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The Radio Society of Great Britain Members' Magazine

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NEW INDOOR OR PORTABLE LOOP

MFJ-935 & MFJ-936 - Gives flat-dwellers the chance to work HF DX. It's this simple: Take approx 1/5th wavelength of thick wire (14ft for 20m) - you can parallel several lengths of thinner wire - and make a square loop (3.5ft diam.) Now connect up to MFJ-935/936 loop tuner and adjust for resonance. You get ultra low noise reception, 150W capability and tuneability up to 0.75% of lowest frequency ie 20m loop also gives 17m and 15m. Likewise 40m loop (6.5ft square) gives 40m plus 30m. Hange the loop over curtain rail or purchase the special spider support with ready-cut 20-17-15m loop (MFJ-57 £39.95) that fits on top of ATU. An experimenters delight. **Peter Waters G3OJV says**: *This is the most amazing antenna I have played with in years. I worked SSB with VK7 & several Ws in one day's operation. On 40m I worked UK and Europe with ease - all from an upstairs bedroom.*

Icom HF Transceivers

ICOM IC-756 PRO MkIII

Top of its range HF transceiver. HF & 50MHz, features large colour LCD with spectrum scope, auto ATU and 32-bit floating point DSP unit. **£2099 C**

IC-7800 £6400 C
Flagship HF 200W transceiver. 200W max. The ultimate receiver - the ultimate design! AC psu built in.

IC-7800-PACK £6995 C
The superb transceiver as above plus 17" flat screen, keyboard and SM-20 base microphone.

IC-756 PRO MkII £1499 C
Last few of this model at knock-down price. If you don't want the latest model - then save £600!!

IC-7400 £1299 C
HF/VHF 160m - 2m transceiver 5 - 100W. SSB CW FM AM. 12V DC. Nice big display. Lovely price.

IC-706 MkIIGDSP £769 C
It's unbeatable. 160m - 70cm (up to 100W HF) yet so small with detachable head. The ultimate mobile..

IC-718 £449 C
This is a budget class radio HF 16 - 10m at a price that belies its performance. Beautiful display.

IC-703 £539 C
Take an IC-706, reduce power to 10W max and get rid of VHF. 160 - 6m of pure QRP joy!!

Going HF Mobile?

Then check out the great 80m - 6m SIDE-KICK motorised mobile whip from USA. No hassel and great performance. £249.95 C

Kenwood HF Transceivers

KENWOOD TS-2000

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. **£1389 C**

TS-2000
The station in a box. 160m - 70cm with every feature imaginable inc. DX cluster. Kenwood fans dream rig.

TS-2000X £1799 C
Take the TS-2000 and add a superb 23cm module. The best 23cm we know of plus all other bands!

TS-B2000 £1299 C
Designed for the 21st century. You get HF - 70cm with PC software for direct PC control. It works great.

TS-870S £1249 C
Kenwoods great HF radio that uses phasing for SSB. No more filters to buy - they are all inside the box!

TS-570DG £839 C
The best budget radio at the price. Superb 100W from 160m to 10m. As used by Peter Waters, G3OJV

TS-50S £595 C
A great rugged mobile for 160m to 10m with up to 100W output. Also a great price.

TS-480SAT £899 C
HF 160m - 6m with remote front panel. Large enough for base use, small enough for mobile. Big display

TS-480HX £1049 C
Take the TS-480SAT, remove the auto ATU and offer a beefy 200W output. That's a really potent package!

Yaesu HF Transceivers

YAESU FT-1000 MKV

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. **£2099 C**

FT-1000 FIELD £1699 C
The HF choice for DXers. With this rigs reputation on DXpeditions what more persuasian do you need?

FTV-1000 £729 C
6m 200W module for the FT-1000 range. Probably the ultimate for 6m DXing.

FT-897D £759 C
160m - 70cm self-contained portable. 100W and up to 20W from optional internal batts.

FT-857D £579 C
160m - 70cm mobile with up to 100W output. Lovely tuning control from remote head unit - and great price!

FT-847 £999 C
Complete station in a box! 160m - 70cm - up to 100W (50W 2m/70cm). Great for satellite work.

FT-840 £399 C
Is there any other radio that comes close to this price? One of our all-time best sellers. 100W 160m - 10m

FT-817ND £489 C
The ultimate QRP self-contained radio. Up to 5W output 160m - 70cm. New low price. UK warranty.

FT-817DSP £589 C

Warning - as a regular advertiser you can be sure all our stock is genuine UK warranted. Check serial numbers!!

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

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Icom
VHF/UHF Mobile/Base

ICOM IC-E208

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*
£239 C

IC-910H £1099 C
2m / 70cm 100W Base station all - modes with option for 23cm module (**UX-910 £359**)

IC-910HX £1249 C
As above but with 23cm module ready fitted and a big saving as well.

IC-2100H £189 C
2m 55W FM mobile with rugged construction and all-in one die-cast chassis.

IC-2725E £269 C
Icom's dual band 2m / 70cm radio. Very easy to operate and install and a lovely detachable head.

Kenwood
VHF/UHF Mobile/Base

KENWOOD TMD-700E

2m/70cm dual band mobile transceiver with APRS. Does not need extra high cost boards to function. Only extra if required is a compatible GPS receiver. **£439 C**

TM-G707E £269 C
Dual Band 2m & 70cm with detachable front

TM-V7E £359 C
Dual Band 2m & 70cm with 50/35W output

TM-271E £189 C
Dual Band 2m FM 60W mobile transceiver

Yaesu
VHF/UHF Mobile/Base

YAESU FT-7800E

**2m/70cms Dual Band Mobile *High power 50W 2m /40W 70cms *Wide receive inc. civil & military air-band *CTCSS & DCS with direct keypad mic. *Detachable front panel *1000 memories plus five one-touch*
£229 C

FT-2800M £159 C
*2m FM Mobile transceiver * High power 65W * Capable of VHF wideband receiver

FT-8800E £269 C
*2m/70cmDualband FM Mobile transceiver * 50W 2m, 35W 70cm * Wideband receiver

FT-8900R £339 C
*2m, 70cm, 6m & 10m Quadband FM Mobile transceiver * Independent dial for each band

Watson
On-Glass Antenna

WSM-270 **£29.95 B**

Dual Band 2m/70cm mobile whip. 2.5dB gain and 1.5:1 VSWR.).8m long. Complete system including 3.5m cable. No drilling involved. Antenna sticks on glass and interface assembly sticks on inside. Simple and very effective.

Icom
VHF/UHF Handhelds

ICOM IC-E90

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. **£269 B**

IC-T3H £129 C
2mFM handheld 5.5W c/w BC-01 & BC-146

IC-T22A £149 C
2mFM 5W handheld transceiver

Kenwood
VHF/UHF Handhelds

KENWOOD TH-F7E

• 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. **£239 B**

TH-D7E £299 C
2m/70cm dualband FM handheld transceiver with data communications

TH-G71E £179 C
2m/70cm dualband FM handheld transceiver

TH-K2E £139 C
2m FM 5W portable transceiver c/w Ni-MH battery/charger

TH-K2ET £145 C
2m FM 5W portable transceiver c/w Ni-MH battery/charger

TH-K4E £139 C
70cm FM 5W portable transceiver c/w Ni-MH battery/charger

Yaesu
VHF/UHF Handhelds

YAESU VX-7R

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. **£249 C**

VX-2E £119 C
2m/70cm miniature handheld transceiver with LiON battery/charger

VX-110 £94 C
2mhandheld transceiver with 8-key keypad NiCd & charger

VX-150 £99 C
2m handheld transceiver with 16-key keypad NiCd & charger

Alinco
VHF/UHF Handhelds

DJ-V5E £159 C
2m/70cm FM 5W dualband handheld transceiver

DJ-193E £91 C
2m FM transceiver no keypad, Ni-Cds & charger

DJ-195E £99 C
2m FM transceiver with keypad Ni-Cds & charger

DJ-C7E £124 C
2m/70cm credit size FM handheld

Linear Amp UK
HF Linear Amplifiers

RANGER 811H

**1.8 - 29.7MHz *800W CW or SSB, 400W RTTY *Uses 4 x811A vertically mounted *Drive 10 - 100W *Toroidial AC Power Transformer *6:1 Reduction Drive on Tuning Controls *"Near Silent" Papst Cooling fan *Front-panel ALC Adjust Control *Built-in AC 230V @ 8A Supply*
£945 B

CHALLENGER III £1795 C
HF linear amplifier 10-160m WARC 100W in 1.5kW out

Ameritron
HF Linear Amplifiers

AL-1200XCE £2499.95 C
HF linear amp 10-160m 1.5kW

AL-1500XCE £2799.95 C
HF linear amp 10-160m 1.5kW

AL-800X £2699.95 C
HF linear amp 10-160m 1kW

AL-82XCE £2399.95 C
HF linear amp 10-160m 1.5kW

AL-80B £1399.95 C
HF linear amp 10-160m 1.5kW

AL-811HXCE £849.95 C
HF linear amp 10-160m 500W (3x811A)

ALS-500MXCE £849.95 C
HF linear amp 10-160m 500W solid state

ALS-600X £1299.95 C
HF linear amp 10-160m 600W (export only)

SGC
HF Linear Amplifiers

SG-500 £1399.95 C
"Power Cube" 1.6-30MHz 500W solid state

Yaesu
HF Linear Amplifiers

QUADRA (VL-1000) £3795 C
HF + 6m linear amp. 1kW comes with PSU

Tokyo Hy-Power
HF Linear Amplifiers

HL-1FKX £1399.95 C
HF linear amp. 1.8-29.7MHz 500W PEP max, solid state

HL-2FKX £2699.95 C
HF +6m linear amp 1.8-29.7MHz + 50MHz 1kW PEP max, solid state

HL-100BDX £429.95 C
HF+ 6m linear amp 3.5-29.7 & 50MH\- 1-10W in 100W PEP solid state

NEW STOCK & OFFERS

W&S European Locator Map

Full colour European Locator Map with new countries and callsign prefixes. Available in high gloss finish with a choice of three sizes. These maps will grace any shack, charts are provided to show how to calculate your locator from latitude and longitude.

A2 Size (LOCW-MAP) **£4.99 A**
A3 Size (LOCD-MAP) **£2.99 A**
A4 Size (LOCS-MAP) **£1.99 A**

YAESU FT-60E

**Wide band Reception 108-520MHz & 700-999.990MHz (Cellular blocked) *New Emergency Automatic ID System *High 5W Power Output *Ni-MH Long-Life Battery FNB-83 (7.2V,1400mAh) *Programmable Keys for user convenience *Split CTCSS/DCS and DCS Encode-Only Capability.*
£179.95 B

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.

MFJ-935 "Magic Circle" Loop Tuner

This is the most amazing antenna we have seen in years. For 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. Available around March. Great for QRP and portable as well. **£179.95 B**

Watson
Mobile Antenna's

ANTENNAS

W-2LE	1/4 wave 2m 0.48m 200W	£9.95 B
W-285	5/8th 2m 1.33m long 200W	£14.95 B
W-77LS	2m/70cm 0.42m 50W	14.95 B
W-770HB	2m/70cm 1.1m 200W	24.95 B
W-7900	2m/70cm 2m/70cm 1.58m	£32.95 B
WSM-270	Dual band mini magnetic	£19.95 B

BASES

WM-08	8cm diam magnetic	£9.95 A
WM-14B	14cm diam magnetic	£12.95 A
W-3HM	Hatch mount	£14.95 A
ECH	Cable kit	£10.95 B

NOTE: All antennas have PL-259 ends. Mag mounts have cable attached. Hatch mount needs ECH cable.

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

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MANSON SDC-2010

NEW

£9.95 A

* Cigar Plug-in DC adaptor
* 1.5 - 12V DC 1.5 Amps
* Stabalised and protected.
* 7 - way DC adaptor set.
* Matches most Yaesu / Alinco sockets.
* Works from 12 V or 24 V vehicle systems.

POCKET MORSE READER

MFJ-461

Reads CW
Just hold near receiver speaker

£84.95 B

That's right - just hold this self-contained decoder near your speaker and see the text scroll across the screen. Absolutely amazing

SG-2020ADSP QRP 20W HF Radio

160m - 10m
0.1 - 20W
Full DSP
Diecast Chassis

Perfect for QRP. SSB / CW and DSP processing. Passband down to 100Hz. Built-in SWR meter and electronic keyer. Max Tx drain 4A. Size 15 x 6.5 x 18cm. 680g.

£589.95 B

Antenna Accessories

Dipole Bits

Kevlar	Strong 400lb strain line 200ft	£22.95	A
FW-PVC	50m clear PVC 2mm nt wire	£39.95	A
Flexweave	50m multi-strand 2mm wire	£29.95	A
HDCW	50m hard drawn 16g copper	£14.95	A
Insul-8	Black ribbed insulator	£0.99	A
WDC-50	SO-239 dipole centre insulator	£6.49	A
Egg-m	Medium ceramic egg insulator	£2.15	A
Egg-s	Small ceramic egg insulator	£1.75	A
WS-2580	25pcs 3" ladder line spacers	£4.99	A

Diamond 50 Ohm Balunas

BU-50	1:1 1.7MHz 40MHz 1.2kW	£26.95	A
BU-55	1:1 3.5MHz - 75MHz 500W	£34.95	A

Antenna Traps (pairs)

TR-200	200W bands 10m - 20m	£44.95	B
TR-200-10	200W 10MHz	£47.95	B
TR-200-7	200W 7MHz	£49.95	B
TR-200-3.6	200W 3.6MHz	£53.95	B
TR-1000	1kW bands 10m - 20m	£59.95	B
TR-1000	1kW 30m	£61.95	B
TR-1000	1kW 40m	£64.95	B
TR-1000	1kW 80m	£73.95	B

German Made High Quality Baluns

HB-1-200	1:1 3.5 - 30MHz 200W	£25.95	B
HB-4-200	4:1 3.5-30MHz 200W	£25.95	B
HB-6-200	6:1 3.5 - 30MHz 200W	£25.95	B
HB-1-1	1:1 3.5 - 30MHz 1kW	£34.95	B
HB-4-1	4:1 3.5 - 30MHz 1kW	£41.95	B
HB-6-1	6:1 3.5 - 30MHz 1kW	£41.95	B

Remote 4:1 1.5kW Balun

REM-BAL	For coax to ladder line match	£45.95	B

Patch Leads

WPL-70	V low loss 75cm PL-259	£6.95	A
WPL-50	Standard 50cm PL-259	£2.99	A
WPL-50BNC	BNC version of above	£2.99	A
HQ-66	66cm RG-213 PL-259	£4.99	A
HQ-10m	10m long PL-259	£14.99	A

SGC External Auto ATU's

SGC SG-231

1 - 60MHz. 3 - 100W pep (50W CW). Min wire length, 7m. 50 Ohm feed. Needs 12V at approx 900mA.

£349.95 C

SG-239 £189.95 C
Mini auto ATU 1.8 - 30MHz 1.5 - 200W PEP primarily for long wires - non waterproof. 12V DC

SG-231 £349.95 C
1.8 - 60MHz 100W PEP. A great random wire tuner that you can use outdoors. 12V DC

SG-237 £299.95 C
1.8 - 60MHz 100W PEP. Great for mounting outdoors and feeding long wire. Waterproof. 12V DC

SG-230 £339.95 C
1.8 - 30MHz 200W PEP. The original design that handles end fed or coax unbalanced. Waterproof. 12V

Icom External Auto ATU's

AH-3 £479.95 C
1.8 - 28MHz. A hunky 120W PEP tuner that handles whips or wire longer than 2.5m. Waterproof.

SG-235 £749.95 C
3.5 - 54MHz. A hunky 120W PEP tuner that handles long wires. Great outdoor design. Waterproof.

Alinco External Auto ATU's

EDX-2 £289.95 C
1.8 - 30MHz 150W long wire tuner designed for use with DX-70 transceiver. Waterproof.

MFJ Internal Auto ATU's

MFJ-993

**Auto ATU with digital data display *1.8-30MHz *Long wire, coax & balanced line *300W SSB, 150W CW *Cross needle metering*

£249.95 C

MFJ-991 £209.95 C
1.8 - 30MHz auto ATU. Similar to MFJ-993 but no digital display. Works with any HF transceiver. 150W PEP

MFJ-994 £349.95 C
1.8 - 30MHz high power auto ATU. 600W PEP / 300W CW. Tunes wire, coax and balanced feed.

SGC Internal Auto ATU's

MAC-200 £359.95 C
1.8 - 60MHz 200W PEP. Wire, coax and balanced feeder. Features auto antenna switching.

SG-237PCB £299.95 C
1.8 - 60MHz 100W PEP. Same as SG-237 but without housing for building into your own housing.

SG-211 £189.95 C
1.8 - 60MHz works off internal dry cells. Zero drain wait state. 60W PEP. Ideal for portable (Min 1W).

Yaesu Internal Auto ATU's

FC-20 £249.95 C
1.8 - 60MHz 100W matched for FT-100/Ft-847. Desk top unit to match transceivers. Coax systems only.

FC-30 £249.95 C
1.8 - 60MHz 100W. Designed for use with FT-857/FT897. Coaxial input / output.

FC-40 £239.00 C
1.8 - 60MHz 100W. New waterproof ATU designed for use with FT-897 / FT-857 and mobile operation.

Icom Internal Auto ATU's

AT-180 £349.95 C
1.8 - 54 MHZ ATU designed for IC-708. Plugs directly into transceiver for seamless operation. Coax only.

Kenwood Internal Auto ATU's

AT-50 £319.95 C
1.8 - 30 MHZ 100W ATU specifically designed for use with TS-50 transceiver. Coaxial only.

Cushcraft HF Antennas

MA5V £239.95 C
Vertical 5-band 20m - 10m. No separate radials needed. 250W. Self-supporting. 4.48m tall.

A3-S £469.95 D
The classic 20 15 10m 3-el beam. 2kW 8dB gain. 8.45 el. Turn radius 4.72m. F/B ratio 25dB.

A3-WS £379.95 D
Dual Band 3 el beam for 17m & 12m. 2kW. El length 7.66m. Turn radius 4.4m. Gain 8dB. F/B ratio 25dB.

A4-S £569.95 D
Tri-band 4 element Yagi. for 20m - 10m. DXers delight. 2kW . 8.9dB gain F/B 25dB. Turn radius 5.49m

R-8 £469.95 C
8-band vertical 40m - 6m. No separate radials needed. 1.5kW. Height 8.7m

R-6000 £329.95 C
6-band vertical 20m - 6m. No separate radials needed. 1.5kW. Height 5.8m. Great small garden ant.

MA5V
£239.95 C

5-band 2 El mini beam. 20m - 10m 2kW. Elements 5.2m Turn radius 2.7m. (Dipole on 17/12m) 5dB gain

Diamond HF Antennas

DIAMOND CP6

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.

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

£239.95 C

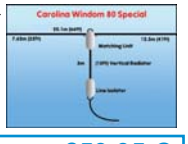
Radio Works HF Antennas

CW-160 £129.95 C
8-band 160m - 10m dipole with 22ft vertical radiating feeder. 1.5kW. Balun fed. 265ft long.

CWS-160 £119.95 C
Compact 8-band 160m - 10m dipole with 22ft vertical radiating feeder. 1.5kW. Balun fed. 133ft long.

CW-80 £89.95 C
7-band 80m - 10m dipole with 22ft vertical radiating feeder. 1.5kW. Balun fed. 133ft long.

CWS-80 £109.95 C



Compact 7-band 80m - 10m dipole with 22ft vertical radiating feeder. 1.5kW. Balun fed. 133ft long.

G5RV Plus £59.95 C

Rugged 2kW balun matched G5RV with 102ft element and 31ft ladder line. Requires ATU. Made in USA

Hustler Base Antennas

6-BTV £229.95 C
80 - 6m 6-band vertical. 7.3m tall 1kW. Can be used at ground level with earth stake. Ideal small gardens

5-BTV £199.95 C
80 - 10m 6-band vert. 7.64m tall 1kW. Can be used at ground level with earth stake. Ideal small gardens

4-BTV £169.95 C
40 - 10m 6-band vert. 6.52m tall 1kW. Can be used at ground level with earth stake. Ideal small gardens

Butternut Antennas

HF2V £229.95 C
80 / 40m high performance vertical. 1kW PEP 9.75m tall. Self supporting for ground mount use.

HF6V-X £299.95 C
6 band vertical 80-40-30-20-15-10m. 2kW. 7.9m tall. Use own radials or ground mount.

HF9V-X £349.95 C
9-band 80 40 30 20 17 15 12 10 6m vertical 1kW 7.9m tall. Use radials or ground mount

Buddipole Products

HF Portable at its Best

W3-BP £199.95 B
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W3-BS £134.95 B
40m - 2m vertical is half a Buddipole. Ideal for QRP and rucksack - as used by Peter Waters G3OJV.

Peter Waters says: *I think these products are great. Superbly engineered and very efficient.* Options include adaptor for dipole to decorators pole £6.95, Field tripod £89.95, 2.45m telescopic mast £49.95, mini tripod for Buddistick.

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RadCom
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P&P on RSGB orders: £1.75 for 1 item, £3.30 for 2 or more items. Overseas rates on request.

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RSGB

RSGB discusses 70cm with MoD

The first of a series of meetings between the Society and the Ministry of Defence to discuss 70cm took place at the Riverside House offices of Ofcom on Friday 25 February. Society delegates included the President, Jeff Smith, MI0AEX; General Manager Peter Kirby, G0TWW; Spectrum Forum Chairman Colin Thomas, G3PSM; DCC Chairman Iain Philipps, G0RDI, and interim RMC Chairman Andrew Barratt, G8DOR. Members of Ofcom staff were also in attendance.

Most members will know that as the primary user the Ministry of Defence imposed a freeze on licensing of 70cm amateur service unattended data nodes and repeaters in February 2002 and this meeting was the first to work towards the lifting of these restrictions. MoD put it on record that they wished to work with the RSGB as the representatives of the UK amateur service on a partnership basis, and there was no wish to deprive the amateurs of the facilities previously available to them.

In facilitating the move forward MoD informed the meeting that RAF Fylingdales will carry out tests from April to October of this year using frequencies between 420 and 450MHz. The object of these tests is to establish if any mutual harmful interference is likely and if so the steps that should be taken to alleviate any problems.

Further meetings will be held over the coming months and progress reports will be made available via the usual outlets. Procedures for the reporting of any harmful interference will be established over the next few weeks.

The RSGB is also talking to the MoD through Ofcom with regard to interference being experienced on the 2m band primarily in Northern Ireland. These discussions are ongoing.

Riverside House, the Ofcom offices in London where discussions between the RSGB and MoD took place.

MORE AMATEURS - ADVANCE!

The largest number of candidates since the introduction of the three tier licensing structure are booked to take the March Advanced Radio Communications Examination. Over 100 candidates are scheduled to take the examination on 16 March.

It is pleasing to note that the Foundation level examination is still attracting around 220 candidates a month and that the numbers of amateurs progressing through the Intermediate to Advanced grow in number month on month.

INTERNATIONAL EXAMINATION LAUNCHED

March saw the launch of the RSGB International Amateur Radio Examination (IARE). PTT administrations, particularly in smaller countries, have used external examining bodies in qualifying their prospective radio amateurs. However, the withdrawal of some of these bodies from the field of amateur radio has now meant that a number of countries did not have a structure which can be used for licensing purposes.

The RSGB has developed an examination system which can be adopted by any administration, and which is based on the Harmonised Amateur Radio Examination Curriculum (HAREC). HAREC is the CEPT-approved and internationally accepted level of training and examination.

Many countries were using the City & Guilds RAE as a qualification route for their radio amateurs. Since the demise of the RAE in 2003, those countries have had to choose between creating their own syllabus and examination system or finding an organisation which can provide the equivalent. For some smaller countries, this is a burden which has led, in some cases, to a steep decline in new licensees. In a number of countries, because of the lack of interest of the administration in amateur radio, there has been a complete cessation in the issuing of

CHAIR OF THE REPEATER MANAGEMENT COMMITTEE

Due to the retirement of the current Chairman, the Board is seeking to appoint a new chair person to the Repeater Management Committee (RMC). The role of the RMC is to administer the UK's Repeater Network. This includes ensuring network compatibility and the technical vetting of repeater proposals.

Ideally candidates for the position will have a technical background, have some experience of repeater management, commissioning and operation, and be experienced in working both with fellow amateurs and outside agencies such as Ofcom.

In the first instance anyone interested in taking up this important position should forward to the General Manager a CV of their amateur radio experience / activities for consideration by the Board. The closing date is 25 April 2005.

matters

new amateur radio licences.

The RSGB IARE has been welcomed by the international community and a number of countries has already signed up to the scheme. Initially the examination will be held twice a year. The inaugural examination saw 30 candidates from Kenya and Trinidad & Tobago sit the test; they now eagerly await their results which will be with them in 28 days.

It is planned that the IARE will also be available at short notice to international candidates passing through the UK. The RSGB is seeking to have the examination officially recognised by the International Amateur Radio Union, and it is hoped that once this recognition is received the IARU will recommend that countries that do not have their own examination system use the RSGB IARE as the international standard.

Information on the RSGB IARE can be obtained from HQ.

G5RP TROPHY PRESENTED

Congratulations to Stuart Heathcock, M1SMH, who has been presented with the G5RP Trophy. The trophy is awarded jointly by the Vale of the White Horse Amateur Radio Society and the Radio Society of Great Britain for the amateur who, in the opinion of the awarding committee, has shown the greatest improvement in HF DXing during the previous year. Stuart, who is a member of the Radio Society of Harrow, first obtained a Foundation licence, M3BZI, in 2002. He quickly discovered HF DXing and worked 63 DXCC entities within his first six months on the air. His enthusiasm led him to take the RAE and he obtained his Full licence in July 2003. Since then Stuart has improved his station and antennas, with home-made verticals for 40 and 80m, and he achieved his next goal of 100 DXCC entities after a few months. His future goals are to work 200 entities, including 100 on RTTY and each of 10, 20 and 40m.

Stuart Heathcock, M1SMH (right), is presented with the G5RP Trophy by *RadCom* editor Steve Telenius-Lowe, G4JVG.

The G5RP Trophy was presented to Stuart at RSGB Headquarters on 21 February.

Twelve of the 14 DRMs at HQ.

RMs AND DRMs VISIT HQ

A total of 14 RSGB Regional Managers and Deputy Regional Managers from all over the country visited RSGB headquarters in Potters Bar, Herts, on 16 February. The group viewed the new RSGB video, *RSGB Today*, which many of them will be showing at radio clubs around the country, and received training sessions on membership services, licensing administration and commercial matters from RSGB HQ staff. The RSGB Regional Managers and their Deputies represent the RSGB at local radio clubs and at radio rallies around the country.

RSGB QSL BUREAU NEWS

The RSGB QSL Bureau has appointed two new Sub-Managers. Andy Burchell, M1BPN, has given up the callsign series G4BAA to G4BZZ and Benny Tonkin, G7DUC, 9 Penhallick Road, Carn Brea, Redruth, Cornwall TR15 3YJ has now taken over. In Scotland, the GM1, 6, 7 and 8, GM4 three-letter calls, MM1 and MM5 series have all been taken over by Michael Whitehead, GM0PHW, 185 Allanton Road, Allanton, Shotts, Strathclyde ML7 5AX. He can also be contacted by e-mail: gm0phw@hamcall.co.uk

Both Andy, M1BPN, and George, GM0SYU, are thanked for their services as QSL Bureau Sub-Managers in the past.

A new regular column about QSLing and the Society's QSL Bureau, written by Marc Litchman, G0TOC, and John Short, G1DJI, starts on page 63 of this edition of *RadCom*.

DEPUTY REGIONAL MANAGER VACANCY

There is a vacancy for an RSGB Deputy Regional Manager in **Wiltshire**. If you live in Wiltshire and would like to volunteer, please contact the RSGB Regional Manager for Region 10, Ivan Rosevear, G3GKC, on 01225 863622 or e-mail: ivangkc@ btinternet.com

WANTED: DRAUGHTSMAN OR TECHNICAL ILLUSTRATOR

To produce a small number of illustrations comprising mainly component layouts and a few circuit diagrams for a forthcoming RSGB book. Drawings would need to be supplied in a high quality electronic format and delivered to a tight schedule. If you would like to apply, please contact mark.allgar@rsgb.org.uk (by e-mail only) supplying some examples of work you have already produced and to discuss terms.

RADIO COMMUNICATIONS FOUNDATION GRANTS

If you think you have a project which could be supported by a grant from the Radio Communications Foundation (RCF), please make an application as soon as possible. The details of the objectives of the Foundation and how to apply are on the RCF website at www.comms-foundation.org The next trustees meeting will be in May and later in the year in November.

CONTENTS ON PAGE 5

Over the years, several members have contacted the editor to ask why the *RadCom* 'Contents' page was not the first page inside the magazine. The reason is that contracts with regular advertisers had precluded this. However, new contracts have recently been negotiated and we have now been able to move the 'Contents' from page 9 forward to page 5 in the magazine. We hope that members will find this more convenient.

St DAVID'S DAY 1 MARCH

Mi fuasa y Gymdeithas Radio (RSGB) ymddiheuro i Mike Evans, MW0CNA, am y camgymeriad hefo'r dyddiad o Special Event Station Dydd Dewi Sant, GB0SDD. Roedd'na wall gosod teipio yn ty argraffu. Mae'n ddrug iawn gan-dom RSGB os ydym wedi digio unrhywun.

RSGB OUT & ABOUT IN THE MIDLANDS

The RSGB West Midlands Regional Team will be manning an RSGB bookstall and answering questions at:

Aldridge on Sunday 24 April at Anchor Meadow, Middlemore Lane, Aldridge;

National Vintage Communications Fair, Sunday 1 May at Hall 11, National Exhibition Centre, Birmingham;

Drayton Manor on Sunday 15 May at Drayton Manor Park, Tamworth, Staffs; and

Telford on Sunday 5 September at West Midlands Agricultural Show Showground, Shrewsbury (change of venue).

The West Midlands Regional Team will be on hand to answer queries, and a member of the RSGB EMC Committee will be on hand at the Drayton Manor and Telford rallies to give advice on any EMC problems. ♦

RADIO COMMUNICATIONS FOUNDATION

'FUNny business' at the Eagle Radio Group - re-visited

It is great to see evidence of the GB4FUN project working. Last year, GB4FUN visited Mablethorpe in Lincolnshire and, as a direct result of that visit, one 13-year old is already on the air with his M3 callsign.

Zac Ardern, M3INQ (left), with his amateur radio 'Elmer', Mark Dumpleton, M3NCG.

Let the FUN begin! As a result of the GB4FUN 'Fun Bus' visit to Mablethorpe's Tennyson School show last July as guest of the Eagle Radio Group [see *RadCom* September 2004, page 15 – *Ed*], 13-year old Zac Ardern is now M3INQ. Young Zac was so infected by the Fun Bus visit that members of the Eagle Radio Group feared he would stow away in it when GB4FUN Project Coordinator Carlos Eavis, G0AKI, left!

Foundation trainer Alan Matthews, M0AQC, took Zac on as a student and Zac has passed the Foundation test with flying colours. Now under the wing of young group member Mark Dumpleton, M3NCG, Zac is getting used to operating on the HF bands. Veteran Mark has already worked 125 countries and has had over 80 confirmed in less than 12 months on the air.

Eagle Radio Group Chairman Nevil Brinnen, G3VDV, said: "Who says the 'Fun Bus' and the Foundation licence are not working? I'm getting young enthusiastic members with energy joining the group and taking part in our events. Could you imagine a better and more rewarding way of keeping our hobby alive?"

Thanks to Nevil for this news story and the photos.

GB4FUN IN APRIL

At the time of going to press, GB4FUN has been booked for visits to three educational establishments in April:

18 April: Blake Valley Technical College, Cannock, Staffordshire;

19 April: Fulsen Primary School, Burntwood, Staffordshire; and

21 April: Pembroke Primary School, Chepstow, Monmouthshire.

If you would like GB4FUN to visit your local school, please see the GB4FUN website at www.gb4fun.org.uk for information on how to book. ♦

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.

M F Lomax, 2E0AWX
J E Bence, 2M0JSB
B J Schultz, AB9CV
W B Mannion, EI5CL
P Walker, G0CPJ
J P Bennett, G0NLF
A Bowmaker, G0REV
N B Irwin, G0SSO
T J Barclay, G0TBD
E J Baxter, G0TII
K M Rogawski, G0UNU
Dengie Hundred ARS, G0UTT
R J Konowicz, G0YYY
W L Roberts, G1TES
J E Shute, G3GTA
M R Coward, G3PRH
H Froggatt, G3SOX
R Farrance, G3TRH
J G Assenheim, G4BOK
C A Webb, G4FWM
M A Wood, G4HLZ
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R Brown, G4QA
B P Lewis, G4SJH
R F Carter, G4VSO
I Poyser, G6NWN
C L Baker, G6ZDQ
I Bodie, G8END
L M Overton, G8MRZ
D A McCoye, G8UZU
R D Moore, GI8FLQ
H R McGregor, GM4ZQZ
A G Robson, GM8YIK
N Mackinnon, GW3PPQ
R A Abbott, M0AGH
R Gould, M0CFR
P Dickman, M0DFQ
Brimham Contest Group, M0IPX
Trewellard RA Group, M0TRG
T Cooke, M1CDE
H Morgan-Jones, M1NTO
M C Turner, M3BIZ
E B Stanmore, MW3EBS
R T Bougourd, RS194382
J W Coultham, VK6WC
C P Maulick, WB2YZX

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.

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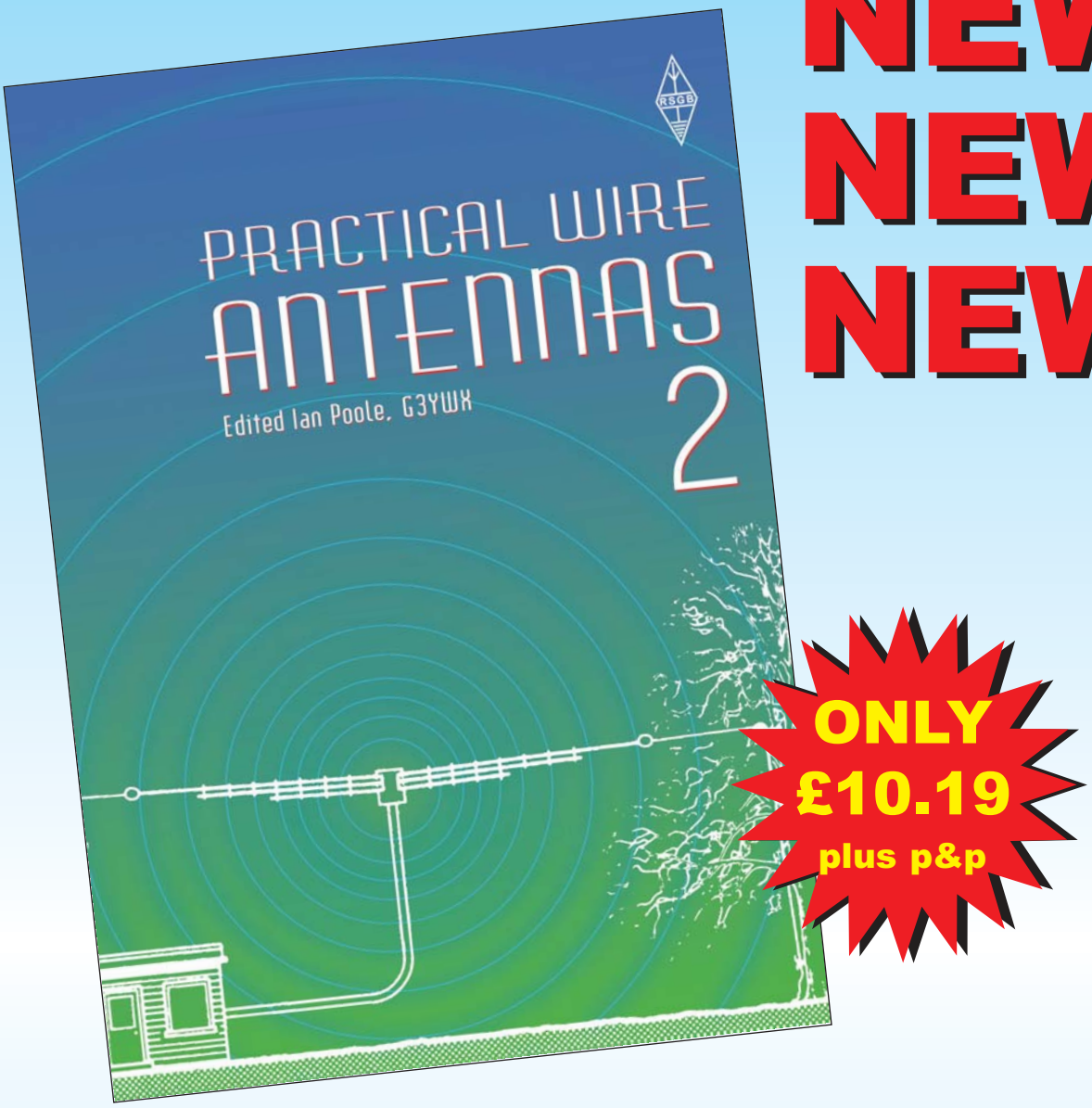

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Practical Wire Antennas 2

Edited by Ian Poole G3YWX

"Probably the best book on wire antennas ever"

Based on the hugely popular Practical Wire Antennas by John Heys, G3BDQ this book is a hugely extended and fully revised for the 21st Century. Nearly doubling in size with even more designs this book this practical book holds many complete and easy to understand recipes for a wide range of wire antennas.

Practical Wire Antennas 2 contains just about every type of wire antenna imaginable including plenty of original designs that you simply won't find in other publications. You're sure to find one that is ideal for your own particular set of circumstances. Some will fit small urban gardens and others are best deployed by those lucky enough to have plenty of available space. Theory is kept to a minimum throughout the book, and only a few formulas are given where they are necessary to allow the reader to calculate the lengths of various antennas. Practical Wire Antennas 2 has chapters covering feed lines, dipoles, antennas with tuned feeders, loop antennas, end-fed wires, verticals and practical aspects of antenna work. The book also provides a wealth of information and 'know how' on the mechanics of antenna building and includes there are designs for ATUs for almost every type of antenna.

Practical Wire Antennas 2 provides a collection of antenna designs and ideas that will help people to capture the enjoyment of experimenting in the true spirit of amateur radio. This book will help improve any station and is a must have book for anyone interested in antenna construction.

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E&OE

Call through 2m repeater triggers helicopter rescue

Amateur radio saves a life

Jesse Jones, KL1RK, was hiking in rugged mountain terrain near Anchorage, Alaska, on 12 February when he slipped and fell more than 200ft down a steep ravine, losing his snow shoes and becoming trapped. Snow drifts were 10ft deep and the air temperature -10º F.

Fortunately, Jesse was carrying his 2m handheld and was able to reach the WL7CVG mountaintop repeater almost 40 miles away. Jim Wiley, KL7CC, a control operator for the repeater, heard Jesse's weak "Mayday!" call and immediately contacted the emergency services. Jim was able to pass on Jesse's messages to the rescue coordinator, including coordinates from a GPS unit he was carrying. The local mountain rescue group were called out with snow machines. Jesse was able to keep in touch via 2m and told the rescuers that he was uninjured but very cold, being forced to remain in one position in the sub-zero conditions. After two hours the first rescue team made contact with him but came to the conclusion that they would not be able to get him out without additional assistance. The local Air National Guard was called, who sent a rescue helicopter and para-rescue jumpers. Jesse was finally rescued six hours after the accident, and taken to a local hospital for observation. He was released just before midnight, cold and hungry, but otherwise uninjured. Without amateur radio, though, he could well have died from hypothermia. The full story can be read on the ARRL website at www.arrl.org/news/features/2005/02/24/1/?nc=1

Jesse Jones, KL1RK.

New radio regulations

DF5UG reports that new **German** amateur radio regulations came into force on 19 February. There have been several changes, the most relevant being that there are now only two classes of amateur radio licence in Germany. These are Class A (the former class B and C, or CEPT Class 1 or 2 licences) and Class E (the former class 3 and class D licence). Overseas amateurs holding a HAREC certificate will be issued with a German A licence. The class E licence is limited to VHF and UHF only, but now includes the 10GHz band. The output is limited to 10 watts EIRP. There have also been some changes to the spectrum allocation at 1.8MHz. The new regulations can be found on the DARC website at www.darc.de/aktuell/afuv.pdf

Since 5 February, ZR licence holders in **South Africa** have access to the HF bands. Before that date, the ZR licence was VHF and above only (thanks to Dennis, ZS4BS, South African Radio League HF Manager).

Two changes in the **Spanish** regulations came into force on 3 March: the Morse code requirement has been removed for Class A (General) and Class C (Novice) licences; and Class A (General) and Class B (Restricted) may now use 50.0-51.0MHz with special authorisation.

Left: Chris Taylor hands over the equipment to Harry Craggs of the children's ski team, in time for the first race of the season in Czechoslovakia.

Radios for the fast set

Icom (UK) Ltd and Martin Lynch & Sons have recently supported the British children's ski team (www.GBJuniorSki.com) by supplying members with radio communications equipment. Chris Taylor, Sales Director of Martin Lynch, said "Their equipment gets a tough old battering in all weathers but the IC-F12's we are supplying are extremely robust – and easy to use, even with gloves on!" The team has eight races in Europe during the season, including the unofficial World Championships, the Topolino Races in Italy.

Group for Earth Observation

The Group for Earth Observation (GEO, www.geo-web.org.uk) is holding its second annual meeting at the National Space Centre (NSC, www.spacecentre.co.uk) in Leicester on 30 April. The programme will include speakers, live demonstrations and workshops relating to weather satellite reception. If there is a successful launch of the American satellite NOAA 18 (scheduled for March / April), GEO will try to be one of the first stations to receive weather images from this new satellite.

GEO has grown from nothing to a membership of 580 in one year. About 60% of GEO's membership are radio amateurs so a special event station will again be in operation over the weekend. The cost for the day is £12.00, which includes entry to the NSC's exhibition area. Registration is possible on the day but the organisers prefer you to register in advance so they know how many delegates to expect. Contact Francis Bell, e-mail: francis@geo-web.org.uk or post to 'GEO', Coturnix House, Rake Lane, Milford, Godalming GU8 5AB.

GB90STD on the air

GB90STD is the 'special special' event callsign issued to the St Dunstan's Amateur Radio Society to mark the 90th anniversary of the founding of the organisation for blinded ex-servicemen and women on 26 March 1915. The callsign will be in use 24 - 31 March, 9 - 16 July and 7 - 14 October and at other times until the end of the year from the St Dunstan's ARS clubroom at St Dunstan's, Ovingdean, near Brighton, on HF and 2m. QSL via the bureau or direct via G3ITF (SASE please).

IOTA dinner at US DX convention

The 10th annual Islands On The Air dinner will be held on Friday 15 April at the Birch Room of the Holiday Inn Hotel and Conference Center, in Visalia, California, in conjunction with the 56th Annual International DX Convention. There is also an evening of IOTA presentations, entrance to which is free of charge. The dinner costs $21 per person. Please contact Jim Zimmerman, N6KZ, e-mail: Jimzim1@mindspring.com for further information.

UK packet radio conference

The 4th UK Packet Radio Conference (http://pzt.org.uk/pk2005) will take place on Saturday 7 May, at the Poacher's Pocket, Warndon, Worcester. It will be free of charge, and open to anyone with an interest in packet radio. There will be demonstrations and presentations, plus ample time for informal discussions and socialising. As the boundaries between packet radio, the Internet, and packetised speech are becoming blurred, VoIP topics will be included on the agenda if there is sufficient interest. For further details please see the website or contact Paula Dowie, G8PZT, e-mail: g8pzt@blueyonder.co.uk

Looking forward to this July's AMSAT-UK Space Colloquium

AMSAT-UK (www.uk.amsat.org) will be holding its 2005 Space Colloquium at the University of Surrey in Guildford from 29 to 31 July. An antenna test range will be available to check the gain of antennas. Microwave experts will also be on hand with test equipment covering up to 24GHz. There will be guided tours of the Surrey Space Centre with the satellite mission control centre and the satellite assembly facility.

The RSGB GB4FUN van, which has a fully equipped satellite station, will be available during the event for visitors to work the satellites. There is an extensive lecture programme ranging from highly professional technical presentations to basic down-to-earth 'how to do it' type talks. Last year Prof Colin Pillinger, who led the Beagle 2 Mars Probe project, was the keynote speaker.

Day passes and two or three day packages covering meals and accommodation at the University are available. For details contact AMSAT-UK Jim Heck, G3WGM, tel: 01258 453959; e-mail: g3wgm@amsat.org

Trevor, M5AKA, with Prof Colin Pillinger at last year's AMSAT-UK Colloquium.

Hospice appeal

Dennis Spratt, M3DJS, raised over £1100 for the Mount Edgcumbe Hospice in St Austell, Cornwall, last year by operating special event station GB2WCM. Since 1989, Dennis has single-handedly raised almost £10,000 for the hospice and local air ambulance by receiving sponsorship for contacts made by CB and amateur special event stations. Well done Dennis!

NEWS BRIEFS

- Icom's new flagship transceiver, the IC-7800, has recently been awarded the highly prestigious 'Good Design Award' by the Japanese Industrial Design Promotion Organisation. The new transceiver, reviewed in the August 2004 RadCom, boasts a 110dB dynamic range and +40dB 3rd order intercept point in the HF bands.
- Mills weekend takes place on the weekend of 7 and 8 May. Now is the time for clubs, organisations, or individuals wishing to take part to arrange a special event station from a windmill or watermill. All details be found on the Denby Dale Amateur Radio Society's website www.g4cdd.net along with a registration form.
- IARU Region 3 Directors have named Peter Lake, ZL2AZ, to fill the vacancy on the board that resulted from the death in January of Chairman Peter Naish, VK2BPN. On 4 February the Region 3 Directors agreed unanimously to appoint Young-Soon Park, HL1IFM, as chairman of the Region 3 Directors.
- 'Heroes Return' is a Veterans' Agency initiative supported by the Lottery Fund. Ken Rosier, G3DJK, asks those who are ex-AC4, VS1, VS7, VU2, XZ2 etc to contact him for a possible joint journey. For details write to Ken at 31 Croindene Road, Norbury, London SW16 5RE.
- The Telford Rally will now be held at the West Mids Agricultural Show Showground in Shrewsbury, site of the famous West Mids Agricultural Show (the Wellington venue has been dropped). The date remains unchanged at 4 September.
- World Amateur Radio Day is held on 18 April each year to mark the anniversary of the founding of the International Amateur Radio Union in Paris on 18 April 1925. This year therefore marks the 80th anniversary of the IARU.

New Haydon on-line catalogue

Haydon Communications has recently launched an on-line catalogue with 128-bit SSL order facility. It is already active and Haydon is adding content daily. It is expected to be completed by mid-March.

Ohm's law watch and clock

The TechNote Time Watch Company (www.technotetime.com) has added an Ohm's law watch and clock to its product line. Anne Dorsey, the company's vice-president has targeted radio amateurs, saying "hams are a very diverse, highly-educated, technically-savvy group... Our Ohm's law clocks are an especially appealing product for radio hams because they can easily refer to its formulas while at their workbench engaged in their projects." For further details see the website or contact Anne Dorsey, info@technotetime.com

Raynet news

North Anglia Raynet was called out at 2.30pm on 13 February by the Emergency Planning Unit at King's Lynn to support a Precautionary Evacuation Notice in the North West Norfolk coastal area, following predictions of very high surge tides. Within an hour, six members were up and running and links had been established between control rooms and mobiles in the risk areas. Other members were placed on standby and other groups offered assistance should it be required. As the situation developed, a rest centre was established at Hunstanton and Raynet put in place links to communicate from handhelds, using talk-through units, to King's Lynn 15 miles away. The high tide passed without serious incident and all members were stood down at 10.30pm. Kevin Kent, Group Controller North Anglia, wishes to thank all who assisted or offered assistance. It is interesting to note that this alert was only a week away from the time of year of the disastrous 1953 East Coast Floods which led directly to the formation of Raynet.

