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The Radio Society of Great Britain Members' Magazine

RadCom

£3.95 Vol 79 No. 6 June 2003

Out now!

PARTY IN THE PARK JOIN IN THE FUN ON THE **RSGB'S 90TH BIRTHDAY!** SEE P7

YAESU FT-857

HF/VHF/UHF MOBILE TRANSCEIVER REVIEWED P28

INSIDE

WIN! Tickets to Royal International Air Tattoo **p22**

WATERS & STANTON

GENERAL ENQUIRIES: 01702 206835/204965
FREEPHONE ORDERLINE: 08000 73 73 88

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

3 STORES TO CHOOSE FROM

WEB ORDERING
www.wsplc.com

NEW RIGblaster pro

New in the line up is the RIGblaster pro rig to sound card interface. Full status front panel LEDs, electret mic. input plus second mic. Now features dual headphone outputs 1/4" and 3.5mm. Built-in Yaesu CAT and Icom CI-V interface and Kenwood compatibility. Two independent keying outputs for CW and FSK. New CD-ROM program selections including sound card based DSP software. Large number of leads supplied for most hook-ups.

£299.95 B

NEW ICOM IC-E208

AVAILABLE SOON....

VHF/UHF FM Dual Band Mobile Transceiver
Frequency range 144-146MHz, 430-440MHz Tx 55/50W (3 power steps each band) *Wideband Rx 118-173, 230-549 & 810-999MHz *512 memories with Alphanumeric names *FM narrow capability *104x2 DTCS, 50 CTCSS tone squelch operation *16 DTMF channels *Detachable front panel *Extra large LCD with choice of colours green, amber, yellow *Large combined tuning dial & band switch *HM-133 remote control microphone - supplied *Packet ready for 9600/1200bps through mini DIN or 1200bps through mic socket *Supply 13.8V

NEW YAESU FT-2800M

£159 B

**144-146MHz *FM *137 - 174MHz expanded Rx *RF Pwr 65/25/10/5W *25/12.5kHz channel spacing *High/Low deviation *Supply 13.8V DC*
The FT-2800M is the latest model from Yaesu with 65 Watts High Power, rugged consruction, excellent receiver performance and direct keypad entry.

NEW YAESU FT-857

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

£799 C

HF TRANSCEIVERS

ICOM IC-756 PRO II £2399 C

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

ICOM IC-7400 £1449 C

HF/VHF 100W transceiver. Features large LCD with spectrum scope, auto ATU and same DSP system as IC-756PRO II. Supplied with free SP-21 speaker & SM20 desk mic.

ICOM IC-703 NEW £599 C

HF/ 50MHz Transceiver 0.1-10W Portable, Mobile, Base-Station. (9-15.87V DC) Designed especially for the Foundation Licence/QRP. Built-in features auto ATU, DSP memory keyer. (5W when using 9.6V batts) Battery and Carry Pack to follow.

ICOM IC-706 IIG DSP £799 C

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

ICOM IC-718 £549 C

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

KENWOOD TS-2000 £1695 C

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

KENWOOD TS-870S DSP £1399 C

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

KENWOOD TS-570DGE £849 C

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

ICOM IC-910X with 23cm £1249 C

Icom's all mode VHF/UHF transceiver with 23cm. Large clear LCD with lots of facilities. 100W on VHF and 75W on UHF, 10W on 23cm. IC-910H version £1149

HF TX / LINEAR AMPLIFIERS

YAESU FT-1000 MKV £2499 C

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

YAESU FT-1000 FIELD £1999 C

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

YAESU FT-920AF £1099 C

LAST FEW

100W HFplus 6m transceiver. 100kHz - 30MHz, 48 - 56 MHz Gen coverage Rx, 100 memories, Internal ATU with 100 tuner memories, large backlight LCD, Built-in memory keyer, 13.5V DC. Now includes FM unit and 6kHz AM filter.

YAESU FT-897 £989 C

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

YAESU FT-847 £1199 C

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

LINEAR AMP UK CHALLENGER III £1795 C

HF linear amp 160-10m including WARC bands. Output 1500W CW or SSB, 400W RTTY. Soft start and timer protection at switch-on. Front panel adjustable ALC.

LINEAR AMP UK RANGER 811H £895 C

HF linear amp 160-10m including WARC bands. Drive 10-100W, output 800W (max) CW. Soft start on switch-on. Compatible with all modern 100W HF rigs. Silent running Papst fan.

TOKYO HY-POWER HL-50B £265.95 C

FT-817 VERSION !

This model has been specifically designed for the FT-817. Enjoy up to 50 Watts output

TOKYO HY-POWER HX-240 NEW £229.95 C

HF TRANSVERTER

*144MHz (2.5/10W) in, 3.5/7/14/21/28MHz (30-40W) out. If you have an all mode (SSB/CW/FM) 2m transceiver and don't want the expense of buying an HF transceiver then this transverter might be for you.

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THE ONLY THING WE WON'T DISCOUNT • CUSTOMER SERVICE

VHF / UHF TRANSCEIVERS

ICOM IC-2725E NEW £309 C

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

ICOM IC-207H £279 C

Great budget price dual band FM 50W/35W transceiver. Simple band operation. Front panel detachable from main unit if required.

ICOM IC-2100H £229 C

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

YAESU FT-8900R NEW £369 C

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

YAESU FT-817 £569 C

All bands & All modes gives you a totally portable HF DX or VHF/UHF station. *Ours includes* battery and charger.

YAESU FT-1500M £179 B

Remarkably small and compact, yet built like a Battleship!
Should last for years.
Look at the Price!

KENWOOD TMD-700E £449 C

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

KENWOOD TM-V7E £359 C

A lovely cool blue display, easy with 50/35W output. 50W/35W plus 280 memos and five storable operating profiles.

KENWOOD TM-G707E £289 C

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

VHF/UHF TX & HANDHELDS

YAESU VX-7R NEW £319 B

6m/2m/70cm

Available in Silver or Black

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

YAESU VX-1R GREAT PRICE £119.95 B

2m/70cm

Ultra-wide frequency coverage which includes VHF and UHF TV audio, AM broadcast, FM broadcast and AM airband.

YAESU VX-110 £109 B

Combining the ruggedness of the VX-150 with the simplicity of 8-Key operation, the VX-110 is a fully featured 2m handheld ideal for the most demanding of applications. It has a die-cast case, large speaker and illuminated keypad.

ICOM IC-E90 NEW £269 B

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

ICOM IC-T3H £129 B

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

KENWOOD TH-D7E £319 B

DATA COMMUNICATOR

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

KENWOOD TH-F7E £259 B

WITH EXTRA WIDE RX COVERAGE
• 144-146MHz Tx/Rx: FM
• 430-440MHz Tx/Rx: FM
Up to 6W out with Li-ion battery and "scanner" style coverage from 100kHz to 1300MHz including SSB on receive! This is a great radio to have at all times when you are on your travels.

KENWOOD TH-G71E £199 B

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

VHF / UHF ANTENNAS

MOBILE ANTENNAS

DIAMOND ANTENNA (PL-259 base type) **NEW**

CR-8900. Quad bander 6m/10m/2m/70cm. Length 1.26m, max pwr 60W with fold over base. **£72.95 B**

WATSON ANTENNAS (PL-259 base type)

W-2LE	2m quarter wave 2.1dBi 0.45m	**£9.95**	A
W-285S	2m 3.4dB 0.48m (fold over base)	**£14.95**	B
W-77LS	2m/70cm 0/2.5dB 0.42m	**£14.95**	B
W-770HB	2m/79cm 3/5.5dB 1.1m	**£24.95**	B
W-7900	2m/70cm 5.6/7.6dB	**£32.95**	B
W-627	6m/2m/70cm 2.15/4.8/7.2dB 1.6m	**£34.95**	B
WGM-270 NEW	2m/70cm On glass 3.7m coax 50W	**£29.95**	B

MOBILE BASES

DIAMOND

K-600M.
Deluxe boot mount SO-239, c/w 5m RG-58 & PL-259

AML	Gutter mount fold over type	**£15.95**	A
K-11	Universal gutter mount	**£24.95**	A
K-33	Adjustable hatch mount	**£23.95**	A
K-400	Adjustable boot mount heavy duty	**£26.95**	A
K-600M	Deluxe boot mount + cable	**£49.95**	B
DPK-TR	Stainless Steel boot mount (ECH)	**£18.95**	A

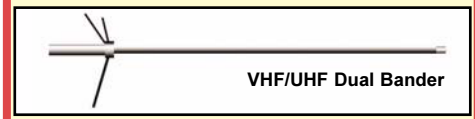
WATSON

WM-14B.
Large diameter 14cm magnetic mount SO-239, c/w 5m RG-58 & PL-259

W-3HM	Adjustable hatch mount	**£14.95**	A
WM-08B	8cm mag mount, 5m cable PL-259	**£9.95**	A
WM-14B	14cm hvy duty mag mount+cable	**£12.95**	A
WSM-88V	BNC mag mount plus 3m cable	**£14.95**	A
W-3CK	5m 5D-FB cable assembly+pigtail	**£18.95**	A
W-ECH	5m standard cable kit assembly	**£12.95**	A

BASE STATION ANTENNAS

DIAMOND



VHF/UHF Dual Bander

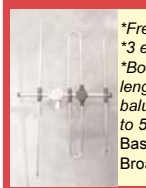
X-200	2m/70cm colinear 6/8dB 2.5m	**£79.95**	C
X-300	2m/70cm colinear 6.5/9dB 3.1m	**£99.95**	C
V-2000	6m/2m/70cm 2.15/6.2/8.4dB 2.5m	**£89.95**	C

WATSON

W-300.
Very popular dualband base antenna. Supplied with u-bolts for mast fixing.

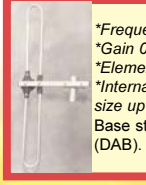
W-30	2m/70cm colinear 3/6dB 1.15m long	**£39.95**	C
W-50	2m/70cm colinear 4.5/7.2dB 1.8m long	**£49.95**	C
W-300	2m/70cm colinear 6.5/9dB 3.1m long	**£64.95**	C
W-2000	6m/2m/70cm 2.15/6.2/8.4dBi 2.5m	**£69.95**	C

DAB-DIR NEW £24.95 B



**Frequency 175 - 230MHz *Yagi beam *3 elements *Gain 5dBd *Impedance 75 Ohms *Boom length 51cm *Elements 3 *Max element length 88cm *Connector screw terminal *Internal balun *Weight 700g (with clamp) *Mast size up to 50mm*
Base station yagi antenna for Digital Audio Broadcasting (DAB). Complete with mast clamp.

DAB-OMN NEW £16.95 B



**Frequency 175 - 230MHz *Folded dipole *Gain 0.0dB *Impedance 75 Ohms *Elements 1 *Element length 67cm *Connector screw terminal *Internal balun *Weight 400g (with clamp) *Mast size up to 50mm*
Base station antenna for Digital Audio Broadcasting (DAB). Complete with mast clamp.

WATERS & STANTON

1973 WATERS & STANTON PLC 30th ANNIVERSARY 2003

PRICE MATCH

HF ANTENNAS

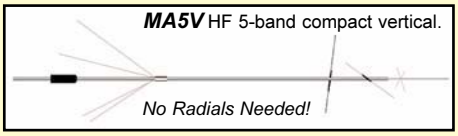
VERTICAL ANTENNAS

HUSTLER BASE ANTENNAS

6-BTV. HF 6-band vertical. Can be ground mounted

6-BTV NEW	80-40-30-20-15-10m 1kW PEP	£239.95	C
5-BTV	80-40-20-15-10m 7.64m 1kW	£209.95	C
4-BTV	40-20-15-10m 6.52m 1kW PEP	£169.95	C

CUSHCRAFT BASE ANTENNAS

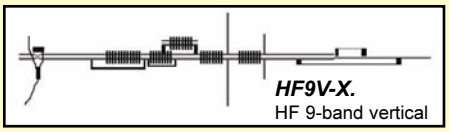


MA5V HF 5-band compact vertical.

No Radials Needed!

MA5V	20-17-14-12-10m 250W PEP	£229.95	C
R8	40-30-20-17-15-12-10-6m 1.5kW	£529.95	C
R6000	20-17-15-12-10-6m 1.5kW PEP	£349.95	C

BUTTERNUT BASE ANTENNAS



HF9V-X.
HF 9-band vertical

HF9V-X	80-6m 7.9m 1kW PEP	£365.00	C
HF6V-X	80-40-30-20-15-10m 7.9m 2kW	£315.00	C
HF2V	80-40m 9.75m (160m opt) 1kW	£230.00	C

HY-GAIN BASE ANTENNAS

DX-88. HF 8-band vertical

AV-640	40-6m 1.5kW, 300W 6m (PEP)	£399.95	C
AV-620	20-6m 1.5kW, 500W 6m (PEP)	£299.95	C
AV-14AVQ	40-20-15-10m 1.5kW PEP	£179.95	C
AV-12AVQ	20-15-10m 1.5kW PEP	£139.95	C
DX-88	80-10m 1.5kW, 250W 30m	£395.95	C

HORIZONTAL BEAMS & DIPOLES

CUSHCRAFT

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

X-7	20/15/10m 7 el. Yagi 2kW	£699.95	D

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

MA-5B	10-12-15-17-20m 4 el. Yagi 2kW	£349.95	D
A4-S	10-15 & 20m 4 el. Yagi 2kW	£599.95	D
A3-WS	12 & 17m 3 el. Yagi 2kW	£399.95	D
D-3	10-15-20m dipole element 2kW	£249.95	C

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

D-3W	12-17-30m dipole element 2kW	£249.95	C
D-4	10-40m dipole element 2kW	£339.95	C
D-40	40m dipole element 2kW	£299.95	C
TEN-3	10m 3 el. Yagi 2kW	£219.95	C
ASL-2010	13.5-32MHz 8 el. log periodic	£799.95	C

RADIO WORKS

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

CW-160	160-10m 76.8m long	£139.95	C
CWS-160	160-10m 40.5m long	£134.95	C
CW-80	80-10m 40.5m long	£99.95	C
CWS-80	80-10m 20.1m long	£119.95	C
CW-40	40-10m 20.1m long	£94.95	C
CW-20	20-10m 10.36m long	£84.95	C
CW-620	20-6m 9.7m (32ft) long	£94.95	C
G5RV PLUS	80-10m with balun 31m (102ft) long	£64.95	B

HF ANTENNAS

RADIO WORKS - Baluns and Isolators

T-4 Plus	Line Isolator1.8 - 54MHz 4kW	£42.95	B
T-4-500	Line Isolator1.8 - 30MHz 500W	£32.95	B

Use a line isolator to eliminate stray RF.

T-4G	Line Isolator 1.8-30MHz + gnd 4kW	£42.95	B
T-4G Plus	Line Isolator 1.8-54MHz + gnd4kW	£45.95	B

The **REM-BAL** is a 4:1 current type balun and is ideal for open wire to coax interfacing, especially external to the operating position. Unlike voltage baluns, current type baluns maintain output balance over a wide range of loads.

REM-BAL	Ladder line 4:1 balun 1.8-30MHz	£49.95	B
B1-2K Plus	1:1 current balun - for inverted V 's	£28.95	B
B4-2K	4:1 voltage balun loops/folded dipoles	£42.95	B
Y1.5K Plus	1:1 current Yagi balun 1.8- 54MHz	£42.95	B

Sundries

KEVLAR	200ft 400lb strain guy line	£22.95	A
LADDER	450 Ohm ladder line - per metre	£0.90	A

MOBILE ANTENNAS

HUSTLER

Standard Resonator 400W (mast sections not included)

RM-40S **RM-80**

RM-10	10m 150-250kHz	£19.95	B
RM-11	11m 150-250kHz	£19.95	B
RM-12	12m 90-120kHz	£19.95	B
RM-15	15m 100-150kHz	£19.95	B
RM-17	17m 120-150kHz	£24.95	B
RM-20	20m 80-100kHz	£24.95	B
RM-30	30m 50-60kHz	£26.95	B
RM-40	40m 40-50kHz	£26.95	B
RM-80	80m 25-30kHz	£29.95	B

Super Resonator 1kW (mast sections not included)

RM-10-S	10m 250-400kHz	£24.95	C
RM-15-S	15m 150-200kHz	£26.95	C
RM-20-S	20m 100-150kHz	£31.95	C
RM-40-S	40m 50-80kHz	£37.95	C
RM-80-S	80m 50-60kHz	£51.95	C

Lower Mast Sections

MO-1	54" (FOLD @ 22")	£33.95	C
MO-2	54" (FOLD @ 27")	£33.95	C
MO-3	54" (NON FOLD)	£26.95	C
MO-4	27" (NON FOLD)	£22.95	C

Mobile Mount Accessories

SSM-1	Ball mnt stainless steel spring&stud	£45.95	B
SSM-2	Ball mount	£28.95	A
SSM-3	Stainless steel spring & stud	£24.95	A
HOT	Trunk lip mount	£24.95	A
RSS-2	Stainless steel resonator impact spring	£10.95	A
QD-2	Quick disconnect adaptor	£19.95	A
VP-1	Multi-band adaptor	£7.95	A

PORTABLE ANTENNAS

MIZUHO (FOR FT-817)

ATX-WBN	Walkabout 80-6m Whip 1.5mBNC	£49.95	B

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

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

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

AT-80	Single band 80m whip with BNC	£24.95	B
AT-40	Single band 40m whip with BNC	£24.95	B
AT-30	Single band 30m whip with BNC	£19.95	B
AT-20	Single band 20m whip with BNC	£19.95	B
AT-17	Single band 17m whip with BNC	£19.95	B
AT-15	Single band 15m whip with BNC	£19.95	B
AT-12	Single band 12m whip with BNC	£19.95	B
AT-10	Single band 10m whip with BNC	£19.95	B

ANTENNA TUNER UNITS

MFJ 989C VERSA TUNER V £379.95 C

High power tuner.*1.8-30MHz *3kW *6-way Antenna/ load switch *2 coax positions *Built-in 4:1 balun *X-needle meter *Peak & AV

MFJ 986 DIFFERENTIAL-T TUNER £349.95 C

Differential capacitor & Roller inductor.*1.8-30MHz *1.5kW *6-way Antenna/load switch *2 coax positions *Built-in 4:1 balun *X-needle meter *Peak & AV

MFJ 949E DELUXE VERSA TUNER II £159.95 B

Firm favourite with HF operators. *1.8-30MHz *300W *3-way Antenna selector *Dummy Load socket *Internal balun *X-needle meter *Peak & AV

MFJ 962D VERSA TUNER III £279.95 C

Ideal tuner for max UK legal power.*1.8-30MHz *1.5kW *6-way Antenna/ load switch *2 coax positions *Built-in 4:1 balun * X-needle meter *Peak & AV

MFJ 921 VHF DUAL BAND TUNER £74.95 B

This tuner helps you get perfect VSWR and offers some filtering as well.*144/220MHz *200W max *Power meter *Rear panel earth terminal

MFJ 906 6 METRE TUNER £89.95 B

Help match your 6m rig to your antenna.*50-54MHz *100W FM *200W SSB *X-needle meter, 0-60W & 0-300W *By-pass position for tuner

MFJ 931 ARTIFICIAL GROUND £94.95 B

Places rig near to actual ground potential.*1.8-30MHz *Ground current meter *Used where no earth ground is possible *Reduces TVI/RFI *Resonates random wire

MFJ 267 DUMMY LOAD/WATT METER NEW £129.95 B

Switch enables the dummy load to be by-passed*1.8-54MHz *300/3000W FWD *60/600W RFD *50 Ohms *3in X-needle meter VSWR/Pwr *reads PEP or AV *SO-239 x2 sockets *9-12V

MFJ 269 ANTENNA ANALYSER £349.95 B

Once you have used an antenna analiser you will wonder how you ever managed without one. The MFJ-269 covers 1.8 to 170MHz and 415 to 470MHz. The MFJ-259B 1.8 to 170MHz. Both operate as signal generators and frequency counters as well.

MFJ-259B	HF/VHF digital analyser	£269.95	B

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

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded in 1913 incorporated 1926.
Limited by guarantee
Member society of the
International Amateur Radio Union
Patron: HRH Prince Philip, Duke of Edinburgh, KG, KT

Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the Subscriptions Department from which full details of Society services may also be obtained.

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RSGB Matters

THE NEW INTERMEDIATE LICENCE EXAM

Following the successful completion of the two controlled pilot schemes conducted in March and April of this year, the candidates' results have been processed and the pass mark has been set for all future Intermediate examinations at 60%. This equates to 27 questions being answered correctly out of the total of 45.

Until such time as the Intermediate Licence examination becomes available on-demand, the following dates have been identified for examinations during 2003: 27 May, 30 June, 28 July, 26 August, 29 September, 27 October, 24 November, 15 December. The exams will normally start at 6.30pm.

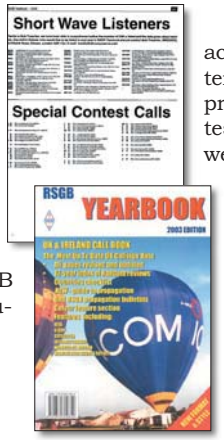
NEW DRRMs APPOINTED

Two new Deputy RSGB Regional Managers have been appointed within Region 9, London & the Thames Valley. They are: Dave Oliver, G0SJY, for Berkshire and South Buckinghamshire; and Martin Charman, G4FKK, for Surrey and London South of the Thames.

RSGB AT FRIEDRICHSHAFEN

The RSGB will be represented at the 'Ham Radio 2003' amateur radio and electronics exhibition in Friedrichshafen, Germany, over the weekend of **27 to 29 June**. If you are planning a visit, General Manager Peter Kirby, G0TWW, and his team would be pleased to see you.

SWL LISTING IN RSGB YEARBOOK



For the last few years, there has been a listing of SWL addresses and/or e-mail addresses published in the RSGB Yearbook. Unfortunately, few SWL members of the RSGB have taken advantage of the facility to have their details included in the Yearbook and the listing has not grown much from year to year. If the listing is not substantially bigger this year, the facility to include SWL addresses is likely to disappear. The listing of SWLs in the Yearbook is compiled by RadCom 'SWL' columnist Bob Treacher, BRS32525, who is therefore urging all listeners to take the time to either write to him or e-mail the details they would like to see appear in the SWL listing in the next Yearbook. Bob's address is 93 Elibank Road, Eltham, London SE9 1QJ, and his e-mail address: brs32525@compuserve.com Remember, if you do not send your details, the SWL listing may disappear.

MORSE CAMP IN REGION 4

Another RSGB Morse Camp will take place over the weekend of **12/13 July** in Grindon, Sunderland. The idea of the weekend is to provide sufficient intensive training to get candidates up to speed for the RSGB 5WPM Morse code test. All participants should at least know the Morse code characters for all the letters, numbers and prosigns used in the test at the start of the weekend. For further details and to book, please contact Catherine Pearson at RSGB HQ on tel: 0870 904 7373, or e-mail: ar.dept@rsgb.org.uk

EMC COMMITTEE TO MONITOR WINCHESTER PLT

According to an article in the *Hampshire Chronicle* of 25 April, Winchester is to be the first place in England to receive broadband Internet access through the electricity mains. The newspaper reported that the town would start to receive the PLT system in June. A similar system was recently tested in Cambletown and Crieff in Scotland. The RSGB EMC Committee will be monitoring the situation in Winchester, as it did during the trials in Scotland. Any RSGB member resident in the Winchester area who would like to report on the effect of PLT on the amateur bands is invited to contact Hilary Claytonsmith, G4JKS, by e-mail: g4jks@btinternet.com

AROS TALKS

The RSGB Amateur Radio Observation Service (AROS) coordinator, Barry Scarisbrick, G4ACK, is giving a talk on the work of AROS at the **Mid-Cheshire Amateur Radio Society** on **4 June**. Details from Niall, G0VOK, tel: 01606 871413.

VHF AWARD NEWS

Unfortunately, we did not have enough space for Tony Jarvis's usual report of VHF

/UHF award news in the May *RadCom*, so here is a short summary of the award claimants received in March, followed by Tony's usual report of April claimants. The first claim for March came from Martyn Medcalf, G1EFL/M3VAM (CM) who reaches his next milestone level of '200' squares. Tom Burke, M5LXU (DN), updates his 'squares' to 50 and 'countries' to 20. Gerry Farrance, G3KPT (BM), gains his '275' squares increment and Graham Badger, G3OHC (YO), attains the '75' square level. On 70MHz, Geoff Dover, G4AFJ (LE), has now achieved 45 squares.

Andrew Thomas, G8GNI (MK), submitted a successful claim for 40 squares and 10 countries at 144MHz. John Tye, G4BYV (NR), found 25 cards for 10GHz squares confirmed and now heads the 10GHz table as well!

April produced just two claimants and coincidentally they were both from almost the furthest point north in mainland Britain. The first was from Erik Mckay, MM3AXK (KW), who sent in a varied collection of cards to get a foot on the first rung of the 50MHz countries table. I can foresee some light-hearted family competition in due course as both father and brother have previously made claims.

The second was from Colin Bayliss, GM3WKZ (KW), and he's been taking advantage of the openings on 6m with a fine bundle of cards which included many from the 01/02 trans-Atlantic openings as well as numerous auroral contacts. This has enabled Colin to gain square increments for '125–200'.

Colin also enclosed a superb claim for 40 square/10country award on 144MHz. Colin's location faces north towards the Arctic and he comments that "I need a really good lift or auroral propagation to have any chance of working into the heavily populated areas of the south-east or mainland Europe. The positive side of the location is the extremely low background (man-made) noise levels experienced here." The equipment in use for this award was relatively modest, just 100W to a 9-element beam. Congratulations to all recipients.

Details on all VHF, UHF and Microwave Awards can be obtained on receipt of an A4 or A5 SASE from the Awards Manager, Tony Jarvis, G6TTL (QTHR). They are also available on the Internet at www.rsgb.org (go to 'Operating', 'VHF/UHF', then 'VHF/UHF Awards'). Queries may also be sent e-mail to vhf.awards@rsgb.org.uk

SUMMARY OF AWARD RECIPIENTS FOR MARCH AND APRIL.
50MHz: 10 Countries (2-way): MM3AXK. 20 Countries (2-way): M5LXU.50 Squares: M5LXU. 75S: G3OHC.125Squares: GM3WKZ. 150S: GM3WKZ. 175S: GM3WKZ. 200S: GM3WKZ G1EFL/M3VAM. 275S: G3KPT.
70MHz: 45 Squares/8 Countries: G4AFJ. 45S/10C: G4AFJ. **144MHz:**40Squares/10Countries: G8GNI, GM3WKZ.
Microwaves: 10GHz: 5, 10, 15, 20 & 25 Squares: G4BYV.

PLANNING CONSULTATION DOCUMENT

Several amateurs have contacted RSGB HQ about a new government consultation document, 'Satellite Dishes and Other Antennas: Consultation on Possible Changes to Planning Regulations'. This is intended to replace earlier permitted development rights for small satellite dishes. The Chair of the RSGB Planning Advisory Committee has contacted the relevant government department, which has confirmed that there is no intention to change the present regime for amateur radio aerials. Thus amateur aerials will continue to be 'not development', '*de minimus*', 'permitted development' or will require specific permission, depending on the size and location of them. Members seeking more information are advised to consult the advice booklet, copies of which can be obtained from RSGB HQ or viewed on the RSGB members-only website at www.rsgb.org/membersonly There is therefore no need for the Society to make representations to the government on this consultation.

The consultation document can be found at www.planning.odpm.gov.uk/consult/satothan/index.htm and the closing date for responses is 4 July 2003.

LONGPATH PROPAGATION PREDICTIONS

Gwyn Williams, G4FKH, the Vice-Chairman of the RSGB Propagation Studies Committee (PSC) and the man who compiles the HF F-Layer Propagation Predictions in *RadCom* each month, writes: "It has been a little while now since the topic of longpath propagation predictions hit 'The Last Word' section of our magazine. It has not been an easy task to bring the request to fruition, but we have done it. The PSC agreed straight away that longpath predictions should be shown in *RadCom*, so Dr J Sylvan Katz, VE5ZX, and I set to the task. Sylvan wrote the program while I provided the prediction parameters and worked with the various prediction engines. We decided to change from a batch type program to 'Perl', a high-level programming language. Next it was expected that we would take this opportunity to change over to *VOACAP* from the *REC533* prediction engine. In the event, *VOACAP* proved unreliable during certain periods of the year and the work-around was simpler if we continued with *REC533*, whilst losing none of the accuracy. So, from this month onwards *RadCom's* 'HF F-Layer Propagation Predictions' will include longpath predictions whilst retaining *REC533* as the prediction engine. Higher input power and superior aerials have been used to produce the predictions; the PSC thought it being more important that potential longpath openings are indicated, even though less well-equipped stations may find these particular predictions inaccurate. I would like to request that those proponents of LP kindly check the validity of the predictions and e-mail (G4FKHGwyn@aol.com) or write (G4FKH QTHR) to me with their comments and/or suggestions."

5MHz EXPERIMENT UPDATE

Steve Richards, G4HPE, wishes to thank the many correspondents who have sent in reports detailing their activities as part of the RSGB 5MHz Experiment. All reports have been forwarded to the 5MHz Working Group for analysis. It is clear that a good deal of interesting work is taking place and the material received by Steve undoubtedly progresses our understanding of this part of the spectrum.

Several months ago, Steve felt it necessary to withdraw from his role as 5MHz co-ordinator, but he is still receiving a number of reports from participants in the 5MHz experiment. All reports should now be sent to Colin Thomas, G3PSM (QTHR), or to the 5MHz Working Group, c/o RSGB HQ.

5.6GHz NARROWBAND 'PREFERRED FREQUENCIES'

Mike Dixon, G3PFR, the RSGB Microwave Manager, writes with a correction to the Microwave Managers' report on the IARU Region 1 Conference, San Marino, which formed part of the article published on pages 43/44 of the April 2003 *RadCom*. This concerns the 'preferred' frequencies in the 5.6/5.7GHz (6cm) band.

It was stated that 5,668–5,670MHz was the preferred narrow-band modes segment. This was the result of an interim recommendation taken at an earlier Conference to accommodate certain Scandinavian countries which, at that time, did not have access to the 5760–5762MHz segment that had traditionally been used throughout the Region for narrowband modes. This no longer applies and operators in this band are now recommended to use the 5760–5762MHz segment for all narrowband communications modes. ◆

RIGHT STATION, WRONG OPERATOR

In the 'SSB Field Day 2002' article in the May 2003 *RadCom*, the photograph on page 50 captioned "GM4ZRR operating MM0CPS/P" should have read "David Dodds, GM4WLL, operating MM0CPS/P". Apologies to GM4WLL and GM4ZRR for the error. To recompense, here again is the picture!

‘PARTY IN THE PARK 2003’ – 26 / 27 JULY 2003

IT’S OUR 90th BIRTHDAY!

COME TO OUR ‘PARTY IN THE PARK’

Over the weekend of **26/27 July** the RSGB celebrates its 90th Birthday. To acknowledge this milestone in the Society’s history we are giving radio hams across the country the opportunity to get together to join us in our celebrations by holding a number of open-air events across all our regional areas.

The ‘**Great Birthday Party**’ will give us the opportunity to come together for a day of fun, the chance to ‘rag chew’ and to get on the air.

We will also be running a 90th Birthday Award programme which will be in operation over the weekend using the special callsign:

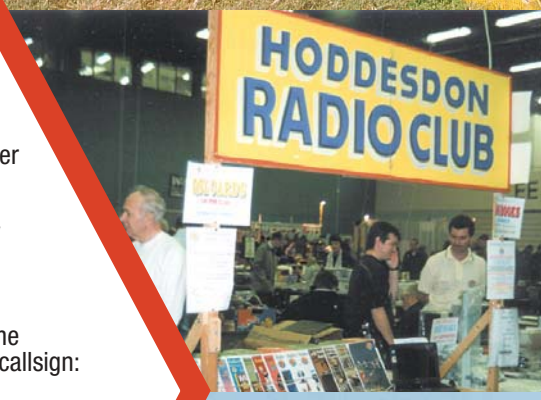
GB90RSGB

Special event stations will be operating in all our 58 regional districts and 90th Anniversary Award certificates will be available for those taking part.

This is a unique opportunity for clubs and individuals and their families to meet up and enjoy a traditional amateur radio day out. You make the fun and get mobile and ‘on the air’

Why not join us in our celebrations!

Full details of the nearest event to you will appear in next month’s *RadCom* and on the RSGB website at **www.rsgb.org**



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TS-570DGE
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ML&S: £849.00

ZERO DEPOSIT 36 x £30.87

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Dual Band Mobile/Base Transceiver

Probably the most complex rig ever to come out of Japan. But if you stick with it (as so many have) its features are amazing. For starters there is a built in packet TNC making it ideal for APRS and it will even put either a TS-870 or TS-570 on the correct frequency for DX cluster auto QSY! 50W on 2M, 35W on 70cm.

RRP: £519.95

ML&S: £449.00

ZERO DEPOSIT 36 x £16.32

RadioSport Communications & Computer Show

Taking place at the Stevenage Arts & Leisure Centre, Stevenage, Herts.

Sat 31st May & Sun 1st June 2003

The latest Block Buster Event from RadioSport.

Brand new venue incorporating two massive exhibition halls.

8th June 2003

Elvaston Rally at Elvaston Castle

SEE YOU THERE!

TS-2000E/X
All band All mode Base Transceiver

The TS-2000 is a full function HF, 6M, 2M, 70cm and 23cm (with optional UT-20) DSP base station. Built in Auto ATU, it has on board 9k6 packet modem, full remote capabilities when used with the optional RC-2000 controller. The TS-2000 is, which ever way you look at it, the most advanced all band all mode operation transceiver available today.

