF, including ♦ LF at the HF Convention ♦ Grabbers in Hungary and Germany ♦ Trans-Atlantic news ♦ The 'Ashlock loop' ♦ More QRM from Rugby?

During the weekend of 23 / 24 October, the RSGB HF convention was held at a new venue near Gatwick, which just happens to be conveniently close to the Crawley club headquarters. The club's LF enthusiasts were thus able to take their 100ft tower and 1kW Decca transmitter and set up a 136kHz demonstration station. The aerial they erected was a sloping-T, rising from 15m to the top of the 30m tower, which enabled MB2HFC to put out an excellent signal around the UK and Europe. Twenty stations were contacted over the weekend, and the countries worked were G, F, DL, PA, EA, OH, OK and S5, and the station was copied by Ingolf, OZ7QC, and several other European listeners. Unfortunately, a trans-Atlantic attempt was unsuccessful.

Meanwhile, in the meeting rooms, there were three LF events: a lecture on 136kHz propagation by Alan, G3NYK, a 'Getting Started' talk by Mike, G3XDV, and an update on the MB7LF remote receiver project.

NEW GRABBER IN HUNGARY

In October, HA6PC and HA6PX installed an LF receiving station at the HG6N Club station, Karancs Hill, JN98VE.

The receiver, built by Gyuri, HA6PC, has 100Hz bandwidth and the aerial is 400m long, running north-west.

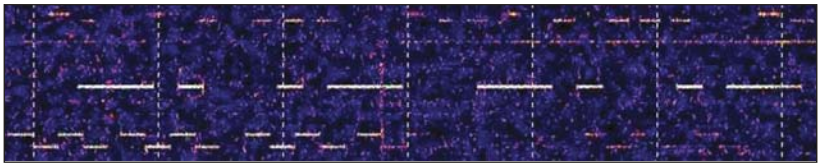
The spectrogram from the receiver is live on the Internet. See the links below.

Another interesting grabber has been set up by Marcus, DF6NM. It has a colour-coded display indicating from which direction each signal has come.

TRANS-ATLANTIC NEWS

It's been a great season for Laurence Howell and his beacon, WD2XDW, in Oklahoma. Now Decca-powered, XDW was first copied by CT1DRP, and M0BMU on 22 October and later by G3AQC, then by Hartmut Wolf in Northern Germany and DF6NM in Bavaria, a distance of just over 8000km. Hartmut also copied WD2XES (Holden, Mass) around the same time.

More was to come a couple of days later when Mike, ZL4OL, near Dunedin, South Island, New Zealand (RE54GG) captured WD2XDW between 0800-0900UTC, just after ZL sunset. The distance is just over 13,000km on a bearing of 231.8° from ZL, which is in the main lobe of the loop in Oklahoma.



Jim, M0BMU, got this excellent grab of three trans-Atlantic signals at the same time on 29 October. From top to bottom you can see 'XES' in DFCW, V01NA sending 'NA' in QRSS and WD2XDW with a mark-space signal.

The good conditions continued into early November, when M0BMU's signal was received by the usual east-coast suspects W1TAG, W1VD and W3EEE.

Later in November, conditions were ruined by a large amount of solar activity and were only just recovering by early December when K2ORS's beacon WD2XGJ was seen in the UK and Portugal. Warren is in Maryland, and is using a G0MRF transmitter and an Ashlock loop aerial. He hopes to upgrade to a Decca transmitter soon.

THOSE LOOPS

It seems that all the big signals out of the US on 136kHz are using loop aerials as pioneered by Bill Ashlock on the 185kHz band.

These loops are usually supported by trees and are much less affected by the foliage than a Marconi would be. A circumference of at least 200ft is desirable for efficient operation on 136kHz.

Bill recommends using a bow and arrow to get the wire through the branches and suggests using as thick a wire as possible, perhaps large coax or even microbore central-heating pipe for the conductor.

Transformer matching is favoured (as shown in **Fig 1**) as it isolates the loop from ground and hence gives better noise immunity on receive.

The transformer can be wound on a large toroid of type 43 or 77 or equivalent ferrite material, the turns-ratio being about 7:1. If the core has a high enough permeability, the secondary can be formed by the loop conductor passing once through the core; the primary would then be 7 turns.

High-current capacitors of 'pulse rated' or transmitting types should be employed for the resonating capacitor. Dependent on the size of the loop, something of the order of 10 to 20nF will be needed. Remember that currents of 30A can flow in a good loop, so components must be rated accordingly.

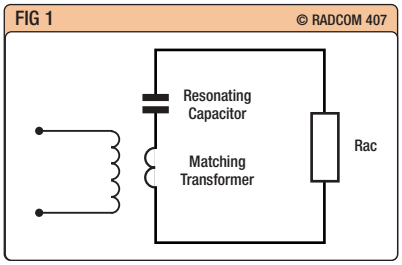


Fig 1: Bill Ashlock's suggested matching circuit for the loop, Rac.

RUGBY QRM?

It seems that, despite most of the masts coming down, Rugby Radio is not dead after all. It has been announced that BT are to set up an experimental Loran station at the site for the next couple of years which will augment the North Atlantic coverage of the system.

Loran is centered on 100kHz and presently the nearest transmitter to the UK is at Lessay in Northern France. Sidebands from this station cause the distinctive 'galloping horses' noise which makes listening to the 136kHz band difficult along the south coast of England. We can only hope that the Rubgy transmitter doesn't cause similar trouble over the rest of the country.

NEW ON THE BAND

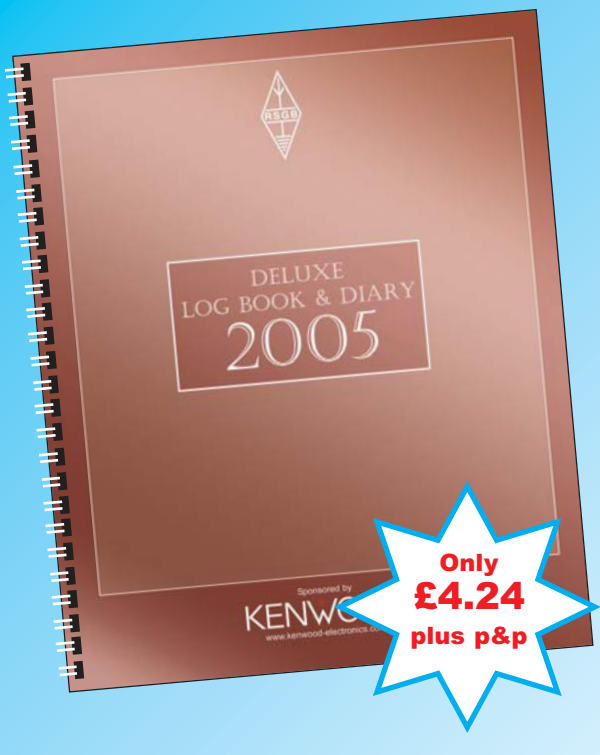
Juan, EA3FXF, has recently appeared on 136kHz. He lives in the city of Lleida (JN01HO) and has a 9m high Marconi with an 18m top. His transmitter uses two IRF640 to produce 90W. He has already been copied in the UK and Germany.

Also active on the band are: OK2BVG, who has been worked by a couple of G stations over the past few months; G3WCB in Iver; and G3YKB in St Albans who is using a loop aerial. ♦

WEB SEARCH

More on the 'Ashlock loop'	www.thepittsfieldinn.com/Bill/
The Hungarian grabber	www.starjan.hu/~ha6px/SCG.htm
DF6NM's directional grabber	http://members.aol.com/DF6NM/Grabber.htm

Logging & Yearbook



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Finished in glossy metallic copper the Deluxe Log Book is back! This edition has been thoroughly revised and updated. Amongst its many features are Band plans, locator maps, lists of abbreviations & codes and a DXCC prefix guide. As usual a 2005 diary section is included along with notes of events and contests through the year. This wire bound book contains generous 255 x 420 log pages yet folds neatly for storage (overall folded size is 255 x 210mm). This book is also the ideal way to neatly record a whole year of activity and store it in attractive way for years to come. This handy reference guide is in the ideal place for every day use the logbook of the shack!
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QRP

- **G3RJV mentions some QRP rallies in 2005**
- **An idea for waterproof log**
- **Additions to the Wonder Wand range**

Each year, several QRP gatherings occur across the UK which attract QRP operators and equipment constructors. They are somewhat different from the usual radio rallies in that the traders tend to deal in components and surplus items, rather than sell new commercial equipment. In short, they are like amateur radio events used to be. Below is an outline of the major QRP events for 2005.

On Saturday 19 March 2005, the 5th Junction 28 QRP Rally will be held at the Village Hall Community Centre, Market Street, South Normanton, near Alfreton, Derbyshire. The venue will be clearly signposted and is only five minutes from the M1 Junction 28 and the A38. Further information and directions will be posted on the South Normanton Alfreton & District Amateur Radio Club website, www.qsl.net/snadarc/

The 21st Yeovil QRP Convention will be held on Sunday 10 April 2005. Further information can be had by e-mail from George Davis, G3ICO, george@mudford.fsnet.co.uk. This is preceded by the 'Yeovil FunRun' operating event from 14 – 18 March, 1900 – 2100UTC each day.

Later events are Sunday 5 June, the Red Rose QRP Festival and Saturday 8 October, the Rochdale QRP Convention

QRP PORTABLE ACCESSORIES FROM THE UK

In recent times, there has been a large increase in interest in QRP portable operation. Compact commercial transceivers like the FT-817 have helped as has the 'adventure radio' concept. Organisations like Summits on the Air (SOTA) have encouraged open-air radio communication using both commercial and home-built equipment. The SOTA website at www.sota.org.uk/ says, "Summits on the Air (SOTA) is an award scheme for radio amateurs and shortwave listeners that encourages portable operation in mountainous areas. SOTA has been carefully designed to make participation possible for everyone - this is not just for mountaineers! There are awards for activators (those who ascend to the summits) and chasers (who remain in the warmth of their radio shacks!)."

Richard Newstead, G3CWI, who appears on the front cover of the RSGB publication *QRP Basics*, has been active in outdoor amateur radio for many years. Recently, Richard has developed a neat idea for the open-air portable operator which he calls the 'Waterlog'. Tired of wet log sheets with illegible entries, he brought together several items to make one very functional and almost indestructible outdoor logging package.

The 'Waterlog', devised by Richard Newstead, G3CWI (see 'QRP portable accessories from the UK').

The Waterlog uses a special waterproof paper which can be left out in the rain for a month without deterioration. Mud will simply rinse off and the printed logging grid cannot be removed even with a scouring pad. The back-board is a super-tough aluminium alloy. There is an apocryphal story that NASA spent $18 million developing a pen that would write in space; the Russians used pencils. So the Waterlog uses a pencil that will write effectively in the wet. Information about the Waterlog can be found at www.sotabeams.co.uk/waterlog.htm, by e-mail from sales@sotabeams.co.uk or by writing to SOTA Beams, ECS Ltd, 89 Victoria Road, Macclesfield, Cheshire SK10 3JA, tel 01625 425 700.

LITTLE WONDERS

From time to time in this column, I have mentioned interesting, and sometimes amazing, results that operators have achieved using portable QRP transceivers and tunable whip antennas. Often the antenna has been the Miracle Whip made in the USA but, for some time, there has been a British small tunable whip antenna called the Wonder Wand designed by Carl Peake. The Wonder Wand has a telescopic whip mounted on a small antenna matching unit which plugs directly into the SO-239 socket of a transceiver. It can be made to tune on any band from 7MHz to 70MHz. It is also possible to tune between 144MHz and 432MHz by switching to the VHF/UHF position and adjusting the length of the whip. The whip and tuner are capable of handling up to 25W of RF output. I have tried the Wonder Wand and enjoyed several European contacts using about 2.5W from my alternative address in mid-Wales.

The Wonder Wand can be used with the Wonder Wand TCS (Tunable Counterpoise System), a loaded ground radial system using a tuner and a 4m wire. There are two very recent additions to this range of compact portable antenna systems. The Wonder-Pole is a tunable dipole using two telescopic whips and a tuner which adjusts the loading of both whips. This uses an interesting ganged slider system on a loading inductor. The latest product idea is the Band Stacker. This is a miniature tuner for the FT-817 tri-band whip antenna. Carl reports that initial tests included CW and SSB contacts with HA5MK/7, OE3BBC, OK1DSA, and YZ9A on 7MHz and 14MHz with 58 / 559 reports with 2.5W. Information about the Wonder Wand and other allied products can be had from bhi Ltd, PO Box 136, Bexhill-on-Sea, East Sussex TN39 3WD, tel 0870 240 7258, e-mail info@bhi-ltd.co.uk, www.radio.bhinstrumentation.co.uk/html/wonder_wand.html ♦

CZEBRIS 2005

This event, arranged with our QRP colleagues from the Czech and Slovak Republics is a contest, but still offers plenty of opportunity for relaxed operating. The rules are as follows:

Time and Date: 1600UTC Friday 25 February to 2359UTC Sunday 27 February.

Frequencies: around the usual QRP CW frequencies: 3560, 7030, 14,060, 21,060, 28,060kHz, +VHF/UHF if conditions permit.

Points awarded:

Your location	QSO with station in			
	UK	OK/OM	Eu	Non-Eu
UK	2	4	2	3
OK/OM	4	2	2	3
Eu	4	4	1	2
Non-Eu	4	4	2	1

There are no multipliers. Final score is total number of points scored. Separate logs for each band showing (for each QSO) date, time, callsign, exchange sent/received, and a summary sheet showing your name, callsign, claimed score for each band, and brief details of your station should be sent by the end of April. UK entries to Peter Barville,G3XJS, 40 Watchet Lane, Holmer Green, High Wycombe, Bucks HP15 6UG. Non-UK entries go to Karel Behounek, OK1AIJ, Na sancich 1181, 533705 Chrudim IV, Czech Republic. They are both happy to receive logs by e-mails to g3xjs@gqrp.co.uk and to karel.line@seznam.cz, respectively.

Norman Fitch, G3FPK

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E-mail: g3fpk@compuserve.com

VHF/UHF

Although terrestrial VHF/UHF propagation was poor during the month under review, there is plenty of EME - or 'moonbounce' - news, as Norman Fitch reports . . .

Due to the lack of much in the way of terrestrial DX worked in this reporting period, a fair amount of this month's 'VHF/UHF' is devoted to moonbounce operation, in particular to the final leg of the ARRL International EME Competition. It seems that some operators feel that the ARRL should consider changing the rules of this event to cover the use of chat rooms for scheduling and contact progression, as this is a new amateur practice that can be open to abuse.

Russ Pillsbury, K2TXB (FM29) commented, "One thing I am a little disappointed in is that some stations were only working via the loggers. They would show up and work a station and then disappear - no CQs, or at least not many CQs. It's fine to declare that you are working 'assisted' or whatever you want to call it, and not turn in a score, but I think it would be only fair to give the guys who want to work by the rules a chance, too." Also some EME-ers feel that there should be a definite division between CW and digital modes instead of lumping them together. So your thoughts and suggestions about any rule changes would be welcome.

SUMMER BARBECUE

Last August Chris Gare, G3WOS, held a successful barbecue at his home and he is organising a '2005 6m pig roast BBQ' at his QTH for Saturday, 6 August. It had been proposed for the following week but, as that is the date of the Six Metres Forum in Tampere in Finland, he has brought it forward. As last year, there will be plenty of food and drink and the ladies are encouraged to attend. Last year's event can be seen on a website - see 'Web search'. Please e-mail Chris to cgare@nexagent.com to indicate if you would definitely like to attend or might possibly come.

MOONBOUNCE

To begin there is news of a notable first when Josep Prat Panella, EA3DXU (JN11CM), completed the first ever 2m EME QSO from Spain to New Zealand. After a long time and some failed skeds, he finally made it on 7 December with Bob McQuarrie, ZL3TY (RE57OM), using JT65b digital mode. This was Josep's 92nd DXCC entity and initial (#) 557 and is a remarkable achievement considering the very short window with the Moon at just 3° elevation at each end. The QRB, calculated with the G4JNT *Distbear* program, is 19,101km, just short of the record claimed by ZS6ALE (KG46RC) and K6MYC/KH6 (BK29AO) made on 18 July 1984 which works out at 19281km. Nevertheless, congratulations Josep and Bob.

Ian White's, G3SEK, 'Lunar Weekend Calendar for 2005' is now available and is reproduced on the last page of the December *432 and Above EME News* edited by Al Katz, K2UYH. This is an awkward year for Northern Hemisphere operators since the weekends of high Moon declination occur around apogee. The suggested weekends fall into this category and the next one is 19/20 February when London latitude stations will have about 33.6 hours of Moon time. The declination varies from +28.17° to +25.75° and the 144/432MHz sky temperature range is 550/42K to 259/19K. The signal degradation referred to perigee varies between -1.85dB and -1.91dB.

The final leg of the 2004 ARRL International EME Competition took place over the 4/5 December weekend. Some of the following reports from British stations were by direct e-mail while the rest were from the Moon Net website. Paul Tomlinson's, M0EME (IO93), station comprises an FT-847 transceiver with 100W solid-state amplifier, an antenna array of four FO20 6-wavelength 70cm Yagis, MGF1302 GaAsFET 15dB, 0.5dB NF preamp and 30m of Westflex feeder.

SOLAR AND GEOMAGNETIC DATA

In the 30 days to 7 December the solar flux was fairly constant at a few units over 100 for most of the period. The maximum value was 127 on 9 November, the minimum being 90 on 7 December and the average was 105. The SESC sunspot number never reached 100, the maximum was 93 on 8 November with the minimum of 26 being recorded on 7 December. Only 11 new regions were noted.
After the high geomagnetic activity at the beginning of the period the middle latitude A-Index at Fredericksburg was in single figures on 16 days and was zero on 4 December. Apart from the severe storm value of 101 on 10 November, when the estimated planetary A-index reached 181, there were no further reports of auroral activity as far as British Isles stations were concerned.

Well-known EME operator Peter Sundberg, SM2CEW, at his VHF/UHF operating position

On the Saturday he copied HB9Q, DL9KR and SM5IOT but their signals were all down on previous occasions so he didn't complete any QSOs.

Peter Blair, G3LTF (IO91), added another 12 stations on 23cm and seven more on 70cm but activity in the later US window, 1030 onwards, was virtually zero. On the 5th on 2m he completed with RN6BN, RU1AA and SV1BTR using a 2-ele quad in the 6m dish with 800W at the feed point. On 70cm he worked OK2BDQ, S51ZO, HA1YA, G3LQR and K2UYH but didn't find K5JL or PY5ZBU. 23cm brought QSOs with LA8LF, DF3RU, OZ6OL, G3LQR, ON7UN#, LA9NEA# and F6KHM on SSB.

Howard Ling, G4CCH (IO93), added another 19 QSOs on 23cm for a final score of 68x36 and a total of 244,800 points. As in the previous leg, a few stations got away, some just appearing for a 'golden QSO' never to be heard again. Conditions were good on the 4th but libration made things more difficult on the 5th. He found activity good on both days but was disappointed at the low level of US activity. ON7UN, W6YX and LA9NEA were new initials bringing his total to 196.

Peter Etheridge, G4ERG (IO93), finished with 31x24 on 70cm adding VK3UM, S52CW, SM3BYA, HA1YA, OE5EYM and K2UYH in the December weekend. Others heard were KE2N, JH4JLV, ZS6JON, G4RGK, F2TU and RW3PX. He is hoping to get his initial count going again so would welcome skeds on CW only and his e-mail address is peter@g4erg.demon.co.uk

Next a selection of overseas reports from the Moon Net website starting with EA3DXU who was QRV till 0900 on the 5th, but nobody answered his CQ calls on 2m CW and all the stations he heard he had already worked in the first leg in October. So he turned to JT65b and completed 18 QSOs with RA3AQ, SM5CUI, SK0UX#, PA2CHR, I6WJB, EB1DNK,

IK1UWL and PA0JMV on the 4th and next day with EA6VQ, EB8ANY#, F9HS, ZS6WAB, RU3ACE#, F5LRL, K2TXB, OE6IWG, SK6EI and N5BLZ. On 70cm he made only two CW QSOs with DL9KR and S52CW on the 5th. In all he ended up with 43 QSOs on 2m and 19 on 70cm.

K2TXB enjoyed the contest, completing with 22 stations on 2m with CW activity definitely down. Russ really enjoys JT65 mode, which makes it much easier to complete a contact when conditions are down, though when they are favourable CW is much quicker. He thought conditions were not too good and is puzzled why a lot of stations had trouble copying him - he runs the legal limit - though he was copying them well. He thinks that part of this was due to Faraday rotation and part due to the ever-increasing noise and junk on the band.

Rob Hardenberg, PE1ITR (JO21), was QRV on 70cm and runs 'a semi-permanent kind of set-up'. The antenna array is a pair of 28-ele 8.5-wavelegth Yagis, 0.35dN preamp and GS35b PA. He worked HB9Q on JT44 random, N9AB# on JT65b random and K2UYH on a JT65c sked. A JT65b attempt with EA3DXU failed due to poor decodes when there was rapid QSB.

Gudmund Wannberg, SM2BYA (JP81), unpacked last year's SM3BYA Spitzbergen expedition crates, hooked up all the gear and was delighted to find it all worked well. At the farm QTH it was exceptionally quiet with only two barely detectable birdies in the first 50kHz on 70cm and no wide-band man-made noise at all. In spite of Faraday rotation, he had good echoes the whole weekend. He completed on CW with 19 stations; HB9Q, DL9KR, VK3UM, DL7APV, RA3LE, OH2PO, OZ4MM, G3LTF, SM3AKW, OE5EYM, F6KHM, K5JL, N2IQ, SV1BTR, OK2BDQ (but that one is probably a failed QSO as he insisted his call was SM3BYR), SM2CEW, G4ERG, F2TU and K1FO. The US appeared to be a case of solid Faraday lock-out on both days since K0RZ, KJ7F, K4EME and N9AB were all good signals but none responded to his calls.

Jimmy Vittorakis, SV1BTR (KM18), had a great time in both legs of the contest managing his highest-ever score with 97 stations on 2m plus four duplicates and 33 on 70cm. All were CW unassisted QSOs bringing 21 new initials on 2m, taking his total to 332, and 22 on 70cm for a total of 87.

Doug McArthur, VK3UM (QF22), finished with 48 unassisted random CW QSOs on 70cm and his 27 multipliers gave him a total score of 129,600 points. He found conditions stable for the most part with Faraday mostly 45° but 90° for short periods but very little libration. As others found, the North American window was poor even though they were in "convenient opening hours."

BAND REPORTS

50MHz

Some winter Sporadic E (Es) and auroral activity brought the 'magic band' to life on four days in November. David Butler, G4ASR (IO81), caught an evening opening on the 9th when he worked I8MPO (JN70) and IT9TJH (JM67). Later auroral-E (Au-E) mode brought in beacon OH9SIX (KP36) at S5 followed by a QSO with OH6HFX (KP14).

Next morning there was an aurora resulting in CW contacts with GM4DZX (IO89), GM4ILS (IO87), EI3IO (IO63), ON4FU (JO11), SM7AED (JO65) and DL7HG (JO62) at beam headings (QTE) 30-65°. At 1637 he copied the Lebanese beacon OD5SIX (KM74) at S5, a QRB of 3575km. Double-hop QSOs with 4Z5AO (KM72/3704km) and 5B4FL (KM64/3450km) followed with SV8UM (KM17) heard. From 1810 he completed CW contacts with S53XX (JN76), I3EVK (JN66), S51WX and 9A6Z (JN75). In the morning of the 11th David made Es contacts with YO9HP (KN35/2260km) and YO7VS (KN14/2145km). Stations in I, OM, S5, T9 and 9A were copied until after 1100.

Ted Collins, G4UPS (IO81), caught a morning Es opening on 1 November and at 1034 worked IK1EGC (JN35) followed by IK0BJQ (JN61), IZ8FDH (JN70), I8MPO, IW0BET and IW0GXY (JN61). He heard 7X0AD calling CQ very weakly at 1159 and ended with a partial QSO with IK0FTA (JN61) at 1206 after which the event ended.

Things were quiet until the evening of the 9th when he completed an auroral contact with G4DEZ* (JO03) before fade-out at 1740. From 1803 he had Es QSOs with I8PLR* (JN71), IW6MNT (JN62), I8JIT (JN71), IW5ACZ (JN53), IW0BET (JN61), IW0GXY and I8MPO before fade-out at 1905. At 1956 and he worked SP2MKO* (JO93), then MM0AMW (IO75) via aurora.

On the morning of the 10th Ted made CW auroral contacts with G4FUF (JO01) and EI3IO. From 1722 there was Es propagation that brought QSOs with S57AC (JN76), OK2DW*, YU1EU* (KN04), S51WX*, S57RR* (JN65), S57MHA (JN76), IV0ALA (JN65), T99C* (JN93) and 9A6DM* (JN86). The event faded out at 1835. In the late morning of the 11th there was more Es propagation that resulted in contacts with IK2GSO* (JN45), OE6BMG* (JN77), IW3FZQ (JN55), IW3SNU (JN65), I5MZY (JN53), HB9CKV* (JN46) and IW7EEO (JN71).

In the auroral event on the 9th Kevin Jackson, M0XLT (IO83), worked GM8LFB (IO88) and MM0AMW and in the evening Es, IT9TJH with other Italians and an S5 heard. He mentions JA3CRY heard on 50.110MHz at 1847 but that sounds highly unlikely to be genuine. In the Es event on the 10th, 1628-1832, he worked 23 stations in DL, I0, 1-3, 5 and 8, OE, S5 and 9A. Next morning, 0934-1144, he made another 18 QSOs with Italians in the 0, 1, 3 and 5-7 districts plus S57AC (JN76) and DK7CH (JN58). From 1027 on 1 December many Italian beacons were audible and he contacted IW5EFX and I5IAR (JN53) and IW0GXY. All these QSOs were on SSB using an IC-706MkII transceiver and a tri-band collinear antenna.