The 2005 British Special Olympic Games will be held at several locations in and around Glasgow from 2 to 9 July. 2500 athletes will participate, accompanied by over 1000 family members and friends, plus around 1500 volunteers. Greater Glasgow Raynet is coordinating the Raynet response and seeks assistance from Raynet members able to volunteer for this project. Duties are expected to include working with the medical and transport groups and possibly with other ancillary communications at each venue. Those interested in helping, or finding out more about Glasgow's Special Olympic Games should e-mail Olympics@raynet-uk.net, giving their name, callsign, Raynet group, and dates of availability. Further details are at www.rsgb.org/emergency/newsboard.htm

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
23, 10-pin bowling. Bob, GM4UYZ, 01875 811723.
LOTHIANS RS
11, The RSGB, Jeff Smith, MI0AEX, RSGB President.
28, 5MHz upwards & outwards, Rob, MM1RAH. Toby, MM0TSS, 07739 742 367, tobysigouin@onetel.net.uk
PAISLEY (YMCA) ARC
13, 'Invisible Aerials'.
27, 'How much power do you need?' Jim, GM3UWX, no contact details provided.
WIGTOWNSHIRE ARC
21, Banaba DXpedition, Tom, GM4FDM. Ellis, GM0HPK, 01776 820413.

2 Scotland North & Northern Isles

No club details received

3 North West

CHESTER & DARS
5, Surplus equipment sale.
18, Inter-club quiz at Wrexham club.
26, A day in the life of a Halifax bomber crew. Derrick, M1SUM, 0151 356 1572.
SOUTH MANCHESTER R & CC
1 'Technical Tall Stories'.
8, Vintage military vehicles, Lance Collier.
15, Raynet, Dave, G6IFA, and John, G7JKK.
22, Aerial photography, Nigel, G0RXA.
2, *Skype*, Dave, G0BJK. Ron, 0161 969 3999.
STOCKPORT RS
5, 80 Years of Electronic Warfare from a German perspective, Paul, G7EAH.
19, Construction of 2m aerial, Sean, M3FVH. David, M1ANT, 0161 456 7832.
WARRINGTON ARC
5, RF earthing, Jim, G3NFB.
12, Surplus equipment sale.
26, Building projects from kits, Mike, G4VSS, and Ron, G0WJX. John, G0RPG, 01925 762722.
WIRRAL & DARC
6, D&W at *The Fox and Hounds*, Barnston.
13, QRP, Rev George Dobbs, G3RJV.
20, D&W at *The Pilot Boat*, Egremont.
27, Merseyside police, speed detection devices. Tom, G4BKF, 07050 291 850.

4 North East

GOOLE R & ES
13, Contest equipment check at LWC Selby.
20, Social Evening at *Black Swan*, Asselby. Richard, G0GLZ, 01405 769894.
GREAT LUMLEY AR & ES
6, 13, On air.
20, Health & safety in the home & shack, Warren, G7MWB.
27, On air. Nancy, 0191 477 0036, 07990 760 920, nancybone2001@yahoo.co.uk
GRIMSBY ARS
7, Table top sale.
21, 80m data contest. Brian, G4DXB, 01472 231383.
HALIFAX & DARS
19, Members' short talks. Tom, M0TKA, 01484 715079.
KEIGHLEY ARS
14, On air.
28, Surplus equipment sale. Kath, G0OSA, 01535 656155.
SHEFFIELD ARC
4, Lighthouses and BARLS, Steve, G0SGB.
11, Practical evening: linear amplifiers.
25, Test equipment: how to use it, Peter, G3PHO. Nick, G4FAL, 0114 255 2893.

5 West Midlands

CHELTENHAM ARA
1, Constructional exhibition.
4, Construction contest. Ron, G3SZS, 01452 713761.
GLOUCESTER AR & ES
11, 18, On air HF and workshop evening.
25, DF hunt. Tony, 01452 618 930 daytime.
HILLCREST ARS
7, Himley Lifeboat Marathon equipment test.
21, The RNLI, John Pittwood. Stuart, M0SJV, 01384 232457, m0sjvstuart@supanet.com
KIDDERMINSTER & DARS
5, Digital Signal Processing, Mike, G1NQW. Tony, G1OZB, 01299 400172.
MAXPAK
6, AGM at *Sir Robert Peel* public house, Bloxwich. Miles, G4GSB QTHR, 01952 585447.
MID-WARWICKSHIRE ARS
12, Digital Signal Processing, Norman G6BRB.
26, Oscilloscopes, Don, G4CYG. Bernard, M1AUK, 01926 420913.
ST LEONARD'S ARS
21, Highlights of club events.
28, Club website, John, G0FSM. Derek, G0EYX, 01785 604904.
STRATFORD UPON AVON DRS
11, Summits On The Air, Chris, M0BQE.
25, AGM & surplus sale. Terry, G3MXH, 01789 294387.
TELFORD & DARS
13, The computer in the shack, G4UJS and G3VAO. Mike, G3JKX, 01952 299 677, mjstreetg3jkx@aol.com

6 North Wales

WREXHAM & DARS
5,Home brew competition final, John, GW3RBM.
19, Inter-club quiz. Mark, MW1MDH, markmdh@btopenworld.com

7 South Wales

ABERYSTWYTH & DARC
14, North Dyfed Raynet AGM. Ray, mwmg01@aber.ac.uk

8 Northern Ireland

No club details received.

9 London & Thames Valley

COULSDON ATS
11, Construction evening. Steve, G7SYO, 01737 354271.
CRAY VALLEY RS
7, Project evening, G0FDZ, TBC.
21, AGM. Richard, G7GLW, 07831 715797, rcains@btinternet.com
CRYSTAL PALACE R & EC
1, Demonstration and discussion evening. Bob, G3OOU, 01737 552170 or Victor, G1PKS, 020 8653 2946.
EDGWARE & DRS
14, Radio nostalgia, John, G3SJE, & Steve, G0PQB.
28, *Echolink*. Rod, G0SQL, 020 8204 1868, g0sql@harrow-middx.demon.co.uk
GUILDFORD & DARS
1, Pub night at the *Squirrel*, Hurtmore, Godalming.
8, Operating in the Falklands / LOTA 2004, Roger, G0SWC.
22, AGM. Malcolm, G0MIC, 01483 766807, G0MIC@aol.com
HODDESDON RC
12, MS Office Part 1 - *Powerpoint*, John, G4VMR.
26, Valves revisited, Don, G3JNJ. Don, G3JNJ, 020 8292 3678.
MAIDENHEAD & DARC
7, Video: aerial circus of Dud Charman, G6CJ.
19, 'Travels with Auntie' (BBC radio OB), Tony Holland. John, G8RYW, 01628 628463.
NEWBURY & DARS
27, History of N&DARS, Gus, G3LLK. Kevin, G6FOP, 01635 826397, g5xv@ntlworld.com
READING & DARC
14, Latest Yaesu demo, Paul Bigwood, G3WYW. Pete, G8FRC, 01189 695 697.
SHEFFORD & DARS
7, Planning a mast installation, David, G8UOD.
14, 'About My Past', Peter, M0CKA.
21, 'The 70s', Bryan, M0BIK. David, G8UOD, 01234 742757.
SILVERTHORN RC
1, Club meal, *Queen Elizabeth* public house, Chingford.
8, 29, On air. Les, G0CIB, 07980 275081.
SURREY RCC
4, AGM. Ray, G4FFY, 020 8644 7589.
SUTTON & CHEAM RS
21, Amberley Working Museum, Bryn Thomas. John, G0BWV, 020 8644 9945, info@scrs.org.uk
WIMBLEDON & DARS
8, PSK, from idea to operating, Martin, M1MRB.
29, PicATUne construction, club on air. Jim, M0CON, 020 8874 7456.

10 South & South East

BASINGSTOKE ARC
17, 'Foxhunt', G4ODM & G6JDP.
24, 2m and 80m DF event. Frank, M0AEU, barc@2lo.info
CRAWLEY ARC
27 'The 5MHz Experiment and NVIS', John Gould, G3WKL. John, G3VLH, 01342 714402.
FAREHAM & DARS
6, On air.
12, 20, Annual club project.
27, VHF propagation and DX modes, Bob, G8VOI. enquiries@fareham-darc.co.uk
FARNBOROUGH & DRS
13, The Microchip PLC, Alan, M5AMN.
27, Surplus equipment sale. Alan, M5AMN, 01252 682447.
HASTINGS E & RC
20, Auction. Gordon, 01424 431909, gordon@gsweet.fsnet.co.uk, www.g4cus.freeserve.co.uk
HORNDEAN & DARC
26, History of Meccano company and Dinky toys. Stuart, G0FYX, 023 9247 2846.
MID-SUSSEX ARS
1, Good waves, bad waves, G0OIO.
8, Construction evening, radio evening.
15, Radio night and table top sale.
22, DAB, Eugene Sully.
29, Taurus birthday bash Russell and Sue 21 again. John, G6XTW, 01273 588556.
SOUTHDOWN ARS
4, Is electricity being supplied from 'green sources' a good idea? Jim, G4DRV. John, G3DQY, 01424 424319, vaughdqy@aol.com
WORTHING & DARC
6, Annual dinner.
13, Hints and tips on running your station.
20, 'How to work DX', G3VXJ. 27, The story of Baird television, G0GNA. Roy, G4GPX, 01903 753893.

11 South West & Channel Islands

BOURNEMOUTH RS
1, Tsunami, Graham, G3NIL.
15, Annual dinner. David, G4BKE, 01202 697338, www.brswebsite.freeserve.co.uk
CORNISH RAC
7, AGM and vintage radios, Russell Hodges. 11, Computer section, 'Computers and music, part 2.
23, IMD. John, G4LJY, 01872 863849.

FLIGHT REFUELLING ARS
10, Informal evening.
17, Rig demonstrations and reviews. Tony, G3PFM, 01202 622262.
HOLSWORTHY ARC
6, Repeater night, Don, G0RQL. David, 01288 353561.
NORTH BRISTOL ARC
8, Antenna maintenance.
15, Chippenham ARC DXpedition to Lundy Island, Ian Carter, G0GRI.
29, Masts, construction & planning permission, Dick, G0XAY. Dick, G0XAY, 01454 218362, Jon, 0117 941 4602.
PLYMOUTH RC
2, Rooster breakfast.
12, Direction-finding, Trevor Day, RN, G3ZYY. Frank, G7LUL, frank@foxonezero.fsnet.co.uk
POOLE RADIO SOCIETY
8, AGM. Phil, G0KKL, 01202 700903.
SOUTH BRISTOL ARC
6, Computer & software clinic, David, G7PKJ.
13, Wine and cheese evening, Muriel, G4YZR.
20, Horticultural evening, Mrs Susan Grace.
27, On air. Len, G4RZY, 01275 834282.
SOUTH DORSET RS
10, Propagation, Rob Micklewight, G3MYM.
12, AGM, presentation of *PW* award.
23, Marconi weekend Field Barn. Carol, 2E1RBH, 01305 820400, carolonfraggle@tiscali.co.uk
TAUNTON & DARC
1, Skittle evening, *Queen's Arms*, Pitminster.
13, Club championship. William, G3WNI, 01823 666234, g3wni@btinternet.com
THORNBURY & SOUTH GLOUCESTERSHIRE ARC
6, AGM.
13, On air.
20, Video.
27, On air. Stan, G0RYM, stang@talkgas.net
TORBAY ARS
1, Presentation night.
22, 90/10 sale. Dave, G6FSP, g6fsp@tars.org.uk

12 East & East Anglia

BRAINTREE & DARS
4, APRS demonstration.
18, Construction contest. John, M5AJB, 01787 460947.
CAMBRIDGE & DARC
1, AGM.
15 PIC programming, Mike, M0BLP.
29, Wilf memorial evening, Ron, G3KBR. Ian, G4AKD, 01954 782974.
CHELMSFORD ARS
5, BBC Essex talk. Martyn, G1EFL, 01245 469008.
COLCHESTER RADIO AMATEURS
5, Club constructors' championship.
7, Brightlingsea Harbour, Bernard Hethrington (harbour master). Keith, 01206 521330, keith@g3isk.fsnet.co.uk
EAST KENT RS
4, Spring cheese and wine.
18, Visit to radio museum, Brian, G7JWX. Paul, G3VJF, 01227 365384, g3vjf@paulnic.com
HARWICH ARIG
13, Delta loop construction, Tony, G4EYE. Tony, G4EYE, 01255 886065.
HAVERING & DRC
6, Raynet presentation, Paul, G8MJH, Controller NE London, and Phil, G6AQP, Zone Coordinator.
13, Informal evening.
20, Business meeting.
27, Informal. Oliver, G3TPJ, 01708 746677.
KING'S LYNN ARC
14, Table top sale. Mike, G0SHC (no contact details provided).
LEISTON ARC
5, Ham radio backpacking, Peter Best, G8BLS. Paul, M3MIG, 01728 746044, m3mig@aol.com
LOUGHTON & EPPING FOREST ARS
1, AGM.
15, *IRLP*/*Echolink* demonstration.
17, GB6EHL, Queen Elizabeth's Hunting Lodge.
29, HF data night on air. Marc, G0TOC, 020 8502 1645, info@lefars.org.uk

13 East Midlands

DERBY & DARS
5, Junk sale. Martin, G3SZJ, 01332 556875.
FRANKLIN RADIO GROUP
27, RSGB video, Jim G0EJQ. Robert, G0OTH, 01754 765408, robert@skegness.e7even.com
HUCKNALL ROLLS-ROYCE ARC
1, Marconi video, Mike, G0RGE.
8, 'Foxhunt'.
15, Model boats, Neville, M3GAC, and Keith, M3KMK.
22, Forum.
29, On air VHF/UHF. Keith, G6NHY, 07929 916642, hrrarc@ntlworld.com
LEICESTER RS & CC
4, Quarterly meeting.
11, Video, on air, quiz.
18, DF antenna construction, video, on air.
25, Early years in the UK, Johan G3VZO. Tom, G1IUT, 0116 286 3949, tomchristmas@ukonline.co.uk
LINCOLN SW CLUB
6, On air.
13, 80m SSB contest, 1st construction contest of 2005.
17, DF hunt.
20, Visit to BBC Radio Lincolnshire. 27, Junk sale. John, G1TSL, 01526 323153.
LOUGHBOROUGH & DARC
5, On air, 2m contest.
12, Vintage wireless night; bring something along.
19, Falcon Works locos pre-1920, George Toms. 26, Inter-club quiz. Chris, G1ETZ, 01509 504319.
MELTON MOWBRAY ARS
15, Amateur satellites, John Heath, G7HIA. Phil, G4LWB, phil@croxtonkerr.fsnet.co.uk
SOUTH NORMANTON, ALFRETON & DARC
4, AGM.
11, Packet radio, Ian Percival.
18, Junk sale.
25, On air, Snadpole testing. Mike, M0RMJ, 01949 876523, mike.jeffs@ntlworld.com, www.qsl.net/snadarc
SOUTH NOTTS ARC
6, Liaison Meeting for Mills on the Air.
13, Construction project, John, G4EDX.
20, The multimeter, Terry, M0RIA.
27, On air. Terry, M0RIA, 0115 937 2942.

RAIBC: VOLUNTEER AUDITOR WANTED

The Radio Amateur Invalid and Blind Club is requesting a volunteer to work as auditor in order to help the club prepare its annual accounts for the AGM each year. The club's present auditor, John Brown, G3DVV, is retiring. John has done this job on behalf of RAIBC for many years and is taking the opportunity to retire at the AGM. Enquiries please to David Jones, G0HHP (QTHR), tel: 0121 605 0244 or e-mail: daveg0hhp@blueyonder.co.uk

MKARS RAISES £500 FOR TSUNAMI APPEAL

On 7 February members and friends of the Milton Keynes Amateur Radio Society (MKARS, www.mkars.org.uk) held an auction of donated amateur radio and computer equipment, all proceeds going to the Disasters Emergency Committee (DEC) tsunami earthquake appeal. Club chairman, Mike Everett, G3LFR, played the part of auctioneer, and over 25 lots of equipment, some old and some new, raised a total of £520 for the fund. The auction had been organised by club member John Housego, M0TIF, who also runs the society's website.

MKARS welcomes all interested in amateur radio and provides a range of training courses. It meets every Monday (except public holidays) at its club room at Bletchley Park, historic home of the Enigma decrypts and early wartime radio station. For further information please contact the society's vice-chairman, Malcolm Bay, on 01525 874075.

BRITISH RAILWAYS ARS TROPHY AWARDED

Following the AGM of the British Railways Amateur Radio Society, the society's chairperson presented the new Tuckfield Trophy to Ian Hogan, G6TGO. The trophy was first awarded to newsletter editor Coral Sims, wife of G4GNQ, in 1988 by the late John Tuckfield, G2HOX. It was therefore appropriate that Coral should make the presentation of the new shield to Ian.

PHOTO: GEOFF SIMS G4GNQ, SECRETARY BRARS

Ian Hogan, G6TGO, receives the Tuckfield Trophy from Coral Sims, wife of G4GNQ.

REJUVENATION OF BEDFORD CLUB

The Bedford and District Amateur Radio Club (www.badarc.net) has taken a new approach to running the club. Many of the committee and members felt that it was time for change and that new blood was required. At the recent AGM the outgoing committee commented that it would like new and younger members of the club to take control. As a result, the club is now being run by chairman Bob Palmer, M3DPQ, secretary Andy Sanderson, M1TLK, training officer Steve Down, G3USE, and special events organiser Glen Loake, G0GBI. The new committee is hoping to take the club from strength to strength and so far this year membership has increased by 50%. Webmaster Hugh, G7UOD, has been appointed a new committee member.

Through 2005 BADARC will be holding special event stations to commemorate the 75th anniversary of the maiden voyage of the airship R101 at Cardington, the Bedford kite festival and the Bedfordshire county show at Shuttleworth, where club members will be helping with Bedfordshire's secret war exhibition sponsored by BBC Three Counties. BADARC is supporting its chosen charity, the British Wireless for the Blind Fund, and hopes to be able to raise money at the special events and through the website.

GMDX CONVENTION AND DINNER

The GMDX group will be holding its eighth annual convention and dinner at the King Robert Hotel, Whins of Milton, Stirling, on Saturday 23 April starting at 12.30pm (bar lunches available from 11.30am). The provisional programme includes presentations on 'Modern DXpeditioning' by Roger Western, G3SXW; 'HF radios for successful DXing', by Peter Hart, G3SJX, and 'Kerguelen Island DXpedition', by Mark Haynes, M0DXR.

Card checking for DXCC, WAZ and RSGB award schemes will be available. The main raffle prize is an FT-817 plus CW filter, carry case and ATAS25 HF antenna, generously donated by Yaesu UK Ltd. The cost of the afternoon's convention is £7 (including tea / coffee) and the dinner is £17 per person. Booking your dinner tickets is particularly important as numbers are limited and forms are available from Rob Ferguson, GM3YTS, e-mail: gm3yts@btinternet.com The King Robert Hotel has a special rate for convention delegates: £25 per person B&B for a double room and £35 per person B&B for a single room. Please contact the hotel direct (tel: 01786 811666) and say you are attending the GMDX Convention to get the special rates.

RNARS CELEBRATES VICTORY IN EUROPE

RNARS GB60VE special commemorative QSL card.

The HQ station of the Royal Naval Amateur Radio Society, GB3RN, at *HMS Collingwood* will be celebrating the 60th anniversary of Victory in Europe from 1 - 28 May 2005 with special special event call GB60VE. Activity will mainly be on 40 - 10m and 2m CW and SSB. The club made 1350 QSOs under poor conditions with GB60DDL (D-Day Landings) last June and hopes to do as well with this continuation of special events arranged by the RNARS. QSL manager Mike, G0VIX, will respond to cards on receipt of yours.

HAVERING CLUB TREATED TO 'TOPBAND IN THE '60s' TALK

Part of the Havering & District Amateur Radio Club's (www.haveringradioclub.co.uk) commitment is to bring a wide and varied programme of events and lectures. The club came up trumps when it invited Fred, G3SVK, to talk about his exploits on topband back in the 1960s. Perhaps better remembered as GM3SVK during his time as Britain's most northerly amateur on Unst in the Shetlands in the late 60s, Fred spoke about his time chasing rare DX stations and his enjoyment at giving Shetland to those who needed it for the *Short Wave Magazine* 'Worked All British Counties' award. He treated club members to a rare showing of his old cine film showing his Scottish tour of the rarest counties with co-expeditioner John, G3YNC. He also showed club members some of his many topband certificates and rare 160m QSL cards such as those from ZP5, VS9, MP4, PY, VP5, VP8, LU5, KV4 and VE7.

Fred, G3SVK, with some of his certificates and rare topband QSLs.

The club meets every Wednesday at 8.00 at Fair Kytes Art Centre, 53 Billet Lane, Hornchurch, Essex (opposite the Queen's Theatre, with plenty of car parking). Anybody in the Essex or East London area interested in joining the club or taking amateur radio courses should please contact Dave, 2E0EBV, tel: 07956 594514 or e-mail: g4hrc@haveringradioclub.co.uk

'Honest' Bernie, G0ENN, one of the Canvey Rally traders.

CANVEY RALLY A SUCCESS

The Canvey Radio Rally, organised by the South Essex Amateur Radio Society (www.southessex.ars.btinternet.co.uk), took place on 6 February, and was a great success. Both the public and traders had a good day - and even the weather was kind this year!

The club's next project is to arrange a contact with the International Space Station for a local school. Further details about the club from southessex.ars@btinternet.com

LEEDS & DARS LOSES STALWART MORSE MEMBER

The Leeds and District Amateur Radio Society has lost one of its most stalwart members: Charlie Lee, G0ORS, who became a silent key on 6 December. He had been a member of the Leeds club for many years, serving on the committee for the last six. He was particularly known for his expertise in CW and taught many amateurs over the air to the old 12WPM Morse test standard, some later becoming Morse tutors themselves. He will be sadly missed by the radio fraternity.

Charlie Lee, G0ORS.

CLUB NEWS IN BRIEF

♦ Waters & Stanton plc is holding its annual 'Open Evening' for Essex radio clubs at its HQ in Hockley from 7.00pm on Monday 11 April. W&S will provide a talk, tour of the building, a look at the W&S museum, a light snack - and some special prices. Club secretaries are asked to call W&S on tel: 01702 206835 to confirm numbers.

♦ A new amateur radio club has been formed in the Wigan and Leigh area of Lancashire. The Northwest Amateur Radio Club meets every Tuesday at 7.30pm at the Upper Morris Street Working Men's Club, Morris Street, Wigan (opposite Tesco Wigan). Further details from Joe Shaw, M3WIG, at narc@tesco.net

EXAMINATIONS NEWS

Following the recent success of the Intermediate exam held by the **Northampton** Radio Club, a group of new Intermediate licensees decided to upgrade further by sitting the Advanced exam. Regular meetings took place on Thursday evenings to read through the *Advance - the Full Licence Manual* book. Several local amateurs took up the challenge and offered their help in delivering talks on their special areas of interest. Phil, M0CTC, invited the group to his home where they were shown slides of receiver and transmitter circuits. Eric, G4MZX, delivered a practical talk on antennas and feeders, and Bob, G1UQF, gave a huge amount of his time and effort by providing transport, study materials and just as important, words of encouragement and support. The Advanced candidates were Graham Rumsey, M0GCR; Bill Rogers, M0DTU and David Allen, M0DUU. It has been suggested that Bill, M0DTU, may be the oldest person to sit the new Advanced exam, being 84 years young. The group thanks the Northampton Radio Club and Ian, G1BHR, who organised the exams. Although only just licensed in the UK, Graham operated from Antarctica as VP8BF in 1953. He wanted to take out an M0 callsign in order to renew VP8BF as he is returning to the Antarctic station where he worked over 50 years ago. The British Antarctic Survey is dismantling the buildings and Graham was given one last opportunity to see them before they were demolished. Graham left for the Southern Continent on 1 February.

Successful members of the Holsworthy Radio Club in Devon who passed the Intermediate exam at the club in January. The course was run by Don Silver, G7PFU, and Brian Aicheler, M0OZJ.

♦ The next **Reading** & DARC Foundation course is planned to start on Friday 8 April at 7.30pm in **Caversham**. This follows the 100% overall success rate of the last course: several new M3 callsigns are regularly heard on the air, with good standards of operating. There will be four sessions in the April course, with session 2 an all-day event on Saturday 9 April and sessions 3 and 4 will week nights at 7.30pm. Harry Hogg, G3NGX,

♦ **Loughton and Epping Forest** Amateur Radio Society members Janet, M3FHS; Brian, M3FHU; Michael, M3HSX; and Alex, M3HSK, all passed the Intermediate examination and are now awaiting their 2E0 callsigns.

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Aerial photography from kites

Aerial Photography from Kites (APK) has been around since the start of the 20th century, when military intelligence was obtained during the Great War by photographing enemy trenches. Interest was re-kindled in the 1980s when smaller SLR cameras and motor drives made APK more achievable, if heavy. In the last five years, there has been an explosion of interest as high-resolution digital cameras have revolutionised what it is possible to achieve with a relatively small payload.

Despite being interested in radio for over 30 years, it took me some time to embrace the fact that our hobby isn't about passing a test; it's about experimenting and being creative with radio. Like passing your driving test, the amateur licence is a door opening into another world, not an end in itself.

But this has always been the case; the experiments may change over time, but it is to our credit that our hobby includes such diverse elements. Read on to learn about the interesting things I have been doing with radio over the last couple of years; it may not be mainstream, or at the cutting edge, but I think you'll find it creative!

Technical Editor's note

Amongst the aficionados of this type of aerial photography, the description 'Kite Aerial Photography' (KAP) is used. In view of the use of kite aerials in amateur radio, it was thought that, to the radio amateur, the description 'Aerial Photography from Kites' (APK), was less likely to be misconstrued.

BACKGROUND

For me, the interest in APK started with the idea of taking aerial pictures but, the more I learned, I began to realise that there was a technical radio challenge in the mixture of flying a kite, building a radio-controlled 'rig' (not the radio type, it's the name given to the radio / mechanical apparatus that the camera flies in), keeping the weight down, and taking good pictures! After building a very lightweight rig with a low-resolution webcam, I moved on to build fully-functional high-resolution rigs, on which the rest of this article is based.

Of course, some say why bother? Many excellent photographs are taken from the ground and, after all, there are aeroplanes! APK fills a gap and can produce some interesting and different photographs from the space above ground but below the 150m limit on aircraft. Getting above, but still close, to the object being photographed is unusual so, contrary to first impressions, more height isn't necessarily better. This also helps bound the design, a two way radio system with a range of 150 – 300m.

For simplicity, I'll work through the design and construction of a steerable digital camera rig and viewfinder, weighing about 600g, including 200g for the camera. None of this design can be bought off-the-shelf, so all rigs are bespoke – all part of the fun! This is not a constructional article, but a journey through the design and experimentation of a flying camera. The system block diagram is shown in **Fig 1**.

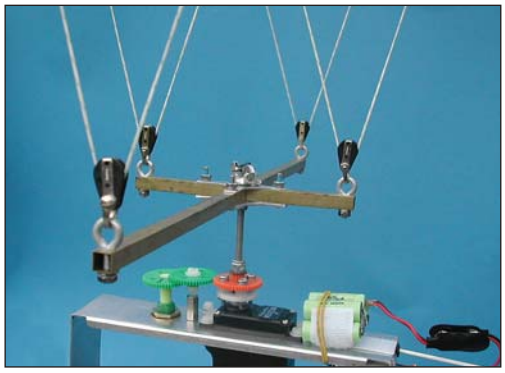

Photo 1, left: A 3m-span 'delta conyne' kite, flies from the hand. It will lift a 600g load in 10 – 20mph winds.

Photo 2, right: Close-up of the Picavet Cross.

KITES & SUSPENSION

Flying kites is not as simple as it may seem. Most modern 'sport' kites with two control lines are useless; APK needs a single-line kite as a stable platform. Generally, special kite designs (or hybrids of two designs) are used for maximum stability. For a 600g payload, a 3m span 'delta conyne' (a cross between a delta- and a box-kite, shown in **Photo 1**) will lift the load in a steady 10mph wind. For lower winds, or heavier payloads, a larger kite will be required although, below 5mph, the risk of becalming becomes significant.

The rig itself isn't connected to the kite, but attached to the line below the kite. This allows the kite to be flown in stable air before attaching the precious payload. Although there are various ways of attachment, a cord bridle arrangement called a Picavet (after its French inventor at the turn of the 20th century) is generally considered to be the most stable – see **Photo 2**. Consisting of two attachment points at the kite line, and four on a platform immediately above the rig, eight cords run through a pulley system in a continuous loop and keep the platform level, as the kite line varies.

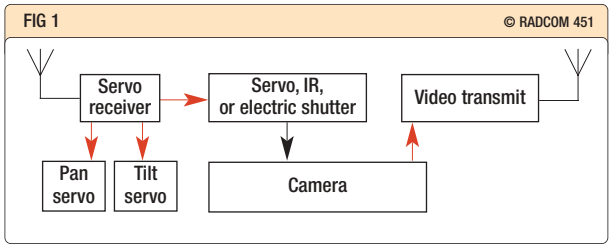

Fig 1: Block diagram of the basic system.

CAMERA SELECTION

As well as the normal photographic considerations, the camera must be light, and have semi-automatic aperture priority operation. With the best will in the world the stability is always going to leave something to be desired, so it is good to keep the shutter speed high at the expense of depth of field, which is less of a consideration with distant subjects. The ability to take hundreds of pictures, and choose the best framing later, is where digital cameras have really made a difference over the 36-exposure limit and developing cost of film cameras. Digital cameras are now available with near-SLR quality, weighing around 200g.

I have described a camera and a kite, now the difficult part. How to point the camera, and take pictures remotely, while viewing from the ground…

Photo 3: The uplink transmitter located on my waist, with pan, tilt and shutter controls beside my hand. The aerial extends up my back where it doesn't obstruct kite-flying.

THE UPLINK

This is where the creative plagiarism really starts! The radio-controlled-plane folks have most of this down to a tee. A wide range of very small receivers and servos is readily available and can be pressed into service with minor modification. They use the 35MHz allocation, have a range of up to 1km, and are licence-free. The available transmitters, however, are less useful as they tend to be designed for handheld use in front of the operator with control via self-centring joy-sticks. I like to keep the space in front of me free for a 'kite emergency', so I have repackaged a commercial kit transmitter to use knobs (pan and tilt) and switches for control. Housed in a bum-bag, it can be strapped to my waist, with the controls available at my side, as shown in **Photo 3**.

THE DOWNLINK

To see in what direction the camera is pointing, binoculars can be used, but now with tiny webcams and digital cameras with 'video out' connections, there is the possibility of transmitting video back to the ground. Other operators are using 2.4GHz modules that are now available; however, with a 10mW power output, constantly moving aerials, and the need for a receiver and monitor, this is not the simplest solution. Talking to others, there was a general level of dissatisfaction with the received picture quality.

Looking for alternatives uncovered two 70cm transmitter solutions; one in particular from the US is in a potted box, measuring 57 x 20 x 16mm and weighing 43g. Interestingly, this uses around the same current as some 2.4GHz modules (60mA) but delivers up to 10 times the output power. Unfortunately, none of these options can use the 4.8V provided for the servos. To keep weight down, by sharing batteries, means that a DC-DC converter is required to generate 9V for the transmitter.

A simple $\lambda/4$ aerial and ground plane were constructed, weight being kept to a minimum by using phono plugs and sockets rather than heavier BNCs. This gave good results over the range required, so a provisional solution using a 3-element short-boom Yagi was shelved due to its weight and more difficult implementation.

A pocket TV was purchased second-hand for the downlink receiver, and then modified to extend its received range to cover the 70cm band. This is worn round the operator's neck and is viewed through a screen shield, as pocket TVs aren't designed to be watched in direct sunlight!

TELEMETRY AND CONTROL

With both an up- and down-link available, some additional features were added. A PIC microcontroller was already planned to control some aspects of the operation, so with software weighing (virtually) nothing, its features were extended to add a data logger (so flight data can be analysed after the flight), and the real-time viewing of flight data via the downlink. In fact, two PICs are used, the second generating a full-spec TV picture, which contains height, temperature, battery and logger status information. Selection between the camera video, or the telemetry data, can be made from the ground via a switch on one channel of the uplink.

SHUTTER RELEASE

This is perhaps the most important part of all. Over the years, many ways have been employed, from mechanical timers to elastic bands and melting ice cubes. It is more commonplace today to trigger the camera via the uplink. Traditionally, it was done with a small servomotor and 'finger' positioned above the shutter release although, more recently, there are options to do this via an electrical shutter release, or the camera remote IR control. The infra-red signal is not strong enough to operate the camera from the ground; instead, the shutter command is sent using the uplink signal, and this signal is used to trigger an IR transmitter on the rig, so IR is used for only a few inches. Both electrical and IR triggering reduce weight, simplify mechanical construction, and make the camera easier to load into the rig.

EMC

Having taken a number of basic building blocks, the next stage was to get it all working. Experience with previous rigs told me that this might be problematic, so I started a proving cycle. A number of trials was carried out on a local playing field with the rig completed electrically, but not mechanically. The various elements were taped to a plastic tray, which was 'flown' at hand height over the test field, by walking away from the uplink transmitter.

It didn't work any further than 30m from the transmitter, and reception became noisy, as indicated by servo jitter.

I then started a series of experiments, and quickly found that transmitting 470MHz within 200mm of the 35MHz receiver wasn't making its job easy! Given the restrictions of a weight limit, this was not going to be easy to solve.

Further analysis showed that there were three interference modes. The biggest component of the interference was actually 470MHz conducted through the power supply from the transmitter. Reading the manual again for the video transmitter revealed that it had no power supply regulation; the corollary of this is that there is no filtering of either RF or current spikes back out of the device either!

The second mode was caused by the 50Hz current spikes from the video field syncs in the DC – DC converter. Modification of the DC – DC converter design, and the addition of a choke in the video supply were a great help. Various experiments were conducted to select the optimum, lightest choke, the main factors being the physical size and the number of turns that could be added – unfortunately, these are inversely proportional.

Thirdly, there was radiated interference – the 35MHz front-end was being de-sensitised by the 470MHz transmitter. After various experiments, this was reduced by separating the aerials – placing them on booms on either side of the camera. More field trials took place to find the shortest booms that gave an acceptable result without making the rig too ungainly.

MECHANICAL CONSTRUCTION

This had been left deliberately to the end of the design / construction process. The rig must stay balanced during all conditions of pan and tilt

SAFETY

Kites are normally flown in open spaces, but APK tends to invade more confined spaces, and operate closer to buildings and people, since there are more photo-opportunities here than on, for example, an open beach, or field! Suffice to say that the personal safety of other people must be paramount at all times. The presence of overhead power lines, wind direction and 'smoothness', available launch areas, an escape route back to the launch area, and risk of entanglement must all be considered and discussed with the property owner. It is advisable to have third-party insurance cover.

In the UK, the Civil Aviation Authority (CAA) regulations cover the flying of kites. The rules are quite complex but, generally, flying up to 60m more than 5km from operational aerodromes is not regulated, anything else requires CAA advance notification and approval. Whilst, at first glance, 60m may seem a limitation, as previously mentioned this fits in with the low-altitude niche between aerial work and ground photography, offering a 'different' perspective.

of the camera. This offers the best chance of keeping the images square, and the horizon reasonably level.

As well as having a lightweight and robust mechanical construction, the need for balance means that, once constructed, it is difficult to change other aspects of the rig without the danger of upsetting the balance.

Most rigs follow the same basic outline, and consist of two U-brackets. The upper U is mounted upside down (see **Fig 2** and **Photo 4**) and from the top there is a single mounting point. This mount can rotate through 360° via a specially-modified servo – servos normally rotate through only 100°. This gives the pan for the camera.

The camera is mounted on the lower U, which is connected to the upper U via a second servo, this gives a 100° tilt to the camera, so it can look straight down, out horizontally or, if necessary, look up slightly.

Photo 4: The double-U rig.

WEIGHT

I have seen rigs designed in materials from wood to glass-fibre; it depends what material suits the builder. I used 0.8mm-thick aluminium strips, which were available and easy to work. If I needed more strength (eg across the top U) I added folds to the edges as a weight-saving way of increasing rigidity.

The whole area of weight has to be considered from the start. During all the work described above, attention was paid to this area, on the assumption that I would "watch the ounces and the pounds will look after themselves", to misuse an old saying.

Where possible, very thin sheet metal was used – it needs only to be robust enough to work, not to withstand abuse. Plastic screws were used unless they were critical to safety. The smallest batteries were used, ie one set per flight. There is no point flying excess battery capacity, as that means excess weight. On RF aerials, phono plugs replaced BNCs; they may not have as good RF performance, but they are significantly lighter. Aerial booms were made of lightweight carbon fibre although, for the receiver aerial, non-conducting glass fibre was used.

FIG 2 © RADCOM 452

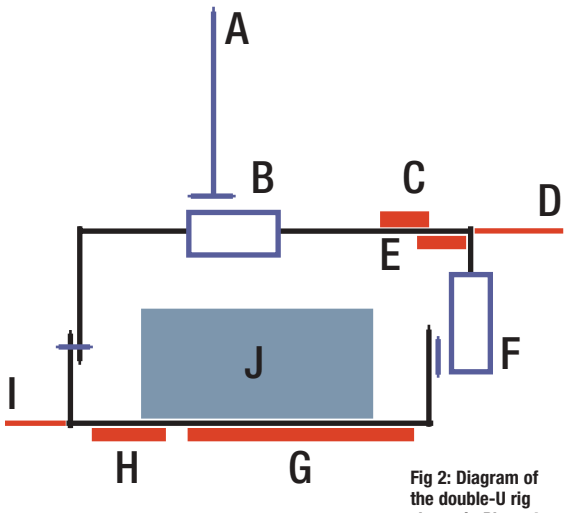

Fig 2: Diagram of the double-U rig shown in Photo 4.

A: Fixing to bridling / suspension system
B: Pan servo
C: Batteries
D: Support for rx aerial
E: Rx module
F: Tilt servo
G: Control electronics
H: 70cm video tx
I: Support for tx aerial
J: Camera

LEGALITY AND SAFETY

With such a mixture of disciplines, the APK operator has to be mindful of various rules. The principal safety rules are outlined in the box.

The RC modeller 35MHz band, although un-licensed, has various self-imposed rules and regulations by the RC fraternity for the safety of their models, and others in the air and on the ground. For safety and courtesy to others, their band-plans and rules should be obeyed, although you shouldn't be flying a kite and an RC model in the same airspace. You can't plan for all the possibilities, though; I have had a kite line hit by a duck at about 50m. This was quite a shock, both for the duck and me!

Finally, there are the amateur radio considerations. Maybe this is where our preoccupation with the licence starts! 100mW 625-line TV on 70cm is a little anti-social but, given low power, monitoring the frequencies in use, and the transmission being in open spaces away from other users, in rural Scotland, I considered it acceptable. The colour signal from the camera is low-pass-filtered to 3MHz before transmission to reduce unwanted out-of-band transmission, and avoid the 438.075 – 438.175MHz IARU packet radio frequencies. The reduction in bandwidth removes the colour part of the signal but has negligible effect on received quality, since the small pocket TVs used have limit-

ed resolution anyway. The aim here is to use the downlink for picture framing and telemetry, not to transmit high-quality colour video. Space is made available on the telemetry downlink for my callsign to be transmitted at least every 15 minutes.

More interesting are the rules on repeater and remote operation. The rules are designed to delineate clearly between the extremes of shack use and a remote hilltop location, where it may take some time for the keeper to switch-off the station.

With my video downlink located 60m up in the air, enabled via an uplink on 35MHz, does this count as remote operation? Is there a difference between having the kite tethered to a stake, or walking it around looking for the best picture? Is the fact that I am connected to the transmitter via a line mean that it is not remote? Is it all part of the same system that just happens to be 60m long?

Whilst this may be a grey area, what is important is that I meet the *spirit* of the rules. The PIC control system is designed so that the 70cm transmitter is switched off if no signals are received for 30 seconds, or the camera switches off. As well as saving batteries, this makes sure that there is a fail-safe condition, together with receiving periods where other band-users can alert me to any conflicts. Additionally, it takes only a couple of minutes to bring the kite to ground should that be required.

Most new radio applications will encounter these sorts of issue – where the rules do not cover innovative use of technology. Everyone needs to adopt a sensible view of the rules, and what they are trying to prevent – interference to other users, especially on shared bands, and those on other bands.

FLYING TECHNIQUE

The objective of this hobby is taking pictures, and making the most of the bird's-eye-view. This is a whole subject in itself – what makes a good picture is very much in the eye of the viewer. After careful consideration of the subject, the light, the wind, etc, I can plan the shoot, which can easily take an hour for just one usable image. I keep a list of subjects and conditions and, when suitable, I return and fly the kite. Only when the wind is assessed and the kite is flying well is the camera attached and raised into the air. Only now can the shot be lined up. Several digital images are taken, with the view that some will be well-framed and in perfect focus. I consider some digital post-processing to be acceptable, removing the kite line, straightening the horizon, or stitching two images together. Some purists may frown, but conventional photographers have used pre-processing (eg filters), or post processing in the developing tank to some degree or another, so why not do this digitally?

CONCLUSIONS

So what does all this have to do with amateur radio? Amateur radio is about self-education and application. I have successfully applied knowledge gained through amateur radio experience to choose components, build them into an APK system, and debug that system. The finished system uses a combination of off-the-shelf solutions, modified to meet the new needs of my unique APK requirements.

We all lament the past, before the advent of computers, when there were more young people in radio etc. Hopefully, this article has shown that there are still opportunities where radio technology can be experimented with and employed to good effect, complementing modern technology. These are the areas where the inventiveness of the radio amateur lives on, and areas we should all be encouraging. Our hobby will constantly change, but self-education and experimentation can be encouraged as much today as it was 100 years ago.

RESULTS

The remaining photographs illustrate the excellent results achieved. ♦

Below: The Falkirk Wheel boat lift.

The Forth Bridge, North Queensferry.

Lin's Mill Aqueduct, Union Canal, Ratho, Edinburgh.

Warkworth Castle, Northumberland.

Above: Island House, Isle of Tiree.

Left: Cairnpapple prehistoric burial site, 3000 – 1400 BC, Bathgate Hills, W Lothian.

Right: St Mary's Lighthouse, Whitley Bay, N Tyneside.

Right: Telecom mast, near Bathgate, W Lothian.

Below: Blackness Castle on the River Forth.

WEB SEARCH

Author's website*	www.gentles.info/KAP
Author's IR camera control*	www.gentles.info/KAP/gentled
European APK website	www.kiteaerialphotography.net/
American APK e-magazine	www.kaper.us/
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*** Note: these URLs are case-dependent**

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Heavy Duty Aluminium (1.8mm wall)
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1½" set of four (20' total approx).....**£34.95**
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1¾" set of four (20' total approx).....**£39.95**
2" single 5' ali pole.....**£15.00**
2" set of four (20' total approx).....**£49.95**

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RGMini 8 best quality military spec per mt.....**70p**
RG213 best quality military spec per mt.....**85p**
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3-core rotator cable per mt.....**45p**
7-core rotator cable per mt.....**£1.00**
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CS201-N Same spec as CS201 but with N-type fittings.....**£19.95**
CS401 Same spec as CS201 but4-way.....**£39.95**

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RC26 Alignment Bearing for RC5-1/3.....**£49.95**

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SO259 fitting.....**£14.95**
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SO259 fitting.....**£12.95**
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TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ Approx 20ft erect 6ft collapsed.....**£99.95**
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HF Yagi

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

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

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

HF Verticals

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

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

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

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

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

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

Trapped Wire Di-Pole Antennas
(Hi grade heavy duty Commercial Antennas)

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MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts.....**£54.95**
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts.....**£99.95**
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts.....**£44.95**
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts.....**£89.95**
(MTD-5 is a crossed di-pole with 4 legs)

Patch Leads

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

ALL PICTURES ARE FOR REFERENCE ONLY

Callers welcome. Opening times: Mon-Fri 9-6pm sales@moonrakerukltd.com

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Rodney Fry, M Sc, C Eng, G3NDI

7 Thornbury Close, Crowthorne, Berks RG45 6PE.

E-mail: g3ndi@thersgb.net

AADE digital L/C IIB meter kit

G3NDI builds and tests a kit to measure accurately capacitance and inductance.

Above left: The completed meter showing the jig for wire ended components.

Above: The meter with the upper half of the case removed.

Above right: Typical components checked with the meter.

In the last few months I have been collecting components for modifying the Pye A200 solid state RF amplifier [1, 2] to boost the output of my FT-847 on 4m. The output of the amplifier passes through an elliptic filter [3] requiring a number of small capacitors and inductors to be changed for the new frequency band. Trying to find these small values in my junk box and that of another amateur proved difficult. A local amateur mentioned the little digital L and C meter kit available from the USA. Reading through the web pages of Almost All Digital Electronics (AADE, see 'Web search' below) suggested a solution to my problem of sorting the capacitors, albeit in a moderately expensive, but very easy, manner!

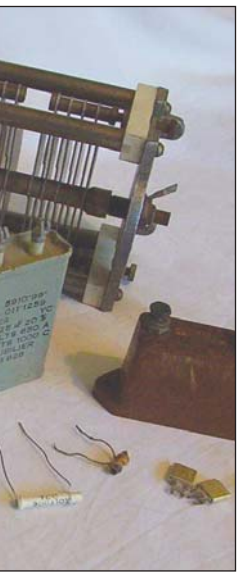
Contact with AADE indicated the postage cost from the USA west coast as $9 and the approximate delivery times. A quick phone call enabled my credit card details to be passed and in less than two weeks a small airmail package arrived. Unfortunately I had to go to the local Post Office centre and pay a charge of £13.60 for customs VAT and Royal Mail administrative charges.

CONSTRUCTION

Bringing the package home and checking the enclosed kit instructions I found that all the parts were present. A slight consternation arose as the microprocessor IC *seemed* to be missing, but it was found hidden underneath the small block of black anti-static foam that had on the other, visible, side the amplifier IC, as I later discovered! A construction manual will be found on the website, which is slightly different from the supplied paper copy. The finished unit and the delivery pack is shown in photo 1. As can be seen the unit comes with a small PCB jig plugging into the terminals. Soldered to the board is a small multi-pin socket to take wire ended components. The two accurately measured capacitors for calibration were provided separately in a small envelope and the display module was also separately wrapped in bubble polythene envelope with protective tape on the LED. The plastic case was also protected from scratching by another envelope. Everything was present and the few resistors were checked with a digital meter as a precaution.

The manual was read through first to see if there were any queries. These were minor and quickly answered by e-mail. The parts were laid out and using a small 15W soldering iron with a fine tip, construction begun according to the enclosed construction sheets. There are not many components and the board is only about 3in square. The through-plated holes were checked carefully to see that there were no obvious breaks, but the instructions suggest making sure the solder appears on both sides of the hole when installing a component. The kit took less than two hours to assemble. After checking carefully all soldered joints had been completed and that everything was installed correctly, such as the miniature electrolytics and tantalum capacitor, the battery was plugged in and the power switch pressed. The 16-character display immediately showed the text given in the manual and the unit cycled through the switch-on sequence and announced it was ready to test a component after a few seconds with the message "READY MEASURE µ". An inside view of the unit is shown in photo 2.

It was noticed that the miniature potentiometer for the display contrast was immediately under the display module when installed following the written instructions and could only be altered if the module was unplugged for access. There was clearance to place the control on the back of the board providing that it is remembered that movement is opposite to that mentioned in the supplied manual. It was confirmed by e-mail that this could be done and it was also noticed the web manual actually mentions this position. It is a simple matter to locate in the case where the control



screwdriver slot sits and a small hole was drilled in the case back plate. I feel this is a preferred solution as the unnecessary unplugging of multi-pin connectors can be a cause of premature failure.

Whilst I had no immediate need, a nice touch was the ability to select a mode where a set of nominally identically-valued capacitors, or inductors, can be matched against a particular wanted component and the percentage discrepancy, or absolute value, is given on the display. Similarly, some years ago I made a TVI filter in a tobacco tin, but I had never been able to determine its response although it was constructed carefully to the given coil dimensions, etc. This meter would now enable me to check the values of the silver mica capacitors and the small wire inductors by setting them to the design values more accurately than previously. Whilst this does not give the response curve it would probably be a better starting point.

The kit is quite straightforward to build and should be suitable for someone who has had a little constructional experience providing care is taken.

Above: An old paper capacitor of nominal value 0.25μF.

Above right: A small tubular ceramic capacitor of nominal value 300pF on the jig.

Above far right: Measuring a large ceramic coil from a wartime transmitter.