RRP: £1699.99

ML&S: £1599.00

ZERO DEPOSIT 36 x £58.13

The remote controller RC-2000 is also available at £209.95

ML&S Package

- TS-2000E Transceiver
- UT-20 23cm 10w unit
- MC-60A Desk Microphone
- SP-23 Desk Speaker
- ARCP-2000 Control Software

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ML&S: £2169.00

ZERO DEPOSIT 36 x £78.86

TH-F7E
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ML&S: £259.00

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- UBC-4 Charger
- USC-3 Case

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Still the only handie with built in TNC, (1200/9k6), the new mk2 version is compliant with AX.25 and KISS mode. The APRS (Automatic Packet/Position Reporting System) is rapidly gaining popularity for the transmission of positional data and messages. Don't forget 6W output on 2/70 too!

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ML&S: £319.00

ZERO DEPOSIT 36 x £11.60

TS-870S
Full DSP HF Transceiver

With most of the other Transceivers on the market offering every band (and many more features that may not be so important to you), Kenwood soldier on with their remarkable TS-870S. The very first to offer true IF DSP, The TS-870S is still a star performer and once bitten, you'll be smitten.

RRP: £1999.00

ML&S: £1399.00

ZERO DEPOSIT 3 6x £50.86

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RADIO COMMUNICATION

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RSGB MEMBERSHIP – Annual Rates

Home Corporate	£40.50
Overseas Corporate	£40.50
Corporate (Senior Citizens) (Applications should provide proof of age at last renewal date)	£31.50
Corporate (50 years membership)	50% DISCOUNT
Corporate (60 years membership)	FREE
Family member (Must reside with existing member. Does not include RadCom)	£16.50
Student Members (Applications should include evidence of full-time student status)	£26.50
HamClub (under 18)	£16.50
Affiliated Societies (UK or Overseas)	£40.50

Subscriptions include VAT where applicable.

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

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WRC-03 June – July

THE INTERNATIONAL Telecommunication Union's World Radiocommunication Conference (WRC-03) takes place in Geneva, Switzerland, between **9 June and 4 July**. Radio frequencies and the geostationary satellite orbit are limited natural resources, which must be used rationally, efficiently and economically. International agreement on the way the various bands of the radio-frequency spectrum are used is essential to the smooth operation of the whole range of radiocommunications services, of which the Amateur Radio and the Amateur-Satellite Services are but a small part. WRC-03 will update the regulatory framework, sharing scenarios and methodologies used to ensure fair and efficient use of the radio-frequency spectrum.

Of greatest interest to most amateurs is the question of the necessity to prove competence in Morse code for the purposes of obtaining an HF licence, and the question of the 're-alignment' of the 7MHz band. The IARU has been lobbying for the introduction of 300kHz of spectrum around 7MHz for the Amateur Radio Service on a world-wide basis. If, as is expected, the need for Morse testing as a condition of gaining an A licence is removed at WRC-03, the RA has announced that it intends to leave existing callsigns unchanged. UK amateurs would retain their present callsigns and the concept of A and B class licences would disappear: licences would simply be Foundation, Intermediate and Full, with all the existing privileges of the A class licence at that level of licence.

The RSGB will be represented at this vital conference by its HF Manager, Colin Thomas, G3PSM, who is attending in his capacity as an advisor on amateur radio issues.

Fiona Fountain of the BWBF with members of the Cray Valley Radio Society and Mike Devereux, G3SED, of Nevada at the prize-giving ceremony.

Transmission 2003

The winners of the club section of last year's 'Transmission' event, for the second year in a row, was the Cray Valley Radio Society. Members of the club were recently presented with their prize, an Alinco DX-70 transceiver sponsored by Nevada, by Mike Devereux, G3SED.

Transmission is the British Wireless for the Blind Fund's (BWBF's) annual fund-raising event in which radio amateurs are invited to obtain sponsorship for the number of contacts made over a weekend. The money raised helps BWBF to provide specially-adapted audio equipment to UK registered blind people – free of charge and for life. Every £75 raised will buy a radio for someone who is blind.

Transmission 2003 is scheduled for the weekend of **20/21 September 2003** and now is the time for you or your club to start planning your activity. To encourage you, BWBF has arranged with sponsors to provide a number of attractive prizes for individuals and radio clubs. For full details, or to receive sponsorship forms, please write to BWBF, Gabriel House, 34 New Rd, Chatham, Kent ME4 4QR; tel: 01634 832501 or e-mail: fiona@blind.org.uk

Amateur Rig Locates Distress Beacon

Jon Wornham, GD4RVQ, works as an Air Traffic Control Officer at Ronaldsway Airport. On 1 May he was contacted by the Kinloss Air Rescue Co-ordination Centre to say that a satellite had picked up a rescue beacon signal on 121.5MHz, initially thought to be located about six miles south of the airport, in the Irish Sea. Jon was asked if he could hear it and obtain a more accurate DF bearing. Unfortunately, although Ronaldsway is equipped with DF equipment, it is only operational on the airport's frequencies. However, Jon was carrying his Kenwood TH7E handheld with broadband receiver and could receive the signal, both on 121.5 and 243.0MHz, at S9, suggesting it was originating from the airfield itself. All operators and organisations were asked to check their aircraft but were unable to find any distress beacons operating.

Jon removed the aerial from the TH7E and by walking around each aircraft was able to positively identify the signal as coming from a jet that was in store at the airport: the signal was strong close to the nose of the aircraft but decreased rapidly as he walked away. The owners, who were in Brazil, were contacted and permission received to enter the aircraft. Finally, after about two hours, the false alarm was switched off.

Jon's quick thinking and amateur radio skills saved considerable cost and effort, negating the need for a full-scale search and rescue operation or for an RA DF team to fly out to the island from England.

Spalding Rally at New Venue

1 June sees the Spalding & District ARS holding its 35th annual rally. Ever popular and friendly, this year there is to be a change of venue as its former home is about to undergo redevelopment. It is therefore to be held at the Sir John Gleed School, Halmer Gate, Spalding, where one of the club's founders, Sam Whitley (SK) once taught and where club meetings were once held. The venue has easy access from the main A16 and is about 1 mile closer to the town centre than the previous venue. There will be local signs and talk-in on 2 metres.

The new venue has under cover accommodation for traders and special interest groups alike, and there will also be a large outdoor area available to 'car boot' style traders. Doors open at 10.00am. The event features an RSGB bookstall, RSGB representative present, special interest groups including VMARS and local repeater groups; refreshments and rig testing on a spectrum analyser (please book). For further details tel/fax: John, G4NBR, on 07946 302 815; e-mail: rally-secretary@sdars.org.uk or see the SDARS website at www.sdars.org.uk

Royal Honour for PA0LOU

Congratulations to Louis van de Nadort, PA0LOU, who has been awarded the title 'Lid in de Orde van Oranje Nassau' (Knight of the Order of Orange Nassau) on the occasion of the birthday of Queen Beatrix of the Netherlands. Lou received the honour for his outstanding work for the community of radio amateurs, in particular his work for IARU Region 1, of which he was chairman for many years.

Louis van de Nadort, PA0LOU.

Vintage Station

The XXX Corps Mid Hants Military Vehicle Trust will be operating a vintage wireless station from the village of Southwick in Hampshire from **6 to 8 June**. It was from Southwick House that the invasion of Europe in 1944 was planned and executed. The group would like to make con-

Amateur's Estate Raises Funds for BWBF

The widow of John Taylor, G0AKN, who became a silent key in 2000, has donated all his radio equipment to the British Wireless for the Blind Fund (BWBF). Members of the Cray Valley Radio Society agreed to help BWBF to sell the equipment and raised £635 for the charity at the Kempton Park rally on 27 April, with a lot more equipment yet to be cleared. The club will also have a stand at the Epson Radio & Electronics Fair on 22 June, when it will be selling more of G0AKN's equipment for the BWBF.

Raising funds for the British Wireless for the Blind Fund. Ralph Browne, 2E0ATY, and 'Nobby' Styles, G0VJG, of the Cray Valley Radio Society, with the BWBF's Fiona Fountain at Kempton Park.

tact with as many operators of vintage military wireless equipment as possible. The callsign use will be M3ADD and the station will be active on 3655kHz AM, and 7055 and 14325kHz SSB. Visitors in period clothing and vehicles of the 1944 era welcome.

Professor Stuart Kind, G4AYP, SK

Professor Stuart Kind, one of the country's top forensic scientists and the man who played a vital role in tracking down the Yorkshire Ripper, has died at the age of 78. Although he had an international reputation as a forensic scientist, few were aware that he was also an active radio amateur, licensed as G4AYP. Prof Kind came to national and international prominence when, in late 1980, he was brought in by the Home Office to help track down a serial killer who had murdered 13 women. Within two weeks he had developed a technique called 'geographical profiling' which led to him to predict that the murderer lived between Shipley and Bingley. Two weeks later, Peter Sutcliffe was arrested. The Yorkshire Ripper had been living in Bradford, exactly where Stuart Kind had predicted.

Prof Stuart Kind, G4AYP, SK.

Prof Kind lived in Harrogate and enjoyed gardening, hill walking and amateur radio in his retirement. He was a true grammarian with an in-depth knowledge of language and dialect and was often heard on 2m conversing on such topics with the late Gus Davies, G6HBL. Stuart was active until late in his final illness, especially on 40m CW and SSB, as well as 2m.

International Museums Weekend

The third International Museums Weekend takes place over the weekend of **14 / 15 June**. Those wishing to take part should please ensure they have registered via the form on the International Museums Weekend website at www.ukradio amateur.org/imw Those lacking web access and who are wishing to register their museum should ring Harry, M1BYT, tel: 0113 2866 897.

Artist on the Air

John Allsopp, G4YDM, has recently set up a website (http://hometown.aol.co.uk/allsppjhn/index.html) to promote his art work. John offers to produce a life-like oil painting on Belgium woven canvas from your clear photograph – see the website for details. John's QSL card, shown here, shows the exceptional quality of his work.

GBR Rugby Closes

Many members will be aware that GBR, the Rugby VLF station on 16kHz, closed down at the end of March. Bob Harrison, G4LMF, sent us the text of the final transmission, sent at 2400UTC on 31 March: "VVV de GBR VVV de GBR. After 77 years, three months of almost continuous operation, the GBR 16kHz service from BT Radio Station Rugby ceases today. A thank you to our customers, mainly the Royal Navy, without whom the service would not have been required and whose co-operation has enabled the service to run so smoothly. A big thank you must go to all of those who over the years have been involved in the design, construction, maintenance and operation of GBR. They can feel very proud of providing a consistent high level of reliable service and a job well done. This is the final transmission and GBR will now be shut down for the last time. de GBR GBR QRT."

AMSAT-UK Colloquium

AMSAT- UK will be holding its 18th annual Colloquium from **Friday 25 July to Sunday 27 July** at the University of Surrey at Guildford. This year's event, which is open to everyone, will include many presentations and displays over the three days. Accommodation and individual day tickets will be available. Many new amateur satellites are being built and about to be launched and the availability of the amateur satellite service to the new Intermediate Licensees means that this is an ideal time to find out more about this exciting side of our hobby.

GB4FUN is fully equipped for satellite operation and will be on hand and there will be special beginners sessions on two afternoons. Full information from Jim Heck g3vzv@amsat.org or www.uk.amsat.org

Tommy Wigg, G3SKF (seated), received the RAIBC plaque from Brig Johnny Clinch, G3MJK.

RAIBC Stalwart Rewarded

Tommy Wigg, G3SKF, was recently presented with a special plaque by RAIBC vice president Brig Johnny Clinch, G3MJK, to thank him for his 10 years acting as net controller for the RAIBC HF nets. Tommy 'retired' as RAIBC net controller back in January. The nets are now held every Tuesday morning at 1000 on 7050kHz using the club callsign G4IBC. Anyone wishing to learn more about RAIBC and its activities to help the blind and disabled to have a better quality of life may contact the membership secretary, Alex Gaffin, G0MWO, on 0208 204 2347.

LF Records from GI and GM

Ian Kyle, MI0AYZ/GI8AYZ, made the first Northern Ireland to Russia QSO on 136kHz on 19 April by working RU6LA using very slow CW. The distance was 3185km. Ian was running only 100W into an antenna 10m high and contained within an area approximately 40ft square.

Simon Lewis, GM4PLM, the *RadCom* 'Microwave' columnist, has also been busy at the other end of the radio spectrum. On 20 April Simon completed the first Scotland to Yugoslavia LF contact with YU7AR on 137.7kHz. GM4PLM is at present using a 125m-long wire antenna. He plans to improve the antenna system over the summer in preparation for trans-Atlantic tests next winter.

Both MI0AYZ and GM4PLM are currently the only known stations active on the 136kHz band in Northern Ireland and Scotland respectively.

NEWS IN BRIEF

WAB AGM

The AGM of the Worked All Britain Awards Group will be held at the Radio Sport Communication and Computer Show in Stevenage on Sunday 1 June at 2.00pm. A new WAB CD-ROM will be launched over this show weekend.

GB50 Windsor Castle CD

The first special event station interactive CD has been released by the Cray Valley Radio Society. The CD features the highly successful GB50 special event station that was active from Windsor Castle to celebrate HM Queen Elizabeth II's Golden Jubilee in June 2002.

The 'Amateur Radio Experience' featuring the GB50 special event station was jointly organised by the Radio Society of Great Britain, the Cray Valley Radio Society and the Burnham Beeches Radio Club. The station was active from 29 May to 9 June last year from the North Terrace of Windsor Castle, making over 24,000 contacts with amateurs in 145 DXCC entities. The special CD was produced by FDS Graphics and includes background to the event, setting up the station, the transceivers and antennas used, video footage of HRH The Duke of Edinburgh's visit to the event, the GB50 awards, as well as pictures of Windsor and the castle. It costs $10, 10 euros or £6 (inc P&P) and can be ordered from Paul Lethbridge, G3SXE, 24 Furze Road, High Salvington, West Worthing, Sussex BN13 3BH. (PC minimum requirements: Pentium III 700MHz or greater; 128Mb RAM; 16Mb graphics; 64k colours.)

Transceiver Found

A transceiver and an accessory were found at the NARSA Norbreck Rally. If you wish to claim them, please contact NARSA secretary Carl Thacker, G6MEI (not QTHR), tel: 01257 485782 or e-mail: carl@g6mei.freeserve.co.uk, specifying the make and type of transceiver and what the accessory is

Digital Shortwave Broadcasts to Begin This Month

At the official launch of Digital Radio Mondiale (DRM) at the World Radio Conference, the German international broadcaster Deutsche Welle (DW) will start digital short-wave programmes broadcast to Europe and the Middle East. From June, DW plans to broadcast 8.5 hours a day in the DRM standard in German, English and Arabic. The conversion of two transmitters at the DW relay station in Sines, Portugal, which is required for them to transmit the DRM standard, is scheduled to have been completed by June.

Club and Regional

Club News is a service for clubs and societies affiliated to the RSGB. The announcements are intended to notify non-members and potential members of your club of specific events, therefore 'informal', 'committee meeting', 'natter night' and 'ragchew evening' etc will only be included if space permits. Basic, unchanged details about RSGB-affiliated clubs are published annually in the RSGB Yearbook.

Region 1: Scotland West & Western Isles

WEST OF SCOTLAND ARS
13, 'Filters and Q', GM8MRW. A M Fraser, GM3AXX, 01560 482720.

Region 2: Scotland East & the Highlands

ABERDEEN ARS
6, Junk sale. Robert, 01224 896 142.
COCKENZIE & PORT SETON ARC
6, Normal club night. 14, 15, Museums weekend. 15, *PW* 144MHz QRP Contest. 18, C&PSARC 20m Contest (note: change of band). Bob, GM4UYZ, 01875 811723.
LOTHIANS RS
9, AGM. 23, Social evening, BBQ (members only). Peter, 0131 446 0155.

Region 3: North West

CHORLEY & DARS
18, North West Repeater Group, the RSGB, Dave Wilson, G7OBW. Sean, M1SMf, sean1226@hotmail.com
EDEN VALLEY RS
26, Joint Meeting with Anglo-Scottish Repeater Group at Merlin Club, Penrith. Dave, M5TXJ, 017683 71106, www.qsl.net/m5txj/evrs.htm
FYLDE ARS
19, Discuss next 6 months programme. Ken, G3RFH, 01253 407952.
MID-CHESHIRE ARS
4, Amateur Radio Observation Service, Barry Scarisbrick, G4ACK. Niall, G0VOK, 01606 871413.
SOUTH CHESHIRE ARS
5, HF on Air. 12, Antenna project. 19, RSGB video. 26, Activity night. Chris, G1PUV, G0RDK, g1puv@chriswiseman.freeserve.co.uk
THORNTON CLEVELEYS ARS
2, Discussion on special event stations/contests. 9, BBQ at John's, G4FRK, QTH. 16, 'My Ham Radio', G8KBH. 23, Talk on RNLI (TBC). 30, Component night, Charles, G4FWM & John, G8RDP. Jack, G4BFH, jack@jduddington.fsnet.co.uk

Region 4: North East

GOOLE RADIO & ELECTRONICS SOCIETY
4, Pub night. 11, Contest equipment preparation. 18, Contest site visit. 25, Contest planning. Richard, G0GLZ, 07867 862169.
GREAT LUMLEY AR & ES
8, Bus to Elvaston Rally. 18, Erecting and testing whistling dipoles for 'foxhunt'. Nancy, 0191 4770036, nancy-bone2001@yahoo.co.uk
GRIMSBY ARS
5, On air. 19, UFOs, Les Baker, G0TEO. Brian, G4DXB, 01472 231383.
HALIFAX & DARS
17, BBQ at Rishworth School. Tom, M0TKA, 01484 715079.
HORNSEA ARS
4, NFD preparation. 11, 'Foxhunt'. 25, Activity. Andy, G0VRM, 01430 801122.
KEIGHLEY ARS
12, On air. 19, 'Amateur Television', Ray Newsome, G1MSD. 26, Quiz, Joe, G0RLY. Ian, M1BGY, 01274 723951.
RIPON & DARS
5, Guest Speaker. 19, Mag review, aerial topics. 26, Video. Andy, G0HUC, 01423 507623, andy@aicuk.demon.co.uk
SCARBOROUGH SPECIAL EVENTS GROUP
17, 2E0OOO International QRP Day. 21, 22, GX0OOO 15th Anniversary. Andy, G0VRM, 01430 801122.
SHEFFIELD ARC
2, Club night. 9, VHF radio. 16, 'Foxhunt' and meal. 23, HF radio. 30, Club night. Nick, G4FAL, 0114 2552893.

Region 5: West Midlands

BROMSGROVE ARS
10, Technical Topic. Details for DF hunt 3. 24, DF hunt 3, on foot. Angus, G8DEC, 01527 875573.
COVENTRY ARS
6, D-Day landings clandestine operation (TBC). 13, BBQ and on air. 20, Night on the water. 27, On air, Novice class, CW practice. John, G8SEQ, 024 7627 3190 johng8seq@ntlworld.com
KIDDERMINSTER & DARS
3, Summer outdoor activity night and BBQ. Tony, G1OZB, 01299 400172.
MID-WARWICKSHIRE ARS
10, 'Technical Topics' discussion. 24, ARDF 145MHz. Bernard, M1AUK, 01926 420913.
SOUTH NOTTS RC
6, Elvaston rally organisation. 8, Elvaston Rally. 13, Construction of aerial analyser, John, G4EDX. 20, Brian Jones memorial discussion. 27, 10-min talks on any subject by club members. Secretary, tel: 01509 569746.
ST LEONARDS ARS
5, Intro to APRS (UI-View), John, G0FSM. Derek, G0EYX, 01785 604904.
STRATFORD UPON AVON & DRS
1, 2, HF NFD. 9, VHF 'foxhunt', G4OHJ. 23, BBQ & on air, M0AYA. Geoff, G4OHJ, 01789 773 286.
TELFORD & DARS
4, Open evening, on air. 6, 7, NFD/6m Trophy at Bridgnorth. 11, 2nd DF competition, 'fox' G4EIX on 2m. 18, BBQ and Social at HQ. 25, VHF NFD planning and organisation. Mike, G3JKX, 01952 299677.

Region 6: North Wales

DRAGON ARC
2, '78.8 Inches', Geoff Spencer, GW4DRR. 16, Microphone amplifier design, Les Hayward. Stewart, GW0ETF, 01248 362229.
NORTH WALES RS
1, Red Rose Rally, transport arranged. 8, Visit to Jodrell Bank radio telescope, transport arranged. Ted, GW0DSJ, edward@eshipton.fsnet.co.uk
WREXHAM & ARS
3, Preparation for Museums weekend. 17, Club BBQ (members only). Mark, MW1MDH/MW3MDH, www.qsl.net/wars

Region 7: South Wales

ABERYSTWYTH & DARS
8, Constitution Hill picnic (free train ride for club members). 26, Club net S21 (call on S20) with GW7OZP. Ray, GW7AGG.

Region 8: Northern Ireland

BANGOR & DARS
4, BBQ & QRP evening. Mike, GI4XSF, 028 42772383.

Region 9: London & Thames Valley

AYLESBURY VALE RS
11, Morse tuition, RSGB video. Roger, G3MEH, 01442 826651, roger@g3meh.fsnet.co.uk
COULSDON ATS
9, 2m DF hunt. Steve, G7SYO, 01737 354271.
CRAY VALLEY RS
7, GB50 reunion. 19, Annual DF hunt. Bob, BRS32525, 020 8265 7735 after 8pm & weekends.
CRYSTAL PALACE R & EC
6, Club project, Morse practice. 20, Military radios, G8JAC. Bob, G3OOU, 01737 552170 or Victor, G1PKS, 020 86532946.
DORKING & DRS
7, 8, NFD CW. 22, Epsom Radio & Computer Fair. 24, VHF Field Day preparation. John, G3AEZ, 01306 631236.
NEWBURY & DARS
25, Talk by Waters & Stanton. Richard, G3ZGC, 01635 46241.
RADIO SOCIETY OF HARROW
1, GB2DHH operating day. 6, Informal. 13, Preparation for International Museums Weekend. 15, GB2DHH operating day. 20, Informal. 22, Epsom Radio and Electronics Fair. 27, Newcomers' programme. Jim, G0AOT, 01895 476 933 or 020 7278 6421.
READING & DARC
12, Club meeting, subject TBC. Pete, G8FRC, 0118 969 5697.
STEVENAGE & DARS
3, Members' discussion. 10, Operating. 14, 15, Intermediate course. 17, Members' discussion. 24, Video night. info@sadars.org
SILVERTHORN RADIO CLUB
7, Junk sale. David, G0KHC, 020 8504 2831.
SURREY RADIO CONTACT CLUB
2, Construction contest. Ray, G4FFY, 020 8644 7589.
SUTTON & CHEAM RS
19, Summer junk sale. John, G0BWV, 020 8644 9945.
VERULAM ARC
9, Antenna practical session. Walter, G3PMF, 01923 262180.

News

WIMBLEDON & DARS
13, 'Desert Island Radio', Reg, M1EEK. Jim, G4WYJ, 01737 356745.

Region 10: South & South East

ANDOVER RAC
3, Radio software. 11, Slow Morse class, Keith, G0HKC, on 145.250MHz. 17, VHF NFD planning evening. Terry, G8ALR, 01980 629346.
BASINGSTOKE ARC
2, Constructors' contest. 15, Newbury Club boot sale, 15, Radio orienteering event TBC. 28, New Forest 'foxhunt', M1CQI/M1HAT. Peter, M1DGQ, 0118 983 6545.
CHIPPENHAM & DARC
3, Discuss 'foxhunt' equipment & techniques. 10, Make aerials and/or attenuation boxes. 17, Test equipment. 24, 'Foxhunt'. Andrew, G4GWR, andrew@scott-green.fsnet.co.uk
CRAWLEY RC
25, 136kHz QRP transmitter, Derek Stanners, G3HEJ. Derek, G3GRO, 01293 520 424.
FAREHAM & DARS
4, On air. 11, 18, Steve's world of portable (operating when away form home) G7HEP *or* APRS, Chris, M3CZS. 25, MFJ Antenna Analyser part X, Brian, G4ITG & Mick, G4ITF. Steve, G7HEP, 01329 663673.
FARNBOROUGH & DRS
11, Transmission lines, John, G3OQB (TBC). 25, Meteorology, Bernd, M0COH. Norman, G0VYR, 01483 835320.
HASTINGS E & RC
18, RDS Steam Railways (TBC). R C Gornall, G7DME, 01424 444466.
HORNDEAN & DARC
3, Social evening. 14, 15, Special event station at Clanfield Carnival. Stuart, G0FYX, 023 9247 2846.
HORSHAM ARC
5, 'Home brew'. David, G4JHI, 01403 252221.
ITCHEN VALLEY RADIO CLUB
13, Sunspots and All That, Prof Henry Rishbeth. 27, Treasure hunt, Peter, G4EOW. Sheila, G0VNI, 023 80813827, sheila.williams@ivarc.org.uk
MID-SUSSEX ARS
6, 'Foxhunt', Kevin, G4XVG. 13, HF predictions, John, G8JBJ. 20, Annual gathering. 27, Shut. 28, Summer supper. 29, The All Electric Show: early gadgets & vintage radio sets. Geoff, G6MJW, 01273 845103.
SOUTHDOWN ARS
2, Laser Communications. GB2PW report and QSOs. John, G3DQY, 01424 424319.
SWINDON & DARC
12, AGM. 19, 50MHz contest preparation. 26, 'Penguin Radio in VP8', Dave, G1LJZ. Den, M0ACM, 01793 822705.
TROWBRIDGE & DARC
4, Digital SW radio and how to convert your rig to receive it, Mike Adams of Far East Broadcasting Co. Ian, G0GRI, 01225 864698, evenings/ weekends.
WORTHING & DARC
4, The Volks Railway. 11, Final plans for PW contest. 18, Newhaven Fort, M5KHH. 25, DF hunt, Roy, G4GPX, 01903 753893.

Region 11: South West & Channel Islands

APPLEDORE AND DARC
14, 15, Portable event from Appledore Maritime Museum. 16, Broadband and PSK31, Mike Hammond, G3PGA. Brian, M0BRB, brian.jewell@ic24.net
BLACKMORE VALE ARS
3, VHF on air. 10, Bring your home brew antenna. 17, HF on air. 24, VHF/UHF and Above, Geoff, G7RMG. Tony, G0GFL, 01258 860 741.
BOURNEMOUTH RS
6, National Coastwatch Institution, David, M1OBC. 20, Test cards & icons, Tony, G3YWG. Chris, M5AGG, 01202 893126.
CORNISH RADIO AMATEUR CLUB
5, Antenna erection, Keith, G3XFL. 9, Computer section. John G4LJY, 01872 863849.
SOUTH BRISTOL ARC
4, Computer clinic. 11, RSGB (Bristol) Group Presentation. 18, Summer bring & buy sale. 25, Preparing for VHF NFD. Len, G4RZY, 01275 834282.
WEST SOMERSET ARC
3, 'Foxhunt'. Jean, G0SZO, 01984 633060.
YEOVIL ARC
5, QRP Convention briefing. 8, 19th QRP Convention at Digby Hall, Sherborne. 12, QRP Convention de-briefing. 19, Using and maintaining oscilloscopes, G7LNJ. 26, On air. Derek, M1WOB, 01935 414452.

Region 12: East & East Anglia

CAMBRIDGE & DARC
13, Assembling your ATU. 15, Fun radio day at Wimpole Hall fete. 20, G3BYW Morse evening. 27, Testing your ATU. Ron, G3KBR, 01223 501712.
CHELMSFORD ARS
3, Constructors' competition. David, M0BQC, 01245 602838.
COLCHESTER RAC
5, The Life of Issac Newton, Tony Dagnal. 19, Talk and Update on APRS, Jonathan, G0DVJ. Andy, M1MOD, 01206 735122.
EAST KENT RS
16, Talk and slide show, crewing a yacht through the French canals. 22, Epsom Radio & Electronics Fair. Paul, G3VJF, 01227 365384, EKRS@paulnic.com, www.paulnic.com/ekrs
FELIXSTOWE & DARS
2, Quiz vs Ipswich Radio Club. 15, East Suffolk Wireless Revival. 16, 'Ultra High Speed Morse', Peter, G3IRQ. 30, Indian cookery, Bharat, M1PDN. Paul, G4YQC, paul.whiting@bt.com
LOUGHTON & EPPING FOREST ARS
13, Preparation for International Museums Weekend. 14, 15, International Museums Weekend GB2BHM from Blake Hall Gardens. 22, Abridge Village Fete GB2AVF. 27, HF on air (from the garden). Marc, G0TOC, 07803 023501.
NORFOLK ARC
4, Informal and CW instruction. 11, Norfolk Repeater Group AGM, NB the Truth, Mark, G0LGJ. 18, Informal and CW instruction, DF evening briefing. 25, Club direction finding contest. Reg, G0VDO, 01603 429269.
RAF RADAR DEFENCE MUSEUM
14, 15, QRV for Museums On the Air Weekend. Terry, G4PSH, terry@g4psh.freeserve.co.uk

Region 13: East Midlands

DERBY & DARS
3, Junk sale. Martin, G3SZJ, martin@martinshardlow.demon.co.uk
EAGLE RADIO GROUP
10, 'Setting up and Operating a Special Event Station', Nevil, G3VDV. G0SWS, 01507 478590.
LINCOLN SHORT-WAVE CLUB
7, 8, Special event station at Brockelsby Park, Grimsby. 14, 15, International Museums Weekend GB2BHM from Blake Hall Gardens. 25, Sports evening at the Golden Eagle. John, G1TSL, 01522 793751.
LOUGHBOROUGH & DARC
3, 'Kites & Aerial Experiments' at the college. 10, 'The Melton FM Local Project', P McCracken, G1SMX. 17, 3rd DF of 2003 on 2m. 24, A night of portable radio, venue TBA. Chris, G1ETZ, 01509 504319.
NORTHAMPTON RC
5, 2m Mobile fun 'foxhunt' in Northampton. Phil, M0CTC, 01604 406887, northamptonradioclub@hotmail.com
RAF WADDINGTON ARC
12, Chairman's lecture, Bob Pickles, G3VCA. 14, 15, Special event station from former RAF wartime station at Wickenby. 28, 29, RAF Waddington Air Show. Bob, G3VCA, 01522 528708.
SHEFFORD & DISTRICT ARS
5, VHF NFD planning. 12, Crock clips and coat hangers: tell us more of your handy hints. 19, Video: DXpedition to South Georgia. 26, Flying at RAF Henlow with Derek, G4JLP. Derek, G4JLP, 01462 851722.

Jim, 2E1GUA / M3GUA, receives the HARIG Challenge Silver Award from Jonathan, G0DVJ.

The HARIG Challenge

Since its 10th Anniversary in 2000, the Harwich Amateur Radio Interest Group (HARIG) has run a small award challenge each year for both members and non-members. The 2002 Challenge Silver award was won Jim, 2E1GUA / M3GUA, a member of the Chelmsford Amateur Radio Society, and he was recently presented with the award by Jonathan, G0DVJ, of HARIG. You can find the results of previous years winners and the rules for the 2003 HARIG Challenge on their website at http://members.lycos.co.uk/harig

Trophy winners at Shefford & DARC's annual dinner

Smiling trophy winners at the Shefford &DARC's annual dinner. Left to right: G4YRF (best club talk), G3JNB (weekend project), G8ATD (major project), G8BEG (services to club) and G4LBH (best kit construction).

Are You Officially an 'Old Timer'?

Interested in the history and heritage of amateur radio? Want to know more about how this fascinating hobby developed? If so, membership of the Radio Amateur Old Timers' Association (RAOTA) is for you. RAOTA aims to encompass all of this by "maintaining the traditions and spirit of amateur radio" mainly via its quarterly magazine OTNews and HF nets. RAOTA is also currently starting to organise regional members' meetings.

Full membership is open to those who have been actively involved in amateur radio for 25 years or more (whether licensed or listener). Associate membership is open to those who do not (yet!) meet the 25 year qualifying period. The annual subs are £8 plus a one-off registration fee of £2 which includes a RAOTA lapel badge.

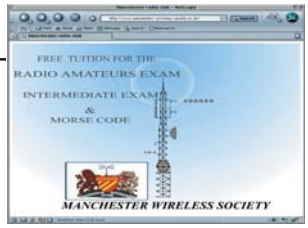
OTNews carries a wide range of articles. A recent issue included articles entitled: 'Amateur Radio Callsign Allocations', 'Interesting Circuits' by G3FEW, 'Memories of an old G' by G3JNJ, 'Relative Field Strengths' by G4VFV, 'The Humble Fuse' by G3FEW and 'Armstrong, the High Fidelity Sound' by Jim Lesurf.

For further details and a sample of OTNews contact Edward Rule, G3FEW, 15 Norwich Road, Lenwade, Norwich, NR9 5S; e-mail edit@raota.fsnet.co.uk or see the RAOTA website at go.to/raota

Successful Foundation Course candidates

The weekend of 12 / 13 April saw the completion of the fifth Foundation Course run by the Glenrothes & District ARC. On this occasion two candidates were successful. This brings the total of successful candidates at club courses to 30.

Keeping it in the Family



Two sisters, Bobbie, aged 12, and Nicola, 13 years old, are the latest to pass the Foundation Course at the Manchester Wireless Society, G5MS. Nicola is an army cadet and her cadet meetings are on the same evenings as the radio club. To allow her to take the Foundation Licence, a special weekend course was held for her and her sister over the Easter bank holiday weekend.