Carl Halkier, OZ1IEP (JO55), was QRV in the 6m Nordic Activity Contest (NAC) on 23 November making 23 QSOs with stations in 10 grids. His ODX was G4IGO (IO80) at 1123km, the other G station worked being G4PCI (IO91) at 1036km. He has a website where you can check his logs, see 'Web search'.

LOCATOR SQUARES TABLE

Starting date: 1-1-1979

Call	50MHz	70MHz	144MHz	430MHz	1296MHz	Total
G4YTL	11	56	560	141	14	782
G3IKR	340	52	45	-	-	437
G8TOK	424	44	145	58	34	705
G4DEZ	690	41	211	89	44	1075
G3XDY	-	34	261	179	130	604
GW3HWR	478	31	187	34	-	730
G3FIJ	278	29	108	51	23	489
G4OBK	469	28	79	11	-	587
G0JHC	1040	26	48	4	-	1118
GM4VVX	357	22	170	2	-	551
M5MUF	155	23	70	-	6	254
G4FUJ	111	20	28	6	5	170
M5BXB	453	15	192	57	-	717
GW3LEW	436	14	232	42	4	728
G4VPD	457	14	231	16	-	718
G0ISW	240	7	103	22	-	372
MM3ERP	91	3	83	22	-	199
G0FYD	724	1	296	50	17	1088
M1DUD	294	1	54	10	-	359
GW7SMV	675	-	250	-	-	925
G6TTL	405	-	140	94	28	667
G8HGN	346	-	208	77	-	631
MU0FAL	540	-	49	9	4	602
EA7IT	209	-	108	-	-	317
M3CVN	249	-	46	5	-	300
G4APJ	192	-	64	31	-	287
G3FPK	30	-	246	-	-	276
M0XLT	175	-	14	2	-	191
G8RWG	-	-	120	-	-	120
M1FEO	59	-	26	1	-	86
2E1GUA	17	-	18	13	-	48

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Band of the month 70MHz. Next deadline is 8 February.

For those interested in the 6m scene in Italy there is a monthly bulletin, Six Italy, available. It's edited by Sergio Roca, IK0FTA, and can be downloaded from their website - see 'Web search'. You can e-mail them with any news and comments to sixitalia@sixitalia.org

70MHz

G4ASR is the only operator reporting any 4m activity this month and in an aurora on 9 November, after copying the GB3MCB and GB3ANG beacons at 1451, David went on to make QSOs with GM4BYF (IO85), G3JYP (IO84), GD0TEP (IO74), EI3IO and G3NAQ (IO91). Next morning from 0815 he again copied the Cornish and Angus beacons and from 1352 heard GD0TEP and OZ3ZW (JO54). On the 10th at 1705 he completed an Es QSO on FM with S51DI (JN76) and heard him again on SSB at 1740. It was a long Es opening to Slovenia.

144MHz

Angie Sitton, G0HGA (IO91), is a very keen 2m CW operator and has created a website for like-minded folk in the UK and Europe. When I looked on 9 December there were 34 members and she would like to have some more. So if you are interested, have a look at the website. She also has a reflector and for details of both see 'Web search'. Her e-mail address is morselady@hotmail.com

Geoff Grayer, G3NAQ (IO91), discovered a French contest on 5 December when he switched on at 0745 but found conditions very unstable with wide variations in signal strength from minute to minute. Before the Affiliated Societies Contest he was able to make a few contacts, those over 500km including F1DLT (JN27) and ODX at 658km, F6CRP (IN96), F1AZJ/P and F4CQY/P (JN28).

In the afternoon aurora on 9 November, G4ASR worked DL1HN* (JO43) at QTE 50° and MM0CEZ* (IO75) at 30°. From 1318 on the 10th David completed a further 14 CW QSOs with stations in DL, G, GW, HA, OK, ON and PA at QTE 50-65°. ODX was with HA8V (KN06) at 1423 a QRB of 1790km and other long DX were HA5OV (JN97/1660km) and OK1DFC (JN79/1243km).

WEB SEARCH

G3WOS (BBQ):	www.gare.co.uk/6m_bbq.htm
Antenna software:	http://members.fortunecity.com/xe1bef/software=antennas.htm
Six Italia:	www.sixitalia@sixitalia.org
OZ1IEP:	www.qsl.net/oz1iep
2m CW (G0HGA):	http://groups.yahoo.com/group/twometrecw/
G0HGA home page:	www.qsl.net/g0hga/vhfcwpage.htm
VHF Communications:	www.vhfcomm.co.uk

On 6 December Bryn Llewellyn, G4DEZ (JO03), found good tropo conditions and worked many German stations at over 1000km and lots more in the 500-999km range. ODX was 9A2AE (JN86) at 1413km who called him on SSB. In the contest the previous day HB9RDE was his ODX.

SIGN OFF

Thanks to Andy Barter, G8ATD, for the copy of the Winter issue of *VHF Communications* which, as always, contains some excellent articles. That's it for another month. The copy deadline for April is 8 February and for May it's 8 March. My telephone answering and fax machine is on 020 8763 9457 and my CompuServe ID is g3fpk ♦

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Professionals adopt APRS-type system

GW7KDU describes how an amateur concept has been adopted by many utility services • Other news includes a 6m repeater in Somerset, ATV repeaters, a store-and-forward repeater, and a vacancy on the RMC.

Matt, G4RKY, installing GB3FH on site.

APRS is a system developed by amateurs, and the basic techniques have now found a high-profile position in commercial radio communications. The popular APRS system has been around for a few years now and provides an interesting facility, which shows the location of fixed and mobile amateur stations.

Using the now quite-affordable GPS (Global Positioning System) form of satellite location to determine position to quite high accuracy, then transmitting it by packet radio, this technique allows the actual location of stations to be displayed on a map. Apart from the interest of watching mobile stations on the move, it can provide an insight into propagation by showing where signals can be received from, as well as weather information and a simple text-messaging system.

Similar commercial services are available using the mobile phone networks, but frequent transmissions are relatively expensive and rely on the network coverage, which can make real-time position delivery intermittent. There are however, increasing numbers of systems being installed, using PMR networks, both private and public, as the bearer for the location data. These offer frequent updates at a low fixed cost, and coverage 'off the beaten track' where phone coverage is limited.

The benefits to operators of large vehicle fleets are obvious, if you know exactly where your resources are, you can deploy them most efficiently to destinations and determine if they are on schedule. The latter finds one of the largest uses in the public transport industry. The government has encouraged the use of Real Time Passenger Information systems to make travel by bus more attractive to the public. The idea is that people are more likely to use the bus if they can see accurately when one will arrive, and be confident that they are running to the timetable.

There are now many thousands of buses fitted with GPS and PMR systems that deliver location data at frequent intervals. The techniques used are similar to APRS, in that small packets of data are delivered using FFSK over conventional FM repeater systems with large coverage areas. The most significant difference is that the data is sent synchronously, either by each vehicle having its own timeslot for transmission, accurate to a few milliseconds, or by 'polling', where the base station requests data from individual mobiles in turn. These systems can deliver the location of up to 10 vehicles per second on a 12.5kHz channel. This means that the location of hundreds of vehicles can be gathered rapidly enough to ensure an accurate view of their adherence to the schedule.

Maps are rarely used but, instead, the data is collated centrally and compared with timetables, then transmitted to bus stop displays which give an accurate indication of the expected arrival in the same way as many railway networks. Similar systems are being deployed by large taxi companies and utilities, where the same data is used to determine which vehicle is closest to a job. One of the largest London taxi operators using such a system now allocates most jobs automatically and the customer can be told instantly the number of his cab, where it is now and even the driver's name. They can also watch the progress of the cab towards the pick-up point via the internet or mobile phone.

OUTSTANDING VOICE REPEATER PROPOSALS SUBMITTED FOR LICENSING SINCE SEPTEMBER 2004 ARE:

Callsign	Type	Proposed Keeper
GB3IP	New 2m, Stafford	G7PFT
GB3DR	New 2m, Dorchester	G0EVW
GB3CD	New 2m, Co Durham	M1FDI
GB3YW	New 2m, Wakefield	G1XCC
GB3WR	2m modification, Somerset	G0TJP

NEW 6m REPEATER IN SOMERSET

GB3FH located in North West Somerset, near Cheddar went on-air on 6 November. After some initial teething troubles, it is working well. Further improvements are planned for early in 2005 including a new receiver setup and audio improvements.

The basic details of the repeater are: output frequency, 50.770MHz; shift, +500kHz; narrow deviation, 2.5kHz max; CTCSS tone, 77.0Hz.

Note that access is only by CTCSS as toneburst is not permitted on 6m. More details can be found on the repeater's website. E-mail reports to Matt, G4RKY (g4rky@gb3fh.org.uk), are welcomed.

ATV REPEATER NEWS

There have recently been several new ATV repeaters appearing on-air. In particular, many of the recently-cleared 13cm units are now active, such as GB3TZ near Luton and GB3BH near Watford. GB3BH relays pictures from GB3HV when it is not itself in use, and the GB3BH overlay can be seen on the GB3HV testcard.

Full details of all the ATV repeaters are available on the RMC website with frequency, contact and coverage details. ATV repeaters were first seen on the air over 20 years ago and there are now 50 ATV repeaters licensed or in process in the UK. In the UK we started with a mixture of AM and FM units only on 23cm; we now have FM and Digital (DVB-S) units on three of our microwave allocations. The uncertainties introduced into our activities by the publication of the recent Ofcom Spectrum Review are, therefore especially, worrying for all ATV operators.

REPEATER MANAGEMENT COMMITTEE VACANCY

The Repeater Management Committee has a vacancy for an East Midlands Zonal Manager. The successful applicant will be responsible for processing applications for voice repeaters in the area and attending committee meetings approximately four times a year. Applications in writing should be sent to the RMC Chairman, Carlos Eavis, G0AKI, c/o RSGB Headquarters. The closing date is 31 March 2005.

STORE AND FORWARD REPEATER

The UK's first unattended 'store and forward' single frequency voice relay was switched on at 1330UTC on Saturday 16 October. It operates on 70.4375MHz using the callsign MB7FM. There is a maximum 'store' time of 120 seconds. The installation is on an elevated site in the Chiltern Hills at locator IO91PS, with 10dBW ERP from a dipole antenna at 32m above ground. Please send signal reports etc by e-mail to mb7fm@77hz.com

REPEATER PROPOSAL STATUS AS OF 19 DECEMBER 2004

The latest clearance status can be obtained from the RMC website. Please note that, even though an application may have cleared, it is beyond the control of the RMC as to when the keeper will bring the repeater into service. ♦

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GB3FH	www.gb3fh.org.uk/
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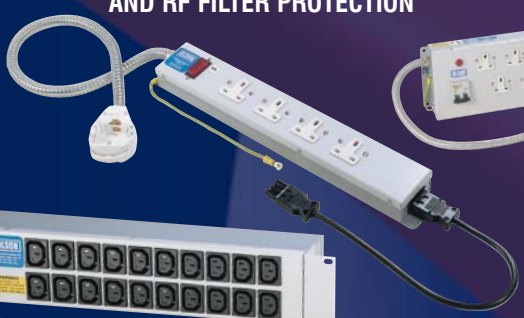

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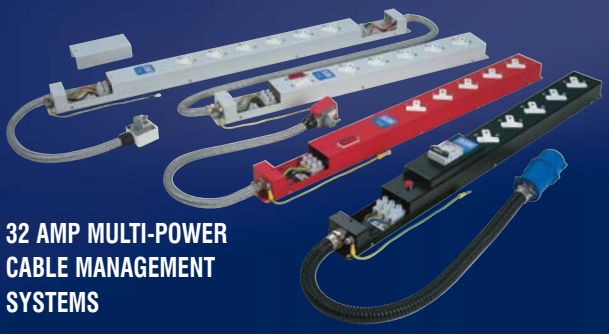

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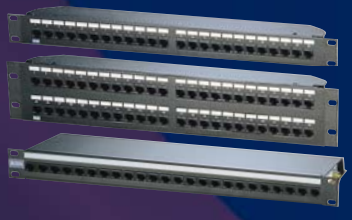

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Antennas

There are some situations where feeding an antenna with coax poses some mechanical problems. One of these is a dipole arrangement using a kite or a balloon as a support. Invariably the element to be fed has to be λ/4 long to present a low impedance to the coax feed. This requires some sort of radial or lower element, complicating the mechanics. Introducing the RFD (resonant feed-line dipole).

This was described by AB2EZ in [1] and described as the RFD (resonant feed-line dipole). This arrangement, shown in **Fig 1**, shows the centre of the coax feed connected directly to end of the quarter-wave wire element and the braid left open-circuited. The coax braid currents are choked off λ/4 down from the feed-point by simply coiling the feeder into 13 turns.

According to AB2EZ, the method gives good results using 20m and 80m versions, with a SWR of better than 2:1 over the bands.

A VHF RFD DESIGN

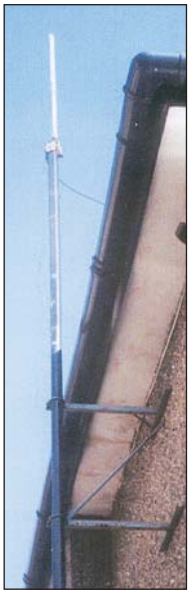
I received a description of a similar antenna for 2m from Peter Grant, G8HAR. For many years he had been using the traditional Slim Jim with good results.

G8HAR then tried an experimental RFD for 2m by simply removing quarter of a wavelength of braid from a length of coax feeder and making a small multi-turned loop of the feeder, quarter of a wavelength down from the point where the braid was removed. The antenna appeared to work well and this encouraged him to make a more permanent arrangement as shown in **Fig 2**.

The upper element is made from λ/4 of coax cable with the inner conductor and the braid soldered together with the centre of the feeder coax connected to this point. The feeder and the coax element are fixed to a plastic or wooden support using tie-wraps.

The coax choke is made by coiling the coax around the antenna support five and a half times and also fixed into place using tie-wraps.

The antenna is adjusted for minimum SWR by trimming the length of the top element and adjusting the position of the choke relative to the feed-point. When the adjustments are complete, the choke is fixed in place with the tie-wrap. The centre feed-point and the end of the elements should be then sealed with shrink-wrap.

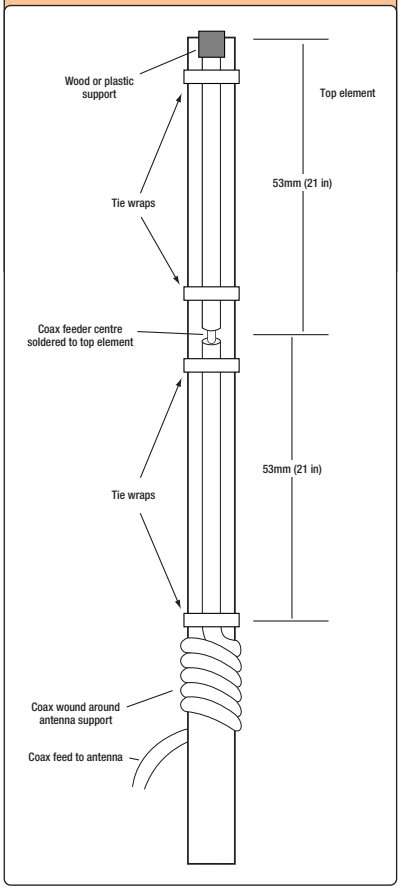


The G8HAR RFD antenna, which is claimed to work as well as the Slim Jim antenna.

Fig 1: The AB2EZ RFD half-wave dipole antenna for 80m [1].

Fig 2: The G8HAR RFD half-wave dipole antenna for 2m. After adjustment (see text) the SWR readings were 1.4:1 at 144MHz, 1.0:1 at 145MHz and 1.2:1 at 146MHz.

FIG 2 © RADCOM 417



FURTHER EXPERIMENTS

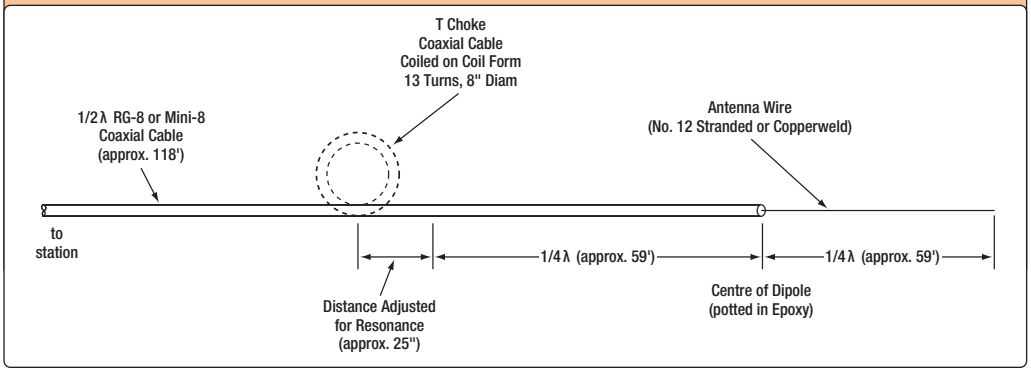
When I first received the description of the G8HAR RFD antenna, I felt unsure about it - it didn't seem right somehow and only decided to pursue the matter after coming across the antenna by AB2EZ [1]. This antenna does not feature in any other of the antenna books that I possess.

The normal method of feeding a coax centre-fed vertical is to use a bazooka λ/4 tube with the coax fed up the centre and the coax braid connected to the tube at the feed-point. I decided to make one of these RFD antennas for the 70MHz band. Pruning and adjustment resulted in a top element 0.93m while the distance from the feed-point to the choke was 1.2m. The choke comprised a single layer of the feeder wound on a 50mm (2in) cardboard tube and held in place using plastic clothes pegs. This arrangement made it easy to adjust the position of the coil on the feed-line and to also adjust the number of turns.

I am not so sure about this 'choke'. I found the number of turns as well as the position on the feeder had quite an affect on the resonant frequency of the antenna. Also, the position of the coil and the number of turns affected the feed-point impedance (measured using SWR). Could the turns be acting as a tuning coil similar to the arrangement that could be used to end-feed a half-wave dipole? Touching the coax above the 'choke' while making tests showed huge changes in SWR, while touching the coax below had no effect on the SWR so clearly the common-mode, or antenna currents, on the line were quite low.

My thoughts on using a kite- or balloon-supported antenna for 80m is that a single wire is much lighter than the lightest weight coax feeder. It might be better to use a single λ/2 wire with a simple parallel tuned circuit ATU at the base as described in [2]. ♦

FIG 1 © RADCOM 416



REFERENCES

[1] 'Experiments with a Balloon-Held Vertical Antenna', Stewart D Personick, AB2EZ. *ARRL Compendium*, Vol 7.

[2] *The Amateur Radio Mobile Handbook*, RSGB.

NEW

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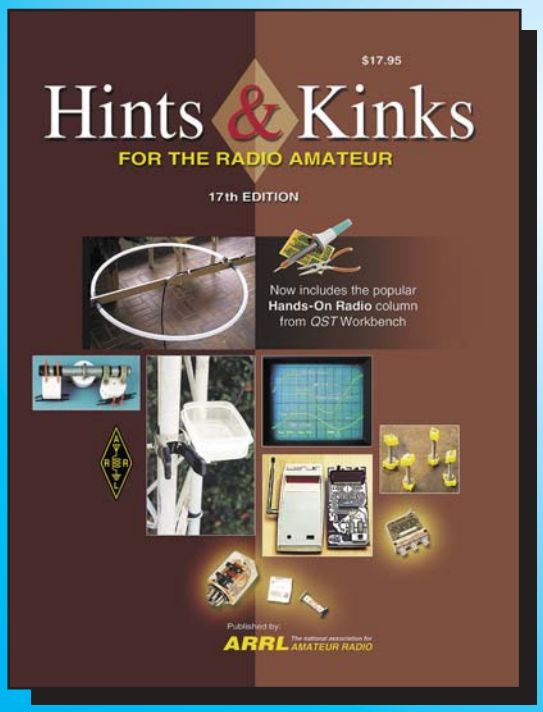

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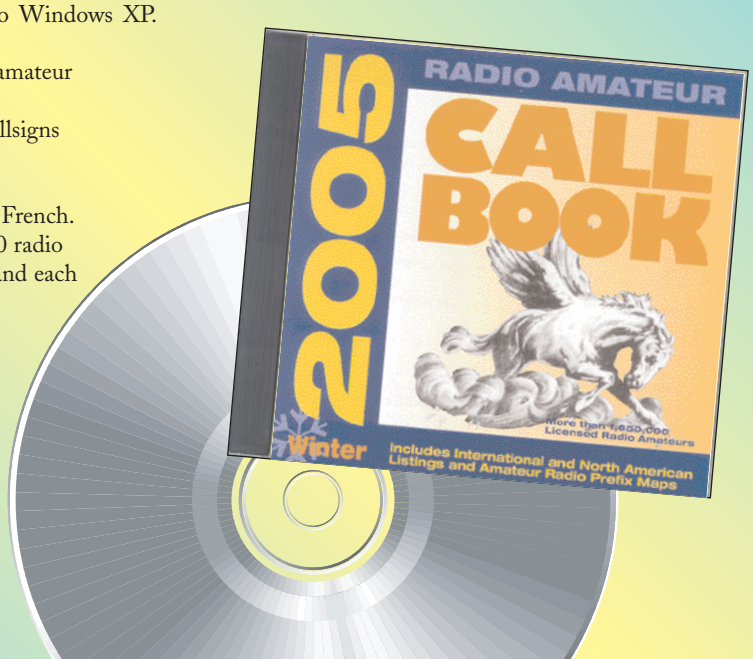

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Whatever next

G3ZVW mentions the problems of fitting an amateur radio mobile transceiver into the slot provided for a broadcast receiver in a motor vehicle. He starts by airing a few of the suggestions from readers about their 'ideal' transceiver.

It seems I struck a chord with readers by suggesting we might be able influence the designers of the next generation of amateur radio equipment, because I received numerous immediate responses. The number and variety of ideas has been overwhelming, so I'm not able to detail them all here. Some of them, in no particular order, are itemised in the box.

READERS' SUGGESTIONS

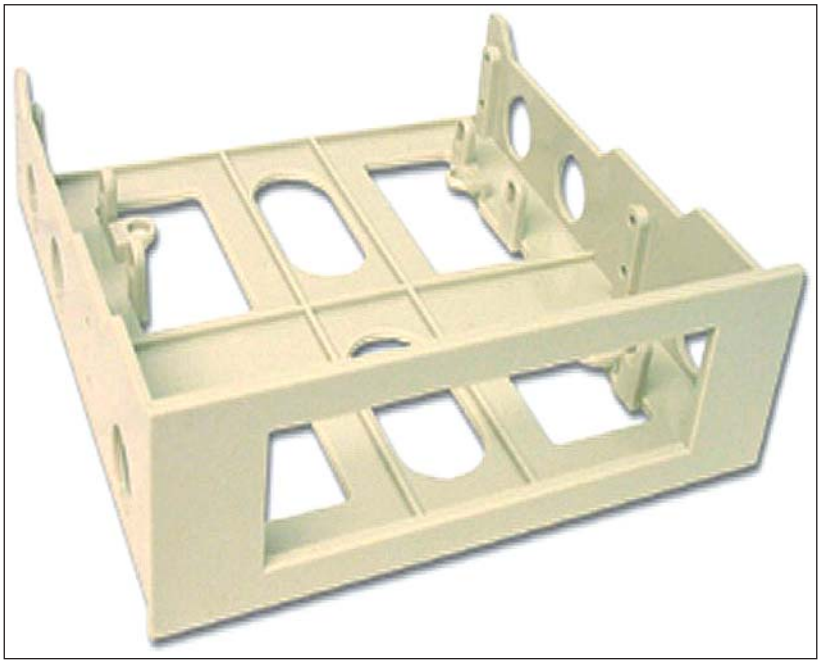
- A quiet cooling fan and side vents, but no top vents since everyone puts things on top of the transceiver, don't they?
- Amateur bands only, thus automatically improving receiver performance with good roofing filters. A second, totally independent receiver (separate tuning knob), which could be general coverage.
- No connections at the back, which might need to be got at while operating.
- IF DSP is mandatory, continuously variable bandwidths down to ~60Hz on all modes. Audio bandwidth should track IF bandwidth at all times.
- Provision for really good audio, because a good microphone and speaker system makes things so much easier on QRP.
- VHF bands? Not convinced, except perhaps for 6m. Maybe I'm out of date, but I can't help thinking that a stand-alone VHF/UHF rig will always beat the VHF/UHF part of a multi-band rig, which is bound to be something of a compromise.
- Good sensitivity and selectivity by whatever means matters most. Switchable filters for CW a must.
- I hate cables from one plug going to more than one piece of external equipment, so all inputs/outputs to be on separate sockets, including PTT, ALC, audio out, audio in, FSK, keyer, etc. The use of 13-pin DIN sockets forbidden (actually, nothing more than 5-pin).
- …cover the amateur bands in 500kHz sweeps, with 0-500 being left-to-right on the dial and clockwise turn of the tuning knob then click the band switch and right-to-left from 500 to 1000, with anticlockwise movement of the knob. A digital readout of the meg-plus-0 or 5 to show which segment would be a bonus, but not essential. Also, the twin knob, outer for fast, inner/top from fine tuning would be essential.
- As many rotary [front panel] controls as possible. I see that the FTDX9000 is covered in rotaries, which is a great move. I think I will have to concede that band changing is better done with push buttons (ie a minimum of potentially dirty contacts). Rotaries not too large, clearly marked and not too closely packed.
- A digital 24hr clock on the front somewhere, with UTC readout.
- A basic amateur bands only rig along the lines of the Elecraft K2, but physically larger, with 100W RF out and a decent analogue meter on the front. It must have a superlative receiver, continuously variable IF bandwidth down to 100Hz and passband tuning, all for less than, say, £750.
- A provision for add-on cards for Automatic ATU, DSP, computer interfacing (isolated audio and PTT, plus RS232), VHF/UHF transverters, and general coverage receiver.
- Facilities for phasing-out interference. Sometimes called 'Null Steerers', they require an additional antenna that can hear the offending interference, which is then nulled-out by creating a 180° phase difference.