OPERATION

The circuit and equations can be found on the website and are given in the included manual. The system comprises a comparator LM 311 which oscillates at a frequency determined by the supplied inductor capacitor pair of 68μH and 680pF. Calibration of the unit is determined by the supplied accurately-measured capacitors of 1020pF ±0.5%. The self-resonant frequency of these standard components and the strays is at approximately 800kHz and is measured accurately by the processor PIC16C622 sampling the output five times per second. An 8MHz crystal is supplied, but this is used for the clocked frequency in the processor IC.

A sub-miniature relay switches the supplied calibrated capacitor pair of 1020pF into circuit and the processor uses the new frequency F_2 to calculate the exact values of the supplied L_1 (68μH) and C_1 (680pF). The measurement of frequency is normally an easy and accurate process.

Adding the unknown inductance or capacitance causes a lowering of this nominal 800kHz frequency which is measured and compared with the original value. A 'zero' push button switch enables the strays to be measured and stored in RAM and removed in the calculation of the unknown reactance. The addition of the unknown over the unit operation range can shift the frequency down to around 20kHz for the largest values. The equations for the calculation of the unknown values are determined only by the ratio of frequencies and the value of the supplied calibration capacitors. The processor solves the equations given in the web manual and interprets the frequency change as the measured value shown on the display.

When the unit is ready to measure an unknown L or C, it continuously checks the value of F_1. Connecting the unknown component and pressing the appropriate L_x or C_x button the unit displays the value to better than 1%.

PERFORMANCE SUMMARY

All the components I tried gave an immediate answer except for one wave wound coil that must have had a break hidden somewhere in the coil as the display indicated "Not An Inductor" when tested. Some examples of the components that can be checked are shown in photo 3. The readings given are shown in photos 4 and 5 for a paper capacitor and a 'ceramicon' in the test jig, respectively. The display may not be visible in the printed image, but it shows 0.2437μF and 301.5pf. A large ceramic former inductor is shown in photo 6.

Shortly after this review had been written the October 2004 *RadCom* arrived. It includes an article [4] describing a technique to measure the calibration capacitor for this kind of LC meter to slightly better accuracy than the 1020pF supplied.

The designer of this kit has tested a unit against a number of standard capacitors and inductors measured with HP4275A or Brüel & Kjoer 878 instruments. The results enable him to claim an accuracy of better than 1%.

The total cost of the AADE digital LC meter kit was £63.03 including credit card commission, plus the £13.60 VAT and Royal Mail charges. It is available direct from Almost All Digital Electronics, 1412 Elm St SE, Auburn, WA 98092, USA; e-mail: neil@aade.com ♦

REFERENCES

[1] 'Modifying the Pye A200 Amplifier for 4m SSB', J P Moore, G3IKR, Four Metre News, June 1999 p6.
[2] 'Bias Mods to the A200', B D Williams, GW0GHF, *Four Metre News*, Sept 1997, p9.
[3] Pye Linear Amplifier Unit Type A200, Service Sheet Iss 2, 1975.
[4] 'Standardising calibration capacitors for L-C meters using a notch filter', David M Jones, G4FQR, *RadCom* October 2004, p64.

WEB SEARCH

Almost All Digital Electronics: www.aade.com

SMARTTALK RF GROUNDING

Second in a series from SGC

Some antennas are simply not complete without an RF ground. RF ground is different and distinct from any of the five other types of ground. Control of antenna current requires control of your ground current. When using an SGC Smartuner™, the rules about grounding change because the Smartuner operates across the full HF frequency range. A Smartuner gets maximum energy into the antenna, but the design of the antenna is what determines its overall efficiency.

Smartuners may provide a satisfactory match with a poor RF ground system, but antenna efficiency will be low and operation will be subject to RF problems. Ground conductivity alone makes a very poor return path for RF currents. This increases the ground losses and reduces antenna efficiency. Radials can improve ground conductivity and provide a counterbalance for the feed point of the antenna, reducing RF radiation feedback.

Here are some general RF grounding tips for use with an SGC Smartuner:

- Balanced antennas, such as center-fed dipoles and loops, do not require an RF ground. Unbalanced antennas (verticals, whips, longwires, random wires or inverted L's) should have enough additional grounding to carry most of the RF current that might otherwise be returned by the lossy ground paths, so put down as much as you have room for.

- If the grounding system will be mounted above the ground, a ground plane can be created with chicken wire or other grid material.

- Unbalanced antennas mounted high in the air require a radial system or ground plane mounted below the antenna and connected to the Smartuner RF ground. A good place to mount the Smartuner is just below the ground plane.

- Indoors, ground wires can be run under carpets, along walls or out of windows. But be very careful to isolate these elements due to the potential high voltages.

- We recommend a minimum of six to eight radials, but efficiency will increase with more. Remember to arrange them symmetrically to keep them from radiating.

- You can eliminate noise from a polluted ground (industrial areas, etc.) by creating your own grounding system using the guidelines above.

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E-mail: g4hcl@rsgb.org.uk

'SkySweeper' datamodes software

Chris Lorek takes a look at this impressive suite of datamodes programs with a suitable level for everyone from beginner to professional.

Many amateurs nowadays get going on amateur radio's digital modes by using commonly-available software together with a PC, the receive and transmit audio being routed through the PC's soundcard with the PC itself acting as a data processor.

If you think this idea is something that's only happened in the last few years, you'd be wrong. Over 20 years ago I was using my Sinclair ZX Spectrum with its 48kB in-built memory, together with a G1FTU RTTY program, to communicate through my local UHF RTTY repeater GB3PT, with the program using the computer's cassette port as the transceiver audio interface.

There's currently a plethora of shareware, freeware, public domain and commercially-available programs to help you get going, some better than others but all offering a relative 'easy to get going' start in the world of digital modes. Others offer DSP-based filtering actions, such as noise reduction, band pass notch filtering, audio spectrum analysis and so on. All you need for receive-only applications is a single lead from your rig's audio output to the 'line in' connection on your PC's soundcard, run the appropriate software, possibly adjust the audio level, and you're off.

Many programs concentrate on a given mode, such as SSTV, or a small 'suite' of modes such as RTTY, CW and PSK. But if you absolutely 'want the lot' then, to the best of my knowledge, the only one that's even capable of this title is SkySweeper, the subject of this review. SkySweep Technologies is a Finnish company with its main focus on advanced digital signal processing software for HF / VHF applications and their products are distributed in the UK by Pervisell in High Wycombe.

PROGRAM VERSIONS AND THEIR OFFERINGS

There are several versions of the software available, these being 'Lite', 'Standard', 'Standard Plus' and 'Professional'. I tested the 'Standard Plus' for this review, although I believe the 'Standard' will be quite enough for most amateur's needs unless you're a keen utility-modes listener in which case the 'Standard Plus' may be worth going for. The 'Professional' version is, as its name suggests, aimed at professional users who need further analysis and histogram facilities for received signals.

The CW TX / RX window, with additional windows showing Spectrogram/ Waterfall and 3D FFT analyser displays.

First of all, in the **'SkySweeper Lite'** version, transceive capability is provided for CW, RTTY, PSK31, PSK63, PSK125, MFSK16, 2MFSK16 and 4MFSK16 data modes. Also included is *SkySweeper's* 'Skyboost' mode, which is based on multi-tone FSK modulation with a bandwidth of 344Hz. *Please note that this product is due to be discontinued very shortly, or may already have been discontinued by the time this edition of RadCom is published – check the Pervisell website for the latest information.*

Of more interest to amateurs is the **'Standard'** version, which adds transceive capability for QPSK31, Hellschreiber and four common SSTV modes, plus receive capabilities for ACARS, AX.25 packet, DGPS, GMDSS/DSC (HF), GMDSS/DSC (VHF), HFDL (HF ACARS), HF-FAX, MIL_ALE (MIL-STD-188-141A), PACTOR-1, ICAO SELCAL, SITOR-A (AMTOR), SITOR-B (NAVTEX), SHIP, SYNOP, and WEFAX (NOAA/TIROS) modes. It also includes DSP filtering and processing capabilities, including noise reduction, a notch filter with up to eight banks, a signal mixer, frequency shift, a 'pitch' sampling rate conversion, an audio signal generator with various waveforms including noise, a recorder, and a mains hum removal tool. There are also several analysers with corresponding displays, including a spectrogram and waterfall, and FFT (Fast Fourier Transform) and 3DFFT capabilities.

The **'Standard Plus'** version adds receive capability of Coquelet 8, Coquelet 13, MFSk36 / CROWD36, Piccolo 6, Piccolo 12, STANAG4285 and DTMF.

The **'Professional'** version contains all these features as well as some extra quite clever signal analysers and decoding tools for FSK, MFSK, MPSK, MSK, PAM and PSK, to decode and analyse other types of transmissions.

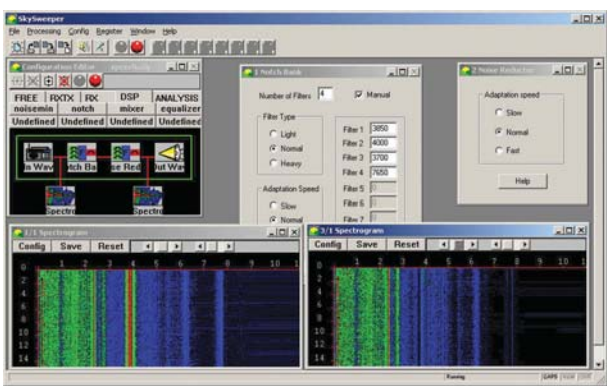
If you want to try any of these out, you can download demo versions from Pervisell's website (see 'Web search' below). The demo versions don't offer 'real time' use, but they'll give you an idea of the program capabilities.

IN USE

If the above modes and capabilities sound somewhat overwhelming, you're thinking exactly what I did when I first read about all the features! But even so, I found *SkySweeper* was quite easy to use, especially as it provides automatic tuning tools for the most of the modes.

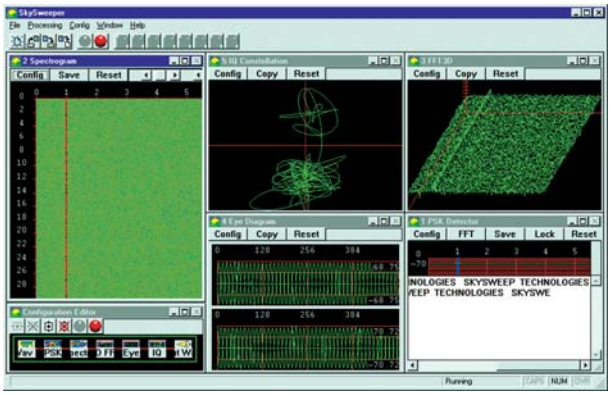
The program comes supplied with a mammoth 259-page manual in electronic pdf format as well as an extensive on-screen Windows 'help' file. I must confess that I printed out the manual to help me, as I much prefer 'hard copy' than a PC-screen version of a book.

The first thing I did, before even connecting my transceiver, was to try one of sample signal files within the program by clicking on the 'radio' icon on the program. This opened an 'IO Settings' window, where I selected

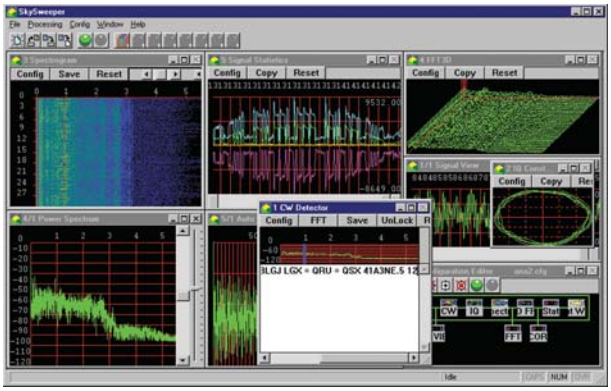


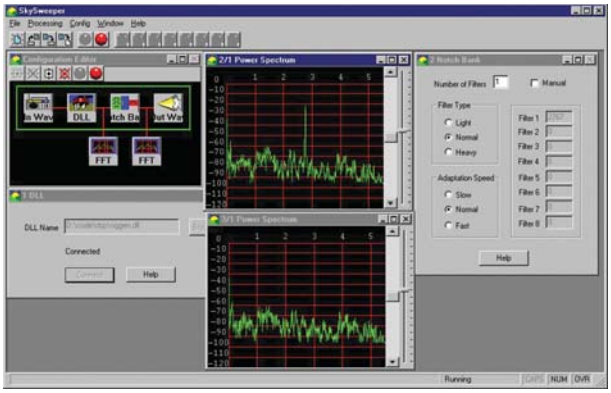
An example of the DSP (Digital Signal Processing) capabilities, with notch and noise reduction filter displays plus spectrogram displays.

The frequency shift function can be visually seen from the power spectrum displays.



PSK (Phase Shift Keying) windows, showing eye diagram, 3D FFT, IQ Constellation, spectrogram, and finally the PSK text.





A powerful audio notch is available with up to eight frequencies, a notch reduction of over 50dB being achieved here.

Signal Analysis is aided by several DSP tools, here the received signal is plain CW.

an RTTY Wave file as an input, a click on the 'OK' then closed it. Then, I opened the RTTY RX&TX box, and pressed the green button for 'go'. The program immediately started to process the incoming audio into text, and halting this was a simple matter of clicking on the red 'stop' button with my mouse.

For use with a receiver or transceiver, the program is set up to use your PC's default sound card, although you can change this in the configuration menu should you need to. I found no problems here, and a simple lead between my HF transceiver's rear panel fixed-level audio output phono socket, and the PC line input gave me excellent results. As an alternative to using a simple VOX mode for initiating transmit mode, an RS-232 output line can be configured to be used as a PTT, which I quickly wired up for use.

On the air, I found that tuning into signals and selecting the 'auto-detect' mode, after around 20 seconds or so, most signals were automatically received and displayed as text. Here, the decoder would lock on to the audio frequency and the on-screen spectrum display would provide a bold blue line at locked frequency (it's shown with a normal width when not locked). After locking, the program would start to decode the parameters of the incoming data, then in virtually all cases would print the text on-screen. The spectrogram indicated the signal level using a graduated colour range, with 'cold' colours (eg black and blue) indicating weak signals and 'hot' colours (eg red) indicating good signals strengths.

I was pleased to find I could also manage to use the program for off-air decoding while I was out of shack. Here, by using the 'recorder' application, I could record incoming signals to a WAV file for subsequent decoding, this being 'intelligent' enough to recognise whether a signal was present or not by using the 'noise squelch' facility included within the program.

For SSTV, an 'auto record' facility would automatically save received images. Although some SSTV modes, such as 'Pakoson' weren't supported, I found the SSTV modes included in *SkySweeper* of Martin 1, Martin 2, Scottie 1 and Scottie 2 and were more than enough for my needs.

For 'manual' use, I also found the noise reducer to be quite useful. Even though I have an external hardware-based DSP noise reducer and auto-notch, it was good to see these facilities were also an integral part of the program suite.

CONCLUSION

Overall, I found *SkySweeper Plus* to be an excellent and quite invaluable addition to my station. It was easy to use, and the 'auto detect' facility was extremely useful while I was hunting around the bands. The offered facilities and modes are quite overwhelming, and a full review of all of these would almost fill a book!

My advice would be to try it yourself, as it's available as a free 'demo' download (see above). Registration prices of the different versions are based on an escalating scale, but as a guide the 'Standard' version is currently priced at 99 euros (about £67) with the 'Plus' version at 199 euros (approx £135).

Our thanks go to Pervisell (tel: 01494 443033) for the provision of the software for review and from whom you can obtain further information and prices.

FURTHER READING

Digital Modes for all Occasions by Murray Greenman, ZL1BPU (RSGB), available from RSGB Shop price £14.44 (non-members £16.99).
HF Digital Handbook by Steve Ford, WB8IMY (ARRL), available from RSGB Shop price £11.89 (non-members £13.99). ♦

RSGB MEMBERS' OFFER

For those who do not have fast Internet download capabilities (each program is about 8 – 9MB), as a service for RSGB members only, Chris Lorek is offering to supply a compilation of all the latest program demo versions together with the complete user reference manual on a recordable CD, including return 1st class P&P in a padded envelope, for a nominal cost of a £1 coin (or a 2 euro coin for EU airmail postage) taped to a piece of card together with your name and address.
Please send your request direct to Chris Lorek, G4HCL, PO Box 400, Eastleigh SO53 4ZF. Please do *not* send your request to RSGB HQ.

WEB SEARCH

Pervisell (download Skysweeper demos):
www.pervisell.com

Terry Genes, G6CNQ

2 Coltishall Close, Wickford, Essex SS11 8XN.

E-mail: genes@blueyonder.co.uk

Ham Radio Deluxe station control and logging software

Terry Genes describes *Ham Radio Deluxe*, which combines rig control, logging, mapping and many other features all in one program. The version described is 3.1, but new features and enhancements are being added all the time.

I have been licensed since 1981, and started keeping my log with paper logbooks. With the advent of computer logging and data modes I have tried several different programs, some of which were quite expensive. One problem that I encountered was that no single program provided all of the facilities that I required, so I ended up with separate programs for logging, *DX Clusters*, WWV, PSK31, mapping and yet another for rig control. The result was a very busy ham selecting many different programs and quite often clicking the wrong icon.

Recently I stumbled upon *Ham Radio Deluxe (HRD)* which fulfills virtually all of my requirements. At first I downloaded version 1.4 and was surprised at the versatility of the program – but there were one or two small things that were not quiet to my liking. I posted a query to the *HRD* forum and received an almost immediate response from Simon Brown, HB9DRV / GD4ELI, and Peter Halpin, PH1PH / G7ECN, pointing out that in the Beta version these points had already been addressed. Subsequently I have requested additions to the program and in every case *HRD* has responded very quickly, sometimes within an hour! This is one of the great attributes of this superb program. *HRD* is so versatile that it is impossible to cover every facility within the scope of this article but here is a précis of *HRD's* features.

RIG CONTROL

HRD works with virtually any rig, including those built by Icom, Kenwood, Yaesu, Elecraft and Ten-Tec and is also fully user-configurable. The colours of buttons, S-meter, frequency readout, background etc can be selected for your personal taste, and the positions of control buttons and sliders can be changed. You can also define your own CAT controls or just select which ones you want to use from the standard list which is very comprehensive. There is no need to touch the rig, as virtually all controls are more easily accessible from your computer screen or keyboard.

AUTOMATED LOGGING AND CALLSIGN LOOK-UP

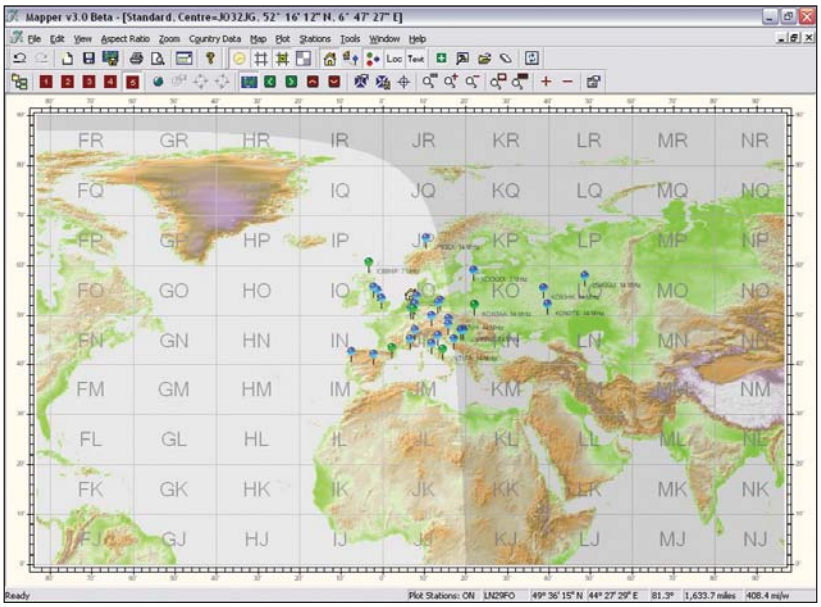
The logging is based on a Microsoft Access database format (.mdb) and provides automatic callsign look-up from QRZ.com. It can, upon your command, drop the details into the appropriate logbook field. DXCC entity numbers are also inserted based upon the callsign, as is the country name.

Main *Ham Radio Deluxe* rig-control screen.

There is no provision for calculating the number of countries or IOTA stations worked but you can either calculate these by exporting your log to Microsoft Access or a dedicated awards tracking program as the logbook supports the almost universally-accepted ADIF 2 format.

All relevant information is taken from the rig and computer, eg frequency, S-meter reading, mode, band, time, date etc, and you can also log from within the *PSK31 Deluxe* window at the click of a button.

The logbook does not cater for QSL printing – yet! Most of us export our logs to the excellent and free *BV7* from DF3CB – but that program should be the subject of its own review.



Using *HRD* to show locations of stations worked, and the day / night terminator.

DXCLUSTER

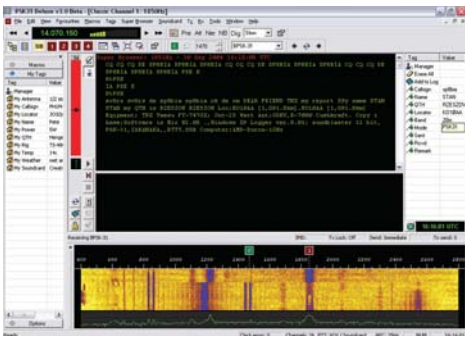
The main control window shows a real-time *DXCluster* display if you are connected to the Internet. You can choose to use either *HRD's* own cluster or the *Kolumbus* one.

You can view all DX spots or select the band / mode of interest. One click on a DX spot and the rig changes to that frequency – great for DX chasers! Spotting DX to the *Cluster* is simple.

WWV is not included in the program, but let's face it, once you have checked the forecast you don't need minute-by-minute information.

SATELLITE TRACKING

The program has a built-in satellite



tracking facility, which automatically adjusts your frequency to account for *Doppler* shift. I am no expert on this mode but devotees tell me it is one of the best satellite tracking programs available.

DATA MODES

HRD incorporates *PSK31 Deluxe*. Its Super Browser mode can watch up to 40 QSOs at once with a ticker tape style display: just click on the one that you want to work and away you go. Fully configurable macros and operating choices make this a very efficient program for *BPSK31/63* or any of the *QPSK* modes. There are no other data modes at present, but who knows what *HRD* will add next?

Above left: *HRD* simulation of the Ten-Tec Orion transceiver. It comes with Dem-O-Matic® simulations of four other popular transceivers.

Above centre: Using *HRD* to receive PSK31 signals.

Above right: The *HRD* 'Super Browser' which can show up to 40 PSK signals simultaneously as rolling 'ticker-tape' displays.

MAPPER

Grid Square mapping can be done automatically from PSK and you can also plot all of your contacts from the logbook with a click of your mouse The maps are good but not particularly high resolution so printing out at A4 is about the largest.

HOW MUCH DOES IT COST?

I have left the best to last – *Ham Radio Deluxe* is completely free! I can assure you that the backup from *HRD* is far better than any software that I have ever used, including commercial programs costing thousands of pounds. It's no wonder that Simon and Pete were awarded the RSGB's 90th Anniversary award for 'significant contribution to the development of amateur radio technology'.

I am sure that I speak for all *HRD* users when I say a great big thank you to the *Ham Radio Deluxe* team for providing the best ham radio software ever! ♦

WEB SEARCH

Main *Ham Radio Deluxe*: http://hrd.ham-radio.ch

Steve Telenius-Lowe, G4JVG and **Rod Wilkinson,** G3TXA

c/o RSGB HQ.

E-mail: radcom@rsgb.org.uk

MFJ-935 / 936 magnetic loop tuners

RSGB HQ staff take up a challenge from Waters & Stanton and test the new MFJ magnetic loop tuners.

Just before Christmas, Peter Waters, G3OJV, of Waters & Stanton called in to RSGB headquarters. Seeing me, he said, "Steve, you've just got to try this fantastic new MFJ magnetic loop which I've received from America!" He described how he had worked around Europe and even some DX stations using low power and the indoor wire loop. It sounded almost too good to be true and I must admit to having been a little sceptical about the results he said he had achieved, but I agreed to try it out anyway.

In mid-January two boxes turned up from W&S. The MFJ-936 is an ATU rated at 150W and designed specifically to tune wire magnetic loop antennas. Included with it was a PVC spreader assembly to make a 3ft square diamond-shaped loop, and two lengths of 10-gauge stranded wire, one about 12ft (3.6m) and the other 26ft (7.9m) long, terminated with eyelet tags. The unit sent was a pre-production prototype.

The idea is that instead of using copper tubing, as is normally the case with magnetic loops, thick wire can be used instead. The increased losses introduced by using wire instead of tubing can be decreased by making the wire loop larger than would typically be the case with a rigid copper loop for the same frequency band. For best performance the loops should be configured to contain the largest symmetrical inside area. A circle is optimum and a square comes next. As the loop is distorted into a rectangle, so the efficiency drops.

The PVC spreaders can be mounted directly on top of the ATUs and the shorter length of wire is simply placed around the PVC spreaders. The two ends of the wire are connected to terminals on the rear of the ATU, and the ATU connected to the rig using 50Ω coax.

The MFJ magnetic loop tuners will tune loops of approximately one-sixth of a wave to one-quarter of a wave in length. The coverage of any one length of loop is about 0.75 of an octave, so one length of wire will work on 7 and 10.1MHz, but not on 14MHz, and a wire that will work on 14MHz will also work on 18 and 21MHz but not on the higher bands.

TUNING UP

The MFJ-936 has a total of five controls and a large 'Antenna Current' meter. One of the controls is simply to adjust the sensitivity of the Antenna Current meter. Three controls in the centre of the unit are labelled 'Matching'. These are a small push button used for switching bands ('in' for 20 – 10m and 'out' for 40 – 30m), a 12-way switch which switches a tapped inductor, and a small tuning capacitor. The final control, marked 'Tune', is a large 360° split-stator capacitor.

To tune the loop, first switch to the correct band, then adjust the inductor and both capacitors for maximum signal on receive. The 'Tune' capacitor in particular is very sharp.

Then, using low power (approx 5 – 10W), adjust the 'Tune' control for maximum deflection on the antenna current meter. At the low power levels used in these tests, the 'Meter Sensitivity' control needed to be kept almost fully clockwise at all times. Finally, the inductor switch and the matching capacitor can be adjusted incrementally for minimum SWR. A separate SWR bridge (or an Antenna Analyser) is necessary. As with all ATUs, the inductor should not be switched with power applied.

MFJ-935

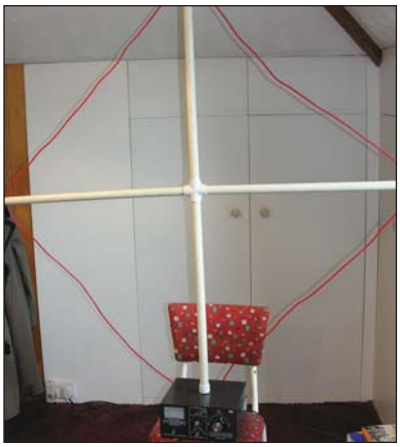
An MFJ-935 tuner is also available. There is little difference between the two units: the '935 is physically smaller than the MFJ-936 and has a smaller antenna current meter. It is also missing the band-change button, all bands being selected from the switched inductor. As it features a carrying handle on the side it can be inferred that the MFJ-935 is intended for portable operation and the '936 for home station use, though in practice either could be used in either situation and both have the same 150W power rating.

W&S also sent a pre-production MFJ-935 for testing and this was passed to my colleague, Rod, G3TXA, who specialises in QRP datamodes work.

HOW DID THEY WORK?

Rod and I made extensive notes and the following is a summary of our combined findings. In performance terms there appeared to be little or nothing to choose between the two units; we found we both had very similar experiences. We both found we could easily obtain a 1:1 SWR reading using the tuning method described earlier. We also both found that the location of the loop within the room was important. Initial trials with the loops located in the middle of a room proved disappointing. They were successful when the antenna wire was placed around a window frame (suggesting that the performance might be better still when used out portable, though this was not tried in January/February!)

On 40m, some good contacts were made during the day on SSB using power levels from 10W to 50W. Both G3TXA and G4JVG used 26ft lengths of wire and compared signals with outdoor full-size 40m dipoles. F5VJK (ex-G8OO), was 59+20dB on the dipole and 59+10dB on the loop (he was using 400W) and gave me a 57



Above left: The 12ft wire loop mounted on the PVC spreaders on top of the MFJ-936 ATU.

Above: The 12ft length of wire wrapped around a window. This set-up works on 14, 18 and 21MHz.

report on the loop and 59 on the dipole. QSOs were also made with G stations at signal levels of 57 to 59+ each way on the loop.

A number of contacts was made on 40m in the RTTY contest over the weekend of 12/13 February using a maximum of 25W. QSOs were with DL, T9, UA, UT and YU and all reports received were 599 (well, it was a contest!)

10W of PSK31 on 10MHz resulted in a QSO with a DL station, receiving a 549 report (he was received at 569).

On 20m, the 12ft length of wire and 10W of PSK31 produced contacts with DL, EA, HA, UA and UT with reports of between 549 and a genuine 599. Signals were compared with an outdoor dipole at G4JVG and an outdoor inverted-V at G3TXA and once again, in most cases, the loop was found to be about 10dB or around two S-points lower than the dipole. The G4JVG 20m dipole, it has to be said, is a proven performer: it is in the clear and when conditions are good I have worked many DX stations on it, including DXpeditions in the Pacific.

There were exceptions to the 10dB/2 S-point difference, and in both directions. A few signals were very much weaker on the loop, while DK2RZ/M (on 40m SSB) was 54 on both antennas with absolutely nothing to choose between them. This may be explained if DK2RZ/M was located off the end of the dipole, in the null of that antenna; though to be fair there was certainly some difference on other German stations – and a single-element dipole is not *that* sharp. In many cases, and in particular on 40m during the day, there was little or no *audible* difference between the loop and the outdoor dipole: it was only when watching the S-meter and switching between the two antennas that there was any noticeable difference.

Conditions were such that only European stations were worked during the test period. However, Peter Waters reports contacting a VK7 one morning, and two W4s during the evening, all on 20m SSB using the loop indoors, and I have no reason to suspect that such contacts would not be commonplace when propagation conditions are favourable.

Using an MFJ-259B antenna analyser indicated that the tuners will work down to about 5MHz, making the system useful on the UK experimental 60m band (where a half-wave dipole is around 83ft long).

SAFETY FIRST

The design of magnetic loops means that there can be some very high voltages on the ATU and the antenna and, quite rightly, MFJ has included suitable warnings on the ATU. On the front panel it states: "WARNING: Stay safe distance away from loop antenna while transmitting!" On the rear panel, adjacent to the terminals used for attaching the loop, is the even more stark message: "WARNING: Do *not* touch or contact loop connectors or loop antenna while transmitting. *You can be killed.*"

The question is, just what is a "safe distance"? To some extent, you *have* to be fairly close to the loop – within arm's distance – if you mount it on top of the ATU as designed, as it is necessary to adjust the controls while transmitting. It was for this reason, and the fact that the units being tested were pre-production prototype without the final versions' power rating, that we chose to carry out all tests at power levels of 10 to 50W. At this power, there was no noticeable TVI or breakthrough on hi-fi loudspeakers etc, though as with all indoor antennas this could become a problem at higher power levels. MFJ's recommended safety distances are from 2ft to 4ft for 100W input to the loop.

The MFJ-935 portable version of the loop tuner.

SUMMING UP

Many amateurs do not have the space to put up outdoor antennas, particularly for the lower frequency bands, where a dipole for 40m is around 65ft long. Even the ubiquitous half-size G5RV is over 50ft long. Flat-dwellers may not be able to put up *any* external antenna at all. The MFJ-935/936 will allow such people to get on the air and not only that, but radiate a signal within a couple of S-points of a well-sited outdoor dipole. I would imagine that if you happen to live in a high-rise apartment block the wire around the window frame many stories up could prove to be a pretty effective DX antenna.

Even if you do have outdoor antennas, these units would allow portable operation from virtually anywhere and at a moment's notice, with almost no setting-up or dismantling time necessary. Frequent travellers who often stay in hotels will find these units a real boon, allowing amateur radio operation from locations that might otherwise seem to be impossible.

With those stark warnings staring back at me from the ATUs, I would hesitate to recommend this system to anyone with a pacemaker – or to those who have young children around who are likely to come into contact with the loop when dad or granddad is distracted by trying to work VK!

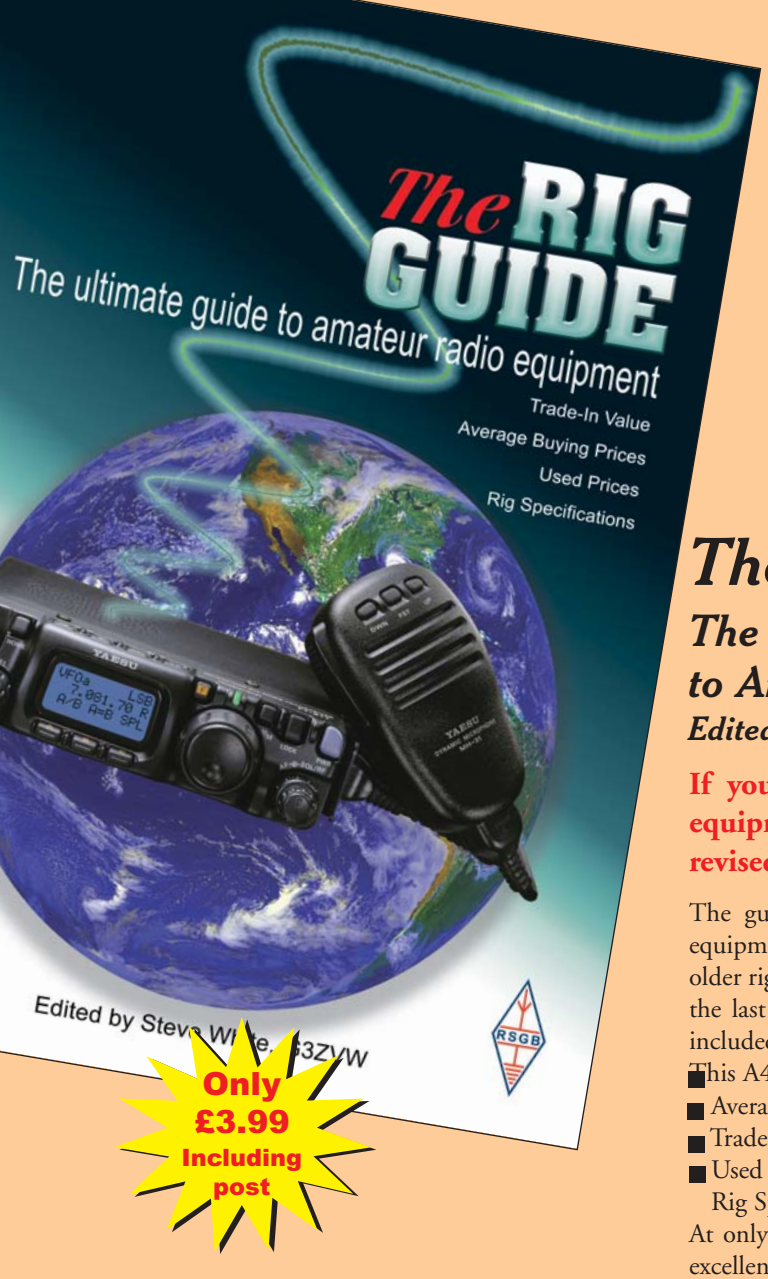
Those warnings aside, my initial scepticism as to the *performance* of these units proved to be unfounded. Having a two-way 100% 'armchair copy' QSO with a station nearly 1000km away on 40m SSB using 10W to an indoor bit of wire draped over a curtain rail was, I felt, extremely impressive and, I must admit, a little unexpected – even if signals were a couple of S-points better on an outdoor dipole.

PRICES & OPTIONS

The MFJ-935 costs £179.95 and the MFJ-936 £229.95. The PVC cross-arms assembly and suitable wire lengths come as optional extras. The MFJ-57 comprises 10-gauge wire for 20/17/15m plus cross-arm support assembly and costs £39.95. The MFJ-58 comprises three 10-gauge wires (for 40/30m, 20/17/15m and 15/12/10m) and cross-arm assembly kits for 20 – 15m and 15 – 20m. The 40/30m wire comes with clips to attach it to any convenient support. The MFJ-58 costs £54.95.

All are available from Waters & Stanton plc, 22 Main Road, Hockley, Essex SS5 4QS (tel: 01702 206835), who are thanked for the loan of the review samples. ♦

WEB SEARCH	
Waters & Stanton:	www.wsplc.com
MFJ:	www.mfjenterprises.com



NEW NEW NEW

The Rig Guide:

The Ultimate Guide to Amateur Radio Equipment

Edited By Steve White, G3ZVW

If you are thinking of buying new or used equipment, the fully updated and completely revised RSGB Rig Guide is here to help.

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RSGB Yearbook 2005 UK & Ireland Call Book

Edited by Steve White, G3ZVW

If you want a complete list of all of the UK licences on issue combined with a 176 pages of invaluable information about amateur radio the 2005 RSGB Yearbook is for you.

Bigger than ever the 2005 RSGB Yearbook has had every page reviewed and updated from the 2004 edition. The contents reflect the current state of the hobby, with pages devoted to contesting, awards, satellites and propagation. New for this edition are the 'Contesting Guide', your complete guide to RSGB contests from HF to microwave. You will also find features on Top Band Direction Finding and Mills Weekend. The section devoted to licensing now contains a huge list of all the Foundation, Intermediate and Advanced amateur radio courses available, plus a list of Examination Centres. IOTA receives extensive coverage, with a feature on IOTA's 40th Anniversary, information on the awards scheme, the Honour Roll and Annual Listing. Additionally there is the callsign listing for the Irish Republic, for short wave listeners and short contest callsigns, plus surname and postcode listings. As you would expect there is also much, much more included. All-in-all it adds up to a reference book that no radio amateur should be without. Everything you need at your fingertips, with 476 A4 pages this book is excellent value.
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Unique concept, brilliant execution. Kenwood's compact TS-480HX/480SAT is tailor-made for DX'ing. But its smartly designed standalone LCD control panel — featuring backlit keys to enhance operating ease — is equally at home on your desk, with the main unit up to 4 metres away. And wherever it is, this HF transceiver delivers an astonishing punch: 200W. Performance is equally impressive. For example, a quad-mixer provides RX dynamic range in the TS-950 class, while AF DSP processing offers many powerful features, including noise reduction, a speech processor, and AF filters. And of course you can enjoy all of the convenience of PC-based control. The TS-480HX/480SAT lets you enjoy the best of both worlds.

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

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Book review

PRACTICAL WIRE ANTENNAS 2
Edited by Ian Poole, G3YWX
Described by RSGB HQ Staff

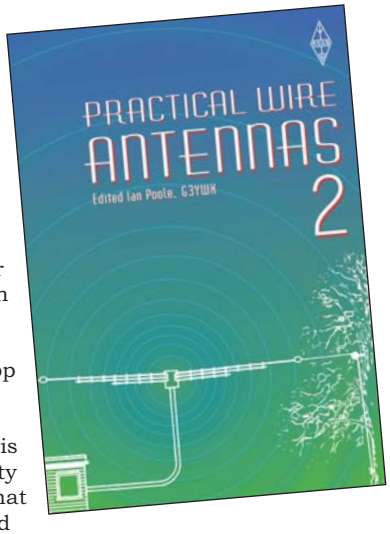
Practical Wire Antennas 2 is a new book which has been largely based around the very popular classic work by John Heys, G3BDQ, published by the RSGB in 1986. The original *Practical Wire Antennas* was reprinted several times but has now been out of print for five years. Instead of simply reprinting it once again, the opportunity has now been taken to edit, update and add new material. The resulting book, while drawing heavily on John Heys's original work, has additional material from the *RSGB Radio Communication Handbook, HF Antennas for All Locations* by the late Les Moxon, G6XN, antenna articles that have appeared in *RadCom* and, finally, much additional new material contributed by the editor, well-known amateur radio writer Ian Poole, G3YWX.

While every radio amateur requires an antenna of some sort, only a lucky minority are able to put up towers with rotatable HF beams. The remainder - and it is a large majority - therefore use wire antennas. Even for the former group, wire antennas are the norm on 1.8, 3.5 and 7MHz. Although unusual, wire antenna can also be used on the VHF bands, and designs such as the V-beam, which are too long for most amateurs to use on the HF bands, come into their own for those wishing to 'target' a particular area on VHF. While fewer amateurs have the time - or perhaps the ability? - to build their own transmitter or receiver these days, the vast majority of amateurs do still construct antennas, even if it is only to build a half-wave dipole from wire and coaxial cable. Thus, *Practical Wire Antennas 2* will appeal to virtually all amateurs and SWLs.

The book starts with a chapter on 'antenna basics', explaining in simple language such terms as resonance, voltage and current distribution, directivity, gain, radiation resistance, antenna impedance, bandwidth, polarisation etc. Theory is kept to an minimum throughout the book, and only a few formulas are given, yet those necessary to allow the reader to calculate the lengths of various antennas, for example, are all there.

Subsequent chapters cover feed lines, dipoles, antennas with tuned feeders, loop antennas, end-fed wires, verticals, ATUs and practical aspects of antenna work.

This book is almost guaranteed to engender strange behaviour in radio amateurs all over the country: enthused hams will be pacing up and down their gardens this spring to work out in which direction to orientate four collinear elements on 21MHz, or whether they can fit in an extended double Zepp for 20m! Just about every type of wire antenna imaginable is described, plus plenty of original designs that you simply won't find in other publications. You're sure to find one that is ideal for your own particular set of circumstances. On top of that, there are designs for ATUs for almost every type of antenna in this excellent book. In the preface, Ian Poole says: "It is hoped that this collection of antenna designs and ideas will help people to capture the enjoyment of experimenting in the true spirit of amateur radio, improving their stations, and being able to say that they have constructed an important part of it. If this is the case, the book will have succeeded in its aim." There can be no better recommendation than that.

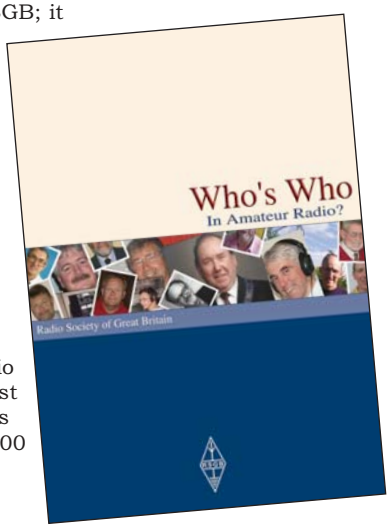


PRACTICAL WIRE ANTENNAS 2
Edited by Ian Poole, G3YWX
RSGB, 2005
176 pages, 240 x 175mm, paperback
ISBN: 1-905086-04-0
Members' price £10.19
(non-members' price £11.99)

WHO'S WHO IN AMATEUR RADIO?
Described by RSGB HQ Staff

This new book is something of a departure for the RSGB; it is unlike any other book published by the Society and, as such, is a bit of an experiment. We reckon that most amateurs will find it absolutely fascinating!

Like its famous namesake, *Who's Who in Amateur Radio?* reveals the achievements of radio amateurs. The biggest section of the book is a listing of around 500 of the most active amateurs, including their name, callsign, place of residence, date of birth, profession, education, when they were first licensed, their amateur radio achievements, areas of amateur radio interest, and amateur radio club or society memberships. In nearly 50% of the cases the listing is accompanied by a photograph of the individual. Unlike the callsign listings in the *RSGB Yearbook*, no addresses are published and *Who's Who in Amateur Radio?* does not claim to be an exhaustive listing. For this first edition, several hundred amateurs who were deemed to have achieved 'something' across the broad scope of amateur radio were contacted and asked to provide their biographical details. In addition, notices were placed in *RadCom* asking amateurs who were interested in appearing in the book to provide such details.



If a particular individual is not included in the book it most emphatically does *not* mean that that person was considered not to have achieved anything! In some cases those contacted rather modestly said they did not want to appear in the book, and with around 60,000 amateurs in the UK and 3 million world-wide, obviously only a small fraction can be included in a book of this size. However, it is hoped that readers who are not included in the first edition will submit their biographical details for the next edition of the book.

Following the main directory section are listings of 'notable' radio amateurs; those amateurs well known for activities outside amateur radio, radio amateurs famous for technical developments, RSGB Patrons, Presidents, Vice-Presidents and Honorary Members, holders of the RSGB Calcutta Key and Founders Trophy, as well as a 1992 interview with Lord (Brian) Rix, G2DQU.

The majority of entries in *Who's Who in Amateur Radio?* are from the UK but some well known overseas amateurs are included; those you are most likely to hear or work on the bands. Keep *Who's Who in Amateur Radio?* in the shack by the rig and the next time you go on the air, or when you're tuning around the bands, look up the people you hear. You're bound to want to refer to *Who's Who in Amateur Radio?* time and time again!

WHO'S WHO IN AMATEUR RADIO?
RSGB, 2005
160 pages, 240 x 175mm, paperback
ISBN: 1-905086-03-2
Members' price £12.74
(non-members' price £14.99)

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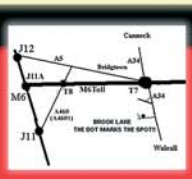

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1KW Auto ATU - 1.8-54MHz - 1-8 secs
Tune - Approx SWR Rating of 10:1

£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 4500 mAh; Fully Compatible with the FT-897 and Yaesu Charger.

NEW!

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-termperature 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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£299.95

iBox is a versatile accessory for amateurs who are serious about their audio.

£Call for information

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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Telescopic Masts Inc Guy Rings

Small 17' 6"	£55.95
Medium 26' 0"	£65.95
Large 33' 0"	£75.95
Tripods to fit masts	£25.95

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£39.95

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Siro MAG125 3/8	£17.95
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Siro MAG 145 PL	£22.95
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Power Amplifier

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YAESU

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Second Hand List

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Icom FL-53	£100.00
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Icom IC-756 PRO HF/6 Base £1199.00
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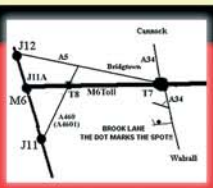

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West London Radio & Electronics Fair

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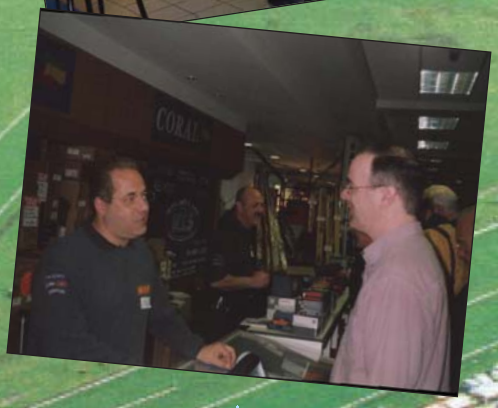

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- ★ DEMO STATIONS BY ICOM & YAESU
- ★ FLEA MARKET TABLES*
- ★ CATS BRING & BUY SALE
- ★ UKSMG AGM - 11.45am
- ★ WAB AGM - 1.00pm
- ★ PETER KIRBY TO SPEAK ON THE FUTURE OF AMATEUR LICENSING IN THE UK

Running Order

Tickets on sale	9.15am
Show opens	10.00am
IOTA	10.30am
6m Digital DX	11.15am
Practical Internet Linking	12.00pm
The Future of UK Licensing	1.00pm
Show closes	4.15pm

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The future of amateur radio licensing to be revealed at Kempton?

The Radio Fairs West London Radio & Electronics Fair takes place at Kempton Park on 24 April. Once again, the RSGB is sponsoring a series of 'Byte-Sized' lectures at the show. The subjects this time are IOTA, 6m DXing in the sunspot doldrums, Internet linking, and the future of amateur radio licensing.

The RSGB is pleased once again to be sponsoring the popular 'Byte-Sized' lectures which have become an immensely popular feature of Radio Fair's West London Radio & Electronics Fair held at Kempton Park Racecourse twice a year. At this month's show on Sunday 24 April, another set of these easily digestible, entertainingly presented mini lectures is to be given.

THE LECTURES

IOTA

Martin Atherton, G3ZAY, will be providing an introduction to the RSGB's Islands On The Air (IOTA) programme, its history, what island chasing's all about, which islands, bands and modes count towards which award, how to prepare your claim and the possibilities for DXpeditioning.