The sisters' father, Steve, M3SGB, is now taking the RAE course at G5MS in time for the December 2003 exam. There are still a few places left for those who wish to join Steve and the others for the final City & Guilds exam. A new Intermediate course also started at the club in May. Further details on the Manchester Wireless Society and the courses offered by the club can be obtained from Ian, M0IPR, tel: 0161 288 7301; by e-mail: secretary@g5ms.com or via the club's website: www.g5ms.com

First Foundation Course for TARS

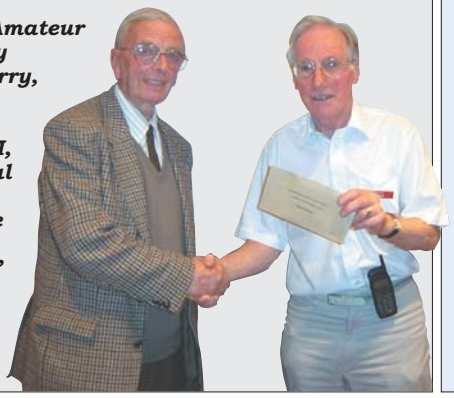
The Torbay Amateur Radio Society (TARS) held its first Foundation Licence course and exam over the weekend of 22/23 March at the 1322 Sqdn Newton Abbot ATC HQ. 13 candidates took part including the Commanding Officer and four ATC Cadets of 1322 Sqdn, with the rest being TARS Club members. The weekend was very successful, with all 13 passing the exam.

L to R: Flt Lt Rick Webb, Brian Miller, John Davis, Cdt Nick Goodwin, John Burham, Cdt Adrian Northcott, Cdt Sgt Stephie Webber, Kelvin Miller, Brian Miller, Cdt Chris Avery, Donna Simms, Eddy Simms and Wendy Buston. The Instructors were Larry, M1ARW (Leader); Derrick, G3LHJ; Alan, M1AVN; Colin, G4FCN and Dave, G6FSP.

Chelmsford's Construction Competition

THE CHELMSFORD Amateur Radio Society (CARS) must be one of the most active clubs in the country at present, regularly attracting in excess of 70 members to its meetings. On 3 June the Chelmsford Amateur Radio Society will be holding its annual constructors' competition. There will be four prizes – 1st, 2nd, 3rd and a 'New Entrant' category for those who've not entered the contest before.

Clive Ward, M0SIX, has been appointed as the CARS Training Officer. Anyone wishing to do the Chelmsford Foundation and Intermediate Training courses which are held at Danbury and Great Baddow should contact Clive, M0SIX, tel: 01245 224577; Mob: 07860 418835; or e-mail: training@g0mwt.org.uk



Chelmsford Amateur Radio Society president Harry, G5HF, presenting Colin, G0TRM, with a special prize for winner of the best 'Alternative Power' entry in last year's constructors' competition.

THE RSGB REGIONS AND DISTRICTS

Region 1 Scotland West & the Western Isles RRM: Gordon Hunter, GM3ULP

Distr. 11	Central, City of Glasgow	DRRM: MM0BHX
12	Lanarkshire, Renfrewshire	DRRM: GM4GZQ
13	Ayrshire, Dumfries & Galloway	DRRM: MM0BRG
14	Dunbartonshire, Argyll & Bute, Western Isles	DRRM: GM3UWX

Region 2 Scotland East & the Highlands RRM: Peter Thomson, GM1XEA

District 21	Highlands	DRRM: GM3WKZ
22	Aberdeenshire, Moray	DRRM: MM0JGP
23	Angus, Perth & Kinross	DRRM: GM4ZNX
24	Fife, Lothian, Borders	DRRM: GM6CMQ
25	Orkney	DRRM: GM7GMC
26	Shetland	DRRM: GM7RKD

Region 3 North West RRM: Kath Wilson, M1CNY / M3CNY

District 31	Cumbria	DRRM: G4USW
32	Lancashire	DRRM: M1SMF
33	Gtr Manchester	DRRM: G4YYB
34	Cheshire, Merseyside	DRRM: G7OBW
35	Isle of Man	DRRM: GD0TEP

Region 4 North East RRM: Geoff Darby, G7GJU / M3GJU

District 41	Northumberland, Tyne & Wear, Cleveland, Co Durham	DRRM: G3ZRK
42	North Yorkshire, East Yorkshire	DRRM: G0VRM
43	West Yorkshire	DRRM: M1BGY
44	South Yorkshire, NE Lincolnshire	DRRM: G3PTV

Region 5 West Midlands RRM: Roy Clarke, M0RLY

District 51	Shropshire, Staffordshire	DRRM: G3FZW
52	West Midlands	DRRM: G8SH
53	Hereford, Worcestershire	DRRM: TBA
54	Gloucestershire, Warwickshire	DRRM: G6RTV

Region 6 North Wales RRM: Liz Cabban, GW0ETU

District 61	Flintshire, Wrexham	DRRM: GW4GTE
62	Conwy, Denbigh	DRRM: GW3RBM
63	Gwynedd, Ynys Môn (Anglesey)	DRRM: GW0ABL
64	Powys	DRRM: GW0RJV

Region 7 South Wales RRM: Ray Ricketts, GW7AGG

District 71	Pembrokeshire	DRRM: TBA
72	Ceredigion (Cardigan)	DRRM: TBA
73	Carmarthenshire	DRRM: GW4RVA
74	Vale of Glamorgan, Cardiff, Newport, Swansea	DRRM: GW0VSW

Region 8 Northern Ireland RRM: Jeff Smith, MI0AEX

District 81	N Belfast, Co Antrim	DRRM: MI5JYK
82	S Belfast, Co Down	DRRM: GI6ATZ
83	Co Armagh, Co Fermanagh	DRRM: GI8RLE
84	Co Londonderry, Co Tyrone	DRRM: GI4YWT

Region 9 London & Thames Valley RRM: Paul Berkeley, M0CJX

District 91	London north of the Thames	DRRM: G3MCD
92	Berks, South Bucks	DRRM: G0SJY
93	Herts, North Bucks	DRRM: G5CL
94	Surrey, London south of the Thames	DRRM: G4FKK

Region 10 South & South East RRM: Ivan Rosevear, G3GKC

District 101	Oxfordshire	DRRM: M3JFM
102	Wiltshire	DRRM: G0GRI
103	East Sussex, West Sussex	DRRM: G4DRV
104	Hampshire, Isle of Wight	DRRM: TBA

Region 11 South West & Channel Islands RRM: Barry Scarisbrick, G4ACK

District 111	Cornwall	DRRM: G3VWK
112	Devon	DRRM: G7SME
113	Somerset, Bristol	DRRM: G0XAY
114	Dorset	DRRM: G0KKL
115	Jersey	DRRM: GJ0JSY
116	Guernsey	DRRM: GU4YOX

Region 12 East & East Anglia RRM: Malcolm Salmon, G3XVV

District 121	Cambridgeshire	DRRM: M0CNX
122	Norfolk, Suffolk	DRRM: G4NZQ
123	Essex	DRRM: M5AKA
124	Kent	DRRM: TBA

Region 13 East Midlands RRM: Bryn Llewellyn, G4DEZ

District 131	Leicestershire, Rutland	DRRM: TBA
132	Lincolnshire, Nottinghamshire	DRRM: G3XZF
133	Derbyshire	DRRM: TBA
134	Bedfordshire, Northamptonshire	DRRM: TBA

Region 14 Overseas

This listing shows the 14 RSGB Regions with their RSGB Regional Managers (RRMs) and, underneath each Region, the RSGB Districts, the areas making up those Districts, and their Deputy RSGB Regional Managers (DRRMs).

Breakdown of the RSGB Regions and Districts, with Regional and Deputy Regional Managers, as of 7 May 2003.

By Carlos Eavis, G0AKI, GB4FUN Coordinator,
c/o RSGB HQ. E-mail: gb4fun@rsgb.org.uk

Education, Education, Education for GB4FUN

GB4FUN's primary focus on education has continued since National Science Week (see *RadCom* May 2003 page 15) with visits to several schools in the Midlands and Mid-Wales.

In April, the RSGB's mobile amateur radio demonstration vehicle spent a day at the Bishop Wilson Primary School in Chelmsley Wood where it was well received by all the pupils and teachers. The younger children showed a flair for Morse that was quite astounding, while the older ones – already familiar with mobile phone text messaging – were surprised to find that they had not invented codes and abbreviations!

The Greswold Primary School in Solihull was the next stop. Both schools had requested a structured programme of 14 half-hour lessons to be carried out in GB4FUN. These started by covering the basics of communications and ended with an opportunity to make a contact on the air. An average of 200 children a day were able to experience amateur radio for the first time and many showed far more than just a passing interest in our hobby. So much so that Mike Johnson, the Head of the Science Department at Greswold, now intends to obtain his amateur licence and put a club station on at the school! A further visit has been booked by this school to concentrate on satellite operation and to give the pupils hands-on experience at setting up and aligning the antenna array. After the visit Mike Johnson wrote: "The whole day was a great success – all the children were absolutely thrilled! What an interesting way to bring the wonders of radio to young people. I have enclosed a few thank you letters from some of the classes who benefited from the experience. Year 6 looks forward to the return of GB4FUN later on in June."

It would seem that the ability of our hobby to educate, not only in communications skills but also languages, geography and space sciences, has not been overlooked by the education authorities.

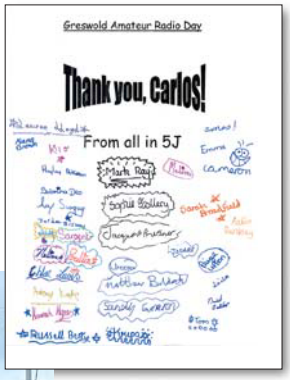
After the successful visit to the principality during Science Week, Careers Wales contacted the Society and requested visits to the Llandrindod Wells and Newtown High Schools, with the specific remit of explaining and demonstrating satellite communications, which is now part of the physics national curriculum at A level. The visit was also to cover the links between amateur radio, industry and careers in the field of communications.

All the schools seemed to relish the opportunity of having communications practically demonstrated. The 'Q and A' sessions continued long after the bell to go home had sounded, which gives a good indication of how interested young people are in our technically-demanding and educational hobby, and which points out that learning can be 'fun' (hence GB4*FUN*).

MoT AND REFIT

The vehicle has just passed its MoT and is mechanically ready for another year circumnavigating the United Kingdom. At the beginning of May there will be a refit of some of the equipment in GB4FUN. It is proposed to re-cable the existing equipment to reduce some of the RF feedback problems that have been experienced, and to make external connections for the feeders to speed up set-up time and to reduce the amount of feeder that needs to be installed manually. Some of the current equipment will be relocated to facilitate demonstrations and operating. It is hoped that before the summer an ATV display will also be installed. The initial phase of this will consist of a camera on a remote-control car sending live video back to GB4FUN. The next phase will be to have video and audio fed back to the classroom during lessons to allow the demonstrations to be viewed by a wider audience.

The GB4FUN website (www.gb4fun.org.uk) is also being revamped to give educational establishments and other interested parties a better idea of the technical parameters of the vehicle and exactly what GB4FUN has to offer and how it can be presented to them. ◆



'Thank you' letter from the children of Greswold Primary School, Solihull.

Left: GB4FUN with all its antennas in situ on a recent school visit.

The GB4FUN Supporters' Honour Roll

We asked members when renewing their membership to include a donation to help to continue to finance the GB4FUN mobile amateur radio demonstration vehicle. 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 'GB4FUN', c/o RSGB HQ.

GB4FUN 'Big Hitters'
Foundation Candidates – Beacons, Frodsham, plus

A M Millard	2E1TNE
A F Hayton	RS95170

N J Sherwood	G0CMK
R Wright	G0EEN
J R M Bumford	G0GTN
B Vaughan	G0VJB
D D Rolph	G3DXD
R Kelly	GM0GRD
B H Giles	M0BHG
H Broyles	M0CPE
W H Bosworth	M0DVG
M Lawson	M1MCL
C J Curtis	M3ZDC
S H P Spence	MM0DGI
J E Bence	MM3JSB
S M Martin	MM3TIA
T Coates	RS177805
A Tomlinson	RS180921
D J Edwards	RS51202
I McLean	VK3JQ

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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YAESU FT-1500M	2M MOBILE TRANSCEIVER	129.00
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KENWOOD TS-680S	HF + 6M TRANSCEIVER	475.00
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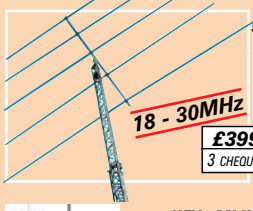

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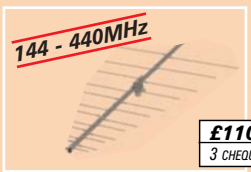

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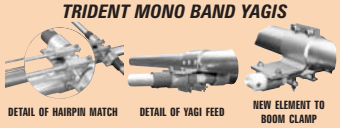

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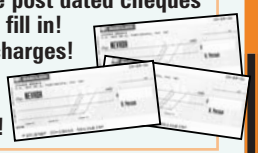

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- Dual roller balanced L antenna tuner
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- Total inductance of 44uH for extended range on 160m
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- Two edge-wound silver plated ball bearing drive roller inductors driven synchronously with a toothed fibreglass belt
- New low minimum variable capacitor with vernier drive
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(Power supply not included)

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Aerial Hassles and

One of the great advantages of being a member of the Society is that you can take advantage of the expertise of the RSGB Planning Advisory Committee (PAC) and Planning Panel. Ian Barraclough did just that and tells this story, with a happy ending.

I have always had problems with aerials. When I first gained my licence in 1988, I was living with my parents. Persuading them to let me put external aerials on the house was hard going, but after I had shown my dedication by studying for the RAE and then getting the licence, they relented, and a scaffold pole was mounted on T & K brackets on the back of the house. This carried a Ringo Ranger aerial which I used for local 'nattering' on 2m. The DX bug caught and the vertical was joined by a 10-element beam and rotator. The scaffold pole eventually got higher and higher in the brackets until the inevitable happened. One particularly windy day I returned from work to find my aerials in the garden, my radio jammed hard against the window frame by the taught coax line and a large pile of rubble on the patio. I learned an important lesson the hard way.

After the house was rebuilt, new aerials went up but this time the brackets were spaced further apart, thus displacing the load over a greater area. In the next few years I moved house a number of times, and only bothered putting aerials up on one of them, which was fine until the mast snapped in a gale and all that lovely aluminium was mangled once more.

TIME TO MOVE HOUSE

My main criterion for the next move, as this was to be our first house purchase, was a reasonable take-off. Up here in Yorkshire, 'good take-off' generally means on the top of a hill. This also means high winds – very high winds. Also, my aspirations for radio were increasing. The VHF beam would still be there, but I now also wanted a tribander to explore the HF bands. I want to try EME as well, so the solution had to be 'future proof'.

As the house has no gable ends the only realistic way of getting the metalwork up was a telescopic mast. After some searching, I dropped lucky when a friend sold me his nearly new 45ft wall-mounting Versatower, complete with rotator and tribander, for a very reasonable fee. One cubic metre of concrete later, the tower was up.

THE DREADED LETTER ARRIVES

I left it like this for a few weeks for people to get used to it before mounting the head unit, stub mast (scaffold pole) and a 14-element 2m beam. I should also point out I also had a Cushcraft R5 vertical at the top of the garden. Three weeks after the beam went up I received a letter from the council. The "alleged unauthorised development – erection of masts" letter gives you three options. One is to prove to the council that you have, or do not need, planning permission for the development. One is to take everything down within 14 days. The final option is to apply for full planning permission.

I chose the latter, but was concerned by a comment on the letter stating that "Initial comment on the masts is that they are large and prominent and out of scale with the existing residential properties and that planning permission may not be granted". Talk about a red rag to a bull! The fight was on, but how best to arm myself? The best weapon is information, so I found out all I could. This involved going to the council to talk to the planning enforcement officer to try to ascertain who had reported it and why. Whilst she couldn't tell me exactly who it was, she made it clear it was a local resident.

I posted a mail on a UK radio e-mail reflector and received about 20 replies, all of them from people who had had similar experiences, and how they had resolved them. There was about a 50/50 split of people who had won and lost planning battles, but all information was good information.

THE APPLICATION

I raided the RSGB Planning Advisory Committee website [1] and downloaded the available literature, rereading it until I could recite it. I then followed the advice given in the RSGB *Planning Permission – Advice to Members* booklet, added a few bits of my own and settled on a plan.

Firstly, I removed the R5 as by now I

What the RSGB planning advisory committee can do for you

Q. When should I consider applying for permission?

A. If you want a limited set of aerials, live in a relatively lowly populated area and get on with the neighbours, you may never encounter the planners. If you are about to make a significant investment (like buying a tower) then it's probably worth seeking planning permission, especially if you have, or have had, EMC problems and / or live in a densely populated area.

Q. When might I have to apply?

A. If you have put up an aerial system and someone reports you to the planners, you are likely to get a letter or visit from an enforcement officer. Unless the system is small, or has been in place unchanged from more than four years, you are likely to end up making an application (or awaiting an enforcement notice which you'll then have to appeal).

Q. What help is available?

A. Before doing anything, read carefully the booklet published by the RSGB Planning Advisory Committee. This is available on the members-only part of the RSGB website [2] or in hard copy format upon request from HQ. Most questions are answered in the booklet. If you need more help, HQ will allocate you to a Panel member. Panel members have experience of helping other amateurs obtain permission. They will offer advice and guidance on a one-to-one basis to help you through the process. The booklet and advice service is available to members only. Prior discussions with the planning officer can also be helpful - most planning officers are amenable to discussion and negotiation.

Q. Why are neighbours important?

A. Virtually all aerials come to the planner's attention because a neighbour complains. And the best proof that an aerial has been up for four years and is therefore immune comes from a neighbour. So do everything you can to keep in with the neighbours, and particularly make sure they will tell you of any EMC problems and then do your best to fix them. Always tell your neighbours what you are doing before you do it. A neighbour pre-warned is much less likely to complain.

Q. Are tenants in a different position?

A. Yes: virtually all aerials will need the landlord's consent, and may also need planning permission.

Q. And how likely is it that I will obtain planning permission?

A. As a matter of planning law, the presumption is in favour of the development – this means the planners need to have good reasons before they can refuse permission. And you can appeal against the refusal of permission. Experience is that most amateurs, with reasonable expectations, and who follow the advice in the booklet do either escape the need to apply or get permission.

Q. Can I help out?

A. The PAC Chair is interested in recruiting additional Panel members: if you have experience of planning process, please e-mail pac.chairman@rsgb.org.uk

By Ian Barraclough, G7DWY/MOINB.
E-mail: G7DWY@Blueyonder.co.uk

Planning Permission

had the tribander up on the mast. This, I feel, showed willing and was certainly favourably received by the planning enforcement officer. Next, I printed about 30 letters to the planning officer, as detailed in the *Advice to Members*. I then went door knocking around the neighbours. Houses on both sides of the street, 10 doors up and down, until all the forms were filled in. Thankfully all the responses were positive. This also gave the neighbours a chance to ask all the "what the…" questions. Take some time doing this. Prompt them to ask questions and answer them honestly. If they have misgivings about RFI, placate them with the answer, "If I cause you problems let me know, and I'll sort it". Prompt them to pinpoint times so you can cross-check with your logbook and work out where the interference is coming from.

It was at this stage I got a bit nervous. I thought I was doing everything right, but just to make sure I contacted the planning panel, who put me in touch with a planning advisor. I only had cause to ring him once, and discuss the case at length, but knowing you have direct access to an expert is very reassuring.

Thankfully, I have access to CAD at work and was able to produce a full set of drawings for the installation. If you do not have access to CAD, I would recommend you employ the services of a professional. I believe that if you present professionally drawn drawings it shows commitment. It also makes the council's work easier. Hopefully, the easier their job, the more favourable the outcome!

The next stage was to photograph the mast from every angle, wound up and down. I submitted 23 photographs with my application. You need to appreciate the council do not come across this type of application every day, so I produced guidance notes for the planner. Within these notes I apologised for not applying for planning permission before erecting the mast, pointed out the removal of the R5, gave the name and address of the person I bought the mast from, where he had had full planning permission for it, and pointed out a number of installations in the vicinity that had received permission.

I also added a very important piece of information: that, by virtue of the experimental nature of the hobby, the actual aerials will vary, although no single aerial shall be larger than the tribander. Well, wouldn't it be annoying if you had to take down the EME array, and the mast, because you'd just infringed the planning permission? I also added two clauses to 'soften the blow'. One, that unless in active use by myself the mast will be in its lowest position. This was more common sense, bearing in mind the wind problem. The second was that the planning permission was not transferable, ie when I move the mast comes with me and the permission is revoked. I thought these fair compromises. I also got a letter of backing, addressed to the chief planning officer, from the RSGB.

Top: The mast extended, from the end of the lane.

The completed application was submitted on 27 February, in quadruplicate. All four copies were bound and submitted in book form with plans, photos, recommendations etc. Within three days the planning notices were mounted on the property and I received a letter stating I would have an outcome by the end of May. A fortnight later I had a visit from the planning officer who wanted to see the mast up, down, aerials turning etc. I had to repeat the process a fortnight later for a representative of the environmental health department, who was most concerned that the winch might make noise at 2.00am if I decided to wind it up!

RESULT!

Then all went quiet. I could have hassled them, but what was the point? I had the mast up. I actually forgot about it when, at the end of October, my wife telephoned me at work to say a large package had arrived from the council. I didn't want to wait, so I had her open it. Full, unconditional planning permission received. Result!

None of the neighbours notice it now. The tribander and 2m beam are still up, but not for much longer: that EME thing still haunts me, and now I'm doing something about it.

With hindsight, I went about things in a very daft manner: I should have applied for the permission *before* putting the mast up. Thankfully it is still possible to get planning for unorthodox developments, even in an area with a reasonably strict attitude to planning.

I wish to thank Bob, G1ZJP, and Alan, G4PSU, for the detailed information they supplied on e-mail, the RSGB Planning Advisory Committee for some excellent guidance notes and especially Geoff Pendrick, M5GAC, for his advice on the end of a telephone line. If anyone wishes to see the application, especially the 'guidance notes' I produced for the council to go with the application, I will be happy to forward them by e-mail. ◆

WEB SEARCH

[1] RSGB Planning Advisory Committee: http://www.rsgb.org/society/pac.htm
[2] Webplus (RSGB members-only website): www.rsgb.org/membersonly

Epsom Radio and Electronics Fair Sunday 22 June

The Epsom Radio and Electronics Fair, organised by Radio Fairs, takes place on Sunday 22 June at Epsom Racecourse, Epsom Downs, Surrey.

Above, right: The splendid trophy and valuable prizes up for grabs in the RSGB National Construction Competition.

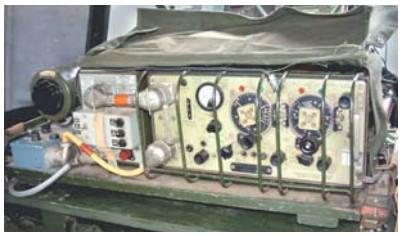
The Epsom Radio and Electronics Fair will be officially opened by RSGB General Manager, Peter Kirby, G0TWW. Doors open at 10.00am and the fair closes at 5.00pm. The event features all the usual trade stands, an RSGB bookstall and membership information stand – and lots more besides.

We asked the organisers how the Epsom Radio and Electronics Fair came about. They replied: "Early last year a group of radio amateurs sat in a pub in Surrey bemoaning the loss of the Sandown, Brighton, Woburn and Longleat rallies. 'Why don't we do our own?' one of them suggested, 'let's make it a bit special too.' A few months later the first Epsom Radio and Electronics Fair opened its doors, proving extremely popular with those who ventured to the racecourse at the top of Epsom Downs." Their aims this year, as last, are:

- To provide an event for the south of England on a long-term basis;
- To further the art of amateur radio and to provide a day of fun for the attendees;
- To encourage non-radio amateurs to attend the rally, especially the younger generation; and
- To promote Morse testing by way of free entry to the event.

Epsom Downs Racecourse is easy to find and there is more than enough free parking. We said there's lots more than just the usual trade stands. Let's take a look at what the Epsom Radio and Electronics Fair has to offer.

Band leader Ken Mackintosh, M0COR, will be entertaining the crowds.



Top: The main grandstand at Epsom. Middle: An aerial view of the Epsom racecourse. Bottom: The Vintage Military Amateur Radio Society will be providing a display of vintage military vehicles and radio equipment.

RSGB NATIONAL CONSTRUCTION COMPETITION

The RSGB, in conjunction with the organisers and the Surrey Radio Contact Club, is staging a National Construction Competition that will be open to all. It's free to enter; judging will be by David Bowman, G0MRF, and Robin Sykes, G3NFV. Top prize in the 'adult' section is a Yaesu FT-817 and a splendid trophy. First prize in the 'under-16' category is a Yaesu VR-120D, and both radios have kindly been donated by Yaesu (UK) Ltd. Second-place prizes are being supplied by bhi, which is donating two NES-10 Noise Eliminating Speakers. RSGB General Manager Peter Kirby, G0TWW, will be presenting the prizes as well as opening the rally.

The competition rules can be found on page 5 of February's *RadCom* or on the organiser's website at www.epsomrally.co.uk Full consideration will be made for the age of the contestant, originality, quality of build, external appearance, novel techniques and use of homemade parts. Come along and join in the fun; it is hoped that there will be many interesting entries from both novices and the more experienced constructor.

Entry forms are available on the day so it's still not too late to polish up your soldering iron and get constructing!

MORSE TESTING

George Eddowes, G3NOH, and his team will be carrying out 5WPM tests and Foundation Morse Assessments throughout the rally. The testing facility will be set up in quiet, private rooms. Anyone taking the Morse test, whether they pass or fail, will receive a refund of his or her rally entry fee on production of his or her Morse test receipt.

SPECIAL ATTRACTIONS

Coulsdon Amateur Transmitting Society will be providing a specially themed WWII talk-in station, using the callsign GB2ERT, to complement a display of vintage military vehicles and equipment being shown by the Vintage Military Amateur Radio Society.

World famous jazz musician Ken Mackintosh and his big band will be helping to launch the show with a New Orleans style march-past and several swinging sets throughout the day. As well as leading his big band Ken also likes to operate on the amateur bands using his M0COR callsign. The internationally renowned saxophonist and band leader formed his first orchestra back in 1949 and has been bringing pleasure to audiences with his distinctive sound ever since. Ken and his band will be playing near the restaurant area – be sure not to miss them!

There is a large outside sale area and people wishing to set up shop are welcome to turn up on the day. Pitches cost from £15.00, depending on vehicle size, no pre-booking is required but it would help the organisers if you could drop them an e-mail to outsidesale@epsomrally.co.uk if you're thinking of coming along. Take the opportunity to clear out the garage and make a few bob into the bargain! ◆

RSGB 'MEET AND GREET' AREA

Following the success of the RSGB members-only 'meet and greet' area at the Kempton show in April, the RSGB is once again providing an area at the Epsom Radio and Electronics Fair where RSGB members will be able to 'meet the RSGB' in a convivial atmosphere. The RSGB will be represented by General Manager Peter Kirby, G0TWW; *RadCom* Editor Steve Telenius-Lowe, G4JVG; and by Deputy Regional Managers and Committee Chairmen.

RSGB President Bob Whelan, G3PJT (second from left), deep in conversation at the RSGB 'meet and greet' area at the Kempton Park show in April.

SUNDAY, 22ND JUNE 2003

EPSOM RADIO & ELECTRONICS FAIR

FREE PRIZE DRAW
WIN A VX7R
SPONSORED BY YAESU

Our Fair at Epsom Racecourse will be officially opened by the RSGB General Manager, Peter Kirby. Come along to see this national Fair to enjoy a fun packed day.

- MAJOR PARTICIPATORS SUCH AS ICOM, YAESU, KENWOOD, ML&S, W&S, RSGB, RA, ETC
- RSGB CONSTRUCTION COMPETITION
- RSGB MEET AND GREET AREA
- LARGE OUTDOOR SALE FOR PRIVATE & COMMERCIAL TRADERS (BOOK ON THE DAY)
- BRING AND BUY SALE

RSGB · YAESU · KENWOOD · WATERS & STANTON · MOONRAKER

- ENTERTAINMENT BY KEN MACKINTOSH AND HIS BIG BAND
- TALK ON NOISE REDUCING SPEAKERS BY BHI
- WORLD WAR 2 OPS ROOM DISPLAY FOR TALK IN ON 2M
- INDOOR DISPLAY OF MILITARY COMMS. VEHICLES
- MORSE TESTING WITH FREE GATE ADMISSION TO CANDIDATES
- OPEN FROM 10.00AM TO 5.00PM. ADMISSION £3.50 (£3.00 AFTER 12.30) FREE TO STUDENTS AND CHILDREN

ICOM · ML&S

For bookings and further information see our web site www.epsomrally.co.uk

or Tel/Fax: 01737 279108 - Email: m0cjx@lineone.net

RadioFairs .... Total commitment to the Hobby

The royal international air tattoo 2003

19–20 July, RAF Fairford, Gloucestershire. Join 200,000 Other Spectators at Europe's Biggest Airshow!

Despite the current world situation, the Royal International Air Tattoo (RIAT) 2003 is going ahead at RAF Fairford, Gloucestershire, on **19 and 20 July**. Deployment of UK Armed Forces to the Gulf region has led to the postponement until next year of 'Defence 2003', billed for RIAT this July. Airshow organisers, however, have a very upbeat message. The show is 'on' and it is anticipated that Europe's biggest tribute to a century of aviation will attract over 200,000 spectators!

It will be 100 years in December since Orville Wright made his record-breaking 12-second, 120ft-long flight, thus opening the door to today's long-haul air travel and the exploration of space. The centenary is celebrated at RIAT2003 with nearly 190 aircraft in the RIAT '100 Years of Flight' line-up, including a star appearance by the Eurofighter Typhoon. This futuristic RAF front-line jet will be on the ground for a close-up view of its sleek 21st century lines.

This year, *RadCom* is running a competition in association with the Royal Air Force Benevolent Fund, the registered charity that is supported by the Royal International Air Tattoo. We have 15 pairs of adult admission tickets, worth a total of nearly £1000, to give away.

FLYING DISPLAY

RIAT2003 will feature breathtaking flying displays from 10.00am to 6.00pm, with sensational solo jet and helicopter routines, vintage planes, gliders and a spectacular airborne performance by the RAF's newest jet, the Eurofighter Typhoon.

Always a crowd-thriller, the nine members of the magnificent Red Arrows display team will once again be in action in the skies over RAF Fairford. Look out too for the national aerobatic teams of many other countries – in total over 30 nations will fly in for what is Europe's biggest airshow.

It's not only the 100th anniversary of flight itself, but also the 60th anniversary of the Battle of the Atlantic this year. International maritime and Search & Rescue units that patrol the Arctic Circle to the southern oceans will fly into Fairford to pay tribute to the veterans of RAF Coastal Command on this anniversary.

OTHER ATTRACTIONS

RIAT2003 is not just about spectacular flying shows and static displays. With hot air balloons, exciting virtual reality rides and hundreds of stalls and exhibits, there's something for all the family.

A two-hour concert performed by military bands commences around 6.00pm at the end of the flying display. The concert features 1940s 'swing', the classics, hits from the last 100 years and culminates in Tchaikovsky's 1812 overture, complete with Army cannon.

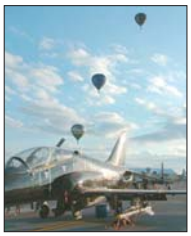
GETTING TO RIAT2003

RAF Fairford is located near Swindon on the Wiltshire/Gloucestershire border and is well signposted on all major routes. This year, a new traffic plan is being put into place to speed vehicle flow, and improvements have been made to car parking arrangements. Gates open at **7.30am** on both Saturday and Sunday, **19 and 20 July**.

Frequent shuttle buses will run from Swindon bus station to RIAT, taking around 40 minutes each way. The first bus leaves Swindon at 7.30am and last bus returns from RAF Fairford at 8.00pm (adults £5.00 return, children £2.50). Plans are also underway for the introduction of a comprehensive 'park and ride' scheme from Swindon.

If you're not one of the lucky winners of our competition, RIAT2003 tickets cost £27.95 in advance or £33.00 on the day (children 15 and under free if accompanied by an adult). Advance tickets can be purchased from the Royal Air Force Benevolent Fund on tel: 0870 758 1918, from www.airtattoo.com or from branches of Waitrose and Stroud & Swindon Building Society.

For further details about RIAT2003 see www.airtattoo.com ◆



Competition!

Win a pair of adult tickets to the Royal International Air Tattoo 2003!

Would you like to join the estimated 200,000 spectators expected at RAF Fairford for Europe's biggest airshow? Thanks to the Royal Air Force Benevolent Fund, **15 pairs of adult tickets worth £66.00 per pair can be won** in the RadCom / RIAT2003 competition. With 15s and under going free when accompanied by an adult, we're offering you the chance to win an exciting day out for the whole family. We would ask those of you who enter the competition to ensure that, should you be one of the lucky winners, you are in fact able to attend the show on either 19 or 20 July, so as not to disappoint others who might wish to go. Look at the three questions below. Write your answers on a postcard or the back of a sealed envelope (no letters accepted) and send them to: RIAT2003 Competition, RSGB HQ, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Don't forget to include your own name and address! The **closing date** is first post on Monday 30 June 2003.