As I mentioned last month, I will be hosting a discussion at the Stevenage Show on 20 February to thrash out the design for a transceiver. All the ideas submitted by RadCom readers will be considered, not just those listed above so, for the moment, please keep them coming. Join me there to put your ideas forward, have your say, and help shape the next generation of amateur transceiver. In the meantime, thank you to everyone who responded.

STANDARD-SIZED MOBILES

A spin-off from the discussion about people's ideal transceiver came from Martin Hamilton, GM0MGE. He said; "I felt I had to write and ask why no manufacturer to my knowledge has yet produced a DIN-E-sized transceiver with connections to suit existing power and speaker connections in modern cars? As a company car driver, it becomes irksome to re-install my radio(s) every two years in a new vehicle. A DIN-E-sized set with these connections would make life so much simpler in that only the antenna cable would require some head scratching."

This idea seemed familiar, so I looked through the indexes for this column and discovered that I raised this very topic in February 2001. Thinking about it now, the fact that no such equipment exists might be attributable to the fact that a lot of amateur equipment is built with the US market in mind, which is much bigger than our market. American cars might have a different standard-size hole in the dashboard for a broadcast radio. This being the case, there wouldn't be a great deal of impetus for manufacturers to produce a DIN-E-sized radio for a small section of the market. However, for physically small transceivers, it cannot be beyond the capabilities of the amateur radio equipment manufacturers to produce adapters that would enable their radios to be slotted into European and American vehicles. We wouldn't be setting a precedent here, because – for example – BMW produces adapters that permit DIN-sized broadcast radios to be installed in their older model vehicles. ♦



For many years, people have fitted 3in floppy disc drives into 5in bays using brackets like this. It should be just as possible to fit a small mobile transceiver such as the Yaesu FT-90R into a standard car radio slot by using a similar tray and connect it to the car's power and loudspeakers via a pre-made adapter. That being the case, why hasn't anyone produced them commercially?

Andy Talbot, G4JNT

15 Noble Road, Hedge End, Southampton SO30 0PH.

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

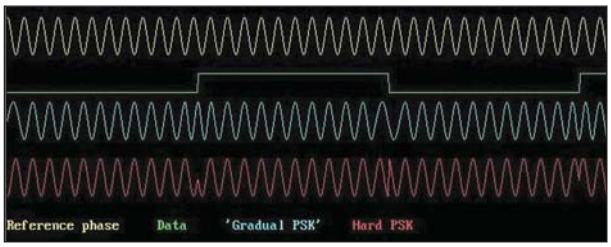
Keeping down the bandwidth

G4JNT takes another look at datamodes for LF users, and describes some original work being done in this area. He also queries the band/mode concept favoured by DXpeditions, before introducing the first steps in PIC programming.

Discussions on the LF reflector have turned once again to LF data modes. The main issue here is that, as antennas are so inefficient, and we are ERP-limited, many stations routinely run very high power transmitters – often in the 1kW output region. These are nearly always of the class D/E switching type, and can only transmit at full power, on or off. The constant envelope means that using many of the soundcard-generated datamodes is not feasible as these rely on precise waveform amplitude shaping to keep the transmitted bandwidth down. 'Plain old RTTY' does not fall into this category but, even at its narrowest practical shift – 85Hz for some soundcard software – is too wide for the narrow frequency allocation of 2100Hz and its use would be antisocial in the extreme!

Two datamodes do lend themselves to constant-envelope signalling, however. Minimum Shift Keying, MSK, is best described as a cross between BPSK and FSK, and uses a frequency shift of exactly half the data rate. MSK was used on the old GBR 16kHz transmission from Rugby, and a variant, GMSK is used for the mobile phone network. While easy to transmit, the optimum reception of MSK is extremely difficult to perform, particularly with poor signal-to-noise ratio signals – which is exactly what we want! However, several DSP authors are plodding ahead with ideas, so watch this space.

Another concept that has been discussed is a modified form of PSK with gradual phase transitions. Here the phase is not rapidly switched over 180° from one bit to the next, but glides there over a fraction of the bit period, keeping constant amplitude as shown in the photograph. This technique does not appear to have been used much professionally or commercially, but Jim Moritz, M0BMU, myself and others have made some simple tests around VE2IQ's 'Coherent' 10bps PSK system, and results look as if they could prove promising. Again, there is a lot of work to be done before anyone can say it is a way forward. Also, as there has been no commercial usage, we are playing with a completely new concept – something amateurs have not done too much recently!. One of the first tasks is to find an easy way to generate a transmit signal.



Illustrating the concept of gradual phase shifts in the PSK waveform, maintaining constant amplitude.

DATA MODES AND DXPEDITIONS

At a recent lecture by John Linford, G3WGV, one of the leaders of the recent Rodrigues Island DXpedition which made over 150,000 QSOs, he commented that a number of those were made using various datamodes. While such HF operation is a complete mystery to me, it appears that many operators like to work the DXpedition stations on as many band/mode combinations as possible; for example, working the station on 7MHz CW and SSB, again on 10MHz on CW and once more on both 14MHz SSB and CW, counts as 5 boxes ticked. The same now appears to be true of the datamode operators, only now they want to work on RTTY, PSK31, PSK63, MFSK, Hell (then all its variants perhaps?). Is this really right, and what has it gained the individual ? Once the DX station has been worked on one mode, it's going to succeed again on just about any of the others, so what has ticking more datamode / frequency-band combination boxes really achieved, apart from tying up the DXpedition station changing computer software when they could have been working more stations?

PIC PROGRAMMING

All microcontrollers interface to the outside world through digital input / output pins. These usually give out, or accept, a 0 – 5V signal to represent the logic levels. Some devices accept analogue voltages usually 0 – 5V or sometimes 0 – 2.5V. PIC devices come in different-sized packages to allow for different numbers of I/O lines, so that a typical workhorse such as the 16F628 device in an 18-pin package typically has 13 of these pins allocated to I/O and the others are allocated to power supplies, reset and clock oscillator. With certain setup configurations, some of these can even be reallocated increasing the I/O capability to 15. Other devices are available with 40 pins or more, giving large I/O capability – conversely, the recently-released tiny 10F series of PICs has just 6 pins, allowing up to 4 interface wires. These pins have an I/O capability designed to 'talk' to the real world. For example, they usually have a current output capability of 20mA, making the direct drive of LEDs and medium- to high-power transistors straightforward. As inputs, they are protected against moderate static discharge and overvoltage. Some have Schmitt trigger inputs for slowly changing waveforms and behave predictably when left open circuit – unlike CMOS devices of old. A number of ports are provided with an optional pull up, making external resistors unnecessary when interfacing to switches and keypads for example. All I/O pins are grouped into 8 bit ports, so PORTB will have 8 inputs or outputs referred to as B0 to B7, PORTA may only have A0 to A4 available. Each individual pin (with a few limitations) can be set to be either input or output, and can even be changed on the fly as and when needed. In the box is a few lines of assembler code to introduce four of the 35 PIC instructions, and show how to set PORTB for Input or Output.

CORRECTION

Paula, G8PZT, wrote in to point out that the URL given for Fourpak and the Packet Radio conference proceeding given last time were incorrect. The correct URL is given below, as well as that for the 2002 and 2003 proceedings. ♦

TO ILLUSTRATE ASSEMBLER CODE

```
bsf     STATUS, RP0     ;Set a flag to tell the PIC we are setting the output direction register
movlw   b'00010010'     ;Put the binary I/O pattern needed for PORTB into the working register W
movwf   TRISB           ;Then move W to the direction register – 1 is an input pin, 0 is an output
bcf     STATUS, RP0     ;Reset the flag, so PORTB can be directly read from or written to
```

Meanings

bsf	Sets a bit in specified register (here the STATUS register)
bcf	Bit Clear register F
movlw	Move a Literal value to W (here binary 00010010)
movwf	Move W to specified register (here to PortB)

WEB SEARCH

2004 UK packet conference proceedings
http://fourpak.org.uk/pk2004/minutes.htm
Other proceedings can be found at http://fourpak.org.uk/cnfindex.htm

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

EMC

This month's 'EMC' includes information on using an ADSL 'microfilter' to tackle telephone EMC problems.

If a TV set, telephone or audio system belonging to a neighbour suffers from breakthrough from amateur radio transmissions, many radio amateurs provide the neighbour with the necessary filter or ferrite ring(s). This can help to promote good relations but in such cases, it is advisable to state that the filter or ferrite ring is on loan to the neighbour for as long as it is required, rather than making it a gift. A small neat label with your name on it would make this clear. In one case known to the RSGB EMC Committee, a radio amateur gave his neighbour a filter for a TV set but then solicitors became involved in the case. The radio amateur had given the filter as a gesture of good will but it counted against him as the solicitor argued that it was an admission of liability for the EMC problem.

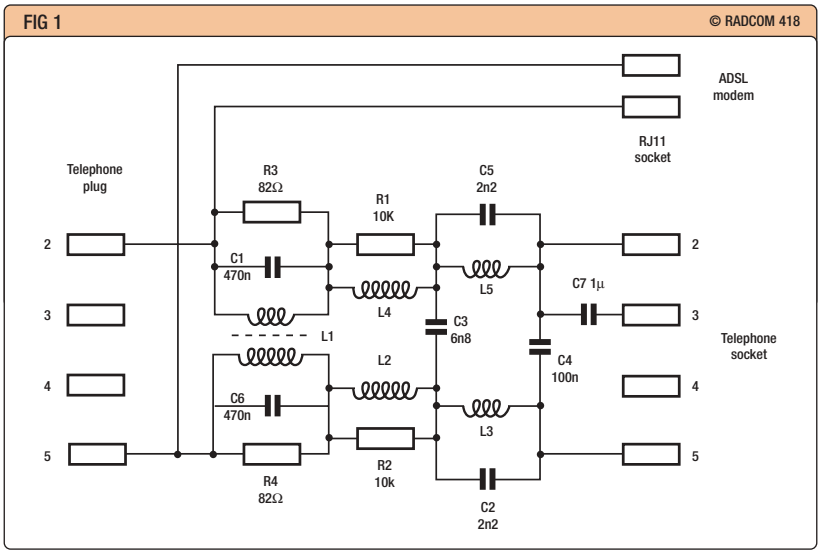
TELEPHONE EMC

As many radio amateurs know, some telephones do not have particularly good immunity to radio frequency signals. Any telephone or answering machine that has a separate mains power supply is more likely to suffer from RF breakthrough than one that is powered only from the telephone line. The reason for this is that RF signals picked up on the telephone line can flow to earth via the telephone and the inter-winding capacitance of the mains transformer.

Sam, G3JNY, had problems with RF breakthrough from his HF transmissions on two telephones in his house, a Philips model TD6311/BB059P cordless phone and a 'Home Alone' emergency calling unit. Both phones are mains-powered via a transformer. Sam was able to cure the RF breakthrough on both phones by fitting ferrite rings in two places on each phone. The first was on the telephone line cable near the phone and the second was on the low voltage power cable between the phone and the plug-in mains transformer. In both cases, he used at least 10 turns of cable through the ferrite ring. Sam tried ferrite rings from RSGB and also some ferrite rings from Maplin Electronics. The Maplin rings were only 7mm wide and Sam found that for effective suppression, he needed to use a pair of rings stacked together and wind the wire through both rings. Sam reports that after fitting the ferrite rings, he can operate up to 400W on the 3.5, 7 or 14MHz bands.

Although ferrite rings are often the most effective way of tackling a telephone EMC problem in the HF amateur bands, there are practical issues to consider. Winding enough turns through the ferrite ring (12 turns if possible) typically makes the cable up to 0.9m shorter so it may be necessary to add a short telephone extension cable. If the telephone belongs to a neighbour, they may not like the look of ferrite rings on their telephone wires. A plug-in telephone filter may not be as effective as ferrite rings, but it may be more acceptable to a neighbour. Further information on plug-in telephone filters is given below.

Fig 1: Schematic diagram of the 'Speedtouch' ADSL filter



ADSL MICROFILTERS

Asymmetric Digital Subscriber Line (ADSL) installations for broadband Internet access use signals in the range 25kHz – 1.1MHz on the same telephone line that is used for the existing analogue Plain Old Telephony Service (POTS). Most ADSL installations use an ADSL 'microfilter' for each telephone. The purpose of the filter is to reduce the level of the ADSL signals that reach the telephone and also to prevent the telephone from loading the ADSL line.

The ADSL signals are above audio frequency so they should not be audible on a telephone but telephones with poor immunity to radio frequency signals can demodulate RF signals that are on the telephone line, whether from ADSL or from amateur radio transmissions. This can produce audible breakthrough on the telephone. An ADSL microfilter improves the RF immunity of the telephone to ADSL signals but could it also be useful for solving a problem with breakthrough of amateur radio signals on a telephone? I have done some laboratory tests on an ADSL filter.

The filter tested was a 'Speedtouch' ADSL filter model DSL4132003, as supplied by One.Tel for their ADSL service via a BT line. The photo shows the ADSL filter dismantled and **Fig 1** shows its schematic diagram. L1 consists of two windings on the same core but, due to the parallel components, R3, R4, C1 and C6, L1 has little effect on amateur radio bands. The network consisting of L2, L4 and C3 forms a balanced low-pass filter which does have useful rejection on amateur bands. The parallel resonant circuits L5/C5 and L3/C2 are 'traps' or notch filters, but these resonate well below the frequency of any amateur band. C4 provides further low pass filtering and C7 is a 'bell ringer' capacitor. This is required because only the two-wire telephone line passes through the filter, not the third 'ringer' wire from the 'bell ringer' capacitor in the master telephone socket.

Fig 2 shows how the filter was tested in two different modes. Fig 2(a) shows the 'differential-mode' test configuration for signals between one

Fig 2: Test configurations for ADSL filter (a) differential-mode, (b) common-mode.

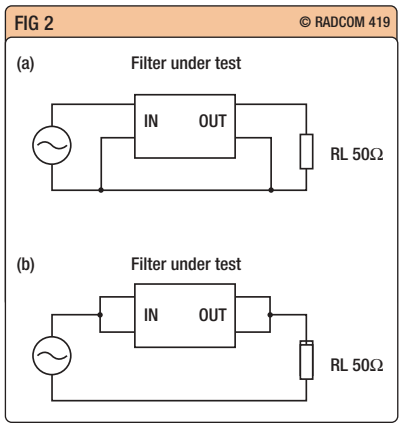


FIG 3 © RADCOM 420

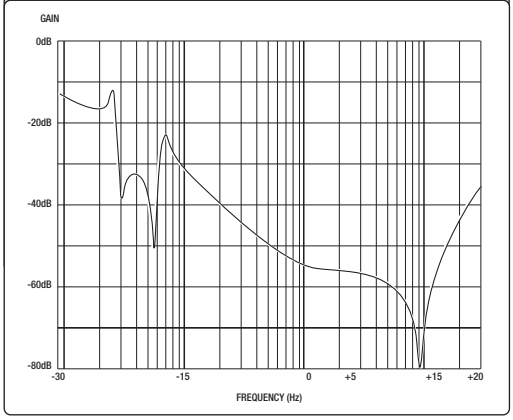
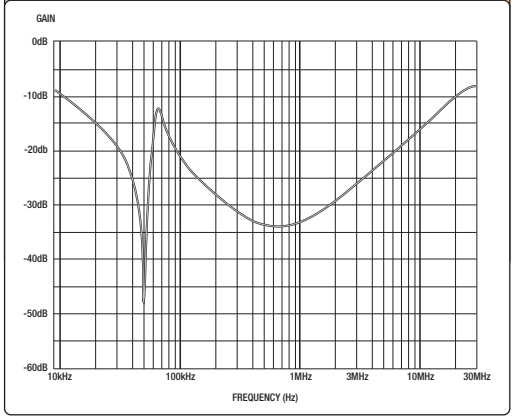


FIG 4 © RADCOM 421



line and the other. The test was performed using an unbalanced configuration, with standard 50Ω RF test equipment although ideally, it should be performed in a balanced test circuit, possibly at 600Ω. Fig 2(b) shows the 'common-mode' test configuration for signals on both lines together relative to ground.

Fig 3 shows the response of the 'Speedtouch' ADSL filter in a differential-mode test from 9kHz to 30MHz. This shows that the loss in a 50Ω test circuit is at least 50dB in all amateur bands from 1.8MHz to 14MHz and at least 30dB up to 28MHz. This makes it a very effective filter for differential-mode RF signals on the telephone line but, in practice, when there is pickup of amateur radio signals on a telephone line, differential-mode signals are not usually the main problem. Most of the pickup is likely to be common-mode, i.e. on both sides of the line together relative to earth.

Fig 4 shows the response of the 'Speedtouch' ADSL filter in a common-mode test from 9kHz to 30MHz. A loss of 26dB is equivalent to a series impedance of about 2kΩ in a 50Ω test circuit. This filter should provide a useful amount of rejection of common-mode RF signals in the 1.8MHz and 3.5MHz amateur bands but the common-mode rejection is not particularly good at 7MHz and above.

In the past, a telephone RFI filter called the BT 'Freelance' was available, and this product was tested in October 1993 EMC. The BT 'Freelance' RFI filter seems to be very difficult to obtain nowadays, but a possible alternative is to use ADSL microfilters that are widely available in computer shops. The 'Speedtouch' ADSL filter described above has similar common-mode rejection characteristics to the BT 'Freelance' RFI filter in amateur bands from 1.8 MHz upwards, so it would worth trying an ADSL microfilter like this in cases where amateur radio transmissions cause breakthrough on a telephone, particularly in the 3.5MHz band. Various different brands of ADSL microfilter are available, although it is not known whether other brands have similar RF characteristics to the 'Speedtouch' filter. I would be interested to hear from any members who have used an ADSL microfilter to tackle a telephone EMC problem.

Fig 3: Response of the 'Speedtouch' ADSL filter, differential-mode test

Fig 4: Response of the 'Speedtouch' ADSL filter, common-mode test

LOW ENERGY LIGHT BULBS

Graham, G7JYD, reports that his mother has a low-energy light bulb as one of the outside lights on her house. The bulb started producing RFI on the MW radio in the kitchen, 25 feet away. The bulb was purchased over 12 months ago and it has no manufacturer's name, only the following markings, SWOP118 240V 50Hz 18W CE on one side and 0206 on the other.

As reported in August 2003 'EMC', some types of low-energy light bulbs can suffer from parasitic oscillation at VHF but, in the case reported by G7JYD, the cause of the RFI in the MW broadcast band is likely to be different. There is an RF interference filtering capacitor between phase and neutral inside a low energy light bulb and it this fails open-circuit, the bulb would continue to work but it would inject a greatly increased level of RFI into the mains. This would be conducted around the house wiring and could also affect HF amateur bands.

In cases where RFI occurs in amateur bands when a particular light is switched on, it is worth bearing in mind that low energy light bulbs can develop a fault that causes an increased level of RFI. If the bulb belongs to a neighbour it would be worth offering the neighbour another low energy bulb in exchange, having checked that the new one is quiet at RF. I would be interested in testing any low energy light bulbs that have developed faults that result in increased RFI.

EMC 'BANANA SKINS'

EMC Compliance Journal has been running a regular feature called 'banana skins' for about 10 years. These items describe cases where electronic designers have 'slipped up', resulting in EMC problems between different electronic systems. Few of these 'banana skin' items relate to amateur radio, but they make interesting reading and they are technically well-informed. *EMC Compliance Journal* is now incorporated into compliance-club.com and the archive of 'banana skins' 1 - 272 can be found on-line (see 'Web Search'). The more recent 'banana skins' 251-272 contain a number of items on medical electronic devices plus railway EMC including tilting train interference problems. There are also items on radar detectors in cars interfering with satellite TV reception, spacecraft EMC and energy-saving lamps. ♦

The 'Speedtouch' ADSL filter dismantled.

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TT

G3VA looks at how electronic equipment communicates with its operators – ergonomics comes to the fore • pitfalls to be avoided when using vector network analysers • a novel form of micropower transmitter • more information on low dipoles

Collins 75A-4 pre-WARC 'amateur-bands' receiver, often regarded as the best receiver designed purely for amateur radio.

The HRO-60 – the final 'valved' version of the late 1950s still bore a family likeness to the original HRO designed in 1934.

The classic Racal RA17 professional receiver, featuring the Wadley triple-mix drift-free loop system.

CONTROLS & ERGOMONOMICS

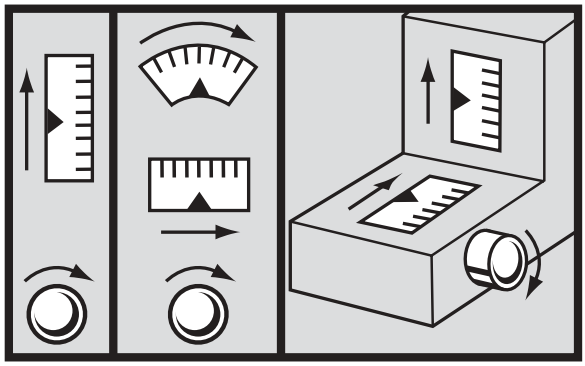
Correspondence over the past year or so about the merits or otherwise of the now ancient HRO (1934 design) and AR88D (1941 design) as viewed from the 21st century has raised a number of pertinent questions as to what makes a communications receiver memorable – as, in respect of the HRO, Bernard Pettit, G3VD, Peter Watson, G3PEJ and Ian Brown, G3TVU have confirmed.

Clearly, the electrical performance of a receiver is important, but then also is its mechanical construction, including its ergonomics and overall suitability for the required purpose. An amateur whose main operational mode is Morse will not necessarily agree with someone who normally or exclusively uses SSB. Again, data modes put emphasis on stability and a level output that demands a good AGC system – whereas the CW operator can tolerate some drift and can be quite content to have no AGC, manually adjusting the RF/IF gain control as required – a standard practice in older receivers. Modern receivers with good AGC and switchable pre-amplifiers/attenuators often omit any RF/IF gain control.

Both the HRO and the AR88 have excellent, smooth, backlash-free geared drives that have seldom been beaten. But, to my mind, the HRO scores in having a larger, better positioned tuning knob, nicely spaced from the RF/IF gain control. On my AR88, I have replaced the original knob with a larger one, supported by an external flywheel taken from a discarded broadcast receiver. This is fine, but does not make for convenient use of the gain control which is positioned close to the tuning control. I use the knob taken from the AR88 on my old KW2000A transceiver which, again, has its gain control inconveniently placed at a higher level than the tuning knob. The receive/transmit switch is stiff and has been replaced by a larger knob (although for SSB I use the microphone PTT and for CW an external switch). Small matters, perhaps, but they make a noticeable difference.

Fig 1: Expected relationships of movement between controls and displays etc. Some examples from *Ergonomics for Industry: 2 – Instruments and People.*

FIG 1 © RADCOM 410



In 'TT' March 1973, I quoted from an article by Roy Udolf and Irving Gilbert (*Electronics,* 4 December, 1972) and a small booklet *Ergonomics for Industry: 2 – Instruments and People* published by the former Department of Science & Industry Research (DSIR). These sources presented guidelines for the design and layout of front panels, etc, useful for both the home-constructor and when assessing factory-made equipment.

It was stressed that neglect of human factors leads to inefficiency in using instruments and control consoles. Instruments, receivers, etc need to *communicate* with the operator, and the communication is two-way since users generally have to do something, like turning a knob or selecting a switch, to obtain or to respond to the information.

Udolf and Gilbert pointed out that "laying out a display-control panel so that an operator can function efficiently requires more than just making sure that everything fits... not only must the panel layout insure a good man/machine interface, but often the location of certain controls and displays determines the layout of many critical internal components." A system that takes full account of 'human engineering' can be much easier and more pleasant to operate than one that does not.

Such common symbols as 'red for danger/stop' or 'green for OK/go' should be used, but their meanings must never be reversed.

People expect certain relationships between the movement of controls and their associated displays (see **Fig 1** for some examples). Pointers and knobs should be designed to avoid ambiguity (and preferably give some simple '1-9 calibration' that allows an operator to see at a glance whether a gain control is almost fully advanced or nearly minimum. Controls should always operate in the expected manner: fully clockwise for maximum effect, a toggle switch turned down for 'on' etc.

Panels should not be cluttered; unnecessary labelling (legends) should be avoided to eliminate operator confusion due to sensory overload. With panels viewed from the front, labels should preferably be placed *above* the controls to which they refer, and large enough to be read comfortably at the normal operating distance, never less than about 20in (50cm).

For amateur operation of a receiver or transceiver, the most important controls are the tuning knob, the RF/IF gain control (but see above) and the transmit/receive change-over system. Personally, with rather large hands and fingers, I like a smoothly-acting tuning knob to be

set centrally at a height of about 4in (9cm) above the desk, fairly substantial (2 – 3in diameter), well clear of all other knobs, providing a tuning rate of preferably not much over 5kHz/revolution. The illustrations show examples of some classic post-war receivers.