Opportunities for 50MHz digital DX in the solar doldrums

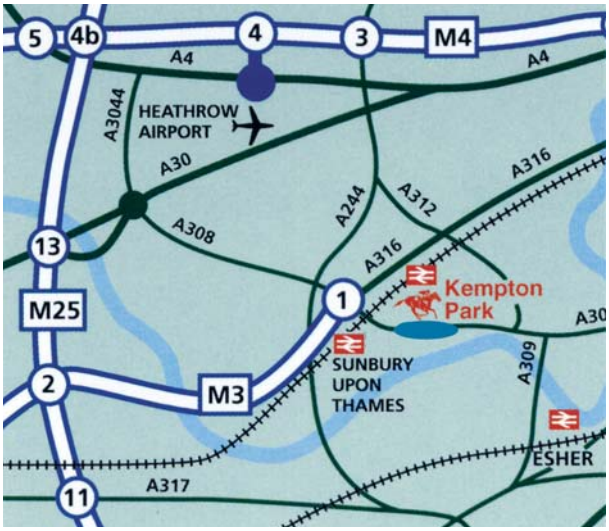
Dave Toombs, G8FXM, and Kevin Piper, G0CHE, will be teaming up to show what can be done on the 6m band despite the band appearing to be in the solar doldrums. Earlier this year saw the first-ever 50MHz digital Moonbounce QSO between M0BCG and ZL3NW; David and Kevin will be showing how it was done – and how you can give it a try too!

The practical side of Internet linking

Well regarded and practical exponent of Internet linking, Terry Giles, G4CDY, will be running through the various types and protocols of Internet linking, paying particular attention to the hardware required to connect your rig to your computer to enable world-wide communications using low power radio equipment. A live Internet connected node will be running throughout the day to allow visitors to Kempton to use their own handheld radios to chat to amateurs across the globe.

The future of amateur radio licensing

The 'Byte-Sized' lectures culminate with Peter Kirby, G0TWW, the General Manager of the RSGB, revealing the results of months of work and negotiation with Ofcom regarding the future of amateur radio licensing in the UK. Peter's talk will be extended from the usual 30 minutes allowed to include a question and answer session where all visitors to the show can share their views and find out how this important matter has been dealt with by Peter and his team.



Kempton Park is easy to reach, being located close to both junction 1 of the M3 and to Kempton Park, Sunbury-on-Thames and Esher railway stations.

THE REST OF THE SHOW

HF demonstration station

The Whitton Amateur Radio Group will be manning an interactive HF demonstration station using the very latest equipment kindly loaned by the big three manufacturers. The aim of the station is to allow visitors the chance to use the best gear connected to a good aerial and running 'a few watts' in order to experience the delights of HF operation and, maybe, generate their own pile-up with a special event callsign.

Traders and clubs

All the top traders will be at the show, including Martin Lynch & Sons, Waters & Stanton, Sycom and Moonraker amongst many others – all trading alongside flea market tables, club stands and the famous Coulsdon Amateur Transmitting Society bring and buy stand.

Latest equipment

Kenwood, Icom and Yaesu will all be showing their latest wares and will be giving sound advice to all queries and questions. British manufacturer bhi will be showing how it is possible to add the very latest Digital Signal Processing to equipment ranging from vintage rigs such as the KW-2000 to the tiny Yaesu FT-817.

AGMs

The UK Six Metre Group and Worked All Britain will be holding their AGMs at the show providing an ideal venue for all interested parties to get together under one roof to discuss the past year's activities and to plan for the next.

Ofcom

Ofcom will be manning a stand to give visitors the opportunity to speak with the regulators about their plans and vision of amateur radio in the future.

RSGB 'meet & greet' & bookstall

The Radio Society of Great Britain will be out in force at the show manning its bookstall and also a 'Meet & Greet' area where you can get to chat with officers of the Society.

Entry to the show is £3.50 and the first 1500 tickets will secure entry to a raffle, the lucky winner of which will be taking home a Yaesu FT-817. ♦

Martin Atherton, G3ZAY.

Dave Toombs, G8FXM.

Terry Giles, G4CDY.

Peter Kirby, G0TWW.

David Hayes, M0GDX and **Nick Totterdell,** G4FAL

43 Linden Avenue, Sheffield S8 0GA, and

35 Meadowbank Avenue, Sheffield S7 1PB.

The Lottery 'Awards for All' scheme

Could your amateur radio club use up to £10,000 in grant money? It could? Read on, as David Hayes and Nick Totterdell explain how their radio club received a Lottery 'Awards for All' grant.

Nearly every radio club committee must have a wish list of what they could do with extra money. In the case of the Sheffield Amateur Radio Club, some of our wishes are coming true thanks to the 'Awards for All' grant programme.

Some months ago we realised that our existing training activities for the Foundation licence and our intention to progress on to the Intermediate, could make us eligible for a grant. As the Treasurer, David Hayes, M0GDX, had previously successfully applied for an 'Awards for All' grant for a project unrelated to amateur radio, the club decided to proceed with an application, armed with his experience.

This article is a guide to help other amateur radio clubs make successful grant applications.

WHAT IS 'AWARDS FOR ALL'?

'Awards for All' is a Lottery-funded grants scheme aimed at local communities. The scheme awards grants of between £500 and £10,000 in a simple and straightforward way. The maximum grant to be awarded goes up from £5000 to £10,000 on 1 April 2005.

The scheme is UK-wide but is administered regionally. There are nine regional offices in England, and Scotland, Northern Ireland and Wales, each have a single office.

The 'Awards for All' scheme funds projects that support community activity. The aims of 'Awards for All' are to:

- Extend access and participation by encouraging more people to become actively involved in local groups and projects, and by supporting activities that aim to be open and accessible to everyone who wishes to take part;
- Increase skill and creativity by supporting activities which help to develop people and organisations, encourage talent and raise standards;
- Improve the quality of life by supporting local projects that improve people's opportunities, welfare, environment or local facilities, for example through voluntary action, self-help projects, local projects or events.

The Sheffield club used its grant to invest in training courses for future amateurs.

To obtain a grant you need to show how you will meet at least one of the above aims.

Each region also has some areas of special emphasis it wishes to focus on. Details are on the regional websites. In the Yorkshire and the Humber region, for example, 'Awards for All' will score more highly those projects which benefit:

- People living in disadvantaged areas and communities;
- Disabled people and / or their carers;
- Black and ethnic minority communities;
- Older people (aged 60 or over).

A young visitor gets the amateur radio experience during a Science Week special event station, under the guidance of co-author Nick, G4FAL.

HOW DOES THIS RELATE TO AMATEUR RADIO?

To be most likely to succeed, the application must show that funding will enable an amateur radio club to undertake activities that are consistent with the aims of 'Awards for All' and the regional focus. This does not preclude budgeting for a linear amplifier or mobile trailer tower, for example, if these are integral to appropriate projects. It will, however, involve a corresponding commitment on behalf of club members to deliver the projects for which the grant application has been made.

We would speculate that an application to kit out a contest station, in isolation, would be unlikely to succeed, but the same equipment used for a series of special event stations in order to demonstrate amateur radio to the public is more likely to be successful.

In the case of our application, we described four proposed project activities, namely:

- To extend the current range of training provided, from the Foundation to Intermediate and finally to the Full licence;
- To provide a series of practical workshops, with a focus on young people in the 14 – 19 age group and people of retirement age;
- To provide educational demonstration workshops in two schools and two community centres;
- To provide a week-long, amateur radio special event station and educational demonstration at the International Scout Jamboree in Yorkshire in August 2005.

There is a need to be careful not to commit your radio club to a level of activity that cannot be resourced, to which end we chose, in the main, to use the grant funding to enhance activities that we would have carried out regardless of the successful grant application.

The 'Awards for All' websites provide brief details of all successful applications. At the time of writing, these included amateur radio clubs distributed nationally: 13 in England, three in Northern Ireland, three in Scotland and one in Wales. Some of these are successful repeat applications.

Typical values and project scope for these grants are shown in **Table 1**.

It is clear that grant money has been approved both for capital purchases on behalf of an amateur radio club and also for club running costs. Our application included expenditure in both categories.

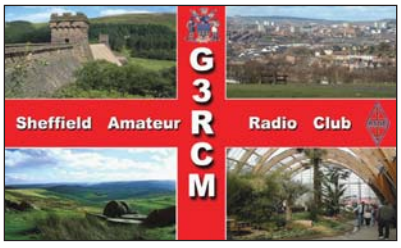
HOW TO MAKE AN APPLICATION

1. From the 'Awards for All' website you will find the criteria appropriate to your region or country. You will have to identify how your projects will meet these. The application form that you require is also downloaded from this website.
2. Decide on the general objectives of your project. For example: enhancing existing training to members, promoting 'hands on' activities within the wider community – schools, Scout groups or improving club premises for people with disabilities.
3. Identify specific objectives that will meet the general objectives you identified above.
4. Identify approximate costs for your projects. It is suggested that a club offer a financial contribution – say 10% of total cost, plus the freely donated time of its members. In Sheffield's case we made a profile of the age range, gender and postcodes of members. This was used to demonstrate that a significant proportion of the membership was below 18, or over 60 (retired) and lived in areas of relative deprivation. This was used to help meet the Yorkshire regional focus.
5. Identify a referee for the project – somebody who knows the club and can provide a written reference as to your bona fide status. The RSGB kindly fulfilled this role for our club.
6. Identify how any equipment items purchased will be stored.
7. Ensure that you have an up to date constitution and a club bank account.
8. Decide the approximate starting date for your award project. Submit your application about eight weeks before your intended start date.
9. Proceed to complete your first draft of the application form. We circulated copies to our committee and several other members to check that we were offering a project that would be easily achievable within the human resources of the club.
10. Finalise your project budget and modify your draft application from any received feedback. Include bank account details.
11. Ensure that the club chair signs the final application form. Send the form to your referee for signing. Return the signed form plus constitution to your 'Awards for All' office.

If you wish you can download a copy of our completed application form, for reference. This is available in PDF format on the Sheffield Amateur Radio Club website, see 'Web search' below.

Above left: The Sheffield Amateur Radio Club operating a special event station at a local museum.

Above right: Is there a pot of Lottery gold at the end of the rainbow? Co-author David, M0GDX, tries to find out.



The Sheffield Amateur Radio Club's QSL card.

THE PROJECT

After beginning the project the club may wish to modify the original budget proposals. If this involves changing equipment to be purchased, which is a significant percentage of the grant application, it may be wise to consult your 'Awards for All' office. It should not be a problem if the change is for valid reasons.

When the grant arrives:

- Bank the cheque in the club's current account. You will have to account separately for the grant money;
- Keep receipts of all items purchased;
- Download the 'Awards for All' logos for inclusion in all activities supported by the grant;
- Send out press releases to RadCom and local newspapers. This is particularly appropriate for advertising special event activities. (In our experience, the local press will publish virtually anything they are sent!);
- If offering training, provide feedback forms for participants to help ensure that your project is meeting the identified need.

After 12 months a short form must be completed identifying how your grant was spent in the appropriate categories. All receipts and accounts should be retained for possible inspection.

If your project has met its objectives it is possible to apply again.

We wish you every success if you choose to apply for a grant. Finally, we would like to thank RSGB General Manager Peter Kirby, G0TWW, for acting as our referee and for promptly returning our application form. ♦

Table 1: Typical values and scope of recent 'Awards for All' grants.

Value	Project scope
£5000	Funding to provide radio construction kits, furniture, display materials and safety testing, advertising and publicity and radio awards.
£835	To provide training in order to encourage more people to be involved in amateur radio. To pay for rent of village hall, examination fees for 12 candidates, 10 amateur band receivers, Morse code transceiver kits and admin costs.
£3265	To provide enhanced training for new and existing members in order to achieve certification in operating transmitting equipment. To purchase an electronic projector and screen, printer, laptop computer, training aids / software, audio mixer and microphone.
£4850	To attract approximately 30 new candidates to participate in a training course. Contribution towards the refurbishment of a radio room, radio equipment, computer and control software, Foundation licence training materials, radio antenna and rotator, Intermediate licence training materials.
£3837	A project to increase skills in amateur radio and extend access to the activities of a group with the provision of equipment to facilitate training courses, for the benefit of new and existing members. To pay for radio equipment, venue hire, and RSGB fees for course documentation and examination papers.

WEB SEARCH

Awards for All	www.awardsforall.org.uk/
Sheffield Amateur Radio Club	www.sheffieldarc.org.uk/

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www.tetra.tv

Bob Titterington, G3ORY

Wiclif House, St Mary's Road, Lutterworth, Leics LE17 4PS.

E-mail: g3ory@lineone.net

ARDF finds its direction

Amateur Radio Direction Finding – ARDF, or 'foxhunting' – has a long history in the UK and although many radio clubs hold DF hunts to their own rules, ARDF to internationally-accepted IARU rules is only now beginning to take off in the UK. Bob Titterington explains all.

PHOTO: K0OV

Nancy Pistole, KF6PAV, in the 2m event at the 2004 US Championships in Southern California.

Direction Finding first started in the UK in the late 1920s, more or less simultaneously in Sheffield and at the Slade Club in Birmingham. We thus have a long tradition of topband DF in this country.

When the 2m mobile radio arrived in the mid 1970s, to be followed a decade later by the handheld, clubs started running DF hunts on that band. FM was (and usually still is) employed because that was all that was provided on the radios. The presence of the limiter in the FM receiver did nothing to enhance the effectiveness of the radio for direction finding where detection of changes in signal strength as the aerial is turned is the key to success.

ARDF on the continent seems to have started in earnest in about 1947 when early Swedish DF hunts took place on 80m. There was also a lot of interest from the former Communist countries, especially Yugoslavia. An unofficial European Championship was held at Sarajevo in 1958. The first proper European Championships followed in 1961 in Sweden, when eight countries participated and both 80m and 2m were used for the first time.

The 1978 IARU Region 1 Conference was a major turning point when a permanent ARDF Working Group was established. Most important of all, it brought ARDF under the IARU umbrella and heralded the start of sustained international competition. The first 'official' set of rules was approved at the Region 1 General Conference in 1984 and this embodied the principles of competition on the two bands, five transmitters operating in sequence on the same frequency and a standardised system of transmitter identification. The rules have been amended several times since 1984 but, in all honesty, today these changes are just minor tweaking. The bi-annual World Championships commenced in 1980 at Cetniewo in Poland and the 12th Championship was held in the Czech Republic last September [see *RadCom* November 2004 p10 – *Ed*].

ARDF IN THE UK

It took until the early 1990s before a small number of UK amateurs began attending events on the continent with any regularity. The Belgian and German Championships were, and still are, popular with UK participants. Also attracting UK participation were the IARU Region 1 Championships, which are held in odd years, and the World Championships in even years. The Region 1 event took over from the European Championships in 1993.

Just as the continental competitions were reaching maturity in terms of a stable set of rules and IARU endorsement, the traditional UK events on topband and 2m, were having to come to terms with the 1988 Road Traffic Act. Section 12 of the Act specifically excludes racing and trials of speed on the public highway. Section 13 permits competitions, not being a race or trial of speed, if "authorised". This sounds very intimidating, but if organisers write to the local police force about running a competition not involving "racing" they are likely to receive a standard letter reminding them of the participants' obligations with regard to road safety and speed limits and that would be about it. Should any participant show disregard for speed limits and get 'nicked', that would be their problem and not the organising club's.

The first event in the UK using the IARU rules took place in 2002 when a group of Midlands amateurs built a set of 2m transmitters complete with PIC timers. These timers ensure that each one of the five transmitters in the set transmits in its allocated 60-second slot in a five-minute cycle. The cycle repeats until switched off or the batteries go flat. All transmitters are on the same frequency. There is also a delay feature, which allows the transmitters to be synchronised in one place, taken out into the competition area in 'sleep mode' and then 'fire up' automatically in the intended sequence at a pre-determined time.

This inaugural event was run near Birmingham and used only 2m. As well as 20 or so participants, the then RSGB President Bob Whelan, G3PJT, came to present the awards and ended up competing himself! Those who attended that event enthused at the challenge presented at trying to locate five transmitters in a fixed time limit (usually two hours). After all, anyone who has participated in a single transmitter club DF hunt will have seen how a team can be very lucky in some way and as a result win. However, you do not get lucky five times in a row, so the winner in an IARU event shows true skill.

PROGRESS OVERSEAS

It is interesting to compare progress in the UK with other countries outside the founding group. In the US it was back in 1989 as a result of a new 'sister city' agreement between Portland, Oregon, and Khabarovsk in Russia that a group of Americans were invited to the USSR to participate in 'Radio Sport'. One of the activities was ARDF, which the Americans doubtless approached with their customary enthusiasm. The first competition in the US took place in 1991, a full 11 years before the UK.

The USA is a seriously big country and that brings them problems of distance, which are much less of an issue in the UK. Clusters of activity have sprung up over there. As well as Oregon, clusters exist in Southern California, New Mexico, Cincinnati, Georgia and other locations. Because of the distances, for most of the time these have to operate in isolation. We have similar 'clusters' in this country, but they are mostly close enough to allow enthusiasts from one cluster to attend events organised in neighbouring clusters.

Immigrants from Eastern Europe have boosted the US expertise. Three members of their team in Brno last September were immigrants. Dale, WB6BYU, observed, "This gives us a much more serious perspective than we might otherwise have had from a bunch of part-time hobbyists".

Over in Australia, things started a little later with the first official event at Townsville, Queensland, in 1995. The two major centres of activity are around Melbourne and up in Queensland. The Australians have excelled in the design and provision of receivers. Bryan Ackerly, VK3YNG, has designed several receivers and the latest Mk4 Sniffer (why it is called a 'sniffer' is a mystery: the receiver is far from being a low-sensitivity device suitable only for the final run-in to the 'fox', but is a fully-featured 2m synthesised receiver). 160 of these receivers have been produced, with 80% being exported to the US. The general pattern of activity in the early days is remarkably similar to things in the UK today. Just as in America, there are serious problems of distance between their centres of activity.

RECENT DEVELOPMENTS

Since 2002 ARDF has made steady progress in the UK. In 2003, the first 80m event was run in Northern Ireland by David Hutchinson, GI4FUM, with technical support from the Chairman of the RSGB ARDF Committee, Geoffrey Foster, G8UKT. 80m was used in mainland events in 2004 when there were two 'dual band' events with a 2m competition in the morning and an 80m one after lunch. One format that was well received was to have a three-transmitter 2m event and a three-transmitter 80m event on the same day. It is rather too much of a physical challenge for older competitors to do two five-transmitter events in one day. A typical five-transmitter event in the UK involves a distance of about 4 or perhaps 5km (straight line distance between transmitters visited in the optimum order). Walking or jogging along the tracks and walking into the transmitter sites works surprisingly well.

ARDF represents a bit of a 'chicken and egg' situation as far as equipment is concerned. No-one is going to build an 80m DF receiver if there are no events to attend; likewise no-one is going to organise an event if there are no amateurs with 80m ARDF receivers to participate. Fortunately we are now past that stage in the UK. There are receiver kits available from UK sources for both 2m and 80m (details on the ARDF website, see 'Web search' below). There are two sets of 2m transmitters; one owned by the Basingstoke Club and one by the author. There are also two sets of 80m transmitters, one in the Midlands and one in Northern Ireland. The Basingstoke club is also building a set.

These transmitters and receivers all use amplitude modulation. Having established that a limiter is an undesired feature of an ARDF receiver and that the receiver must be sensitive to changes in signal amplitude, it follows that amplitude keying is desirable since an AM detector will be in use in the receiver. Normal CW keying is used on 80m and the transmitters generate about 2 – 3W. The antenna systems are relatively inefficient with perhaps an 8 to 10m long antenna wire together with a counterpoise of similar length. The ERP is thus only a few hundred milliwatts. On 2m MCW is employed to permit the use of audio filtering when narrow IF filters are precluded by virtue of limited LO stability, in a low cost, battery powered portable receiver. The 144MHz transmitters radiate about 800mW and horizontal polarisation is used with crossed dipole antennas.

One of the great attractions of ARDF is the age categories. The 'greybeards' can never expect to be competitive against folk in their twenties and thirties of similar DF ability. The sport has five male age categories, with the oldest being 60+ and four female categories, with the oldest being 50+. So, however old you are, you compete against your contemporaries.

The people who participate come from several backgrounds. At the World Championships and the IARU Region 1 Championships, the number of young people and women are far greater proportions of the total participants than those at a typical UK radio rally. In the UK, amateurs with a background in both topband and club DF have come across to enthusiastically embrace the IARU concept. There is interest by the Scout movement in Northern Ireland and in the south of England.

Dave Bullock, G6UWO, finds a 2m transmitter at Kinver Million. The transmitter is nearly invisible but a brightly coloured marker carries the needle punch he is using to mark his control card, to prove he has visited this transmitter.

DF IN 2005

In 2005 it is hoped to run one event a month from March to October. Details are on the website. Equipment is normally available for loan at these events but the quantity is finite, so it is advisable to call the organiser beforehand to arrange a loan.

Direction Finding to the IARU rules offers a much more exciting challenge than DF hunts with just one or, at best, two hidden transmitters. It opens the door to international competition. We in Europe are the envy of the rest of the world with so many countries actively participating in ARDF. In the UK it also avoids any conflict with the Road Traffic Act and in a world that is ever more aware of the dangers to good health of physical inactivity, it offers a pleasurable antidote.

What better way to enjoy amateur radio than to have a day out in the open air, take a bit of exercise and enjoy being competitive? ♦

WEB SEARCH

UK information:	www.ardf.btinternet.co.uk/index.html
US information:	www.homingin.com
IARU Region 1:	www.ardf-r1.org
Australian ARDF:	www.ardf.org.au

This article was prepared with the help of: G3ORI, G4IAR, K0OV, ON7YD, SP5HS, VK3YNG and WB6BYU and their assistance is gratefully acknowledged.

Every week one Radio Retailer receives letters & emails complimenting them about their service.

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John G4XBL

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Alan GM3OXA

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Aubyn G4CMF

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No.3 ★★★★★★★★★
Yaesu FT-1000MP mkV
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No.4 ★★★★★★★★★
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No.5 ★★★★★★★★★
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No.6 ★★★★★★★★★
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No.7 ★★★★★★★★★
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No.8 ★★★★★★★★★
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No.10 ★★★★★★★★★
Yaesu FT-7800
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No.11 ★★★★★★★★★
Yaesu FT-8800
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No.12 ★★★★★★★★★
Yaesu FT-2800M
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No.13 ★★★★★★★★★
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No.15 ★★★★★★★★★
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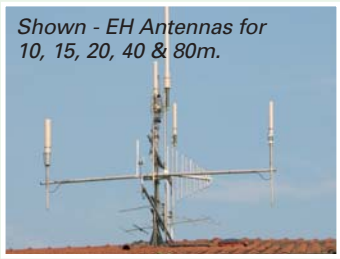
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Propagation and operating experiences from a DX location

How reliable are the propagation predictions that appear in *RadCom*? Gwyn Williams, who produces the predictions each month for *RadCom*, attempts to find out by analysing his own log of operation from Mauritius.

Between 20 August and 13 September 2004, as with the last several years, I was in Mauritius. There were many reasons for the visit: family concerns, a holiday and, of course – since the Mauritian government had granted me a temporary licence – amateur radio. It is the latter which I shall be concentrating upon, as my wife can testify I spent considerable time in front of the Yaesu FT-100 transceiver.

BACKGROUND

I have now operated from Mauritius a few times and have enjoyed each experience, but it has not been since my article appeared in the May 2000 *RadCom* that I have reported my findings to a wider audience. 2000 was a lot closer to the height of the sunspot cycle, whilst in 2004 conditions reflected its place nearer to the bottom of the cycle. Things could not be more different from a propagation point of view.

My operating QTH and set-up were more or less the same as in 2000, but instead of borrowing equipment I now have my own DXpedition station. This consists of a Yaesu FT-100, PSU, CW key and keyer and a box for spares and tools, all neatly and securely packed into a case which when full weighs 12kg. The aerial I took was a Cushcraft MA5V vertical (20m to 10m) which weighs about 4kg. Enough allocation is therefore left over for my personal luggage (I've managed to keep this to a minimum, by leaving some clothes at my destination).

Some time prior to my departure I made some propagation predictions from Mauritius to various parts of the world, see **Table 1** for a selection of these. The predictions were prepared using the same program as those in *RadCom*, called *REC533*. For the predictions I used 100W output with a vertical at 3B8 and a 3-element Yagi at the DX location. I also took a great circle map centred on Mauritius, geomagnetic forecasts from NOAA SEC and the British Geological Survey Geomagnetism Group.

Above: My equipment and operating position.

Left: Gwyn, 3B8/G4FKH, at the key.

I also produced propagation predictions from other programs for comparison purposes as well as an LUF (lowest usable frequency) prediction. It transpired that the LUF prediction was not at all accurate, as frequencies that were below the predicted LUF were frequently open. (However, it must be said that little accuracy is claimed for the LUF in these programs anyway.)

PROPAGATION PREDICTIONS VS OPERATING RESULTS

Table 2 shows the analysed results from my log in roughly the same format as used in Table 1. It was not possible to use S-meter readings because for most of the time the S-meter was not recording signal levels; signals were too weak although it was perfectly possible to hear and copy Morse signals.

In general the predictions are broadly in line with results for the first part of the day, with the exception of 10m. Things started to go wrong with the predictions after about mid-day. Of course, I could only work stations that were on the air and there is no guarantee that stations from the areas that I made predictions for were in fact active, but I believe that my results are a good reflection of the band conditions at the time. This would suggest that higher bands are being *overstated* in the predictions.

On several different occasions I listened to the NCDXF beacon chain on all their frequencies to ascertain the best opportunities but at these times the 10m transmissions were only just readable, also only those close to 3B8 were heard, no real DX beacons. It was fortuitous that no significant solar disturbances occurred whilst I was on 3B8, unlike in 2003 when there were never-ending coronal holes. Coronal holes cause the MUF to decrease and also cause a general decline in radio propagation.

Another important propagation factor that was noticed: early in the operating window, signals from the east, ie Japan, were stronger than during the latter part of the operating window. Conversely, signals from the UK and closer European countries were received at lower levels during the early part of the operating window and were at higher levels at the end of the operating window. My 3B8 signal was therefore difficult to hear in the UK at the end of the operating window. This suggests two things, (a) signal strengths follow the sunrise path but lag behind by some hours, and

Table 1

0700UTC / 1100MLT						0900UTC / 1300MLT						1100UTC / 1500MLT					
Prefix	20m	17m	15m	12m	10m	Prefix	20m	17m	15m	12m	10m	Prefix	20m	17m	15m	12m	10m
G	-	-	2	-	-	G	-	-	2	-	-	G	-	4	2	-	-
JA	-	-	-	2.5	2	JA	-	2	2.5	3.5	3.5	JA	3	4	3.5	4	-
LU	-	-	-	-	-	LU	-	-	-	-	-	LU	-	1.75	-	-	-
EU	-	1.25	2	-	-	EU	-	-	1.75	-	-	EU	-	1.25	2	1.75	-
UA1	-	-	-	-	-	UA1	-	-	-	-	-	UA1	-	1.5	-	-	-
UA9	-	-	-	-	-	UA9	-	-	-	-	-	UA9	-	-	-	-	-
VK3	-	2.5	2.5	-	-	VK3	2.5	2.5	-	-	-	VK3	3.5	-	-	-	-
VK6		1.5	1.5	-	-	VK6	3.5	3	2.5	-	-	VK6	5	3.5	-	-	-
W1	-	-	-	-	-	W1	-	-	-	-	-	W1	-	-	-	-	-
W6	-	-	-	-	-	W6	-	-	-	-	-	W6	-	-	-	-	-
ZL	-	-	-	-	-	ZL	-	-	-	-	-	ZL	-	-	-	-	-

Propagation predictions from Mauritius to 11 different areas of the world. These were made using the program used for the *RadCom* predictions. Times are in both UTC and Mauritian local time (MLT), for ease of use. The higher the figures, the better the predicted path.

(b) reciprocity is not as prevalent as some textbooks and propagation predictions programs suggest. However, to find out the extent of these factors a better-organised study will need to be carried out.

Finally I would like to make some comments on the noise situation. It was my extreme luck that there was very little manmade or atmospheric radio noise. Manmade noise was at low levels because of the relative lack of noise producing factors normally expected in a modern environment. Little atmospheric noise was heard because in this hemisphere it was winter, with its distinct lack of electrical storms. These factors meant that low-level signals could be heard and as in some instances QRP stations worked.

CONCLUSIONS AND SUGGESTIONS

Operations at this time of the solar cycle and at the beginning of the next should attempt to take advantage of some of the points mentioned above. A time in the hemisphere when electrical storms are at a minimum will enable the exploitation of lower atmospheric noise. Staying away from too much modern civilisation will assist with manmade noise. It should then be relatively easy with suitable aerials to work even the weakest stations. Historically there will also be fewer solar disturbances during this period. Advantage could also be taken of the above-mentioned east/west path variations, if these are found to be in existence. The latest operations that I've read about suggested that 14MHz closed down at night due to noise levels, however, it was my experience that 14MHz closed down at night due to the MUF (maximum usable frequency) falling below 14MHz somewhere along the path. The normal ways of verifying this have drawn a blank because of the lack of ionogram information. It would also seem prudent to be equipped for the lower bands if operations during the night are anticipated. ♦

Table 2

0700UTC / 1100MLT						0900UTC / 1300MLT						1100UTC / 1500MLT					
Prefix	20m	17m	15m	12m	10m	Prefix	20m	17m	15m	12m	10m	Prefix	20m	17m	15m	12m	10m
G	2	-	3	-	-	G	-	-	-	-	-	G	-	2	11	8	-
JA	2	-	5	-	-	JA	-	-	28	1	-	JA	4	39	27	4	-
LU	-	-	-	-	-	LU	-	-	-	-	-	LU	-	-	-	-	-
EU	10	4	52	-	-	EU	-	-	43	2	-	EU	1	44	78	61	-
UA1	-	-	7	-	-	UA1	-	-	11	2	-	UA1	-	3	20	9	-
UA9	1	-	9	-	-	UA9	-	-	12	1	-	UA9	1	10	18	11	-
VK3	1	-	1	-	-	VK3	-	-	-	-	-	VK3	-	-	-	-	-
VK6	-	-	-	-	-	VK6	-	-	-	-	-	VK6	1	-	-	-	-
W1	-	-	-	-	-	W1	-	-	-	-	-	W1	-	-	2	3	-
W6	-	-	-	-	-	W6	-	-	-	-	-	W6	-	-	-	-	-
ZL	-	-	-	-	-	ZL	-	-	-	-	-	ZL	-	-	-	-	-

The figures are the numbers of QSOs made with each area of the world at the appropriate times. The times are the same as in Table 1.

Steve Hartley, G0FUW

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

Newcomers' news

Many 'old timers' are newcomers to amateur radio: people coming into amateur radio after their retirement from work. But can newcomers also be amateur radio 'old timers'? Steve Hartley discusses this apparent contradiction.

Christmas doesn't seem that long ago but here we are at Easter when many venture out into the garden for the first time since the winter set in. I wonder if you have any radio-related spring cleaning stories or antenna pruning anecdotes to share? Input from readers is always welcome and we have some good news items this month – keep them coming!

YOUNG AMATEUR IN LOCAL PRESS

Cameron Young, M3IJZ, is the youngest person to gain an amateur licence at the Scarborough Amateur Radio Society. Cameron's success at the grand old age of 10 attracted good coverage in the local paper, the *Scarborough Evening News*.

The paper reported how Cameron and his dad joined three others on the latest course at the Scarborough club. The article explained that the course was run over a 12-week period and how the classes were run by local volunteers. There was also a simple overview of the entry level requirements.

Following their 100% pass rate on the Foundation course, the Scarborough tutors were reported to be starting an Intermediate course, so we could be seeing some more good news soon – hold the front page!

Apparently Cameron is now active on 144MHz and the high frequency (HF) bands and has already worked more than 20 countries. He is keen on PSK31 transmissions and is sharing time on the Yaesu FT-817 transceiver with his father, Angus, M3IKB.

Thanks to Robert Clutson, G0WHO, the Lead Instructor for passing on the story and to the *Scarborough Evening News* for a fine photo of young Cameron.

Cameron Young, M3IJZ, as featured in the *Scarborough Evening News* (see 'Young amateur in local press').

CAN NEWCOMERS BE OLD TIMERS?

I know from my own Foundation classes that 'old timers' can be newcomers – I have had several students come to the hobby as a retirement project – but can newcomers be 'old timers'? News from Ian Brothwell, G4EAN, explains why the answer is a resounding "yes".

As Secretary of the Radio Amateur Old Timers Association (RAOTA) Ian heard several rumours during his time on the RAOTA stand at the Leicester show last year. Some, at least, are amusing but none is true. The rumours say that if you want to become a member of RAOTA, then:

- you have to be retired, or
- you have to be a G3, or
- you have to be licensed (class A!) for at least 25 years, or
- you have to have been licensed before WWII!

Ian points out that, if these rumours were true, he himself would not have qualified to become a member. What, then, is required by way of qualifications? Quite simply – not a lot. You see, RAOTA has two categories of membership – Associate and Full. Associate membership is, quite simply, open to anyone who shares the aims of RAOTA (to maintain the spirit and traditions of amateur radio) and is active in amateur radio.

If a new member has, in addition, been active in the hobby for 25 years or more (whether or not licensed), he or she would become a Full member. Full membership differs from Associate membership only in having voting rights. Last year the group enrolled a 14-year old as an Associate member. Her grandfather was a member and she also wanted to join. The lass had held an Intermediate licence for about three years so will become eligible for full membership whilst still in her thirties.

Members of RAOTA are spread around the UK so RAOTA itself does not hold club nights but members do organise social events, called 'get-togethers', where members and guests eat and chat. The next get-together will be held in Derby, at the Brunswick Inn on the second Saturday in May, that's the 14th by my calendar. All RAOTA members, with guests, are welcome to come along. They should contact the organiser, Ian, G4EAN, so that seating and catering can be arranged. Ian can be found at 56 Arnot Hill Road, Arnold, Nottingham NG5 6LQ with e-mails to ian@bartg.demon.co.uk or by calling 0115 926 2360.

If you are interested in joining RAOTA you will need to contact the membership secretary and magazine editor, Edward Rule, G3FEW, 15 Norwich Road, Lenwade, Norwich NR9 5SH. Edward has the e-mail address edit@raota.fsnet.co.uk and can be contacted by telephone on 01603 872 309.

MM ADVANCEMENT

A wee while ago I responded to a request for some tips on Advanced level training from Dave Hulin, 2M0XPG. Requests for help are not uncommon, and I always try to help if I can but quite often that is the last I hear. I was therefore very pleased to hear back from Dave to say that he had been successful in the December Advanced exam and is now the proud holder of MM0XPG.

Dave's next challenge is to learn the Morse code as he is keen to operate on CW. He says he has no intention of heading for the 'for sale' columns for a linear amplifier, he feels 100 watts is quite enough. Dave has an MA5B mini-beam up at between 7 and 12 metres, depending on the wind blowing across the Ayrshire coast at Irvine.

Thanks for the feedback Dave, it is always a pleasure to know that newcomers are progressing and rest assured that the offer of a pint of 'heavy' will be taken up when I next visit Irvine.♦

WEB SEARCH

Radio Amateur Old Timers' Association: www.raota.org

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A beginner's guide to restoring old valve equipment, part 1

An affectionate look back to the days of radios that glowed in the dark and, should you be lucky enough to obtain one, how to go about restoring it to working condition.

The day I fell in love with radio and thermionic valves was in 1969, when as a 14-year-old I was shown into the radio room of the local Sea Cadet Corps. Three strongly-built benches were stacked end-to-end with a multitude of blue, grey and khaki-painted steel boxes. On their fronts were dials and meters and on their sides were what looked like air vents – which were emitting soft orange, yellow or green glows.

Sitting in front of them, wearing a pair of military headphones, was a tall lad a couple of years older than myself. Very faintly, I could hear a sound coming from the boy's headphones that I realised was Morse code. With the colours, lights and the tinkly sound of Morse, it seemed a strange, mysterious and magical world. From that day on, I was hooked.

When I was 16, my Uncle George found me a 1940s-vintage National HRO MX for £10, bought using money I earned from delivering newspapers. With its huge black dial, inset with numbers that changed as you spun it, and orange-glowing S-meter, it seemed alive. When I passed my Morse test and became G3ZZD, George built me a 1.8MHz AM/CW transmitter using B7G and B9A-type miniature valves, in a beautiful Hammerite-painted case. However, I liked the glow of the valves so much that the case was immediately discarded.

My friend G8EPD thought my attitude to these old-fashioned devices was crazy – Mick was thoroughly modern and used to build equipment using the latest Mullard semiconductors. I would tell him that transistors were a load of trendy rubbish and what good was a device that didn't glow and you couldn't tell by just looking when it was overloaded, off-tune, about to explode or had died. In turn, Mick would roll his eyes as if to say "G3ZZD is a sentimental fool".

Well, this is possibly true, but enough story-telling. The object of all this is to explain a little of the passion that valve radio equipment can produce.

The author Steve Ireland, VK6VZ, with RCA AR88D (left), and Kingsley AR7 (top).

CHOOSING THE OBJECT OF YOUR AFFECTION

There is a considerable variety of valve communications equipment available for restoration. There are also different challenges facing the would-be restorer, depending on what era of radio they would like to restore. In the VK6VZ shack, I have two main varieties of valve radio equipment – ex-military stuff from WWII, and commercial gear from the 'golden age' of amateur radio in the 1960s/1970s. In both cases, this is equipment I became familiar with when I first became interested in radio.

Although the attraction is the same, the restoration problems are somewhat different. In general, equipment from the WWII era is *much* bigger and heavier than similar equipment from the '60s / '70s, making it physically much more difficult to work on. For example, an RCA AR88D receiver weighs over 100lb and is almost 20in long by 20in deep and a foot high: a very imposing set to move about on a work-bench! In contrast, a 1970s Drake R4C receiver weighs less than one fifth of the AR88D and is less than a quarter of the size.

My choice for a first radio to restore would be one that has some nostalgic value to me, but doesn't fetch a premium price. A friend of mine in the UK likes restoring Heathkit SB-101s, as they were the first serious HF radio he used, while another favours KW Electronics gear. Luckily, these two marques are relatively cheap to buy and relatively plentiful. Last year, I bought an old KW160 1.8MHz AM/CW transmitter for £55. One of these, or a similar-aged Codar AT5, would make a good starting point for the would-be restorer.

Another thing to consider is whether you want a radio to restore to its original condition, or would rather just put the radio back on the air for fun, using whatever components are to hand. Since I became interested in restoring old radios, I have discovered there are huge differences between these two approaches, and restorers tend to belong to either one camp or the other. My approach is the less conservative of the two, but I have a friend who is of the electronic Conservative camp. When he restores an old receiver, he immediately purges it of any non-original components or 'modifications'. In one case, he bought a Kingsley AR7 receiver which had been modified by the government department that originally purchased it with a product detector. Like many other countries, Australia made two versions of the HRO receiver around WWII, the AWA AMR100 (made in Sydney) and the Kingsley AR7 (made in Melbourne). Although this modification actually improved the performance of the AR7 substantially, my friend immediately dismantled the product detector and replaced it with the original circuitry.

A few years ago, I purchased a Drake R4C for restoration, which was something of a 'dud'. It had been neglected for most of its life and needed a lot of work, both mechanically and electrically. Rather

The restored RCA AR88D. This receiver is far from being in original condition, with its first RF stage replaced with an miniature EF183 valve and its metal cabinet replaced by a wooden one, made from Western Australian jarrah. However, it works well and is a great talking point.

Close-up of part of the Kingsley AR7 front panel. This example is very original.

than trying to restore it to its original condition, the R4C ended up being 'gutted' and some of its valves actually replaced with semiconductors. Whilst the modified R4C now outperforms everything else in my shack for receiving signals on the 1.8, 3.5 and 7MHz bands – including a Yaesu FT-1000MP – my conservative friend regards it as a great waste of a classic receiver.

MAKING YOUR PURCHASE

First of all, the best idea is to decide what sort of valve receiver you would like to restore, taking into account the factors we have just examined. This choice will also have an effect on where to look for such a receiver.

My first inclination when looking for a receiver to restore is to ask around at the local radio club and friends and acquaintances who are interested in amateur radio. The world is full of radio amateurs who put old pieces of equipment to one side in their garage with the idea of 'one day' restoring them. Often they never quite get around to it, and are quite happy to part with their piece of old gear at a very good price to someone who is keen to do something with it.

The next best places in my experience are hamfests, mobile rallies and ham junk sales of all kinds. In preference, make sure you are on-site well before the events actually start, so you can help sellers unload their cars and trucks – and get first pickings of the gear before the doors open to the rest of the world. The old notion that someone's rubbish is someone else's gold is as true as ever.

The 'special interest' Internet reflectors are also an interesting place to look for gear to restore; there are reflectors for Drake, Collins and Heath gear, plus several devoted to 'boat anchor' radios. If you are really desperate, you could try looking on *ebay* sites on the Internet, but this is may only frighten and depress you, with the ridiculous prices asked for some old radio equipment. On the other hand, the odd reasonably priced piece of valve radio gear does come up on *ebay* from time-to-time – the only problem is you are likely to be competing with half the world to get it.

If you don't already know, the term 'boat anchor' is principally used in connection with the very heavy radio equipment used in the 1940s/1950s, in particular of the war-surplus type. The ruggedness of this equipment is legendary. For example, the story goes that hundreds of RCA AR88s were used as 'hardcore' for an extension to a runway at Heathrow airport after WWII. If you are interested to know more about the different types of 'boat anchor' receivers, I would thoroughly recommend getting hold of the book *Communications Receivers – The Vacuum Tube Era: 1932-1981* by Raymond S Moore [1]. I learnt a lot of what I know about the history of valve receivers from this book.

Another good option is a 'wanted' advertisement in *RadCom* or even in the local paper. A friend of mine who is a non-licensed radio enthusiast has used the latter method for years with great success. He simply puts something like "Wanted – a valve radio, preferably of the shortwave communications type", plus his phone number. He has 'hooked' all sorts of amazing radios in this manner, including ones made by Collins, Drake, Hammarlund and National.

One of the best reasons for buying locally is not only you can see what you are buying, but you can carry the equipment away (OK, stagger off with it) yourself. The cost of transporting a KW Electronics KW77 or an Eddystone 888 is likely to be a lot better than a Hammarlund SP-600 or an RCA AR88D, but it is going to be a *lot* worse than a Kenwood TS-450S or an Icom IC-706.

STARTING THE RESTORATION

Let us assume you have made your purchase of a piece of valve radio equipment and it is sitting on the operating table. The first thing you have to do is to avoid the obvious temptation of applying some AC mains power to it. If you are *absolutely certain* the radio has been in recent regular use, then this is probably OK. If there is any doubt, don't do it! Whatever anyone has said about an old valve radio being used recently, it never gets switched on in the VK6VZ shack until it has a thorough electrical cleaning and check-over. Also, AC mains power is always applied in steps to the radio via a 'variac' – a continuously variable AC transformer – which allows the electrolytic capacitors inside the receiver to 'reform' so they work correctly and do not overheat. Variacs are often communally-owned by radio clubs or sitting gathering dust under the bench of ancient G3-era licensed radio amateurs like myself, who will loan them out. More about this next month.

A valve radio that is over 20 to 30 years old is always going to have accumulated a lot of dust and dirt inside it, owing to the ventilation necessary for thermionic valve-based equipment. While a dusty or dirty chassis is going to make no difference to its performance, dusty or dirty switch contacts and potentiometers could mean that the radio does work at all.

Several valve radios that seemed 'dead' have been revived at VK6VZ by simply cleaning their rotary switches, valve pins and potentiometers with electrical contact cleaning solvent. ♦

In the final part next month, Steve Ireland goes into more detail about how to 'resurrect' apparently 'dead' receivers and other old valve equipment.

REFERENCE

[1] *Communications Receivers – The Vacuum Tube Era: 1932 – 1981* by Raymond S Moore, 4th Edition, RSM Communications, PO Box 27, La Belle, FL 33975, USA. This is a marvellous book if you are interested in thermionic valve communications equipment it is a must for the bookshelf.

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Quality rotator for VHF/UHF. Superb for most VHF-UHF yagis, 3 core cable required. 3 core cable 50p per mtr.

OUR PRICE **£44.99**

AR-201 Thrust bearing for above - accepts up to 1.5" pole £14.99

D-308B DELUXE DESK MIC

(with up/down). Many amateurs using this mic (over 4000) have expressed extreme pleasure with it's performance. Includes 8-pin round Yaesu mic lead.

£49.95 P&P £6.00

Yaesu 8 pin round to modular adapter (FT-100, etc.) £19.99
A-08 8 pin "Alinco" round £9.95
K-08 8 pin "Kenwood" round £9.95
I-08 8 pin "Icom" round £9.95
IM-08 Modular phone "Icom" £9.95
KM-08 Kenwood modular lead £9.95

KENWOOD HS-5

Superb padded professional communications headphones. Designed specifically for SWL. 1/4" jack.

PRICE **£56.99** Del £5.00

MFJ-115

24 hour quartz clock. Major cities shown on rim. World map on face. "Know what time it is around the world".

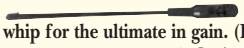
SPECIAL **£19.99** P&P £5.00

SUPER-GAINER RH-9090

SMA 40cm flexible whip that is ideal as replacement. Tx:- 2m + 70cm.

OUR PRICE **£26.95** P&P £1.50

SUPER-GAINER RH-9000



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

OUR PRICE **£21.95** P&P £1.50

FIBRE GLASS POLES *Del £10.00*

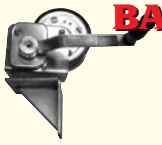
	1½"	1¾"	2"
1m	£8.50	£10.50	£12.50
2m	£16.00	£20.00	£24.00

Longer lengths available – phone

COPPER ANTENNA WIRE ETC

Enamelled (50m roll) .....£13.95 P&P £5
Hard drawn (50m roll).....£14.95 P&P £5
Multi-Stranded (Grey PVC) (50m roll).....£11.95 P&P £5
Flexweave (H/duty 50 mtrs) .....£30.00 P&P £5
Flexweave H/duty (18 mtrs) .....£15.95 P&P £5
Flexweave (PVC coated 18 mtrs).....£18.95 P&P £5
Flexweave (PVC coated 50 mtrs).....£40.00 P&P £6
Special 200mtr roll PVC coated flexweave .....£99.00 P&P £10
Copper plated earth rod (4ft).....£13.00 P&P £6
Copper plated earth rod (4ft) + earth wire .....£18.99 P&P £6
New RF grounding wire (10m pack) PVC coated.....£12.50 P&P £5

BARGAIN WINCH



500kg brake winch.
BARGAIN PRICE
£59.95 Del £8.50

Winch wall bracket.....£19.99
Extra heavy duty "hanging pulley" £14.50

MAST HEAD PULLEY

A simple to fit but very handy mast pulley with rope guides to avoid tangling. (Fits up to 2" mast).

£8.99 + P&P £2.50

NEW EASY FIT WALL PULLEY

Pulley will hang freely and take most rope up to 6mm. (Wall bracket not supplied).

PULLEY **£8.99** + P&P £2.50

Wall bracket, screws not supplied. Simply screw to outside wall and hang pulley on

WALL BRACKET **£2.99** P&P £1.00

COAX BARGAINS

Genuine high quality coax

MILITARY SPEC

RG-213 Mil spec x 100m.
NOW **£59.99** P&P £10
RG-58 Mil spec x 100m.
NOW **£25.00** P&P £10.00
Coax stripping tool (for RG-58) £4.50

COAX SWITCHES (P&P £4.50)

2 way CX-201 (0-1GHz) SO239 .....£19.95
2 way CX-201 'N' (0-1GHz) 'N'.....£24.95
4 way CX-401 (0-500MHz) SO239 .....£69.95
4 way CX-401 'N' (0-500MHz) 'N'.....£79.95

LOW LOSS PATCH LEADS £2.50 P&P

Connectors	Length	Price
PL-259 - PL-259	0.6m	£5.99
PL-259 - PL-259	4m	£9.99
BNC - BNC	1m	£6.99
BNC - BNC	5m	£10.00

NISSEI PWR/SWR METERS

RS-502 1.8-525MHz (200W) .....£79.95 P&P £5
RS-102 1.8-150MHz (200W) .....£59.95 P&P £5
RS-402 125-525MHz (200W).....£59.95 P&P £5
RS-3000 1.8-60MHz (3kW) Incls mod meter £79.95 P&P £5
RS-40 144/430MHz Pocket PWR/SWR.....£34.95 P&P £2
DL-30 diamond dummy load (100W max) ...£26.99 P&P £3

NEW NOISE FILTER!