QUESTIONS:

1. **How many years of flight will be celebrated at RIAT 2003?**
2. **The Royal International Air Tattoo is held in support of which charity?**
3. **How many Red Arrows fly in the display?**

ONLY ONE ENTRY PER READER (MULTIPLE ENTRIES WILL BE DISQUALIFIED). NO OTHER CORRESPONDENCE CAN BE ENTERED INTO. ALL ENTRIES WILL BECOME THE PROPERTY OF THE RSGB; PLEASE STATE ON YOUR ENTRY IF YOU DO NOT WISH TO RECEIVE FURTHER PROMOTIONAL MATERIAL OR OFFERS FROM THE RSGB. EMPLOYEES OF THE RSGB ARE NOT ELIGIBLE TO ENTER. THE WINNERS WILL BE THE FIRST 15 CORRECT ENTRIES DRAWN AT RANDOM. THE DRAW WILL TAKE PLACE ON 30 JUNE 2003.

ICOM

IC-E90

THE IC-E90 - YOUR NEW GO-ANYWHERE POCKET-PAL

The IC-E90 multiband handheld transceiver from Icom covers 50MHz, 144MHz and 430MHz bands. The IC-E90 is equipped with a wide- band receiver covering 0.495-999.990MHz in AM/FM and WFM modes. If that isn't enough, the IC-E90 comes as standard with a 1300mAH Li-Ion battery, this is ideal for long operating periods and provides 5W output in all bands!

All of these great features are built into an ultra compact body, measuring only 58x87x29mm - just look at the list..!

- 50MHz, 144MHz and 430MHz multiband with 0.495-000.990MHz wideband receiver.
- 5W output on 50MHz, 144MHz and 430MHz.
- High-power capacity, long-life Li-Ion battery pack supplied as standard.
- Compact and rugged construction.
- Water-resistant construction equivalent to JIS4.
- a total of 550 memory channels.
- Adjustable 12 tuning steps and automatic tuning.
- Auto-squelch and squelch monitor functions.
- Highly functional keypad provides simple and intuitive operation.
- DTCS, CTCSS tone and pocket beep.
- Automatic power-saver function.
- DTMF encoder with 10 (16 digits) DTMF memories.
- LCD and keypad backlighting with timer.
- 2 VFO (A/B) for split frequency operation.
- FM narrow mode available.
- ±5kHz fully adjustable RIT and 10dB attenuator.
- Dial speed adaptive tuning.
- 5.5-11.5V DC is acceptable as an optional external power supply.
- Tip-replaceable antenna (FA-S6270D) available for wideband operation.

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e-mail: info@icomuk.co.uk ...or visit our website: www.icomuk.co.uk

Count on us!

Book and CD Review

THE RSGB RIG GUIDE

Edited by Steve White, G3ZVW
Reviewed by RSGB HQ Staff

The RSGB Rig Guide is the publication intended to help you decide what amateur radio equipment is right for you, what you should expect to pay for it (new and used) and how to sell it. It also tells you which items have been reviewed in *RadCom*.

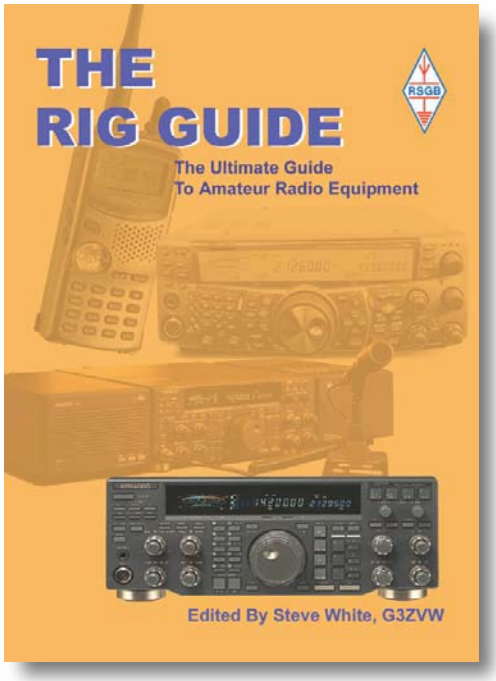
The RSGB Rig Guide contains three main sections: an introduction, the main listings, and a review section.

In the introduction section you will find information about how to use the equipment listing and price guide, numerous tips on buying, selling and trading-in equipment, and a glossary explaining the abbreviations and terms used.

The main 'Listings' section contains an extensive directory of currently-available commercial transceivers, receivers and linear amplifiers, plus many of the more popular discontinued models. In all, over 270 items of equipment are listed and each item is pictured and described. Here is an example of the information given, which is typical of each listing. This one is for the Yaesu FT-817:

"HF-VHF-UHF multimode portable transceiver. SSB/CW/AM/FM/WFM. 208 memories. Scanning functions. CTCSS. DCS. Built-in keyer. Programmable tuning steps. Spectrum scope. PC interface. Optional narrow filters. Output power: 0.5W/1W/2.5W/5W (maximum 1.5W on AM). Frequency range: 1.8MHz – 440MHz Tx (amateur bands). 100kHz – 56MHz, 76MHz - 108MHz, 108MHz – 154MHz and 420MHz – 470MHz Rx."

The 'price guide' given for each piece of equipment will be particularly helpful to those wishing to trade up to a new piece of equipment, or those simply looking to pick up a bargain at a rally. For example, the Kenwood TS-870S is listed as £1400 – £1500 to buy new, £950 – £1050 second hand (the price you are likely to pay from a retailer – if buying privately the price is likely to be lower), and £700 for cash trade-in (the price you might expect to be offered for your equipment if you offer it to a retailer for cash).



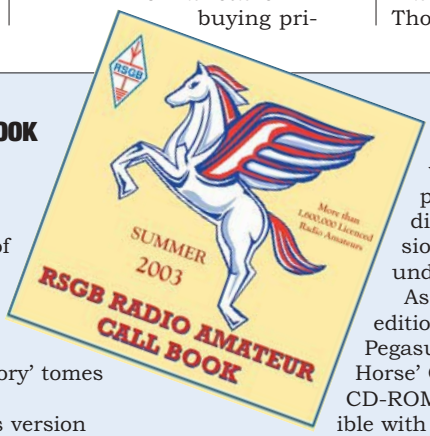
At the back of the book, the 'Reviews' section contains reprints of *RadCom* reviews of many items of equipment. Those reviewed include the Yaesu FT-817; Icom IC-756PROII; Kenwood TS-2000; Icom IC-T3H 2m handheld; Yaesu VR-5000 LF to microwave receiver; Alinco DX-70TH HF/6m mobile transceiver; and, very usefully, a four-way comparison of VHF/UHF hand portables (the Alinco DJ-V5E, Icom IC-T81E, Kenwood TH-D7E and the Yaesu VX-5R).

All-in-all, *The RSGB Rig Guide* is intended to help you get the most from amateur radio, without paying too much for the privilege. It is highly recommended for anyone who is likely to buy or sell any amateur radio equipment in the foreseeable future, or for anyone who simply enjoys mooching around amateur radio rallies! At just £3.99 including postage it also represents superb value for money.

THE RSGB RIG GUIDE
80 pages, A4 magazine format
Edited by: Steve White, G3ZVW
Published by: RSGB
Price £3.99 inc P&P
Available from: The RSGB Shop

RSGB RADIO AMATEUR CALL BOOK (SUMMER 2003) CD-ROM

Reviewed by RSGB HQ Staff.



This call book is the offspring of the world-renowned Pegasus 'Flying Horse' Callbook in CD-ROM form. Everybody knows its predecessor, and some may even have the 'telephone directory' tomes in their shacks.

So what's different about this version on CD-ROM? The main difference involves the radio amateurs on this side of the Atlantic. In the past, users had found the *Radio Amateur Callbook* somewhat lacking in up-to-date information on non-US stations and in particular UK calls. That has now been corrected by the RSGB, and the information UK and world-wide is now as up-to-date as is possible in these days of the information revolution. It is now truly the RSGB World Call Book.

When placing the disc into the drive for the first time, it will auto-run if the user has that option enabled in *Windows*. A series of choices is then offered, enabling the user to decide whether to copy the contents of the whole disc to the computer's hard disc, or to access the CD every time information is needed. In the latter case, nothing is copied to the hard disc and no installation is needed. This is the option I chose. 32-bit and 16-bit versions are provided on the disc, as is a version to run under *MS-DOS*.

As with previous editions of the Pegasus 'Flying Horse' Callbook on CD-ROM, it is compatible with all major logging software.

The user interface of the CD-ROM is exactly the same as in previous issues and, at the basic level, all you have to do is to type in a callsign and the details of the station appear in the same window. Two databases are available, the 'US Database' and the 'International Database', totalling some 1.6 million callsigns. The system will switch automatically from one to the other as soon as the callsign is entered.

If the US Database is selected, searches can be made for Name, County, City, or ZIP code. If a callsign is not found, the nearest to it will be displayed, with a warning that this has occurred. The database can be browsed in increments of ±1, ±10, ±100 and ±1000 entries. On locating a callsign, a map can be called up, showing the position of the station (again, for US entries only). There are maps for other countries, too, but these are not animated. You can print out an address label if required.

All the facilities included on the disc are too numerous to list, but special mention should be made of the Beacon Scheduler. This lists all the NCDXF/IARU beacons and their schedules. If your computer clock is set accurately to GMT (preferably to the nearest second), the callsign, location and frequency of the beacon currently transmitting is highlighted on the list. All you need to do is to tune to the NCDXF frequency on the band of your choice and listen. When you hear a signal, look at the display and you will see which station is transmitting, and where it is. This can be shown in map form also. No knowledge of the Morse code is required!

In many cases, I prefer to browse a book rather than a CD-ROM but, when searching for callsigns and other associated data, the electronic method wins hands down. Here, at last, is a call book which is not unduly biased towards any particular area of the globe.

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5W Power output (AM 1.5W carrier)
Internal battery

FT-857

ALL MODE HF/VHF/UHF
HF/6m 100W, 2m 50W, 70cm 20W
External battery 20W (10W 70cms)

FT-897

ALL MODE HF/VHF/UHF
HF/6m 100W, 2m 50W, 70cm 20W
Internal battery 20W (10W 70cms)

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Paice Lane, Medstead, Alton, Hants GU34 5PR.

Yaesu FT-857 HF/VHF/

Hard on the heels of the recent FT-897 comes the FT-857 ultra-compact transceiver from Yaesu. Virtually identical to the FT-897 in terms of features, circuitry and most of the software, the FT-857 has been engineered to provide a smaller unit adapted to the needs of the mobile user.

In many ways the FT-857 replaces the FT-100, being similar in size, concept and features, and is also provided with a detachable front panel for remote mounting. The radio was available in the US for a few weeks prior to release in the UK, but the UK-sourced model is fully CE approved and supplied with DSP as standard. I eagerly collected the radio from Yaesu on the same day that they received their first shipment.

A full review of the FT-897 was recently published in *RadCom* (April 2003) and the description of the features given also applies to the FT-857. To avoid unnecessary duplication, only a summary of the key features is given in this review; please refer to the FT-897 review for more in-depth information.

BASIC FUNCTIONS

The FT-857 provides all the functions of a fully-featured HF and 50MHz transceiver with a 2m and 70cm multimode together with coverage of the broadcast FM/AM and aircraft VHF AM bands and all this in a unit measuring only 155W x 52H x 233Dmm. It is slightly larger than the earlier FT-100, a little deeper with a similar front panel area but is lighter, at 2.1kg. The radio is powered from a nominal 13.8V supply with a current consumption peaking 22A. SSB, CW, AM and FM modes are provided with extensive capabilities for digital modes accommodating both AFSK (RTTY/PSK-31 etc) and FM (Packet) based systems. The transmit power output is 100W maximum on HF/6m, 50W on 2m and 20W on 70cm.

The radio is very ruggedly constructed on a diecast aluminium chassis with two internal cooling fans and a rather small 55mm diameter speaker in the case top. Layout of the main PC boards is virtually identical to the FT-897. Two antenna sockets are provided, an SO239 for HF/6m and a type N for 2m/70cm. Other connectors on the rear panel provide external speaker and key jacks, two mini DIN connectors for data input and control, and DC power input on a flying lead. Control and power is provided for the ATAS-100 and ATAS-120 mobile antenna systems covering all bands from 40m to 70cm. The ATAS-100 was reviewed together with the FT-100 in the June 1999 issue of *RadCom*. The ATAS-120 is a later model with a faster tuning time. Both models tune automatically using motor driven adjustment of the antenna length.

The front panel of the FT-857 may be unclipped and mounted remotely from the main body of the radio. This enables mobile operation where space is very limited or removal when unattended to deter theft. Data is communicated between the main unit and the front panel via a separation cable at 31.25kbps. A separation kit is available from Yaesu as an extra. The microphone plugs into a recess in the main body of the radio, having first removed the front panel for access. Both the microphone and separation cable use RJ telephone style connectors. The radio is provided with a standard hand microphone, MH-31, but alternative DTMF keypad microphones, MH-36 and MH-59, are also available as extras. The MH-59 is new providing full remote control of all the main functions of the radio directly from the microphone. It is bristling with buttons and even contains a rotary control for tuning and channel selection.

Yaesu's current range of HF transceivers has been developed around two different platforms. The high performance platform forms the basis of the FT-1000MP series. The standard platform covers the FT-817 portable, FT-897 transportable and now the FT-857 mobile transceiver. This platform adopts a double conversion superhet architecture with IFs of 68.33MHz and 455kHz, a common first mixer and all downstream circuitry for all bands HF to 70cm, a common transmit path for all bands

YAESU FT-857 MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

	SENSITIVITY SSB 10dBs+n:n		INPUT FOR S9	
FREQUENCY	PREAMP IN	IPO	PREAMP IN	IPO
1.8MHz	0.18µV (–122dBm)	0.4µV (–115dBm)	7µV	22µV
3.5MHz	0.16µV (–123dBm)	0.35µV (–116dBm)	9µV	25µV
7MHz	0.14µV (–124dBm)	0.35µV (–116dBm)	8µV	22µV
10MHz	0.14µV (–124dBm)	0.35µV (–116dBm)	8µV	25µV
14MHz	0.14µV (–124dBm)	0.32µV (–117dBm)	6µV	18µV
18MHz	0.14µV (–124dBm)	0.28µV (–118dBm)	5µV	16µV
21MHz	0.14µV (–124dBm)	0.32µV (–117dBm)	6µV	16µV
24MHz	0.14µV (–124dBm)	0.32µV (–117dBm)	6µV	18µV
28MHz	0.14µV (–124dBm)	0.32µV (–117dBm)	6µV	16µV
50MHz	0.1µV (–127dBm)	0.2µV (–121dBm)	4µV	13µV
144MHz	0.13µV (–125dBm)	–	3µV	–
432MHz	0.13µV (–125dBm)	–	3µV	–

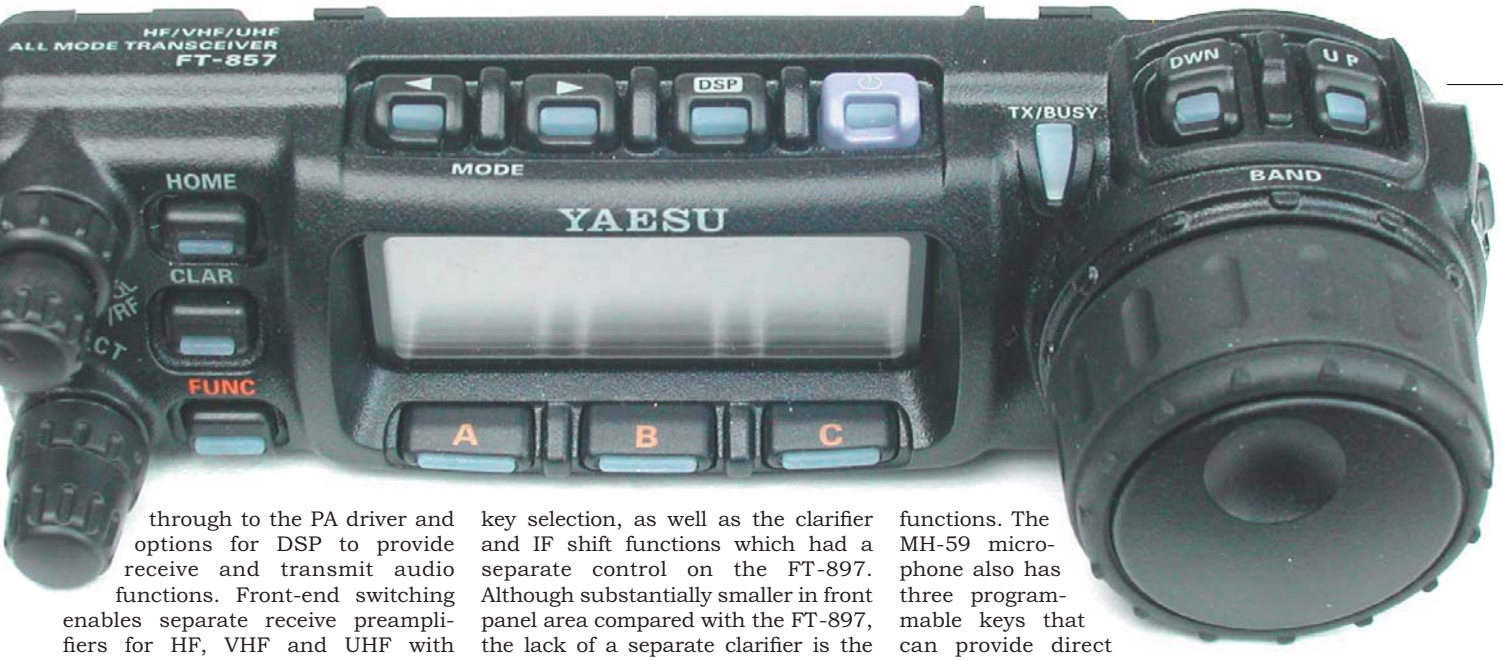
AM sensitivity (28MHz): 0.7µV for 10dBs+n:n at 30% mod depth. **FM sensitivity (144MHz):** 0.16µV for 12dB SINAD 3kHz pk deviation. **AGC threshold:** 1.3µV 100dB above AGC threshold for +1.5dB audio output. **AGC attack time:** 1-3ms **AGC decay time:** 30-200ms (fast), 0.3-3s (slow). **Max audio before clipping:** 8Ω 1.9W, 4Ω 3W at 2% distortion. **Inband intermodulation products:** –17dB to –25dB.

S-READING (7MHz)	INPUT LEVEL SSB PREAMP IN	IPO
S1	1.6µV	4.5µV
S3	2.0µV	5.6µV
S5	2.8µV	8µV
S7	4.5µV	13µV
S9	8µV	22µV
S9+	63µV	200µV
S9++	630µV	2mV

MODE	IF BANDWIDTH -6dB	-50dB	-60dB
SSB ceramic	2380Hz	3575Hz	5200Hz
2.3kHz mech	2390Hz	3600Hz	4990Hz
500Hz mech	575Hz	1660Hz	2750Hz
AM	7140Hz	13.3kHz	14.3kHz
FM	14.3kHz	21.9kHz	22.4kHz
FM(N)	10.3kHz	15.1kHz	15.2kHz

INTERMODULATION (50kHz Tone Spacing)

	PREAMP IN		IPO	
Frequency	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
1.8MHz	+2.5dBm	89dB	+2dBm	84dB
3.5MHz	+6dBm	92dB	+10dBm	90dB
7MHz	+7dBm	93dB	+14dBm	93dB
14MHz	+9.5dBm	95dB	+21dBm	98dB
21MHz	+10dBm	96dB	+22.5dBm	99dB
28MHz	+11dBm	96dB	+21dBm	98dB
50MHz	+0.5dBm	91dB	+8dBm	92dB
144MHz	–6.5dBm	85dB	–	–
432MHz	0dBm	90dB	–	–



through to the PA driver and options for DSP to provide receive and transmit audio functions. Front-end switching enables separate receive preamplifiers for HF, VHF and UHF with switchable bandpass filters. Two transmitter power amplifies are fitted, one for HF/6m and the other for 2m /70cm. The local oscillator uses a combination of DDS (direct digital synthesiser) and PLL to achieve fast tuning, small steps and low spurious outputs. Broadcast FM uses a separate RF path from the front-end filters to a single IC mixer/IF/demodulator.

FEATURE SUMMARY

Undoubtedly the most important control on any HF radio is the main tuning knob. For ease of use this needs to be of a reasonable size and a reasonable tuning rate. On a small unit such as a mobile or portable it is difficult to achieve the ideal but for the FT-857 a 43mm weighted knob is fitted, somewhat dominating the front panel. This gives a significant improvement to the tuning performance over the FT-100 and the FT-817. The rotary detented channel selector provides faster tuning and channel stepping together with memory selection, menu and function key selection, as well as the clarifier and IF shift functions which had a separate control on the FT-897. Although substantially smaller in front panel area compared with the FT-897, the lack of a separate clarifier is the only difference in the controls between the two radios. The band up/down keys, VFO/memory and lock keys are grouped around the periphery of the tuning knob to save space. The FT-100 was not provided with a headphone jack, but in the FT-857 a small 3.5mm jack on the side of the front panel may be switched to function either for external speaker or for headphone use. This is in addition to the external speaker jack fitted on the rear panel of the main body and plugging in to either of these jacks mutes the internal speaker in the normal way.

As with the FT-897, three buttons below the display select most of the functions of the radio with 17 sets of button allocations selectable and scrollable via the rotary channel selector. The FT-100 used a similar concept but this radio used four buttons and 9 sets of allocations. One set of button allocations is programmable so you can bring the three most frequently used keys into one row, providing you do not need the default functions. The MH-59 microphone also has three programmable keys that can provide direct access to three most used functions in a similar way. The menu system in the FT-857 accesses some 91 parameters of the radio and is identical to the FT-897.

The usual variety of methods for tuning and fast frequency changes are provided with memories, comprehensive scanning and twin VFO 'split' operation including a quick split key press which sets the transmit frequency 5kHz above the receive frequency. With 200 alpha-numerically tagable memories available there is plenty for all needs and the manual describes how part of the memory can be used to simplify Low Earth Orbit FM satellite operation and allow for Doppler shift.

Although tiny in size there is still sufficient space provided to fit an optional high stability reference oscillator and two optional Collins mechanical IF filters from three available bandwidths, 300Hz, 500Hz or 2.3kHz. Both wide and narrow CW filters could be fitted if desired. The SSB filter can also be used on trans-

Above: The FT-857 has a detachable front panel.

UHF Mobile Transceiver

CLOSE-IN INTERMODULATION ON 7MHz BAND

	PREAMP IN		IPO	
Spacing	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
3kHz	–42dBm	61dB	–34dBm	61dB
5kHz	–36dBm	65dB	–28dBm	65dB
7kHz	–31dBm	68dB	–23dBm	68dB
10kHz	–23dBm	74dB	–16dBm	73dB
15kHz	–12dBm	81dB	–4dBm	81dB
20kHz	–4dBm	86dB	+3dBm	86dB
30kHz	+7dBm	93dB	+14dBm	93dB
40kHz	+7dBm	93dB	+14dBm	93dB
50kHz	+7dBm	93dB	+14dBm	93dB

FREQUENCY OFFSET	RECIPROCAL MIXING FOR 3dB NOISE	BLOCKING PREAMP IN
3kHz	72dB	–36dBm
5kHz	77dB	–36dBm
10kHz	84dB	–35dBm
15kHz	89dB	–30dBm
20kHz	92dB	–25dBm
30kHz	97dB	–17dBm
50kHz	102dB	–9dBm
100kHz	107dB	–9dBm
200kHz	116dB	–9dBm

TRANSMITTER MEASUREMENTS

	CW POWER	SSB(PEP) POWER		INTERMODULATION PRODUCTS	
FREQUENCY	OUTPUT	OUTPUT	HARMONICS	3rd order	5th order
1.8MHz	99W	100W	–63dB	–27 (–21)dB	–38 (–32)dB
3.5MHz	99W	100W	–68dB	–27 (–21)dB	–38 (–32)dB
7MHz	99W	100W	–60dB	–28 (–22)dB	–38 (–32)dB
10MHz	98W	100W	–58dB	–29 (–23)dB	–38 (–32)dB
14MHz	98W	100W	–58dB	–28 (–22)dB	–38 (–32)dB
18MHz	98W	100W	–53dB	–28 (–22)dB	–36 (–30)dB
21MHz	99W	100W	–56dB	–26 (–20)dB	–34 (–28)dB
24MHz	99W	100W	–65dB	–27 (–21)dB	–34 (–28)dB
28MHz	100W	100W	–65dB	–25 (–19)dB	–32 (–26)dB
50MHz	96W	98W	–68dB	–23 (–17)dB	–30 (–24)dB
144MHz	50W	50W	–70dB	–26 (–20)dB	–32 (–26)dB
432MHz	19W	19W	–67dB	–32 (–26)dB	–38 (–32)dB

Two-tone transmitter intermodulation product levels are quoted with respect to PEP, figures in brackets are with respect to either tone. **Carrier suppression:** >60dB. **Sideband suppression:** 60dB @ 1kHz. **FM deviation:** 4.7kHz (wide) 2.3kHz (narrow). **SSB T/R switch speed:** mute-TX 20ms, TX-mute <1ms, mute-RX 12ms, RX-mute <1ms. **NOTE:** All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on SSB with the receiver preamp switched in.

FT-857 rear panel.

Under the top cover, showing the main PCB.

RIght: Buttons around the tuning knob on the FT-857.

mit. IF shift, an IF noise blanker, DSP audio filters, notch and noise reduction are all provided as standard.

On transmit VOX, speech compression and DSP frequency response tailoring is provided, and on CW a full message keyer is included. The maximum transmit power directly in watts is settable via the menu, separately for HF, 6m, 2m and 70cm. For the FM enthusiast, comprehensive repeater access facilities are provided with auto enabled offsets and CTCSS, DCS and ARTS selective access systems. Power saving features include auto power-off following lack of control activity, a transmission time limiter and auto turn-off of the display backlighting.

The LCD panel fitted into the FT-857 is a little smaller than that used with the FT-897 and FT-100 transceivers and as a consequence the amount of information displayed at any one time is less. The same multicoloured backlighting as used on the FT-897 is retained together with different colour allocations that can be set for different bands, modes, memory groups and other operating status conditions. Frequency readout is to within 10Hz but the meter bargraph has been compressed to the top left corner of the display and is accompanied by a numerical S reading on receive. A socket on the underside of the front panel allows an external analogue meter to be used as well. Correct CW tuning is indicated by a blue LED. This same LED glows green when the receiver is unsquelched and red on transmit.

Right: DSP board with optional filters.

The FT-857 includes a spectrum scope monitor which monitors activity 10, 15 or 63 channels on either side of the receive frequency and displays relative signal strength as a bargraph on the LCD. The channel step size is selectable and either the instantaneous amplitude or maximum peak-hold values may be displayed. Normal receiver operation is disabled whilst the spectrum monitor is sweeping which may be either a single sweep or continuous sweep.

Remote control from a PC is supported for many of the main functions, by no means all but sufficient for use with logging and DX Cluster programs. Interfacing to the PC requires a level converter and Yaesu have available an optional cable for this purpose (CT-62). As with the FT-897, and indeed also the FT-100, as only one socket is provided for linear, ATU or PC control, only one function can be used at a time.

Full operation of the transceiver is covered in the comprehensive 128-page manual which also includes circuits. The omissions and errors in the FT-897 manual have been fixed.

MEASUREMENTS

Measurements were made with the review radio powered from a 13.8V supply and are summarised in the table. The review radio was fitted with 500Hz and 2.3kHz mechanical filter options.

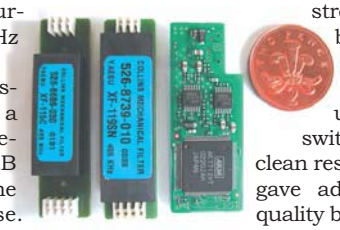
As would be expected the measured results were very similar to the FT-897, but there were differences. In particular, the oscillator phase noise performance of the FT-857 was some 4dB better close to the carrier and this significantly improved the immediate adjacent channel performance. It is not known if these were just spreads between different samples or whether there were some design changes. However, the FT-100 measured in 1999 showed 3dB better close-in phase noise than the FT-857 although all three radios showed similar performance further out than 30kHz from the carrier.

IF bandwidth measurements showed a noticeable improvement at the -60dB skirt level due to the lower phase noise. However, phase noise is still the main limitation to the skirt bandwidth and this questions the benefits of fitting the 2.3kHz bandwidth mechanical filter option. The overall selectivity and adjacent channel results are shown in **Fig 1** (below, left).

The current consumption on receive measured some 650 to 700mA depending on the display colour used (green and red are the most efficient) reducing to 590mA with the backlighting off.

The sensitivity was very good on all bands but reduced significantly at LF (3µV at 136kHz). The rejection of spurious responses was generally very good. Some slight birdies found on 80m with the FT-897 were absent with the FT-857. Possibly this emanated from the switched mode PSU used in the FT-897. The AGC recovery time was again very dependant on level and set rather too fast for my liking. The strong signal performance (intercept and dynamic range) was rather poor close-in but fairly average at wider spacings where it was significantly better than the FT-100. The in-band distortion was poor particularly at fast AGC settings.

On transmit the results are generally good with the CW keying waveform of low distortion although the fall time is a little sharp. SSB intermodulation products are average to poor but data switching times are good.



ON THE AIR

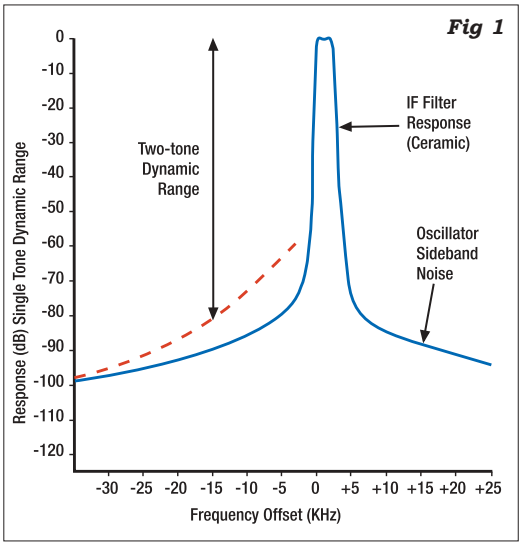
I found the FT-857 to be a good all-round performer. Similar in ergonomics to the FT-897 and FT-100, the larger tuning knob is a definite improvement over the FT-100. Although I did not have the opportunity to evaluate the radio in the car, on the home station antennas the receiver was very lively, sensitivity was excellent and coped well with most situations although some strong signal problems could be provoked on the lower bands during darkness. Often the front-end attenuator needed to be switched in circuit to give clean results. The internal speaker gave adequate communications quality but the frequency response was limited and it tended to rattle at higher levels. With an external speaker or headphones the quality was very much improved. However, even on headphones there was a certain roughness to the SSB audio quality not present on AM or FM or on my FT-1000MP. This is possibly due to the AGC attack characteristic or the rather poor measured inband intermodulation performance. Reducing the RF gain control made a noticeable improvement. I preferred to use the AGC slow setting on all modes, except perhaps when using full break-in, to prevent background noise returning between Morse characters and speech symbols.

On transmit good audio quality reports were received and the CW keying was effective at semi and full break-in. Although simple, I found the CW tuning aid a particularly helpful feature.

CONCLUSIONS

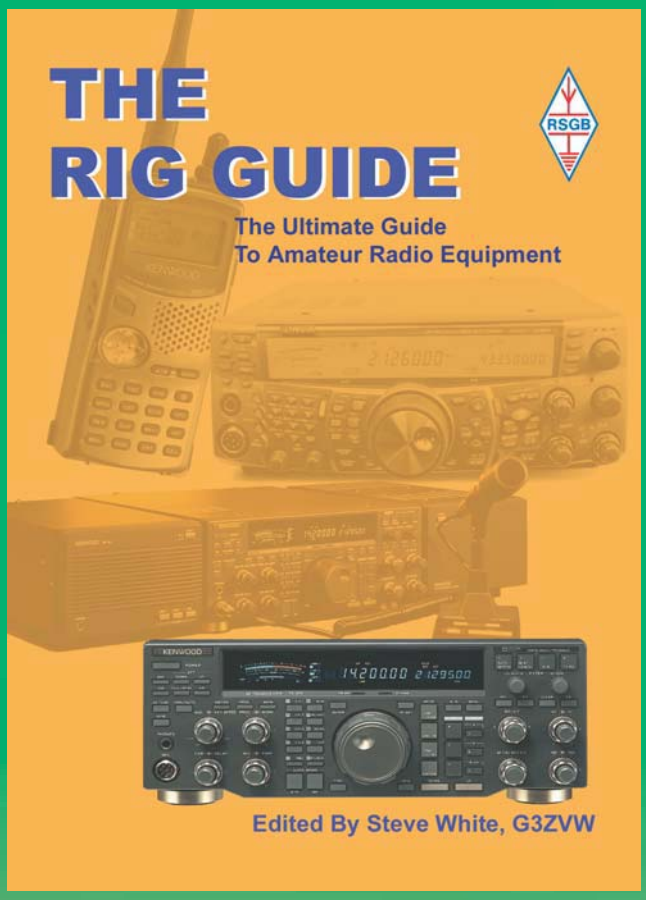
The FT-857 is an excellent do-everything radio for mobile use and where space is at a premium. The radio is currently listed at £849 inc VAT but lower price deals will no doubt be available from the main retailers. My thanks to Yaesu (UK) for the loan of the review item. ◆

Fig 1



USED USED USED USED USE

- WHAT IS YOUR RIG WORTH?
- WHAT CAN YOU GET FOR A TRADE-IN?
- WHAT BANDS DOES *XYZ* RIG COVER



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(Length 7' approx)

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MICRO MAG 2 Metre 70 cms Super Strong 1" Mag Mount (Length 22") **£14.95**

MR700 2m/70cms, 1/4 wave & 5/8, Gain 2m 0dB/3.0dB 70cms Length 20" 3⁄8 Fitting **£7.95**
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(SO239 fitting) **£18.95**

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SO239 fitting commercial quality **£19.95**

MRQ500 2m/70cms, 1/2 wave & 2x5/8, Gain 2m 3.2dB/5.8db 70cms Length 38" SO239 fitting commercial quality **£24.95**

MRQ750 2m/70cms, 6/8 wave & 3x5/8, Gain 2m 5.5dB/8.0dB 70cms Length 60" SO239 fitting commercial quality **£39.95**

MRQ800 6/2/70cms 1/4 6/8 & 3 x 5/8, Gain 6m3.0dBi/2m 5.0dB/70 7.5dB Length 60" SO239 fitting commercial quality **£39.95**

GF151 Professional glass mount dual band antenna. Freq: 2/70 Gain: 2.9/4.3 Length: 31" **£39.95**

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MR 214 2 Metre 1/4 wave (3⁄8 fitting) **£3.99**
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MR260S 2 Metre 1⁄2 wave 2.5 dBd gain Length 43" SO239 fitting **£24.95**

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MR 650 2 Metre 5⁄8 wave open coil (3.2 dBd Gain) (Length 52") (3⁄8 fitting) **£9.95**

MR268S 2 Metre 5⁄8 wave 3.5dBd gain Length 51" S0239 fitting **£19.95**

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(SO239 fitting) **£15.95**

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70 cms 1⁄2 wave, length 26", gain 3.5dB **£24.95**
2 metre 1⁄2 wave, length 52", gain 3.5dB **£24.95**
4 metre 1⁄2 wave, length 80", gain 3.5dB **£34.95**
6 metre 1⁄2 wave, length 120", gain 3.5dB **£44.95**
6 metre 5⁄8 wave, length 150", gain 5.5dB **£49.95**
(All above end fed antennas are DC grounded, so are radial free!)