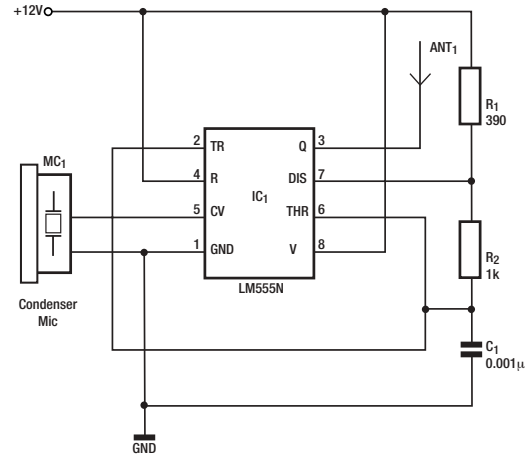
In 1972, I wrote: "Operating controls and knobs, far from improving in recent years, seem to have become more fiddling to use; a real problem with miniaturised equipment is that our fingers and thumbs have not been subjected to a similar process. One exception is the modern toggle switch that is slimmer and more elegant and easier to use. Operability is more important than achieving perfect symmetry although panels that are easy to use are usually those that are visually attractive. A lot of this is applied common sense rather than specifically ergonomics."

Thirty-three years later things seem to have got worse rather than better with front panels crowded with umpteen knobs and push-switches. Whereas the AR88 has 11 front-panel controls, my KW2000A 12, PA0SE's transceiver ("TT" October 2004) 24. Modern top-of-the-range transceivers can have over 73 knobs and push-button controls on a crowded front-panel.

The miniature hand-held remote control units for domestic equipment can be even worse with their tiny buttons and illegible legends. My four units (TV; radio/tape-cassette/CD player; Freeview digital adapter with hard disc recording facility; and analogue VCR) together have a total of some 140 push-buttons. One unit is so designed that the curved end is at the *rear*, consistently leading to my picking it up and attempting to use it the wrong way round. Altogether it is not surprising that I often find myself pressing the wrong button on the wrong unit – no wonder that 'technofear' affects all but the young!

Fig 2: Micropower AM transmitter/signal generator. (Source: Electronics World)

FIG 2 © RADCOM 411



G3RZP ON VECTOR NETWORK ANALYSERS

The August, 2004 'TT' item on the N2PK vector network analyser (see also 'In Practice' *RadCom,* October, 2004) has prompted Peter Chadwick, G3RZP, to add a warning on some aspects of the use of this type of instrument, whether home-built or a high-cost professional laboratory model. He writes: "One point that seems to get overlooked is the terrible inaccuracy available once the impedance levels being measured move far away from 50Ω. Because the analyser depends, for the measurement of impedance, on measuring the difference between forward and reflected powers, then at impedances around 1000Ω or more, the difference will be very small, and an error of 0.05dB can lead to very large (>30%) errors. A classical example of this can be seen when measuring something like a 1in square patch on a slightly larger ground-plane, and sweeping 400 to 2500MHz.

"Taking all the precautions advised by the manufacturer, you can still end up with the line going outside the boundary of the Smith chart – and this on a pretty expensive professional machine just back from calibration. So, for impedances well away from 50Ω, say SWRs of 10:1 or greater, there are times when the answer from a network analyser needs to be treated with some care, and alternative measurement techniques are desirable.

"Those based on a resonance method have some advantages, since frequency and *Q* (derived from 3dB bandwidth) can be measured fairly easily, and a change in those parameters allows calculation of the impedance with a reasonable degree of accuracy. Professionally, it's tending to become more important now that a lot of design is done on sub-micron CMOS and devices having high input impedances. To get round the Miller effect, it is quite usual to use a cascode circuit, just like valves – "*Plus ça change, plus c'est la même chose*" – as Alphonse Karr first put it! Interestingly, just as valves had induced grid noise at UHF, MOSFETs have induced gate noise by pretty much the same mechanism.

"A very good book on measurement techniques is Hartshorn's *Radio Frequency Measurements* – although published in 1940, much of it is basic theory and thus still applicable. Useful too is *Radio Frequency Laboratory Handbook*, by Marcus Scroggie, one-time G(M)6JV. It still has a lot of useful material in it."

MICRO-POWER AM 'TRANSMITTER'

In the early 1920s, a few amateurs used low-power 'valve-less' transmitters based on relaxation oscillation with large domestic-type neon bulbs used as electronic switches. Apparently, these could be made to oscillate at frequencies up to about 2MHz and were used on the allotted wavelengths of just under 200m, as permitted for some years when post-war amateur licences were issued from 1920 onwards.

This early practice is reflected in a short-range (up to about 25m) simple micropower AM 'transmitter' described by Raj Gorkali of Kathmandu, Nepal in the 'Circuit Design' feature of *Electronics World*, August 2004, p40: **Fig 2.** As described, it was intended for operation on about 600kHz to provide a link with a nearby domestic MW broadcast receiver and, strictly speaking, would contravene UK regulations. However, it might prove interesting to see if component values could be changed to result in a frequency above 1.8MHz.

Alternatively, there is the possibility that the Society may obtain permission for operation in a portion of the old marine band around 600m. Raj Gorkali points out that it could also be used as shown as a form of signal generator in conjunction with AM broadcast receivers.

The only active device is the well-known 555 IC as a free-running multivibrator whose frequency can be set above 540kHz, governed by the values of R1, R2 and C1. Values shown are for about 600kHz (500m) and the frequency can be varied by simply replacing R2 by a variable resistor or C by a ganged variable capacitor (350 or 500pF). A condenser microphone is used and the device operates from a 9V battery. The suggested antenna is a 2-3m wire connected to pin 3.

Might or might-not prove an operational 1.8MHz micropower transmitter even with a good long-wire antenna, but it could be a fun project!

MORE ON LOW DIPOLES

In 'TT' December 2004, pp33 – 35, Dave Gordon-Smith, G3UUR, contributed some very pertinent remarks on the ground-losses incurred with low antennas, stressing that "most amateurs don't realise that horizontal antennas induce so much loss in the ground when they are relatively low. It's not just antennas fed against ground that suffer from ground loss... Mind you it might take a bit of digging in the literature to find figures for a dipole over real earth... a paper in *Wireless Engineer* by Sommerfeld, about 1942, gave a theoretical treatment of the subject..."

Letters received from John Pegler, G3ENI, and Dr Brian Austin, G0GSF, show that in the years following the appearance of the paper by Sommerfeld, there have been

FIG 3 © RADCOM 412

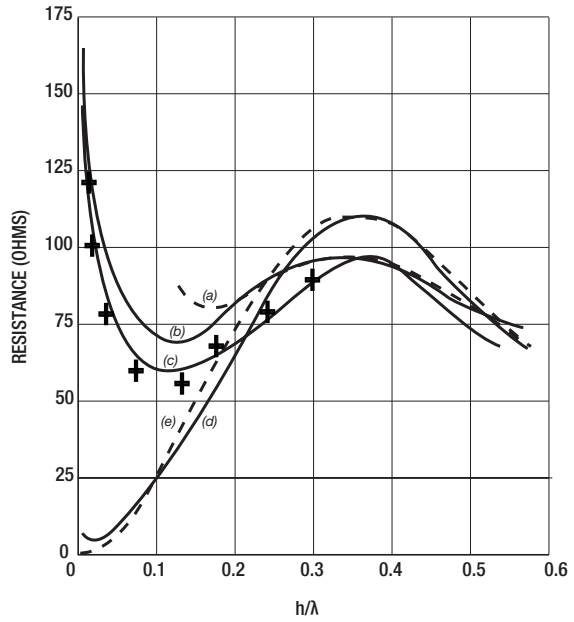
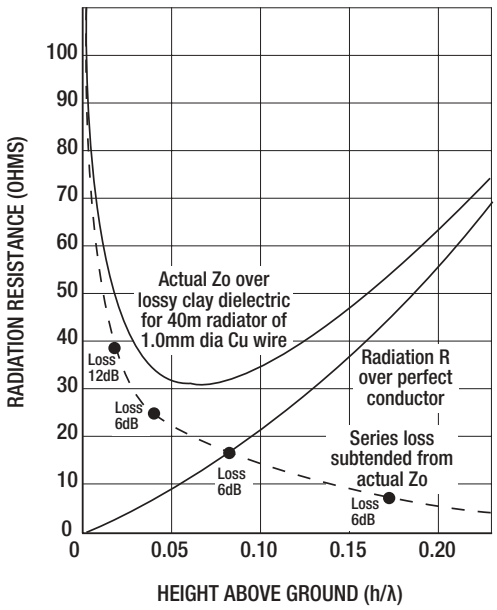


FIG 4 © RADCOM 413



several professional and academic research projects aimed at this important topic, including his own research 20 years ago in South Africa.

G3ENI writes: "I also have been frustrated over the years by inaccurate graphs, also several other cases of the 'Father to Son Syndrome'. From my early notes, I see that M J O Strutt wrote papers, published in German, on the subject in 1929 and 1939. K F Niesen followed in 1935 and 1938. In 1942, A S Sommerfeld and F Renner published their 'Radiation Energy and Earth Absorption for Dipole Antennae', with a wartime English translation in *Wireless Engineer, (*Vol XIX, No 227/228/229 August, September, October 1942, pp351 – 59. 409 – 14 and 457 – 62). Sommerfeld had previously published in 1909 the classic treatise on which all our ground-wave propagation theory is based.

In 1949, R F Proctor who was at the Signals Research and Development Establishment (SRDE) published a paper 'Input Impedance of Horizontal Dipole Aerials at Low Heights [above the ground]', (paper No 962, Radio Section) [G0GSF notes that this paper was published (1950) in *Proc IEE* 97, 5, pp188 – 90, see below]. In conjunction with colleagues B J Starkey and E Fitch, he investigated the behaviour of a dipole above dielectric ground at various heights and permittivities. A family of curves in the paper showed the rise of input impedance at different low heights for dry and wet grounds with different conductivity and also over different sized semi-transparent conducting mats. Other interesting findings were the changes in resonant length of the dipole, sometimes up to 10%, with varying height. All the above confirmed the Sommerfeld and Renner mathematical analysis. All the impedance measurements were carefully taken with a bridge designed by the author with suitable allowance made for the changing reactance components and element lengths."

Fig 3: Proctor's 1950-measured input impedance of a resonant half-wave dipole above the ground, with G0GSF's '+' points from EZNEC data ($\sigma = 10^{-3}$S/m; $\varepsilon r = 15$). h = height above ground. (a) Calculated k =5. (b) Dry ground. (c) Wet ground. (d) Conducting mat a/λ + 0.0003. (e) Calculated k = infinity.

Fig 4: Radiation resistance (driving point impedance) of a half-wave resonant dipole less than a quarter-wave above ground (VK3MI).

G3ENI adds: "Finally, please refer to Fig 6.17 (p102) of G6XN's *HF Antennas for all Locations*, (1st edition, 1982) and adjacent text."

G0GSF writes: "My own research of 20 years ago in South Africa touched on this subject of antenna impedance and ground effects, and we made some measurements of the driving point impedance of horizontal wire antennas as they were lowered towards the ground. Its increase at antenna heights of less than λ/10 is quite marked, and this indicates the significant increase in loss resistance caused by the antenna's interaction with the lossy ground. I've added some of the data points we measured in 1984 to **Fig 3** (basically from the 1950 paper by R F Proctor). The effect of this increase in resistance is to cause the 'radiation efficiency' of the antenna *in situ* to decrease, and this can be estimated from these results, as I've indicated in the box alongside. In view of this effect, I question the use of the term 'radiation resistance', as one sometimes sees it, to describe what is essentially the input or driving-point resistance, which consists of radiation resistance *plus* loss resistance. Radiation resistance essentially refers to 'useful' radiation whereas the energy coupled into the ground is usually considered to be lost, except, of course, if the intention is to radiate into the ground (or, indeed, the sea)."

G0GSF points out that we now have the *NEC* code and its many variants that enable us to simulate the situation. He stresses that the agreement between simulation and measurement is very good indeed, a fact shown clearly in some of the 18 professional papers he has listed on the effects of the ground on antenna impedance. He has added some of his own computed data from *EZNEC* to Fig 3. He adds: "Given the good agreement between measurement and simulation I'm a little surprised by G3UUR's assertion that *NEC* (and even *NEC-4D*) show 'next to no induced ground loss' for the case of small loops over average ground whereas measurement (and theory) indicate significant loss."

G0GSF has supplied a detailed list of 19 professional papers on the effects of the ground on antenna impedance from such journals as *IEEE Trans on Antennas & Propagation*, *Electromagnetics*, *Proc.IEEE*, *Radio Science*, etc.

'TT', February, 1995 (see also *Technical Topics Scrapbook*, 1955-1999, pp14 – 15) included a summary of part of a five-page article by William A McLeod, VK3MI, 'Low Radiators and High Ground Planes', reporting his investigation into antenna behaviour "at what seems to be astonishingly small heights above ground" to quote an editorial comment.

To repeat part of the summary given in 'TT' 1995: VK3MI points out that for 7MHz a height of 10m is a bare quarter-wave above ground, on 3.5MHz only an eighth-wave. This raises the question whether, in practice [particularly for NVIS paths], it is worth striving even for this height. What sort of performance can be expected from horizontal antennas only a metre or two above ground? VK3MI summarises

the factors involved with low horizontal radiators as follows:

- For low practical heights, the radiation resistance [driving impedance] at the centre of a resonant dipole remains within the 2:1 VSWR range for the usual coaxial cable feeder, so matching procedures are minimal, more so when an electrical half-wave of cable is used to transfer the centre impedance directly to the transmitter: see **Fig 4**.

- Whereas the resonant length of a dipole remote from ground is determined mainly by the length-to-diameter ratio of the conductor, when the ground becomes an increasing part of the dielectric, the length is determined by the height-to-diameter ratio. Due to the wide spread of dielectric constant, no simple formula can determine this ratio.

- The losses increase as height decreases towards ground level, but do not become prohibitive until very low levels are reached; for a 7MHz dipole above common clay, this can be as low as λ/40 (1m). [In desert conditions, an antenna can be laid directly on the sand, or even buried a few inches below the surface and yet still radiate reasonably well. VK3MI shows that 'saggy' dipoles are better than 'droopy' antennas at low heights – *G3VA*]

- The 'cone' of radiation directed vertically, then reflected back from the ionosphere, can produce non-directional communication with 'no –skip distance' to some 400 – 500km. This is NVIS transmission and is the mode supporting most of those semi-local nets on the 3.5MHz and 7MHz bands. There is usually some fading but, for SSB reception, the long AGC time-constant of the receiver will alleviate this.

- Two- or three-hop transmission can occur where the intermediate reflection points fall at sea, so some long distance working is possible in these favoured directions without low-angle transmission lobes. Land reflection points include greater losses which soon become excessive.

There is a good deal more relevant information in VK3MI's 1994 article but his 'low dipole conclusions' are as follows: "In general, the resonant horizontal dipole is an effective radiator at very low height from ground, particularly for NVIS transmission. Losses increase seriously below λ/30 (only 1.5m for the 7MHz band) and the high impedance ends of the

FIG 5 © RADCOM 414

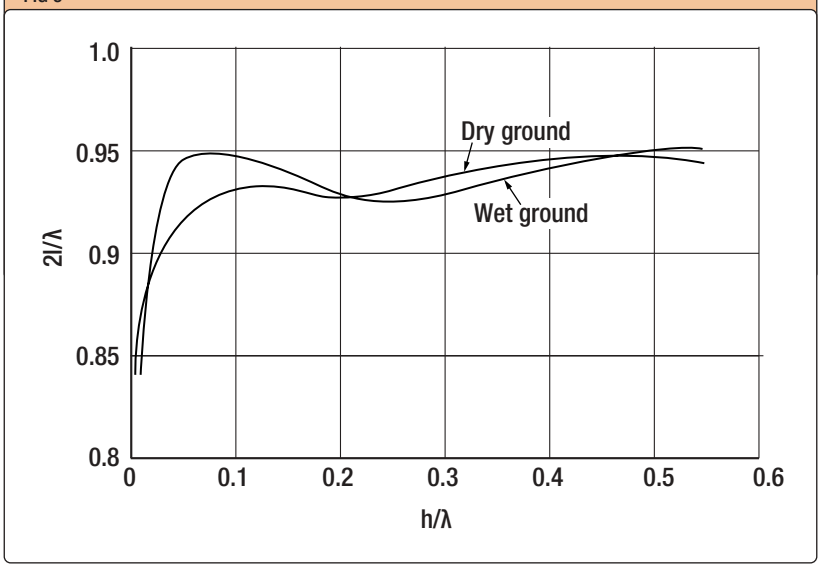


Fig 5: Resonant length of half-wave dipole above ground. h = height above ground. l = length of dipole (Proctor, 1950).`

elements should have at least this amount of separation from ground or metallic earthed objects, towers and poles. Kevlar, black Dacron, polypropylene baler twine, and nylon rope are all suitable insulating supports with far less end-effect than the single egg-shaped strain insulator wired back to a steel tower which has been commonly used... With the elements double-insulated inside the popular 132mm polypropylene garden irrigation piping erected at 1.5m on the post side of a suburban wooden fence, a very effective concealed radiator should result. For portable use, a couple of 4m bamboo poles for end supports and a saggy dipole radiator require no apology as to effectiveness for NVIS transmission, but directivity, if any, depends on local obstructions and reflectors."

VK3MI also discusses the use of quarter-wave radials to form an effective ground-plane, not only for the classical 'ground-plane' antenna, but also as an artificial earth for inverted-L antennas and the like. He shows that this can contribute lower losses than an earth rod when elevated say 1m or so above real earth. He notes that the electrical quarter-wave can be significantly less than a physical quarter-wave: see **Fig 5** from the Proctor paper. As in the case of horizontal dipoles, where the radials are at a low height, the ends of the 'radials' should be higher rather than lower than the feed-point, keeping the high RF voltages some 1.5m or so above real earth. This is the opposite to the usual form of ground-plane radials where the base of radiating element is elevated several metres above earth.

VK3MI also stresses that safety is an important consideration for low radiators and for low elevated ground planes. One part is physical... the other aspect is electrical as, even at low power, a nasty sting and RF burn can occur which, for non-technical people or for climbing children, can produce an emotional reaction far in excess of the initial injury. At medium power, around 100W, these effects can be severe and, for greater powers, the effects of corona and irradiation must also be considered.

Readers seeking a copy (two A4 sheets) of G0GSF's list of professional references should send me a stamped addressed envelope plus one stamp to cover photocopying costs. I believe that the IARU journals copyright agreement would also permit photocopying of VK3MI's five-page 1994 *Amateur Radio* article (the SASE plus 2 extra stamps) for those really interested.

HERE & THERE

The mention of a 24V low-voltage HT in one of the Marconi Marine emergency receivers (August 2004, p47) included an unfortunate error. As G3RZP points out, the pair of PL84s in the output stage provided only 20mW audio output *not* 20W! Hans, PA0TLM adds to the military sets working with low-voltage HT. He writes: "In the 1960s, I served for several years in the Royal Netherlands Air Force as a radio technician. As a navigational aid, the aircraft had on board LW/MW receivers – the American AN-ARN-6. This receiver worked with 28V on the anodes of the valves which were normal high-voltage types 12SK7 (six) 12SX7 (four), 12SY7, 12SW7 and 26A7 (two). Only the two 26A7 were specially intended for 28V. I own one of these receivers and it still works fine, current drain about 3A. This shows once again that normal valves will also work with low anode voltage." True enough, provided you require milliwatts rather than watts of RF or AF output power. ♦

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In practice

Don't panic about lead-free soldering • Touch light interference – a success story.

LEAD-FREE SOLDERING

Q Are we going to have to change to lead-free solder?

A In the very long term, yes – but don't panic just yet.

The background story is that every year, in Europe alone, around 6 million tonnes of electrical and electronic equipment goes to scrap. Most of it ends up in shallow landfill sites, where the heavy-metal content of lead, cadmium, mercury and chromium can be a risk to both health and the environment. This problem is now being attacked at both ends of the life cycle. The Waste Electronic and Electrical Equipment (WEEE) Directive is already setting targets for improved disposal and recycling practices, so that less of these unwanted materials in existing equipment will find their way into landfill. And from July 2006, the Restriction of Hazardous Substances (RoHS) Directive will forbid these materials from being used in new equipment placed on the market. Obviously these are high and noble environmental aims; but they create a rash of technical problems that are left entirely to industry to sort out [1].

For several years now, the electronics industry has been finding good ways to manage without cadmium, mercury or hexavalent chromium, so RoHS will only be the final step. But going lead-free is a vastly bigger problem. The lead content of electronic equipment is almost entirely in solder, and there are very good reasons why ordinary solder has always contained lead. A few special solders do not contain lead, but there is very little experience of using lead-free solders for routine mass-production, or for hand-soldering where the conditions are not so tightly controlled.

What has been so useful about lead? Mainly, the very wide range of low-melting alloys that lead can form with tin. **Fig 1** is the phase diagram for tin/lead alloys, showing the melting properties of all mixtures from 100% tin (point A) to 100% lead (point B). As you see, it isn't simply a matter of solid or liquid. There is a fairly level temperature line C-D, below which a wide range of alloys are definitely solid, while above the line A-E-B the alloy is definitely liquid. But in between lie the so-called 'pasty' ranges where there is a mixture of microscopic crystals in molten liquid. Point E is particularly interesting: this is the eutectic alloy that has the lowest melting point and no pasty range. However, eutectic solder is quite difficult to use for electronic work, because it is *too* free-flowing. For practical electronic soldering, you need a small pasty range to help the joint keep its shape while it cools. This is why the favourite formulation for electronics has long been '60-40': 60% tin + 40% lead. It has a low melting point (188°C) which reduces the stress on components, but also has a small pasty range that improves workability. Until recently, most electronic solders have been variations on the theme of 60-40. For example, 66 + 32 + 2% silver is particularly good for hand soldering of surface-mount components. The silver content reduces the dissolution of silver from the terminations of the components themselves, and the alloy melts at about 180°C so it can be used with your normal soldering iron.

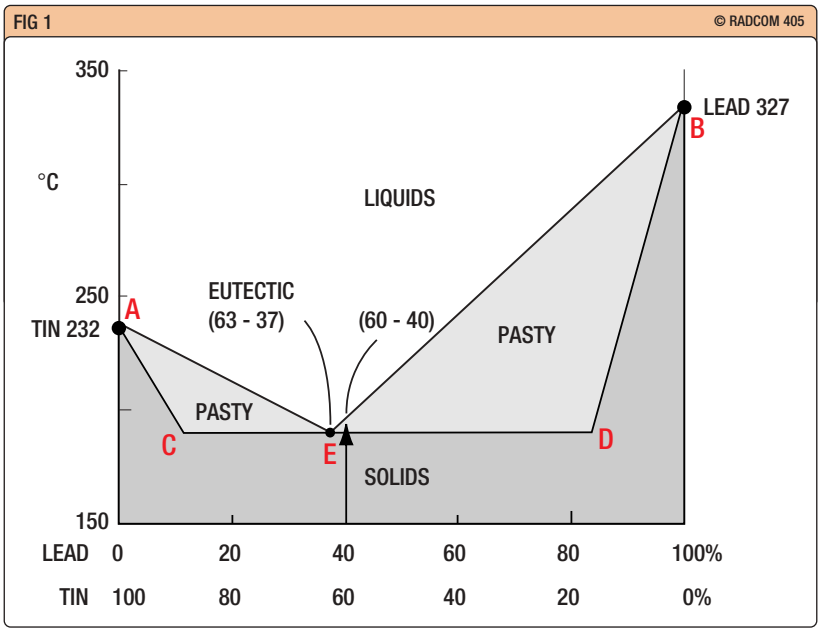

Fig 1: Phase diagram for tin-lead solder alloys.

We have always taken these easygoing tin-lead solders for granted. But now the race is on to develop new formulations that have the same useful properties, yet do not include lead. This applies not only to the solder itself, but also to component leads, IC pins, SMD terminations and printed circuit boards. All of these have relied very much on tin-lead solder 'tinning' processes, or on plating with metals that solder easily using tin-lead. There is also the changeover period to consider. Totally lead-free soldering may be the ultimate goal, but getting there involves additional issues:

- Use of tin-lead solder for reworking existing tin-lead soldered joints, with either existing or lead-free components
- Use of lead-free solder for reworking existing tin-lead joints
- Use of tin-lead solder for reworking joints on previously lead-free equipment.

Guidance on these issues falls into two areas: regulatory and technical. RoHS does not appear to cover any equipment first put on the market before 1 July 2006, spare parts for their repair, or any home-constructed equipment that is not 'put on the market'. There is no mention of the actual solder used for repairs on older equipment, though it seems obvious that the use of tin-lead solder for repairs on newer lead-free equipment will be frowned upon.

Technical guidance seems very patchy at present, and sometimes contradictory. This is partly because the industry practice about solder formulations and surface coatings has not settled down yet. The most common lead-free solder is likely to be almost pure tin with small percentages of copper and perhaps silver, melting at about 230°C. Pure tin is also feasible for PC boards, but the most effective process for plating it onto copper uses chemicals that could damage the environment (another of those unintended consequences).

One technical point *is* very clear: most practical lead-free solders will require higher temperatures than tin-lead. The tip temperature of the soldering iron is always significantly higher than the melting point of the solder, and the temperature of the joint itself will be somewhere in between. Conventional 60-40 solder melts around 190°C and the recommended tip temperature is about 340°C. Solders based on almost pure tin melt around 230°C and require tip temperatures of at least 350-370°C.

Your existing iron will melt lead-free solder, but more slowly, and obviously there will be a greater risk of cold joints. If you increase the tip temperature, this is narrowing the margins before damage to the components and PC boards may result.