A superb TDK 'snap fix' ferrite clamp for use in Radio/TV/ Mains/PC/Phone etc. *Simply close shut over cables and notice the difference!* Will fit cables up to 13mm diameter. Ideal on power supply leads/mic leads/audio leads/phone leads.

On thin cable simply wind cable round clamp 1-to-2 times. Simple yet effective!

OUR PRICE: **2 for £10** (p&p £2.50)

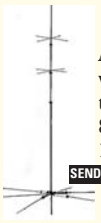
DOUBLE THICK FERRITE RINGS

A superb quaility ferrite ring with incredible properties. Ideal for "R.F.I". Width 12mm/OD35mm. 6 for £12.00
12 for £20.00 P&P £3.50
50 for £40.00 P&P 7.00

METAL WORK & BITS *P&P available on request*

2.4m/2" alloy poles £19.99
2" Mast base plate .....£12.95 P&P £5
6" Stand off.....£6.95 P&P £5
9" Stand off.....£8.95 P&P £5
12" T&K Brackets .....£18.00 P&P £8
18" T&K Brackets .....£22.00 P&P £8
24" T&K Brackets .....£26.00 P&P £8
10mm fixing bolts (needs 8mm hole) .....£1.40 each
U bolts (1½" or 2").....£1.20 each
8 nut universal clamp (2" - 2") £5.95
2" - 2" cross over plate £10.95
3-way guy ring £3.95
4-way guy ring £4.95
2" mast sleeve.....£9.95
1½" mast sleeve.....£8.95
Heavy duty guy kits (with wire) .....£29.95 P&P £6
Ground fixing spikes (3 set) powdered coated £24.00 P&P £8
30m pack nylon guy 4.4mm/B/load 480kg .....£12.50 P&P £3
132m roll nylon guy (4.4mm) .....£40.00 P&P £7.50
Self amalgamating tape (roll).....£6.50
'Nylon' dog bone insulators.....£1.00 each
Chimney lashing kit £12.99

DIAMOND CP-6



A superb (diamond quality) 6 band trap verticle antenna with trap radials – "rotary" trap system allows "flat wall" mounting. 80m/40m/20m/ 15m/10m/6m. 200W SSB, HT 4.6m

SEND SAE FOR DATA SHEET

OUR PRICE **£219.00**

Q-TEK PENETRATOR

"WE'VE SOLD 100S ALL OVER EUROPE"

★ 1.8 - 60MHz HF vertical ★ 15 foot high ★ No ATU or ground radials required ★ (200W PEP).

ONLY **£179.95** Del £10.00

SEND SAE FOR LEAFLET

DELUXE G5RV P&P on either full/half size £6.50

Multi-stranded heavy duty flexweave wire. All parts replaceable. Stainless steel and galvanised fittings.

Double size - 200ft (160-10m).....£84.95
Full size - 102ft (80-10m) £42.95
Half size 51ft. (40-10m) £36.95
Choke Balun — Inline balun for G5RV.....£24.95 P&P £3

STANDARD G5RV

Full size 102ft (now includes heavy duty 300Ω ribbon)....£28.95 P&P £6
Half size 51ft (now includes heavy duty 300Ω ribbon).....£24.95 P&P £6

Q-TEK INDUCTORS

80mtr inductors + wire to convert ½ size G5RV into full size. (Adds 8ft either end).....£25.00 P&P £4.00 (a pair)

Q-TEK COLINEARS (VHF/UHF) *P&P £10.00*

X-30 GF 144/70, 3/6dB (1.1m) £39.95
X-50 GF 144/70, 4.5/7.2dB (1.7m) £54.95
X-300 GF 144/70,6.5/9dB (3m) £69.95
X-510 GF 144/70, 8.5/11dB (5.4m) .....special £89.95
X-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m) ..£79.95

MOBILE ANTENNAS *P&P £8.50*

DB-770M	2m/70cm (3.5 - 5.8dB) 1m PL-259	£24.95
DB-7900	2m/70cm (5.5 - 7.2dB) 1.6m PL-259	£39.95
PL-62M	6m + 2m (1.4m) PL-259	£19.99
PLT-20	20m mobile whip (56" long)	£24.95
PLT-40	40m mobile whip (64" long)	£24.95
PLT-80	80m mobile whip (64" long)	£24.95
PLT-259	PL-259 converter for above	£5.95

TELESCOPIC MASTS

6 section telescopic masts. Starting at 2"/2" in diameter and finishing with a top section of 1"/4" diameter we offer a 8 metre and a 12 metre version. Each mast is supplied with guy rings and steel pins for locking the sections when erected. The closed height of the 8 metre mast is just 5 feet and the 12 metre version at 8 feet. All sections are extruded aluminium tube with a 16 gauge wall thickness.

8 mtrs **£109.95** 12 mtrs **£149.95** *Carriage £12.00.*

Tripod for telescopic masts £89.95

REPLACEMENT POWER LEADS

DC-1 Standard 6-pin/20A fits most HF £20.00
DC-2 Standard 2-pin/15A fits most VHF/UHF £10.00

YAESU REPLACEMENT MICS

MH-IC8 8 pin Yaesu mic (8-pin round) £22.50
MH-4 4 pin fits older HF, etc. (4-pin round) £15.00

BARGAIN MAST SETS

Set A: 5 section 21ft long (1⅛") mast set
£23.95 Del £10

TWO FOR £39

Set B: 5 section 16ft long (1⅛") mast set **£19.95**
Del £10 (2 sets £35.00)

NEW 20' SLEEVED MAST SET

A heavy duty-sleeved, mast set that will tightly slot together. 4 x 5' (2" dia) 16 guage heavy duty aluminuim tubes. (Dimensions approx).

£49.99 Del £10.00.

TWO FOR £90.00 DEL £12.50

ALUMINIUM POLE CLEARANCE

We have sets of 4 (2") poles (3 of which are swaged) that slot together to make a (approx) 20' pole. Each section is approx 5' long – some have small dents in – some have been swaged slightly off centre – hence the price.

2 FOR £35.00 DEL £12.50
3 FOR £45.00 DEL £15.00

SCRAP PRICE
£19.95
Del £10.00

By Don Field, G3XTT

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

E-mail: don@g3xtt.com

HF

The regular round-up of HF operating news and views, compiled by Don Field, G3XTT.

Sadly, the 3Y0X Peter 1 Island team had to abandon its plans for this year and put the expedition on hold until 2006, despite most of the team members having travelled to Chile in readiness. There was a series of problems with the ship and helicopter which took time to resolve and, in the end, it was felt that there was insufficient time left to allow a worthwhile operation to be mounted. This must have been immensely frustrating to the team members, who were left with little to do but activate a couple of Chilean islands for the IOTA programme before returning home.

Band conditions were perhaps better than expected during February, considering that we are now well down the sunspot cycle. While working the Pacific is currently out of the question on the high bands, 12m has been open to Asia, Africa and the Americas most days, and even 10m has its moments. On the second day of the ARRL CW Contest, for example, I was able to work across to the mid-West and earlier in the week there had apparently been a short opening to W6 (California). During that same contest, US West Coast signals were huge on 15 and 20m, one of the benefits of a lower MUF, I suspect. Of course, the low bands also benefit, with US stations workable on 40m mid-evening (mid-afternoon their time) through to as late as 1100, ie four hours or so after daylight here. Perhaps most notable, though, was VY2ZM's 160m signal in recent contests. Jeff, K1ZM, has built a full-size four-square antenna for 160 on Prince Edward Island, and the results have to be heard to be believed!

COUNTRIES WORKED, 2005

(starting 1/1/05, sorted this month by SSB totals)

CALL	CW	SSB	DATA	MIXED
MU0FAL	51	39	0	60
G0LGJ/M	0	31	0	31
G1UGH	0	30	0	30
GM4FAM	55	28	0	75
M0BKV	27	28	9	47
G4WXZ	34	27	0	53
G4FVK	13	26	0	30
G3JFS	74	21	87	114
G6CSY	0	21	31	31
G0RTN	85	15	0	89
M0CNP	1	9	60	65
GM8OEG	45	8	36	56
G0KBL	109	0	0	109
G3YMC (QRP)	82	0	0	82
G4KFT	70	0	0	70
M0BVE	51	0	0	51
GU0SUP	0	0	33	33

John, G4RCG, operating from KP2 (see text).

On a completely different topic, I have been asked several times in recent months for advice on split-frequency operation. I will try to cover this briefly here when space allows but, in the meantime, have penned a piece for the CDXC (Chiltern DX Club, the UK DX Foundation) *Digest*, and will post it on my website, accessible from the *Operating Manual* page, for any of you who are interested.

DX NEWS

F8DVD will operate from 4 to 10 April as JW/F8DVD from the local club station in **Svalbard**. He'll be on all HF bands, SSB. He will QSL via the French REF bureau or direct via his home call.

IZ1DSH IK1WEG and IZ1GDB will append /HB0 from **Liechtenstein** from 22 to 26 April on 80, 40, 30 and 20, SSB and CW. QSL to their home callsigns.

The callsign SU8IOTA will be used from Disuqi, also known as **Nelson Island** (AF-NEW) 23 April to 1 May. This will be the first-ever Egyptian IOTA operation, and is being mounted by local amateurs SU1HM, SU1SK, SU2TA and SU1SA. Nelson is 20km east of Alexandria, 4km north of Cape Aboukir. Guarding the approach to Aboukir Bay, the western part of the Nile delta, it was on an important commercial route in 'antiquity' and became a major commercial and religious centre. It is now of archaeological importance.

DL7CM and DM2AYO will be in **Botswana** from 6 to 20 April and active as A25/DL7CM (or A25CM) and A25/DM2AYO on all bands and modes. They will have two complete stations with amplifiers. For antennas they will use a 27m GP, 3-element 5-band beam and HF9V. There is also a website for further information. QSL via their home calls.

I0SNY, JT1CD and JT2AN will operate as JT1Y from Ulan Bator, **Mongolia**, 20 April to 8 May, except that on 25/26 April they will be on as JT2Y from Choybalsan. QSL via I0SNY.

Three Australian amateurs will activate **St Peter Island** (OC-220) from early on 7 April until 2100 on 11 April. This will be a special event commemorating the 350th anniversary of the death of Pieter Nuyts, the Dutch East India Company man and sometime explorer, who died in 1655. A special commemorative callsign has been applied for. Activity will be on CW / SSB on the usual IOTA frequencies. Emphasis will be on 30 and 40 CW and 20, 17 and 15 SSB. QSL via VK3QI, direct or via VK3 QSL bureau.

YE3K should be active from the **Kangean Islands** (OC-217) around the weekend of the *CQ* WPX SSB contest. QSL via IZ8CCW. There is also a web page.

An expedition to **Swain's Island**, a privately owned island which is part of American Samoa, was scheduled for early March. This island would have been a sufficient distance from the rest of American Samoa to have made it a counter according to the DXCC2000 criteria, under which Ducie and Chesterfield Islands, as well as the Australs and Marquesas came into the DXCC fold. The rules have been revised since then, but nevertheless JA1BK and others have lodged an application for DXCC status for Swain's Island. The ARRL has said that it will count purely as American Samoa, though it is also a rare one for IOTA.

G4WFQ will be active from Treasure Cay, **Abaco Is** (NA-080), from 15 to 29 April, mostly CW and RTTY but with some SSB. QSL via G3SWH. Logs will be put online and also uploaded to LoTW after the operation.

DF5WA and DF7GB plan to be active from **Martinique** (NA-107) starting 8 April. They hope to be on all bands on CW and some SSB, RTTY and PSK. QSL via their home calls.

MOST WANTED LIST

The *DX Magazine* has, once again, brought out its annual listing of 'Most Wanted' entities. You can find the list on the magazine's website. North Korea remains at the top, while the Andaman and Nicobar Islands, in second place, will no doubt fall significantly as a consequence of the December operation. The others in the top ten are likely to remain there, with no operations scheduled for the near

future (Peter 1 Island is at number 6).

CAPITAL OF CULTURE AWARD

To celebrate Cork City's status as European Capital of Culture during 2005, Cork Radio Club and the East Cork Radio group have introduced the Cork Capital of Culture Award. The award is available to all radio amateurs and shortwave listeners and to qualify you need to work or hear the special event station EI05CCC (Echo India Zero Five CCC) and one other of the following three callsigns: EI5CRC, EI1C or EI7M. All four callsigns will be activated regularly during 2005. Contacts must be made during 2005. QSL cards are not required for the award. Claims should be submitted to Rev Fr Finbarr Buckley, 'Curraghmore', Cherry Grove, Model Farm Road, Cork. The cost of the award is 5.00 euros or 8 IRCs. Enquiries to Finbarr, EI1CS, at buckleyf1@eircom.net

CORRESPONDENCE AND TABLES

Mack, M0CUS, asks various questions about the tables, which is a useful reminder to me that it's about time I repeated some of the guidelines and explanations. Firstly, all table figures are 'worked' rather than 'confirmed'. The Annual Table simply wouldn't work otherwise - you'd always be months behind, waiting for QSL cards. The Annual Table starts from scratch on 1 January each year and ends on 31 December. The All-Time Table, compiled by G3GIQ, which appears every quarter, is for the total entities on the current DXCC list (ie excluding 'deleted' entities) which you have worked since being licensed. Everyone is welcome, though for the All-Time Table an entry really only makes sense if you have a total of 1000 or more. Entries for the Annual Table come direct to me (preferably by e-mail) and for the All-Time Table go to G3GIQ (again, preferably by e-mail). Occasionally the format of the Annual Table has changed, for example to focus specifically on the WARC bands, the LF bands or maybe 10m. This depends very much on the interests of those of you who participate and where we are in the sunspot cycle. I welcome your accompanying commentary too, though there isn't always space to reproduce your comments here.

Colin, MU0FAL, says he hasn't been very active recently but 6O0CW, worked on 30m, was his number 249 all-time, so he hopes soon to have 250 entities in the bag. Graeme, G6CSY, made his first RTTY contest QSOs using what he described as an antiquated set-up, consisting of a Pentium II PC running *Winwarbler* into an AEA PK-232 TNC, a Kenwood TS-570 plus a Hygain 14AVQ vertical (40-10m) and a trapped dipole (80m).

For Andy, GM8OEG, the year has started with an LF emphasis. On 160 he caught some nice ones like 5B/K3UY, A61AJ, CT9M, D4B, UO2M and EY8MM as well as various W/VE. After some search and pounce in the CQWW 160 CW contest he decided to call CQ, worked a few stations and then noticed a dramatic increase in the QRM level. This rather threw him at first until it dawned on him that he had his first CW pile-up! I would guess that Andy had been spotted on the *Cluster* network; I had similar experiences on 15 and 20 in the ARRL CW contest, where the number of callers suddenly increased significantly and a check after the contest showed that I had indeed been spotted.

David, M0CNP, says that he feels his results may encourage others as he uses just 50 watts and wire antennas at 7m maximum height. This month he managed contacts with (20 SSB) VQ9LA, 5Z4DZ, and, mostly on RTTY (40) 9Y4W, VK6HD; (20) 5Z4DZ, TF3FK, YV6BTF, ZL2AMI; (17) 3B9FR; (15) 9M2CMC (new call for 9M2/G4ZFE); and (10) 9J2KC.

Gerry, G0RTN, says it has taken him 13 years to get round to making a report to the column! Welcome Gerry. He reports some nice DX, all CW unless otherwise noted: (40) KP2/KI7VR, AX6HD (special prefix for VK6HD), UA0ZDA/MM (Drake Channel), 3B8CF, 9M6/PA0RRS, 6O0CW, HZ1EX, VR2BG; (30) J88DR; (17) ZC4LI, BA4RF, VR2XMT; (15) V31LZ, C6AKQ, YN4SU; (12) A45XR, 3B9FR, YN4SU. Gerry uses an IC-7400 barefoot to a 40/80m dipole on the roof of a 10-storey block of flats in Central London. He lives on the top floor (handy!). The antenna works best for DX on 40, but can be tuned for most other bands and has been a particularly good performer on 12m. Gerry was previously GI0RTN (1996-1999) and has been relatively inactive otherwise until recently, since he put up the current antenna which, despite being of the 'stealth' variety, has brought some surprising DX. Gerry also had the opportunity recently of operating from Oman where, he says, reciprocal licensing is easy. He was able to operate both from the A47RS

This 50m-high commercial radio tower was used to support the 160m dipole on the 6O0CW DXpedition.

club station and as a guest of A45XR and made some 2800 QSOs. This, he says, has given him a taste for being at the DX end of the pile-up, so maybe we can expect some more such operations in the future.

Stan, G0KBL, reports that his greatest DX-related achievement so far this year has been to sneak a 60ft vertical into his suburban garden without even the XYL noticing, so far! This seems to work particularly well on 40m, outperforming the Carolina Windom by up to two S-points in some directions. On that band, it gave him contacts with 3D2RR (Rotuma) and 9N7JO.

David, G4FVK, reports working 5Z4 on 20m for a new country, but otherwise nothing particularly exotic. Cris, GM4FAM, says he hasn't too much to report - and then lists some very choice DX! Some of the highlights include (12) C56C, V31JZ/P (NA-180), YN4SU; (15) *A45WG*, CE8A (SA-094), HS0ZFI, JS6RGJ (AS-024), TO0O, VE3JM/VE2 (NA-125), VR2JN, YN4SU; (17) 3B9FR, *3V8SF, 5H3RK, 5N8NDP, 5Z4DZ*, 9N7JO, A45WD, KG4SB, ST2YJ, SU9BN, YA5Y, YK1BC; (20) *5N8NDP*, 5R8GZ, 6O0CW, A71BX, *A92GR*, HC2SL, *TY5ZR*, VE3JM/VE2 (NA-125), YI9KT; (30) PJ5NA ,V51AS. Those in italics were on SSB, otherwise CW.

QTH Corner

5T5DY:	Yves Dezaele, F6GDC, 05 rue Baudelaire, 62950 Noyelles Godault, France.
C21DL:	DJ2EH, Dieter 'Dick' Hornburger, Grabengasse 7, Schoenbrunn D-96185, Germany.
F8DVD:	Francois Bergez, 6 Rue de la Liberte, F-71000, Macon, France.
IZ8CCW:	Antonio Cannataro, PO Box 360, 87100 Cosenza-CS, Italy.
SU8IOTA	Said Kamel, SU1SK, PO Box 190, New Ramsis Center, Cairo 11794, Egypt.
VK4FW:	(new) Bill Horner, PO Box 612, Childers, 4660 Australia.

Terry, G1UGH, has been busy on SSB, with (20) VP2EBR; (17) VR2XMT, AP2JZB; (15) PZ5RA; (12) WP4U. The VR2 was an all-time new one for him.

Phil, GU0SUP, broke his arm just before Christmas, which is bad news at any time, but more so if RTTY operation is your speciality. Nevertheless, Phil did manage some operation in the XE RTTY Contest, which accounts for most of his total so far this year.

John, G4RCG, reports a successful trip to KP2, operating on 160 from KV4FZ's excellent station (a shunt fed caged 90' tower array and a 5-Beverage RX antenna system). He was able to work Europe most nights on 160, though the noise level was high at times.

Mal, G4KFT, reports 9N7LO, 6O0CW, and two new IOTAs by way of CE8A and OC4P as his best DX for the month, all on CW.

Damian, M0BKV, says he received some helpful advice on CW operating from *RadCom* columnist Dave, G4BUO. Damian is starting to enjoy CW, although he still needs the help of *GetCW*, a CW receiving program, when the speeds are high (such as DXpedition stations and contests). Damian reports quite a few DX stations worked, with the CW bringing him OY1CT and 7X4AN on 80 and ZB2/DL7UFR on 30 among others.

Roy, DU9/G4UNL, writes that the Andaman DXpedition was easy to work from the Philippines and Roy is hoping to meet some of the team members at the SEANET Convention in Bangalore. Roy runs the SEANET (South East Asia Net) on Thursdays and Saturdays and has done so for the past three years.

ON4LDL writes with information about the Francophone Telegraphy Club (CFT), membership of which is free. For more details, drop me a line or see their website.

Paul, G4XTA, reports a station signing T95LSD on most HF bands on SSB and RTTY and announcing Paul's callsign as his manager. This has been going on for two years and is now reaching ridiculous proportions. Do not try to QSL this station!

TOP QSL MANAGERS

K1XN has been soliciting nominations for the best QSL Managers worldwide. The Top Five are G3SWH, G3SXW, G3TXF, IZ8CCW and W3HNK. What great news to see three UK amateurs in that list. The full list can be viewed on the *Golist* website.

PROPAGATION LECTURE

Finally, Rob, G3MYM, writes that he will be giving a lecture on HF propagation at the 21st Yeovil QRP Convention. This takes place on Sunday 10 April at Digby Hall, Hound St, Sherborne, Dorset. Doors open at 10.00am. Rob also wonders whether anyone is planning any events this year to commemorate the 50th anniversary (on 1 August) of what was probably the first British DXpedition, that by Danny Weil on the yacht *YASME* (a history of the *YASME* expeditions is available from the RSGB bookshop).

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 **June** issue by **23 April**. ♦

WEB SEARCH

A2 expedition:	www.qsl.net/dl7cm/A2.htm
CFT:	www.on5cft.be
G4WFQ:	www.g4wfq.btinternet.co.uk
Golist:	www.golist.net
YE3K:	www.mdxc.org/ye3k

HF F-Layer, Propagation Predictions for April 2005

Compiled by - Gwyn Williams, G4FKH

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe								
Moscow	6.....667	761....16777	.2..1122762.	..14555672..	....6666....	.....	.....	.....
*** Asia								
Yakutsk	.....	.....11.	.311.113566.	..354452....	...122.....	.....	.....	.....
Tokyo	.....	.....35..	.....123..	.....1..	.....	.....	.....	.....
Singapore	.....	.....1553.	.....3651.	.....1351..	.....132...	.....11...	.....	.....
Hyderabad	.....	1322	15654	.....14451.	..122366....	...13353....	.....	.....
Tel Aviv	63.....2666	771.....7877	6.51..158728	..3244567...	.....	.....	.....	.....
*** Oceania								
Wellington	.....	.....5...	.....125...	....11212...	.....	.....	.....	.....
Well (NZ) (LP)	.....	.25.....	137.....21.	..4.....21.	.....	.....	.....	.....
Perth	.....	.....111.	.....11..	.....	.....	.....	....1.....	.....
Sydney	.....	.....32..	.....132..	.....11...	.....1.....	.....	.....	.....
Melbourne (LP)	.....	.....	...1.....	...1.....	...2.....	.....	.....	.....
Honolulu	.....	.....	..111.....	....1.....	.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....2...	.....2...	.....2...	.....2...	.....1...
W. Samoa	.....	.....	..11.....	....111.....	.....	.....	.....	.....
*** Africa								
Mauritius	.....	1.....2533	5521	.....252..	.....23...	.....11...	.....	.....
Johannesburg	56.....266	78.....7888	24.....8876	..1....58631	..11..1571..	...1112145...	...334566...	.....345....
Ibadan	21.....12	66.....566	746.....6877	..741.1587..	..68667797..	...833568...	.....9....	.....8...
Nairobi	.....	31.....333	42.....3344	.1.....14565	..31112466..	..13223562..	...133555...	....11111...
Canary Isles	661.....666	886.....2778	7772...15777	..25..23774.	...7766788..	...3347776..	.....2...	.....
*** S. America								
Buenos Aires	112.....	667.....36	113.....22	.....11.	....1...16..	....1..125..	.....22..	.....1...
Rio de Janeiro	.....	223.....13	112.....111	.....2..	....2.1147..	....111146..	.....1133..	.....2...
Lima	.....	112.....1	..1.....	.....	.....12..	.....12..	.....1...	.....
Caracas	.....	221.....2	2.2.....22	.....2.	.....12..	.....12..	.....	.....
*** N. America								
Guatemala	.....	1.1.....	.....	.....	.....	.....	.....	.....
New Orleans	.....	221.....	..1.....1	.....1.	.....13345..	.....1122..	.....	.....
Washington	22.....	664.....4	2.2.....26	.....1..125.	.....13455..	.....111..	.....	.....
Quebec	67.....5	765.....27	.....2.	.....1123.	.....27..	.....4..	.....	.....
Anchorage	.....	11.....	.....	.....	.....	.....	.....	.....
Vancouver	.....	.1.....	.....	.....	.....	.....	.....	.....
San Francisco	.....	.....	.....	.....	.....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.....	.....1....	.....11...	.....11...	.....

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 February 2005 issued by the Sunspot Data Centre, Brussels, was 29.1. The daily maximum / minimum numbers were 56 on 12 February, and 7 on 28 February respectively. The predicted smoothed sunspot numbers for April, May and June are respectively: (SIDC classical method - Waldmeier's standard) 26, 25, 23 (combined method) 33, 32, 31. 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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The art of QSLing

This is the first of a new quarterly column designed to help RSGB members make the best use of the Society's QSL Bureau, and therefore improve their QSLing success rates. Marc Litchman and John Short, two members of the Loughton and Epping Forest ARS (LEFARS), are volunteer QSL sorters at the HQ Bureau and thus ideally placed to offer their advice.

Living relatively close to Potters Bar has enabled both of us to maintain regular weekly visits to Lambda House to offer our services as voluntary QSL card sorters. Over the past few years, we have built a strong working relationship with the Bureau staff and have acquired a unique perspective on the workings, and trials and tribulations, within the RSGB QSL Bureau. Additionally, handling so many cards has made us acutely aware of some of the issues that can frustrate delivery.

Through this new column, we shall try to address some of these issues by conveying to you what we feel is both practical and useful information to aid in the successful delivery, and collection, of your cards via the Bureau.

Primarily, successful QSLing begins with accurate callsign logging. Always listen for QSL Manager's details too, especially when working DXpeditions, operations from rare countries and IOTA islands. Good operators will regularly state, on air, QSL routing details. Take note of these 'QSL via' instructions, as the RSGB cannot deliver cards destined for countries with no bureau service.

If you have access, it is often worth checking on www.qrz.com or one of several other Internet resources available for specific instructions. Also, bear in mind that some overseas bureaus will not handle cards for non-members of the national society. If you intend to send a QSL card, it is always a good idea to make yourselves aware as to whether or not your recipient can receive cards via their country's bureau. We see a great number of cards returned to UK stations marked with "Not a member", "Undeliverable" or similar. Contrary to this approach, the RSGB *does* accept incoming cards for non-members, providing that SASEs are lodged with the respective sub-managers. As stated in *RadCom* in the past, this rather generous attitude raises the hackles in some quarters.

QSLs of three of the special event callsigns operated by members of the Loughton and Epping Forests ARS in recent years.

The RSGB, however, continues to provide this service in the general interest of amateur radio.

THE ART OF QSLING

We have often heard newcomers talk about QSLing as if it were a black art. To dispel this belief, we shall begin by restating some of the basics (and some old hands might also like to take note).

When filling in the QSO details on your outgoing cards, do not allow for any ambiguity with callsigns.

- Write in black or blue ink
- Use only block capitals, not script
- Take great care to distinguish between numbers, and alphabetical characters
- If sending via a QSL manager, ensure that the word "via" and *his* callsign are prominent.

Printing by computer, either directly on to your cards or to sticky labels removes most indistinctness. If this is your preferred method, use a plain font, large enough not to have to be read with a magnifying glass.

This is all really just common sense, but you would not believe some of the gobbledygook we have come across such as cards with no callsign, poorly aligned computer printed labels, where the callsign is decapitated, and undecipherable handwriting that makes one wonder how the sender could have ever believed that his cards will reach the intended recipients. We will endeavour to print some examples in a future edition, and you will see just what we mean.

Prior to sending your cards to the Bureau, make sure that you sort them into the correct order. This practice will ensure that they are dealt with immediately. Failure to do so will impede their progress through the system.

So what does sorting cards into the correct order mean?

Table 1: UK special club prefixes.

Club prefix	Sort as
GX or MX	G or M
GT or MT	GD or MD
GN or MN	GI or MI
GH or MH	GJ or MJ
GS or MS	GM or MM
GP or MP	GU or MU
GC or MC	GW or MW

For UK-destined cards only:

1. Sort primarily by callsign prefix, then by suffix. Cards with special club prefixes should be sorted by the usual country prefix (See **Table 1).**
2. Separate out all cards for special event callsigns, then sort by suffix only. Ignore any "via" instructions received over the air: with a few exceptions, all GB cards go only to one Sub-Manager.
3. Separate out all cards for Special Contest 'Abbreviated' callsigns. Ignore any "via" instructions, as again there is only one specific Sub-Manager for all of these.
4. Separate out all SWL cards.
5. With the exceptions mentioned above, when a QSL Manager or "via" is involved, sort by that callsign only.

For USA-destined cards:

Sort by call area *number*, regardless of the A, K, N, or W prefix. Each US call area has a separate bureau. Take care to sort by QSL Manager, or "via" where appropriate.

Finally, sort all other cards into country order by the usual prefix for that country, for example cards for 7J should be sorted with JA cards, TM with F, J4 with SV and so on. Again, sort by QSL Manager, or "via" where appropriate.

When ready, package your cards in a suitably strong envelope, with correct postage for the weight, and send them to the RSGB Bureau, PO Box 1773, Potters Bar, Herts EN6 3EP. Do not send them to your Sub-Manager.

In the next column, more insights on the outgoing service and how to go about receiving your incoming cards. ♦

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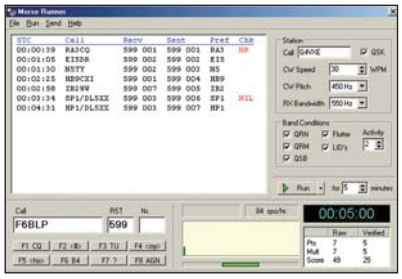
Contest

This month Tim Kirby looks at improving your CW skills – contest style!

This morning I was listening, just after dawn, in the ARRL CW contest on 80m. The band had just started to go out and there was the usual range of people calling CQ contest from Europe. One of them, rattling away at a fine speed was Simon Treacher, M3CVN. At first I thought nothing of it, knowing Simon as a highly capable and competent contest operator. As I thought about it though, I realised that there is an awfully big gap between the 'Morse Appreciation' section of the Foundation licence and feeling comfortable at 30WPM or so in a major contest!

Like most things in life, there are no short cuts and it just comes down to hard work and practice. But there's nothing to say that the hard work and practice can't be *fun*. Dave Lawley, G4BUO, in his excellent 'Morse' column has given news of the Morse practice service which is a great way of getting comfortable using Morse on the air. The RSGB's 80m Club Championships provide a good contest environment for beginners, with plenty of activity and people of varying CW ability taking part. Indeed, entries to this series of contests are burgeoning, but that's another story.

If you want to practice your CW contest skills with no-one around, apart from your PC, if you make a mistake, why not take a look at *Morse Runner* from VE3NEA? Dave Robinson, G4FRE/WW2R, kindly told me about this program. It is a contest simulator



The Morse Runner CW contest practice program.

program, not unlike *RUFZ* or *PED*, though I have to say it seems easier to set up and perhaps a little more flexible. It allows you to practice your CW contesting for a set period of time; the default is 30 minutes. It will show you what mistakes you made and give you a final score. What's nice about it is that you can set up parameters that produce fluttery signals, for example, and even a 'lid' factor (people who, as the 'readme' file says, give you the wrong exchange and then correct it and even give you reports other than 5NN; slightly harsh, I felt!) There is an on-line score table and there seem to be some fine scores already. Not many UK stations yet, so I hope this mention will put that right. I can see some operating sessions (with headphones) on the train, coming up! The program is freeware and may be downloaded from the web (see 'Web search' below).

QRP CONTEST THOUGHTS

I read some correspondence on a reflector recently with someone suggesting that QRP sections in contests should be sub-sections of the restricted section, and QRP operators using beams or 'gain' antennas should be obliged to enter in an Open section. QRP sections, the implication ran, were for low power and restricted antennas. The reason for this suggestion was an honest concern that newcomers might be discouraged by being beaten by 'super-stations', even those running low power. I felt that the argument was flawed. For me, the whole point of QRP contest operating is to cast aside the limitation of power and make up for that with operating skills or antennas. Chris, G4BUE, pioneered this trend, at least in the UK, in contests in the 80s and people like Steve, GW4ALG, and Dave, G3YMC, are continuing it, making great QRP entries in contests and often beating many 'open' contestants.

So for me, it's healthy to see 'big' scores in the QRP sections. Operating QRP in certain contests may be a tactical decision for full licence operators, as well as the only choice for a Foundation licensee. For those who are restricted to low power by virtue of their licence, or TVI perhaps, they will undoubtedly be able to compare their own scores with

Contest Calendar

HF Contests

Date	Time	Contest	Mode	Bands	Exchange
2/3 Apr	1500-1500	SP DX Contest	CW/SSB	1.8-28	RS(T)+SN
3 Apr	0700-0900	RSGB RoPoCo 1	CW	3.5	RST+Last Postcode Received
4 Apr	2000-2130	RSGB 80m Club Championship	CW	3.5	RST+SN
9 Apr	1500-1859	EU Spring Sprint	SSB	3.5/7/14	Serial Number+Name
9/10 Apr	0700-1300	Japan International	CW	3.5-28	RST+CQ Zone (eg 14)
13 Apr	2000-2130	RSGB 80m Club Championship	SSB	3.5	RS+SN
16 Apr	1500-1859	EU Spring Sprint	CW	3.5/7/14	Serial Number+Name
21 Apr	2000-2130	RSGB 80m Club Championship	Data	3.5	RST+SN
23/24 Apr	1200-1200	SP DX RTTY	Data	3.5-28	RST+SN
23/24 Apr	1300-1300	Helvetia	CW/SSB/Data	1.8-28	RS(T)+SN

VHF Contests

Date	Time	Contest	Mode	Bands	Exchange
5 Apr	2000-2230 Local	RSGB 144MHz Activity & Club Championship	ALL	144	RST+SN+Locator
10 Apr	0900-1200	RSGB 1st 70MHz	ALL	70	RST+SN+Locator +Location
12 Apr	2000-2230 Local	RSGB 432MHz activity	ALL	432	RST+SN+Locator
19 Apr	2000-2230 Local	RSGB 1.3GHz/2.3GHz Activity	ALL	1.3G/2.3G	RST+SN+Locator
24 Apr	0900-1200	RSGB 50MHz	ALL	50	RST+SN+Locator +Postal District
26 Apr	2000-2230 Local	RSGB 50MHz Activity	ALL	50	RST+SN+Locator

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

2nd 144MHz BACKPACKERS CONTEST, 2004

Yet another hot, sunny day greeted the 40 entrants for this contest. Band conditions were not as good as the weather, with fewer than half of the entrants able to work outside the UK. However, some stations managed to work DX more than 800km distant. Several stations commented that the contest had been conducted in a very friendly atmosphere.

The accuracy of logging was much better in this session of the Backpackers when compared with the last session. Three stations managed to turn in perfect logs - well done. Another seven stations managed to lose less than 2% of their claimed scored - an excellent achievement. At the other end of the scale, the least accurate logs had nearly 40% of claimed points deducted. Correct copying of locators seemed to cause the most problems in this contest.

Congratulations to Roger Ward and his team for piloting GW5NF/P into the top spot of the 10W multi-operator section. The One Man and His Dog Contest Group, G8NMW/P are the runners-up. The Oldham Radio Club, G1ORC/P, won the 3W multi-operator section with Ken Coxon, G0HDV/P, the runner-up. Congratulations to Ivan Davies, G3IZD/P, for winning the 10W Single Operator section. Paul Selwood, G3YDY/P, is the runner-up. Dave Hewitt, GW8ZRE/P, won the 3W Single Operator section with a score over twice that of the runner-up, Mike Baguley, GW7LQD/P. Finally, congratulations to Myke Oldham, G6DDQ/P, for winning the 'Less than 1W' certificate.

Thanks to G3MEH, PE1EWR and M/DL2LFH/P for their very useful checklogs.

Ian Pawson, GOFCT

10W Multi-Op

Pos	Callsign	Loc	QSOs	Mults	Total	Best DX	km	Ant
1*	GW5NF/P	IO81KR	157	39	1243242	DL8GP	761	2x9el
2*	G8NWM/P	IO92TR	80	29	529830	DL8GP	638	17el
3	M0BPQ/P	IO91XG	84	25	315600	EI9GQ	580	2x9el
4	G4HSO/P	IO91RU	53	18	113238	G7ANV/P	387	4Q
5	G0HRW/P	IO83SO	43	15	85425	M0ADA/P	438	7ZL

3W Multi-Op

Pos	Callsign	Loc	QSOs	Mults	Total	Best DX	km	Ant
1*	G1ORC/P	IO93BJ	97	30	475230	ON7LAO	531	2x9el
2*	G0HDV/P	IO93UK	87	29	467625	EI3ENB/P	458	13el
3	M0WEN/P	IO93EI	66	23	226642	DL2OM	700	17el
4	GW4IDF/P	IO81NV	86	18	226638	PE1AXM	461	17el
5	G1WKS/P	JO01ED	51	24	194256	DG9YIH	500	2x9el
6	G2HDF/P	IO82UK	66	21	184695	ON7LAO	502	10el
7	G3BPK/P	IO83PN	68	20	150880	EI5FK	439	13el
8	G6ZME/P	IO82SQ	23	11	27115	M0ADA/P	351	10ZL

10W Single Op

Pos	Callsign	Loc	QSOs	Mults	Total	Best DX	km	Ant
1*	G3IZD/P	IO84KD	131	29	845524	M0ADA/P	475	13el
2*	G3YDY/P	JO01HX	74	21	247359	G7ANV/P	403	4el
3	G0PQF/P	JO01AX	52	21	181818	G7ANV/P	386	9el
4	M1VPN/P	IO70QO	29	17	89386	G3RIK/P	376	3el
5	M0BAO/P	IO80LV	36	13	75062	M0UKR/P	371	8el

3W Single Op

Pos	Callsign	Loc	QSOs	Mults	Total	Best DX	km	Ant
1*	GW8ZRE/P	IO83JA	156	41	1285186	DL8GP	819	7ZL+12ZL
2*	GW7LQD/P	IO82KW	102	30	554520	DL3YEL/P	800	2x9el
3	GW0PZO/P	IO83ID	98	29	457823	ON5AEN	543	9el
4	G4ARI/P	IO92IQ	96	26	365794	DL8GP	688	14el
5	G4HLX/P	IO91FN	62	24	240984	GM0GMD/P	522	13el
6	GW4EVX/P	IO83JD	70	20	169560	GM0GMD/P	324	9el
7	M5CSM/P	JO01GP	52	17	123675	G6CLD	319	11el
8	G4HUN/P	IO84XE	55	17	114359	G4RLF/P	357	3el
9	G0OIW/P	IO91HH	57	15	106845	G8XQS/P	368	5el
10	G4CZB/P	IO92LE	47	17	106097	G7ANV/P	342	7ZL
11	G0FUW/P	IO81PH	38	17	102068	G7ANV/P	432	7el
12	GI7JYK/P	IO74BS	28	16	99904	G4RLF/P	491	9el
13	G0BVW/P	IO91SW	47	15	99180	G7ANV/P	379	9el
14	G6MXL/P	IO80WP	46	14	97748	M0UKR/P	341	9el
15	G6GVI/P	IO81PH	39	15	82290	EI3ENB/P	321	7ZL
16	G0POT/P	IO91IH	46	14	67676	G3IZD/P	338	3el
17	G8XQS/P	IO94AO	23	14	60928	G3VEF/P	409	9el
18*	G6DDQ/P	IO83UP	42	12	57180	M0ADA/P	447	3el
19	G4VRC/P	IO90NX	37	12	57120	G7ANV/P	476	12el
20	G0NFO/P	IO82QJ	38	12	50724	GM4RIV/P	295	3el
21	GI0RQK/P	IO74AW	16	11	42845	G0HDV/P	405	9el
22	G0LJD/P	JO01GH	29	10	29910	GW8ZRE/P	319	12ZL

Checklogs: G3MEH, PE1EWR, M/DL2LFH/P.

personal bests or others using similar equipment. Contest operators may often choose to relieve any perceived inequity by awarding certificates to leading Foundation and Intermediate licensees in particular sections. But for me, seeking to restrict the antenna choice for QRP sections would be wrong and fly in the face of good QRP operating practice.

If you're interested in QRP contesting in general, you might be interested in the QRP contest calendar (see 'Web search' below). Thanks to Brian Russell, G0NSL, for sending in the details of this calendar.

SD – SOME READER FEEDBACK

Some months ago, we reported that Paul O'Kane, EI5DI, had kindly made his *Super Duper (SD)* contest software freely available. After several contests, I've noticed complimentary comments about *SD* when entrants tried to use their 'normal' contest software for particular events. If for some reason it didn't work they tried *SD* and found it simple and effective to use. This is also my own experience. I have to confess that in the early days of *SD*, I didn't get on so well with it, but having used it more recently, I think it's great! If you haven't tried it more recently, do give it a go. Paul's support for *SD* and UK contesting in general is second to none – before each contest weekend, Paul posts an e-mail to the UK contest reflector showing how to set up *SD* for each event. In my case it often prompts me to remember a contest I might have otherwise forgotten. Thanks, Paul. Oh – and if you use *SD* – see what happens when you work EI5DI in a contest! See 'Web search' below.

OTHER CONTEST CALENDARS

Brian, G0NSL, asked where to find contest details on the web. I generally find that SK3BG site works well (see 'Web search') and – at the very least – provides links to individual contest organisers sites.

CONTESTS THIS MONTH

This year's first RSGB RoPoCo contest takes place on 3 April. A 'different' event which probably appeals to the more experienced CW operator, but it's been good to see some newer licensees taking part in recent events. The SSB leg of the EU Sprint takes place on 9 April with the CW leg on 16 April: again something different for the more experienced contest operator. But don't be put off, even if you're a beginner. These are great contests and deserve plenty of support. The sprints have an excellent web page (see 'Web search') which have lots of information about the events; rules, results, records and much more.

On VHF, there's the RSGB 70MHz contest on 10 April. Four metres is looking increasingly interesting these days, with added European activity and interest particularly from Denmark, and 4m contests are set to profit from this. On 24 April, there's the RSGB 50MHz contest. Too early for Es propagation, maybe – but maybe not! It's worth a look that's for sure, remembering that in sunspot minimum the Es propagation is often better. Even if the band isn't open to continental Europe, tropo and scatter contacts between UK stations can be fascinating. ♦

WEB SEARCH

VE3NEW *Morse Runner*:	www.dxatlas.com/morserunner
QRP contest calendar:	www.n3epa.org/Pages/Contest/contest.htm
Super Duper (SD) from EI5DI:	www.ei5di.com
SK3BG contest calendar:	www.sk3bg.se/contest
EU Sprints:	www.qsl.net/eusprint

MAY 2004 UHF/SHF

Lots of people complained of poor weather and certainly conditions were nothing spectacular for the event this year, but the entry level is the highest that it has been for a number of years - supported by many folk who just came on for a few hours rather than the whole event. John Quarmby, G3XDY, the Single Operator section winner, reported conditions on the higher bands as being better into the UK than into Continental Europe – unusual from his site.

Special credit should go to the Lothians RS for taking on a difficult contest from so far north for the first time. They had great fun, tried out some new equipment on 10GHz, completed some QSOs that they never thought would work, and vowed to be back for more next year. Both they and GD0EMG showed that it's quite possible to put in a decent score on the high bands, but pleaded the usual message that people need to look in their direction earlier in the contest to allow time to complete hard QSOs with weak signals.

Congratulations to John Quarmby, G3XDY, for once again winning the Single Operator section from Neil Whiting, G4BRK, although it was hard fought on some bands. The South Birmingham Radio Society triumphed again in the Open Section, behind the Northern Lights, in significant part due to the fact that the Birmingham team took out 24 and 47GHz.