VHF/UHF VERTICAL CO-LINEAR FIBREGLASS BASE ANTENNA

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

BM100 Dual-Bander **£29.95**
(2 mts 3dBd) (70cms 6dBd) (Length 39")

SQBM100 Dual-Bander **£39.95**
(2 mts 3dBd) (70cms 6dBd) (Length 39")

BM200 Dual-Bander **£39.95**
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")

SQBM200 Dual-Bander **£49.95**
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")

SQBM500 Dual - Bander Super Gainer **£59.95**
(2 mts 6.8dBd) (70cms 9.2dBd) (Length100")

SQBM800 Dual - Bander Ultra Gainer **£129.95**
(2 mts 8.5dBd) (70cms 12.5dBd) (Length 200")

BM1000 Tri-Bander **£59.95**
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")

SQBM1000 Tri-Bander **£69.95**
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")

SQBM 100/200/500/800/1000 are Polycoated Fibre Glass with Chrome & Stainless Steel Fittings.

SINGLE BAND VERTICAL CO-LINEAR BASE ANTENNA

BM33 70 cm 2 X 5⁄8 wave Length 39" 7.0 dBd Gain **£34.95**
BM45 70cm 3 X 5⁄8 wave Length 62" 8.5 dBd Gain **£49.95**
BM55 70cm 4 X 5⁄8 wave Length 100" 10 dBd Gain **£69.95**
BM60 2mtr5⁄8 Wave, Length 62", 5.5dBd Gain **£49.95**
BM65 2mtr 2 X 5⁄8 Wave, Length 100", 8.0 dBd Gain **£69.95**

MINI HF DIPOLES (length 11' approx)

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

ROTATIVE HF DIPOLE

RDP-3B 10/15/20mtrs length 7.40m **£99.95**
RDP-40M 40mtrs length 11.20m **£139.95**
RDP-6B 10/12/15/17/20/30mtrs boom length 1.00m. Length 10.0m **£199.95**

HF DELTA LOOPS

DLHF-100 10/15/20mtrs (12/17-30m) Boom length 4.2m. Max height 6.8m. Weight 35kg. Gain 10dB **£399.95**

HAND-HELD ANTENNAS

MRW-300 Rubber Duck TX 2 Metre & 70 cms RX 25-1800 Mhz Length 21cm BNC fitting **£12.95**

MRW-310 Rubber DuckTX 2 Metre & 70 cms Super Gainer RX 25- 1800 Length 40cm BNC fitting **£14.95**

MRW-232 Mini Miracle TX 2 Metre 70 & 23 cms RX 25-1800 Mhz Length just 4.5cm BNC fitting **£19.95**

MRW-250 Telescopic TX 2 Metre & 70 cms RX 25-1800 Mhz Length 14-41cm BNC fitting **£16.95**

MRW-200 Flexi TX 2 Metre & 70cms RX 25-1800 Mhz Length 21cm SMA fitting **£19.95**

MRW-210 Flexi TX 2 Metre & 70cms Super Gainer RX 25-1800 Mhz Length 37cm SMA fitting **£22.95**

All of the above are suitable to any transceiver or scanner.
Please add £2.00 p+p for hand-held antennas.

HB9CV 2 ELEMENT BEAM 3.5 dBd

70cms	(Boom 12")	**£15.95**
2 metre	(Boom 20")	**£19.95**
4 metre	(Boom 23")	**£27.95**
6 metre	(Boom 33")	**£34.95**
10 metre	(Boom 52")	**£64.95**
6/2/70 Triband	(Boom 45")	**£64.95**

CROSSED YAGI BEAMS All fittings Stainless Steel

2 metre 5 Element
(Boom 64") (Gain 7.5dBd) **£74.95**

2 metre 8 Element
(Boom 126") (Gain 11.5dBd) **£94.95**

70 cms 13 Element
(Boom 83") (Gain 12.5dBd) **£74.95**

YAGI BEAMS All fittings Stainless Steel

2 metre 4 Element
(Boom 48") (Gain 7dBd) **£24.95**

2 metre 5 Element
(Boom 63") (Gain 10dBd) **£44.95**

2 metre 8 Element
(Boom 125") (Gain 12dBd) **£59.95**

2 metre 11 Element
(Boom 185") (Gain 13dBd) **£89.95**

4 metre 3 Element
(Boom 45") (Gain 8dBd) **£49.95**

4 metre 5 Element
(Boom 128") (Gain 10dBd) **£59.95**

6 metre 3 Element
(Boom 72") (Gain 7.5dBd) **£54.95**

6 metre 5 Element
(Boom 142") (Gain 9.5dBd) **£74.95**

70 cms 13 Element
(Boom 76") (Gain 12.5dBd) **£49.95**

ZL SPECIAL YAGI BEAMS
ALL FITTINGS STAINLESS STEEL

2 metre 5 Element (Boom 38") (Gain 9.5dBd) **£39.95**
2 metre 7 Element (Boom 60") (Gain 12dBd) **£49.95**
2 metre 12 Element (Boom 126") (Gain 14dBd) **£74.95**
70 cms 7 Element (Boom 28") (Gain 11.5dBd) **£34.95**
70 cms 12 Element (Boom 48") (Gain 14dBd) **£49.95**

MULTI PURPOSE ANTENNAS

MSS-1 Freq RX 25-2000 Mhz, TX 2 mtr 2.5 dBd Gain, TX 70cms 4.0 dBd Gain, Length 39" **£39.95**

MSS-2 Freq RX 25-2000 Mhz, TX 2 mtr 4.0 dBd Gain, TX 70cms 6.0 dBd Gain, Length 62" **£49.95**

IVX-2000 Freq RX 25-2000 Mhz, TX 6 mtr 2.0 dBd Gain, 2 mtr 4dBd Gain, 70cms 6dBd Gain, Length 100" **£89.95**

Above antennas are suitable for transceivers only

HALO LOOPS

2 metre (size 12" approx) **£12.95**
4 metre (size 20" approx) **£18.95**
6 metre (size 30" approx) **£24.95**

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

	FULL	HALF
Standard	**£22.95**	**£19.95**
Hard Drawn	**£24.95**	**£22.95**
Flex Weave	**£32.95**	**£27.95**
PVC Coated Flex Weave	**£37.95**	**£32.95**
Deluxe 450 ohm PVC Flexweave	**£49.95**	**£44.95**

TS1 Stainless Steel Tension Springs (pair) for G5RV **£19.95**

G5RV INDUCTORS

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

SHORT WAVE RECEIVING ANTENNA

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Complete with 25 mts of enamelled wire, insulator and choke Balun Matches any long wire to 50 Ohms. All mode no A.T.U. required. 2 "S" points greater than other Baluns.

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Solid copper earth rod 4' £9.95
Pole to pole clamp 2"-1.5" £4.95
Di-pole centre (for wire) £4.95
Di-pole centre (for aluminium rod) £4.95
Dog bone insulator £1.00
Dog bone insulator heavy duty £2.00

5ft POLES H/DUTY (SWAGED)

Heavy Duty Ali (1.2mm wall)
1 1/4" single 5' ali pole £7.00
1 1/4" set of four (20' total approx) £24.95
1 1/2" single 5' ali pole £10.00
1 1/2" set of four (20' total approx) £34.95
1 3/4" single 5' ali pole £12.00
1 3/4" single 5' ali pole (20' total approx) £39.95
2" single 5' ali pole £15.00
2" set of four (20' total approx) £49.95
(All swaged poles have a push fit to give a very strong mast set)

REINFORCED HARDENED FIBRE GLASS MASTS (GRP)

1 1/2" Diameter 2 metres long £16.00
1 3/4" Diameter 2 metres long £20.00
2" Diameter 2 metres long £24.00

GUY ROPE 30 METRES

MGR-3 3mm (maximum load 15 kgs) £6.95
MGR-4 4mm (maximum load 50 kgs) £14.95
MGR-6 6mm (maximum load 140 kgs) £29.95

CABLE & COAX CABLE

RG58 best quality standard per mt 35p
RG58 best quality military spec per mt 60p
Mini 8 best quality military spec best quality per mt 70p
RG213 best quality military spec per mt 85p
H200 best quality military coax cable per mt £1.10
3-core rotator cable per mt 45p
7-core rotator cable per mt £1.00
PHONE FOR 100 METRE DISCOUNT PRICE.

CONNECTORS & ADAPTERS

PL259/9 ..... £0.75 each
PL259/6 ..... £0.75 each
PL259/7 for mini 8 ..... £1.00 each
BNC (Screw Type) ..... £1.00 each
BNC (Solder Type) ..... £1.00 each
BNC for 9mm (RG213) £2.50
N TYPE for RG58 ..... £2.50 each
N TYPE for RG213 ..... £2.50 each
SO239 to BNC ..... £1.50 each
PL259 to BNC ..... £2.00 each
N TYPE to SO239 ..... £3.00 each
BNC to N-type £2.50
SMA to BNC £3.95
SMA to SO239 ..... £3.95
SMA to PL259 ..... £3.95
SMA to BNC (male) £3.95
SO239 chasis socket round £1.00
N-type chasis socket round £2.50
SO239 double female £1.00
N-type double female £2.50
SO239 double female £1.00

YAGI COUPLERS

YC-6m For 2 x 50MHz Yagi £29.95
YC-2m For 2 x 144MHz Yagi £24.95
YC-7m For 2 x 70cm Yagi £19.95

10/11 METRE VERTICALS

G.A.P.12 1/2 wave alumimum (length 18' approx) £24.95
G.A.P.58 5/8 wave aluminium (length 21' approx) £29.95

BALUNS

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

TRI/DUPLEXER & ANTENNA SWITCHES

MD-24 HF or VHF/UHF internal duplexer (1.3-225MHz) (350-540MHz) SO239/PL259 fittings £22.95
MD-24N same spec as MD-24 but "N-type" fittings £24.95
MD-25 HF or VHF/UHF internal/external duplexer (1.3-225MHz) (350-540MHz) SO239 fittings £24.95
MX2000 HF/VHF/UHF internal Tri-plexer (1.6-60MHz) (110-170MHz) (300-950MHz) £49.95
CS201 Two-way di-cast antenna switch. Freq: 0-1000MHz max 2,500 watts SO239 fittings £18.95
CS201-N Same spec as CS201 but with N-type fittings £28.95
CS401 Same spec as CS201 but4-way £49.95

ANTENNA ROTATORS

AR-31050 Very light duty TV/UHF £24.95
AR-300XL Light duty UHF\VHF £49.95
YS-130 Medium duty VHF £79.95
RC5-1 Heavy duty HF £349.95
RG5-3 Heavy Duty HF inc Pre Set Control Box £449.95
AR26 Alignment Bearing for the AR300XL £18.95
RC26 Alignment Bearing for RC5-1/3 ..... £49.95

MOBILE MOUNTS

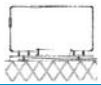
Turbo mag mount 7" 4mtrs coax/PL259 3/8 or SO239 ..... £14.95
Tri-mag mount 3 x 5" 4mtrs coax/PL259 3/8 or SO239 ..... £39.95
Hatch Back Mount (stainless steel) 4 mts coax/PL259 3/8 or SO239 fully adjustable with turn knob £29.95
Gutter Mount (same as above) £29.95
Rail Mount (aluminium) 4mtrs coax/PL259 sutiable for up to 1inch roof bars or poles 3/8 fitting £12.95
SO259 fitting £14.95
Gutter Mount (cast aluminium) 4mtrs coax/PL259 3/8 fitting £9.95
SO259 fitting £12.95
Hatch Back Mount 3/8 4mtrs coax/PL259 ..... £12.95
Roof stud Mount 4mts coax/PL259 3/8 or SO239 fitting £12.95

ANTENNA WIRE & RIBBON

Enamelled copper wire 16 gauge(50mtrs) £9.95
Hard Drawn copper wire16 gauge (50mtrs) £12.95
Equipment wire Multi Stranded (50mtrs) £9.95
Flexweave high quality (50mtrs) £27.95
PVC Coated Flexweave high quality (50mtrs) £37.95
300Ω Ladder Ribbon heavy duty USA imported (20mtrs) £15.00
450Ω Ladder Ribbon heavy duty USA imported (20mtrs) £15.00
(Other lengths available, please phone for details)

HF BALCONY ANTENNA

BAHF-4 FREQ:10-15-20-40 Mtrs LENGTH: 1.70m HEIGHT: 1.20m POWER: 300 Watts £129.95



MISCELLANEOUS ITEMS

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

TELESCOPIC MASTS (aluminium & fibreglass options)

TMA3 3" to 1 1/4" heavy duty aluminium telescopic mast set, approx 40ft when errect, 6ft collapsed £199.95
TMA2 2 1/4" to 1 1/4" heavy duty telescopic mast set, approx 40ft when errect, 9ft collapsed £149.95
TMA1 2" to 1 1/4" heavy duty aluminium telescopic mast set, approx 20ft when errect, 6ft collapsed £99.95
TMAF-1 2" to 1 1/4" heavy duty fibreglass telescopic mast set, approx 20ft when errect, 6ft collapsed £99.95
TMAF-2 2 1/4" to 1 1/4" heavy duty telescopic fibreglass mast set, approx 40ft when errect, 9ft collapsed £189.95

HF YAGI

HBV-2 2 BAND 2 ELEMENT TRAPPED BEAM FREQ:20-40 Mtrs GAIN:4dBd BOOM:5.00m LONGEST ELEMENT:13.00m POWER:1600 Watts £329.95

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 £269.95

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 £499.95
40 Mtr RADIAL KIT FOR ABOVE £99.00

HF VERTICALS

VR3000 3 BAND VERTICAL FREQ: 10-15-20 Mtrs GAIN: 3.8 dBd HEIGHT:3.80m POWER:2000 Watts (without radials) POWER: 500 Watts (with optional radials) £89.95
OPTIONAL 10-15-20mtr radial kit £34.95

VR5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN:3.5 dBd HEIGHT:4.00m RADIAL LENGTH:2.30m (included). POWER: 500 Watts £169.95

EVX4000 4 BAND VERTICAL FREQ:10-15-20-40 Mtrs GAIN:3.5 dBd HEIGHT:6.50m POWER:2000 Watts (without radials) POWER:500 Watts (with optional radials) £99.95
OPTIONAL 10-15-20mtr radial kit £34.95
OPTIONAL 40mtr radial kit £12.95

EVX5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN:3.5 dBd HEIGHT:7.30m POWER:2000 Watts (without radials) POWER:500 Watts (with optional radials) £139.95
OPTIONAL 10-15-20mtr radial kit £34.95
OPTIONAL 40mtr radial kit £12.95
OPTIONAL 80mtr radial kit £14.95

EVX6000 6 BAND VERTICAL FREQ:10-15-20-30-40-80 Mtrs HEIGHT:5.00m RADIAL LENGTH:1.70m(included) POWER:800 Watts £249.95

EVX8000 8 BAND VERTICAL FREQ:10-12-15-17-20-30-40 Mtrs (80m optional) HEIGHT: 4.90m RADIAL LENGTH: 1.80m (included) POWER: 2000 Watts £269.95
80 MTR RADIAL KIT FOR ABOVE £79.00

(All verticals require grounding if optional radials are not purchased to obtain a good VSWR)

TRAPPED WIRE DI-POLE ANTENNAS

(Hi Grade Heavy Duty Commercial Antennas)

UTD160 FREQ:160 Mtrs LENGTH:28m POWER:1000 Watts £44.95
MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts £39.95
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts £44.95
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts £89.95
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts £44.95
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER:1000 Watts £79.95
(MTD-5 is a crossed di-pole with 4 legs)

PATCH LEADS

STANDARD LEADS
1mtr RG58 PL259 to PL259 lead £3.95
10mtr RG58 PL259 to PL259 lead £7.95
30mtr RG58 PL259 to PL259 lead £14.95

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

CS401 4-WAY ANTENNA SWITCH

★ 2.5kW power ★ 0-1000MHz
★ Lightning surge protection
★ Unused connections grounded

OUR PRICE just **£49.95**
plus £6.00 P&P

Although primarily known as an HF operator, RadCom HF columnist Don Field is also an active 6m DXer with over 100 DXCC entities to his credit on 'the magic band'. Who better, then, to review a new 6m Yagi from Britain's newest antenna manufacturer, Trident?

The Trident 6M5L 6m

I have followed developments at Trident antennas since they first came on the scene just over a year ago. It's not often a new antenna manufacturer emerges in the UK, and to see Trident planning a wide range of antennas for both VHF and HF was certainly of interest. So, although undertaking an antenna review is a tricky business, I welcomed the opportunity to have a look at their TA6M5L 5-element 6-metre Yagi.

First, a very quick word about Trident themselves. The company is a co-operation between Chelcom Aerials, an existing antenna manufacturer, and Nevada Communications, well-known as one of the UK's major amateur radio retailers. Trident was set up to develop a whole new range of antennas using riveted, lightweight construction, while being computer-optimised for high performance and physical strength. Further details, both about the company and its products, can be found on its website [1]. All marketing, ordering, shipping and customer service is handled by Nevada.

DESCRIPTION

The antenna reviewed here is the TA6M5L, a 5-element 6m Yagi on a 3.6m-long boom. Gain is claimed to be 10.3dBi, with 26.5dB front-to-back. The design frequency range is 50–51MHz, optimised at 50.250MHz. **Fig 1**, taken from the Trident website, shows the radiation pattern. Weight is 5kg, and the antenna is designed for a maximum windspeed of 220kph (137mph). Maximum power handling is said to be 3kW.

There are two main aspects which need to be considered when reviewing an antenna. One is, of course, the electrical performance, though without the use of a professional antenna test range the results, at least in terms of gain and pattern, are at best subjective. However, in these days of computer modelling, the claimed figures (at least, those from reputable manufacturers) can usually be taken as a good indication of actual performance. The other aspect is physical design, with the focus being on ease of assembly, method of construction and robustness. This aspect is the main focus of this review.

RIVETING

The antenna arrived in a 6ft package. First impressions were good, with all parts sealed together in polystyrene wrapping. Having previously had the experience of opening antenna cartons, only to have a multitude of parts fall in every direction, this was much appreciated!

I know that some amateurs are nervous about riveted construction, perhaps worrying that the rivets will work loose over time. Having, over the past several years, being a user of a US-made HF Yagi using similar construction, I have no such qualms. In my experience, the use of rivets means that smaller diameter tubing can be used (as there are no heavy clamps to support), construction is quicker and more straightforward (no measuring or adjustment to do - just drop the rivets into the pre-drilled holes and 'pop' them) and rivets are less likely to work loose than nuts and bolts.

Just for clarification, it is the element sections which are riveted together, the elements then being attached to the boom with brackets using nuts and bolts. These element-to-boom brackets are pre-assembled on to the boom, so all elements will end up in exactly the same plane, avoiding a problem which is frequently encountered with other manufacturers' designs.

ASSEMBLY

With all Trident antennas, the elements are taped in bundles and labelled, so there can be no confusion. I was surprised not to find the boom labelled to indicate which element went where, though this was actually self-evident, and total construction time from opening the box was exactly one hour.

The instructions received with the antenna consisted of just one side of A4, focusing primarily on the hairpin match and the need for a co-axial balun. Given that everything is pre-

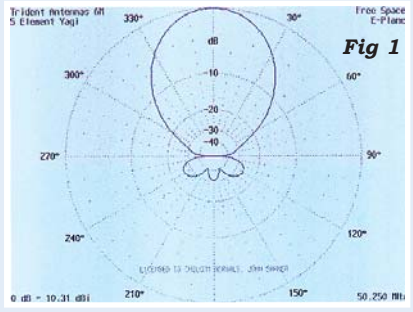
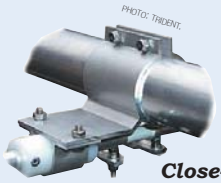
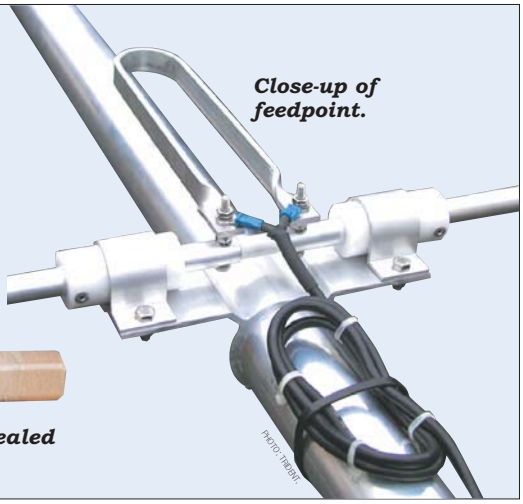


Fig 1: Trident 6M5L claimed radiation pattern (from Trident website).



Close-up of element-to-boom assembly.



Close-up of feedpoint.

The antenna arrives with all parts sealed together in polystyrene wrapping.

Yagi

drilled and labelled, this is adequate. Further information such as specification and gain plots is available from the website, though personally I would have welcomed a slightly more extensive instruction booklet, with that information along with a set of dimensions. While nothing is adjustable, it's actually quite reassuring to have that double-check and most of the popular US manufacturers include excellent handbooks with their antennas. By the way, do remember if you are new to VHF that co-axial cable losses are much higher than at HF, so it is a good idea to invest in the best cable you can afford, especially if you have long runs to the antenna. In my own case the cable run from shack to the top of the tower, when extended, is some 60m, so this is a significant concern.

Incidentally, the only tools required for construction are a rivet gun and some small spanners (or a socket set). When I bought the HF Yagi which I referred to earlier, I made the mistake of buying a cheap rivet gun and found that it didn't grip the aluminium rivets properly, so it was back to the shop to exchange it for a decent one. But if you only expect to build one such antenna you might to prefer to borrow one from a friend. By the way, if you ever need to disassemble the antenna, it's a case of drilling out the rivets. You will then need a fresh supply of rivets when you come to rebuild it.

ON THE AIR

Murphy's law being what it is, 6m band conditions have been diabolical since this antenna went into the air, so it's hard to get a true feeling for its performance. The SWR curve is nice and flat across the band and tests with local amateurs suggest that pattern and gain are what one might expect but, as I said earlier, without a professional test range, such views are purely subjective. What I can say, though, is that for the previous 12 months I have been using this antenna's bigger brother, the TA6M5L DX (still 5 elements, but on a 6m-long boom) to great effect. That was an early production model, and tooling changes have been made since to improve the physical strength of the antennas, which is why this review is of a later model. But electrically it performed flawlessly.

I certainly found it far easier to crack the 6m pile-ups than had ever been the case with the lightweight, short-boom 5-element I had used previously, and from a starting point of about 85 countries on 6m I quickly passed the 100 mark and ended with 118 countries (including some nice ones like VK, YB and YI) before band conditions took a dive.

The TA6M5L has a specified gain about 1.5dB below that of its bigger brother, but with the big advantage of a boom which is less than two-thirds of the length, making it a much more suitable contender for most suburban QTHs.

My experience so far with Trident 6m antennas is that they have been much easier to build and mount than the lightweight 6m Yagi I had used previously, have a more straightforward feed system and, most importantly, appear to perform significantly better on the air. Others apparently feel the same – I have recently heard of one would-be 6m DXpeditioner who has ordered a pair of the 7-element models, considering them light enough for expedition use, but strong enough to take the rigours of portable operation, and with enough gain to make a big noise on the band. A review of the 7-element version can be found on the Avon Valley ARA web page [2]. Quite a number of the UK's top 6m DXers have also moved to Trident antennas in recent months, with favourable comments.

The TA6M5L is available from Nevada Communications for £119.95 plus shipping. Mike Devereux, G3SED, of Nevada Communications tells me that Trident will take note of my comments on the instructions and ensure they include a lot more information for future production runs. ◆

Bottom left: Moonbounce? No, just the Trident 6M5L luffed over for easy access. Bottom right: A size comparison: the author with the Trident 6M5L beam.

WEB SEARCH

Trident:	http://www.tridentantennas.co.uk/
Avon Valley ARA review of TA6M7L:	http://www.avara.co.uk/trident-6m.htm

TELEPHONE SALES ON:
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RADIO

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FT-1000mkV-FIELD	£1,899.00	TS-2000	£1,550.00	IC-7400	£1,299.00	DX-70TH	£599.00
FT-847	£1,145.00	TSB-2000	£1,499.00	IC-910H	£1,100.00	DX-77	£499.00
FT-920	£1,049.00	TS-870S	£1,299.00	IC-706mkIIG	£789.00	DR-610	£369.00
FT-897	£985.00	TS-570DGE	£829.00	IC-703	£575.00	DR-605	£269.00
FT-857	£795.00	TS-50S	£599.00	IC-718	£449.00	DJ-G5E	£265.00
FT-100D	£599.00	TM-D700E	£429.00	IC-2725E	£299.00	DR-150	£259.00
FT-817	£549.00	TM-V7E	£375.00	IC-207H	£275.00	DJ-X2000	£449.00
FT-840	£499.00	TM-G707E	£279.00	IC-2100H	£225.00	DJ-X10	£249.00
FT-8900R	£339.00	TH-D7E	£299.00	IC-E90	£269.00	DJ-V5	£239.00
FT-7100M	£299.00	TH-F7E	£249.00	IC-T3H	£129.00	DR-M06	£229.00
FT-2800M	£179.00	TH-G71E	£210.00	IC-R8500	£1,199.00	DJ-C5	£189.00
FT-1500M	£159.00	RC-2000	£199.00	IC-R75	£599.00	DJ-195	£159.00
VX-7R	£299.00	PS-52	£229.00	IC-PCR1000	£329.00	DJ-193	£139.00
VX-1R	£115.00	PS-53	£229.00	IC-PCR100	£229.00	DJ-X3	£115.00
VX-150	£110.00	PS-33	£199.00	IC-R3	£369.00	DR-135	£229.00
VR-5000	£549.00	MC-60A	£110.00	IC-R10	£275.00	DJ-496	£175.00
VR-500	£199.00	MC-80	£69.95	IC-R5	£169.00	EDX-2	£299.00
VR-120D	£159.00	SP-31	£82.00	SM-20	£125.00	DJ-X2	£165.00
VR-120	£139.00	SP-23	£68.95	SP-21	£69.00	DR-140	£219.00
MD-200A8X	£225.00	SP-50	£27.95	AT-180	£329.00	DJ-596	£199.00
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FC-10	£299.00	YK-88S-1	£61.95	FL-103	£59.95	DJ-C4	£99.00
FC-20	£225.00	YK-88SN-1	£61.95	FL-223	£59.95	DR-M03	£239.00
FC-30	£229.00	YK-88CN-1	£61.95	FL-232	£59.95	DM-330MVZ	£129.00

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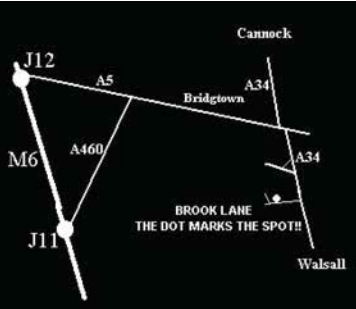