Having now had the opportunity to try both lead-free solder and a range of lead-free finishes on professional PC boards, I am not impressed. Even with quite a high tip temperature, the higher melting point of the lead-free solder slows everything down - to the possible detriment of the components and the PC board. Also the solder blobs tend to pull out into peaks as the iron is taken away. This may be partly aesthetic, but those people trained on tin-lead will find it harder to judge the quality of their hand-soldered joints. The lead-free PC board finishes were bare nickel, and very thin coatings of either silver or gold over nickel. All were easy to solder with tin-lead-silver, and of course the precious metal finishes were particularly nice; but, once again, the lead-free solder was harder to use. In particular, it was very hard to judge whether surface-mount devices had been soldered correctly.

The overall outcome is that lead-free solder *will* be usable for hand soldering, but it will place more demands on your soldering technique. For myself, I'm going to continue to build and repair existing equipment with tin-lead solder, until the lead-free technology settles down. Meanwhile, I will do my bit for the environment by keeping existing equipment working!

TOUCHING ON A PROBLEM

Q I live in a retirement flat and am running 5W on the lower HF bands to a magnetic loop in the window. Snag – I find my keying operates the 'touch-lamps' nearby. Have you any ideas, or I'll get flung out! I appreciate you may not answer individual queries, but...

A It's true that I cannot normally answer individual queries, unless they will also make 'In Practice' items that are of interest to everyone. However, I didn't want to see a poor Old Timer flung out on the streets with only a mag-loop for company, so we gave it a go. Thanks to Google and the OT's own resourcefulness, here is a story about successful problem solving.

When tackling a problem like this, it is important to realise that you are not alone. Almost certainly, someone else has experienced a similar problem. These days, that means there is probably something about it on the web – and sure enough, a Google search for *touch lamp radio interference* produced just what we needed, so I passed the URLs along to the OT. Here's what we learned, from the ARRL website and other sources [2].

The problem with touch-operated lamps is that many of them are very vulnerable to false triggering from RF. There have been reports of triggering even by mobile phones, so it isn't surprising that a few watts at HF could cause problems. Touch lamps can also radiate spurious signals that interfere with HF radio reception. **Fig 2** shows roughly what's inside these gadgets: there is a control IC which is triggered by the touch electrode, and the IC then controls the triac that finally switches on the light bulb. The touch electrode is some ungrounded metal part of the lamp's base, and is connected to a low-frequency oscillator circuit in the IC. The switch is supposed to be triggered when the user's hand capacitance causes a change in oscillator frequency.

You can certainly see the potential for interference *to* HF radio. First there's the risk of spikes and harmonics being injected back into the mains from the triac switch. Then there's a continuously-running RF oscillator at a few hundred kHz, which effectively uses the touch electrode as a transmitting antenna! There is also the possibility of the oscillator signal radiating via the mains lead. All of these problems *should* be reduced to a reasonable level by filtering of the mains lead, and by careful design of the oscillator to avoid excessive power or high harmonic content.

The problem with interference *from* HF transmitters is rather different: the touch electrode is a high-impedance input to the control IC, and any imposed RF signal is liable to trigger the switch.

Given this much information, the OT proved a highly resourceful person, well capable of solving his own problems. Fortunately, the owner of the lamp was willing to let him work on it. The RF was almost sure to be getting in through the touch electrode, and a quick test with a ferrite ring confirmed that the mains lead was not involved.

Somehow the incoming RF had to be stopped at X in Fig 2, between the touch electrode and the input of the control IC, so this would mean getting inside with the soldering iron. It isn't possible to use an RF bypass capacitor, because C2 is actually part of the LF oscillator, and any attempt to add an RF bypass capacitor in parallel would stop the switch from working. The ARRL references confirmed that an RF choke in series could be a solution. Because our resourceful OT was aware that RF interference problems can be highly variable, he ordered a selection of different RFCs from the Maplin catalogue. He then tried each one at point X, in series with the lead from the IC to the touch electrode. A 1mH choke stopped the incoming RF on 80 and 40 metres, but not on the higher frequencies; in fact none of the RFCs would do that on its own. The solution was to add a 22kΩ resistor in series with the RFC, and that cured the trouble on all HF bands.

Some final safety notes: all internal components in touch lamps are live to mains, so be very careful about insulation and clearances if you add any components. Also note that C1 is a special mains-rated blocking capacitor which must *not* be changed. Strictly speaking, you shouldn't ever work on other people's equipment, for obvious reasons of liability. Because touch lamps use ungrounded metal electrodes, they are especially to be avoided unless you really know what you're doing. For the less confident, the safest practical solution may be a 'buy-out': replace the touch lamp with a different model of the owner's choice, but definitely one that uses an interference-proof mechanical switch. Once the touch lamp has become *your* property, just throw the dratted thing away! ♦

FIG 2 © RADCOM 406

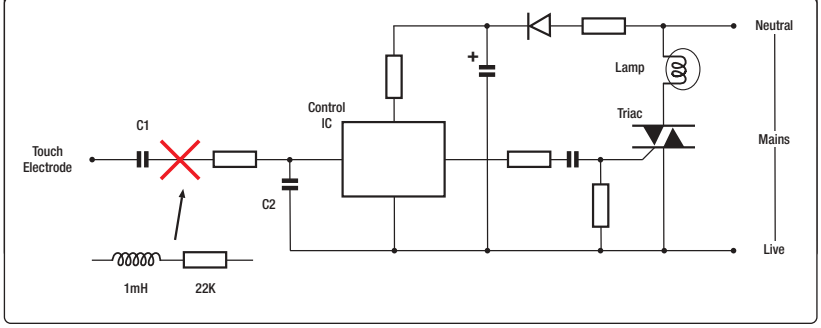

Fig 2: Outline of a touch-lamp control circuit. The RF choke and resistor at point X cured the RF triggering problem.

NOTES AND REFERENCES

1. The 'In Practice' website (URL above) has lots of links about RoHS, WEEE and lead-free soldering.
2. The ARRL website is an excellent technical resource. Specific links are on the 'In Practice' website (URL above).

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Servicing early Yaesu and Trio/Kenwood HF equipment – part two

In the conclusion of his two-part article, G3LLL looks at neutralising and the many problems which can beset the PA and driver stages. To begin, he considers TV line-output valves.

When it comes to replacing line-output valves, there is a problem. One would think that an RCA 6JS6C would be an exact replacement for a Toshiba 6JS6C, and if you are repairing a colour television set, this is the case. Unfortunately, however, these valves were not made for class A/B RF use, and so there is no standardisation of the inter-electrode capacitances or bias requirements, between manufacturers. The RCA valve has extra heat-dissipating plates fitted to the internal structure to make it a better line output valve but, if plugged into an FT-101, it simply becomes a power oscillator; even with the rig switched to receive, it is totally unusable, and may cause damage. In practice, most Japanese valves of the same type seem to be satisfactory when used as replacements for 6JS6C, 6KD6, and 6JMB6 PA valves, but other makes can be difficult. The GE 6JS6C, correctly neutralised, works in the older FT-101, but this can be tricky.

NEUTRALISING

The purpose of neutralisation is to cancel out the valve's internal capacitance, to prevent feedback from anode to grid. Transceivers not correctly neutralised will either burst into parasitic oscillation or, at best, be difficult to tune. When you replace the PA valves with ones identical with those you have removed, the neutralisation should only need touching up as indicated in the manual. If, however, you fit a different make, you must be more careful.

Neutralisation is least critical at the lower frequencies and so, after fitting replacement PA valves, I recommend that the rig be fired up first into an RF power meter and dummy load on the 80m band, as in **Fig 3**. Having done this, set the bias as specified in the manual, and then apply enough drive to produce about 150mA of PA current. 'Plate and load' as in the manual, but keep transmission time down to three-second bursts. Note that minimum current on the I/C meter should coincide with maximum output power. If necessary, adjust the neutralisation capacitor until this is achieved, being extremely careful that you do not come in contact with the high-voltage line. In particular, be sure to use an insulated screwdriver, and to keep your free hand in your pocket, or better still adjust the capacitor by trial and error, with the rig disconnected from the mains supply. Make sure that you use an insulated screwdriver to short-circuit to chassis the top caps of the PA valves (after the rig has been off for a couple of minutes of course!) before touching any wiring around the power amplifier valves.

Once the neutralising is correct on 80m, try 40m and then work gradually higher in frequency. The correct setting for the neutralising capacitor will become more critical the higher in frequency you go. Finally, adjust as recommended in the manual for the smoothest tuning, with maximum output coinciding with minimum current, on 10m and 15m, as shown diagrammatically in **Fig 4**.

FIG 3 © RADCOM 407

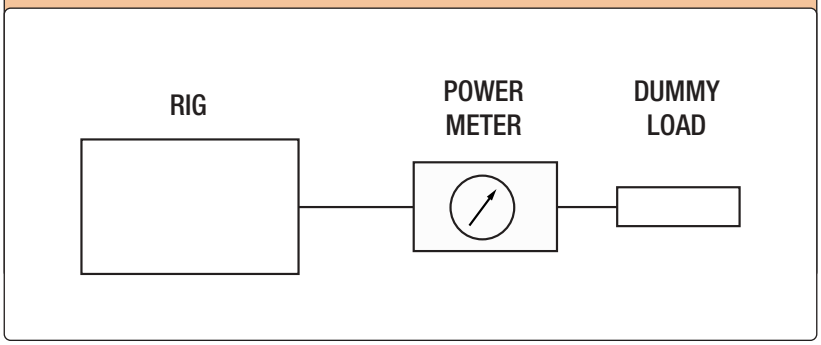


Fig 3: The correct way to test a transmitter.

OTHER FAULTS IN THE OUTPUT AND DRIVER STAGES

Low RF output

All tests must be made via a power meter into a dummy load.

FIG 4 © RADCOM 408

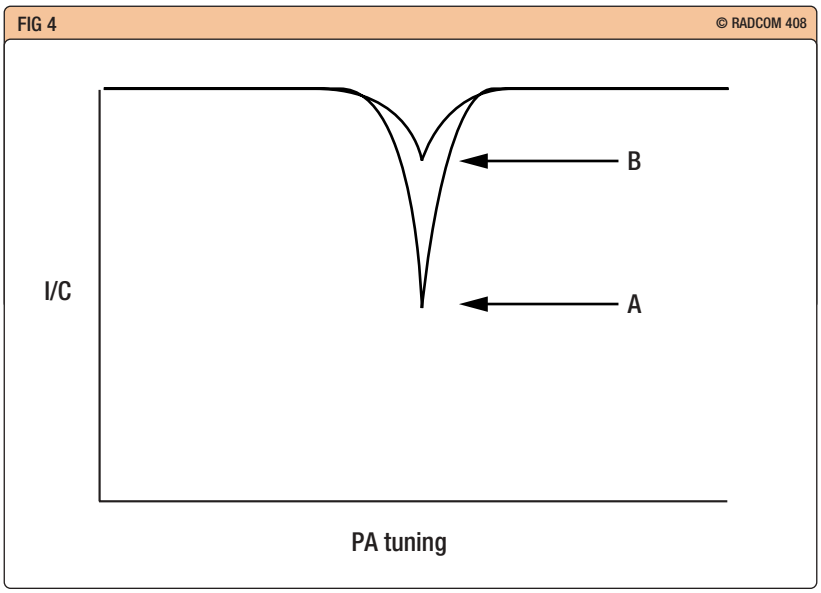


Fig 4: A correctly-neutralised PA stage. When loaded to full output, maximum power occurs at point 'B'. When lightly-loaded (loading capacitor near to maximum capacitance), maximum output occurs at point 'A'. [If the stage is not neutralised correctly, the dip becomes asymmetrical and maximum output no longer coincides with minimum I/C.]

Low RF output is quite a common fault, which is not too difficult to trace, provided you have a rough idea of how the equipment works, so that you can go about the matter logically using the in-built meter system. An ALC system is included in all Yaesu and Trio/Kenwood rigs to try to ensure that the PA valves are not vastly overdriven. If the valves are overdriven, pulses of grid current passing through R1 (in Fig 2 last month) develop a voltage which is passed via C9 to the ALC rectifiers. These produce a negative voltage, which then turns down the transmitter gain. A very similar system is incorporated in most other valve rigs, and the ALC voltage produced is indicated on a panel meter.

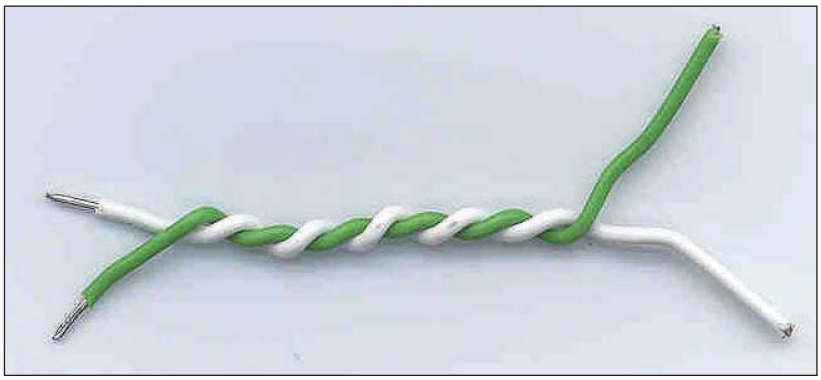
The ALC meter is a very valuable fault-tracing device because, if there is plenty of drive to the PA grids, it will give an indication when operating in the SSB mode. Low RF output with plenty of drive showing on the ALC meter means that the fault is in the PA stage, and so investigations can start there.

Low RF due to a faulty PA stage

If there is plenty of drive, check the voltages around the PA valves to see that they are correct, and then note the current on the I/C meter during tune-up. If the voltages are correct and the current is low, you can be pretty sure that the PA valves are faulty. If, however, there is plenty of current, but very little RF output, tread carefully, or you will blow a pair of good PA valves. When trying to trace this kind of fault, do not use full drive for more than a two-second burst, as almost all the input power will be dissipated as heat in the valves.

While transmitting at low power with the loading capacitor's vanes fully-meshed, (maximum capacitance) try the PA tuning control on a few bands, and note whether or not you get a sharp dip in PA current on the I/C meter. If you do get a good dip, but cannot load up to get an appreciable output, somehow or other the RF is not getting to the power meter. Look for a faulty aerial changeover relay, some disconnection, or a short to chassis, somewhere between the PA coil and the aerial socket.

No appreciable dip in PA current points to a fault in the PA tuned circuit. It could be that something is damping it, or even that C8 is open circuit. The most common causes of this trouble are short-circuited turns on the choke, L3. Depending upon which turns are shorted, you may get a reasonable output on say 160m, gradually dropping off to next-to-nothing on 10m, or the reverse may be true. Fortunately, the same choke is used on all Yaesu rigs made from 1970 to the early 1980s, so it can still be obtained. The Trio/Kenwood PA choke looks about the same size, so I presume either would do in any rig.



A 5pF variable neutralising capacitor made from two 2in pieces of insulated wire twisted together.

If the fault is not caused by the choke, other possibilities include shorted turns on the PA coil (a blob of solder!), a switch, or wiring where the insulation has broken down. The best move here is close physical examination, as it is usually possible to see the effects of burning or discoloration.

Another possibility is a breakdown of insulation on the loading capacitor, or short-circuited vanes. If the vanes are bent and touching, you will get a good dip but little output; if there has been a flashover and insulation material has carbonised, you might not get much dip. These capacitors usually have three sections so, if you cannot obtain a replacement, it is usually possible to disconnect the faulty section and reorganise the wiring so that the good sections operate on the highest frequency bands, and then to use a fixed high-voltage capacitor to make up the missing capacitance on the lower frequencies.

If you still cannot find any reason for the PA stage not tuning, try to borrow a dip meter. With the rig disconnected from the mains and all capacitors discharged, it should then be possible to detect resonance if the dip meter is placed near to the PA coil. If the resonance is way off-frequency, check that the PA switch has not slipped. A common fault with the FT-102 is that the PA switch spindle coupler becomes loose, resulting in the PA circuit being switched to the wrong band.

Arcing in the PA stage

Any case of arcing-over in the vicinity of the PA stage should be treated as serious, and the rig should be examined in a darkened room to ascertain its source. Sometimes 'a stitch in time' may consist only of moving two wires a little further apart, or reorganising the wiring to the PA switch; ignoring the fault is likely to result in burning and serious damage to parts which may be unobtainable.

THE DRIVER STAGE

Valves used in this position, such as the 6GK6 and the 12BY7A, were designed as video amplifier valves and, once again, their internal characteristics are not standardised. The circuit in Fig 2 last month shows a small 1pF capacitor, C3, connected between the anode of the 12BY7A and the bottom end of the grid circuit. This capacitor's exact value is selected in manufacture to neutralise the driver stage, and its value will be correct only if any replacement valve fitted has an internal capacitance similar to that fitted in manufacture. Fortunately, most 12BY7A valves are similar, and are usually interchangeable, but 6GK6 valves, as used in some early rigs, vary considerably and, if possible, an exact replacement should always be used. If the driver stage is not neutralised correctly, in some cases it will burst into oscillation, in others it will be found impossible to align the rig so that maximum receive gain and maximum drive peak at the same point on the preselector. On occasions with the FT-401, which uses a 6GK6, I have had to replace the fixed 3pF neutralising capacitor with a small variable when I have not had an exact replacement valve available. This can be made by twisting two pieces of solid-cored insulated wire together, as shown in the photograph. The capacitance can be adjusted by twisting or untwisting the wires, until the preselector tuning for this stage peaks at the same point on receive and transmit, and the stage has no tendency to oscillate.

How much drive is normal?

It is worth noting that most rigs have a good surplus of drive on 20 and 40 metres, and that this falls off at the extremes of the frequency range. Even when equipment is in good working order, it may only have just sufficient drive on the 160 and 10 metre bands. The ALC meter indicates only when there is a surplus of drive; if there is only just enough, the rig may give full output, but give no ALC indication on these bands. If the rig's output is low on all bands, however, and there is no indication on the ALC meter, this implies that there is insufficient drive, and that there is a fault in a stage prior to the power amplifier.

When a rig is not transmitting at all, or has very little drive, finding the fault is fairly straightforward; if, however, the transmitter is just slightly down, finding the faulty stage can be a problem. Over the years, I have made a practice of checking the transmit signal at various points in equipment whilst whistling into microphones, or while transmitting in the CW mode. If you make such tests, and append notes on to the circuit when a rig is in good order, these will be invaluable when tracing faults in the future. The simplest way of making this test is to remove the driver valve, and then to work gradually backwards taking readings with a diode probe, which you can easily make yourself (see **Fig 5**).

The above suggestion is, however, not much use when you are trying to repair equipment that you are not particularly familiar with, and upon which you have no notes. Fortunately, at one point, nearly all

The 6146 beam tetrode, which is rated at 600V maximum anode voltage. (Source: The National Valve Museum [www.valve-museum.org/])

rigs using a 12BY7A or a 6DK6 driver valve seem to have similar signal levels. If you transmit in the CW mode at full carrier, or whistle into the microphone at full gain, you should get somewhere between 4 and 6V of RF on the driver valve's control grid pin, with the valve removed. Note that removing the valve will slightly upset the alignment, so you must measure the voltage with the preselector re-peaked. If you have plenty of drive at the grid of the driver valve, but not enough to drive the PA valves into ALC, the driver stage is short of gain. The most obvious cause here is a faulty driver valve.

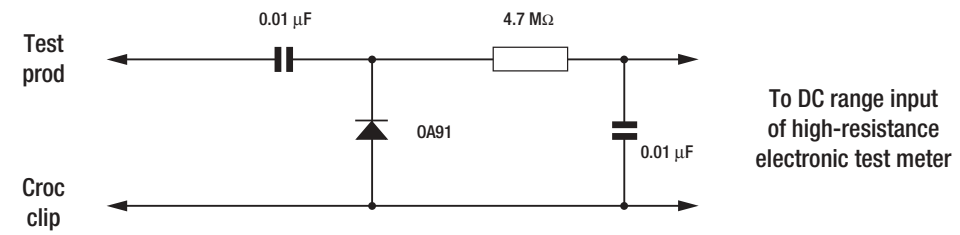
Experience shows that driver valves are much more likely to wear out than are PA valves, and while the latter seem to go on for almost ever, the normal life of a 12BY7A seems to be around five years. Small valves are also very prone to developing poor contacts on the valve pins and, if the drive varies when you move the valve in its base, they need cleaning. To do this, remove the valve and carefully scrape all the pins with a penknife. After you have done this, spray the valve holder with a cleaning fluid that does not contain a lubricant (such as video head-cleaning fluid), and which is not harmful to plastic. While the holder is still wet, push the valve into the holder a few times, and then leave the cleaner to evaporate before applying power. Intermittent drive can also occur due to a faulty valve, and will come and go if you tap it; do be warned, though, that occasionally I have tapped a driver valve, had it flash-over internally, and blown the receiver's front-end FET! Because drive that gradually falls off as the set warms up can also be due to a slightly gassy driver valve, it is always worth trying the effect of swapping it.

Low drive can also be due to incorrect alignment, or incorrect voltages on the valve. You can check the voltages against the manual, but alignment should normally be altered only as a last resort. Only if you are *absolutely sure* that the alignment has been tampered with, try adjusting one band only, otherwise you are likely to make matters worse.

If, after trying everything, the driver stage is still short of gain, you should consider C2 and L4 in Fig 2, last month. C2 may become resistive, and the choke may develop short-circuited turns. The only real test is to try replacing them; note that any small RF choke of half to twice the value will be sufficient to prove whether or not the original is faulty. These parts, although numbered differently, are in all Yaesu valve driver stages, and are part of the neutralising.

Fig 5: The circuit of a simple RF probe with which to make measurements. See 'How Much Drive is Normal?'.

FIG 5 © RADCOM 409



A LAST RESORT

The above covers many of the most common faults in the PSU, PA, and driver of the early rigs. Of course, I haven't covered everything but, if you are stuck, do not hesitate to write – enclosing an SASE please – or send me an e-mail. You might just give me an idea for another article! ♦

Yaesu

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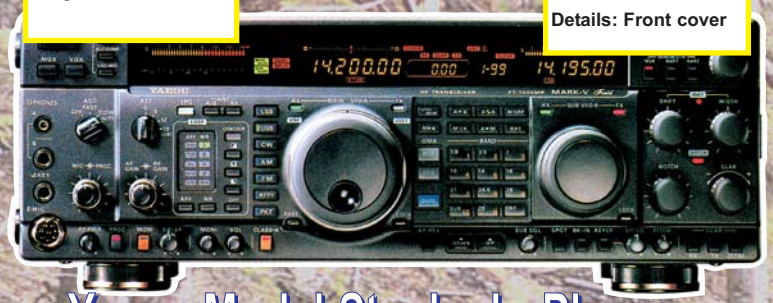

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Simple equations for path loss and antenna calculations

This short note was prompted by the editor's comment following the letter from Hugh Thurgood, M0AQU, in October's 'The Last Word'.

Over the years, I have found that a few simple formulas committed to memory make simple back-of-envelope calculations of signal strength, path loss and antenna gains straightforward. They have been absolutely invaluable for everyday calculations of radio system performance, and have been used in applications as diverse as antenna measurements in the back garden, line of sight communications (particularly to spacecraft), and estimating over what range key fob transmitters ought to operate.

No attempt will be made to show how the equations are derived, the final versions are just presented with some practical examples of their use.

FREE SPACE PATH LOSS

The line-of-sight (free space) path loss between two isotropic antennas at a specified separation is given by **Equation 1**, where
L is the path loss in dB,
F is the frequency in GHz, and
D is the distance in kilometres.

LINK BUDGET

The free space loss can then used with other transmitter and receiver parameters to estimate system performance, as shown in **Equation 2**, where
S/N is received signal-to-noise ratio (dB),
P_{Tx} is the transmit power (dBW),
G_{Tx} is the transmit antenna gain (dB),
G_{Rx} is the receive antenna gain (dB),
NF is the receiver noise figure (dB), and
B is the receiver (or signal) bandwidth (Hz).

The figure of 204 at the beginning comes from fundamental physics and is the power level of thermal noise in a 1Hz bandwidth at room temperature, -204dBW It is given by 10.log(k.T) dBW, where k = Boltzmann's Constant, 1.38 x 10^{-23}JK^{-1}, and T = 290K, room temperature in Kelvin.

WORKED EXAMPLES

1. 145MHz stations on two mountains 100km apart with low power hand-held transceivers.

Using Equation 1,
L = 92.4 + 20.log(0.145GHz x 100km) = 115.6dB

Assume P_{Tx} = 0.5W ≡ -3dBW,
G_{Tx} = G_{Rx} = 0dBi (typical of 'rubber duck' antennas),
NF = 4dB and B = 15,000Hz (typical for narrow band FM).

Substituting in Equation 2 now gives
S/N = 204 + -3dBW + 0dBi – 115.6dB + 0dBi
– 4dB NF – 10.log(15,000Hz) = **39.6dB S/N ratio**,
which gives a very good quality, fully-quieting signal for FM.

2. Estimate of theoretical usable range for a 433MHz key fob car door remote control.

Here we work backwards, firstly to obtain an allowable path loss given equipment parameters. Note the assumptions (guesstimates) of equipment performance which are rather uncertain in their accuracy!

P_{Tx} = 1mW ≡ -30dBW (about what can be obtained from a simple transmitter powered from a 1.5V button cell).
G_{Tx} = -15dBi (reasonable guesstimate for a small PCB magnetic loop antenna of 10mm diameter).
B = 300kHz (Small low-cost SAW filters and resonators will dictate this sort of bandwidth at 433MHz)
NF = 10dB (it would be difficult to get much worse than this with modern silicon technology).
G_{Rx} = -10dBi (often a piece of wire buried underneath the car instrument panel).
S/N = 20dB, needed for good 100% reliable decoding of error-free frequency-shift-keyed data.