Andy Cook, G4PIQ

Single Operator Fixed Section Overall

Pos	Call	Loc	432	1.3	2.3	3.4	5.7	10	24	47	Total
1*	G3XDY	020B	545	1000	1000	1000	1000	631	0	0	5176
2*	G4BRK	91DP	55	678	987	0	187	675	0	0	2582
3	G4EAT	01HR	0	497	0	0	0	1000	0	0	1497
5	G0RRJ	91FE	23	399	596	0	131	136	0	0	1284
6	M0GHZ	81VK	147	466	401	194	0	42	0	0	1250
7	G4DEZ	03AE	1000	0	0	0	0	0	0	0	1000
8*	PE1EWR	11SL	498	0	164	0	0	0	0	0	662
9	G3MEH	91QS	493	0	0	0	0	0	0	0	493
10	G3YJR	93FJ	135	125	0	0	0	0	0	0	259
11	G3YDY	01FQ	242	0	0	0	0	0	0	0	242
12	G8SRL	01ED	217	7	0	0	0	0	0	0	223
13	GW4HBK	81KP	139	0	0	0	0	0	0	0	139
14	G3FIJ	01KV	122	3	0	0	0	0	0	0	125
15*	2E1GUA	01FR	103	0	0	0	0	0	0	0	103
16*	M5ADF	91TO	74	0	0	0	0	0	0	0	74
17	G4LRT	92LJ	3	4	0	0	19	9	0	0	35

Open Section Overall

Pos	Group	Loc	432	1.3	2.3	3.4	5.7	10	24	47	Total
1*	South Birmingham RS	92GB	128	384	1000	1000	1000	930	427	1000	5869
2*	The Northern Lights	74QD	152	498	567	527	422	1000	0	0	3166
3	Colchester CG	01PU	789	1000	0	0	0	872	0	0	2662
4	FRARS/Bracknell ARC	80UU	212	338	380	685	0	423	223	0	2262
5	Telford & DARS	82QL	0	61	0	266	53	279	1000	0	1659
6	Parallel Lines CG	01QD	1000	0	0	0	0	0	0	0	1000
7	Lothians RS	74WV	128	403	0	0	0	82	0	0	613
8	Five Bells CG	92WS	409	0	0	0	0	0	0	0	409
9	G8VOI/P	90MX	0	0	0	0	0	382	0	0	382
10	G6GVI/P	81TL	19	31	0	0	0	0	0	0	50
11	G0POT/P	91GI	19	0	0	0	0	0	0	0	19
12	The Midland CG	82UK	10	0	0	0	0	0	0	0	10

432MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4DEZ	17730	1000	59	03AE	400	4 x 28Y	DK2EA	857
2*	G3XDY	9659	545	21	020B	250	28Y	OL4A	867
3*	PE1EWR	8829	498	35	11SL	120	2 x 21Y	OL4A	701
4	G3MEH	8747	493	52	91QS	250	2 x 23Y	DF2VJ	599
5	G3YDY	4288	242	17	01FQ	100	19Y	DF2VJ	527
6	G8SRL	3844	217	22	01ED	100	2 x 21Y	DL2OM	507
7	M0GHZ	2607	147	11	81VK	50	21Y	PA6NL	441
8	GW4HBK	2457	139	9	81KP	80	19Y	PA6NL	500
9*	G3YJR	2387	135	12	93FJ	25	19Y	PI4Z	422
10	G3FIJ	2163	122	13	01KV	20	23Y	GD0EMG	445
11*	2E1GUA	1819	103	12	01FR	20	19Y	DJ0UO	390
12*	M5ADF	1310	74	15	91TO	20	21Y	PA6NL	312
13	G4BRK	973	55	2	91DP	50	21Y	DL0RTA	579
14	G0RRJ	401	23	1	91FE	20	14Y	PA6NL	401
15	G4LRT	46	3	1	92LJ	10	2 X 18Y	G8OHM/P	46

432MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G8P	121190	1000	301	01QD	400	4 x 28Y + 2 x 21Y	DJ7KG	847
2*	M1CRO/P	95645	789	256	01PU	400	4 x 21Y	OL4A	859
3	G5B	49535	409	147	92WS	400	8 x 28Y + 4 x 28Y	DL0GTH	788
4	G4BRA/P	25724	212	97	80UU	400	4 x 21Y	DL0GTH	920
5	GD0EMG	18465	152	63	74QD	400	4 x 20Y	ON7WP	714
6	GM3HAM/P	15501	128	56	74WV	400	2 x 28QLY	PI4Z	651
7	G8OHM/P	15456	128	83	92GB	400	4 x 19Y	DK6SG	794
8	G0POT/P	2302	19	23	91GI	5	15Y	PA6NL	391
9	G6GVI/P	2275	19	14	81TL	25	7CV	PA6NL	451
10	G2HDF/P	1178	10	9	82UK	10	12ZL	G8P	290

1296MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G3XDY	10592	1000	33	020B	250	4 x 23Y	DL0GTH	684
2*	G4BRK	7183	678	17	91DP	40	67Y	DJ5BV	618
3	G4EAT	5266	497	21	01HR	40	4 x 23Y	DJ5BV	464
4	M0GHZ	4932	466	23	81VK	150	55Y	F1BZG	492
5	G0RRJ	4227	399	18	91FE	100	55Y	DF0HS/P	530
6*	G3YJR	1320	125	6	93FJ	7	44Y	PA6NL	413
7	G8SRL	69	7	1	01ED	7	35Y	G8ADM	69
8	G4LRT	46	4	1	92LJ	20	27QLY	G3OHM/P	46
9	G3FIJ	29	3	1	01KV	20	23Y	M1CRO/P	29

1296MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	M1CRO/P	20549	1000	75	01PU	200	4 x 23Y + 35Y	DK2GR	729
2*	GD0EMG	10230	498	37	74QD	350	8 x 23Y	F8BRK	626
3	GM3HAM/P	8290	403	31	74WV	200	4 x 55Y	M1CRO/P	493
4	G3OHM/P	7893	384	43	92GB	130	8 x 23Y	DK2MN	597
5	G4RFR/P	6945	338	34	80UU	150	4 x 38Y	PA0BAT	619
6	G3ZME/P	1256	61	6	82QL	10	23Y	PA6NL	461
7	G6GVI/P	645	31	6	81TL	15	15/15	G1BQQ/P	268

2320MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G3XDY	3893	1000	17	020B	120	0.6m	DL0RTA	398
2*	G4BRK	3841	987	11	91DP	30	0.8m	DL0RTA	579
3*	G0RRJ	2319	596	11	91FE	19	45QLY	PA0EZ	479
4	M0GHZ	1561	401	9	81VK	40	48QLY	PI4Z	422
5	PE1EWR	639	164	6	11SL	7	25Y	PE1RLF/P	197

2320MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G3OHM/P	3749	1000	19	92GB	60	1.2m	PA0EZ	455
2*	GD0EMG	2127	567	7	74QD	40	1.5m	G3XDY	453
3	G4RFR/P	1425	380	8	80UU	25	45QLY	GD0EMG	397

3400MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G3XDY	2657	1000	11	11SL	15	0.6m	PA6C	372
2*	M0GHZ	516	194	4	81VK	7	1.2m	G3XDY	246

3400MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G8IFT/P	1922	1000	11	92GB	35	1.2m	PA6NL	382
2*	G4RFR/P	1317	685	9	80UU	50	2.4m	GD0EMG	397
3	GD0EMG	1012	527	4	74QD	15	1.4m	G4RFR/P	399
4	G3ZME/P	511	266	4	82QL	0.25	1m	G4RFR/P	179

5700MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G3XDY	2414	1000	10	11SL	15	0.6m	PA6C	372
2*	G4BRK	452	187	2	91DP	4	0.8m	PA6NL	403
3	G0RRJ	316	131	4	91FE	0.24	0.36m	G4ALY	203
4	G4LRT	46	19	1	92LJ	8	0.15m Horn	G8IFT/P	46

5700MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G8IFT/P	1658	1000	11	92GB	15	1.2m	PA6NL	382
2*	GD0EMG	699	422	2	74QD	10	1.4m	G4NNS	385
3	G3ZME/P	88	53	1	82QL	0.25	1m	G8IFT/P	88

10368MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4EAT	4877	1000	24	01HR	10	0.6m	GD0EMG	443
2*	G4BRK	3290	675	9	91DP	10	0.8m	PA0BAT	563
3	G3XDY	3077	631	13	11SL	10	0.6m	DJ5BV	438
4	G0RRJ	661	136	7	91FE	1	0.6m	G4DDK	216
5	M0GHZ	206	42	4	81VK	0.7	0.6m	G4EAT	199
6	G4LRT	46	9	1	92LJ	1.2	0.45m	G4MAP/P	46

10368MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	GD0EMG	4757	1000	15	74QD	15	1m	M1CRO/P	471
2*	G4MAP/P	4424	930	29	92GB	10	0.9m	PA6NL	382
3	M1CRO/P	4150	872	19	01PU	5	0.6m	GD0EMG	471
4	G4RFR/P	2012	423	18	80UU	4	1m	GD0EMG	397
5	G8VOI/P	1816	382	10	90MX	0.8	0.6m	GD0EMG	430
6	G3UKV/P	1329	279	14	82QL	1	0.6m	G8VOI/P	200
7	GM3HAM/P	389	82	4	74WV	1	1m	G4MAP/P	361

24000MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G3UKV/P	349	1000	3	82QL	0.5	0.6m	G0MJW/P	135
2*	G8IFT/P	149	427	2	92GB	0.35	0.3m	G3UKV/P	92
3	G8BKE/P	78	223	1	80UU	0.25	0.6m	G8ACE/P	78

47000MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G3OHM/P	5	1000	1	92GB	0.0001	0.3m	G7VDE/P	5

Checklog: G3MEH

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LF

This month, G3YXM has some DX news from around the world • Have you got Version 0.99 of *Jason* yet? • The mammoth loading coil from GBR Rugby has been preserved • Some ideas for dummy loads at LF.

Above: Scott, VE7TIL, uses his own RF to illuminate a nocturnal tuning session!

Above right: The loading coil before it was removed from GBR Rugby.

Conditions peaked in mid-December with VO1NA regularly being copied well by Hartmut Wolf. He also saw WD2XGJ and WD2XES on the same Argo screen on several occasions.

Shortly after this came the first of several atmospheric disturbances, some of these caused by gamma ray bursts (GRBs), which affected long-haul conditions badly. These GRBs originate from very distant objects, perhaps several hundred light years away and are completely independent of solar activity. It seems we aren't assured of good LF conditions even when the sun is quiet.

Christmas saw a return of the good conditions, with Brian, CT1DRP, capturing the usual suspects on 23 December, and G3AQC getting a very good copy of WD2XES and WD2XGJ on Christmas morning.

At the more Northerly latitudes, conditions remained poor; Laurence KL1X, spent Christmas near Anchorage, Alaska, and didn't get much of a sniff at the DX from there. It wasn't all bad news though; Laurence's beacon WD2XDW, still running from his Oklahoma QTH, was again received by Mike,ZL4OL.

The doldrums returned in early January with only traces of trans-Atlantic signals being seen but, by the end of the month, things had improved with another ZL report for WD2XDW and a nice 2300km report for Scott, VE7TIL, in broad daylight! Scott is using a vertical with top-loading wires.

JASON SLOWS DOWN

Alberto Di Bene, I2PHD, has again improved his *Jason* software – *Jason* is a keyboard-to-screen mode designed for weak signal use. This time he has added new fast and slow modes and a 'turbo' mode to increase throughput if conditions improve. Version 0.99 also has quadrature outputs, so that a simple phasing exciter can be driven directly by the PC sound card.

While using this new version in slow mode, WD2XES was copied by Hartmut Wolf in Northern Germany. See 'Web Search' for download information.

FYR MACEDONIA ON LF

In the middle of January, Teo, YU7AR, and some friends made a trip to the Former Yugoslav Republic of Macedonia (Z3) to make some LF contacts.

They operated as Z38AR and Z38AV on QRSS with a 100W transmitter and a 25m high aerial.

That same weekend, RU6LA was on the air from Machta and the band was very busy with QRSS signals from all over Europe.

The following weekend, Marek, SQ5BPM, operated from the his club station as HF75PZK and caused another pileup while working OK, DL, OH, G, I and PA stations in QRSS.

SOME MF NEWS.

In December, Walter Staubach, DJ2LF, received permission from the German Reg T P to operate an experimental transmitter on 440kHz. It is to be used for the study of propagation and the testing of modern modes of communication.

The allocated callsign is DI2AG and it is licensed to run up to 9W ERP with a bandwidth of 200Hz or less. Walter's location is JN59NO.

Initial tests at 1W ERP showed good results from around Europe on QRSS with reports from RA, EA, LA, G, ON, F and DL at distances up to 1650km. A large amount of QSB was reported by most operators, something we LF listeners are unused to! By February, he was up to 3W ERP and trying for trans-Atlantic reports.

MONSTER COIL PRESERVED.

The huge loading coil from VLF station GBR (Rugby Radio) has been saved.

A BT Global Service team of six engineers – led by Rugby radio station manager Stan Francis – undertook the task of dismantling the giant tuning coil at BT's Rugby radio station recently

It was then moved to the Science Museum's hangars at Wroughton Wiltshire, where there are displays of aircraft, large machinery, and transport exhibits. Entrance is free.

ENERGY CONSERVATION?

A recent discussion of dummy loads for testing those QRO LF transmitters gave rise to some unusual suggestions: Marcus, DF6NM, has evidently tried both a toaster (1000W/230V = 53Ω) and a coffee maker (750W = 70.5Ω), but he suggests that we add some water to the coffee maker otherwise it'll turn itself off; he doesn't mention whether bread is necessary when using the toaster.

Bob, ZL2CA, perhaps more sensibly, came up with the suggestion of using an oil jacket radiator, I guess the small tubular greenhouse kind would be good. He says that a 1200W 230V heater has a resistance that is a bit under 50Ω, but there is some inductance, so simple compensation with around 2200pF (the exact value depends on the specific heater) can neutralise the reactance at 136kHz. Polystyrene or polypropylene HV capacitors are recommended. The low *Q* compensation also raises the effective resistance by way of the series to parallel transformation (consider it to be a form of L match, with series R and parallel C).

Me? I just use those big aluminum -cased resistors on a heatsink. ♦

WEB SEARCH

***Jason* software**	www.weaksignals.com
Science Museum, Wroughton	www.sciencemuseum.org.uk/wroughton/

LF Today:

A Guide to Success on 136KHz

By Mike Dennison, G3XDV

Many operators have said that their first contact on the 136kHz band was their most satisfying amateur radio experience. LF Today is a guide to amateur radio on LF and the effective use of this challenging allocation. Based on the experiences of the LF early experimenters this book will provide the reader with a firm basis so he will not waste time having to reinvent the wheel whilst still providing much scope for experimentation. Previous books about LF amateur radio have provided a way for experimenters to publish their ideas and practical results but LF Today moves on a stage. LF Today takes the reader step-by-step through the various parts of the station, explaining the options available and how to avoid pitfalls. With care and a little perseverance, an efficient station can be produced, capable of ranges of hundreds - perhaps thousands - of kilometres, even from a relatively small suburban garden. It contains everything needed to succeed on 136kHz without unnecessary effort.

Size:175mm x 239mm, 128 pages,
ISBN 187230999-2
Non Members price £11.99 plus p&p

Operating Manual

By Don Field, G3XTT

This 6th edition of the RSGB Amateur Radio Operating Manual has been completely updated and redesigned this edition reflects the huge changes in hobby in recent years. The impact of licensing changes and the ubiquity of PCs and the Internet are just some of the challenges in the hobby in the 21st Century. To deal with these, RSGB Amateur Radio Operating Manual has a completely new look at the content and approach. For example, some of the traditional demarcations between HF and VHF and between the various operating modes have been overturned. New and comprehensive chapters can be found on topics such as PCs in the Shack and Operating Modes. There is also a huge amount of new material included, for example, the 136kHz and 5MHz allocations, new data modes and the WSJT software suite, APRS and VoIP. Much of the book has been heavily updated and there is a complete rewrite of the chapter on Satellites and Space communications. If you are interested in amateur radio the RSGB Amateur Radio Operating Manual is the book you should not be without. This book provides a comprehensive guide to operating across the amateur radio spectrum. Packed with information and tips this book has long been a standard reference work found on the bookshelf of radio amateurs.The RSGB Amateur Radio Operating Manual is a valuable addition to your bookshelf and the must have book for everyone interested in amateur radio.

Size: 210mm x 297mm, 224 pages, ISBN 1-905086-00-8
Non Members price £19.99 plus p&p

Hints & Kinks

NEW

For the Radio Amateur

QST's popular column, Hints & Kinks, 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 from 2003 and 2004 QSTs. In addition, you'll find articles included from the 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!

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QRP

EI5EM's QRP transceiver wins two prestigious Eire awards ♦ Advance notice of 'Four Days in May' at the Dayton Hamvention ♦ Where to get modifications to the Heathkit transceiver range ♦ Rules for the AGCW QRP Party on 1 May.

Congratulations are due to Tony Breathnach, EI5EM, who has been awarded The Prof Folan (EI6W) Shield and The Kevin Freeney (EI9BMB) Shield by The Irish Radio Transmitters' Society for his Bosca-40 40m transceiver design. The EI6W shield has only been awarded 17 times since 1956 and was given for 'New Techniques and Advanced Constructional Work'. It is the premier construction award in Eire. Tony has received the EI9BMB shield eight times since it was first presented in 1989! I described Tony's transceiver in this column in November 2003.

Tony describes his Bosca 40 as: "A home-designed 40m CW QRP superhet transceiver incorporating DSP, memory keyer, ATU, SWR meter and digital readout. I christened the rig the 'Bosca 40' which is Gaelic for 'The Forty Box'. The receiver section is a superhet with a 4MHz IF. The output power is about 4W. The rig is based on several designs by others. However, the finished project is unique. The receiver is based on the 40-40 by David Benson, NN1G, and the original design was published in *QST* (November 1994). This design is also described in the current ARRL publication *QRP Power*. The transmit driver is based on the *PW Severn* by George Dobbs, G3RJV, of the G-QRP Club. The original article was published in *Practical Wireless* in July 1983. The 5W transmit power amplifier is based on the NB6M 'Miniboots' design. I downloaded Wayne McFee's design from the web."

FDIM 2005

FDIM (Four Days in May) is a QRP symposium organised and run by the American QRP-ARCI (QRP Amateur Radio Club International) group. Currently the QRP-ARCI has an English President – Dick Pascoe, G0BPS. The FDIM title comes from adding a day (Thursday) to the three days of the Dayton Hamvention, the largest amateur radio event in the world. The Dayton Hamvention has been held each year since 1952 and attracts radio amateurs from all over the world. This year the FDIM event is from Thursday, 19 May 2005 to Sunday, 22 May. QRP activities are based at the Holiday Inn in Fairborn, Dayton. The QRP symposium with a day of internationally-recognised speakers is on the Thursday. Other events include a QRP Vendor's evening, the Buildathon for radio constructors and a QRP Banquet with award presentations and prizes. Further details can be found at www.qrparci.org/fdim64.html

The award-winning EI5EM 'Bosca-40' transceiver.

HW MODIFICATIONS

The Heathkit HW series of QRP transceivers is part of the folklore of QRP operating and although the last of the series, the HW-9, appeared in the 1980s, it is still used and sought after by QRP operators. The HW-7 was a direct-conversion transceiver for the 40, 20 and 15m bands, with about 3W on 40m, 2.5W on 20m and 2W on 15m. The transmitter was fine, but the receiver was, to say the least, a bit 'iffy'. The HW-8, although still a direct-conversion transceiver, was a vast improvement on the HW-7. The HW-8 used frequency-mixing to determine the bands and gave a consistent 2W of RF output on the CW portions of the 80, 40, 20 and 15m bands. It had a balanced-mixer circuit and also included a two-pole active audio filter. The HW-9 was a multi-band, 4W, CW superhet transceiver with an 8.83MHz IF covering the 80, 40, 20 and 15m bands. An add-on kit for the HWA-9 added the 30, 17, 12 and 10m bands. It had a Mini-Circuits doubly-balanced first mixer and an audio-derived AGC, although the crystal filter in the IF stages was a rather minimal 4-pole arrangement.

Because of the simplicity of the HW range transceivers, especially the HW-7 and HW-8, a large collection of modifications has appeared over the years. In fact it is difficult to buy a secondhand HW transceiver that has not been modified in some way. There are several sources of modifications, including the excellent *HW-8 Handbook* by Michael Bryce, WB8VGE. A new edition of this book appeared last year.

Chet Sprinkle, K8YTO, has undertaken a project to collect and share modifications to the very popular Heathkit QRP transceivers. His collection of Heathkit QRP modification information (www.geocities.com/chetsprinkle/) covers the HW-7, HW-8 and HW-9 transceivers, and is arranged in a Microsoft *Excel* spreadsheet. For those who may not have the *Excel* program, Microsoft offers a free downloadable *Excel* viewer. ♦

The Heathkit HW-8 transceiver.

THE AGCW QRP-PARTY

The German club AGCW (Activity Group Telegraphy) runs a QRP contest on 1 May each year; the rules are:

Date	Annually on 1 May.
Time	1300 - 1900UTC.
Participants	All licensed amateurs and SWLs, CW mode only (A1A). The use of keyboards and automatic CW decoders is not allowed.
Frequencies	3510 - 3560kHz, 7010 - 7040kHz .
Call	CQ QRP
Categories	A: max 5W out or 10W in. B: max 10W out or 20W in.
Exchange	RST & QSO No / Category. The QSO number is irrespective of the band in use. Example: 579002/A.
Scoring	Every QSO counts one point. Each QSO with a class-A station counts two points. A station is allowed to be worked only once per band. SWL logs have to contain both callsigns and at least one report.
Multipliers	Each DXCC-country counts one multiplier.
Final Score	QSO points times multipliers per band. The final score is the sum of the band results.
Note	Non-observance of the rules will lead to disqualification! All logs must contain a declaration that the contest rules have been respected. Send SASE or SAE plus one IRC to receive a list of the results. Be sure to add your complete postal address. The results will also be posted to the AGCW board of the Packet Radio BBS network and to the AGCW home page. Additionally, they will be published in *AGCW-Info*.
Logs	Deadline is May 31. Manager: Werner Hennig, DF5DD, Am Cappeler Freistuhl 33, D-59556 Lippstadt, Germany. E-mail: qrp-party@agcw.de

Norman Fitch, G3FPK

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E-mail: g3fpk@compuserve.com

VHF/UHF

This month: news of a VHF / UHF / SHF meeting in Sweden, a planned DXpedition to St Paul Island, and of a radio and visual aurora at the end of January.

As many already know, Angus McKenzie, G3OSS, died on 14 January, as reported in the March *RadCom*. To elaborate a little, he was a dedicated VHF operator and was particularly concerned about the quality of transmissions. As such, he was always willing to discuss this topic with those whose signals were substandard and to help them improve their quality. He served on the RSGB VHF Committee for several years under different chairmen when we used to meet at London House in Bloomsbury, making the journey via the London Underground network with Simon, his faithful guide dog. I was always amazed at the way Simon led the route from Russell Square station, where there are lifts, to London House.

SWEDISH MEETING

The 27th Nordic VHF/UHF/SHF meeting is scheduled for 27-29 May in Ånnaboda, Sweden (JO79LI). It is organised by the Örebro Sändaramatör, whose club callsign is SK4BX. There is a comprehensive website – see 'Web search' – and when I looked at it on 9 February, 63 (mostly Scandinavian) amateurs had registered. On the programme are lectures, demonstrations, measurements, a flea market, Friday barbecue and a traditional ham dinner. A special event station will be QRV on 2m and up.

The website includes a map and the instructions are to take the E18/E20 to Örebro then follow the signs to Garphyttan/Ånnaboda. Accommodation information is given and you can book through the website. Previous Ånnaboda meetings have featured an antenna range where you could measure the actual performance of commercial and home-made antennas.

ST PAUL ISLAND

A major DXpedition to St Paul Island is planned for the period 7 June through 7 July using the callsign CY9SS. The organisers hope to have five or six operators QRV at all times, rotating them in weekly shifts. They are planning operation on SSB, CW, WSJT, MS and EME modes on 6m and 2m with a separate 6m station dedicated to trans-Atlantic communications. There will also be stations on all the HF bands.

They would like to have 24 operators and, when I looked on the website on 10 February, 14 were listed. By all accounts, St Paul Island, which is located in the Cabot Strait between south-west Newfoundland and north-east Nova Scotia, can be a rather cold and windy place, even in summer. Landing all the tons of equipment will be a major undertaking with strong ocean currents to contend with and the probability of at least one North Atlantic storm. Further details on the website – see 'Web search'.

SOLAR AND GEOMAGNETIC DATA

The period from 9 January through 8 February reveals that the 10.7cm solar flux peaked at 145 units on 15 and 16 January with a minimum of 82 on 2 and 4 February. The average was 102.6, about 10% higher than last month's value. The SESC sunspot number peaked at 109 on 18 January and was down to 22 on 4 and 5 February. 14 new regions were recorded. In the 30 days to 8 February the mid-latitude A-index values at Fredericksburg were somewhat erratic with 16 quiet days and seven each unsettled and sub-storm days. The maximum value was 35 on 18 January with a minimum of zero on the 26th.

To quote extracts from the GB2RS news broadcast of 23 January, "Sunspot region number 720 proved to be very prolific. During its transit across the visible face of the Sun it produced 100 C-class, 24 M-class and five X-class solar flares. The largest solar flare of the period was an X7/2B on the 20th. This was the third largest solar flare of the present cycle and brought the strongest high-energy space radiation since 1989. In fact it produced an energetic proton storm that reached 5040 particle flux units. At one point protons actually penetrated down to ground level in the Polar regions.

"It produced at least six geo-effective coronal mass ejections. The last CME that arrived on the 21st was so intense that it was followed by magnetopause crossing. In simpler terms, the Earth's magnetic field was compressed in the opposite direction of the Sun to such an extent that orbiting satellites, including the International Space Station, were exposed to the full wrath of the Sun; very unhealthy to microprocessors and human DNA.

"Geomagnetic activity was at major storm levels on four days. The most disturbed day was the 18th, with an estimated Ap-index of 72 units. However, the most disturbed period was for about six hours during the evening of the 21st, when the Kp-index reached 8. A radio and visual aurora took place over the UK and Europe." See the photos of the event as seen by Scottish observers.

PHOTO: DAN YOUNG.

Dan Young from Anstruther in Fife took this photograph of the big aurora on 21 January. It was quite brilliant despite the bright Moon.

TRANS-EQUATORIAL PROPAGATION

TEP is a well-researched mode and many European operators in the Mediterranean region have worked stations in Southern Africa by this mode on 6m and a few on 2m. In the 20-26 January period, Brazilian amateurs Luiz Tresso, PY2OC, and Flávio Archangelo, PY2ZX, made the first 2m TEP contacts between the state of São Paulo and the Caribbean. Located on Comprida Island (GG64BX) they initially made contact through the Barbados repeater on 146.910MHz. On the 25th the Caribbean repeaters were relaying back their signals very strongly and they worked 8P6JB/M. When they checked the input channel, Ron's signal was almost as strong as it was through the repeater. So they QSYd to the 146.450MHz simplex channel and at 0200 completed a successful point-to-point QSO. The aim of this experiment was to ascertain the northernmost point from which PY2 stations could make a 2m QSO via TEP mode. For further details see the Japy DX Group's website.

METEOR SCATTER

The April Lyrids meteor shower is likely to peak around 0500 on the 22nd with a zenithal hourly rate (ZHR) of 15 according to the OH5IY *MSSOFT* program. The maximum is rather broad and the radiant is above a mid-UK horizon from about 1830 for 20 hours. At maximum, the best paths appear to be east/west and north-west/south-east. Nobody has mentioned the Quadrantids shower, so was it another disappointing year?

MOONBOUNCE

During the EME Conference in Trenton last year, Joe Taylor, K1JT, announced that he was working on JT1 mode software. He has now abandoned it as on-air tests proved it was unsatisfactory. Instead he posted on the Moon Net website; "I am pleased to announce the release of WSJT version 4.9.0. This version of the program has two major features that will be of particular interest to EME users: 1) A CW mode that handles T/R switching and 15WPM transmission for EME CW QSOs. 2) A new decoder for JT65 modes that is about 4dB more sensitive than any previous version. Some new features also serve to make JT65 more 'random friendly' in operation. With the

PHOTO: JIM HENDERSON PHOTOGRAPHY, WWW.JIMHENDERSONPHOTOGRAPHY.COM

This is how the aurora on 21 January looked from the home of Jim Henderson, 25 miles west of Aberdeen.

new JT65 decoder, full decodes of standard EME messages (two callsigns, a grid locator, and an optional 'OOO' signal report) are now accomplished more than half of the time at a signal level of -28dB relative to the noise power in 2500Hz bandwidth." Joe says that a more complete description of the new decoder, as well as the updated program itself, can be found on the WSJT home page website. Also he strongly advises users to read the descriptive material – see 'Web search'.

In the first six hours after release over 300 EME-ers had downloaded v4.9.0 from his website. Inevitably some anomalies were reported with '000AAA 000AAA RA90' garbage messages being seen. He writes, "None of the WSJT modes was ever intended to be like using the Internet. Operator skill is required and one of the skills you need to learn is how to recognise proper synchronisation of a transmission. If you are suspicious of any message presented to you by the decoder, ask yourself: 'Have I established that there is a JT65 signal at the specified frequency and time offset?' If not, you should certainly treat the decoded message as provisional, at best, until you do establish that there is a legitimate signal there. Also, you might well ask yourself whether your received signal is clean of birdies, QRN etc. If not, the probability of false decoding goes up. Make sure you have the latest version of the UPD491.EXE file, which is 499,229 bytes long."

Still on software, Lance Collister, W7GJ (DN27), has now uploaded a revised TRACKER program that utilises a new callsign database that is the same as the CALL2.TXT file format used in v4.9.0. This can be downloaded from Lance's website. Lee Scott, AA1YN (FN43), has finished rewriting his versatile VHF and Up database which includes nearly 1300 callsigns, details on his website – see 'Web search'.

Howard Ling, G4CCH (IO93), was QRV on 23cm in January and on the 16th completed on CW with W9IIX, K2UYH, K9SLQ, IW2FZR and VE6TA. On the 21st G3LTF, K5GW, NA4N, LA9NEA, N2UO and W5LUA were worked on CW. Next day brought CW completions with SK0UX, OZ4MM, F1ANH, LA8LF and WB5AFY. On the 23rd he completed with VE6TA*, PY5ZBU*, W7BBM (55/55), NA4N* and DF3RU*. Guy Fletcher, VK2KU (QF55), suffered a major lightning strike at his QTH on 1 February which caused a lot of damage to his equipment, so it may be a while before he has repaired everything.

There has been much discussion about dates for this year's ARRL EME Competition and Joel Harrison, W5ZN, writes that, "There is absolutely nothing that dictates when the ARRL EME Contest dates have to be other than what the EME community decides are the best dates to have the contest. They don't even have to be in the fall/winter. When the contest originally began, it was held in the springtime. The community decided that was not a good time of the year to have the contest because, just coming out of winter, it did not allow stations enough time to maintain/modify/repair or build new antennas over the 'warm' months, and the fall was believed to be a better time to have the contest. So the dates were changed.

"Now, we run into the situation of trying to work around numerous other VHF related contest dates around the world or trying to work around other situations. So, there is nothing at all that says the contest has to be in the Oct/Nov/Dec time frame other than that is when the community tends to focus on now. As far as the ARRL is concerned, we'll be happy to sponsor the contest any time of the year!"

The February issue of the 432 and *Above EME News*, edited by Al Katz, K2UYH, runs to six pages in A4 format in the .pdf version. Peter Blair, G3LTF (IO91), wrote the guest editorial dealing with EME contacts using digital modes. There are reports from Peter on 23cm and 70cm activity and Dave Dibley, G8RGK (IO91) on 70cm operation.

The next activity weekend is 16/17 April when London latitude stations will have 32 hours of Moon time. The declination varies from +27.27° to +21.62° and the 144/432MHz sky temperature ranges from 390/29K to 200/15K. The signal degradation over this apogee weekend varies from -1.91dB to -1.88dB and the Sun offset at Saturday midnight is +94°.

BAND REPORT

50MHz

Kevin Jackson, M0XLT (IO83), caught the January E-layer openings and on the 13th, 1648-1726, he completed Es contacts with IZ5EME (JN52), IC8COJ (JN60 on Ischia Is), IW0BET (JN61), I5TAT (JN53), IW0GXY (JN61) and I5ARS (JN53). He also copied the I0JX and OE3XLB beacons. On the 17th he heard MM0AMW (IO75) via aurora backscatter. The next Es event was on the 19th, 2048-2127, when he had QSOs with IK4PLU (JN64), IW0BET, F2JD (JN25), HB9SJV (JN36), IK2EAE (JN45), F/ON6DH (JN33), IK1EGC (JN35) and IW1AZJ (JN35). In an auroral-E opening on the 21st he worked OH6KTL (KP02) at 1907 and copied the TF3SIX (HP94) and OH9SIX (KP36) beacons after which he heard MM0AMW, GI6ATZ (IO75), G4DEZ (JO03) and an OZ via auroral backscatter. All the above were on SSB using an IC-706 and tri-band collinear antenna.

Robin Burrows-Ellis, M1DUD (JO02), sent a long monthly summary of his QRP activity in 2004. In the Nordic Activity Contest (NAC) on 28 December he only made three contacts one of which was his first JT6M mode QSO with OZ6OM (JO55) at 2039 in quite flat conditions. Robin is impressed with this as he was only running 5W.

Ted Collins, G4UPS (IO81), reports nil Es activity in January until the 24th when G3HBR telephoned at 1049 to say he was copying the 9A0BHH beacon at S5. Ted copied it at S3 and shortly afterwards heard the IQ4AD beacon at S3 among strong European TV signals. At 1103 the 9A1CAL beacon was peaking to S6 and at 1151 the SR9FHA beacon popped up for 6 minutes at S5.

70MHz

The following notes are compiled from the Four Metres Website – see 'Web search'. Tony Vernucci, I0JX (JN61), writes, "We are continuing to push our national communications

WEB SEARCH

CY9SS:	www.cy9ss.com
Ånnaboda:	http://vhfmeeting.sk4bx.se
Japy DX Group:	http://planeta.terra.com.br/noticias/jdxg
Four Metres:	www.70mhz.org
I0JX (4m transverter):	www.qsl.net/i0jx/tentec_e.html
WSJT home page:	http://pulsar.princeton.edu/~joe/K1JT
WSJT update/history:	http://pulsar.princeton.edu/~joe/K1JT/UpdateHistory.txt
W7GJ (*Tracker*):	www.bigskyspaces.com/w7gj/tracker.htm
AA1YN (WSJT database):	www.aa1yn.com/vhf

office to get a 4 metre operating permit. In particular, I am considering applying for a licence to cover the Sporadic E period from 15 May – 15 August. If obtained, I could ask for renewals until it becomes permanent, and eventually extended to other amateurs." He has modified an inexpensive Ten-Tec 6m transverter kit to operate on 4m and the project is covered on his website – see 'Web search'.

Dave Ackrill, G0DJA, has set up an unattended personal beacon running 5W of PSK31 from his QTH in Bolsover. More information is in the Narrowband Data Modes section of the Forum. In the January 'VHF/UHF' column I mentioned John Livesey's, G0JJL, planned 10-day operation from Gibraltar from 4 June. He will have 100W on 4m and the antenna will be a 4/6m dual-band 4-ele Jaybeam Yagi on the roof of the Caleta Hotel on the eastern side of the rock. He has set up an e-mail address specifically for this operation at john@gibraltar.f9.co.uk

144MHz

The *only* contribution this month was a brief one from Bryn Llewellyn, G4DEZ, who worked into OZ (JO44) on 31 January in flat band conditions. In the Cumulatives and UKAC contests on 1 February he remarks that it was nice to see some new callsigns in conditions just a little above poor. He hears FM activity on 144.400MHz when beaming towards the Midlands, Coventry and Northamptonshire. This is most certainly *not* in accordance with the band plan. Since it is unlikely that those operators read this column, the only way to persuade them to move would be for local amateurs to contact them on air to explain the situation vis-à-vis the beacon band.

430MHz

Ken Punshon, G4APJ (IO83), was QRV in the Affiliated Societies Contest on 6 February and was pleasantly surprised at the number of stations participating concluding, "Shame that the conditions didn't match the turnout." G4DEZ was QRV in the 70cm UKAC evening on 8 February but conditions were very poor and the activity was low. ODX was DF9IC (JN48) at 767km and Bryn was pleased to work EI3GE for a new country for this year's annual table, the first appearance of which will be in the May issue.

SIGN OFF

Thanks to the UK Six Metre Group for the copy of the February issue of its quarterly journal *Six News*. The deadline for copy for the June issue is **12 April** and for July it's **10 May**. My telephone answering and fax machine is on 020 8763 9457 and my CompuServe ID is g3fpk ♦

LOCATOR SQUARES TABLE

Starting date: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1296MHz	Total
G4YTL	11	56	560	141	14	782
G0FYD	724	1	296	50	17	1088
G3XDY	-	34	261	179	130	604
GW7SMV	675	-	250	-	-	925
G3FPK	30	-	246	-	-	276
GW3LEW	436	14	232	42	4	728
G4VPD	457	14	231	16	-	718
G4DEZ	691	42	221	103	49	1106
G8HGN	346	-	208	77	-	631
M5BXB	453	15	192	57	-	717
GW3HWR	478	31	187	34	-	730
GM4VVX	357	22	170	2	-	551
G8TOK	424	44	145	58	34	705
G6TTL	405	-	140	94	28	667
G8RWG	-	-	120	-	-	120
G3FIJ	278	29	108	51	23	489
EA7IT	209	-	108	-	-	317
G0ISW	240	7	103	22	-	372
MM3ERP	91	3	83	22	-	199
G4OBK	469	28	79	11	-	587
M5MUF	155	23	70	-	6	254
G4APJ	192	-	64	31	-	287
M1DUD	294	1	54	10	-	359
MU0FAL	540	-	49	9	4	602
G0JHC	1040	26	48	4	-	1118
M3CVN	249	-	46	5	-	300
G3IKR	340	52	45	-	-	437
G4FUJ	111	20	28	6	5	170
M1FEO	59	-	26	1	-	86
M3GUA	17	-	20	14	-	51
M0XLT	176	-	16	2	-	194

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Band of the month 144MHz. Next deadline is 12 April.

HELPLINES

- Tony, G3NPF, has a dead **Epson Stylus Colour 460 printer** which requires a replacement print head. Any information as to where such an item could be obtained or the whereabouts of a scrap printer with a serviceable print head would be much appreciated. G3NPF, QTHR. Tel: 01903 746959, or e-mail a.wadsworth@tesco.net

- Michael, G8MOB, is looking for a manual or circuit to restore the **Labgear 160 Twin top band transmitter** and the **Siemens Ediswan LF Oscillator Type R66**. He will meet all expenses. G8MOB, QTHR. Tel: 020 8873 0716 after 8pm or e-mail michaelob@tiscali.co.uk

- Tim, A45WG / M0FGC, is looking for a technical manual or service manual for the **Rohde & Schwarz EK071 ULF-HF receiver**. All expenses will be fully reimbursed. A45WG, e-mail: deepstar@omantel.net.om

- George, M5ACN, is looking for a **Cossor 'Tuneon' type 3184**, or equivalent. This was a neon tuning indicator used in many wireless sets of the 1930s. It is 12mm in diameter, and about 91mm long, excluding the pins. Any incurred expenses will be reimbursed. M5ACN, QTHR. Tel: 01707 659 015.

- Stuart, G3YPS, is looking for an **AN212 audio IC** for his **FT-75** transceiver. He also seeks a service manual for a **Lambda switch-mode PSU, type LT-803**. All information will be gratefully received. G3YPS, QTHR. Tel: 07803 601 176.

- Rob, G3TFM, is looking for any available **Nascom 2** hardware, firmware or documentation which is no longer wanted. G3TFM, QTHTR. E-mail: g3tfm@aol.com

- John, ZL3TR, is looking for the following: **valves** type 6870, 6SN7, 6SL7, metal 6L6; **capacitors** (a) paper or better – 0.001µF to 0.5µF up to 750Vwkg, (b) disc & feed-through ceramic – 100pF to 0.1µF up to 2kV, (c) 25µF 25Vwkg to 32µF 450Vwkg. John Haynes, ZL3TR, c/o Pacific Haven Residential Care, 365 Marine Parade, South New Brighton, Christchurch 8007, New Zealand.

- Stuart, G0OUD, is looking for the user manual for the **Dewsbury Electronics Star-Masterkey CMOS memory keyer** – original or photocopy. All expenses would be covered. G0OUD, QTHR. E-mail: stuart.hill4@virgin.net

Peter Dodd, G3LDO

37 The Ridings, East Preston, W Sussex BN16 2TW.

E-mail: g3ldo@ukonline.co.uk

Antennas

For those of us who spend all our lives on the HF bands, the subject of coaxial cable is hardly given a second thought. Just fit a PL-259 to one end and connect the other end to the antenna and away we go.

All coaxial cable presents some attenuation to both the transmitted power being fed to the antenna and the received signal returning to the transceiver. But just how important is coax cable attenuation to the performance of a station and what are the properties of good coax?

SERIOUS COAX

Electro-magnetic waves tend to propagate along the surface of conductors, rather than inside, due to the phenomenon of skin effect. Coaxial cable performance depends upon the conductivity and size of the outer surface of the inside conductor and the inner surface of the outer conductor.

The centre conductor of a coaxial cable may consist of either a single wire of the desired outer diameter, or a twisted bundle of smaller strands. Stranded-centre conductors improve cable flexibility, while solid centre conductors provide the greatest uniformity of outer diameter dimension, which contributes to stable electrical characteristics.

The outer conductor of coax cable should ideally be made from a solid conductive pipe, but this construction makes the cable difficult to bend. The flexibility and bend radius of such cables can be improved by corrugating the outer conductor; examples are shown in the photograph.

Nearly all of the popular flexible coaxial cables employ braided shields. These are not as effective electrically as solid outer conductors because gaps in the woven outer conductor permit some signal leakage, or radiation, from the cable, increasing the attenuation at higher frequencies. This effect can be minimised by adding a layer of copper foil under the braid, as is done in the Ecoflex cables.

The dielectric material that separates the outer conductor of a coaxial cable from its centre conductor determines the intensity of the electrostatic field between conductors and maintains the physical position of the inner conductor within the outer conductor.

FIG 1 © RADCOM 439

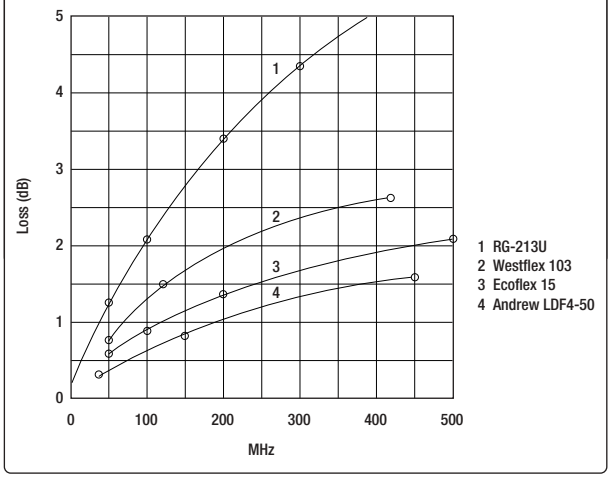
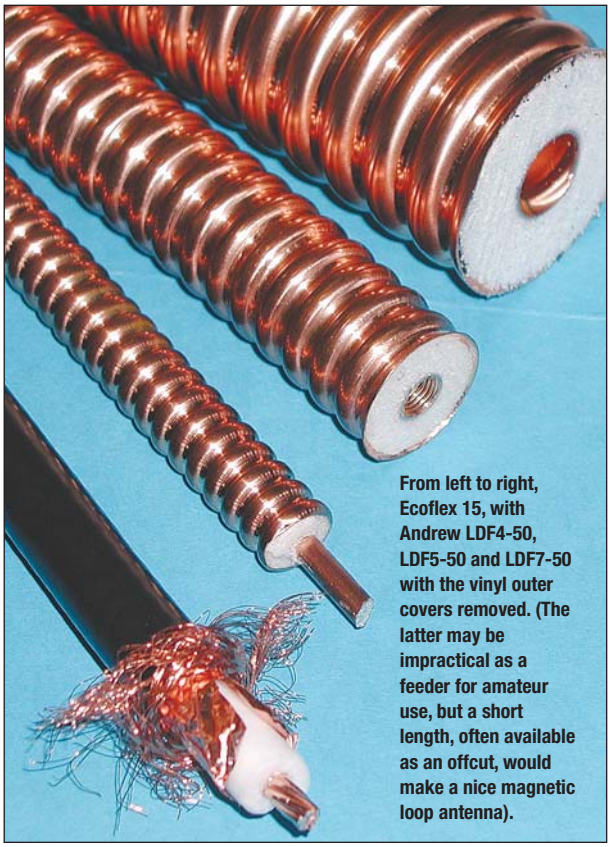


Fig 1: Matched feeder attenuation for 30m of various feeders discussed in the text. Note the similarity between Ecoflex 15 and Andrew LDF4-50



From left to right, Ecoflex 15, with Andrew LDF4-50, LDF5-50 and LDF7-50 with the vinyl outer covers removed. (The latter may be impractical as a feeder for amateur use, but a short length, often available as an offcut, would make a nice magnetic loop antenna).

Partially-assembled N-connector used with Ecoflex 15 coax. Note that the centre pin is a tight push fit over the coax centre conductor.

Common dielectric materials for coaxial cable in-clude polyethylene, polystyrene and Teflon®.

The least lossy dielectric material is a pure vacuum, which is totally impractical for use as a cable dielectric. However, the electromagnetic properties of air or gaseous nitrogen are very similar to a vacuum and can be used by mixing low-cost polyethylene with low-loss nitrogen. This is accomplished by bubbling nitrogen gas through molten polyethylene dielectric material before the polyethylene solidifies. This material is variously known as cellular polyethylene dielectric, foam dielectric, or polyfoam. It has half the dielectric losses of solid polyethylene at a modest increase in cost.

LOW-LOSS COAX – IS IT WORTH IT?

The attenuation factors of various correctly-terminated coax cables are shown in Fig 1. These attenuation figures are for 30m (100ft) lengths and indicate that, for frequencies below 50MHz, there is not much to be gained by using expensive low-loss coax feeders. At VHF, and particularly UHF frequencies, it is a different matter. Good quality coax can really enhance a station's performance. On a typical UHF installation at least a 3dB increase should be possible by replacing RG-213 with, say, Ecoflex. If this doesn't sound much remember that generally the size a VHF/UHF antenna array has to be doubled to get 3dB gain.

One has to bear in mind the cost. Current prices for 'small quantities' (100m lengths) of LDF4-50 is apparently £2.50 per foot. That is around £8 per metre, although it can be obtained much more cheaply through surplus sources (try eBay). Ecoflex15, which has similar characteristics to LDF4-50 (see **Fig 1**), is £2.85 per metre up to 25m reducing to £2.65 per metre, 75 to 100m. (see facing page).

Interestingly, all connectors used on high-grade low-loss cable appear to be solderless. This applies to the N-type male and female connectors used with Ecoflex15, see the photograph. This connector proved to be very easy to fit.

FINALLY

My thanks to Walter Blanchard, G3JKV, for samples and information about Andrew cable.

My thanks also to Terry Clayton, G0TKJ, of Diode Communications, for a sample of Ecoflex 15 coax and N-connectors. ♦

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E-mail: g3zvw@dsl.pipex.com

Whatever next

Firstly, news of an American device for disabling the ignition systems of cars ♦ The first results of the 'ideal transceiver' debate at the Stevenage Show.

FIG 1 © RADCOM 440

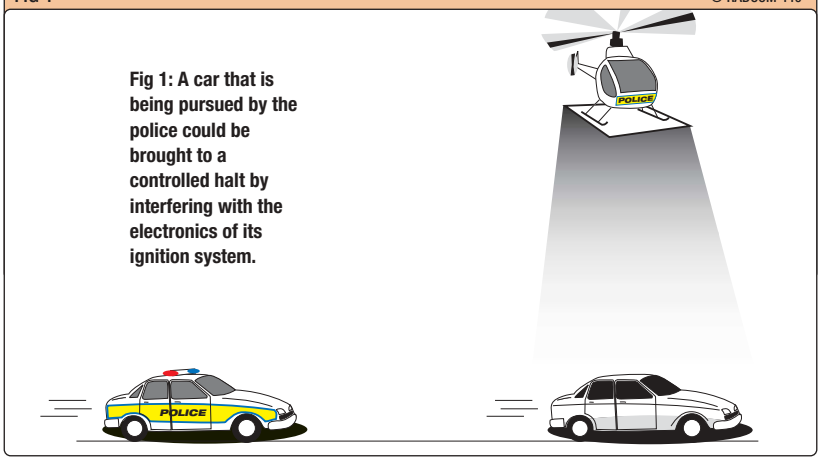

Fig 1: A car that is being pursued by the police could be brought to a controlled halt by interfering with the electronics of its ignition system.

In the not-too-distant future, someone being pursued by the police may find that the boys in blue have a new method of stopping them if they decide not to pull over.

Los Angeles-area scientist James Tatoian took the facts (a) that modern cars rely increasingly upon electronics for the ignition system, and (b) that electronics can be interfered with by high levels of electromagnetic radiation, and came up with a plan to equip police vehicles with high-power microwave transmitters to interfere with on-board microprocessors and electronic devices. "If you put approximately 10 or 15 kilovolts per metre on a target for a few seconds, you should be able to bring it to a halt," he said.

Thus, Tatoian's company, Eureka Aerospace, is developing a 'High Power Electromagnetic System', the antenna of which consists of a series of 'wires' arranged in a 1.5m x 1.2m (5ft x 4ft) array. It is said to be able to zap a vehicle at 90m (300ft). With an antenna of this size, I think it is a little optimistic to think that it could be mounted on a vehicle that would be able to keep pace with someone who didn't want to stop, but the helicopter-mounted version they are proposing seems viable (see **Fig 1**).

After seeing a preliminary demonstration of the device last year, Commander Sid Heal, who evaluates technology for the Los Angeles County Sheriff's Department, said that he was very enthusiastic about its prospects. "Everybody on the globe is interested in a technology like this," he said, adding "Every law enforcement agency and every military agency in the world will jump on this. I can say that with absolute confidence."

THE NEXT GENERATION – THE RESULTS BEGIN

With all the seats in the lecture room occupied, the discussion I hosted at the Stevenage Show on 20 February was well attended and lively. Thanks to the *RadCom* readers who wrote and e-mailed, we had plenty to talk about. I'm pleased to report that Ian Lockyer, Marketing Manager of Icom-UK attended the discussion. Yaesu and Kenwood were invited to attend, but unfortunately they did not have enough personnel on site to do so. To maintain a level playing field, the big three manufacturers will each receive the full outcome of the discussion and be invited to comment. In due course, I will communicate back to *RadCom* readers what they have to say.

Right at the start, Ian expressed concern that the discussion might turn into some kind of 'spank the manufacturers' session. This was a perfectly valid concern, but it soon became clear that all those in attendance simply wanted to point the manufacturers in the direction they would like them to go, not to castigate them for anything they had done in the past. It was a discussion with a win-win aim, where the manufacturers could sell more by virtue of the fact that they would be producing equipment that people would find attractive to buy. But could an informal group of amateurs come up with some useful ideas or anything radical? Is there anything the manufacturers don't already do that would fire peoples' enthusiasm? You bet!

I started the technical side of the discussion by saying that from the input received I had identified five main areas we ought to discuss:

- ♦ The transmitter (output power, etc)
- ♦ The receiver (performance, frequency range)
- ♦ The user interface (front panel, displays, types of control)
- ♦ Connectivity (sockets and interfaces)
- ♦ Facilities (power supply, modes, menus, frequency bands, etc).

The Transmitter

We started by discussing what the output power should be. There was an appeal for higher output powers for VHF transmitters, but in general 100W for the HF bands was seen as adequate. However, it would be seen as a good thing if manufacturers could provide a slot for a plug-in module that would boost the maximum output to 200W (ie an additional 100W amplifier).

It was clear that most people accepted the idea of a cooling fan, but it has to be *very* quiet. However, where space is not a concern, an additional bolt-on heatsink could result in a transceiver that was absolutely silent.

The subject of power control was raised by a QRP enthusiast, who pointed out that many modern transceivers cannot be adjusted down to really low power. Manufacturers please take note!

CW enthusiasts wanted a full break-in transmitter with a *really good* key click filter, whilst SSB enthusiasts wanted flexible DSP equalisation of the transmitted audio.

When it came to antenna tuning, the feeling of those present was that an Auto ATU was a good thing, but it should be an accessory, ie another plug-in module.

VHF/UHF transverters were discussed and it soon became very clear that those interested in them wanted weatherproof transverters, for mounting at the masthead.

Because digital communications is becoming more and more common, the facility to feed a digital stream of data straight into the transmitter was required. The young look upon digital communication as the norm, so to attract them into the hobby the next generation of equipment *must be* equipped for digital input.