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SECOND HAND EQUIPMENT LIST

MAKE	MODEL	DESCRIPTION	PRICE
Accom	2000A	ATU HF Amp	£2,995.00
ADI	AT-600D	Dual band Handheld Transceiver	£129.00
AEA	MM-3	Morse Machine	£30.00
AEA	PK-232MBX	TNC	£125.00
AEA	PK-900	TNC	£200.00
AEA	PK-96	TNC	£90.00
AKD	6001	6m FM Transceiver	£135.00
ALAN	HQ-2000	2kW 26 - 30MHz SWR / Watt Meter	£25.00
Alinco	DJ-G5EY	Dual Band Handheld	£199.00
Alinco	DJ-X10	Wide Band Receiver	£200.00
Alinco	DJ-X3	Handheld Scanner	£99.00
Alinco	DR-150	2m Transceiver with Air-and Receive	£150.00
Alinco	DR-610	Dual Band Mobile Transceiver	£225.00
Alinco	DX-70	HF & 6m Mobile Transceiver	£399.00
Alinco	DX-70TH	HF & 6m Mobile Transceiver	£475.00
Ameritron	QSK-5	Amplifier Switch / Pre Heat	£200.00
AOR	AR-7030	Top Receiver	£550.00
AOR	AR-7030+	HF Receiver	£625.00
AOR	AR-8600mkII	Base Scanner / Receiver	£525.00
AOR	ARD-2	Decoder	£200.00
Bencher	YA-1	Low Pass Filter (1.8 - 30MHz)	£25.00
BNOS	12/40A	Top Quality 40 Amp Power Supply	£175.00
BNOS	LMP144-25-180	180 Watt 2m Amplifier	£200.00
Comet	CD-20		£40.00
Comet	CD-270D	SWR Power Meter	£49.00
Commtel	COM-510	Wide Band Scanner	£80.00
Daiwa	CL-22		£20.00
Daiwa	CN-103L	2m / 70cms Cross Needle SWR Meter	£40.00
Daiwa	CN-540		£20.00
Daiwa	DK-210	Electronic Keyer	£60.00
Daiwa	LA-20		£99.00
Datong	ASP	Automatic Speech Processor for FT-817, FT-77 etc.	£70.00
Datong	FL-2	Filter	£60.00
Datong	RFA	Broad Band Amplifier	£20.00
Diamond	SX-100	SWR & Power Meter - 1.6 - 60MHz	£65.00
Drake	R-7A	HF Receiver	£500.00
Drake	SW-8	World Band HF Receiver	£375.00
ERA	ERA	Microreader	£60.00
Fairhaven	RD-500VX	Wide Band Receiver	£525.00
Global	AT-2000	Manual Short Wave Tuner	£60.00
Grundig	SAT-100	Satellite Receiver	£400.00
Heil	ProSet 5	Headset HC-5 Insert Fitted	£75.00
Icom	AT-160	Automatic ATU	£175.00
Icom	AT-500	Automatic ATU	£275.00
Icom	CT-16	Satellite Unit	£80.00
Icom	IC-2100H	2m FM Mobile Transceiver	£150.00
Icom	IC-229A	2m Mobile Transceiver	£100.00
Icom	IC-2500E	70 / 23 cms Dual Band Mobile (RARE!!!)	£295.00
Icom	IC-2710H	Dual Band Mobile	£225.00
Icom	IC-271E	2m Multimode Transceiver - 25W	£299.00
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Icom	IC-2GE	2m Multimode Transceiver	£60.00
Icom	IC-32E	2m / 70cms Handheld Transceiver	£99.00
Icom	IC-451E	70 cms Base AC	£299.00
Icom	IC-471E	70cms Multimode Transceiver	£299.00
Icom	IC-490E	70cms Mobile Transceiver	£250.00
Icom	IC-505	50 MHz Multimode Transceiver	£275.00
Icom	IC-575A	50 MHz Multimode Transceiver	£450.00
Icom	IC-706	HF / VHF Mobile Transceiver	£450.00
Icom	IC-706mkIIG	HF / VHF / UHF All Mode Mobile Transceiver	£675.00
Icom	IC-707	HF All Mode, General Coverage Transceiver	£375.00
Icom	IC-7100	25 - 2000 RECEIVER	£575.00
Icom	IC-71E	Receiver	£325.00
Icom	IC-718	HF Transceiver	£399.00
Icom	IC-720A	HF & FM Transceiver	£400.00
Icom	IC-728	HF Transceiver	£400.00
Icom	IC-735	Base Or Mobile Transceiver	£399.00
Icom	IC-740	HF Base Transceiver	£350.00
Icom	IC-746	HF / 6m / 2m Built In ATU	£875.00
Icom	IC-751	HF Base Station With Built In PSU, General Coverage	£425.00
Icom	IC-756	HF / 6M All Band Transceiver	£950.00
Icom	IC-756pro	High Class Transceiver	£1,400.00
Icom	IC-781	Icom Top Class Transceiver	£1,600.00
Icom	IC-821H	Dual Band Base - All Mode	£599.00
Icom	IC-910	2m / 70cms Base Transceiver	£999.00
Icom	IC-R100	100kHz - 1.85GHz Receiver	£199.00
Icom	IC-R2	Handheld Scanner	£99.00
Icom	IC-R7000	MINT CONDITION!!! Receiver	£550.00
Icom	IC-R71E	Receiver	£325.00
Icom	IC-R72	Receiver	£350.00
Icom	IC-T8E	Quad Band Handheld Transceiver	£175.00
Icom	IC-W2E	2m / 70cms Handheld Transceiver	£140.00
Icom	PS-55	Power Supply Matching IC-735	£100.00
Icom	RC-7000	Remote Control	£40.00
Icom	SM-8	Desktop Microphone	£75.00
Icom	SP-12	Speaker	£30.00
Icom	SP-20	External Speaker	£99.00
Icom	SP-3	MINT CONDITION!!! Speaker	£50.00
Icom	SP-7	Speaker	£20.00
Icom	WR-2000	SWR & Power Meter with 3 Modules	£99.00
JPS	NIR-10	Noise / Interference Reduction Unit	£99.00
JRC	JST-245	HF 50MHz 1500w AC Base Transceiver	£1,295.00
JRC	NRD-345N	HF Receiver	£275.00
JRC	NRD-525	HF Receiver	£375.00
JRC	NRD-545DSP	HF DSP Receiver	£975.00
JRC	NRD-L2000	1kW Linear Amplifier Solid State (VERY RARE!!!)	£1,600.00
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Kent	RA	Morse Paddle Key	£40.00
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Kenwood	MC-60A	Desktop Microphone	£70.00
Kenwood	MC-80	Desk Microphone	£40.00
Kenwood	PS-10	Power Supply for TR-9130 etc.	£40.00
Kenwood	PS-430	Power Supply	£100.00
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Kenwood	TM-D700E	Dual Band Built In TNC	£299.00
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Kenwood	TS-850SAT	HF Base Station with Built In ATU	£699.00
Kenwood	TS-940SAT	Mains HF Base Transceiver with Built In ATU	£599.00
Kenwood	TS-950SD	HF 150W DSP Base Station	£1,200.00
Kenwood	TS-950SDX	Kenwood's Flag Ship	£1,650.00
Kenwood	VC-10	VHF Converter	£99.00
Kenwood	YG-455CN-1	270Hz CW Crystal Filer	£100.00
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Kenwood	YK-88CN1	270Hz CW Filter 8.83MHz	£40.00
Kenwood	YK-88S-1	2.4KHz SSB Narrow Filer 8.83MHz	£40.00
Kenwood	YK-88SN	1.8K SSB Filter	£40.00
Kenwood	YK-88SN-1	1.8KHz SSB Narrow Filter 8.83MHz	£40.00
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Lowe	HF-225	HF Receiver	£150.00
MFJ	MFJ-1272B	TNC / Mic Switch	£20.00
MFJ	MFJ-1278	TNC All Mode	£175.00
MFJ	MFJ-207	HF SWR Analyser	£50.00
MFJ	MFJ-259B	HF / VHF Analyser	£175.00
MFJ	MFJ-722	CW / SSB Filter with 5 Watts Amp	£59.00
MFJ	MFJ-784DSP	DSP Tunable Filter	£140.00
MFJ	MFJ-921	VHF 200 Watt ATU	£50.00
MFJ	MFJ-962D	1.8 - 30MHz, 1kW Antenna Tuning Unit	£199.00
Microset	SR-100	Power Amplifier with Pre-Amp (100W Output)	£99.00
Microwave	28/144	28 / 144 MHz Transverter	£125.00
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Microwave	Pre-Amp	Low Noise RF Switched Pre-Amp	£25.00
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SGC	SG-3030	All band Antenna	£200.00
Shure	444D	Desktop Microphone	£35.00
Signal	R-532	Airband Receiver	£99.00
Sommerkamp	FT-290R	2m Multimode Transceiver	£150.00
Sony	7600-D	Worldband Radio	£80.00
Sony	SW-100E	FM/SW/MW/LW Portable Receiver	£90.00
SSB Electronics	LT-23S	23cms Transverter	£450.00
Standard	C-156E	2m Handheld Transceiver	£125.00
Standard	C-500	Dual Band Handheld	£99.00
Standard	C-510	2m / 70cms Handheld Transceiver	£125.00
Standard	C-510E	Dual Band Handheld	£99.00
Swedish	Key	Straight Morse Key	£25.00
Timewave	DSP-599ZX	DSP Filter	£225.00
Tokyo	HL-30V	2m - 25W Amplifier	£75.00
Tokyo	HL-35V	2m Power Amplifier with Pre-Amp	£89.00
Tokyo	HL-37V	Linear Amplifier	£60.00
Tono	MR-150	150 Watt 70 cms Amplifier	£175.00
Tono	T-777	Communications Terminal	£120.00
Tono	4M-70G	60 Watt UHF Transciever, Including Pre-Amp	£119.00
Transverter	QM-70	28/144 Transverter	£100.00
Trident	TRX-200	Latest Scanner	£175.00
Trio	TM-201A	2m Mobile Transceiver (Complete with Detachable Front & Speaker)	£99.00
Trio	TR-9000	2m Multimode	£199.00
Trio	TR-9130	2m All Mode Transceiver	£250.00
Watson	W-DB30	Dualband Amplifier	£89.00
Welz	AC-38M	200W Mobile Matching Network	£50.00
Welz	CT-150	Dummy Load	£50.00
Welz	CT-300	300W / 1kW Peak Dummy Load	£65.00
Welz	SP-15M	SWR Meter	£35.00
WinRadio	WR-1550E	Trunking Software	£450.00
Yaesu	ATAS-100	Yaesu Active Tuning Antenna System	£175.00
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Yaesu	FC-700	Tuner - AS BRAND NEW (BOXED)	£129.00
Yaesu	FEX-767-2m	2m Module for FT-767	£175.00
Yaesu	FEX-767-6m	6m Module for FT-767	£175.00
Yaesu	FL-2025	Amplifier	£90.00
Yaesu	FP-30	Power Supply - FT-897, FT-857	£189.00
Yaesu	FP-700	Power Supply	£100.00
Yaesu	FP-707	Power Supply Unit	£80.00
Yaesu	FP-757GX	Power Unit for FT-757	£300.00
Yaesu	FR-101	HF, 2m, 6m Base Transceiver	£399.00
Yaesu	FRG-8800	Receiver Including Converter	£399.00
Yaesu	FRT-7700	Antenna Tuner for FRG-7700	£60.00
Yaesu	FRV-7700	Converter for FRG-7700	£60.00
Yaesu	FT-100	HF / 6m / 2m / 70cms Mobile Transceiver	£499.00
Yaesu	FT-100D	HF / 6m / 2m / 70cms Mobile Transceiver	£539.00
Yaesu	FT-1000D	200 W HF Transceiver (MAINS)	£1,600.00
Yaesu	FT-1000MPmkV	200W DSP HF Transceiver	£1,800.00
Yaesu	FT-1000MPmkV-Field	Top HF Radio - AC (2 Months Old)	£1,750.00
Yaesu	FT-101B	HF Base Transceiver	£99.00
Yaesu	FT-101ZD	HF Base Transceiver	£275.00
Yaesu	FT-1500M	2m 50W Mobile Transceiver with DTMF Microphone	£129.00
Yaesu	FT-2600M	Mobile VHF / FM Transceiver	£120.00
Yaesu	FT-290RMKII	2m Multimode Mobile Transceiver with Amplifier	£250.00
Yaesu	FT-41R	Handheld Transceiver	£120.00
Yaesu	FT-50R	Dual Band Handheld	£150.00
Yaesu	FT-5100	Dual Band Transceiver	£199.00
Yaesu	FT-51R	2m / 70cms Handheld Transceiver	£199.00
Yaesu	FT-650AC	26-50MHz 100w Base Station Transceiver (MINT!!)	£525.00
Yaesu	FT-690RMKI	6m Multimode Mobile Transceiver	£199.00
Yaesu	FT-7100M	Dual band Mobile Transceiver	£225.00
Yaesu	FT-726R	6m / 2m / 70cms / HF Transceiver	£575.00
Yaesu	FT-726R	2m / 70cms / HF Transceiver	£475.00
Yaesu	FT-730R	70cms Mobile Transceiver	£120.00
Yaesu	FT-736R	2m / 70 cms Base Transceiver	£575.00
Yaesu	FT-736R	6m / 2m / 70cms Transceiver	£650.00
Yaesu	FT-747GX	HF Transceiver - General Coverage	£325.00
Yaesu	FT-757GX	HF Transceiver	£350.00
Yaesu	FT-76R	70 cms Handheld Transceiver	£99.00
Yaesu	FT-790R	70cms Multimode Transceiver	£175.00
Yaesu	FT-790RmkII	70cms Multimode Transceiver	£250.00
Yaesu	FT-840	HF Base / Mobile Transceiver	£399.00
Yaesu	FT-847	HF 6m / 2m / 70cms Transceiver	£850.00
Yaesu	FT-920AF	HF / 6M Base Transceiver	£899.00
Yaesu	FTV-1000	200 W Transverter	£450.00
Yaesu	FTV-430MHZ	Module for Transverter	£99.00
Yaesu	FTV-707	2m Multimode Transverter Including Module	£125.00
Yaesu	FTV-901	Transverter including 2m Module	£165.00
Yaesu	FTV-902DM	Transverter	£225.00
Yaesu	FV-102DM	Digital VFO	£150.00
Yaesu	FV-901	Digital VFO	£175.00
Yaesu	G-650	Rotator	£300.00
Yaesu	KR-400	Rotator	£120.00
Yaesu	KR-600	Rotator	£140.00
Yaesu	MW-1	Remote Control Microphone & Infra-Red	£60.00
Yaesu	SP-55	Mobile Speaker	£15.00
Yaesu	SP-767	Extention Speaker (BOXED)	£70.00
Yaesu	SP-980	Speaker with Built In Filters	£60.00
Yaesu	System 600	HF Commercial Radio	£600.00
Yaesu	VR-120	FM / WFM / AM Receiver	£99.00
Yaesu	VR-500	Yaesu Handheld Scanner	£149.00
Yaesu	VR-5000	Top Class Base Scanner	£450.00
Yaesu	VX-1R	Handheld Transceiver	£120.00
Yaesu	XF-114SN	2KHz SSB Filter	£60.00
Yaesu	YO-901	Scope	£250.00
Yupiteru	MVT-3300	Handheld Scanner	£99.00
Yupiteru	MVT-7300	Multiband Handheld Scanner	£199.00
Yupiteru	MVT-8000	Base / Mobile Scanner	£199.00

HF

Band conditions always appear to be at their worst in the summer, at least for those of us in the northern hemisphere. But do remember that this is winter in some important parts of the world, giving them longer nights and lower static. So now is the time to look out for some interesting DX on the low bands from Australasia, southern Africa and South America. You just have to be prepared to suffer some static yourself!

I recently made my first foray to a mountain-top to activate a summit for the Summits on the Air Award, a programme which is gaining adherents at quite a rate. John, G3WGV; Justin, G4TSH, and I were active from Blencathra, LD-008, in the Lake District. It seems that most HF activity takes place around 7030kHz (CW works best with the low power and small antennas commonly used), though 20m activity is growing to satisfy chasers who are further afield. More details from the SOTA website (to simplify administration, the programme is administered entirely via the Internet) or join the SOTA Relector.

SPLIT FREQUENCY OPERATION

Last month I talked about list and net operations on the HF bands. They are often frequented by resident amateurs in DX locations, who can then be spared the hassle of running a pile-up (ie a horde of simultaneous callers). However, DXpedition operations normally eschew lists and nets, preferring to run their own operations, rather than leave it to a third party. If, as is often the case, many stations want to work them, then the standard recourse is to work 'split frequency'. The concept is simple. By transmitting on one frequency and listening on another, callers can hear the DX station clearly, rather than through a mass of other callers, and therefore know when to go ahead with their contact and, more importantly perhaps, when to remain silent while another contact is taking place. And rather than listening on a single frequency, the DXpedition may choose to listen over a range of frequencies, thereby making it easier to pick out callers.

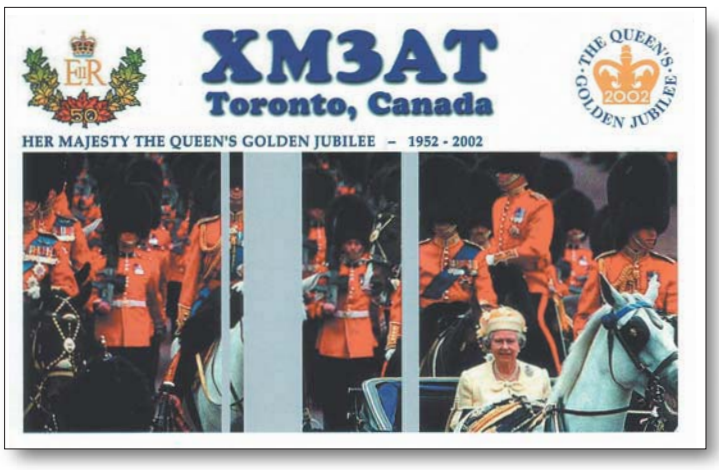
If you hear an expedition making plenty of contacts, but you can't hear the callers, then the chances are that you are listening to a split-frequency operation. Indeed, before calling any DX station on his own frequency, it's always worth waiting a moment to determine whether he is working split. Otherwise, if you call him co-channel, you risk the wrath of others who have been waiting and will almost certainly inform you of the error of your ways!

If a DX station is working split, what do you do? In the past many amateurs may have had a problem in that their transceiver was only capable of transmitting and receiving on the same frequency. In practice most transceivers came equipped with RIT and XIT (receiver and transmitter incremental tuning) allowing for a limited degree of split operation (typically up to 10kHz between transmit and receive frequencies). Most modern transceivers go one step further and have two quite separate VFOs, giving total flexibility (though it's worth practicing split operation in the peace and quiet of your own shack before you try it on the air and end up pressing the wrong buttons!) Most radios also allow you to check your transmit frequency, which is handy, because as well as listening to the DX station, half the trick can be finding the people he is working, and putting your transmitter on to that frequency. The more expensive radios go one step further still, with a second receiver. With that capability, you can listen to the DX station in one ear of your headphones (I never use a loudspeaker for anything other than casual ragchews, and I suspect most DXers are the same) and the pile-up in the other ear. Then you know exactly what is going on.

Always listen to the DX station carefully. Often he will announce his receive frequency, and may also be giving other instructions (such as "UK stations only") which should always be followed carefully to avoid creating unnecessary interference and slowing things down. If no listening frequency is announced, the general rule is to call about 1kHz up on CW, or 5kHz up on SSB. But, again, a few moments' listening should, in any case, quickly allow you to find the callers he is working. Listen for a little longer and you may also determine a pattern. For example, does the DX station always respond to callers on the same frequency or does he, for example, listen a little higher up the band after each contact, finally dropping back down the band and starting the whole process anew? Does he respond to stations only giving part of their callsign or does he, like many DX operators, only respond to callers when he has their full callsign? And so on. Some intelligent listening can pay dividends, compared with simply calling at random. This is how experienced operators running low power can often go through more quickly than less experienced operators running high power (No surprise there, I suppose. Experience counts for more than brute force in most competitive sports and activities).

Unless the DX station is specifically taking 'tail enders', ie stations who call as the previous QSO is coming to an end, *never* call over the top of a contact in progress but wait until the DX station signs and calls "QRZ?" or similar. Otherwise chaos ensues. Equally, if the DX station manages to get part of a callsign, and sends something like "XT?" on CW or "the station with X-ray Tango" on SSB, don't take that as an invitation to keep calling (unless it's you he's heard!), even if others do so. It only serves to slow the whole process down.

And that's about all there is to it. I



The Queen's Jubilee, one year on. While UK stations were operating with GQ prefixes in June 2002, Canadian stations were also celebrating.

By Don Field, G3XTT, 105 Shiplake Bottom, Peppard Common, Henley on Thames RG9 5HJ. E-mail: hf.radcom@rsgb.org.uk

Left: Edi Giorgadze, P5/4L4FN (right), at dinner in Ankara, Turkey, with Laurie Margolis, G3UML.

might mention, though, that several of you have written or e-mailed to say that you appreciate these 'back to basics' items, and some of you have kindly suggested topics I might cover. My thanks for that, and I will try to oblige over the coming months.

DX NEWS

Special French callsign TM6ACO will be active 7 to 15 June to celebrate the 71st running of the Le Mans 24-hour road race. QSL via F6KFI.

Seppo, OH1VR, will sign OJ0VR and possibly OJ0U from 12 to 14 June from Market Reef. He will then be back there, again as OJ0VR, in mid-July for the IARU contest.

A large group of Italians and several Albanians will join forces to activate Albania from 25 May to 8 June, signing ZA3/their home calls. Activity is expected on all bands and modes, which will be very welcome as Albania has been somewhat less active in recent years than when it first came back on the air in 1991, after a long absence, although a Finnish group appeared at short notice in April, making quite a noise on the bands as ZA1B.

Winton, ZL3AO, writes with some news about DX contacts made on 80m while he was operating mobile. As the LF DX season was in full swing in early January, Winton was determined to work into Europe from his mobile station (running 80-100 watts to a top-loaded helically-wound vertical whip). Winton writes, "Each evening we travelled out from the city to some sites by lakes and also to the seaside at New Brighton. We were able to hear some 136 DX stations from the UK, US, Caribbean, Middle East, etc." Some excellent two-way contacts took place including, for example, one with EI6S at 59+ both ways. These contacts took place around 2150, in other words at New Zealand sunrise. Winton mentions that his first DX contact on 80m from his mobile was in 1999, when he worked Les, G4OFY.

Dave, K3LP, is going to St Maarten/St Martin in June. He will sign FS/K3LP and PJ7/K3LP from 20 to 28 June. For those who don't know, this small island consists of two DXCC countries, but there is no formal border and visitors travel freely throughout the island. QSL via K5KV.

Ann, W2AZK/KP2, and Brian, KF2HC/KP2, both from the New Jersey DX Association, will be on from St Croix, US Virgin Islands, from 12 to 19 June, SSB and CW, 160-10m. QSL direct to their home calls. QSOs will count towards the NJDXA Award, which you can learn more about at the NJDXA website.

Edi Giorgadze, P5/4L4FN, has been working for the World Food Programme in Turkey, but expects to move on to Angola, where he hopes to become active. Laurie Margolis, G3UML, who was on assignment in Turkey for the BBC during the Iraq war, met Edi in Ankara in April. In all Edi spent four years in North Korea, making about 16,000 contacts when given permission to operate for his final year. G3UML was his first and, for two weeks, only UK contact.

IOTA ACTIVITY

Detlev, DL1RTW/P, and Klaus, DL7UXG/P, will operate from Pellworm Island (EU-042, N-23 for the German Islands Award, ARLHS FED-187, German Lighthouse 40) from 19 to 22 June. More information at DL7UXG's webpage.

Costas, SV1XV, writes to say, "There will be a DXpedition to Gavdos Island (EU-187), which counts as SV9 (Crete) for DXCC from 1 to 10 June." Look for activity on all modes, 10 to 80m. QSL direct only via SV2DGH.

Members of the Association des Radio-Amateurs du Senegal plan to operate 6V1A from Goree Island (AF-045) from 7 to 9 June. Activity is expected on HF on CW and SSB. QSL via 6W6JX.

Kadek, YC9BU, and others plan to be active (on 10, 12, 15, 17 and 20) as 8A9R from Rote Island (OC-241) for about 10 days in mid-June. I have no other information at this time.

IOTA enthusiasts AB5EB, AD5A and KB5SKN will be on from Little Corn Island, Nicaragua (NA-013) from 31 May to 2 June with a rig, amplifier and vertical. They hope to use the common modes and bands, plus RTTY. QSL via N6AWD.

DXCC

ARRL Membership Services Manager N7NG, Wayne Mills, says the League will accept for DXCC credit YI/ operations from Iraq by US or British military personnel provided the operator has written permission from his or her commanding officer. "There is precedent for this," Wayne said, citing an operation during the 1991 Gulf War. "These operators will need written authorisation to operate from their commanding officers until an interim Iraqi government is in place." After that point, operators would need documented permission from Iraqi authorities.

HALL OF FAME

CQ Magazine has announced this year's *CQ* DX and Contest Hall of Fame inductees for 2003. This year Ken Keeler, N6RO, and Dan Street, K1TO, join the *CQ* Contest Hall of Fame, while James Brooks, 9V1YC, is inducted into the *CQ* DX Hall of Fame in recognition of his DX operations, support and unique presentations of DXpeditions through video.

CORRESPONDENCE AND TABLES

Ken, M3NPB, has noticed that there have been no CW entries from M3 licensees, so writes to put that right. Ken runs a TS-530S, Autek ATU and a G5RV antenna with the highest point at 5m. Most of his contacts so far have been with Europe, but he has also been working 'across the pond'. David, M0CNP, writes that, having observed how poor band conditions had been

COUNTRIES WORKED, 2003

(sorted this month by CW totals)

CALL	CW	SSB	DATA	MIXED
G3XTT	186	136	97	209
G3SXW	179	0	0	179
G0NXX	172	0	0	172
G4KFT	168	0	0	168
G3YVH	150	116	0	183
G3VDL	143	0	0	143
G3ZRJ	117	0	0	117
G3YMC (QRP)	114	0	0	114
G3LHJ	112	53	81	146
G4WXZ	107	125	0	169
GU4YOX	102	93	0	139
G4OBK	101	16	42	111
GM0TGE	93	96	0	142
MU0FAL	91	78	0	112
ZC4VG	89	17	8	89
ZC4DW	85	71	74	116
GM0ELV (QRP)	47	0	0	47
GW4ALG (QRP)	39	0	0	39
G4DDL	31	6	10	36
G4FVK	28	74	0	82
MM0BQI	27	28	81	100
M5AEF (1W)	27	50	0	58
M3NPB	27	9	0	32
M0CNP	5	118	36	126
M3RDX	0	137	70	153
M3CLY	0	138	0	138
G0ARF	0	0	120	120
G0GFQ	0	112	0	112
M0AWX	0	107	0	107
M5PLY				105
GU0SUP	0	0	98	98
M5GUS	0	91	0	91
GI0NQC	0	59	58	87
G0URR	0	0	75	75
G4YWY/M	0	69	0	69
G4ZPL	0	2	69	69
G0LGJ/M	0	66	0	66
M3FSI	0	50	0	50

during April, he was pleasantly surprised when he added up the DX he had been able to work, including such nice ones as VR2MY (Hong Kong), 9N7YL (Nepal), 5Z4BL (Kenya), 5H9KR (Tanzania), VP5/GM3JOB (Turks & Caicos), E20KIR (Thailand), TO4T (Guadeloupe) and V47KP (St Kitts). Keith, G0GFQ, even managed some good ones on 10m, including S9SS (Sao Tome), ST0F (Sudan), 8R1E (Guyana), D2BB (Angola) and ZS1J (S Africa). G0LGJ's mobile activities brought him contacts with A71AW (Qatar, 15m), YB0AZ (Indonesia, 15m), ST0RY (Sudan, 10m), DU9/G4UNL (Philippines, 15m) and VK4SJ (Australia, 20m) to name but a few. John, G4ZPL, found the month fairly slow going but his log includes BPSK31 contacts with BX4AF (Taiwan, 15m), TF3JX (Iceland, 20m) and JW0HU (Svalbard, 15m), as well as SSTV with 7X2DF (Algeria, 20m).

THANKS

Special thanks go to the authors of the following for information extracted: *OPDX Bulletin* (KB8NW), *The Daily DX* (W3UR) and *425 DX News* (I1JQJ). Please send items for the **August** issue by **21 June.** ◆

WEB SEARCH

DL7UXG:	www.qsl.net/dl7uxg
NJDXA:	www.njdxa.org
Summits on the Air:	www.sota.org.uk
VK9XI:	http://members.datafast.net.au/electronics/vk9x.htm

QTH Corner

3B8MM Mart Moebius, DL6UAA, Kirchplatz 10, D-04924 Dobra, Germany.
3XD02 Sebastian, F8DQZ, Rue des Ecoles, 49260 Antoigne, France.
4S7DXG UR9IDX, PO Box 85, Mariupol 87531, Ukraine.
5Z4BL Thomas Lindner, DL2RUM, Lehnschulzenweg 2, 15754 Bindow, Germany.
5Z4BK Jan B C Harders, DJ8NK, Kalckreuthweg 17, D-22607 Hamburg, Germany.
5Z4DE A R Hickman, G0IAS (direct only), The Conifers, High St, Elkesley, Retford DN22 8AJ.
9V1YC (new) Joe Morris, N5ID, 813 Highway 13, Wiggins, MS 39577, USA.
C53KL Girt Budis, YL2KL, PO Box 19, Ainazi, LV-4035, Latvia.
C53ZF Kaspars Uztics, YL1ZF, 6 Dzintaru 8, Liepaja, LV-3401, Latvia.
HU1M Frank Proschmann, DK7AO, Waltersdorf 5, D-07589 Lindenkreuz, Germany.
N6AWD Fred K Stenger, 6000 Hesketh Dr., Bakersfield, CA 93309, USA.
P29KM Kazuo Miyamura, PO Box 321, Port Moresby, Papua New Guinea.
TX4PG Silvano Borsa, I2YSB, PO Box 45, 27036 Mortara (PV), Italy.
V63JE Jeffrey R Pych, KI0RO, 1095 E 19th Ave, Broomfield, CO 80020, USA.
VK9XI Steven Gregory, VK3OT, PO Box 622, Hamilton, VIC 3300, Australia.
XY4KQ Frank Rosenkranz, DL4KQ, Blumenstr 25, D - 50126 Bergheim/Erft, Germany.
ZW0S Joaquim Das Virgens, PS7JN, Rua Carlos Serrano, 1969 Natal-RN, Brazil.

HF F-Layer Propagation Predictions for June 2003

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz
Time	0000111112 20	0000111112 20	0000111112 20	0000111112 20	0000111112 20	0000111112 20	0000111112 20
(UTC)	2468 0246 8020	2468 0246 8020	2468 0246 8020	2468 0246 8020	2468 0246 8020	2468 0246 8020	2468 0246 8020
*** EUROPE							
Moscow	23	62.....156	54.....2456	.354 3332 4662	...66...77..	.....	.....
*** ASIA							
Yakutsk	.....	.....	11.....1222	5544 3345 6666	.124 6433 2.2.	.....	.....
Tokyo	.....	.....	.....	.....11..	.....11221.	.....1....	.....
Singapore	.....12.	.....242.	4411	.....242.1	.....12...	.....	.....
Hyderabad	1	234	2.....13565	.221 1136 7773	..32 2215 653.	..1111.....	.....
Tel Aviv	6.....345	75.....2777	663....26787	8.342 1136 758	3	....11.....	.....
*** OCEANIA							
Wellington	.....	.....	.....	....	....	....	....
Well (NZ) (LP)	.....	16.....4..	571.....553	451.....265	11.....32	21	.....1.
Perth	.....	.....1.1	.....1.2	1	2	.....	...11.....
Sydney	.....1..	.....11..	.....	.....	.....3.	.....	.....
Melbourne (LP)	.....	..1.....	.....	.....	1.2.....2	1	.....
Honolulu	.....	.....	...1.....	....1.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....	.....	.....1...	.....
W. Samoa	.....	.....	.....	.....	....1.....	.....	.....
*** AFRICA							
Mauritius	.....	1.....221	1321	.....321.	.....121..	.....11...	.....
Johannesburg	24.....32	56.....2787	.1.....6763	.....1751.	..1....24...	..1....21...	..232234....
Ibadan	.....	11.....111	662.....1556	3371...25777	..876667887.	..85323377..	..5.....
Nairobi	.....	1.....111	21.....122	33.....1344	.42...125662	..422135662.	...1111221..
Canary Isles	43.....154	663.....666	7641....2566	7663....6577	..5766677786	...644548 85.	.....11..
*** S. AMERICA							
Buenos Aires	1.....	771.....5	552.....14	321.....24	4.2.....466	1564	.....131.
Rio de Janeiro	.....	22.....2	33.....23	21.....23	53..1....777	....11..2765	....1.1.141.
Lima	.....	21.....1	211.....2	1.1.....11	..43.....66	153	.....11.
Caracas	.....	.....	.....	1121.....1	..1.1....12	.....12.	.....11.
*** N. AMERICA							
Guatemala	.....	.....	.....	.....	.....	.....	.....
New Orleans	.....	.....	.....	11.....	1222252	.....11122.	.....
Washington	1	1.....1	321.....1	531.1....24	3333453	.....11112.	.....
Quebec	2.....6	62.....6	21.....12	...1....1123	.....33.	.....	.....
Anchorage	.....	.....	.....	11.....111	..1.....232	.....	.....
Vancouver	.....	.....	.....	.....	1121	.....	.....
San Francisco	.....	.....	.....	.....	11	.....	.....
San Fran (LP)	.....	.....	.....	.....	.....	.....	.....

Key: Each number in the table represents the expected circuit reliability, e.g. '1' represents reliability between 1 and 19% of days, '2' between 20 and 30% of days, etc. No signal is expected when a '.' is shown. **Black** is shown when the signal strength is expected to be low to very low, blue when it is expected to be fair and red when it is expected to be strong. The RSGB Propagation Studies Committee provides propagation predictions on the internet at http://members.aol.com/g4fkhgwyn. The page is updated monthly. The provisional mean sunspot number for April 2003 issued by the Sunspot Data Centre, Brussels, was 60.0. The daily maximum/minimum numbers were 109 and 16 on 29 April and 16 April respectively. The predicted smoothed sunspot numbers for June, July and August are respectively: (SIDC classical method – Waldmeier's standard) 63, 61, 59 (combined method) 67, 66, 63. 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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CONTEST

Readers will have noticed, no doubt, that there is a considerable backlog in some of the results that we are publishing. We are doing our best to deal with the backlog as quickly as we can and, until such time as we do, have taken the decision to reduce the font a little and also cut back on the number of write-ups that we include for the various events. This is a shame, as they make interesting reading, but both the editor and I felt that it was best to try to get the results to you in as timely a fashion as possible. Needless to say, once the backlog is eliminated, we will reintroduce the write-ups as quickly as we can.

CONTESTS THIS MONTH

The major event this month, and for many clubs of the year, is NFD on 7/8 June. Hopefully your club will be taking part and supporting this contest, which started life off as a test of emergency preparedness. Nowadays, it is an opportunity for clubs of all shapes and sizes to take part in a fun weekend of setting up a field day station, which can be very simple or, in the Open section, elaborate. If your club is taking part, and we hope it is, do go along and support the event. Hopefully you will be rewarded by lots of fun and, who knows, perhaps a successful result. In years past, some clubs entered several stations; one for the top operators and one as perhaps a less serious entry. More recently, it has been hard for many clubs to find support for one station, let alone two, but we hope with the influx of new operators into the hobby that this situation may change again.

The ARRL runs its domestic Field Day on 28/29 June between 1800 and 2100. Although we can't enter from the UK, it's fun to try and support the contest by calling a few stations taking part. Many of the operators taking part may not have worked into the UK before, so you can expect to get a positive response if you take the trouble to call them.

VHF operators have the opportunity to enjoy some (hopefully) good weather during the month; the second of the 144MHz Backpackers contests takes place on 15 June which runs parallel with the first four hours of the 20th *Practical Wireless* QRP Contest.