Equation 2 gives,
20dB S/N = 204 + -30 + -15dBi – path loss +
-10dBi – 10dB NF – 10.log(300000),
so L = path loss allowed = 64dB, to the nearest dB.

Now substituting in Equation 1,
92.4 + 20.log(0.433GHz . D) = 64,
so D = 10((64 – 92.4) / 20) / 0.433 = **0.088km**.
A range of 88m is actually rather good for a remote key fob system, but in the right ball park!

EQUATIONS RELATING ANTENNA PERFORMANCE TO SIZE

Gain and Beamwidth

The gain, G (dB), of an antenna with beamwidths of θx horizontally and θy vertically, is given by **Equation 3**. So, a medium-sized Yagi antenna that has been measured as having a beamwidth of 20° in one plane and 25° in the other, will have a gain of roughly
10.log(41250/(20 x 25) = **19dB**.

Gain of parabolic dish

A parabolic dish of diameter d (m), operating at a frequency F (GHz), has a gain (dB) given by **Equation 4**. The figure of 18 at the beginning assumes a dish feed that is 60% efficient. Perfect dish illumination (which is something that is never possible with small antennas) leads to a figure of 20.4 here.

For example, a 0.6m dish at 10.37GHz will have a gain of
18 + 20.log(0.6 x 10.37) = **34dB**.

Approximate beamwidth of a parabolic dish

Again with F in GHz and d in metres, the beamwidth, θ, is given by **Equation 5**, so the dish above will have a beamwidth of around 18.3/ (10.37 x 0.6) = **3°**.

Cassini

Now to the question from M0AQU that prompted this response…

Without looking up any precise details of the spacecraft, we can make some simple assumptions based on current technology. The frequency for deep space communications is usually in the 2 to 8GHz range so, as the last Mars probe was at 8GHz, lets assume the same here. There are advantages in higher frequencies, since the increase in antenna gains at each end (two lots of the '20.log' term, one for each antenna) offsets the increase in free space path loss (one '20.log' term only).
So at a distance of 1.49Gkm,
free Space Loss = 92.4 + 20.log(1.49 x 109 x 8) = 294dB.

Some more assumptions…

Deep space probes in the past have used nuclear/thermal batteries which generate a few tens of watts of power. So let's assume 10W of RF. This power level is easy to generate at 8GHz with GaAs FETs.

Spacecraft antenna hardware (at least when I worked in the space industry 10 years ago) indicated that a pointing accuracy of 0.1° was quite viable and dish antennas of several metres diameter on spacecraft were normal. So if we allow a bit of margin, and assume an antenna of 0.2° beamwidth can be steered, this leads to a gain of around 58dB at 8GHz (and a diameter in the region of 11m).

At the ground station end, 20m dishes are commonplace, and they have high efficiency feeds when that big, so at 8GHz a gain of 64dB is reasonable.

For deep space communications, where the ground station is looking at cold sky, different rules about noise level and noise figure apply from those for terrestrial working, and work to our advantage.

First we just calculate the received signal level, ignoring noise.
P_{Rx} = 10dBW + 58dB G_{Tx} – 294dB + 64dB G_{Rx} = -162dBW.
(In real power terms, this corresponds to 0.063 femtowatts (x 10^{-15}W), or 63 attowatts (x 10^{-18}W), out of the 20m diameter antenna).

When the antenna is looking at cold sky, the receiver noise level is calculated from the effective noise temperature of the receiver front end. A state-of-the art cooled low noise amplifier may achieve a noise figure of 0.2dB, which corresponds to a temperature of 14K. Allowing a bit for losses and 4K for the temperature of deep space, lets take a system noise temperature of 22K.
So receiver noise power density using Boltzmann's Constant is
P_{Rx}= 10.log(1.38 x 10^{-23} x 22)
= -215dBW per Hz.

We now have a received signal power and a noise power density, so we are left with a bandwidth term and a signal-to-noise ratio to complete the link budget.

For digital communications, phase shift keying gives the best link budget performance on noisy signals, and with heavy error correction coding, a signal-to-noise ratio of 8dB is sufficient for virtually error-free communications. So all we have to calculate now is the bandwidth that can be allowed in order for –162dBW of received power to give 8dB S/N at this noise.density.
Maximum bandwith (expressed in dB) = -162 dBW – 8dB S/N – -215dBW = 45dBHz.
Actual Bandwidth = $10^{(45dB / 10)}$
= 31.6kHz.

For phase-shift-keyed signals, bandwidth is to all intents and purposes the same as data rate, so it looks as if something like 30Kbits/s can be transmitted over the 1.5 Tera-metre (or 1.5 Giga-kilometre) path from Cassini to Earth. More than enough for high quality digital images and telemetry.

Clearly, the calculation above is full of assumptions and guesstimates, and space technology has moved on, but the answer is in the right region and I'll bet the values aren't too far from reality! ♦

Equation 1

$$L = 92.4 + 20.\log (F.D)$$

Equation 2

$$S/N = 204 + P_{Tx} + G_{Tx} - L + G_{Rx} - NF - 10.\log(B)$$

Equation 3

$$G\ (dB) = 10.\log (41250 / (\theta x\ .\ \theta y))$$

Equation 4

$$G\ (dB) = 18 + 20.\log(F\ .\ d)$$

Equation 5

$$\theta(°) = 18.3 / (F\ .\ d)$$

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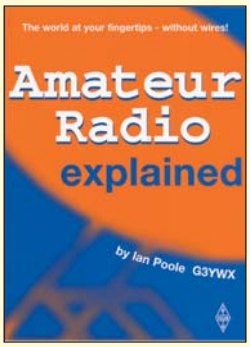

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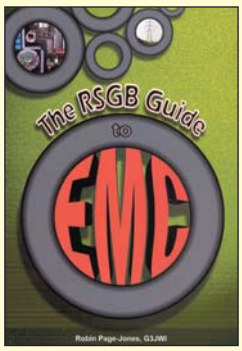

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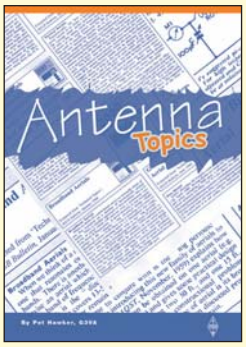

Antenna Topics

If you are interested in antennas this book is a goldmine of information and ideas on the subject. Pat Hawker has been writing his "Technical Topics" column in Radcom since 1958 and in this time has produced much excellent work in this time. This book is a chronological collection of cuttings of Pat's words over the years.

Hundreds of areas and subjects are covered and many a good idea is included. Carefully indexed this book is not only a great reference work but also a history of over forty years of antenna design. At 384 pages this book is excellent value and asset to any amateur interested in antennas.

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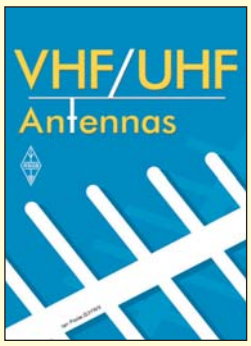

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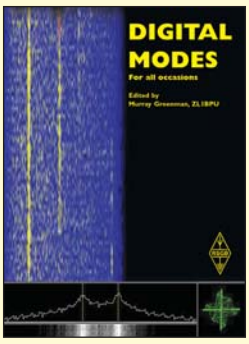

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This is the book for every person who is interested in Amateur Radio Digital Modes, as it is simply the most complete book yet written on this subject. This book describes serial transmission and various data and error correction techniques. It explains the differences between a bit, a byte and a symbol, the baud and BPS, Baudot and ITA2.The history of digital modes is covered along with reviews all the important modes and tools available for PC sound card.

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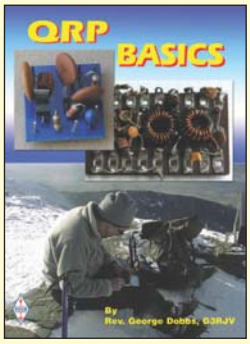

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QRP Basics tells of the fun to be had by operating with low power, both from home and in the great outdoors. Advice is given on how to how to get the best results from a QRP station, how to try out QRP if you haven't before.

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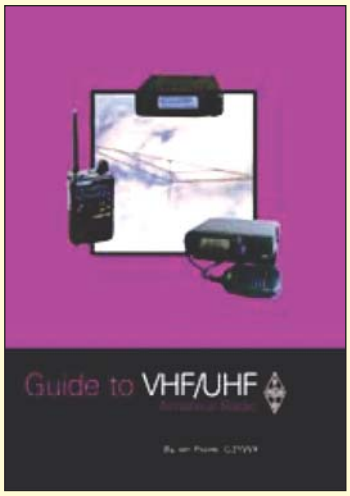

The VHF (veryt high frequency) and UHF (ultra high frequency) bands are some of the most interesting, useful and challenging of the amateur bands. As a result they are widely used by radio amateurs and short wave listeners today, who use them in a variety of ways.

Some enjoy the convenience they offer to enable to make local contacts with friends, either from home or in the car, often journeying to and from work. Others enjoy DXing, and there is a variety of different and fascinating types of propagation that can be used to enable long-distance contacts to be made. Also, satellites are often used to make contacts over distances of a few thousand kilometres.

Many other people enjoy being able to make their own equipment. There is also a large amount of activity by amateurs using data modes like packet radio. This enables them to combine an interest in radio with one in computing.

This hand-sized book has been written to help those starting out on VHF and UHF, or to act as a reference for those with little more experience who use the bands.

1st Edn, 2000, RSGB, paperback, A5, 112 pages, ISBN: 1-872309-58-5.

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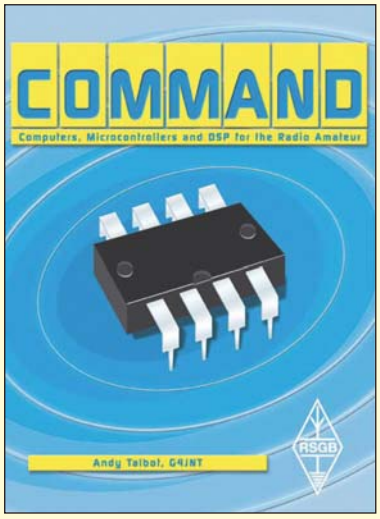

This book is for the radio amateur and home experimenter who wants to use modern digital and computer technology to make more use of his/her radio equipment. It is aimed at those who want to add additional hardware and try new signalling and communications methods, and to build hardware and systems for controlling existing equipment. The home computer is first covered, writing programmes and software, with much detail on how to interface the PC to external hardware via its various ports. Software techniques for detecting signals in noise and for automatic beacon monitoring are described. Microcontrollers, covered in depth, particularly the PIC family of devices. Finally, basic Digital Signal Processing is covered, with aspects such as digital filtering, time/frequency transformations and very narrow bandwidth working being described. How to start using DSP techniques at home is explained; evaluation modules and DSP routes using some simple additional hardware and a PC are covered. Programming in the Windows operating system, with particular emphasis on using the soundcard for DSP purposes, is then introduced.Written for the experienced amateur, this book is aimed at the experimenter and home constructor who wants to get involved in the subject, and to understand how to take it further.

2003 Edn, RSGB, paperback, 240 x 173 mm, 232 pages, ISBN: 1-872309-94-1

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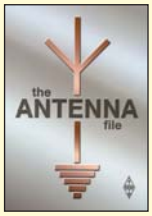

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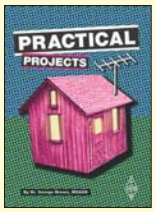

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Old Timers' Honour Roll

The RSGB has subscription concessions to reward loyal service of many years. On 9 December 2004, the following had been members of the Society for 50 years or more.

78 YEARS
RS2627 ..... Mr W S Eadie

74 YEARS
HB9T ..... Dr R Stuber

72 YEARS
G0BXB ..... Mr R E Wilkinson
G2QT ..... Mr F H Cooper
G5RL ..... Mr B K Rowell
G5WW ..... Mr P M Carment
G6XM ..... Mr W James

71 YEARS
G2HW ..... Mr H Whalley
G2PT ..... Mr J Piggott
G3AWA ..... Dr A J Woiwod

70 YEARS
EI3G ..... Mr T W D Aliaga-Kelly
G2ASF ..... Coventry ARS
G2DFP ..... Mr J M Lowe
G2FBU ..... Mr J C M Greig
G2KU ..... Mr R M Herbert
G3MA ..... Mr E A Perkins
G4LX ..... L G Spencer
G5KM ..... Mr H H Eyre
G5ZK ..... Mr R N Lawson
G6CS ..... P T W Castle
G6HY ..... Mr R Healey
G6RJ ..... Mr A Robinson
G8FF ..... Mr S Southgate
G8JM ..... Mr W G Hall
G8PO ..... Cdr J E Ironmonger
GM5NU ..... Mr W B H Lord

69 YEARS
EA6ZY ..... S Ingram
G2AVV ..... Mr G E Evans
G2CIL ..... Mr G A Hook
G2DYM ..... Mr R Benham-Holman
G2HV ..... Mr J Dickson
G3LX ..... Mr H P Arnfield
G3WP ..... Mr J H Brazzill
G6JJ ..... Mr W N Craig
G8CXL ..... Mr N K Read
G8GP ..... Mr E V Neal
G8KW ..... Mr R G Shears
G8QM ..... Mr V J Flowers
G8VF ..... Mr A A Moss
VE3XE ..... Mr E C Ilott

68 YEARS
(RAFARS) , G8FC, G8RAF, GB2RAF Royal Air Force ARS
G2ARU ..... Mr R A Loveland
G3HN ..... Col J W W Cock
G3LD ..... Mr F W Foster
G3VA ..... Mr J P Hawker
G5BM ..... Mr F H Watts
G8GD ..... Mr H E Ward
G8VL ..... Mr J I Sinclair
GW3SB ..... Mr T C Bryant
RS2692 ..... Mr E M Frost
ZL1AH ..... Mr J D Wightman

67 YEARS
G2BTO ..... Mr G Openshaw
G2DSP ..... Mr R Allen
G2DTQ ..... Mr A Goode
G3DFA ..... Mr D B Gaggs
G3FD ..... Mr H T Brock
G3OEP ..... Mr D J Buddery
G3ZTF ..... Mr G T Sparkes
G4AL ..... Mr G R Cox
G4FB ..... Mr F Barnard
G8FW ..... Mr K E Walters
G8GEA ..... Mr K T Warriner
G8RW ..... Mr R W Standley
GI3VQ ..... Mr J K Thompson
GM2AOL ..... Mr W S Hall
GM3UU ..... Mr A S McNicol

66 YEARS
5B4AGP ..... Dr T A Appleby
G2CXT ..... Mr A R Richardson
G2HKS ..... Mr R P B Udall
G3CQ ..... Mr A J Hallett
G3ENI ..... Cdr A J R Pegler
G3FP ..... Mr B R Arnold
G3QD ..... Mr J G Treece
G3QX ..... Mr T R Barlow
G4DR ..... Mr D P Urquhart
G8CK ..... Mr W E Bartholomew
GM3AWW ..... Mr W S Murray
GM3CFK ..... Mr P Harrison
GM3UM ..... Mr G P Millar
GW2DHM ..... Mr W D Andrews

65 YEARS
G2ART ..... Mr F H P Cawson
G2BGU ..... Mr K Gasson
G2CVO ..... Mr F H Osborn
G2FSI ..... Mr L W Smith
G2HHV ..... Mr J Spivey
G3AIK ..... Mr K N Watkins
G3ANI ..... Mr J R Senior
G3AOS ..... Mr J G Barnes
G3AQM ..... Mr F J Gregory
G3BWV ..... Mr F E Springate
G3SZ ..... Mr A Chilvers
GM2BMJ ..... Mr T D Jardine
GM3AKM ..... Mr L R Richardson
GW2FLZ ..... Mr B H Green
GW3CF ..... Mr F G H Jones
GW3ZV ..... Mr J Banner
RS37399 ..... Mr D H Tomlin

64 YEARS
G2AMG ..... H W Mitchell
G2BLA ..... M A Pyle
G3DVV ..... Mr J O Brown
GD0GBA ..... Mr J G Carroll
GW2HIY ..... Mr E M Davies
GW3ARS ..... Mr J Sagar

63 YEARS
AB4SW ..... Mr I T Haynes
EI4L ..... Mr J E Scanlon
G2BPW ..... Mr I W K Smith
G2FUU ..... Mr T Knight
G2FXQ ..... Mr S W Saddington
G2FXZ ..... Mr J B Hodgetts
G2HAX ..... Mr S P Shackleford
G2HDU ..... Mr C W Cragg
G3AEZ ..... Mr John Greenwell
G3CLL ..... Mr J Willy
G3DAM ..... Mr H Barnett
G3FVD ..... Mr R K Mildren
G4IOF ..... Mr M East
G8XXV ..... Mr G L Clarke
GJ3EML ..... Mr J H E Watson
GM2FVV ..... Mr W Girvan
GM3CIX ..... Mr L J McDougall
GU4GG ..... Mr C D S Wintle
GW2HFR ..... Mr A Ellis
RS4430 ..... Mr W Telfer
RS4590 ..... Mr A J W Rozelaar
VK2FFF ..... Mr S J Hutchison

62 YEARS
G2AOY ..... Mr J R Muddell
G2HKU ..... Mr E H Trowell
G3AKX ..... Mr R G Lascelles
G3ALK ..... Mr E J Holmes
G3ASE ..... Mr H S King
G3BAP ..... Mr R Cordingley
G3BWX ..... Maj A L Fayerman
G3DRN ..... Mr E G Allen
G3GBN ..... Mr S H Feldman
G3GJX ..... Mr E B Grist
G3GYE ..... Mr P T Pitts
G3HYJ ..... Mr O F Simkin
G3LCZ ..... Mr T W Hickinbottom
G4LW ..... Mr L Huntley
G6NB ..... Mr D N Biltcliffe
G8LOK ..... Mr L E Currington
GM0IJA ..... Mr B C Skinner
GM3DOD ..... Mr A M Murray
RS5272 ..... Mr C L Chappell

61 YEARS
G3AAZ ..... Mr G G Gibbs
G3AKU ..... Mr R A Harding
G3ANG ..... Mr J W Emmott
G3BPM ..... Mr P J H Matthews
G3CAQ ..... Mr W Moorwood
G3CBW ..... Mr H Walker
G3CXP ..... Mr R A Gill
G3GHS ..... Mr J G Holland
G3IGM ..... Mr R G Hindes
G3LIA ..... Mr R J Rogers
RS6181 ..... Mr R P Hope
RS6464 ..... Mr E Valentine
VK5ZO ..... Mr D Clift

60 YEARS
G0RVQ ..... Mr A J W Harrison
G2AAN ..... Mr J H Clarke
G2CAZ ..... Mr M S Ellis
G2DGB ..... Mr AG Short
G2DQX ..... Mr R J Woodroffe
G2FQP ..... Mr L J Avory
G2FUD ..... Mr A W Owen
G3AAJ ..... Mr R J C Broadbent
G3ADQ ..... Mr A W Walmsley
G3BVU ..... C J Beanland
G3CJD ..... Mr L F L Allen
G3CWW ..... Mr A W W Timme
G3EKL ..... Maj R A Webb
G3FDG ..... Mr R G Morris
G3FZR ..... Mr M W Capewell
G3HKT ..... Mr A R Partner
G3IRM ..... Mr P Lumb
G3YLR ..... Mr F R Blake
G4KID ..... Mr B C Partridge
GW3HGL ..... Mr B Clark
RS558 ..... Mr R D Thomas
RS8618 ..... Mr A R Cameron
RS8896 ..... Mr J Crabtree
ZL1AOA ..... Mr J R Whitney

59 YEARS
G0AEW ..... Mr D T Arlette
G0TTK ..... Mr M A Chatfield
G2ADR ..... Mr E Parvin
G2AOZ ..... Mr GW F Ashford
G2FQS ..... Mr R L Barrett
G2FSS ..... Mr J A Caley
G2HCG ..... Mr B Sykes
G3AMF ..... Mr K G Thompson
G3AUB ..... Mr N R Paul
G3BJC ..... Mr R E Sparry
G3BNE ..... Mr G W Alderman
G3BPG ..... Mr J H Richards
G3BVB ..... Mr D R J Adair
G3BZB ..... Mr R T Cunliffe
G3CRJ ..... Mr B J Shaw
G3CSC ..... Mr S J Roddan
G3DNJ ..... Mr G F Weller
G3DWQ ..... Mr G Lancefield
G3EFS ..... Mr W H Borland
G3FPN ..... Mr J R Davey
G3IJS ..... Mr J F Stratfull
G3INN ..... Mr N S Lilley
G3TXT ..... Mr R T Laing
G4AQ ..... Mr E G Filby
G4IOT ..... Mr A T Hunt-Duke
G4YK ..... Mr B M Morrisey
G5GC ..... Mr G A H Eckles
G6RO ..... Mr R C Kaye
G8GF ..... Mr W A Higgins
G8PG ..... Mr A D Taylor
GW2FYV ..... Mr M Arthur
GW3CZC ..... Mr P J Williams
GW3JGA ..... Mr J E T Lawrence
RS10128 ..... Mr A C Lees
RS10548 ..... Mr J B Gurney
RS20428 ..... Mr A R A Bunnage
RS9475 ..... Mr J Smith
RS9710 ..... Mr F W Adderley
VK5CE ..... Mr C Taylor
W2CIH ..... Mr N A Champness

58 YEARS
5Z4DV ..... Mr T H Hutchinson
G0TTG ..... Mr M Warriner
G2ACZ ..... Mr G Whitehead
G2AFV ..... Mr P Carbutt
G2CHI ..... Mr W G Bailey
G2CKQ ..... Maj R S Trevelyan
G2CQX ..... Mr P V Pugh
G2DQW ..... Mr A Williams
G2DZF ..... Mr J H English
G2FCA ..... Mr A E Burnard
G2FKZ ..... Mr C E Newton
G2FSA ..... Mr R L Harvey
G2FTK ..... Mr F A Noakes
G2FUM ..... Mr H Hunt
G2HFW ..... Mr E G Anthoney
G2MJ ..... Mr R T Hunt
G3ABA ..... Mr L J Kennard
G3AGF ..... Mr R L Edginton
G3AIO ..... Mr S Fenwick
G3AQF ..... Mr H F Weston
G3ASH ..... Mr R A Jackson
G3AXI ..... Mr R J Boal
G3BHF ..... Mr E C Hasted
G3BHK ..... Mr L R Mitchell
G3BKN ..... Mr E W Batten
G3BNF ..... A G Embleton
G3BTM ..... Mr N Shires
G3BXS ..... Mr A G Stacey
G3CHD ..... Mr S R Barker
G3CLK ..... Mr K J Vickery
G3COJ ..... Mr A H B Bower
G3CRH ..... Mr H H A Sanders
G3CRR ..... Mr A E Glozier
G3CTQ ..... Mr H Westwell
G3CTR ..... Mr R L Whorwell
G3CVI ..... Mr B H Thwaites
G3DII ..... Mr J Bell
G3DIT ..... S Hampshire ITS
G3EAT ..... Mr W H Burden
G3EBP ..... Mr P E R Courcoux
G3EEQ ..... Mr K C Gill
G3ENG ..... Mr J D Mathews
G3EOO ..... Mr J Hamlett
G3EPO ..... Mr K I Procter
G3ESY ..... Mr P W F Jones
G3EUE ..... Mr E F Jones
G3EUK ..... Mr R W Curtis
G3EUS ..... Mr J G Fitzgerald
G3FEV ..... Mr J R Platt
G3FJN ..... Mr J A Barson
G3FNM ..... Mr W R Parkinson
G3FPQ ..... Mr D Courtier Dutton
G3GAW ..... Mr D J Redshaw
G3HCO ..... Mr G A Errock
G3HJS ..... Mr R V Woodford
G3JMG ..... Mr J M Gale
G3JSB ..... Mr S B Jeffrey
G3ODH ..... Mr S B Smythe
G3PFJ ..... Mr J D Harris
G3YCN ..... Mr W E Kent
G4FM ..... Mr R H Kelsall
G4HSA ..... Mr V C Whitchurch
G4KEE ..... Mr V A Tomkins
G8ACR ..... Mr R W Yates
G8MVD ..... Mr K Wilks
GD3AHV ..... Mr G W Ripley
GM3JOA ..... Mr H E Stanway
GW3ATM ..... Mr D Nasey
GW3JBH ..... Mr J S Hammond
RS12233 ..... Mr H W Sennett
RS12415 ..... Mr H J Wood
RS12840 ..... Mr J L Butcher
RS14170 ..... Mr D H Clements
RS644 ..... Mr H J Darling
VK6PZ ..... Mr P Zeid