Finally, an auxiliary audio input was required (many transceivers have this anyway), but it needed a gain control independent of the microphone.

To sum the transmitter up in one sentence, it needs to be far more modular than we are accustomed to.

More next month. ♦

WEB SEARCH

Microwave car stopper: http://tinyurl.com/6oew9

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JT44 – moonbounce at lower power

This month, Andy considers the JT44 mode, what it is and how it may be used ♦ Is the future of packet radio hanging in the balance? ♦ Networking protocol descriptions available on the Internet.

The regular copy of Fourpak's *Newsletter* arrived in time for this column and, as usual, it made interesting reading of packet radio operation in the Midlands. The status of the various nodes, the next packet conference to be held on 15 May, the use of WiFi and voice/VoIP repeaters are all covered. However, there are also some disturbing comments on the future of packet, and where the mode may be going. The two extracts in the box are taken verbatim from the *Newsletter*.

THE FUTURE OF PACKET?

As evidenced by the abysmal attendance at Fourpak meetings, there seemed to be little interest in packet radio these days, especially amongst non-SysOps, and even the SysOps were losing interest. Someone quipped that users weren't necessary, as the network would work perfectly well without them! One SysOp felt that we were merely hanging around waiting to 'turn out the lights' after the last user had gone. Maybe everyone was feeling particularly gloomy, but even these die-hard sysops were feeling that there was no point any more. There seemed to be more interest in VoIP than packet, both within and outside the group. What do you think ?

MLVN & GB7GLO

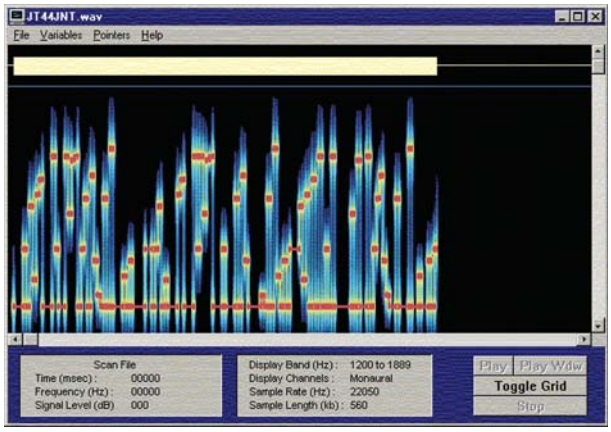
Steve's node and BBS continue to provide all the usual facilities for the area and further afield. Steve is considering turning off the 4m port, as no-one had used it for many months. Is it still required?

PROTOCOLS

An Internet site that contains a very comprehensive description of networking protocols and descriptions is given in the 'Web Search' box . It is aimed at the world of telecommunications rather than point-to-point radio, but goes a long way in covering such things as the meaning and function of TCPIP, HDLC and all the cellular radio details, and a lot more.

WSJT UPDATE

It is just over two years ('Data', February 2002) since we covered the *WSJT* software for Meteor Scatter communications. WSJT stands for 'Weak Signals by K1JT', and the software suite has been expanded since that date to encompass several different modes for weak signal working. The original FSK441 mode detailed in that article has been retained and will not be described further here, but a number of exciting new modes have appeared since then.



Spectrogram of a JT44 signal sending the message 'G4JNT TEST IO90IV59'.

JT44 is a mode designed primarily for Moonbounce, or EME, working as well as terrestrial operation. The scheme encodes each letter of a reduced alphabet of 43 characters (capital letters, numbers and some limited punctuation) into one of 43 audio tones. The tones are equally spaced on a frequency grid generated from the soundcard sampling rate of 11025Hz / 1024 = 10.77Hz. A 44th tone is added, three intervals below the lowest, at a frequency of 1270Hz to act as a synchronising signal. The total bandwidth of the ensuing waveform is now close to 500Hz. Each tone is transmitted at a rate of 11025 / 2048 = 5.38Hz, half the tone spacing, or a bit less than 200ms per character. A message of 22 characters exactly (shorter messages need to be padded with spaces) is repeated three times, requiring 66 symbols in a transmission period. These symbols are merged with 69 symbols of the sync. frequency, with the mixing done in a pseudo-random pattern. A spectrogram display of a JT44 frame is shown and the sync symbols can be clearly seen. The virtue of merging the synchronisation symbols in this way is that the decoder software can search for the sync tone in both time and frequency as it knows the sequence, and tuning errors of up to 400Hz can be allowed for, as well as timing errors of a few seconds. The 200ms signalling interval means that the effective noise bandwidth is around 5Hz, about 10dB narrower than conventional CW requires. Furthermore, the three-times repeat gives another few dB of processing gain so, in all, JT44 requires around 10 – 15dB less signal strength than CW does. The symbols take 25 seconds to send, and the JT44 EME protocol calls for a 30-second transmit/receive sequence, with timing on the minute/half minute boundary automatically derived from the PC's clock.

JT44 has been used successfully for some time now and the *WSJT* software, at Version 3, has enabled several amateurs to set up EME stations using lower transmit power and/or smaller antennas than would otherwise be possible with conventional CW. However, Joe has now upgraded the code to JT65 (in *WSJT* Ver. 4.7) which includes Forward Error Correction and a signalling protocol that is more tightly geared to EME working. This latter element makes the mode of considerably less use for terrestrial working; and as Joe has removed JT44 from Ver 4.7, users are strongly advised to keep both versions (3 as well as 4.7) for backwards compatibility. Both versions are available for free download from the website given at the end.

PICS AND *WSJT* CODING

JT44, with its simple coding of random messages lends itself perfectly to VHF beacons, with a straightforward automatic implementation using a PIC plus Direct Digital Synthesiser to generate the signal. By controlling the AD9852 DDS chip with a PIC, a personal beacon directly generating *WSJT* at 50 and 70MHz becomes possible. JT65, with its built-in FEC, is not nearly so easy to programme into a PIC, so any beacons adopting this mode will almost certainly have to stick with JT44 and require *WSJT* Version 3 for decoding.

Any time a PIC is used to generate real-time signalling, the timing becomes important. For *WSJT* modes timing is ideally derived from a crystal oscillator that is a 'nice binary multiple' of the soundcard rate, such as 11025 x 512 = 5.6448MHz, but such crystals are not usually available off the shelf and are expensive to have cut especially. However, some crafty playing around with the numbers on a calculator can reveal ways of generating the correct timing. For example, for FSK441, a 10MHz crystal is divided by 128 in the PICs prescaler then, by regular reprogramming the interrupt timer counter to overflow after a count of 177 instead of the usual 256, an interrupt can be generated at 10MHz/128/177 = 441.384Hz – sufficiently close to the ideal 441Hz as to be perfectly acceptable. For JT44, the timing comes from 10MHz/2048 generating an interrupt at 4882.8Hz, which is then counted in software and every 907th one used for a rate of 5.3835Hz. ♦

WEB SEARCH

***WSJT* software**	www.pulsar.princeton.edu/~joe/K1JT
Protocols	www.protocols.com/protocols.htm

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

EMC

This month's 'EMC' includes more about using ADSL microfilters for amateur radio EMC purposes, information on EMC in television sets and digital set-top boxes and an update on home computer networks.

Right: A standard type of SCART cable with shielded signal cables and an overall foil shield (arrowed).

Left: A SCART cable with shielded signal cables but no overall shield.

Following the item in February 2005 'EMC' on ADSL filters, Alan, G3WXI, has found that various different types of ADSL micro-filter are available at widely different prices. Alan bought two at 98p each and prised one apart to see what was inside. It contains a small transformer-like device, together with several resistors and capacitors. This does not appear to contain any other inductors and it is likely to be much less effective for rejecting amateur transmissions than the type featured in February 'EMC'. A 'rule of thumb' for selecting ADSL microfilters for amateur radio EMC use would be to look for a relatively large case containing four or more ferrite-cored inductors plus a ferrite-cored bifilar-wound choke, as shown in Feb 2005 'EMC'. These filters may not be easy to dismantle and need gluing back together. This can be done with polystyrene cement or solvent weld cement for PVC pipes.

Simon, G3XXH, has tried using ADSL filters for a telephone EMC problem with considerable success. Simon has a BT telephone extension booster, marked as Item Number 870788 and he reports that this is susceptible to RF breakthrough, especially in the 3.5MHz band but also, to a lesser extent, in the 7MHz band. The RF breakthrough causes an effect that sounds like a relay vibrating at about 10Hz, which can then be heard on the telephones. Simon had previously tried filtering the input and output phone lines and the mains cable with many turns through ferrite rings but with little effect. He has now fitted BT ADSL filters type MF50, which are available from Maplin Electronics and these appear to have cured the problem. He needed to fit filters to both the input and output lines.

DIGITAL TV SET-TOP BOXES

Simon, G3XXH, also reports that he recently experienced interference around 3.6MHz from his neighbour's Sony VTX-D800U set-top box for terrestrial digital TV. Simon's antenna is about 6m from the neighbour's TV set and the noise level was S9. The interference appeared to come from a switch-mode power supply. It had modulation at about 100Hz and it extended over most of the 3.5 – 3.8MHz amateur band. Simon had some e-mail correspondence with Sony and asked if they thought this might be a fault. He reports that they measured a set in the factory and pronounced it satisfactory.

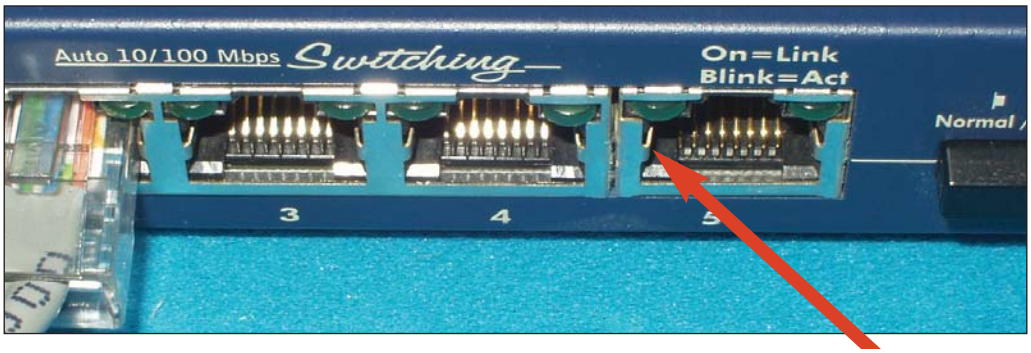
Simon then decided to buy the same model of digital TV set-top box for himself and he found that this too radiated significantly via the TV antenna cable. The solution was to fit a high pass filter and braid breaker (RSGB Filter 3) in the aerial input to the set-top box. This considerably reduced the level of interference from the set-top box. Simon then suggested the same solution to his neighbour who is very friendly and keen to help. Unfortunately, the solution was not as simple because his neighbour only has a loft aerial. This provided sufficient TV signal for digital reception without the filter but not with the additional loss introduced by the filter. Simon and his neighbour solved this problem by fitting a TV aerial amplifier. This solved the problem in this case where the issue was emissions of RFI from the set-top box affecting amateur radio reception but an extra amplifier would not be a good idea in cases where there is a problem with breakthrough of amateur radio transmissions.

Last year, Mike, M0DIV, purchased a new 28in TV with Freeview, but he reports that the noise from the switch-mode power supply nearly wipes out the 7, 24 and 28MHz bands and interferes with other bands as well. Mike's mains supply is on overhead power lines and he believes that these are re-radiating the noise. He says that he cannot be the only person to be affected by this modern scourge and that the old TV was fine. The first thing to try in this case would be the solution adopted by Simon, G3XXH, above.

LOW LOSS TVI FILTERS

If amateur radio transmissions cause breakthrough on analogue or digital TV reception, the problem can often be solved simply by plugging in a high-pass filter and 'braid breaker' at the aerial input to the TV or set-top box. The RSGB 'Filter 3' (see the box) is a high-pass filter that passes UHF TV signals but attenuates amateur radio signals on all bands 1.8 – 144MHz. It also includes a 1:1 transformer or 'braid breaker' that reduces 'common-mode' signals that are picked up by the braid of the TV aerial coaxial cable. A 'braid breaker' alone can solve many breakthrough problems with amateur transmissions on the HF bands. Any filter has a certain amount of loss in the passband, however, and in cases where an analogue TV signal is weak, the loss introduced by a filter can cause a noticeable reduction in picture quality. In the case of digital terrestrial TV, the effect of progressively weakening the signal is a sharp transition between near perfect transition and no reception. If the digital TV signal strength is marginal, fitting a filter can result in loss of digital reception.

There is a need for a TV aerial filter with a lower passband loss than commercially-available types, particularly for use with digital terrestrial TV. A design for such a filter was published in 'EMC' in October 2001 *RadCom* (pp90/91). This UHF TV high-pass filter has a low passband



An RJ45 socket on a network router showing spring grounding tabs (arrowed) that allow the use of Shielded Twisted Pair (STP) cables and connectors.

loss and a ferrite ring 'braid breaker'. Although a 1:1 transformer type 'braid breaker' is more effective than a ferrite ring, it is difficult to design a 1:1 UHF transformer with sufficiently low loss. The filter published in October 2001 'EMC' has a passband loss of under 2dB. In some cases, only the ferrite ring is required for HF amateur bands, in which case the loss is about 0.75dB. This is due to the loss of a 0.9m length of miniature 75Ω coaxial cable. A suitable type of cable is RG179B/U miniature 75Ω coaxial cable. This is available by the metre from Maplin electronics (Stock No XS67X) but it is too thin to be used with standard coaxial plugs and line sockets. If a ferrite ring 'braid breaker' is required for a TV aerial feeder cable, the most reliable and robust form of construction is to wind the miniature coaxial cable onto the ferrite ring and mount it in a small plastic box with coaxial sockets, as shown in October 2001 'EMC'.

SCART CABLES

Nearly all modern TV sets have a SCART connector which can be used for connecting a video recorder, DVD player or digital TV set-top box (terrestrial or satellite). As a SCART cable carries audio and video signals, it is a possible source of RF breakthrough, particularly in the 1.8MHz and 3.5MHz amateur bands which fall within the video passband of 0 – 5.5MHz. If you suspect that breakthrough in a TV or video system is occurring due to RF *pickup* in a SCART cable, it is worth checking whether it is possible to connect the items in question, for example a TV set and set-top box, via an RF connection into the aerial socket of the TV. Although a SCART connection is likely to give better picture quality than an RF connection, it can be a useful test to use an RF connection temporarily and unplug the SCART cable to see whether RF breakthrough is getting in via the SCART cable.

If a SCART connection appears to be the *source* of RF breakthrough, probably on 3.5MHz, it is worth checking what type of SCART cable is used. Although the audio and video cables are almost certainly shielded, the shield is usually a 'lapped' (spiral wound) shield, as used in shielded audio cables, not a woven braided shield as used in RF coaxial cables. The SCART cable with the flat cable shown in the photo has all 21 pins connected. It uses shielded cables for the audio and video signals but these are 'lapped' shields so the shielding effectiveness at RF is not particularly good. The other SCART cable with the round cable shown in the photo only has nine pins connected, but this is adequate for many applications. The audio and video cables are shielded with a 'lapped' copper shield but there is also an overall aluminised plastic foil shield around the bundle of cables. This type of foil shield with a 'drain wire' does not have particularly good shielding effectiveness at RF but, when used over shielded cables with 'lapped' shields, it should give some improvement in shielding. Nevertheless, the SCART plugs themselves are not shielded. Better quality SCART cables are available with shielded metal plugs but these tend to be quite expensive as they may have extra features like 'oxygen-free copper' wire and gold-plated connector pins that add cost but do not improve RF shielding.

However well-shielded a SCART cable and its connectors may be, RF current circulating in the cable shield flows via the grounds of the connected equipment and this may cause RF breakthrough. In such cases, some improvement may be possible by winding the SCART cable through a large ferrite ring as a common-mode choke. The only practical way to do this is to use a split ferrite yoke ring core from a scrap TV set or computer monitor. Ferrite deflection yoke ring cores are not designed for RF use but, in practice, the type of ferrite used can often give a useful amount of impedance at RF (see also the 'EMC' section of the *RSGB Yearbook*). Nevertheless, at least 10 turns will probably be required, which shortens the cable by about 1.5m.

HOME NETWORKS

Further to the item in December 2004 'EMC' on home computer networks, Malcolm, G3VNQ / NM9J has provided some information about his location in the USA. He has a shack with several network cables running near to radio equipment. The cables are connected to a Linksys router and Motorola SURFboard cable modem that is connected to a cable TV network. One solution to RF radiation from the network cables was to replace all the Cat 5E UTP (unshielded twisted pair) cables with STP (shielded twisted pair) cable. Malcolm also placed the cable modem inside a perforated metal shield cover. He described the experience in the May 2004 issue of the local radio club newsletter *PCARA Update* (see 'Web Search'). Malcolm suggests that using STP cable might be easier than winding the network cables through ferrite rings, but placing a ferrite choke on the DC power cables would still be well worthwhile. Before buying STP cables, it is important to check that the RJ-45 sockets on the router and on the computers have grounded spring tabs.

The photo shows a Netgear network router where the RJ-45 sockets have grounded spring tabs for use with shielded RJ45 connectors and shielded network cables. Category 5E STP shielded Ethernet 'patch' cables with connectors fitted are available in the UK from various suppliers including CPC PLC and Farnell InOne (see 'Web Search'). ♦

RSGB FILTERS AVAILABLE FROM THE RSGB SHOP

Filter 1 Braid-breaker
Filter 2 HPF (for FM Band II)
Filter 3 HPF & braid-breaker (for UHF TV)
Filter 5 Notch at 435MHz
Filter 7 Notch at 70MHz
Filter 10 Notch at 28MHz
Filter 15 Notch at 21MHz
Filter 20 Notch at 14MHz
Retail Price £10.00, **Members' Price** £8.50 each

Filter 8 HPF (for UHF TV, with high rejection of 70cm band)
Retail Price £29.99, **Members' Price** £25.49

Ferrite rings
Retail Price £2.24 each, **Members' Price** £1.92 each
www.rsgb.org/shop or tel:0870 904 7373 (office hours)

WEB SEARCH

Noisy networks in *PCARA Update* club newsletter, May 2004
http://home.computer.net/~pritch/docs/pcud0504.pdf (See pages 4-5)

Maplin Electronics	www.maplin.co.uk
CPC PLC	www.cpc.co.uk
Farnell InOne	www.farnellinone.co.uk

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* in the 14MHz band

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TT

This month, Pat looks at the chequered history of the Wadley Loop, and considers its future ♦ Nylon washers as VHF toroids ♦ Neat earth connections ♦ 2V / 300V DC-DC converter ♦ 3V MOSFET shunt regulator ♦ By-passing: one or multiple capacitors? ♦ Precision time / frequency

RECEIVERS – A FUTURE FOR THE WADLEY LOOP?

One of the interesting post-war developments in improving frequency stability of receivers and transmitters was the introduction in the 1950s of the Wadley loop (also known as the triple-mix system). The story of how Dr Trevor Wadley developed the system in South Africa and came to the UK in an effort to persuade British communications firms to adopt the system for HF communications receivers is well known – how he failed to convince the major firms that the drift-free triple-mix system provided a feasible and viable system – how he then approached a small and little-known firm, Racal, that had been largely engaged in restoring surplus military receivers for export. The outcome was that Racal took on the task, although their first prototype suffered from self-oscillation until, in desperation, a saw cut was made in the chassis. The requirement for good bandpass filtering and effective screening and bypassing meant that the Wadley loop has never been an easy system to implement. It can be considered almost as a later form (in this case with a crystal-controlled signal stabilising a free-running VFO) of the 'Goyder Lock', pioneered by Cecil Goyder, operator of 2AZ at Mill Hill School, on which he made the first England – New Zealand contact (see the article by John Heys, G3BDQ, *RadCom*, October 2004, pp 38 – 39).

Dr Brian Austin, G0GSF, believes that the seed-bed of the Wadley Loop can be found in Trevor Wadley's earlier design of 'A Single-Band 0-20MHz Ionosphere Recorder Embodying some New Techniques' (*Journal IEE*, Vol 96, Part III, pp483 – 486). This described a pulsed ionosonde in which the receiver and transmitter swept simultaneously over the spectrum up to 30MHz in a single band. There was only one moving part, namely the rotor of the main sweeping oscillator. Single-span operation was obtained by mixing two high frequencies (one variable, the other fixed) to obtain a beat frequency in a manner very similar to that employed in an ordinary audio BFO, except that the beat is from a radio frequency, variable from zero to 20MHz. The receiver IF is 30MHz. The mechanical simplicity was obtained at the expense of increased electrical complication – a characteristic of the later Wadley loop.

Trevor Wadley added his drift-cancelling technique to the basic single-span up-conversion technique of his ionosonde and developed the triple-mix form of frequency synthesis. In effect, a front-end tuner provides drift-free output over the 1MHz band between 2 and 3MHz, the tuner acting as a crystal-controlled converter with a single 1MHz crystal providing 30 crystal-controlled frequencies by means of a harmonic generator. These signals are locked to the 40 – 70MHz VFO that acts as the band selector for the 30 bands each 1MHz wide. The overall stability of the receiver then depends solely on the stability of the conventional tunable 2 – 3MHz stages of the receiver where it is relatively easy to achieve excellent stability from a free-running oscillator. There will thus be a minimum of three mixers (triple-conversion) in the signal path, plus a further mixer to provide the drift-cancelling facility. The system requires good band-pass filters at 40MHz (±650kHz), 37.5MHz (±150kHz) and 2.5MHz (±150kHz), not easy for a home-constructor to design, build and align.

Fig 1 shows the basic arrangement of Wadley loop as used in the RA17 front-end, and later in the RA117 and RA171. In 1967, a pre-production Model 919 was also described in which the Wadley principle was used to extend the frequency range into the VHF and UHF bands, although I am not sure whether this design was ever marketed.

The outstanding performance and excellent calibration of the RA17 and particularly the RA17L, with a tuned pre-amplifier, lifted Racal from near obscurity into a major manufacturer of high-grade professional and military communications equipment. This lasted for decades until the firm was sold to a French manufacturer and the subsequent disappearance of the name Racal.

A more complex form of the triple-mix system was also adopted by Marconi to form an analogue frequency synthesiser for transmitters and receivers that avoided the phase-noise problems of PLL synthesisers, but at appreciably higher cost. Marconi frequency-synthesisers were adopted by the Diplomatic Wireless Service for its Piccolo multitone teleprinter links, providing the required frequency stability within just a couple of Hertz. The triple-mix approach was also used in the Wadley-Barlow HF broadcast receiver.

A Wadley-loop design for home constructors appeared in a series of articles by the late Ian Pogson, VK2AZN, in *Radio, Television & Hobbies* (later *Electronics Australia*), including that of a triple-mix 'front-end' valved tuner (converter) in July and August, 1963, later incorporated into a complete 'Deltahet' communications receiver (September and October, 1964). Brief details appeared in 'TT' and *Amateur Radio Techniques* and, over the years, a number of requests for further

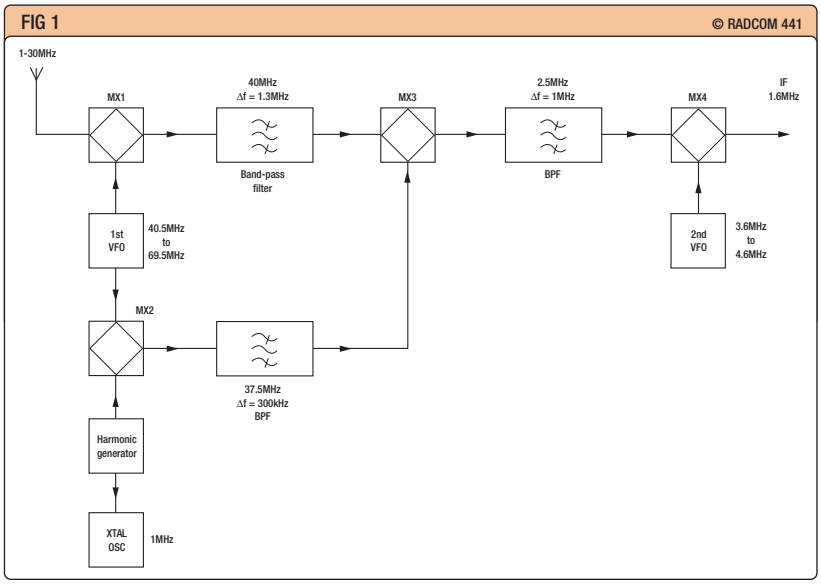


Fig 1: The basic Wadley Loop as implemented in the Racal RA17, RA171, RA117 MF/HF communications receivers.

Table 1: Nylon washer dimensions.

(Screw clearance	outer diameter (in)	inner diameter (in)	thickness (in)
Number 4	0.250	0.115	0.125
Number 10	0.375	0.194	0.125

Table 2: Inductance windings and measured values.

Toroid diameter (in)	Inductor winding	Max inductance (nH)	Min inductance (nH)
0.250	7t / 26AWG	116	86
0.375	7t / 22AWG	113	86

details was received and satisfied.

For receivers, the dominance of solid-state technology in the 1960s led to the abandonment of the Wadley loop primarily due to the then poor performance of solid-state mixers. In the late 1960s, Racal produced and marketed a solid-state model, the RA217, using balanced- and single-FET mixers. The model appears to have had limited dynamic range and its performance was much inferior to the original RA17 valved sets. Racal sponsored research at Bradford University on solid-state mixers offering improved dynamic range, but soon abandoned the triple-mix system in favour of PLL frequency synthesis despite the increased phase-noise.

This raises the question: might not an updated triple–mix analogue Wadley loop with the strong-signal performance and high-dynamic range of modern solid-state mixers, combined with careful gain-distribution, outperform PLL and DDS systems with respect to phase-noise and spuriae, at the same time avoiding high-speed digital switching pulses affecting weak signals? For portable operation, such a receiver could probably be less power-hungry than one based on digital technology.

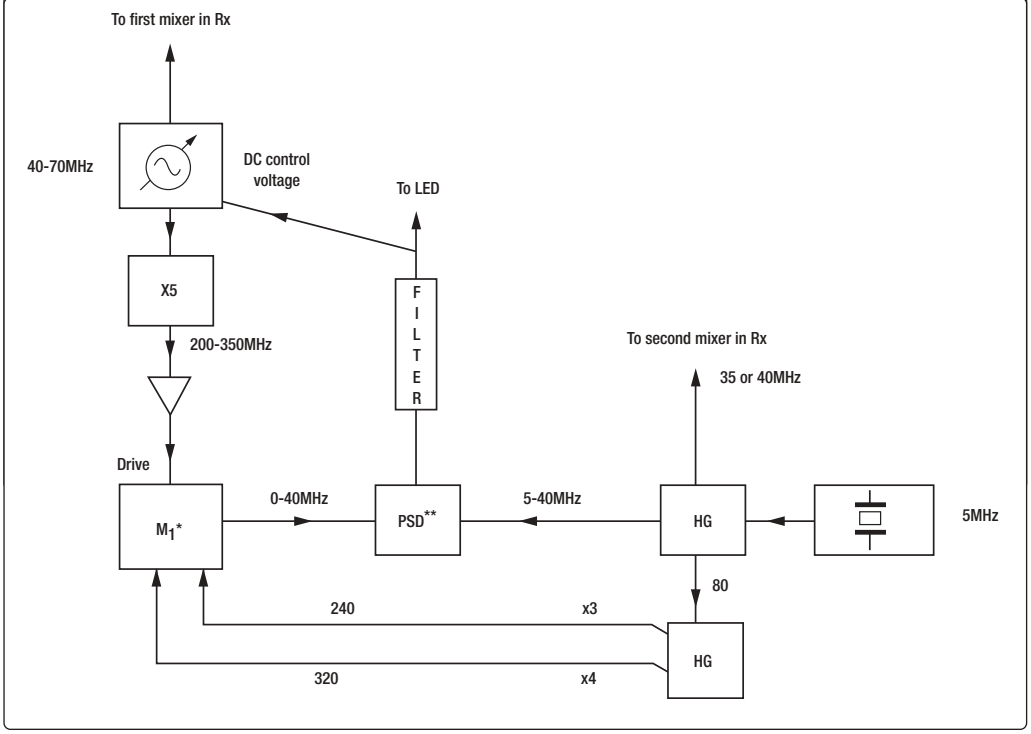
Tony Webb, G4LYF, admits to having long been fascinated by the Wadley-loop as used in the RA17 and Deltahet. He writes: "However, in a home-built version, I would expect a spurious response every 1MHz from the harmonics of the crystal oscillator. It occurs to me that, if a 5MHz crystal were used, the 'birdies' would be at 5, 10, 15, 20, 25 and 30MHz, and at least three of them would coincide with WWV standard frequencies, and so could be used to trim the crystal.

"This system could be used if the 'bandset' oscillator frequency were multiplied by five before mixing with an appropriate harmonic of 5MHz, the filtered VHF mixing product being then divided by five before being used to drive the second mixer in the receiver. It now seems to me that a simpler approach would be to phase-lock the band-set oscillator at 1 MHz intervals. Since its drift would then be very small, the drive for the second mixer in the receiver chain could be taken from a harmonic of the crystal as in **Fig 2**. I wonder if there is any merit in such an idea and whether anyone else has thought of it?"

In Fig 2, M1* acts as a mixer and/or phase detector, so can give a DC or RF output. Appropriate frequencies in the 200 – 350MHz range will mix with the 240 or 320MHz inputs to give outputs in the range 0 – 40MHz, which are mixed with appropriate 5MHz harmonics in the PSD to generate to generate the control signal. The PSD** is arranged so that it can pass a DC input from M1. If this is difficult, any DC from M1* could be added to the control voltage from the PSD using an op-amp, which could also provide an offset voltage.

Fig 2: G4LYF's proposed 'bandset' oscillator phase locked at 1MHz intervals replacing the harmonic generator system in a Wadley Loop arrangement.

FIG 2 © RADCOM 442



NYLON WASHERS AS VHF TOROIDS

Gary Aylward, G0XAN, feels that readers may be interested in an item that appeared a few years ago in the 'Ideas for Design' feature of *Electronic Design* (June 18, 2001, pp104 – 205) by Richard M Kurzrok, 'Low-Cost VHF Inductors use Nylon Toroids'.

This noted that toroidal inductors can be used in passive-filter and equaliser circuits in the VHF range, Although SAW filters have taken over many bandpass filter applications, LC low-pass and high-pass filters are still viable.

Kurzrok added: "When inductance values are smaller than 1µH air cores with unity relative permeability can be used instead of powdered-iron or ferrite cores. For wire size thinner than 20AWG, a coil former is often needed for mechanical support. Nylon 6/6 standard flat washers are usable as low-cost coil forms. The nominal electrical parameters of this material are a dielectric constant of 3.6, a dissipation factor of 0.04 and a dielectric-strength of 385V/mil."

He provides winding data etc based on two standard (American) sizes of nylon washers in **Table 1**.

"Some typical toroidal inductors were wound and tested as shown in **Table 2**. The maximum inductances were obtained with the windings squeezed and minimum with the windings spread. Inductance values were calculated from measured resonant frequencies using a known capacitor. As the winding area is filled, the adjustability of the inductors decreases and there are limitations on the number of turns that can be applied as a single-layer winding.

It is claimed that, despite its dielectric constant and dissipation factor, the quality of nylon toroidal inductors is quite good with typical unloaded Qs in the range 75 to 125, more than adequate for most low-pass and high-pass filters in the range of about 30 to 100MHz. They provide small size, efficiency and some adjustability. With a 0.250in-diameter washer, maximum turns (22AWG) are six and for 0.375in, 15. With 26AWG, minimum turns of 15 and 30 for these diameters.

NEAT EARTH CONNECTIONS

Bruce Carter, GW8AAG, noted that, in the article on 'The Linear Amp UK Ranger 811 Kit' (*RadCom.* September 2004, p35), Steve Icke,

G4ZWY, in the section on 'Valve bases' emphasises the need to "scratch off enough paint to ensure a good earth connection."

GW8AAG comments: "Scratching sounds a bit drastic and probably looks ugly. I had to retro-fit some earth terminals and phono sockets that would remain in full view. To achieve a good earth connection I employed the following method. I measured a 1/4-in wood chisel and found it to be 6.53mm; as a bevelled chisel this was its greatest width. Likewise, a 1/2-in chisel measured 12.67mm. From a sheet of soft grade aluminium, I cut a strip about 18mm wide with a length to suit my particular purpose. At one end I drilled a 7mm-diameter hole and at the other a 13mm hole.

"The 'aluminium hole' was placed centrally over the hole in the unit and held firmly in position. The appropriate chisel was rotated in the aluminium hole until the paint was removed from the unit in a neat circle. The slight discrepancy between the hold diameter and its chisel width made no discernible difference. The chisels only have to remove paint and 'polish' the metal surface slightly so they are easily re-sharpened for their legitimate use."

2V / 300V DC-to-DC CONVERTER

A DC/DC converter capable of running a low-energy (9W) light bulb from a single 2V lead-acid cell is described by Paul Bennett of Bristol in the 'Circuit Ideas' feature of *Electronics World*, February 2005, p41: **Fig 3**. It comprises a single-ended forward converter with resonant flyback, with the oscillator frequency selected so that the secondary winding capacitance provides the correct amount of tuning. It is intended to work at a fixed duty cycle, with the output regulation tracking the input. providing an output voltage of about 300VDC determined by the 150:1 turns ratio of the transformer comprising an un-gapped R10 core in 3C85 or similar. Drive for the 5MΩ, 20V IRF3717 FET is provided by the 74HC14 hex Schmitt buffer with a boot-strapped supply. Note that, to guarantee the circuit starts, the 1000µF capacitor is charged from the battery via the switch when the circuit is switched off. Then when first turned on, the capacitor is connected in series with the battery to provide a 4V start-up voltage (logic FETs can have thresholds of 2V). It is also stressed that tight layout and low ESR capacitors are essential for good efficiency.

3V MOSFET SHUNT REGULATOR

The increasing use of low-voltage ICs and microprocessors has brought about a demand for 3V DC supplies derived from standard 5.1V supplies. This is usually obtained from a series linear regulator or a DC/DC converter. For prototype circuits etc, it is possible to use a MOSFET shunt regulator as a substitute for a series regulator. Although this has the drawback that, should the MOSFET fail (open circuit), the higher voltage will be applied to the load. With a series regulator a corresponding problem arises if the regulator fails shorted.

A shunt regulator arrangement is described by Stuart Michales in the 'Design Ideas' feature of *EDN* (1 November 2004, pp100 – 101). He points out that the MOSFET in **Fig 4** can replace a Zener diode in a shunt regulator and provides lower output impedance. The MOSFET is self-biased by connecting its drain to its source. The difference between the input voltage and the gate-to-source threshold voltage, VGS, sets the current. The IRF521 device has a threshold voltage of 2 to 4V at 250µA, and in this example has a gate-to-source voltage of 3V at 200µA. MOSFETs can vary from device to device but, typically, have thresholds at about the mean between the limits. **Fig 5** shows the output impedance. Although this is near 800Ω at 100µA, it rapidly drops to less than 6Ω at 50mA.

FIG 3 © RADCOM 443

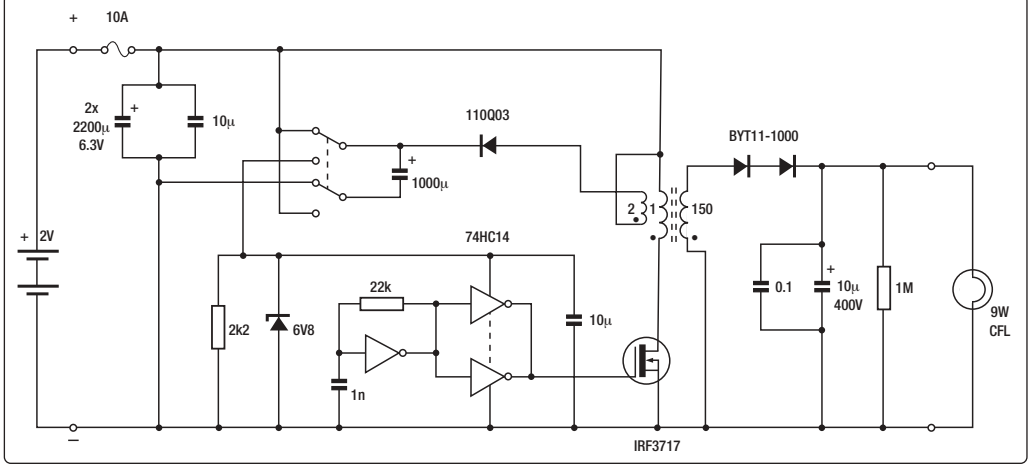


Fig 3: Circuit diagram of the DC-DC 5W converter providing an output voltage of up to 300V from a 2V lead-acid cell. (Source: *EDN*)

FIG 4 © RADCOM 444

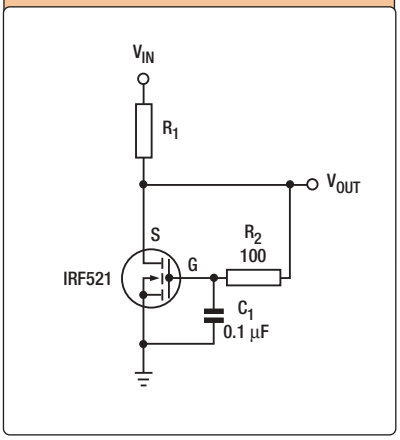
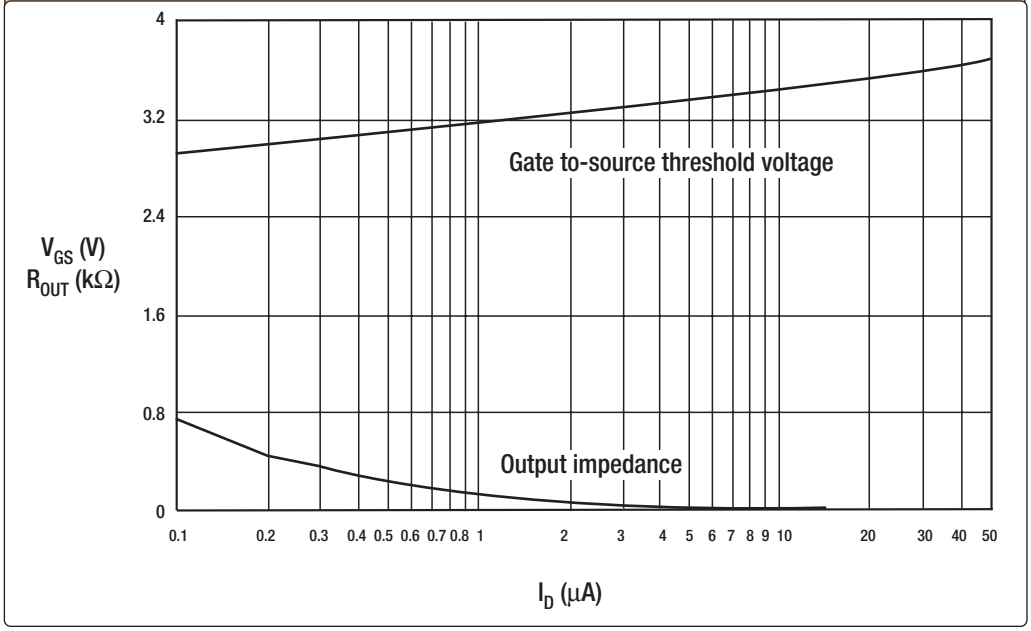


Fig 4: A MOSFET used to replace the Zener diode of a shunt regulator provides lower impedance than a diode-based implementation. (Source: *EDN*)

Fig 5: Graph of the key parameters of the MOSFET regulator – gate-to-source voltage and output impedance – versus drain current showing the smoothness of variation over two-and-a-half decades.

FIG 5 © RADCOM 445



BYPASSING: ONE OR MULTIPLE CAPACITORS?

In 'TT', October 1992 an item 'Decoupling Capacitors – Why Use Two When One Will Do?', based on a paper 'Effectiveness of Multiple Decoupling Capacitors' by Clayton R Paul (University of Kentucky) in *IEEE Trans EMC* (May 1992), called into question the effectiveness of the common practice of using a parallel combination of large value and small value capacitors in order to increase the effectiveness at higher frequencies and to overcome the effect of lead inductance. He concluded that this practice only minimally reduces the high-frequency impedance of either capacitor except over a limited range of frequencies. To quote: "Above the self-resonant frequencies of both capacitors, the impedance of the parallel combination is reduced at most by 6dB. This may not be worth the expense of the additional capacitor or its installation and could be attained by using only the larger value capacitor while simply cutting its lead lengths in half!"

As a follow-up in the December 1992 'TT', Bob Price, GW3ECH, drew attention to circumstances when multiple bypass capacitors may be needed, based on his experience of tuning solid-state VHF power amplifiers. Low-frequency parasitic oscillations may occur. Different small values of impedance in common paths to two stages or in supplies which also feed bias stabilising circuits (to just one stage) can lead to the right conditions for (parasitic) oscillation. One small value but low inductance capacitor is used to decouple the stage at the amplified frequency. A second (and often third) capacitor(s) then decouples the stage at lower frequencies at which parasitic oscillations are likely to occur. He added: "It is not unusual to find a relatively high value polyester capacitor and an electrolytic capacitor used, not to improve the frequency response of the decoupling at signal frequencies but to minimise the risk of oscillation at one or more low frequencies."

In the May 1993 'TT', Brian Bower, G3COJ, noted that the BBC Technical Memorandum R.1027 (90) 'Supply Rail By-Passing in Video Circuitry' included an introductory statement: "In video circuitry (frequencies up to about 6MHz) one sometimes sees supply rails with an electrolytic capacitor used for by-passing together with a smaller capacitor, typically a 22nF ceramic, across it to improve HF performance. The drawback to this has long been known but is not always appreciated."

The Memorandum concluded: "Supply rail by-passing in video circuitry should be by a single capacitor, never by two in parallel. A tantalum capacitor is preferable and arrangements must be made to limit inrush current on switch-on. In more general applications, a parallel combination can provide lower impedance decoupling at higher frequencies than a single electrolytic provided component values are chosen so that the parallel resonance frequency is placed where it will not be a problem – a series element is then optional."

This topic turns up again in the 'Circuit Ideas' feature of *EDN* (April 15, 2004), in an item 'Take Steps to Reduce Anti-Resonance in Decoupling', by Dale Sanders of the firm X2Y Attenuators. This firm manufactures a special type of 'X2Y' capacitor.

The item starts: "To maintain power integrity on PC boards, you need multiple capacitors to decouple the power-distribution system. A typical configuration might comprise five capacitors connected in parallel between the power and the ground traces or planes. To provide broadband decoupling performance, assume the individual values of the parallel capacitors are 470nF, 1nF, 10nF, 100nF, 220nF, as in **Fig 6(a)**, providing a total of 801nF capacitance to the power-distribution system."

With a vector-network analyser, each capacitor's self-resonant frequency (SRF) can be identified, each of which can cause anti-resonance. The anti-resonance occurs when one capacitor is still capacitive, while another has become inductive. It is claimed that considerable reduction of the anti-resonance effects is obtained with a single 400nF X2Y capacitor producing, when connected as in **Fig 6(b)**, some 800nF decoupling, with a single anti-resonance frequency of around 10 – 11MHz. It is also claimed that the use of X2Y capacitors saves PCB space and reduces layout complexity. I have no idea whether X2Y capacitors are available in the UK, but is stated that capacitors using X2Y technology are available, for example, from Johanson Dielectrics (www,johansondielectrics.com).

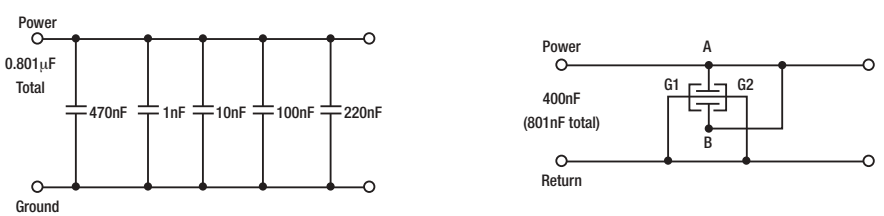
Fig 6: (a) Typical decoupling arrangement using several multilayer ceramic capacitors connected in parallel and yielding multiple anti-resonances. (b) A 400nF X2Y capacitor connected as shown yields a total decoupling capacitance of 800pF and single anti-resonance. (Source: *EDN*)

PRECISION TIME / FREQUENCY

John Osborne, G3HMO, has always been fascinated by clocks, pendulums, hairsprings, quartz crystals, etc, and enjoyed dividing-down frequencies with suitable chips for weather satellite fax and for sync signals for the tape for playback. He draws attention to an article in the October 2004 issue of *Physics World* 'NIST Builds Smallest Atomic Clock'. This reports that John Kitching and colleagues at the National Institute of Standards and Technology (NIST) in Boulder, Colorado have built a 'physics package' with a volume of only 9.5mm^3. It consumes only 75mW and its possible applications include frequency control for hand-held radios including mobile phones and GPS receivers. It is claimed to represent a breakthrough in developing a prototype atomic (caesium) clock a hundred times smaller than existing atomic clocks. The clock is stable to one part in 10-billion, equivalent to about 1 second in 300 years The chip is expected to become available in two or three years time.

Electronics World, February 2004, p8, reports that UK scientists at the National Physical Laboratory have "found a new way of measuring time that is three times more accurate than any other method in the world." A single ion of strontium is trapped and isolated in a vacuum, and then chilled to near absolute zero (-273°C) with a blue laser beam. It is claimed that it may enable improved levels of accuracy in deep space navigation and exploration. ♦

FIGS 6a (left) and 6b



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In practice

Understanding key-clicks

FIG 1 © RADCOM 447

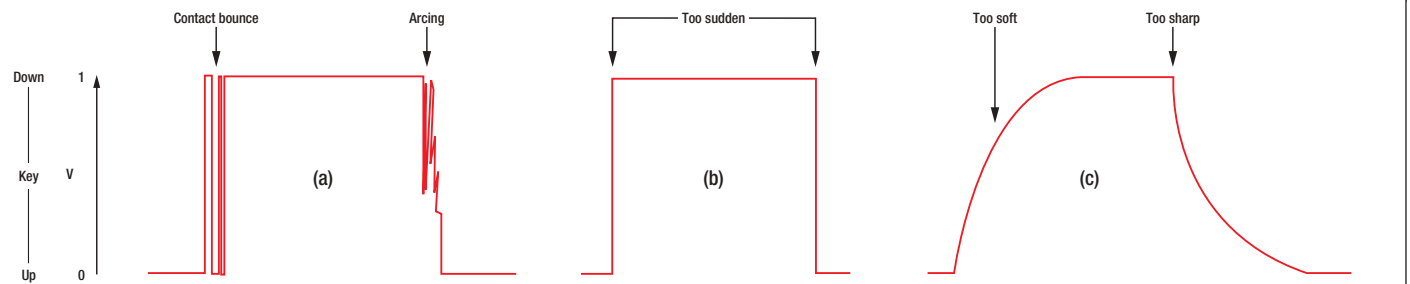

Fig 1: All of these waveshapes generate key-clicks: (a) Sparking; (b) Sparking removed, but still very sharp transitions; (c) R-C filtered transitions – there is still a sharp unfiltered 'corner' at key-up.

KEY-CLICKS

Q What causes key-clicks, and why are some transceivers worse than others?

A These days, the blame for key-clicks lies mostly with the transceiver manufacturer – although I will also identify some mistakes that the user can make. The problems at the manufacturer seem to be three-fold:

- A very long historical learning process about the real causes of key-clicks
- Poor design - inability or failure to tackle the problem effectively
- Corporate denial within some manufacturers, that has allowed the same mistakes to be repeated in new models.

There is also an ethical problem for the user: if you have bought a rig, and only later discovered that it is notorious for key-clicks, is it right to continue to use it without modification? This applies especially in contests, where your own key-clicks seriously disadvantage other stations but do not disadvantage you.

Unfortunately, anyone looking for answers is likely to meet a wall of denial at all levels. Some manufacturers simply don't want to know; the dealer is caught in the middle, with no backup from the manufacturer; and many users of the same rig will deny there's a problem because they desperately don't want to think about it.

There are solutions... but first you need to understand what the problem really is. Historically, the problem has been uncovered layer by layer, so let us do the same.