21/22 June is the date for the rearranged 50MHz Trophy. The date was amended so that the contest would be concurrent with the IARU 50MHz trophy which was moved after the RSGB's VHF Contest Calendar had originally gone to press. In any event, with luck, it will prove a good weekend for Es propagation around Europe and perhaps beyond. ◆

Contest Calendar

HF CONTESTS

Date	Time	Mode	Contest	Bands	Exchange
7/8 June	1500-1500	CW	RSGB HF Field Day	1.8 – 28	RST + SN
21/22 June	1400-1400	CW	All Asia CW	1.8 – 28	RST + Age
28/29 June	1400-1400	CW	Marconi Memorial HF	1.8 – 28	RST + SN
28/29 June	1800-2100	ALL	ARRL Field Day	1.8 up	RST + QTH

VHF CONTESTS

Date	Time	Mode	Contest	Bands	Exchange
3 June	2000-2230 Local	ALL	RSGB 144MHz Activity	144	RST+SN+Locator
10 June	2000-2230 Local	ALL	RSGB 432MHz Activity	432	RST+SN+Locator
15 June	0900-1600	ALL	PW 144MHz QRP Contest	144	RST+SN+Locator
15 June	0900-1300	ALL	RSGB 144MHz Backpackers#2	144	RST+SN+Locator
17 June	2000-2230 Local	ALL	RSGB 1.3 – 24GHz Activity	1.3 –24G	RST+SN+Locator
21/22 June	1400-1400	ALL	RSGB 50MHz Trophy	50	RST+SN+Locator
22 June	1100-1500	ALL	RSGB 50MHz Backpackers #1	50	RST+SN+Locator
24 June	2000-2230 Local	ALL	RSGB 50MHz Activity	50	RST+SN+Locator

MICROWAVE CONTESTS

Date	Time	Mode	Contest	Bands	Exchange
22 June	0900-2100	ALL	2nd 5.7 and 10GHz Cumulative	5.7 / 10G	RST+SN+Locator

144MHz May, 2002

MULTI-OPERATOR SECTION

Pos	Group	Call	Loc	QSOs	Mults	Points	Total	Best DX	Dist	Power	Ant
1	Bristol CG	GW6YB/P	IO81KW	505	113	155450	17,565,850	DG0OPK	928	400	4x10
2	A1 CG	G4ZAP/P	JO02QV	548	84	198264	16,654,176	DD0VF	879	400	4x12+2x12+4x9
3	Five Bells CG	G4SIV/P	JO03CE	466	93	174272	16,207,296	DD0VF	961	400	6x12 + 2x12
4	Colchester CG	G0VHF/P	JO01GN	355	94	95212	8,949,928	DL1APW	774	400	12+9
5	De Montfort University ARS	G3SDC/P	IO92JR	332	92	74479	6,852,068	DG0OPK	812	400	4x9 + 4x3
6	Torbay ARS	G8NJA/P	IO80DQ	269	78	79376	6,191,328	DL2OM	793	180	2x17
7		G8MNY/P	IO91XG	237	84	41682	3,501,288	HB9RDE	668	350	2x17
8	Swindon & DARC	G8SRC/P	IO91CL	201	74	33449	2,475,226	HB9RDE	781	150	2x17
9	Culverstone CG	G0DLR	JO01EI	143	72	24385	1,755,720	GI4OWA	650	350	15
10	Herstmonceux Megacycles	G3YNN	JO00EU	155	48	34816	1,671,168	DG0OPK	681	100	12
11	Newquay & DARS	G4ADV	IO70LK	34	19	5471	103,949	G4SIV/P	473	400	8ovr8
12		GB2ME	IO92BK	25	25	3485	87,125	GM4WLL/P	372	25	18
13		M1DQG/P	IO82NS	30	21	2985	62,685	G4ZAP/P	286	8	8Q

SINGLE OPERATOR OTHERS

Pos	Call	Loc	QSOs	Mults	Points	Total	Best DX	Dist	Power	Ant
1	G0RMG/P	IO91EX	238	84	49531	4,160,604	F6FHP	811	150	12ZL
2	GM4WLL/P	IO85NR	66	53	19528	1,034,984	G8NJA/P	563	25	8ovr8
3	G1KHX/P	IO81MH	51	34	6702	227,868	GM8BDX/P	507	150	9
4	M5AHQ/P	IO80UU	24	21	3646	76,566	PA5KM	435	50	9

SINGLE OPERATOR FIXED

Pos	Call	Loc	QSOs	Mults	Points	Total	Best DX	Dist	Power	Ant
1	G3MEH	IO91QS	266	74	62253	4,606,722	DG0OPK	755	400	2x10
2	G7RAU	IO90IR	166	39	55995	2,183,805	DG0OPK	799	400	2x9
3	PE1EWR	JO11SL	61	42	17314	727,188	G4RRA	523	80	10
4	G4RYV	IO91OI	25	22	3410	75,020	PA5KM	324	10	9
5	M1DUD	JO02QC	23	16	3957	63,312	G8NJA/P	386	2	5XY
6	GM4VVX	IO78TA	8	9	1503	13,527	GW6YB/P	681	400	

6 HOUR SINGLE OPERATOR

Pos	Call	Loc	QSOs	Mults	Points	Total	Best DX	Dist	Power	Ant
1	G4PIQ	JO01MU	240	71	75483	5,359,293	F6FHP	799	400	3x15 + 2x9
2	G4DEZ	JO03AE	154	63	44422	2,798,586	DL1APW	837	400	2x12
3	G0TPH	IO92IO	51	37	7398	273,726	F6CBH	437	25	9
4	G3YJR	IO93FJ	28	26	4192	108,992	G8NJA/P	336	2.5	9
5	2E1GUA	JO01FR	9	13	1024	13,312	G8NJA/P	312	10	19

6 HOUR OTHERS

Pos	Group	Call	Loc	QSOs	Mults	Points	Total	Best DX	Dist	Power	Ant
1		M0AFC/P	IO84SA	76	51	14308	729,708	ON1LPA	686	10	13
2		GW8ZRE/P	IO83JA	63	49	10480	513,520	PA5KM	512	10	7 ZL
3	Dacorum ARS	G7RIH	IO91RR	66	41	6865	281,465	GM4WLL/P	470	50	7
4		G0RGH/P	JO01OV	38	26	7287	189,462	DF2VJ	494	50	5ovr5
5		PA5KM	JO11WL	64	3	23175	69,525	EI3GE	699	400	9

2nd 144MHz Backpackers, 2002

10W MULTI OPERATOR

Pos	Group	Callsign	Locator	QSO	Points	Mult	Total	Best DX	km	Power	AntEquipment
1*	One Man & Dog CG	G8NWM/P	IO92TR	94	15795	30	473850	DG6PY/P	569	10W	2x10el FT736R
2*		GW5NF/P	IO81KR	77	12460	19	236740	DG6PY/P	713	8.5W	2x9el FT290R
3	Barpackers CG	M1BAR/P	IO83XH	65	9053	21	190113	EI3ENB/P	363	10W	14el TR751E

3W MULTI OPERATOR

Pos	Group	Callsign	Locator	QSO	Points	Mult	Total	Best DX	km	Power	AntEquipment
1*		GW7LQD/P	IO82KW	144	19533	27	527391	PE1HWO	532	3W	2x9el IC275E
2*		G0HDV/P	IO93UK	84	13947	23	320781	G0JVR	509	3W	13el TR751E
3	Oldham Radio Club	G1ORC/P	IO93BJ	97	13150	24	315600	DG6PY/P	691	2.5W	2x9el FT290
4	Wigan Douglas Valley	G3BPK/P	IO83PN	50	6015	21	126315	G4NVM/P	355	3W	11el IC746
5	Mighty Potters	M1LOL/P	IO83VC	36	4511	21	94731	GU3TUX/P	375	2.5W	5el FT290R

10W SINGLE OPERATOR

Pos	Group	Callsign	Locator	QSO	Points	Mult	Total	Best DX	km	Power	AntEquipment
1*		G4RQI/P	IO93PW	92	15813	23	363699	GU3TUX/P	479	10W	10el IC746
2*		GQ4EDR/P	IO94RD	30	6419	19	121961	G8NJA/P	440	10W	4Q IC706

3W SINGLE OPERATOR

Pos	Group	Callsign	Locator	QSO	Points	Mult	Total	Best DX	km	Power	AntEquipment
1*		M0AFC/P	IO84SA	152	32222	30	966660	F8AIL	624	3W	13el IC706
2*		GW8ZRE/P	IO83JA	125	22308	37	825396	F6CBH	555	3W7ZL+12ZL	TR751E
3		GW0PZO/P	IO73XB	78	15227	22	334994	GM0LWD/P	401	2.5W	4Q FT290
4		GW0TPH/P	IO83JA	72	11078	23	254794	GU3TUX/P	373	2.5W	4el FT817
5	West Kent ARS	G1WKS/P	JO01ED	50	8692	19	165148	DG6PY/P	463	3W	9el FT817
6		G4HLX/P	IO91FN	53	8264	18	148752	MM5AJN/P	597	3W	13el K2+TVTR
7		G0BVW/P	IO92RA	47	7144	19	135736	GI4SNA	459	3W	9el IC202
8		M0BAO/P	IO80LV	44	7828	15	117420	G8XQS/P	422	3W	17el IC706
9		M1TAP/P	IO82XJ	56	5439	18	97902	PI4ALK/P	452	2.5W	9el FT290
10		M0BHE/P	IO80MU	34	5784	16	92544	G2CP/P	422	3W	5el FT817
11		G0WJR/P	IO81PH	34	4905	17	83385	G2CP/P	368	2.5W	7ZL FT817
12		G0LJD/P	JO01GH	40	5547	14	77658	GW0PZO/P	368	2.5W	12ZL FT290R
13		G1ATZ/P	IO84TE	36	4543	17	77231	G1OGY	336	2W	5el FT290
14		M5CSM/P	JO01GP	35	5623	13	73099	GW0PZO/P	349	2.5W	5el FT290
15		G8XQS/P	IO94ML	22	4312	15	64680	M0BAO/P	422	2.5W	9el FT290
16		M0COP/P	IO92DB	39	4267	15	64005	GU3TUX/P	262	2.5W	9el FT817

Checklog: G3MEH

By Tim Kirby, 11a Vansittart Road, Windsor SL4 5BZ. E-mail: tim@g4vxe.com

432MHz and Up, May 2002

SINGLE OPERATOR FIXED OVERALL RESULTS

Pos	Call	Loc	432MHz	1.3GHz	2.3GHz	3.4GHz	5.7GHz	10GHz	24GHz	47GHz	Total
1*	G3MEH	91QS	964	1000	1000	0	0	0	0	0	2964
2*	G8VHI	92FM	1000	171	0	0	0	0	0	0	1171
3	G0GCI	01ED	238	0	0	0	0	0	0	0	238
4	G3YJR	93FJ	176	0	0	0	0	0	0	0	176
5	G1KHX	81MI	144	0	0	0	0	0	0	0	144
6*	2E1GUA	01FS	114	0	0	0	0	0	0	0	114
7	G4LRT	92LJ	3	30	44	0	0	0	0	0	77

SINGLE OPERATOR PORTABLE OVERALL RESULTS

Pos	Call	Loc	432MHz	1.3GHz	2.3GHz	3.4GHz	5.7GHz	10GHz	24GHz	47GHz	Total
1*	GM4WLL/P	85NR	1000	1000	0	0	0	0	0	0	2000
2*	GW1ATZ/P	82KW	728	0	0	0	0	0	0	0	728
3	G4APJ/P	94MJ	298	0	0	0	0	0	0	0	298

MULTI OPERATOR OVERALL RESULTS

Pos	Group	Loc	432MHz	1.3GHz	2.3GHz	3.4GHz	5.7GHz	10GHz	24GHz	47GHz	Total
1*	Parallel Lines CG	01QD	1000	1000	1000	1000	947	1000	245	0	6193
2*	South Birmingham RS	92GB	100	241	378	985	1000	410	795	1000	4909
3	The Northern Lights	94RJ	527	439	377	858	447	622	0	0	3270
4	Telford & DARS	82QL	0	199	240	43	228	385	1000	0	2096
5	Flight Refuelling ARS	80UU	202	0	0	69	0	154	0	0	426
6	Five Bells CG	03CE	371	0	0	0	0	0	0	0	371
7	Luton VHF Group	91RU	58	182	17	0	0	0	0	0	257

432MHZ SINGLE OPERATOR FIXED

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G8VHI	17136	1000	62	92FM	100	2 x 23Y	DF0MTL	684
2*	G3MEH	16511	964	80	91QS	250	2 x 23Y	DF2VJ	599
3	G0GCI	4085	238	28	01ED	100	2 x 21Y	DL0VR	464
4*	G3YJR	3019	176	69	93FJ	10	19Y	PI4ZLD	422
5	G1KHX	2465	144	17	81MI	120	19Y	PA6NL	493
6*	2E1GUA	1958	114	16	01FS	10	19Y	PA6C	431
7	G4LRT	46	3	1	92LJ	10	2 x 18Y	G8OHM/P	46

432MHZ SINGLE OPERATOR PORTABLE

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	GM4WLL/P	4325	1000	11	85NR	50	21Y	PA6NL	620
2*	GW1ATZ/P	3150	728	33	82KW	50	23Y	G8P	367
3*	G4APJ/P	1290	298	6	94MJ	25	21Y	G4RFR/P	404

432MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G8P	94531	1000	242	01QD	400	8x21Y+38Y	OK1KHI	921
2*	M6V	49853	527	104	94RJ	400	4x28Y	OK1KIM	1031
3	G5B	35050	371	105	03CE	400	8x28Y+8x21Y	DF4UE	815
4	G4RFR/P	19133	202	81	80UU	400	QLY	DF0MMO	726
5	G8OHM/P	9446	100	53	92GB	400	4 x 19Y	DK2MN	597
6	G4LOO/P	5492	58	34	91RU	200	3 x 36Y	DK0BN	620

1296MHZ SINGLE OPERATOR FIXED

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G3MEH	5167	1000	23	91QS	50	4 x 35Y	DF2JQ/P	474
2*	G8VHI	881	171	4	92FM	10	67Y	PA6NL	390
3	G4LRT	153	30	2	92LJ	20	27QLY	G3ZME/P	107

1296MHZ SINGLE OPERATOR PORTABLE

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	GM4WLL/P	1097	1000	4	85NR	18	67Y	G3XDY	487

1296MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G8P	23074	1000	75	01QD	150	16 x 23Y	DK2GR	599
2*	M6V	10126	439	23	94RJ	400	8 x 23Y	DG1KJG	653
3	G3OHM/P	5562	241	37	92GB	130	8 x 23Y	DF0HS/P	531
4	G3ZME/P	4593	199	27	82QL			DF0HS/P	616
5	G8ATD/P	4200	182	30	91RU	25	4 x 36Y	DF0HS/P	465

2320MHZ SINGLE OPERATOR FIXED

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G3MEH	2410	1000	11	91QS	10	67Y	ON7WR	371
2*	G4LRT	107	44	1	92LJ	8	45QLY	G3ZME/P	107

2320MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G8P	6510	1000	27	01QD	30	0.8m	PI4GN	438
2*	G3OHM/P	2460	378	16	92GB	60	1.2m	PA6NL	382
3	M6V	2452	377	8	94RJ	20	1.5m	PA5DD	432
4	G3ZME/P	1564	240	10	82QL			G8P	311
5	G4FFM/P	113	17	3	91RU	10	1.8m	G3OHM/P	67

3400MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G8P	2080	1000	9	01QD	6	0.8m	PA6C	407
2*	G8IFT/P	2048	985	10	92GB	30	1.2m	PA6NL	382
3	M6V	1785	858	6	94RJ	15	1.5m	PA5DD	432
4	G4JNT/P	144	69	1	80UU			G8IFT/P	144
5	G3ZME/P	90	43	1	82QL	20	0.9m	G8IFT/P	90

5700MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G8IFT/P	1764	1000	10.5	92GB	15	1.2m	PA6NL	382
2*	G8P	1671	947	8	01QD	4	0.8m	F5HRY	283
3	M6V	789	447	4	94RJ	10	1.2m	M1CRO/P	308
4	G3ZME/P	402	228	4	82QL	10	0.9m	G3LRP	150

10368MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G8P	8540	1000	34	01QD	10	1.2m	PA6C	407
2*	M6V	5309	622	17	94RJ	15	1m	PI4GN	489
3	G4MAP/P	3504	410	25.5	92GB	10	1.0m	PA6NL	382
4	G3ZME/P	3292	385	29	82QL	4.5	0.7m	G8P	311
5	G4JNT/P	1317	154	12	80UU			M6V	409

24000MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G3ZME/P	322	1000	3	82QL	0.6	0.6m	G8ACE/P	147
2*	G8IFT/P	256	795	2.5	92GB	0.35	0.3m	G3PHO/P	125
3	G8P	79	245	1	01QD	0.5	0.5m	M1CRO/P	79

47000MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G3OHM/P	1	1000	1	92GB	0.0001	0.6m	G7VDE/P	1.3

3rd 144MHz Backpackers, 2002

10W MULTI-OP

Pos	Group	Callsign	Locator	QSOs	Score	Mult	Total	Best DX	Km	Power	Ant	Equipment
1	One Man and His Dog CG	G8NWM/P	IO92TR	68	14535	33	479655	F5KMQ/P	883	10W	2x10el	FT736R
2	Barpackers CG	M1BAR/P	IO83XH	66	12381	27	334287	F6KCP/P	616	10W	14el	TR751E
3	Wigan Douglas Valley RS	G3BPK/P	IO83PN	55	10367	26	269542	F6KCP/P	666	10W	11el	IC746

3W MULTI-OP

Pos	Group	Callsign	Locator	QSOs	Score	Mult	Total	Best DX	Km	Power	Ant	Equipment
1		GW5NF/P	IO81KR	74	16715	39	651885	EA2URE/P	978	2.5W	2x9el	FT290
2	Malvern Hills "B"	GW4IDF/P	IO81NV	63	13658	32	437056	F6HTJ/P	1121	3W	17el	IC202
3		G0HDV/P	IO93UK	70	10885	23	250355	F5PQV/P	469	3W	13el	TR751E
4	Mighty Potters	M1LOL/P	IO83VC	37	4927	20	98540	GM4ZUK/P	427	2.5W	9el	FT290

10W SINGLE OP

Pos	Group	Callsign	Locator	QSOs	Score	Mult	Total	Best DX	Km	Power	Ant	Equipment
1		M0AFC/P	IO84SA	110	25174	34	855916	DC6IA	711	10W	13el	IC706
2		GW8ZRE/P	IO83JA	127	23288	34	791792	OS4PRA/P	558	10W	7ZL	TR751E
3		G0PQF/P	JO01AX	57	13323	35	466305	F5KMQ/P	795	10W	9el	FT847
4		G4RQI/P	IO93DW	61	14958	30	448740	DK0BN	785	10W	10el	IC746
5		M0BAO/P	IO80LV	54	12284	28	343952	EA2URE	1106	10W	17el	IC706
6		M1TAP/P	IO82NM	52	8221	23	189083	OR4NOB	563	10W	9el	TR751E

3W SINGLE OP

Pos	Group	Callsign	Locator	QSOs	Score	Mult	Total	Best DX	Km	Power	Ant	Equipment
1		G4HLX/P	IO91FN	70	12844	34	436696	DK0BN	679	3W	13el	K2+TVTR
2		G0BVW/P	IO91SW	49	8129	27	219483	GM3POI	792	2.5W	9el	FT290
3		G1WKS/P	JO01ED	46	8014	25	200350	EI7M/P	499	3W	9el	FT817
4		G8XQS/P	IO95AF	35	9313	18	167634	G4LIP/P	505	2.5W	9el	FT290
5		G1RVK/P	IO92TR	20	2853	16	45648	PI4GN	478	2.5W	9el	FT290
6		G0PZO/P	IO93AF	3	145	4	580	GW8ZRE/P	87	2.5W	5Q	FT290

* Certificate winner.

4th 144MHz Backpackers Contest, 2002

10W MULTI-OPERATOR

Pos	Group	Callsign	Locator	QTH	QSOs	Score	Mult	Total	Best DX	km	Power	Ant	Equipment
1*		M0AFC/P	IO84SA	LA	95	21820	68	1483760	DL6BF	680	10	13el	FT847
2*	One Man and his Dog CG	G8NWM/P	IO92TR	PE	60	11841	64	757824	F4CVA	488	10	2x10el	FT736R
3	Wigan Douglas Valley RS	G3BPK/P	IO83PN	WN	66	11050	67	740350	ON4AMX	595	10	11el	TS2000

3W Multi-operator

Pos	Group	Callsign	Locator	QTH	QSOs	Score	Mult	Total	Best DX	km	Power	Ant	Equipment
1*		G0HDV/P	IO93UK	LN	47	9282	52	482664	G0KYS/P	395	3	13el	TR751E
2*		GW5NF/P	IO81KR	NP	52	8004	51	408204	ON1AEN	488	2.5	2x9el	FT290R
3	Malvern Hills "B"	GW4IDF/P	IO81NV	NP	50	6210	42	260820	F0DSH/P	391	3	17el	IC202
4		G1WAC/P	IO82XJ	BM	32	2924	35	102340	G8XQS/P	315	2.5	17el	FT817

10W SINGLE OPERATOR

Pos	Group	Callsign	Locator	QTH	QSOs	Score	Mult	Total	Best DX	km	Power	Ant	Equipment
1*		GW8ZRE/P	IO83JA	LL	94	15489	75	1161675	ON4AMX	602	10	7ZL	TR751E
2*		M0BAO/P	IO80LV	TA	30	5297	37	195989	GM4IGS/P	451	10	8el	IC706
3		G0WJR/P	IO81PH	BS	15	2126	22	46772	M0AFC/P	302	5	HB9CV	FT817

3W SINGLE OPERATOR

Pos	Group	Callsign	Locator	QTH	QSOs	Score	Mult	Total	Best DX	km	Power	Ant	Equipment
1*		G4HLX/P	IO82NN	SY	58	9184	58	532672	ON1AEN	493	3	13el	K2+Tvtr
2*		G8XQS/P	IO95AF	NE	31	8381	41	343621	G4RRA	512	2.5	9el	FT290
3		GM4IGS/P	IO74WV	DG	28	8021	39	312819	G3YVR	495	3	17el	FT290
5	West Kent ARS	G1WKS/P	JO01ED	TN	32	4986	39	194454	DO1KOH	440	3	2x9el	FT817
6		G0BVW/P	IO91SW	LU	21	3342	30	100260	G8XQS/P	379	2.5	9el	FT290
7		G1RVK/P	IO92TR	PE	15	2442	25	61050	G8XQS/P	297	2.5	9el	FT290R
8		GW4EVX/P	IO83JF	CH	18	1675	24	40200	G8XQS/P	237	2.5	5ZL	FT290R

* Certificate winner

5th 144MHz Backpackers Contest, 2002

MULTI-OPERATOR, 3W

Pos	Group	Callsign	Locator	QSOs	Score	Mult	Total	Best DX	Km	Power	Ant	Equipment
1*		GW5NF/P	IO81KR	62	11732	30	351960	DK0WD	699	2.5	2x9el	FT290
2*	Malvern Hills "B"	GW4IDF/P	IO81NV	45	10021	28	280588	F6KUP/P	653	3	17el	IC202
3		G0HDV/P	IO93SN	48	8377	18	150786	PA6C	447	3	4Q	TR751E

MULTI-OPERATOR, 10W

Pos	Group	Callsign	Locator	QSOs	Score	Mult	Total	Best DX	Km	Power	Ant	Equipment
1*		M0AFC/P	IO84SA	97	23601	33	778833	F6KPQ/P	678	10	13el	FT847
2*	One Man and his Dog CG	G8NWM/P	IO92TR	65	15470	38	587860	DL0GTH	803	10	2x10el	FT736R
3	Wigan Douglas Valley RS	G3BPK/P	IO83PN	72	11614	29	336806	LX/PE1BBI	721	10	11el	TS2000
4		G0TPH/P	IO92IR	76	11906	27	321462	PA6C	512	10	4el	FT847

SINGLE OPERATOR, 10W

Pos	Group	Callsign	Locator	QSOs	Score	Mult	Total	Best DX	km	Power	Ant	Equipment
1*		G4RQI/P	IO94JF	66	19124	37	707588	F8KTH/P	727	10	2x10el	IC746
2*		GW8ZRE/P	IO83JA	88	16782	30	503460	F5KOU/P	537	10	7ZL	TR751E
3		G1ATZ/P	IO82KV	79	14641	26	380666	ON7RY	575	10	5el	TS770
4		G0PQF/P	JO02HV	34	8379	30	251370	G4ADV/P	495	10	9el	FT847
5		M0BAO/P	IO80LV	39	8711	26	226486	GM4ZUK/P	673	10	17el	IC706
6		G4WVD/P	IO70LE	5	1294	5	6470	G0VHF/P	480	10	10ZL	FT480R

SINGLE OPERATOR, 3W

Pos	Group	Callsign	Locator	QSOs	Score	Mult	Total	Best DX	km	Power	Ant	Equipment
1*		G4HLX/P	IO82NN	58	11459	27	309393	ON4BAX/P	574	3	13el	K2+trvtr
2*		GW0PZO/P	IO83ID	66	9960	24	239040	F5KOU/P	549	2.5	9el	FT290
3	West Kent ARS	G1WKS/P	JO01ED	45	7986	23	183678	F1DLT	541	3	9el	FT817
4		G8XQS/P	IO95AF	32	9622	18	173196	G8NJA/P	518	2.5	9el	FT290
5		G0OIW/P	IO91MP	42	6759	22	148698	GM4ZUK/P	597	3	5el	IC202S
6		G3JKV/P	IO91TE	40	6273	23	144279	F8KTH/P	414	3	9el	FT817
7		G0BVW/P	IO91SW	39	6206	23	142738	GM4ZUK/P	572	2.5	9el	FT290
8		G4CZB/P	IO91XF	26	4951	20	99020	DF0OL	576	2.5	7ZL	FT290
9		G0WJR/P	IO81PH	27	4652	15	69780	F6KPQ/P	376	2.5	HB9CV	IC202
10		GW4EVX/P	IO83JD	29	4188	15	62820	G5LK/P	377	2.5	5el	FT817
11		M0BHE/P	IO80MU	18	3545	13	46085	PA6NL	507	3	5el	FT817
12		G1RVK/P	IO92TR	16	1993	12	23916	ON1YW	291	2.5	FT290	9el
13		G7NBE/P	IO92AR	17	1957	12	23484	G5LK/P	282	2.5	FT290	9el

* Certificate Winner

By Bob Treacher, BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ. E-mail: brs32525@compuserve.com

SWL

Above, right: Three years on and SWLs are receiving DX special event bureau QSLs from stations that were specially active for the millennium.

Things have changed at the Treacher household as my son Simon, RS177448, is now licensed as M3CVN, and I cannot get anywhere near the receiver! He is having a ball on the HF bands, and worked 84 DXCC entities and over 800 stations in his first month of activity! He is using an Alinco DX-70TH and just 10W into my Cushcraft R6000 vertical and a sloping dipole for 7MHz. He has worked some good DX, and his grounding as an active HF SWL is clearly paying dividends.

HF REPORT

David Whitaker, BRS25429, now has XT2WP (IK92FI) confirmed on 6 metres thanks to Fred, G4BWP. He now has 136 confirmed on 'the magic band' and is looking forward to this summer's Sporadic E season.

He was alerted to auroral conditions on the band at around 1500UTC on 31 March. He heard a number of GM stations as well as some LA and OZ stations. Some of the stations heard were: GM4VVX, GM6CMQ, MM3ERP, GM7 LIN, MM5DWW, OZ7IS, MM0BSM, LA 9VFA, GM3XOQ, LA6FFA, OZ1BUR, OZ1KEF and GM0HLV.

David also took a look at the low bands during the SSB WPX contest. He was quite pleased with his results: **160m**: YV5MBX (0456UTC), HC8N (0502UTC), YW4M (0537UTC). **80m**: HC8N, 3V8BB, CO8ZZ, TI0RC, ZF 2NT, CQ9K, VP5V, V47KP, TO4Y, CL 9C, HI3CCP, YW4M. **40m**: ZF2NT, FY 5FY, VP5V, ST0RY, ZY7C, D44TD, TI 5N, CN2R, ZW5B, PY0FF, HC8N, YW 4M, PV8DX, 3V8BB, P41P, KP3Z, CN 8NK, CV1T, P40Y, TO3M, but the star logging was undoubtedly VK9NS (0640UTC).

David will have returned to the Canary Island by the time this column appears. He is likely to have taken a receiver with him again and hopes that conditions are a little better than those that we are experiencing in the UK!

Robert Small, BRS8841, says that this has to have been the worst equinox for conditions ever! He, like most of us, was looking forward to an upturn in conditions, but that did not materialise – only some good signals from ST0RY lifted the gloom for Robert. He did hear ST2CF and ST0RY on 40m and 80m, while 30m provided 3G1P, 3B8MM and C53CW, and 17m gave J5UCW, A71EY and S21YY. With such ordinary conditions, 10m had been in poor shape. Best DX on that band was 5R8FL, CW1OO, YE8A (OC-242) and XW1DA. With a report like that, I am left to wonder what conditions might be like once we hit the sunspot minimum?

RAOTA

How many listeners are Interested in the history and heritage of amateur radio? Are you interested in knowing more about how our hobby developed? If so, you might be interested in RAOTA, the Radio Amateurs' Old Timers Association. Indeed, some listeners might already listen to the RAOTA nets. Membership entitles you to a subscription to the quarterly *OT News*, and runs from April to March – so it might be a good time to think about joining. Membership is open any listener who has been actively involved in amateur radio for at least 25 years. For further details, visit the RAOTA website (see 'Websearch' below) or you can write to Edward Rule, G3FEW, 15 Norwich Road, Lenwade, Norwich NR9 5SH, or e-mail him at: edit@raota.fsnet.co.uk

SUMMITS ON THE AIR (SOTA)

How many listeners are aware that the Summits on the Air award scheme is open to them? SOTA is an award scheme that encourages portable operation in mountainous areas. The scheme has been designed to make participation possible for everyone. As well as awards for activators (those who climb to the summits), there are awards for chasers (those who stay in their radio shacks). This is where SWLs can join in the fun.

Although the scheme has been running for about one year, there are no SWLs in the 'chaser' listings. Activity tends to be on 144MHz FM and 7 and 14MHz CW and SSB. Each of the mountains are afforded points on the basis that the higher the mountain the higher the point value. To give an example, Ditchling Beacon in Sussex is worth 1 point, whereas Hellvellyn in the Lake District will gain you 10 points. 100 points are required to claim the basic award. Activity is obviously greater during the summer months. With many listeners favouring 7MHz SSB, the main frequency for SOTA operation on that band is ±7090kHz.

DATACOMS

With listeners beginning to monitor datamodes on a more regular basis, there may now be a greater need for listeners to consider joining the British Amateur Radio Teledata Group (BARTG). The group promotes all forms of datacoms within amateur radio. It produces a regular magazine, has an informative website and two very popular annual contests. BARTG has world-wide membership.

Datacom magazine is published monthly in A4 format and is full of up-to-date information about the rapidly changing world of amateur radio datacoms.

GB QSLING

Finally, this month, a further offering about non-QSLing GB special event stations which may let us 'put this topic to bed'. It is clear from several months' mail that SWLs would like to see all GB stations having QSL cards printed to commemorate the event that led to the issuing of their special GB callsign, and having a policy of QSLing all accurate SWL reports. Unfortunately, this is an unenforceable policy. QSLing has always only ever been voluntary: it has never been seen as mandatory. Indeed, it is of no concern to the licensing authority whether any particular station QSLs or not. A licence would not, for example, be withheld from M0xxx if he made it known that he did not plan to QSL. The same 'rules' apply to GB calls, as they are only Notices of Variation on standard callsigns.

Having said that, I hope that organisers of special event stations this summer give due consideration to the issuing of a QSL card that will also be available to listeners. After all, if the event is special enough to warrant a special GB call, it should be special enough to warrant a QSL card being printed. ◆

WEB SEARCH

Radio Amateurs' Old Timers Association (RAOTA):	go.to/raota
Summits on the Air (SOTA):	www.sota.org.uk
British Amateur Radio Teledata Group (BARTG):	www.bartg.demon.co.uk
Franck Parisot's SWL contest:	http://site.voila.fr/SWLCONTEST

By Norman Fitch, G3FPK, 40 Eskdale Gardens,
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VHF/UHF

The topic for this month is the jargon associated with amateur radio. To the uninitiated, leafing through a copy of *RadCom* could give the impression that it's a very complicated hobby. *Amateur Radio Explained* by Ian Poole, G3YWX, [available from the RSGB Shop – *Ed*], is the ideal reference for interested newcomers. One of the first things we encounter is the universal Q-code. This is very long and detailed but radio amateurs' use of it is restricted to codes concerning signals. A selection of these can be found in most handbooks such as the *Amateur Radio Operating Manual* [again, available from the RSGB Shop – *Ed*].

Q-codes have precise meanings and we tend to 'bend' them a bit in day-to-day usage. For example, QSO means, "Can you communicate with...?" whereas we use it to mean a contact between two or more stations. When stations indicate which direction they are pointing their antennas during an aurora they report, say, "QTF 045°". In fact, QTF means "Will you give me the position of my station according to the bearings taken by the direction finding stations you control?" Well, an aurora can hardly report this, so that's why I prefer QTE which actually means "What is my true bearing in relation to you?" to indicate the beam direction or azimuth: not quite correct, but nearer perhaps?

QRG means "Will you tell me my exact frequency?" but we use it instead of the word frequency. Everyone is familiar with the term QTH, which initially meant one's position in latitude and longitude. Now it can be your town, post code or a grid reference. To confirm that your address is correct in the current *RSGB Yearbook* the abbreviation 'QTHR' is used, the additional 'R' presumably meaning 'right'.

QRV means "Are you ready?", but we use it to indicate that either a station was operating in a particular event or is capable of operating on a particular band or mode. For example, "GM4VVX was QRV in the aurora on 31 March" or "GM4WLL is now QRV on 4m". When describing distances, QRB is the accepted code, whereas it really means "How far approximately are you from my station?" I'm not sure where it originated, but when noting the longest QRB, the term ODX has become accepted meaning best (or "Optimum") DX.

The various propagation modes are usually abbreviated such as EME (Earth-Moon-Earth) when describing contacts made by bouncing signals off the Moon, Es denoting a Sporadic E event, MS for meteor scatter operation, tropo for tropospheric propagation and FAI for a field aligned irregularity event. The majority of VHF/UHF contacts are via tropo, but Es, MS and auroral QSOs are E-layer phenomena. Around the peak of the sunspot cycle, F-layer contacts can occur on the 50MHz band, which is the usual mechanism on the HF bands. These are F_2 events.

In this column times are given in UTC, which for our purposes is the same as GMT (Greenwich Mean Time), unless otherwise stated as 'local'. CW contacts are identified with an asterisk (*) and in the Moonbounce section a hash (#) denotes an initial contact, ie a new station worked for the first time. I don't propose to explain these abbreviations in future columns as I assume that most readers will now be familiar with them. After all, most hobbies and games have their own jargon.

EXPEDITION NEWS

Keith Tatnall, G4ODA, reports that he will be in Iceland (TF) from 5 to 19 June operating on 6m from several grids. On the way back he hopes to be QRV from the Faeroe Islands (OY) between the 20th and 22nd. Presumably the callsigns will be TF/G4ODA and OY/G4ODA. See page 44 in the May *RadCom* for details of more June DX operation.