57 YEARS
G2CYN ..... Dr M Hely
G2DUS ..... Mr I B Howard
G2XP ..... Sutton & Cheam RS

G3AVE ..... Mr F C P Flanner
G3AYZ ..... Mr J F Turner
G3BDH ..... Mr R R Flaum
G3BDQ ..... Mr J D Heys
G3BFP ..... Mr J N Headland
G3BMI ..... Mr A Bolton
G3BOK ..... Mr W G Rennison
G3BPE ..... Mr R G Holland
G3BRQ ..... Mr K B Tackley
G3BRW ..... Mr R G Wyatt
G3BUF ..... Mr B J Fost
G3CDE ..... Dr G A Jackson
G3CMH ..... Yeovil & DARC
G3COY ..... Mr V J Reynolds
G3DJK ..... Mr K Rosier
G3DOJ ..... Mr W J Omer
G3DPW ..... Mr R L Knight
G3DSV ..... Mr R W P Wilson
G3DUL ..... Mr H H Pickering
G3DWW ..... Mr G Cripps
G3ECM ..... Mr P W Bowles
G3EDM ..... Mr G L Mills
G3EDS ..... Mr K G Perkins
G3EFK ..... Mr W T Clegg
G3EFP ..... Mr J C Pennell
G3EKD ..... Mr A A Sparrow
G3EVT ..... Mr R J Mutton
G3EZZ ..... Mr J Eaton
G3FIB ..... Mr G A Livesey
G3FMT ..... Mr D W Robinson
G3GFG ..... Mr D R Payne
G3GGG ..... Mr R A Bishop
G3GGL ..... Mr G Wormald
G3GIH ..... Mr J C Bird
G3GIQ ..... Mr H F Lewis
G3GOT ..... Mr B W Legrys
G3HCT ..... Mr J Bazley
G3HGM ..... Mr J A Ewen
G3HHU ..... Dr J C W Ickringill
G3HTP ..... Mr E G Drackley
G3IIV ..... Mr A Davies
G3IIY ..... Mr E C Clayson
G3IJE ..... Mr M J Powell
G3IVF ..... Mr H E Smith
G3JIZ ..... Mr J M Read
G3MUI ..... Mr D J Durrant
G3NTA ..... Mr G A Couzens
G3SKI ..... Mr R A Bravery
G3VHP ..... C B H Bradshaw
G4CCA ..... Mr M J L Fadil
G4LKX ..... Mr D C Hepworth
G5MS ..... Manchester & DARS
G8NJF ..... Mr A J Cox
G8TB ..... Mr B W Wynn
GM3EDZ ..... Mr T P Hughes
GW3FPH ..... Mr J W Hayes
GW3HCL ..... Mr D E C Lockyer
GW3ITT ..... Mr J Cairns
HB9ALV ..... Mr K J Marley
RS15448 .... Mr A S Kitching
RS15845 .... Mr L Grout
RS15851 .... Mr K J Edwards
RS17044 .... Mr M Woodfield
RS19877 .... Mr H J George
VK2AYD ..... Mr D A Pilley
VK2BPN ..... Mr P J Naish
VK6RV ..... Mr R G B Vaughan
W8PR ..... Mr D R Hearsum
ZB1AH ..... Mr F Hague

56 YEARS

7Q7RM ..... Mr R Macfarlane
EA7FSF ..... Mr F Pilkington
G2ACN ..... Mr B J Bale
G2HBA ..... Mr C H Spencer
G3BON ..... Mr W J Rawlings
G3BSU ..... Mr A F Cleall
G3BYG ..... Mr N L H Williams
G3CXT ..... Mr G H Clarke
G3DCZ ..... Mr R G McDonald
G3DDA ..... Mr K W Dyson
G3DEB ..... Mr T A Bennett
G3DGW ..... Mr D Early
G3DIC ..... Mr C H Bullivant
G3DPX ..... Mr C E Pollard
G3DQY ..... Mr J Vaughan
G3DSK ..... Mr R A Lord
G3DVQ ..... Mr R H Pounder
G3EDD ..... Mr B A Armstrong
G3EFY ..... Mr T W A Smith
G3EGV ..... Mr R Staniforth
G3EHZ ..... Mr A H Wreford
G3ELF ..... Mr F W Malpass
G3EOQ ..... Mr M Flinn
G3FBN ..... Mr W J Bolton
G3FFY ..... Mr M H Stedman
G3FHL ..... Mr G C Bagley
G3FIA ..... Mr A D Lowden
G3FIJ ..... Mr F R Howe
G3FKI ..... Mr E C Lambert
G3FNZ ..... Mr J A Lambert
G3FWB ..... Mr P L Hunt
G3FYP ..... Mr P S Robson
G3FZW ..... Mr E A Matthews
G3GBU ..... Stoke on Trent ARS
G3GUD ..... Mr A Bosworth
G3HAT ..... Mr M C Hately
G3HBN ..... Mr J R Bolton
G3HPM ..... Mr P J Mullock
G3HTA ..... Mr J D Forward
G3HZW ..... Mr D C Mainhood
G3IGI ..... Mr L E R Hall
G3ISD ..... Mr E J Hatch
G3IWT ..... J P Hewitt
G3JCL ..... Mr C K Lawson
G3JXG ..... Mr F T Hodgson
G3KKD ..... Mr I M Waters
G3KXE ..... Mr E W Bettles
G3NEO ..... Mr P Bagshaw
G3NOX ..... Mr J R T Royle
G3NWR ..... Wirral ARS
G3ORC ..... Mr R R J Caines
G3WUZ ..... Mr P H Brown
G3YLJ ..... Mr J Boraston
G4LU ..... Mr S F Brown
G6IPU ..... Mr G A Edwards
GD3FLH ..... Isle of Man ARS
GD3FXN ..... Mr A D Radcliffe
GM3COQ .... Mr D Oswald
GM3DEE ..... Mr R P Russell
GM3ENJ ..... Mr K Street
GM3GVD .... Mr J A Dunlop
GM3HOM .... Mr J Reilly
GW3EJR ..... Mr J B Armstrong
RS17032 .... Mr B M Collings
RS17058 .... A M C Macklow-Smith
RS17624 .... Mr F J Shepherd
RS4190 ..... Mr F J W Trollope
VE3EAB ..... Mr W A Cheek
VK3XX ..... Mr G S Bracewell
VK6HD ..... Mr M E Bazley
ZL1HV ..... Mr A G Godfrey

55 YEARS

DJ0OS ..... Mr F C Hartles
G3BVW ..... Mr C P Townley
G3EPV ..... Mr R D Emes
G3ETH ..... Mr J L Goldberg
G3FFH ..... Mr J Frings
G3FOP ..... Mr R G Barrell
G3FPK ..... Mr N A S Fitch
G3FRX ..... Mr J A Wilkes
G3FVL ..... Mr H J Hudson
G3GVV ..... Mr R J Hughes
G3GZJ ..... Mr F J Crisp
G3HTC ..... Mr G E Storey
G3HZT ..... Mr P S Fraser
G3JNW ..... Mr H L Fleming
G3KQF ..... Mr J Anthony
G3LMR ..... Mr J K Eley
G3SOL ..... Mr J B G Parker
G3SVC ..... Spen Valley ARS
G4CDB ..... Mr G Lindsay
G8CDW ..... Mr E H Double
GI3FJX ..... Mr J Davidson
GM3EWC .... Mr R B Irvine
GM3JJJ ..... Mr J D Hague
GM3OBC .... Mr R Thomson
GU3HKV ..... Mr E H Page
GW3GEN .... Mr C F Cole
RS18567 .... Mr A H Turner
VK3ADW .... Dr D A Wardlaw

54 YEARS

G1KEP ..... Mr J G Houghton
G3CZU ..... Dorking & DRS
G3DNH ..... Mr J A Spicer
G3DXJ ..... Mr T H Holbert
G3GEJ ..... Mr L M Airey
G3GGS ..... Mr W E Waring
G3GJW ..... Mr T I Lundegard
G3GKI ..... Mr F V Kershaw
G3GLB ..... J E Lacey
G3GLL ..... Mr T N Green
G3GMY ..... Mr F E A Green
G3GNQ ..... Mr G C Cutting
G3GRO ..... Mr D Atter
G3GRV ..... Mr G Halse
G3GVM ..... Mr F Robins
G3GWR ..... Mr A G Stormont
G3HEA ..... Mr J U Burke
G3HJK ..... Mr B J Mitchell
G3HMF ..... Mr G G Kenyon
G3HQX ..... Mr J Brodzky
G3HRK ..... Mr D F Willies
G3HZM ..... Mr M Barnsley
G3IAS ..... Mr A M Smith
G3IVZ ..... Mr W E Stephen
G3JJA ..... Mr E F Steventon
G3KDP ..... Mr A G Bounds
G3KGW ..... Mr J D Smith
G3KPU ..... Mr E Prince
G3MGW ..... Mr R Wheeler
G3MVV ..... Mr Norman Miller
G3OCA ..... Mr K Frankcom
G3OEG ..... Mr E F Harverson
G3ORW ..... Mr E J Gregory
G3PMW ..... Mr K W Dews
G3RQS ..... Mr R A Rimmer
G3WKS ..... West Kent ARS
G3YJJ ..... Mr R T Palmer
G4IER ..... C D Colbeck
G6BZ ..... M C Bunting
GD3HDL ..... Dr S E Kelly
GM3DDL .... Mr J Jackson
GM3GRG .... Mr D R Rollo
GM3IBU ..... Mr A W Wright
GM3IQL ..... Mr A Lawrence
GW3IGG ..... Mr J P G Jones
RS18978 .... Mr R G Clement
RS20443 .... Mr M B Greenberg
VK6PG ..... Mr A J Gibbs

53 YEARS

G2XV ..... Cambridge & DARC
G3FAU ..... Mr V Cundall
G3FJE ..... Shefford & DARS
G3GGO ..... Mr C N Wridgway
G3GMM ..... Mr E McFarland
G3GYF ..... Mr A J F Powell
G3HIA ..... Mr H C Young
G3HKO ..... Mr D A Wood
G3HKQ ..... Mr L V Westmoreland
G3HQH ..... Mr H Froggatt
G3HRB ..... Mr J Coatsworth
G3HRE ..... Mr F Watson
G3HVX ..... Mr W H Wells
G3HYH ..... Mr S P Hay
G3IFX ..... Mr A R Cooke
G3IJA ..... Mr J Allan
G3IJW ..... Mr G S Garrett
G3ISX ..... Mr C J Leal
G3IUZ ..... Canon H R Davis
G3JIE ..... Mr D C Youngs
G3JLH ..... Mr I L Hampton
G3JMX ..... Mr P C Hayward
G3KHR ..... Mr J W Fox
G3KKP ..... Mr J Burgess
G3LMX ..... Mr T W Mitchell
G3MEA ..... Mr S Harle
G3MZO ..... Mr D Rosen
G3TOK ..... Mr J L Hall
G3VRB ..... Mr J D Nias
G8BOP ..... Mr M J Palmer
G8HLE ..... R E W Marshall
GM0UPE ..... Dr G R Sutherland
GW3FPF ..... Mr P F Jones
GW3INW .... A Davies
VE3EZP ..... Mr J C Watson
VK2BE ..... Mr L W Louttit
VK6LK ..... Col G R K Lyon

52 YEARS

G0FMU ..... Mr A J Turner
G2HDR ..... Mr C N Chapman
G3BHT ..... Mr B G Meaden
G3CCM ..... Mr W R Harris
G3EHP ..... Mr J Wilmot
G3HBW ..... Mr A L Mynett
G3HHD ..... Mr T J Hayward
G3HRD ..... Mr J Ellis
G3HRN ..... Mr D L Wright
G3HUL ..... Mr D M Mallett
G3HWW ..... York ARS
G3HZI ..... Mr C L Hatfull
G3ICH ..... Mr P N Pitt
G3IDW ..... Mr R Reynolds
G3IER ..... Mr D G Martin
G3IEW ..... Mr S J Heard
G3IFB ..... Mr F H Bliss
G3IGP ..... Mr J G H Pearce
G3IGU ..... Mr K H Coates
G3IGV ..... Mr J W Birkbeck
G3IGZ ..... Mr D W Bruce
G3IIN ..... Mr M J Griffin
G3IKL ..... Mr R T Craxton
G3INA ..... Mr R G Robinson
G3INL ..... Mr A A Chisholm
G3IOI ..... Mr N R Pascoe
G3IPV ..... Mr P W Haylett
G3ITH ..... Mr R D Franklin
G3ITP ..... Mr J T Parker
G3JHL ..... Mr J H Lepper
G3JKF ..... Mr K V Franklin
G3JKT ..... Mr J Huggett
G3JKV ..... Mr W F Blanchard
G3JLN ..... Mr F G Blain
G3JQS ..... Mr J Guttridge
G3JTJ ..... Mr T Jones
G3JYG ..... Mr J Kirby
G3KSP ..... Mr P O Hooper
G3KTN ..... Mr J F Brown
G3LQW ..... Mr K Wallace
G3LUY ..... Mr E W Brett
G3LWK ..... Mr H Taylor
G3LZG ..... Mr E Griffiths
G3MWG ..... Mr D E Bootman
G3NXX ..... Mr I Miller
G3PXJ ..... Mr S A Gaunt
G3TEV ..... Mr M J Mills
G3VDL ..... J A St. Leger
G4DMP ..... Mr D M Pratt
G6UQ ..... Stockport RS
G8IDL ..... Mr D A D Smith
GM3KAM .... Mr D Mather
GM3LGU ..... Mr R I Pryde
GM3MGT .... Mr A W Hope
GM3NYG .... Miss J G Fish
GW3JSV ..... Mr D A S Holmes
GW3MDK .... Mr R Jones
RS19615 .... Mr M Addicott
RS21683 .... Mr J C P Sharp

51 YEARS

G3CVW ..... Mr R F Saunders
G3DSS ..... Maj G S Symons
G3GFT ..... Mr G Oldfield
G3IHX ..... Mr N J Bond
G3IKR ..... Mr J P Moore
G3INU ..... Mr R J Appleby
G3IYF ..... Mr D E Baker
G3IYT ..... Mr S R Walker
G3IZJ ..... Mr M J Faulkner
G3IZQ ..... Mr H Hyman
G3JBQ ..... Mr J S Munn
G3JFR ..... Mr N B Cottrell
G3JHP ..... Mr E W G Allen
G3JIP ..... Mr J W Hill
G3JME ..... Mr M Watson
G3JMY ..... Mr E C Halliday
G3JNB ..... Mr V E Brand
G3JNM ..... Mr T R Whittaker
G3JSF ..... Mr A W Baker
G3JVL ..... Mr M H Walters
G3KDA ..... Mr M G Rimmer
G3MBL ..... Mr A G Edwards
G3MCW ..... Mr R A E Fronius
G3MDM ..... Mr G J McGee
G4ONP ..... Loughton & Epping Forest ARS
GW3KJW .... Mr P E W Allely
GW3LQE ..... Mr A M Ernest
GW3MPP .... Mr G C Price
GW4BYA ..... Mr P A Braham
GW4HXO .... Mr M Probert
RS20103 .... Mr A J Kightley

50 YEARS

G3AHD ..... Liverpool AR & ES
G3JHC ..... Mr B Jenkinson
G3JIR ..... Mr J A Hardcastle
G3JJG ..... Mr G F Gearing
G3JNJ ..... Mr D A Platt
G3JOT ..... Mr F G Whatley
G3JPU ..... Mr D G Plant
G3JTG ..... Mr E G Gibbins
G3JUL ..... Mr G C Voller
G3JYL ..... Mr R M Woodman
G3JYO ..... W J Grainger
G3JYP ..... Mr W B Capstick
G3KAY ..... Mr R J Lang
G3LDU ..... Mr R Ballantyne
G3LSQ ..... Mr P J Aitchison
G3MCA ..... Mr D F Owen
G3MPB ..... Mr A R Smith
G3NDO ..... Mr P Sorab
G3SNN ..... Mr A B Woolford
G3TGR ..... Mr J J Woods
G4IUH ..... Mr R J Pye
G8BFL ..... Mr B J Jayne
G8CJ ..... Mr F Ellesmere
GM3JQJ ..... Mr G Moore
GM3LKY ..... Mr P Cohen
GW3JXN ..... Dr J E Tindle
RS20249 .... Mr M Harrington
RS20323 .... Mr L Foster
RS20353 .... Mr A A Kendall
VK3CEC ..... Dr H Maclean

Members' ads

FOR SALE

87 OAP, ill health, Yaesu FRG-100 rcvr, serial 2E570038, mint, NES 10-2 digital speaker serial 10302079 mint, Kenwood HS-6 headphones, mint. H/books and dealers receipts, £230 As one lot, please, collect if possible, will share petrol. 0181 526 7802 (Hetton-le-Hole).

CHALLENGER II by Linear Amp UK. 3CX-1500A7 model, £750 ono, buyer collects. 01484 654 650 (Huddersfield).

COLLECTABLES – Domestic valve radios e.g. Westminster ADP-6/TAD6 4-valve, others 1940 – 1960. Offers? Buyer collects. G0KSG, 01233 812 799 (Ashford).

CUSHCRAFT X7 7-ele 10/15/20 beam in good cond, £350 plus delivery cost. GJ4KBM, 01534 482 030 (Jersey). E-mail: byron.nelson@laelands.co.uk

ICOM 7400, 2 months old, boxed, £1100. Icom 756, £750 ono. Keith, G3NAS, 01543 255 992 (Lichfield).

KENWOOD 430 HF tcvr, good cond, £375. Icom-725 HF tcvr, good cond, £350. Icom-706MkII + Icom AT-100 tuner -+ leads, £700. Kenwood AT-230 tuner, ex cond, £130. MW0TJD, QTHR, 01443 772 745 (Treorchy).

KENWOOD SP-23 speaker, £45. AKD model 2001 2m rig, £95. Watson W-3A Power supply, £15. Samlec 23A power supply, £65. BNOS 2m linear amp, £119. Inac 22A power supply, £69. All the above are in mint cond and are in original boxes. Maynard, M1EGX, QTHR, 0121 351 2827. E-mail: mbeddard@hotmail.com

KENWOOD TMD-700E, as new, £350. heavy duty rotator, G-1000 DXC brand new, still boxed, £400. Drum URM-67 low loss CO.AX, new, £50 (100m). G4LSP, QTHR, 01449 722 055 (Needham Market).

LINEAR amplifier Challenger II by Linear Amp UK 2 x 3CX800. No modifications, h/book included. Purchaser arranges transport, £900. GM4FDM, QTHR, 01505 343 790 (Nr Paisley). E-mail: tom@gm4fdm.com

OSCILLOSCOPES Leader LBO-523 (40MHz) works well but Y range-switches need replacing, £25. Also Maplin GOS-625 (50MHz) as new (see Maplin cat p663 for details), £300. 01566 782 463 (Launceston). E-mail: g-j-bowhay@beeb.net

SILENT key – Norman Birkett, G3EKX - radios/com rcvrs, books, mans, mags, HRO coils. Call for lists. Richard & Ivana Birkett-Ova, 01872 862 575 (Truro).

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

SILENT key Dentron amplifier, TS-570D, SP-23, 25A supply, MFJ-945C ATU, EK-150 keyer, Hanson SWR-300W, MC-80, Drake WH7, 2000W-SWR. TM-241E FM, 10W, PSU, FDK-800D FM 25W, Timestep Proscan down-converter, dish. Offers? Collection, no boxes. G4LFB, QTHR, 01707 329 756 (Welwyn).

VINTAGE & Military Amateur Radio Society is acting as agent for the sale of a rare and unique clandestine radio, a Type A MkIII (see the photograph). This set is in near-perfect condition and is still owned by the person who, as an SOE agent, operated it in Yugoslavia in WWII. It is contained in parachute drop boxes and is complete with spares, headset, Morse key, connector and original manual. Offers are sought in excess of £2500. For further details telephone 0118 979 1488 or e-mail secretary@vmarsmanuals.co.uk

YAESU complete HF setup. FT-757GX HF tcvr, matching FP-757HD heavy-duty PSU and matching FC-757 fully auto ATU. In good cond with orig boxes, packaging and all manuals, owned by non-smoker. 100W o/p with wide band rcvr and extendable transmit (will cover 5MHz NoV & 7MHz band extension), £475 plus post and package. Keith, 01449 767 888 (Suffolk). E-mail: g0fea@qsl.net

YAESU FT-1000AC. TL-922 linear amp. Both as new cond with boxes. One owner from new. Offers? G4LFB, QTHR, 01707 329 756 (Welwyn).

YAESU FT-4700RH, Standard C-5608D, 2m/70cm mobile tcvrs, £70 ea incl antenna diplexers. Yupiteru MVT-7100 h/h scanner, £40. Yaesu FT-470 2m/70cm h/h, incl 600mAh battery & charger, £45. FT-23R 2m h/h, £35. Daiwa APS-300 PSU, 24A continuous, will float-charge lead-acid backup battery, £20 plus carriage. Nikon Coolpix 990 3M3 pixel camera c/w closeup & telephoto lens adapters, software, £90. G3UYK, QTHR, 01962 820 466 (Winchester). E-mail: g3uyk@kembles.co.uk

YAESU FT-90R Dual-band micro mobile, dual-band antenna, boot mount, all boxed vgc, £160. Prefer buyer collects. G0CZB, 01462 434 552 (Hitchin).

YAESU FT-920 vgc, hardly used from new, with man and box, £650. Andy, M1FJG, QTHR, 01502 572 109 (Lowestoft). E-mail: andym1fjg@aol.com

YAESU-857D 3 months old, all-mode mobile, complete, boxed mans, warranty. As new. YSK-857 ext kit, £600 ono. Dave, 07762 739 345 (Reading). E-mail: dfbooth@lineone.net

WANTED

BC-348 Good, bad or indifferent for restoration project. 01670 505 675 (Morpeth). E-mail: stratfordtuke@aol.com

HYGAIN rotators – Damaged Ham IV and V, T2X complete with control units. Required for spares. Carriage paid. 01792 290 770 (Swansea). E-mail: philip@gw4hat.demon.co.uk

VERSATOWER or similar head unit, rotator alignment bearings used or damaged. 01792 290 770 (Swansea). E-mail: philip@gw4hat.demon.co.uk

XTAL 7MHz 40m CW band, 3/4in centre, 1/8in-dia pins, also high impedance headphones and low-pass filter suitable for 10W valve set or information on how to build one. Brian, M1EWP, 01726 61549 (Cornwall).

SILENT KEYS

We regret to record the passing of the following radio amateurs:

G1DTC	Mr A K Quarterman	18/11/04
G2CUJ	Mr J B Jones	10/04
G2DKI	Mr P N Ridout	26/11/04
G3AAG	Mr V Copley-May	15/11/04
G8BFS	Mr J F Dudeney	22/05/04
G8KJ	Mr A W Wright	2004
M1CRD	Mr R M Black	03/12/04
M3EEC	Mrs E Matthews	19/11/04

CONGRATULATIONS

to the following, whom our records show as having reached 70, 60 or 50 years' continuous RSGB membership:

70 years

G2AVV	Mr G E Evans

60 years

G2ADR	Mr E Parvin
RS9475	Mr J Smith
GW3CZC	Mr P J Williams

50 years

G3KJX	Mr B Alderson
G3KTJ	Mr G P Rigby

RALLIES

TI – Talk-In; **CP** – Car Park; **£** – admission; **OT** – Opening Time – time for disabled visitors appears first, eg (10.30/11am); **TS** – Trade Stands; **FM** – Flea Market; **CBS** – Car Boot Sale; **B&B** – Bring and Buy; **A** – Auction; **SIG** – Special Interest Groups; **MT** – Morse Tests; **MA** – Foundation Morse Assessments; **LB** – Licensed Bar; **C** – Catering; **DF** – Disabled Facilities; **WIN** – prize draw, raffle; **LEC** – LECtures/ seminars; **FAM** – FAMily attractions; **CS** – Camp Site.

6 FEBRUARY 2005

SOUTH ESSEX ARS Radio Rally – The Paddocks, Long Road, Canvey Island, Essex, at the southernmost extremity of the A130. Radio, computers and electronics. OT 10.30am. C (home-made), CP free, DF, TS. Brian, G7IIO, 01268 756 331 or briang7iio@yahoo.com [www.southessex.ars.btinternet.co.uk]

13 FEBRUARY 2005

HARWELL ARS Rally – Didcot Leisure Centre, Mereland Road, Didcot, Oxon. Signposted from A34. OT 10.15 / 10.30am, CP free. B&B, C, LB, TS, SIG, DF, TI on 145.550MHz. Ann, G8NVI, 01235 816 379, ann.stevens@btinternet.com. [www.hamradio.harwell.com]

WAKEFIELD & DRS 14th Northern Cross Radio Rally – Thornes Park Athletics Stadium, Wakefield, W Yorkshire. Just out of town on the Horbury Road. Easy access from M1 jns 39 and 40 – well signposted. OT 10.15 / 10.30am, £2.50. B&B, TI on 145.550MHz. John, G7JTH, 01924 251 822 or g7jth@wdrs.org.uk [www.wdrs.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: 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?

12 Feb GB5TT: Tango Tango. LH2 (G4UHM)
18 Feb GB5WVR: Worth Valley Railway. L (G0FQN)

20 FEBRUARY 2005

Stevenage Radio & Electronics Show – Stevenage Arts & Leisure Centre, Lytton Way, Stevenage, Herts. Close to A1 & GNER mainline. OT 9.30 / 10am, £3. TI, CP, DF, TS, SIG, B&B, LB, C. Steve G4UKR, 07950 327 822, stevenageshow@dsl.pipex.com [www.stevenageshow.dsl.pipex.com]

27 FEBRUARY 2005

SWANSEA ARS Amateur Radio & Computer Show – Afan Lido, Aberavon seafront, Port Talbot, 1 mile from jn 41, M4. OT 10.30am. TS, B&B, SIG, repeater groups, TI on 145.550MHz. Roger, GW4HSH, 01792 404 422.

5 MARCH 2005

CRYSTAL PALACE R & EC Spring Radio & Electronics Sale – St John's Hall, Sylvan Road, SE19. OT 10.30am, £1 (inc free drink), under-16s free. C, local parking free. Bob, 01737 552 170. [www.members.aol.com/rfcburns]

LAGAN VALLEY ARC Annual Rally – Lagan Valley Hospital, Hillsborough Road, Lisburn. OT 11am. B&B, C, CP, TI on 145.550MHz.