Key-clicks spreading on either side of a keyed carrier come from the transitions or 'edges' when the carrier is turned on or off. The traditional cause of key-clicks was the brutality of the switching involved. Typically, the open-circuit voltage before the key was pressed was several hundred volts, and the closed-circuit current could be several hundred milliamps. Pressing the key would always be accompanied by contact bounce and arcing, and releasing the key would pull an arc as the circuit was opened. As viewed on an oscilloscope, the upper edge of the 'waveshape' looked something like **Fig 1(a)**, where the fuzzy transitions were caused by the contact bounce and sparking. On the air these sounded like either clicks or tearing noises [1]. The obvious solution was to suppress the sparks.

When that had been done, the waveshape looked more like **Fig 1(b)**... but the clicks were still there. Not so bad as before; but definitely still there. The next level of discovery was that the very sudden transitions in the squared-off waveshape of Fig 1(b) are a problem in themselves. A very fast switch-on or switch-off will always create a click, which is most intense just above and below the carrier frequency, but actually spreads across *all* frequencies. Lightning is a very good example of this: the rise-time of the current is so short that, no matter where your receiver happens to be tuned, you'll hear that click. The order of bandwidth covered is roughly the inverse of the rise time. For example, rise times of a few microseconds (10^{-6}s) imply bandwidths of the order of a megahertz (10^{+6}Hz); milliseconds (10^{-3}s) imply kilohertz bandwidths (10^{+3}Hz); and so on. There isn't any sharp cut-off in the bandwidth covered, but that general rule shows that, in order to keep the *total* bandwidth of a keyed CW signal to no more than a few hundred hertz, the on/off transitions need to take place in a gradual and *controlled* manner, over at least several milliseconds. Now that can be tricky to achieve, because a high-speed dot only lasts a few tens of milliseconds anyway. If the designer fails to control the very fast transitions, there will be key-clicks; but slowing them down too much will make high-speed dots will sound 'soft' and indistinct. There is no room for poor design in this area; but poor design is very common, in commercial and homebrew rigs alike.

A frequent mistake in commercial transceivers is to favour high-speed capability, but that approach condemns *all* users of that rig to transmit the same key-clicks, no matter how slowly they are sending. It also gives high-speed operators a bad name for having clicky signals. This is really not deserved, because the individual clicks don't actually get any worse at high speed – there are only more of them, at shorter intervals, and that can sometimes cause problems with receiver AGC.

The overall timescale of the transitions is important; but it isn't the only thing that determines the amount of energy going into the key-clicks. Almost equally important is the *shape* of the transition... and unfortunately there is a legacy of bad information about this topic. Modern keying is all done at very low levels, in the driver stages, so arcs and sparks are a thing of the past [1]. The power amplifier stages of our transceivers are linear, so they do not change the waveshape that is created by keying the lower-level stages. The easiest way to slow down the turn-on and turn-off of an amplifier stage is to use R-C circuits with time constants of a few milliseconds. That technique typically produces waveshapes like **Fig 1(c)**, and handbook authors have unfortunately mistaken this for the ideal way it

FIG 2 © RADCOM 448

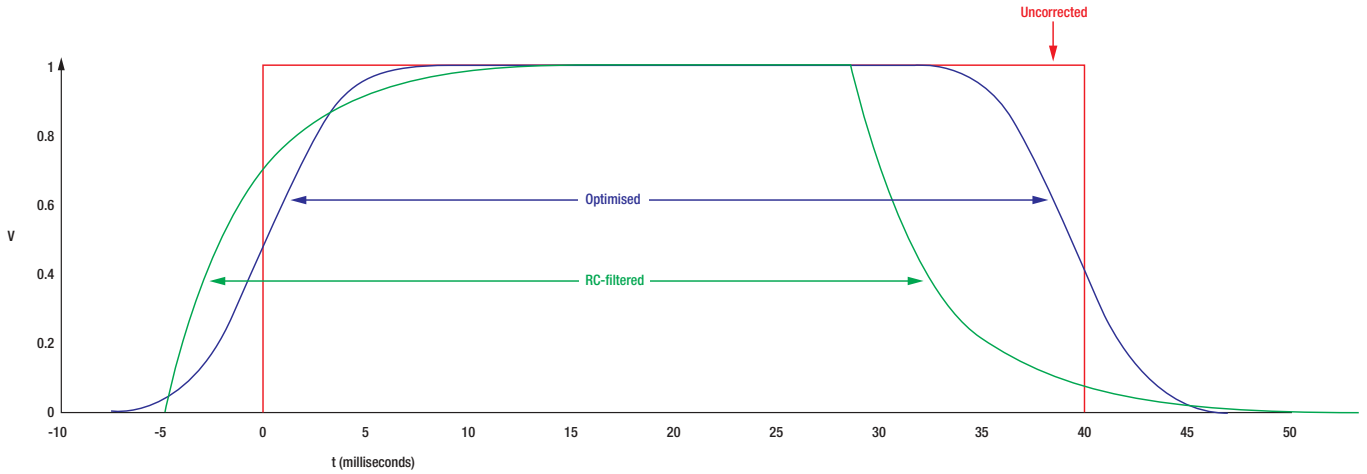

Fig 2: Comparison between uncorrected, R-C filtered and optimised waveshapes (after W9CF).

should be done, which it isn't. The rise is actually much softer than it needs to be, but the real problem is the sharp drop-off at the instant the key is released. Simple R-C smoothing does not soften the start of that downward transition at all, so there may still be a significant click at the end of every dot and dash.

This is somewhere near the state of the art in many modern transceivers, but it simply won't do for today's operating conditions. Improvements in receiver front-ends, IF filters and synthesiser phase noise – along with a healthy world-wide interest in Morse as an enjoyable operating mode – have all led to stations crowding a lot closer together. The closer you tune to someone else's keyed carrier, the stronger the key-clicks will be, so we now need better click suppression than ever before. The solution to this problem lies in some fairly advanced mathematics [2] but, in simple terms, the key-clicks are generated by the combination of two factors: the steepness of the rise/fall at its worst point; and also the sharpness of any 'corners', particularly when the carrier level is close to its maximum. The problem with Fig 1(c) is that the waveshape has an uncorrected sharp corner at key-up, with a very steep drop-off.

There is one specific mathematically-derived waveshape that gives the best possible compromise between high-speed capability and a clean signal [2]. It cannot prevent key-clicks, but it can definitively *minimise* them for a given overall transition time. **Fig (2)** compares the R-C (exponential) waveshape with the optimised version, and includes the uncorrected sudden transition for reference. The optimised waveshape is more S-shaped and has no sharp corners, so it avoids all the pitfalls in Fig 1, yet it also has quite a steep rise and fall at mid-height which will give good articulation at high speeds. With modern rigs that have DDS, DSP and computer control down to the finest detail, we could have a very close approximation to this optimum waveshape, with an overall transition time that is user-selectable or even tracks the sending speed... but we don't have that, yet. In the meantime, I strongly suggest that you consult the excellent **www.mods.dk** website, to check for any key-click mods that might apply to your rig.

A separate class of key-click problems can arise from the initial changeover from receive to transmit. This problem affects all modes, but let's stay with CW for a moment more. When the RX-TX changeover is triggered by pressing the key, almost all transceivers deliver a shortened first dot. Most of us can live with that (with apologies to readers in EI and EA), but many transceivers also generate a large spike at the leading edge of the first dot **(Fig 3**) – and therefore, inevitably, a key-click. Exactly the same occurs on SSB when you hit the transceiver with a loud first syllable, except that now you get an initial spike of splatter rather than a click. The problem is that the transmitter has more RF drive available than the power amplifier stages actually need, and it relies on the Automatic Level Control (ALC) loop to throttle the drive back. But it takes a millisecond or more for that to happen, and during that time the power amplifier stages can be severely overdriven. Subsequent dots, dashes or SSB syllables are much less distorted, because the ALC level remains substantially constant during any short gaps; but after a brief pause the ALC level will reset itself, and then the whole problem will happen again. Most transceivers also use the ALC loop to control the RF carrier power, so if even if you reduce the power output setting, the initial spike may remain the same. The solution is to design the ALC loop so that it permanently pre-sets the RF drive level to no more than is actually needed, and so eliminates any large step transitions in the ALC loop. Many transceivers are not designed that way, and some ALC loops are so badly designed that they are actually unstable – after any step transition, the loop oscillates at a frequency of several kilohertz (Fig 3). This produces discrete keying sidebands at plus-and-minus the oscillation frequency [3].

FIG 3 © RADCOM 449

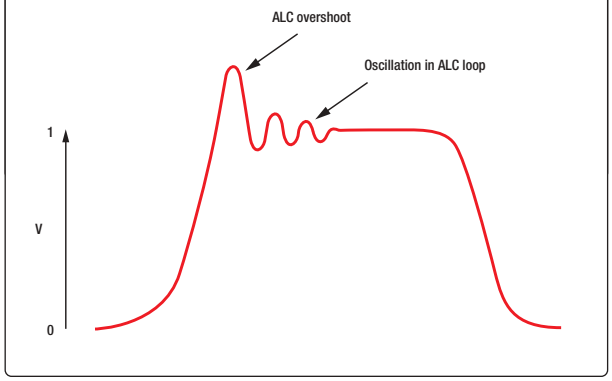

Fig 3: Spike on the first dot (or first syllable of SSB) caused by ALC overshoot. This real-life example also shows oscillation in the ALC loop.

In summary, what we are increasingly noticing is that the transmitter parts of our transceivers have failed to keep up with recent advances in receiver design - to the extent that transmitter problems are now replacing receiver overload as the main source of inter-station interference [3]. ♦

NOTES AND REFERENCES

1. I am using the past tense – "was", "looked", "sounded" – in the hope that such brutal keying methods are now history. Anyone who puts a so-called 'classic' transmitter on the air *today* with that kind of keying should really stop and think!
2. See the link to the paper by W9CF on the 'In Practice' website.
3. SM5BSZ has made many real-life measurements on HF, VHF and UHF transceivers, that are reported in a series of articles for *DUBUS* magazine (see link on the 'In Practice' website).

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A multi-band inverted-V dipole for portable operation – PART TWO

In this concluding part of a two-part article, GM3VLB considers the dimensions of his inverted-V for several bands.

Before giving the dimensions for the inverted-V, here are some fundamental considerations.

(1) Length of a λ/2 dipole

Readers will be familiar with the following rule of thumb formulae which apply to *horizontal* dipoles either in free space or at least a half-wavelength above ground. If f is the design resonant frequency in MHz, we have the situation represented by **Equation 1**.

In practice, the length is shorter than this due to the so-called 'end-effect' of the insulators and their supports. **Equation 2** gives the physical situation.

Each leg of a λ/2 horizontal dipole is thus half of this, or 71/f metres long. For example, for a λ/2 dipole resonant on or about 14.150MHz , the length of each will be 71/14.15 or 5.02m (16ft 5in). This is about 0.95 of the free-space length of 5.30m (17ft 5in).

Thus, the relation of the physical and free-space lengths are related by **Equation 3**.

However, what is generally not made clear in the literature is that, as the ends are lowered towards the ground into what is known as inverted-V configuration, the resonant frequency *drops* – the antenna becomes too long! To maintain the original resonant frequency, the length of the inverted-V must therefore be *reduced*. This is probably the cause of much head scratching when trying to tune inverted-Vs. The author's experiments on inverted-V dipoles suggest the empirical formula given in **Equation 4**.

It is regrettable that the literature does not make this clear.

(2) Effect of height of the ends above ground

The above figures are not 'cast in stone'. They are very much dependent on the resonant frequencies chosen, the height of the mast and the 'apex half-angle', all of which in turn determine the height of the end insulators above the ground. In the author's case, with the frequencies chosen, a mast height of 8m and an apex half-angle of 68°, the end insulators of the 20/40/80m inverted-V are about 60cm (2ft) above ground.

Doubling the height of the end insulators above ground to 120cm (4ft) *increases* the resonant frequency to 3.830MHz (an increase of about 1.8%), whilst *lowering* them by 60cm (2ft) to ground level *lowers* the resonant frequency to 3.690MHz (this time a decrease of about 1.8%). It is apparent that the 80m antenna can be fine-tuned by increasing or decreasing the height above ground of the end insulators (achieved by longer or shorter cords).

The author feels this is another aspect of inverted-V antennas (with end insulators close to the ground) which is rarely, if ever, made clear. (Note: In each case, we are changing the capacitance of the antenna ground. Bringing the ends closer to ground increases the capacitance, thus decreasing the resonant frequency, and *vice versa*). There is negligible effect on 20m and 40m.

(3) Nature of the ground

The figures derived in this article refer to 'average' ground, if there is such a thing. Experience suggests one should, where possible, avoid solid rock, sand or severe undulations in the line of the antenna. Sometimes, however, choice is not an option, and variations in proximity to ground and in its conductivity, may affect the resonant frequencies and input impedances, and have, on occasion (rarely, fortunately), caused some serious head-scratching!

(4) Dimensions

Table 1 gives the lengths of each leg of a 20/40/80m inverted-V dipole. These lengths are the distances between the fixed end-points (in effect, the wing-nuts, or in the case of the lower end of the 80m segment, the centre of the end insulator). The 20m- and 40m-band frequencies are based on the average of the IOTA CW and SSB frequencies for the 20m and 15m bands, respectively.

As previously stated, the 15m band is available on the 20/40/80m version by using the 40m dipole as a 3λ/2 dipole for 15m. Similarly, the 20m dipole has been used (40/80m disconnected) as a 3λ/2 dipole on

Equation 1: Free - space total length of a λ/2 horizontal dipole = $\frac{492}{f}$ (ft) or $\frac{150}{f}$ (m)

Equation 2: Physical total length of a λ/2 horizontal dipole = $\frac{466}{f}$ (ft) or $\frac{142}{f}$ (m)

Equation 3: Physical length of a horizontal dipole = 0.95 × free - space length

Equation 4: Physical length of a λ/2 inverted - V dipole = 0.91 × free - space length of a λ/2 horizontal dipole

Equation 5: Length of each leg of a 3λ/2 inverted - V dipole = $\frac{212}{f}$ (m)

10m, by adding about 2.4m each side and allowing these additional lengths to hang freely from the 20/40m insulators.

Table 2 gives the lengths of each section in each leg of the 10/12**/15/17/30m version of the multi-band inverted-V.

CONCLUSIONS

This form of inverted-V allows multi-band operation with one antenna from portable locations. It might be argued that it is perhaps not quite so convenient for the home location. This said, how often is rapid and frequent band changing required, even at home?

The author (together with 'Island' partners Alex, GM0DHZ, and Keith, MM0BPP,) has made over 100,000 QSOs from a great variety of island locations. With the inverted-V described, he has never needed to use an ATU, other than in exceptional circumstances such as an antenna system fault (broken conductor, or corrosion, or in an extremely adverse location. A site near the water (ideally *over* the water) and close to the landing point is always chosen in preference to height above sea level. Apart from anything else, the latter reduces the distance the equipment has to be carried.

The formulae and dimensions proposed are the result of much experimenting and experience. They appear valid whether the antenna is near the sea or far removed from it, and represent a good starting point for anyone contemplating putting up an inverted-V. There is no doubt that such an antenna will out-perform a horizontal dipole whose centre may be sagging well below the height of the end supports, an unfortunately all-too-familiar sight. If using a 10 to 17m inverted-V, ensure that the apex angle is *not less* than 110° (with the 20/40/80m version atop an 8m mast, the apex angle will generally be greater than 130°). In limited space, one can 'swing the ends round' slightly.

FINALLY

In his past life as 5Z4KL in the 60s and 70s, the author frequently and successfully used the ubiquitous G5RV, in its familiar form using 300Ω ribbon cable and 75Ω coax, always in inverted-V configuration, and often in the bush at heights as low as 6ft above the ground. Valved rigs were very forgiving – not so today's solid-state 50Ω output rigs and amplifiers. Prior to using a G5RV dipole as a multi-band antenna, you would be well advised to read the work done by ZS6BKW (see *Practical Wire Antennas*, by John Heys, G3BDQ) on improving this antenna, and the reasons for doing so. This book also gives guidance on the design of a doublet – arguably a far better multi-band alternative for the solid-state home station – using G5RV's own dimensions, chosen to avoid unwieldy reactances.

Table 1: Lengths of each leg of an inverted-V dipole.

Band (m)	Chosen design frequency (MHz)	Balun switch position	Feedline (13.6m of 50Ω coax)	λ/4 (68/f, m)	'extra' length in each case (m)
20	14.150	1:1	2λ/2	4.81 (15ft 9in)*	
40	7.050	1:1	λ/2	9.65 (31ft 8in)*	4.84 (15ft 11in)
80	3.772	1:1	λ/4 txfmr	18.03 (59ft 1in)*	8.38 (27ft 5in)

* These are lengths on either side of the feed-point – the overall length is double this.

Table 2: Lengths of each section in each leg of the 10/12/15/17/30m version of the multi-band inverted-V.**

Band (m)	Chosen design frequency (MHz)	Balun switch position	Feedline (13.6m of 50Ω coax)	λ/4 (68/f, m)	'extra' length in each case (m)
10	28.250	1:1	4λ/2	2.41 (7ft 11in)	
12**	[24.940]	1:1	~7λ/4	[2.73] (8ft 11in)	[0.32] (1ft 0in)**
15	21.150	1:1	3λ/2	3.22 (10ft 7in)	0.81 (2ft 8in)
17	18.113	1:1	~5λ/4	3.75 (12ft 4in)	0.53 (1ft 7in)
30	10.125	1:1	~ 3λ/4	6.72 (22ft 0in)	2.97 (9ft 8in)

** In practice, the extra length (with its own 'U' spade terminal) for the 12m band (relative to 10m) is taped to the side of the 15m section and the appropriate spade terminal is connected to the end of the 10m section depending on whether 12m or 15m is selected.

Table 3: Dimensions for the 20/40/80m version depicted in Fig 6.

Band (m)	Chosen design frequency (MHz)	Balun switch position	Feedline (13.6m of 50Ω coax)	λ/4 (68/f, m)	'extra' length in each case (m)
40	7.050	1:1	λ/2	9.65m (31ft 8in)	
20	14.150	1:1	2λ/2	14.98m (49ft 2in)#	5.33m (17ft 6in)
80	3.772	1:1	λ/4 txfmr	17.91m (58ft 9in)##	2.93m (9ft 7in)

NB: The length of the 3λ/2 dipole is greater than 204/f (3 x 68/*f*). This is because the shortening due to end-effect affects only the outer 1/2-wavelengths of the 3λ/2 dipole. The *ARRL Antenna Handbook* suggests that the length of a *horizontal* 3λ/2 dipole is about 442/*f* metres rather than 426/*f* (3 x 142/*f*). In the absence of any accurate, theoretically-based formula, the author applied simple proportion and predicted an empirical value of 212/*f*. This gave a length of 14.98m for each leg of the 3λ/2 inverted-V dipole, which is indeed almost exactly the value of the length he obtained by experiment! The author would therefore suggest the use of **Equation 5**.

The additional length for 80m resonance is about 4in less than predicted by the 1/2-wave formula (68/*f*) previously proposed. This is negligible on 80m. In any case, the ends of the 80m dipole are folded back on themselves approximately 40 - 50cm (18in) to allow precise adjustment of the 80m resonant frequency *in situ*. The author passes the wire through one half of a twin terminal block connector (preferably with brass screws), then through the egg (or other insulator) and back into the connector block. This allows easy adjustment, without cutting the surplus wire.

FIG 6 © RADCOM 450

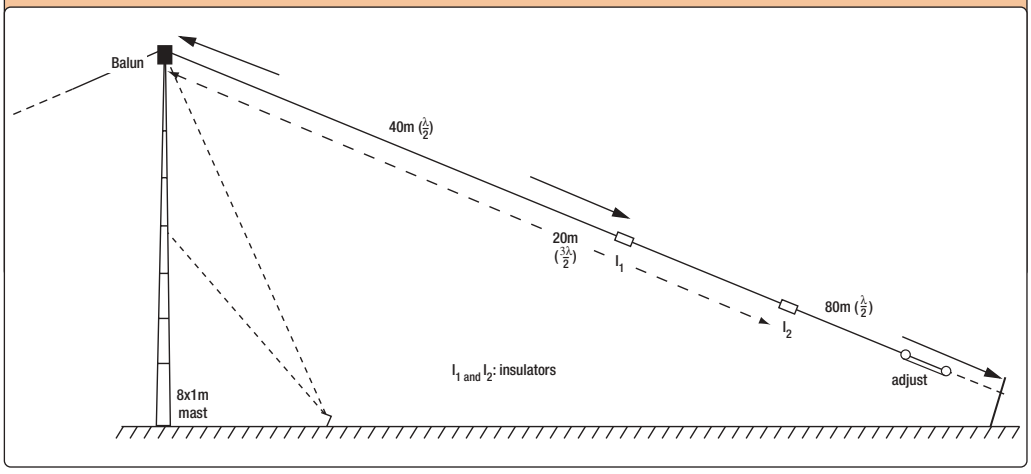

Fig 6: Alternative configuration for the 20/40/80m antenna, which is 3λ/2 on 20m.

APPENDIX – a new configuration

Since drafting this article, the author has tested another configuration for the 20/40/80m version of his multi-band inverted-V dipole. It occurred to him that, by making the innermost dipole the 40m one, the next 'segment' could be used to extend this to a 3λ/2 (three half-wavelengths) on 20m. The length of the third segment on each side is adjusted accordingly to allow resonance as before on the 80m band. Dimensions are given in **Table 3**. ♦

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We regret to record the passing of the following radio amateurs:

G0BYQ	Mrs J M Buckmaster	04/02/05
G0EHB	Rev G G Montgomery	10/02/05
G0ORS	Mr C B Lee	
G0OVB	Mr G W Linnegar	31/01/05
G0PDO	Mr W J Gardner	24/01/05
G2DQX	Mr R J Woodroffe	05/02/05
G3IHR	Mr H R Henly	14/01/05
G3JKQ	Mr D Gyles	26/01/05
G3JTS	Mr T L Stoakes	12/10/04
G3KZY	Mr J Rathbone	09/01/05
G3OVZ	Mr A C Woodroffe	14/01/05
G3SHW	Mr W Shaw	16/12/04
G4MVJ	Mr L T Hughes	01/05
G4MWN	Mr F Brown	10/02/04
G4PJW	Mr H Southern	09/02/05
GI5MV	Mr M J McVeigh	27/01/05
GM0BUL	Mr A B Horton	30/01/05
GM0JKR	Mr K A Thomson	08/02/05
GW0SLM	Mr E Catherall	28/01/05
GW0SZB	Mr A J Plumbley	06/07/04
VK2BPN/G3EIX	Mr P J Naish	09/01/05

CONGRATULATIONS

to the following, whom our records show as having reached 60 or 50 years' continuous RSGB membership:

60 years

G3TXT	Mr RT Laing
G3DNJ	Mr G F Weller

50 years

G3JKK	Mr R M Allen
G3KDN	Mr D L Roberts
G3TOE	Dr T R Skrbic
G3MDC	Mr G H Taylor

£20. Buyer to inspect & collect. No time wasters. M0CJI, QTHR, 01270 761 224 (Sandbach). E-mail: reginald_turner@msn.com

SILENT key sale, G3XNR. Two Tektronix 545 oscilloscopes, one 1A2 amp, one CA twin channel, handbooks probes, £50 each. Rcvr B-40 offers? Tektronix BDM-125 digital multimeter, offers? Pye Vanguard tcvr 160-170MHz, offers? Burndept tcvr 166-171MHz, offers? G8FMH, QTHR, 01256 323 979 (Basingstoke). E-mail: alang8fmh@aol.com

SILENT key sale. Yaesu FL-2100Z, FT-902DM, FV-901DM, FC-902, YO-901, FTV-901R, SP-901, fabulous WARC station, no split, sensible offers please. Westower 58ft on heavy duty trailer with generator, also other items, buyer inspects and collects. GW3XJQ, 01994 453 495 (Carmarthen). E-mail: 73@gw3xjq.fsnet.co.uk

SILENT Key. Drake R-8A comms rcvr little used, £400. Corkish, GD0IFU, 01624 69455 (Isle of Man).

SONY SW100 + AN-100A active antenna - SSB, CW, FM – excellent rcvr, perfect, £120 ono. Yaesu VX-5R, leather case, h/set charger etc, perfect, £140 ono. Q-Tec Penetrator, £50 ono. All plus postage. 01502 861 230 (Lowestoft). E-mail: susan.feasey@btconnect.com

TEN-TEC Jupiter, superb tcvr, mint. Full details at www.aoruk.com/tentec, £750 plus p&p. Heil Studio mic, £50 plus p&p. 01852 200 237 (Kilmelford). E-mail: willy@kilmelford.freeserve.co.uk

WORKSHOP clearout. New PCB prototyping kit with UV unit. XY recorder. Linear amp parts & valves. Project boxes. SAE or e-mail for list. G0JXN, QTHR, 01992 468 204 (Cheshunt). E-mail: g0jxn.jim@ntlworld.com

YAESU 847 complete HF/VHF station HF-6-4-2-70 also Yaesu FC-20 matching ATU and Yaesu FP-1030A 30A PSU. This rig comes complete with FV-51A voice unit, all mint cond, not to split, £980 no offers. Craig, G1OLT, 01773 836 993 (Alfreton). E-mail: sandysawyer3@hotmail.com

YAESU FRG-7000 SSB rcvr vgc, £100 ono. Price includes ATU & extra filters, buyer collects or pays p&p. Alan, M3VAV, 01564 792 162 (Wootton Wawen). E-mail: allan.singer@virgin.net

YAESU FRG-7700 rcvr and tuner, exc cond, £180. Buyer collects, contact Gareth, M3IIY, 01793 430 288 (Swindon). E-mail: g_drinkwater@tiscali.co.uk

YAESU FT-767GX tcvr HF, VHF and UHF. All modules fitted, (6m, 2m, 70cm). Internal ATU & PSU. Complete base station. Good cond. Buyer collects, £575. MFJ-1276 packet – pacTOR 1 data controller, with mans, £50, selling up. Al, G4ORJ, 01945 780 661 (Wisbech). E-mail: abj2002uk@yahoo.co.uk

YAESU FT-990DC, £550. IFT-840 incl FM board & extra filters, £325. FT-290R MkII + accessories + FL-2025 linear, £200. Icom 275H 2m 100W, £550. All with mans, mics & power leads. All in original boxes (except FT-990). G0LAN, QTHR, 01723 891 533 (Filey). E-mail: gapcres2@tiscali.co.uk

YAESU G-450C rotator c/w lower mast clamp and 25m control cable. As new, never been used outside, £175 + carriage ono. G3FEV, QTHR, 01706 211 339 (Rawtenstall).

WANTED

ANY information on HF to VHF converters for the Yaesu FRG-9600 rcvr. There were versions manufactured by Kuranishi (external), but others were internally fitted. Did Tom Withers make one? Any information gratefully received by Dennis, G3HCM, 01427 752 284 (Lincs). E-mail: deng3hcm@aol.com

FT-736R accessories. FEX 736/50 50MHz module. FVS-1 voice synthesiser. Keyer unit B. XF-455MC CW filter. SP-767 speaker. MD-1B8 desktop mic. G0EVJ, 01543 251 915 (Lichfield).

KW-77 rcvr in gwo. John, G4DOE, 01689 831 878 (Orpington).

KW-77 rcvr in working order & good cond if possible. Can collect from anywhere. 01352 771 520 (Mold). E-mail: gw3tmp@tiscali.co.uk

MAGNETIC loop antenna CapCo, MFJ, AMA, Hately, etc. Must tune from 80m-10m. Fair price paid for suitable unit. 01823 442 477 (Taunton). E-mail: eddie.hayden2@btinternet.com

MORSE keys wanted please. Early brass keys, especially by Marconi, GPO etc, but all considered. John, G0RDO, 01626 206 090 (Newton Abbot). E-mail: john@morsemad.com

PAXOLIN tube, 2in (50mm) diameter, WHY? Paxolin sheet, 1/4in (7mm) thick, WHY? Details to Dave, G0DMP, QTHR, 01482 862 149 (Beverley). E-mail: david@dsp.karoo.co.uk

RECEIVER type 88, PSU type 360, 4-pin male & female Jones connectors. R-1475 accessories, AP-2883G vol 1-6. G0XEM, 7 Bounder Treath, Coverack, Helston, Cornwall, TR12 6TP.

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 693892 (Leeds). E-mail: g4uzn@qsl.net

TEN-TEC 208A notch / CW filter for Argonaut 515. 2E0ATZ, 01227 263 939 (Whitstable). E-mail: mac.atz@btopenworld.com

TOWER mast wanted, will dismantle and collect. Any type considered, also antennas and poles required. G0WAY, 01902 737 330 (Wolverhampton).

TS-520S TS-520SE. The one with topband must be in gwo. Good price + carriage. Peter, G4VUN. 01677 460 302 between 7pm and 10pm (Bedale).

EXCHANGE

ICOM 756 for tower P40/60 or similar. 07890 950 461 (Birmingham). E-mail: vwhile@aol.com

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.

3 APRIL 2005

Northern Mobile Rally (Harrogate) – Harrogate Ladies' College, Clarence Drive, Harrogate. B&B, C, DF. Gerald, G0UFI, 07734 478 080. [www.harrogaterally.co.uk]

8 APRIL 2005

MAIDSTONE ARS Junk Sale – YMCA Sports Centre, 8pm. Bill, M0WTW, 01892 532 471, 07919 443 222.

10 APRIL 2005

CAMBRIDGESHIRE REPEATER GROUP Annual Rally – Bottisham Village College, Bottisham, 6 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.fstnet.co.uk

15 / 16 APRIL 2005

56th International DX Convention – Visalia, California, zimzim1@mindspring.com. [www.scdxc.org/visalia]

17 APRIL 2005

LOUGH ERNE ARC 24th Enniskillen Amateur Radio Show – *** New Venue *** - Manor House Hotel, 6 miles from Enniskillen on Kesh road. OT 12 noon. Herbie, 028 6638 7761. [http://uk.geocities.com/enniskillenrally/]

23 APRIL 2005

CORNISH RAC International Marconi Day – [www.gb4imd.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 Show – 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]

30 APRIL 2005

Group for Earth Observation (GEO) Annual Meeting – National Space Centre, Leicester. £12 for day. Theme 'International nature of weather satellite coverage and reception'. LEC, demonstrations, workshops. Special event station. Pre-registration preferable; contact Francis Bell, francis@geo-web.org.uk or by post to GEO,

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?

7 Apr	GB4YOU: Youlbury Scouts & Guides. Oxford. TLH27P (G0RJX)
	GB4YOU: Youlbury Scouts & Guides. TLH27P (G0REL)
8 Apr	GB1CCC: Cardiff Centenary Celebrations. Cardiff City. LH (GW0WHT)
10 Apr	GB2LOW: LOW Power. Sherbourne, Dorset. TLH27 (G3ICO)
20 Apr	GB6OMF: Marine Friendship. Birkenhead. LH (G0ELZ)
22 Apr	GB2SFL: South Foreland Lighthouse. Dover, Kent. LH2 (G4GAN)
23 Apr	GB0MGY: MGY = RMS Titanic's Callsign. Harlow, Essex. LH2 (G0BXL)
	GB0MPB: Marconi Portland Bill. TLH27 (G0RYL)
	GB2FWS: Frinton Wireless School. TLHV27P (G3LWM)
	GB4SGD: Saint Georges Day. L27 (G0KNM)
24 Apr	GB5WOM: W O Maston School. Presteigne, Powys. LH2 (GW0DIB)
30 Apr	GB0SVR: Severn Valley Railway. Bridgnorth, Salop. LH2

Coturnix House, Rake Lane, Milford, Godalming GU8 5AB.

2 MAY 2005

DARTMOOR RC Radio Rally – Tavistock College, Tavistock, Devon. OT 10.15 / 10.30am. CP, TS, B&B, C, picnics, FAM, TI on 145.550MHz. Ron, G7LLG, 01822 852 586.

MID-CHESHIRE ARS Rally – Civic Hall, Winsford. OT 9.45 / 10am. CP, C. David, G4XUV, 01606 77787.

8 MAY 2005

DUNSTABLE DOWNS RC 22nd Amateur Radio Car Boot Sale – Stockwood Park, Luton. Access via M1 jn 10. OT 9am, parking £2 per car. C. Phil, G8XTW, 01525 384 419, 07880 737 594.

Magnum Rally 2005 – Magnum Leisure Centre, Irvine, Ayrshire. OT 10.15 / 10.30am, £3, under-14s free. CP free, B&B, WIN, C, TS, TI on 145.550MHz. Helen, MM0HLN, 07776 385 247, helen@magnumrally.co.uk [www.magnumrally.co.uk]

14 MAY 2005

Radio Amateurs Old Timers' Association (RAOTA) Get-Together – Brunswick Inn, Derby. All members & guests welcome. Notify Ian, G4EAN, 0115 926 2360, ian@bartg.demon.co.uk, to arrange catering & seating.

15 MAY 2005

MIDLAND ARS Drayton Manor Radio & Computer Rally – Drayton Manor Park, Fazeley, Tamworth, Staffs, on A4091 near jns 9 & 10 of M42. OT 9am. TS in two marquees, FM, SIG, CBS, clubs. Norman, G8BHE, 0121 422 9787 or 07808 078 003, nlgutteridge@aol.co.uk [www.midamradio.com]

20 – 22 MAY 2005

54th Hamvention – Dayton, Ohio. [www.hamvention.com]

29 MAY 2005

MID-ULSTER ARC Rally & Computer Fair – The Embankment, Derrymacash, nr Lurgan, Co Armagh. OT 12 noon. TS, B&B, LB, C, TI on 145.550MHz. Ivan, GI0SZH, 028 3834 2501.

Waters & Stanton PLC Open Day – Hockley Shop. 01702 206 835.

5 JUNE 2005

PLYMOUTH RC Rally – Sparkwell Village Hall. OT 10am. Frank, G7LUL, 01752 263 222, 07702 456 401, frank@foxonezero.fsnet.co.uk

SPALDING & DARS Annual Rally – Sir John Gleed Technical School, Halmer Gardens, Spalding. OT 10am. CP free, TI on 145.550MHz, TS, C, DF, CBS. Ambrose, M0DJA, 07989 636 520, or John, 07946 302 815. [www.sdars.org.uk]

WEST MANCHESTER RC 9th Red Rose QRP Festival – Formby Hall, Alder Street (off High Street), Atherton, Manchester. OT 11am, £1.50. TS, Clubs, RSGB, G QRP low-cost B&B, CP free, DF, C, LB, TI on 145.550MHz. Les, G4HZJ, 01942 870 634, or g4hzj@ntlworld.com

12 JUNE 2005

36th Elvaston Castle National Radio Rally – Elvaston Castle Country Park, Elvaston, Derby, on the B5010 between the A6 and A52, 5 miles SW of Derby. OT 9am, CP £6. Radio, computers & electronics, FM, B&B, crafts, FAM, C, etc. Les, G4CWD, 01332 559 965, secretary@elvastonrally.co.uk [www.elvastonrally.co.uk]

19 JUNE 2005

East Suffolk Wireless Revival (Ipswich Rally) – Suffolk Showground, Bucklesham Road, Ipswich. OT 9.30am. CBS, B&B, RSGB bookstall, CP, TI via GB4SWR on 145.550MHz from 8am. Iain, G0OZS, 01206 396 419, or John, G3XDY, 01473 717 830.

NEWBURY & DARS Car Boot Sale – Ackland Memorial Hall, nr Thatcham, Berks. Kevin, G6FOP, g5xv@ntlworld.com Directions and map on website. [www.nadars.org.uk]

WORTHING & DARC Rally – Newhaven Fort, midway between Brighton and Eastbourne, well-signposted. OT 10.30, £2.50, incl access to all fort facilities. FAM. Jim, G4XRU, 01273 473 505, g4xru@aol.com

24 – 26 JUNE 2005

Hamtronic Friedrichshafen – [www.messe-friedrichshafen.de]

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]

YORK RC Rally – Arthur, G8IMZ, 01904 787 799, 07841 120 738. [www.yorkradioclub.net]

10 JULY 2005

CORNISH RAC 42nd Cornish Rally – John, G4LJY, g4ljy@dsl.pipex.com, Ken, G0FIC, ken@jtarry.freeserve.co.uk

17 JULY 2005

McMichael Amateur Rally & Car Boot Sale – Min, G0JMS, 01189 723 504, g0jms@radarc.org [http://go.to/mcmichael rally]

24 JULY 2005

COLCHESTER RAC Rally – Gary, M0JJH, 01621 818 620, M0JJH@despandmed.com or James, M0ZZO, 01255 242 746, james@mcginty.net

29 – 31 JULY 2005

AMSAT-UK Space Colloquium – Jim, G3WGM, 01258 453 959, g3wgm@amsat.org [www.uk.amsat.org].

30 JULY 2005

Martin Lynch & Sons' Summer Barbecue & Boot Fair – sales@hamradio.co.uk [www.hamradio.co.uk]

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.

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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*

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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

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G4TJB QSL CARDS. Large SSAE for samples. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-Super-Mare BS22 6BX.

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MISCELLANEOUS

-PATENTS - TRADE MARKS - DESIGNS.
Kings Patent Agency (Est 1886).J.B.King (G5TA) Regd. Patent & Trade Mark Attorney, 73 Farringdon Road, London, EC1M 3JQ. 020 7404 7788 www.kingspatent.co.uk

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The last word

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Always put Safety First

From: Les Austin, G0NMD (member of RoSPA Advanced Drivers' Association)

I was stunned to see in the *RSGB Yearbook* (p71) that the right to use a handheld microphone whilst driving is listed as an "improvement" to amateur radio. This was a matter also raised in the letter from Geoff Darby, G7RTC ('The last word', March 2005). I doubt whether amateur radio can be improved by such a 'right', and driving certainly cannot. In this day and age, there is too much going on all around any driver for him or her to be talking into any electronic device - recorder, phone or microphone. The use of a hand-held phone is rightly illegal, and it surely would not take any decent lawyer long to prove in court that a fist mic is no different, since its use is the same - talking to a person remote from the location.

The driver is responsible for what he or she does at the wheel, no exemption can take that away. If you are driving a vehicle and carrying out some secondary activity as well - eating an apple, using a microphone, putting a cassette or CD into the car stereo - and your vehicle is involved in a crash you are answerable for your actions contributing to that crash. Even the traffic police with all their advanced training are now not supposed to use a fist mic whilst driving, and traffic cars are usually staffed by two officers so that the 'co-driver' uses the radio whilst the driver drives. The first fatal crash involving an on air radio ham will bring our hobby into national disrepute.

Probably the most responsible thing you will do today or tomorrow is to drive your vehicle. Radio is just a hobby, but other people's lives depend on you driving properly. Please let nothing - including a QSO - come between you and that responsibility. Turn the radio off while you are driving, enjoy it when you get to your destination.

GB2RS headlines e-mail

From: Geoff Gott, G3MUO

I think that these news e-mails from RSGB are great - always a pleasure to be reminded of RSGB and the United Kingdom.

[All RSGB members may receive the news headlines by e-mail every Wednesday. Simply e-mail sales@rsgb.org.uk requesting to be added to the list - *Ed.*]

Small loops controversy

From: Don MacLennan, G3KGM

With reference to the debate on small loops' radiation efficiency, and in the context that for the majority of radio amateurs communications is a hobby and not a means of livelihood, does it really matter if the aerial is 90% or 5% efficient as long as contacts can be made? A J Balfour, in his *Foundations of Belief*, said "It is not explanations which survive, but the things which are explained; not theories but the things about which we theorise," a truth established by the success and popularity of the cubical quad (how many know how it came to be invented and the theory behind its invention?)

When the T2FD first was used there was much criticism from the theorists of the day who said, "It won't work." Their mental hazard that "it won't work," was subsequently proved wrong when the American Air Force, Navy, Japanese Government and British Air Force used it in commercial form for their main communications links. More recently, the Partridge 'Joystick' was much sworn at, and sworn by, yet for a time the world QRP record for miles per watt was established by an operator when using a Joystick aerial.

In the final analysis, it is operating skill that is the real criterion. I have the utmost respect for both G3LHZ and G3VA.

Bittern DX Group

From: Glynn Finney, 2E0TPP

In February's *RadCom* I noticed a small entry in the 'HF' column regarding the Bittern DX Group (BDXG) located in Norfolk. My parents and I make regular trips to this elegant part of the country, but I'm the only radio amateur so far in the family. I would often find it quiet on the bands in this area, whether it be on HF, VHF or UHF, apart from some regular contacts made over the years. One of these is the secretary of BDXG.

While on holiday in the area I was invited along to GB2BML (Blakeney Mariners Light), a special event station set up and run every year by this group. I was very impressed with the friendliness of the amateurs manning the station. They chatted with me and my family and told me about their new group. I joined there and then and I was put straight on the air. My family have since joined the group (mum and dad being SWLs).

Although the Bittern DX Group is based in Norfolk, they've made us very welcome and involve us whenever possible. The group has an excellent website at www.bittern-dxers.org.uk The next planned event is National Mills Weekend - listen for us?

Customer service still exists

From: Tony Cadney, G0HUZ

Recently I had the misfortune to break the plastic clip on my 20-year old Kenwood desk microphone. A call to Kenwood brought a rapid response from David Wilkins, G5HY, who furnished a list of retailers that supply spares. As a result I telephoned Acoustic Services Ltd of Hanwell, where I spoke to a Mike who took time to confirm the part number, availability, and promised to send the item as soon as possible. Two days later Mike phoned me to say the item had arrived from Kenwood and he would post it. The clip arrived the next day. The price was a mere £4.91. In these days of 'call centre culture' it is so refreshing to meet with excellent customer service. Thank you Kenwood and well done Acoustic Services.

RadCom reviews

From: Ray J Howes, G4OWY

Can I please point out that the unfortunate inclusion of G3PJT's woes (March 2005) concerning his antenna retirement - due of course as he implies, to metal fatigue, weather exposure etc, is not something I personally wish to read about. Besides, waxing lyrical about an aerial which only a tiny minority can place in their back gardens (not because some of us couldn't afford to do so) let alone the huge tower to put it on, seems to me to be a wasted two pages of editorial space. The 'Buddipole' review was, on the contrary, much more appropriate. Simply because, every one of us could if they so wish, rush out and buy one and stick it in the smallest garden

imaginable, right now! I mean, just envisage that metal monster G3PJT describes hovering over both you and your neighbours' property? It is all very well to say to your fellow amateurs look how big mine is compared to yours, but that is not the point. No, the point is, most of us couldn't just stick one of those OB1O-3W 10-elemen Yagis in our back garden and key the mic and wait for the cacophony of DX to roll in! The reality is far different. Bits of wire strung out here and there - be they homebrew or commercial, is what you see hung-up with pride in most amateur radio operators gardens.

So perhaps when in some far distant future when our respected editorial team at the helm of *RadCom* suddenly realise that towers and 10-element beams do not drive the engine of amateur radio as we know it, we mere mortals who pursue our hobby in a far less sublime way, may not be constantly reminded and troubled by things we can only dream about during nightly slumber!

[In the same way that car magazines and the *Top Gear* TV programme review the latest Ferrari or Bentley while most of us drive around in 10-year old Fords, surely it is relevant to review 'top end' amateur radio equipment as well as the 'Fords and Fiats' of radio gear? Hence the review of the Optibeam in the same issue as the Buddipole and, in the February 2005 *RadCom*, a review of a top-end transceiver costing over £2000 in the same issue as a £34 transceiver kit - *Ed.* Bob Whelan, G3PJT, adds: "'Poles' apart, maybe, but I am sure we can remain good 'buddies'!"]

Voltage variations

From: Bill Caine, I Eng, MIIE, LCGI, G6JNZ (shift control Engineer Central Networks West)

In reply to the letter from John Loader, M3LOA ('The last word', March), the declared voltage for the UK is actually 230V ±10% in line with European standards (ref CENELEC HD 472 S1). The original standard allowed +10% and -6%, but from January 2003 the lower limit is -10%. The maths is simple and gives a variation in voltage of 216V to 253V at a frequency of 50Hz ±1%. From reading John Loader's letter he and other consumers actually received a voltage considerably lower than this.

He mentions this was a result of restoration of supply following a power cut. Without knowing the full story it seems very likely that the supply would have been restored from an alternative source due to part of the normal network not being available because of faulty equipment. When transferring sections of network on to alternative feeds a considerable voltage drop can occur due to the increased current load on the circuit. Another reason could be more complicated which occurs when there is a loss of either one phase of a balanced high voltage network or loss of the system neutral reference on low voltage networks, although the latter has far more dramatic results than just low voltage at the supply terminals. I suspect that the problem lies with the network being under such a strain that normal voltage levels could not be sustained. This problem could have occurred at EHV system voltages 3, 66 or 132kV and the automatic voltage control equipment at its maximum range and therefore unable to compensate, resulting in low voltage at the supply end.

Sometimes the only way to stay within statutory voltage limits would be to disconnect customers for the duration of the fault, but isn't it a case of "low volts is better than no volts"? At least the telly still worked.

Operating from Kenya

From: Graham Coyne, G3YJR

Last summer I was fortunate to have a holiday in Kenya with my family and decided to look into the possibility of doing a bit of amateur radio while I was there. The Sheffield ARC contacts put me in touch with Ted Alleyne, 5Z4NU, the Chairman / Hon Secretary of the Amateur Radio Society of Kenya. He e-mailed me straight away with helpful advice and referred me to the website at www.qsl.net/arsk Ted was wonderfully helpful in guiding me through the application process and providing me with practical support in submitting the fee on my behalf, calling at the office, and doing all those things which it is so hard to do at a distance. In due course I received my licence, 5Z4HY.

We booked with African Safari Club who fly their own airline and operate their own hotels near Mombassa and other lodges across the country. I was slightly apprehensive at presenting my amateur radio equipment at customs, an FT-817 with ATU and antenna wire, but actually they showed more interest in my camcorder. We were based at ASC's Paradise Hotel on the Shanzu Beach, just north of Mombassa. I approached the tourist officer at the hotel and was pleasantly surprised with offers of men with ladders to put up an antenna wire for me. (It is useful to have some low denomination notes in local currency to use as tips). Kenya uses the same mains standard and three-pin plug fittings as the UK, so adapters are unnecessary.

So a big thank you to Ted for all his assistance. I would certainly encourage others to consider Kenya as a holiday and amateur radio destination. It was fun!

Just what is 'DX'?

From: V Waddington, G4JSS

Anyone care to tell me what 'DX' means? Yes, it used to mean distance or long distance in the early days when primitive gear was the norm. Now it seems to mean rare or exotic stations. If so, which are they? An example is today when I tried to work an SV (Greek) station and was curtly told "DX only". Bear in mind that I am roughly 1500 miles from Greece - isn't that DX?

[To paraphrase, DX can mean exactly what you want it to mean. If your attempted QSO had been on 2m or 70cm that would certainly be DX - but not on 20m. And DX is not always reciprocal: to a GJ, a W on 20m is not really DX, but to a W a GJ might certainly be! - *Ed*]

Internet gateways the death of 'proper' radio

From G Mack, M0CUS

Maybe it is just me but does anyone agree that Internet chats (I refuse to call them QSOs) could spell the demise of proper radio? We all know the problems with getting planning permission for antennas and as I see it, once the town planners are fully aware of this so-called Internet radio then you don't have any real argument for mounting antennas. I have heard the argument that some people cannot use antennas because of restrictions and Internet radio is their saviour. Nonsense, you're trying to tell me that you cannot use any antenna? Nothing at all? Not even a mobile on a biscuit tin? I have worked ZL mobile several times. OK so there may be someone who lives 60ft underground in a lead lined cave where no type of antenna works, but by and large you can usually do something and if you can't generally you're not trying hard enough.

I hear hams saying they had a QSO with some VK, ZL, K or any other station. Now let's get it right. You basically did the same as *ICQ*. You did not have a proper QSO, at best all you did was access the local repeater. You did not bounce a radio signal from a satellite, the ionosphere, the moon, meteorites, weather anomaly or any other medium. So when a station tells me he worked a DX station on *eQSO* it carries about as much weight as Boy Scouts doing their communications badge with walkie talkies at opposite ends of the local church hall.

Computers do play an important role in our hobby today with the various data modes, calculations, experimentation etc, but Internet chats should not be part of ham radio. ♦

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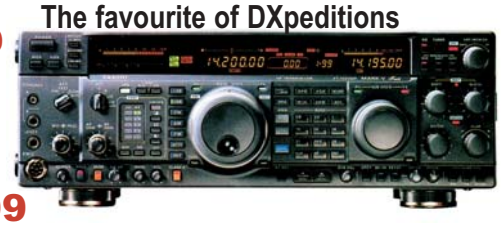

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