6 MARCH 2005

TYNE & WEAR REPEATER GROUP Auction – Community Centre, Front Street, Great Lumley, Chester-le-Street. OT 11am, £1. C. Nancy, 0191 477 0036, 07990 760 920, or nancybone2001@yahoo.co.uk

13 MARCH 2005

ABERYSTWYTH Amateur Radio & Computer Rally – Penweddig Secondary School, Aberystwyth, next door to Aberystwyth Swimming Pool and Leisure Centre (signposted). OT 10am, £1. HF and VHF demonstrations, hobbies, TS, computers, B&B, clubs, SIG, C, model railway and aircraft, dolls' houses. TI on 145.550MHz. Ray, GW7AGG, 01970 611 432, or ray@clocktower.go-plus.net

BOURNEMOUTH RS 17th Annual Sale – Kinson Community Association Centre, Pelhams Park, Millhams Road, Kinson. OT 10am, £1.50. TI, TS, B&B, SIG, CP, C (light). John, G0HAT, 07719 700 771, johncbales@yahoo.co.uk [www.brsweb-site.freeserve.co.uk]

BREDHURST RECEIVING & TRANSMITTING SOCIETY 18th Rainham Radio Rally – Rainham School for Girls, Derwent Way, Rainham, Kent. OT 9.30 / 10am, £2, under 14s free. TS, SIG, C, TI on 145.550MHz via GB4RRR, CP off-road. Mike, 01634 313 905.

WYTHALL RC Radio & Computer Rally – Woodrush Sports Centre, Shawhurst Lane, Hollywood, nr Birmingham, on the A435, two miles from jn3, M42. OT 10am, £1.50. TS, C, B&B, CP,TI on 145.550MHz. Chris, G0EYO, 07710 412 819 or g0eyo@blueyonder.co.uk [www.wrcrally.co.uk]

19 MARCH 2005

BRAC Foundation of VERON 30th Annual Dutch National Radio Fleamarket, – Autotron, Rosmalen ('s-Hertogenbosch). Look for signs to the Autotron. OT 9am, 6 Euro. C, TI via PI4SHB on 145.250MHz. pi4shb@amsat.org [www.qsl.net/pi4shb]

20 MARCH 2005

CAMBRIDGE & DARC Rally – Britten Arena, Wood Green Animal Shelter, on the A1198 Godmanchester, off A14. OT 9.45 / 10am, £2, conc. DF, TI on 145.550MHz, B&B, CP free, C, LB, FAM. Bring own tables. John, G0GKP, 01954 200 072.

NORTHERN AMATEUR RADIO SOCIETIES' ASSOCIATION (NARSA) Norbreck Blackpool Rally – Norbreck Castle Exhibition Centre, Blackpool. Peter, G6CGF, 0151 630 5790, g6cgf.peter@ntlworld.com

3 APRIL 2005

Northern Mobile Rally (Harrogate) – Harrogate Ladies' College, Clarence Drive, Harrogate. B&B, C, DF. Gerald, G0UFI, 07734 478 080. [www.harrogat-erally.co.uk]

10 APRIL 2005

CAMBRIDGESHIRE REPEATER GROUP Annual Rally – Bottisham Village College, Bottisham, six miles E of Cambridge. Access is via A14 A1303. OT 10am, £1.50. B&B, CBS, TI on 145.550MHz. Paul, G0LUC, 01462 683 574, g0luc@btinternet.com [www.gb3pi.org.uk]

21st Yeovil QRP Convention – Digby Hall, Hound Street, Sherborne, Dorset. On the A30 and adjoining roads, follow the black on white road signs to town centre. The Digby Hall adjoins the central shopping car parks. Do not follow the brown tourist signs to town and abbey. OT 10am. LEC, TS, B&B, C, DF, CP free, TI via GB2LOW on 144.550MHz. George Davis, 01935 425 669, george@mudford.fsbnet.co.uk

24 APRIL 2005

ALDRIDGE & BARR BEACON ARC Annual Surplus Radio & Electrical Sale – Anchor Meadow, Middlemore Lane, Aldridge. OT 10.30am, £1. WIN free, CP, C, TI on 145.550MHz. Doug, 01543 571 269. [www.goneq.co.uk]

ANDOVER RAC Spring Boot Sale – The Village Hall, Wildhern (map ref SU351510). OT 10am, £1. TS, C, DF, TI on 145.550MHz. Terry, G8ALR, 01980 629 346, g8alr@ukgateway.net

West London Radio & Electronics Rally – Kempton Park racecourse, Sunbury-on-Thames, Middx. OT 10.15. TS, FM, C, LEC, B&B. Paul, M0CJX, 01737 279 108, m0cjx@radiofairs.co.uk [www.radiofairs.co.uk]

2 MAY 2005

DARTMOOR RC Radio Rally – Ron, G7LLG, 01822 852 586.

MID-CHESHIRE ARS Rally – David, G4XUV, 01606 77787.

We apologise to both the Mid-Cheshire ARS and the Midland ARS for an error in the January listing, which was beyond our control, and may have given false impressions of the rally dates of these two clubs. The dates are correct as printed here.

15 MAY 2005

MIDLAND ARS Drayton Manor Radio & Computer Rally – Norman, G8BHE, 0121 422 9787 or 07808 078 003, nlgutteridge@aol.co.uk [www.midamradio.com]

5 JUNE 2005

SPALDING & DARS Annual Rally – Ambrose, M0DJA, 07989 636 520, or John, 07946 302 815. [www.sdars.org.uk]

12 JUNE 2005

NUNSFIELD HOUSE ARG 36th Elvaston Castle National Radio Rally – Les, G4CWD, 01332 559 965, les@g4cwd.com

19 JUNE 2005

NEWBURY & DARS Car Boot Sale – Kevin, G6FOP, g5xv@ntlworld.com [www.nadars.org.uk]

26 JUNE 2005

SEVERNSIDE TV GROUP West of England Radio Rally – Shaun, G8VPG, 01225 873 098. [www.westrally.org.uk]

3 JULY 2005

NORFOLK ARC Barford Radio Rally – David, G7URP, 01953 457 322 or 01953 458 844, radio@dcpmicro.com [www.norfolkamateurradio.org]

7 AUGUST 2005

FLIGHT REFUELLING ARS Hamfest – Mike, M0MJS, 01202 883 479, hamfest@frars.org.uk [www.frars.org.uk] KING'S LYNN ARC 16th Great Eastern Radio Rally and Car Boot Sale – andyjackson@2e1klp.freeserve.co.uk

12 AUGUST 2005

COCKENZIE & PORT SETON ARC Annual Junk Night – Bob, GM4UYZ, 01875 811 723, bob.gm4uyz@btinternet.com

28 AUGUST 2005

TORBAY ARS Communications Fair – Colin, G4FCN, 01803 812 117, or Peter, G3VTO, 01803 864 528. [www.rally@tars.org.uk]

4 SEPTEMBER 2005

Telford Rally – * Temporary change of venue ***** – Orleton Park School, Wellington, 1 mile north of M54, jn 7. Mike, G3JKX, 01952 299 677.

10 / 11 SEPTEMBER 2005

50th Weinheim VHF Convention – df1gw@amsat.org

11 SEPTEMBER 2005

LINCOLN SWC Hamfest – Roger, 01522 693 848, hamfest2005@mail.com

7 – 9 OCTOBER 2005

RSGB INTERNATIONAL HF & IOTA CONVENTION 2005 – Gatwick Worth Hotel, Sussex. 0870 904 7373.

HELPLINES

- Mr C A Collins, G3THX, needs a carrying strap for the Yaesu FT-290RII portable transceiver. G3THX, QTHR. Tel: 01754 761 306.
- Bill, VK7KBG, is looking for information on and a circuit diagram of the KW Ezee Match. Can anyone help? VK7KBG, QTHR. E-mail: nosmo@netspace.net.au
- Khalid, AP2DKH, needs a copy of the manual for the Kenpro rotator KR-400RC. AP2DKH, QTHR. E-mail: ap2dkh@yahoo.com
- Chris, M0HMR, is looking for a supplier of blank aluminium chassis suitable for valve-based equipment. The small chassis from Maplin are too small for his applications. Any information would be greatly appreciated. M0HMR, QTHR. Tel: 01453 832 725, or e-mail: chris.harmer@v21mail.co.uk
- Francis, G4ALD, asks if the 'Decon-Dalo' printed circuit pen is still available and, if so, where can he get one? G4ALD, QTHR. Tel: 01474 569 357.

4 DECEMBER 2005

BISHOP AUCKLAND RAC Rally – Mark, G0GFG, 01388 745 353, or Brian, G7OCK, 01388 762 678.

RSGB MEMBERS' ADVERTISEMENTS

RSGB members wishing to place an advertisement in this section should use the official form printed in *RadCom* each month and send it to 'Memads', *RadCom*, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. No acknowledgement 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*. **The RSGB believes that it is inappropriate for members trading in whatever way in radio equipment to place members' advertisements. We therefore regret that we are unable to take such advertisements, although we do welcome these in the 'Classified' advertising section of *RadCom*.** The editor reserves the right to refuse any advertisement for any reason. In such matters, the editor's decision is final.

The RSGB 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. Members may submit *one* photograph of equipment being sold / wanted at an additional cost of £5.00. This *must* be a .jpg or .gif file and the file name *must* be included on the Order Form. The photograph may be e-mailed to radcom@rsgb.org.uk or sent on a floppy disk or CD.

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 Danby Advertising (advertising agents). The closing date for copy is the first day of the month prior to publication, e.g. 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 Members' 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. As a last resort, members may also send in their advertisements on separate 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 way.

RSGB MEMBERS' ADS ORDER FORM

Application form for one For Sale, Exchange or Wanted advertisement. Do not mix classifications on this form; separate 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*

☐ I enclose a cheque/PO for £ ☐☐.☐☐ p

☐ Please charge to my credit card

Number ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry date ☐☐☐☐ Issue number (Switch only) ☐☐

Signed _____ Date _____

Section: ☐ FOR SALE ☐ EXCHANGE ☐ WANTED

RATES: UP TO 20 WORDS £5.50; 21-40, £6.50; 41-60, £7.50.
PHOTO (jpg or gif only) ADD £5.00

Free entries

Photo file name (if applicable) _____.jpg/gif

Town _____

E-mail _____

Phone _____

CLASSIFIED

Classified advertisements 58p per word (VAT inc.) minimum 14 words £8.12. All classified advertisements must be prepaid. Please write clearly. No responsibility accepted for errors. Latest date for acceptance is 1st of the month prior to publication.

Copy to: Chris Danby G0DWV, Danby Advertising, 299 Reepham Road, Hellesdon, Norwich, NR6 5AD
Tel: 0870 904 7377 Fax: 0870 904 7378 E-mail: adsales@rsgb.org.uk

Payment to: RSGB, Lambda House, Cranbourne Road, Potters Bar, Herts, EN6 3EP

FOR SALE

ISOLATED INTERFACES for PSK-SSTV-RTTY-CW-INTERNET LINKING plus other DATA modes. Suitable for PC Soundboards.
NEW DUAL CAT Control cables for YAESU and ICOM transceivers. COMs transformers available to build your own ISOLATED interface. Registered with PAYPAL. See www.g3liv.co.uk
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Tel 0191-2843028. johnny@melvin.com

FIBREGLASS TUBE High strength tube, square box, rod, and other sections all from stock in 6m lengths. Engineered Compositions, Chester. Tel: 01244 676000 e. barbara@engineered-composites.co.uk www.engineered-composites.co.uk

6.7M TELESCOPIC fibreglass antenna poles. Ideal for verticals or lightweight portable use £17.95 including p&p. Cheques to SOTA Beams, 89 Victoria Road, Macclesfield, Cheshire SK10 3JA. See website for great quantity discounts! www.sotabeams.co.uk

VARGARDA VHF-UHF ANTENNAS. DX & contest performance. Strong and long lasting. No matching required. UK distributor, Steve Burrows M5BXB. Tel: 01992 623335. www.m5bxb.com E-mail: sales@m5bxb.com

AT11MB Tuner. New unused, approx Half price at £100. Tel0161 7665265

SILENT KEY- RADIOS / COMMUNICATION Receivers, Books, Manuals, Magazines, HRO Coils, For Lists 01872-862575, www.rabeng.co.uk

EQUIPMENT

VHF/UHF ACCESSORIES AND AERIALS, PMR equipment and spares, Garex Electronics, P O Box 52 Exeter EX4 5FD www.garex.co.uk Phone 07714 198374

G2DYM ANTI-TVI, ANTI INTERFERENCE AERIALS outperform any other commercial wire aerial. Information, testimonials, Large S.A.S.A.E:- G2DYM, Uplowman, Devon, EX16 7PH. 01398 361215 Anytime.

REPAIRS to all amateur and vintage RX/TX cost effective service phone or call in for details. Medway Aerials rear of 14 Luton Road, Chatham, Kent, ME4 5AA 01634 845073

COMPUTER SOFTWARE

SHACKLOG 5.6 – probably the most popular UK written logging software. £32.00. With IOTA addons £42.50. Alan Jubb, G3PMR, 9 Quidditch Lane, Lower Cambourne, CB3 6DD. www.shacklog.co.uk

AMATEUR RADIO ELECTRONICS
Colourful, highly interactive - Foundation, Intermediate and Advance! exams. FREE. www.eptsoft.com

MEMORY MANAGEMENT SOFTWARE for YAESU rigs. FT-817/ND, FT-847, FT-857/D, FT-897/D,FT-7800, FT-8800, FT-8900, VR-5000. 9 South Avenue, New Milton, Hants BH25 6EY. Website: www.g4hfq.co.uk
Email: bob.freeth@g4hfq.co.uk
Phone: 01425 618092

HOLIDAY

SELF CATERING ACCOMODATION
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BUSINESS CARDS

The last word

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PR is vital!

From: Alan Turner, G3UFP

I write to express my support for the decision of the RSGB to spend members money on PR activities to help with PLT and other issues of spectrum use. Forty years ago G3KP, a friend of my father, used to pass me envelopes bearing foreign stamps. He got them from direct QSLs. One day he left the QSL cards inside, perhaps intentionally.

The process of self-training in radio communication began and two years later, aged 16, I had got my licence. I became a professional engineer and have led a comfortable and interesting working life that includes many 'firsts' as a result.

My son M1CVZ followed me. I now work in military avionics - stuff familiar to all amateurs such as power-amplifiers, low-noise receivers, intermodulation, cable-losses and EMC. About 4% of our engineers are licensed amateurs.

During WWII and in conflicts since such work has prevented many aircrew from being shot-down. See what a little PR can do.

From: Jim Hicks MBE I Eng FIIE, G4XRU

. . . Fantastic news, at last it has been decided to employ a PR consultant to help put our side of PLT and counteract the weird image of hams that many of the public have. The ARRL recognised the importance of PR years ago and have been able to project the true image of amateur radio. They have focused on the public service aspect both in civic and emergency situations plus technical training especially of young people. Respect and understanding of hams in the US is much higher than in the UK. I speak from many years of visiting the USA on business. If we had taken on a PR agent right after Tony Hancock's programme, which you have to admit is both very funny and very true, then we may not be having so many issues defending our privileges today.

I realise many of you will be horrified at the idea of spending £20,000 on PR. I can only assure you from practical experience that a budget of that size is the minimum to get anything worthwhile achieved and that it will take time to see the results. I would vote for an even larger budget but take heart from the fact that individual clubs throughout the UK will also be doing their bit locally.

My own company has been spending a similar sum annually for 30 years in the industrial electronics industry and as a result we have a brand image and credibility out of all proportion to our size.

Tsunami disaster

From: Chris Sharp, RS21683

What a splendid report ['Amateur radio and the Asian tsunami disaster' on www.rsgb.org - *Ed*] and what a truly magnificent response in the disaster area you describe. I am sure we in the UK knew our amateur friends would be in the forefront of giving assistance as they often do in this wonderful world-wide hobby of ours and your story confirms just that. How very moving and humbling their efforts make one feel.

Try 'Pic-a-STAR'

From: Paul Moir, G3ZCU

I would like to share an experience from 2004. I had been following the Pic-a-STAR project as it progressed, but as I hadn't picked up my soldering iron in anger for around 15 years, I thought "No, not for me, it's just too difficult". Well, as I write this I am looking at my completed Pic-a-STAR transceiver. So, was it difficult to build? No, certainly fiddly in parts, but not difficult. What really made the difference was the help and enthusiasm of Peter Rhodes, G3XJP, and the other members of the Pic-a-STAR Yahoo group, where the ham spirit is alive and well. Where else could you go for assistance on a project and get prompt advice from the designer himself and all for free? Just brilliant. At the start of 2004 I had never made a really intricate PCB, programmed a PIC, or built with SMD components. Thanks to this project these tasks are second nature now. The end result is a transceiver with truly stunning performance that outclasses anything I've ever bought or built in the past. New code releases from Peter's on-going software development just serve to make the rig even better still.

So, if you are looking for a project for 2005, give serious consideration to Pic-a-STAR. The components you will need are still available, the help and enthusiasm of the group is almost limitless and you will have a transceiver that will be your pride and joy for a very long time to come.

Another nostalgia trip?

From: Andy Talbot, G4JNT

I regret to say I cringed on opening January's *RadCom* at the 'Technical Topics' page, and just put the magazine down to flip through later. Yet more pages of ancient valve circuitry. It doesn't matter that I later realised the diagrams were used to illustrate a description of demodulation - disillusionment had already set in. What about all the youngsters and newcomers we need to keep the hobby going, they are just going to be turned off immediately they see the diagrams. To those 'more established' readers, who read 'TT' for its new ideas, it's just going to be a "yet another nostalgia trip".

Perhaps Pat Hawker is not receiving enough input for his 'TT' column. I know that there is an awful lot of quite advanced and interesting amateur development out there - you only have to subscribe to some of the specialist Internet groups to get a feel for what is going on in the areas of DSP, digital signalling, Software Defined Radio, LF and Microwaves (and those are just in four of the groups) - so why does so little ever appear in 'TT'? Could it be because there is no obvious route by which ideas can be sent to G3VA electronically? Who wants to submit things on paper these days?

I am hearing (and seeing) *RadCom* referred to more and more now as "Radcomic"; could the contents of 'TT' be contribut-

ing to this trend?

[The content of *RadCom* as a whole needs to cover a very wide range of subjects in order to appeal to the wide range of amateur radio interests among RSGB members, from absolute beginners to members of 60 or even 70 years standing. Certainly there is a place for 'nostalgia' articles (although *RadCom* publishes far fewer of these than other radio magazines), as equally there is a place for leading-edge technology articles - as witnessed by the letter from G3ZCU above - reviews of 'black box' equipment, and non-technical articles covering the operating side of amateur radio - *Ed.*]

New Foundation licence centre

From: Davy Gregg, Rectory West Residents Association, Portadown, N Ireland

I would like to thank you and Peter Lowrie, MI5JYK, for all the help you have given me on setting up a Foundation licence centre in our area. Special thanks must go to GI0KUH on becoming our Lead Instructor. I hope that I can work along with him and his invigilator (GI8TAX) as soon as possible.

Top service

From Mark Marsden, G4AXX

My seven-year old Heil headset disintegrated during CQWW. I just received it back from repair by Waters & Stanton, fitted with new headband and swivel joint parts they imported from Heil Sound in the USA. Cost of repair - *free!* Now that's a damn good service.

Try German!

From: Bill Turton, G4MSG

After reading Martyn Phillips's, G3RFX, article entitled, 'Basic QSOs in German', I wondered if my experience would interest other readers. About four years ago after I retired from teaching, I decided to attend evening classes to (try to) learn German. Eventually I plucked up enough courage to reply to a German station in German. It was a new dimension to the hobby.

I have, to date, approximately 170 QSOs *auf Deutsch*. Several German groups now recognise my callsign and welcome me into their QSOs with, "Hallo Bill, wie gehts?". One early morning group has Lorenz, Heinrich, Hans, Udo, Sepp, Jurgens and a couple of Gunters and they are all very friendly. Another group consists of ladies with names like Marita, Silke, Traudl, Ushi, Ingrid and Erna. They all know me now. We have also exchanged e-mails and letters.

One gentleman, Stan, DF8WZ, invited me to stay at his home for a week. He lives in Edertal and he took me to stand on the Eder dam wall on the exact date of the 60th anniversary of the dam busters' raid and one can see clearly where the dam had been breached and repaired. I have now been on holiday to Germany several times and with my 2m hand-held have had many contacts through the Bonn repeater.

I still attend evening classes, although my brain is just a fraction slower these days. All this excitement and enjoyment is due to amateur radio.

From: Paul Bradfield, G1GSN

. . . I have just read the article 'Basic QSOs in German' by Martyn Phillips, G3RFX (*RadCom* January). A most interesting article and one that should encourage 'entente cordiale'. However, the guide to pronunciation is missing. To complete the QSO terms, there should be a line following each phrase with how to pronounce the German words, just as there is in travellers' phrase books. For example, the word "vielen" should sound something like "feelen". V sounds as F; W sounds as V. So Volkswagen should be pronounced something like "Folksvargen". While it may seem pedantic, remember how easily we smile at mispronounced English. The very least we can do is to try to get the pronunciation correct or we could end up by confusing the very matter that should be accurate: exchange of information.

On having two addresses

[Editor's note: the second letter published under this headline in 'The last word' January 2005 was from Robert K Taylor, G4KTI, and not John Tye, G4BYV. Apologies to both gentlemen. (However, both letters attributed to Prof Ray Hills, G3HRH, on this page are, in fact, from Prof Hills!)]

From: Prof Ray Hills, G3HRH

I can readily explain to Mr Taylor how ". . . the widespread (misuse) of the term /Portable. . ." has come about. In the old days the suffix /P was reserved for operations which used stations which were truly portable. They did not make use of public supply mains, permanent buildings, masts or towers. I believe that the suffix was first widely used in NFD. Certainly I can remember it in use in 1950. The only other suffix at that time was /A, which was for operation from another Alternative address but using a station which was definitely fixed. I did that at university in 1952. So /A was "Alternative" and /P was "Portable", useful descriptive phonetics. Then /M came on the scene followed by /MM, both of which employed equally descriptive phonetics.

The wet got in when the suffix /A was discontinued and those of us who have been around for a while find it hard to break the habit of using the phonetic "Portable" when signing /P. Mr Taylor is, of course, quite correct in saying that there is no reference to "portability" in BR68. That is exactly what I am trying to change. Otherwise I don't quite know what phonetic we could sensibly use for operation from a Temporary Address. Signing "/Papa" doesn't sound right. I suppose we could sign "/Temporary" but then adding /T after a callsign has a precedent and some might think we were licensed for television. Let's bring back the concept of Alternative Address and the suffix /A which many of us understand.

Araldite and RF

From: Prof Ray Hills, G3HRH

I was interested to read the letter from Mr Tye ('The last word', January). As a young BBC engineer in 1956 one of my jobs was to provide receiving antennas at BBC TV stations so that in the event of a link failure an alternative signal source from another station was available. The antenna was a bayed pair of three element Yagis and each Yagi was matched to its operating channel in Band I using a coaxial stub. After matching, the feed points and the stub 'tee' connections were all potted in situ using two-part Araldite resin. As far as I know, the Yagis performed as expected. Certainly we received adequate signals over remarkably long distances, although being near the top of a 500ft mast does help. Maybe modern Araldite has changed its formula?

What's in a prefix?

From: Kev Haworth, 2E0XTC / M0TNX

I read with bemusement W R Atkins's, 2E0AJT, comments about the fantastic 2E0 callsign ('The last word', January). I was working portable from a friend's station recently. He is always wondering why I do so well with HF contacts. I decided to call on 15m CW, and the ensuing pile-up nearly caused my friend, G3SZU, to fall off his chair. In all his radio life, Keith pointed out he had never had such a response to a CQ call. If the 2E0 callsign was replaced by an 'M' series, I am very sure my HF contacts would fall dramatically, and it's because the world and his XYL has yet to understand the Intermediate call comes from the UK.

I am as proud of my 2E0 call as I am of my M0. You are privileged to hold the 2E0 call, very privileged, Mr Atkins. Try it on HF sometime, you may be surprised. ♦

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£229.95 C

NEW New Tailored Audio Base-Station Speaker

Designed for radio communications and speech. This heavy duty unit is built into a black cast alloy case and has a tailored frequency response which is ideal for SSB. It matches the colour of branded HF transceivers and is supplied with 3.5mm lead.
Size 12W x 18H x 11D cm.
Weight 0.85kg.

SP-2B **£29.95 C**

New Graphic Equaliser & Mixer UB-802A

Dual Mic graphic equaliser with dual **variable 60dB pre-amps** plus 2 x mon/stereo line inputs.Configure to adjust both tx & rx audio and monitor both through phones. Professional quality features low-mid-hi, tape in/out, 1/4" jack and XLR sockets, 48V for condenser mics etc. **Plus FREE AC adaptor.**

£54.95 C

In/out adaptor sets for 8-pin mics: K-802, Y-802, I802 £19.95

STEVENAGE RADIO & ELECTRONICS SHOW
SUNDAY 20th February 2005 10am-4pm

Travel: By Rail it is just 20 minutes from Kings Cross on the GNER East Coast Mainline, Stevenage Station is 1 minute from the venue. By Car it is less than 2 miles from the A1M and surrounded by tarmac car parks, aswell as the adjacent leisure park's free parking.
Stevenage Arts & Leisure Centre, Lytton Way, Stevenage, Hertfordshire SG11 1LZ

*Admission £3, children under 5 FREE.

*New & Used Amateur Radio equipment Computers & peripherals, Electronic components, Leads & Cables, Books and CDs, Software, Batteries, Tools

*A premiere event for the Amateur Radio and Electronic hobbyist, with over 15,000 sq ft of floor space

*Waters & Stanton will be there with plenty of bargains


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