SOLAR AND GEOMAGNETIC ACTIVITY

In the 30 days to 14 April, the daily 10.7cm radio flux averaged 122.5 units so continuing its steady decline. It was below 100 on five days, the minimum being 89 on 22 March, while the maximum reached 160 on the 31st. The SESC sunspot numbers were below 100 on 19 days, the minimum counts being 40 on 21 and 22 March with the maximum value, 189, on the 28th and again on 2 April. The number of new sunspot regions recorded was down to 20.

In the 30 days to 14 April the geomagnetic A-index at Fredericksburg was in the quiet range on only eight days. The only day it was in the sub-storm range – just – was on 28 March when it reached 23. The rest of the period was unsettled. As usual, things were livelier at College in Alaska where 17 sub-storm days were recorded with three storm ones.

METEOR SCATTER

There are a couple of worthwhile meteor showers in June. The Arietids are useable until the beginning of July and should peak around 2200 on 7 June with a zenithal hourly rate (ZHR) of 55. The radiant is above a mid-UK horizon 0100–1730. The Zeta-Perseids stream is very similar and should peak around 2200 on the 9th with a ZHR of 50 and can be 'seen' 0200-1930.

MOONBOUNCE

In the April edition of the *432 and above EME News* it is reported that

Propagation

IN THE FEBRUARY ISSUE of SunMag, compiled and published by Neil Clarke, G0CAS, there is an interesting article on noctilucent clouds, which have been observed by astronauts on board the International Space Station when flying over the Southern Hemisphere. They occur in summer time in the mesosphere, a region 50-85km above Earth's surface, and have been reported by British Isles observers for many years.

This is a very dry and very cold region (-125°C) yet these NLCs are made of water. The molecules need something to stick to and one suggestion is that this nucleation could be the result of the tonnes of meteoroids that are swept up daily by the Earth. Whether or not NLCs could affect E-layer propagation is very uncertain. Nevertheless they are a delightful sight so look out for these electric blue clouds on summer nights by looking west 30-60min after sunset when the Sun has dipped to 6°-16° below the horizon.

Noctilucent clouds taken by Finnish photographer and SWL Timo Leponiemi.

conditions in the *DUBUS*/REF World Wide Contest over the 15/16 March weekend were very good. On 70cm activity was better than in last year's ARRL event. The big disappointment was that the much-anticipated operation from Mauritius did not take place. The operators were there but the necessary licence never materialised.

Simon Freeman, G3LQR (JO02), spent a few hours on 13cm in the contest but only worked six stations with 40W to a 4.2m dish. On 70cm only VK3UM and HB9Q were worked with his 8-Yagi array, which he says, "Are not up to snuff!"

Peter Blair, G3LTF (IO91), reported, "For once we had good EME conditions with good Wx, no wind and clear skies." He found US activity on 13cm and 70cm disappointing but even so seven new initials were worked on 70cm: SM3YBA, YU1EV, SP6JLW, DL4KG, JR9NWC, PA0BAT and SM5IOT, bringing his tally to 372. His claimed score is 46x24. On 13cm he completed with OE9XXI, HB9SV, F2TU, SM3AKW, OZ4MM, ZS6AXT, G3LQR and OK1CA on the 15th and with GW3XYW next day for a score of 9x9, his best ever on the band. I assume all the above QSOs were on CW.

Howard Ling, G4CCH (IO93), worked *K5GW (579/579) and *W2UHI (569/579) on 23cm on 14 March. In the contest he completed with *DL6YDH, *DL8OBU, *K0YW (579/589), K0YW, K5GW, VE7BBG (O/RO and 539/539) and *IK2MMB.

Dave Dibley, G4RGK (IO91), found conditions excellent for most of the time on 70cm and completed with 33 stations in three sessions totalling 14 hours. The non-Europeans included K4QI, K1FO, WA4NJP, KL6M, VK3UM, JA6AHB, K0RZ, N9AB, KE2N, K9KFR, KO7N and VK4AFL. He is in the initial stages of assembling a 23cm portable station as he has local neighbour restrictions.

The next sked weekend is 7/8 June when London latitude stations will have 26.4 hours of Moon time. The declination ranges from +14.53° to +2.99°, the 144/432MHz sky temperature varies from 225/17K to 316/23K and the signal degradation referred to perigee is -0.55dB to -0.20dB. The Sun offset at Saturday midnight is +92°.

LOCATOR SQUARES TABLE
Starting date: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1296MHz	Total
G3XDY	–	34	251	175	123	583
G3IMV	835	20	616	125	53	1649
G4YTL	–	53	529	122	–	704
G6TTL	220	–	133	90	27	470
G1SWH	439	42	242	81	30	834
G8HGN	310	–	168	67	–	545
G4DEZ	608	24	156	65	28	881
G8TOK	406	34	140	56	29	665
M5BXB	335	15	160	56	–	566
G3FIJ	278	29	108	51	23	489
GM4JJJ	206	3	430	46	–	685
G4ZHI	101	10	259	33	–	403
G4APJ	176	–	58	25	–	259
G0ISW	224	5	88	22	–	339
G0FYD	676	1	285	20	–	982
M3CLY	246	–	270	20	–	536
G1UGH	280	–	130	18	–	428
G4OBK	426	25	64	7	–	522
G4FUJ	96	20	25	6	5	152
M3VAM	17	–	18	6	–	41
G0JHC	1000	26	48	4	–	1078
G1EFL	231	–	67	2	–	300
M1DUD	241	1	32	1	–	275
GW7SMV	664	–	211	–	–	875
G8BCG	661	–	–	–	–	661
G7KHF	487	–	18	–	–	505
GM4VVX	324	5	132	–	–	461
G3FPK	30	–	246	–	–	276
GM6MEN	186	–	–	–	–	186
EA7IT	–	–	103	–	–	103
G8RWG	–	–	30	–	–	30

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Band of the month 430MHz. Next deadline is 17 June.

BAND REPORTS, 50MHz

David Whitaker, BRS25429 (IO93), was alerted to an aurora on 31 March at 1500. Stations heard were GM4VVX, G4PCI, G3FPQ, GM6CMQ, MM3ERP, GM7LIN, MM5DWW, OZ7IS, G6UUR, MM0BSM, G8KBF, G6DOX, LA9VFA, GM3XOQ, ON4GG, LA6FFA, OZ1BUR, OZ1KEF and GM0HLV. The grids copied were IO75, 78, 82, 84, 89, 91-93, JO20, 28, 39, 46 and 56. The event ended at 1550 and the QTE was about 45°. He heard the first Es of the spring in a 20min opening from 1550 on 14 April copying IT9IPQ (JM78), IW8EWT (JN70) and IK7MCJ (JN80). All were S8-9 and at the same time he heard GW stations working into the Middle East.

Ted Collins, G4UPS (IO81) continued his morning MS-type skeds on CW with SM7AED completing them every day in March. On the 28th, Dave Court, EI3IO, telephoned him at 1552 to report that PA6MM had worked ST0RY on 50.110MHz but in a few minutes the Sudan station was working a huge pile-up on 28.003MHz. From 1915 that day it seems that French stations had worked PY5CC and PY1RO but nil was heard at G4UPS or in IO91. His first DX of this spring was on 14 April when he worked *5B4AGN (KM64) at 1620. Later on he heard GWs working 5N6NDP/9. On the 16th, G3HBR (IO91), had an Es opening to T9, LZ and YU from 1309.

Bryn Llewellyn, G4DEZ (JO03), reports auroral activity on 29 and 30 March with a few GMs and LA stations but the event on the 31st was better, resulting in two more grids. Clive O'Hennessy, GM4VVX (IO78), caught a few auroras but finds operating hard with only 40W and a 3-ele Yagi. On 16 March he completed SSB QSOs with GMs, SSB and CW contacts with GMs on the 20th and SSB QSOs with Gs and GMs on the 31st.

70MHz

4m is Ross Wilkinson's, G0WJR, favourite band and he has been operating mostly on Sunday mornings in mobile or back-packing modes from various hilltops in the Mendips, Cotswolds and on the West Pennine Moors. These, together with the five RSGB Cumulative sessions, have resulted in almost 200 QSOs this year. Hardly a week passes without his meeting at least one new station, including many with newly-converted Ascom PMR sets. He finds he gets a better success rate from CQ calls on this band than he does on 2m. He has re-activated his previous callsign, G6GVI, now 21 years old, and will be using it this summer on VHF/UHF. He has updated his website, see the list.

David Dodds, GM4WLL/P (IO85NR), was QRV in the first RSGB 4m Contest on 13 April completing 29 QSOs in the four hours with stations in 14 grids, IO74, 78, 81-84, 86, 90-93 and JO01-03. Countries worked were G, GD and GM. ODX was G4RFR in Poole at 555km and four other contacts were over 500km. He tried out an FT-847 using it as a 2m IF for a Spectrum transverter running 20W, comparing it with the FT-847 'barefoot' on 4m. He concludes that the latter is inefficient using lots of DC power to produce just 8W output and the receiver is rather deaf. However, as a driver it proved effective particularly the speech processor, the G0VHF/P operator in Basildon asking, "Have you got a power station up there?" The antenna was a 6-ele Yagi. GM4VVX hopes to be QRV in contests this year.

144MHz

GM4VVX was QRV in the RSGB 144/432MHz contest on the 1/2 March weekend but found it very hard going from IO78, a very poor QTH for tropo contacts. Clive managed QSOs with 12 Gs, a GI, 14 GMs and 3 GWs. ODX was G4RRA (IO80). In the last half of March he was only QRV during auroras, mostly on CW. The 16th brought QSOs with G and GM stations from 2045, the 17th from 1450 with DL, G, GM, GW and OZ, similarly on the 20th from 1500 when GM6VXB (IO97) was a new grid.

The event from 1535 on the 27th produced CW contacts with DL, EI, GW, OH and SM and SSB QSOs with DL, GM, GW and SM. Next day saw more CW QSOs from 2235 with GM, GW, LA and SM, and SM on

SSB. From 1530 on the 29th there were CW contacts with DL, EI, G, GM, GW, LA, ON and SM, while SSB brought DL, EI, G, GW and SM QSOs. From 1520 on the 30th he completed on CW with DL, G, GM and SM and with an EI on SSB. The best day was the 31st. Starting at 1310 he made CW QSOs with stations in EI, G, GW, LA, OH, ON, OZ, PA, SM and SP1CNV (J083 for a new grid), while SSB brought DL, EI, G, GI, OZ, PA and SM contacts.

When auroral conditions occur but no activity is apparent, Clive transmits on the QRG allocated to the Lerwick beacon, 144.445MHz, sending dashes followed by 'GM4VVX IO87TA' with a 5s break listening on 144.050MHz when he has not got any replies from 'CQA' calls on that QRG. He has also sent this signal on 144.300MHz as an auroral alert and he hopes that won't upset some operators.

430MHz

Graham Coyne, G3YJR (IO93), reports a nice tropo opening on 18/19 March. Using 10W to a 19-ele Yagi he worked PA5DD, OZ1FF, DL2NUD, OZ1AFS, OZ6OL and G6TTL. GM4VVX has an old FT-790R transceiver running 50W and a 19-ele Yagi, which he has never used since moving to Scotland. During the March contest a couple of operators he worked on 2m asked if he had 70cm capability so he thinks he might try his luck from a portable site, IO78TA. Checking the last few contest results for GM activity it seems that very few operate that far north. He wonders if it would be worth the effort?

PHOTOGRAPHS NEEDED

Last month I mentioned that I'd appreciate some photographs to include in VHF/UHF and that still stands. Now Ev Tupis, W2EV, writes that he is need of several still photographs and a video clip of an EME station. He says, "Ideally the still photos should be of antennas with a full Moon behind them – or in the picture – with the antennas pointing at the Moon". He is not looking only for monster stations and that 4-, 6- and 8-Yagi arrays would be fine, as would pictures of dishes.

A short video clip of an array that is moving would be outstanding. He continues, "Some video of a CW key sending dashes and then hearing their own signals coming back to them in the background 2.6 seconds later would be very nice, too. I am not looking at this time for anything with WSJT or other computer-generated stuff. That may come later". Ev's project is to compile a video of EME operation to help inspire others to join the ranks. He can accept up to 5MB attachments and his e-mail address is w2ev @arrl.net

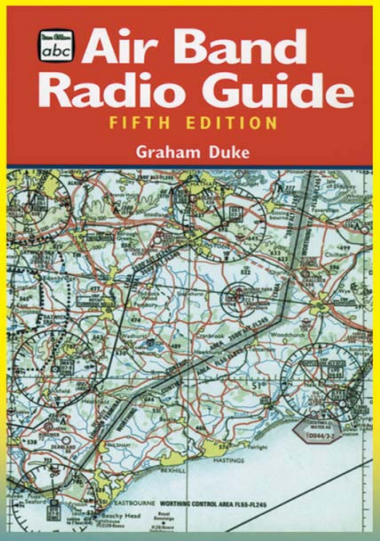
FINALE

That's it for another month. Let's hope that next time they'll be some 2m Es to report as well as the expected Es on 6m and, hopefully, 4m. My thanks to Andy Barter, G8ATD, for the issue 2003-Q1 of *VHF Communications* and to Dr Steve Reed, G0AEV, for the February edition of the *Six and Ten Report*. The deadline for copy for the August issue is **17 June** and the September date is **15 July**. The telephone answering and fax machine is on 020 8763 9457 and my CompuServe ID is g3fpk. ◆

WEB SEARCH

SunMag (G0CAS):	http://www.g0cas.demon.co.uk/main.htm
432 and above EME News:	http://www.nitehawk.com/rasmit/em70cm.html
G0WJR 4m website:	http://www.70mhz.org
VHF Communications:	http://www.vhfcomm.co.uk

AIR BAND RADIO GUIDE



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The R.A.I.B.C. produces a Quarterly Journal called 'RADIAL', which goes out to all of our members and supporters in either printed or cassette form. The photograph shows our Editor, Peter Hunter, GOGSZ in his shack chatting on the much loved FT-890O which - of course - was supplied by Martin Lynch & Sons.

If you are an invalided U.K. Licensed Radio Amateur (or know someone who is) who may benefit from the R.A.I.B.C., then why not drop them a line?

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OREGON SCIENTIFIC

E&OE

By Don Beattie, G3BJ, Hares Cottage,
Woolston, Church Stretton, Shropshire, SY6 6QD.

IARU

The major role of the IARU is the promotion of amateur radio interests around the world. It does this through its relationships with the ITU and regional telecommunications bodies. But it also plays an important part in the development of amateur radio and the training of administrations in administering amateur radio licensing.

AFRICAN PROGRAMME

At the end of last year, the latest amateur radio administration programme to run in IARU Region 1 took place in Nairobi, Kenya. The Amateur Radio Administration Course (ARAC) was presented to a group of 22 officials from English-speaking African countries. The ARAC was conducted jointly by IARU and the African Advanced Level Telecommunications Institute (AFRALTI). Support for the course was provided by the International Telecommunication Union Telecommunication Development Bureau (ITU-D), the African Telecommunications Union (ATU) and the Communications Commission of Kenya (CCK). Students were drawn from administrations and telecommunications operators from Ghana, Kenya, Sudan and Zambia. Presenters were Paul Rinaldo, W4RI (third from left, front row, in the photograph) for IARU, Mohamed K Noorani of AFRALTI and Gideon Mwakatobe of ATU. AFRALTI Director Edward Mallango participated in the opening ceremony and ATU Secretary General Jan Mutai officiated at the closing ceremony. The Amateur Radio Society of Kenya (ARSK) Chairman Ted Alleyne, 5Z4NU (third from left, back row), set up an HF station at the training site.

IARU Secretary David Sumner, K1ZZ, said that the presentation of the course in Nairobi was made possible by a strong sense of partnership that exists between ITU, ATU, and IARU. "Larry Price, W4RA, the IARU President, has assigned a high priority to the development of amateur radio in Africa. We are most gratified that ITU-D Director Hamadoun Tour as well as ATU Secretary General Mutai and his colleagues in Nairobi share our conviction that amateur radio can contribute to human resource development for the improvement of telecommunications in Africa", he said.

The ARAC included instruction in subjects such as the ITU, Radio Regulations, spectrum management, the IARU, domestic and international regulations, amateur radio operations and technology, disaster communications and the Amateur Satellite Service.

AUSTRALIAN LICENCE CHANGES?

Many countries are now looking at the ways in which their amateur licensing arrangements might need to change if, as is expected, the World Radio Conference starting later this month removes the requirement for a Morse competence for an HF licence. Of course it is not just that licensing regimes would need to change to accommodate this change. National societies are also looking at this as an opportunity to re-think the licensing strategy to attract more newcomers into amateur radio. Many countries are experiencing a very significant reduction in new blood coming into amateur radio, and recognise that 'something needs to be done'.

In the UK, this debate is more or less over, with the close working relationship between the RSGB and the Radiocommunications Agency having developed a new licence structure over the last three years, which should be ready for the outcome of WRC-03.

The Wireless Institute of Australia (WIA) has published a discussion document by Jim Linton, VK3PC, and Roger Harrison, VK2ZRH, looking at possible ways in which the licensing regime might evolve in Australia (you can read it at www.wiavic.org.au/lintonharrison). Although stated as not necessarily representing WIA policy, the paper makes some telling points.

Australia has experienced the same pattern of amateur licence numbers as many other countries including the UK. Linton and Harrison argue that decline begets decline, and fewer people on the air means fewer are attracted into amateur radio. In Australia this is a particular problem with the vast distances involved, and HF bands being closed for most of the day. Australia's current licensing structure is similar that of the UK before the introduction of the Foundation Licence. The Linton-Harrison paper argues that, right around the world where amateur numbers are dropping, a fundamental re-think is needed about the ways to attract people into amateur radio, and retain them, in the face of other competing interests and options. The authors contend that the current licensing system and syllabuses have become irrelevant because they are well behind the times, and need a fundamental rethink, and that this rethink must be done taking into account prevailing social conditions.

The bottom line in the Linton-Harrison paper is to propose a two-level licence: Entry Level and Unrestricted. Access to the higher level would (unlike the UK) not require prior success at entry level. Interestingly, the privileges proposed for entry level are 100 watts, all mode, all bands from 1.8MHz to 5.65GHz, with no requirement to use only commercial equipment. What is not clear in the paper is how the question of operating practice would be handled. This has been a significant feature of both the original Novice (now Intermediate) and Foundation licences in the UK.

The WIA Federal Convention took place just as this article was submitted for publication. I understand that the meeting approved the principle of an entry-level licence for the majority of bands (it is not yet known whether all the principles in the Linton-Harrison paper were endorsed) as part of a two-tier licence structure. WIA will be opening discussions with ACA, the licensing authority in Australia, to progress the new approach. It will be interesting to see how the pattern of licensing develops other parts of the world.

TOM ATKINS, VE3CDM

Congratulations to Tom Atkins, VE3CDM (who also holds the call G4ABN), who has been elected to the Canadian Amateur Radio Hall of Fame, for his extensive contribution to both Canadian and International Amateur Radio.

Tom has been a member of the Executive Committee of IARU Region 2 (The Americas) for 18 years, six of which were as President.

IARU HF WORLD CHAMPIONSHIP

Finally, a reminder that the IARU HF World Championship contest takes place from 1200UTC on **12 July** to 1200UTC on **13 July** on 160, 80, 40, 20, 15 and 10m. This contest caters for both SSB and CW operators. Multipliers are each ITU Zone, society HQ stations and each Executive Committee and the Administrative Council. Details at www.arrl.org/contests/rules/2003/iary.html ◆

Members of the Amateur Radio Administration Course run in Nairobi in December 2002.

By Mark Lewis, GW7KDU, 14 Hornbeam Close, St Mellons, Cardiff CF3 0JA. E-mail: rmcwales@ntlworld.com

Repeaters

Internet linking of repeaters has been around for some time and is growing in popularity, with more than 2000 nodes and repeaters now active world-wide.

The first Internet linking experiments started with *Iphone* in 1996. *Iphone* was a commercial piece of software from VocalTec. As support for *Iphone* dropped, amateur-developed software took over.

There are now three 'systems' in use, namely *eQSO, Echolink* and the *Internet Radio Linking Project (IRLP).* All three systems assist in amateur radio communications by using Voice Over IP (VoIP) technology. This is carried over the Internet to computers connected to transceivers allowing on-air users using VHF and UHF frequencies to achieve contact distances far in excess of those that they would normally on these bands. Echolink and eQSO also permit users to connect directly from their home computers, whereas IRLP is aimed at developing a network of nodes/ repeaters that are only accessible using radio.

eQSO

eQSO was developed by Paul Davies, M0ZPD. This system offers a number of servers/chatrooms that can be connected to via a personal computer or through a radio/RF gateway. The Windows based software can be downloaded at the eQSO website [1]. There are three versions of the software available: PC user installation, RF gateway and Server. The PC user installation version is intended for those who only wish to connect to one of the many chatrooms using their PC and a microphone and speakers attached to it.

The RF gateway version provides extra functionality (eg PTT keying via the PC COM port) that permits a transceiver to be connected to a PC to provide a local RF node or repeater.

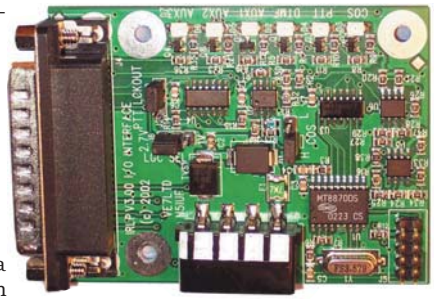
The Server version is for the dedicated eQSO user who wants to provide chatrooms for other users. Setting up a server is likely to be expensive in both time and money as a high bandwidth, permanent connection to the Internet is required to provide a good service.

ECHOLINK

Jonathan Taylor, K1RFD, developed Echolink in 2002. The Echolink website [2] claims that the system has "more 78,000 registered users in 131 countries world-wide". The Windows based software is available for free download from the website. Echolink provides chatrooms (conferences) and also the ability for 'private' point-to-point connections between individual users. If you plan to set up an RF gateway using Echolink, a big advantage is that many commercially available PC sound card interface units from companies like MFJ and Western Mountain Radio make the job of interfacing radio to PC very easy.

IRLP

The Internet Radio Linking Project was started in Canada by David Cameron, VE7LTD, in November 1997. IRLP is a VoIP network that is designed to be accessed *only* by radio. IRLP runs on the Linux operating system (a flavour of UNIX) and uses dedicated hardware. It is certainly not as popular as Echolink and eQSO and the coverage of IRLP in the UK and Europe is very poor: according to the IRLP website [3] there are no nodes or repeaters in France, Spain and Italy amongst others. Germany has one node with Belgium and the Netherlands having one and two respectively. The UK has more nodes than the rest of Europe, but even here there are large areas of the country that aren't covered. The reasons for this must lie in the fact that Linux is a much more specialised operating system (speaking from many years professional experience as a UNIX network manager) and there are far more Windows based PCs in the world!



Right: a computer IRLP board.

INTERNET LINKING FREQUENCIES

If you are interested in working an RF gateway in UK listen on the following frequencies: 70cm 430.0125 to 430.0750MHz and 434.4750 to 434.5250MHz; and on 2m 145.2875 to 145.3375MHz. There are also some nodes operating on 6m. CTCSS is used on some nodes to reduce QRM. Contact the node operator for details if necessary. Many repeaters are also Internet linked, some permanently and others via gateway operators on a part-time basis. Some repeaters such as GB3DX (2m Birmingham) and GB3IE (70cm wide split Plymouth) have been established with the intention to use them as Internet repeaters from the outset. Both of these units use Echolink.

The February 2003 issue of *QST* has a more detailed introduction to amateur radio linking with the Internet. A PDF of the article can be downloaded from the ARRL website [5].

VIDEO REPEATER GROUP

Britain's most forward-looking repeater group, the Video Repeater Group, is proposing an additional digital output to its existing analogue 10GHz TV repeater. GB3RV at Brighton General Hospital has been licensed for over four years and provides a useful facility for TV enthusiasts in the area. The new unit will use digital MPEG-2 TV with two stereo audio outputs with the minimum transport MUX stream of 10Mbit/s. The total bandwidth of transmit output will be 13MHz. Subject to licensing, it is hoped the new digital TV channel will be on 10.065GHz. The proposed hardware will consist of NDS E5820 encoder, Kuhne MKU10G2 upconverter and Kuhne Electronic MKU101N Power Amplifier. The keeper is Martin, G8KOE, to whom further queries should be directed, or check the group's website [3]. ◆

WEB SEARCH

1. eQSO:	www.eqso.net
2. Echolink:	www.synergenics.com/el
3. IRLP:	www.videorepeater.co.uk
4. RSGB Repeater Management Committee:	www.coldal.org.uk/rmc
5. QST VoIP article:	www.arrl.org/qst/2003/02/VoIP.pdf

LATEST CLEARED REPEATERS

There have been no clearances since the last 'Repeaters' column (RadCom April 2003).

OUTSTANDING VOICE REPEATER PROPOSALS SUBMITTED FOR LICENSING ARE

Callsign	Type	Process Stage	Proposed Keeper
GB3AA	New 23cm Alveston, north of Bristol	PU	G4CJZ
GB3BM	New 70cm Wide Southport	RA	G4WPS
GB3DN	2m Site Change North Devon	RA	G1BHM
GB3ET	New 70cm Winchester	PU	G8GTZ
GB3IN	New 2m Huthwaite, Yorks	RA	G4TSN
GB3IR	New 2m Richmond, Yorks	RA	G4FZN
GB3IT	New 70cm Wide split Tamworth	PU	G6NHG
GB3ML	New 70cm Motherwell	RMC	GM3SAN
GB3YS	Site change 70cm Yeovil	RA	G3UGR

Repeater proposal status as of 14 April 2003. The latest clearance status can be obtained from the RMC website [4]. Please note that even though an application may have cleared, it is beyond the control of the RMC as to when the keeper will bring the repeater into service.

By Steve Hartley, G0FUW, 5 Sydenham Buildings, Lower Bristol Road, Bath BA2 3BS. E-mail: newcomers.radcom@rsgb.org.uk

Newcomers' News

In 'The Last Word' in April Martin Stone, G0OXZ, highlighted some concerns over the changes to the UK licence structure. I am pleased to report that action is already in hand to deal with them.

In effect Martin said there should be no need for competent candidates to sit through basic training courses. The good news is that there isn't! The Intermediate syllabus states that there is *no requirement to attend a course*, only a registered assessment/exam. The same wording is about to appear in the revised Foundation syllabus and it is envisaged that, in time, it will also apply to the revised RAE. In theory, a competent candidate will be able to merely sit all three assessments in one day.

In later correspondence Martin proposed that exams should be available 'on demand', like the current Morse tests. This is almost the case already for Foundation exams, subject to some advance booking. The interim arrangement for the Intermediate is for one examination per month but it is expected that the long-term position will be as for the Foundation and there seems no reason why the revised RAE should not follow the same pattern. However, there will always be a requirement to give at least 10 days notice as setting up a written exam takes a bit more organising that a Morse test.

Martin suggested that there should be a range of self-study courses for each exam. Well, there are bright new text books for the first two levels and the *RAE Manual* is set to be re-written by the end of this year, in line with the syllabus review.

The idea of publishing the question bank was another of Martin's suggestions. This has been raised before and it has not been entirely dismissed. However, until there are more questions in the bank its publication seems unlikely. Any volunteers for question writing should contact Alan Betts at the Radiocommunications Agency (see below).

I hope this has quelled some of Martin's concerns that may be shared by others.

ANOTHER ANTRIM SUCCESS

During National Science Week, a Foundation course was run for 12 school pupils, and three Scout Leaders/helpers at Antrim Grammar School. All were successful and delighted with their achievements. The 12 pupils from the school were aged between 11 and 13.

The instructors were the two Johns, GI3YRL, and GI0USX, from the Carrick Amateur Radio Group, assisted by David, GI4FUM, from the Antrim Radio Club. The Johns said that another Foundation Course was to be run by the Carrick Group, at Downshire School, Carrickfergus, in April. Great news!

ALL AT SEA?

Dennis Shields, M3JWJ, went to London in March to ride the London Eye but he had also been invited to operate the station GB2RN from the Wireless Office of the *HMS Belfast*. Dennis said that it was great to use the radio on board the ship but he wishes he had set aside more time for the visit. Nevertheless, he did have time for a couple of quick contacts on 80m and hooked up with Mike, G0VIX, operating another Royal Naval station, GB3RN, from *HMS Collingwood* in Gosport.

When Dennis left the Wireless Office he was given a certificate for operating from *HMS Belfast* together with some other 'goodies' from Terry, G0TBD, who was supervising the station. Dennis says it feels quite strange talking on the bands after 41 years of listening but he is enjoying every minute. Welcome aboard, Dennis!

MORE ON VFO PARTS

Several Intermediate tutors contacted me asking where to get the parts for the VFO in the *Intermediate Licence* book before the April *RadCom* hit the streets. One even admitted to never having built a radio frequency project before, so it seems the tutors are learning new skills too!

In addition to the sources I mentioned in the April column, I have confirmed that Sycom Components can also supply all the necessary parts for the VFO, and many other radio projects. Send a 41p stamped self-addressed envelope to: PO Box 148, Leatherhead, Surrey, KT22 9YW for a catalogue, or you can obtain some details from the Sycom website (see below).

Brian Jones, G0UKB, has been running an Intermediate pilot course and could not source the Toko coil for the VFO circuit. He contacted Toko directly who pointed him to Deltron UK, their UK distributors. At the time of writing Brian had not established if Deltron deal in small quantities but it is another lead.

BUSY ROBERT 'OBE

Another pilot course for the Intermediate exam was run by Robert Snary, G4OBE, and he reports that all five of his students passed. Spurred on by their success, they have already asked to sign up with Robert when the new RAE starts. Well done!

In addition to all his tutoring, Robert has just cut version 2 of his PowerPoint slides for the Foundation Course. Robert can supply the slides on CD with PowerPoint Viewer so that people who run Windows 95, or higher, can used the slides even if they don't have the PowerPoint software. Robert is QTHR in the *RSGB Yearbook*.

TANZANIAN NOVICES

Good news came in from a couple of sources about the issue of 21 Novice Licences to amateurs in Tanzania. The Tanzanian Novice Class is an entry-level licence with reduced frequency and power allocations. It requires no Morse code examination but allows code operation so that the Novice operator may work towards upgrading to a Full Amateur Radio Licence.

Ted Alleyne, 5Z4NU, Secretary of the Amateur Radio Society of Kenya, confirmed the story and sees this as a very encouraging move. Ted reports that Ralph Karhammer, 5H3RK, of the Swedish Embassy in Dar es Salaam has been the prime mover in getting things going. In addition to the Novice Licences, the Dar es Salaam Institute of Technology (Box 2958, Dar es Salaam) has been issued with the club station callsign 5I3A. ◆

Left: Dennis, M3JWJ, at the controls of GB2RN (see 'All at Sea?')

15 out of 15 for the students at Antrim Grammar School (see 'Another Antrim Success').

WEB SEARCH

Writing licence exam questions:	alan.betts@ra.gsi.gov.uk
Sycom Components:	www.sycomp.co.uk

Guide to HF

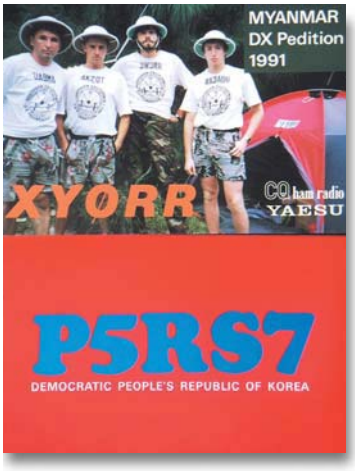
PART 3 HOW TO WORK DX. . .

The concluding part of Colin Dollery's feature on how to work HF DX – with more light-hearted warnings on how not to do it!

To get propagation on the higher bands (14MHz and above) you [generally – *Ed*] need a daylight path. So in the morning seek stations to the east and in the afternoon to the west. After dark, except in very good conditions, the higher bands quickly fold. The grey line, along which the sun is just rising or setting, can be (briefly) great for low-band DXing. If you have a rotary antenna remember that Japan is at about 30 degrees and W7 at about 320 degrees (ie not due east and west). Use the propagation charts in *RadCom* and watch the packet cluster. Subscriptions to the Weekly DX (www.dailydx.com) and membership of the Chiltern DX Club (www.cdxc.org.uk) are good value.

LEARN SOME MORSE

I can feel you wilting – surely that went out with the dodo? Not for DXing it didn't, and if you have a pipsqueak set-up it is by far your best chance of working significant DX. You can use your computer to *send* beautiful regular Morse but you must learn to read the callsigns and simple overs by ear. Morse reading programs don't work when there are several stations on the frequency but human ears and brains do. In poor conditions Morse will get through when SSB won't. As the current sunspot cycle declines that will become even more important. Most of the DX I worked when first licensed was on CW; I could not afford the big audio amplifier and modulation transformer you needed for AM phone.



QSL cards are not always what they seem. Goodness knows where Romeo Stepanenko, 3W3RR, and his friends were on these DXpeditions, but apparently not in Myanmar or North Korea.

LEARN A LITTLE FRENCH & SPANISH

You only need about 100 words and callsign phonetics in their language - but do get the accent right (most Brits have dreadful accents in French and Spanish). Many of the weaker South American stations are reluctant to take calls in English because they speak it so poorly. Overseas French-speaking stations often call for "stations français" but seem quite happy to take other countries provided that they respond in reasonable French. Great for working French Polynesia (FO) around 14125kHz!

"CQ DX, CQ DX"

Sadly, if you have a plain-vanilla M or G callsign like me, calling CQ DX is as likely to flush out rare DX as standing beside a rabbit burrow in broad daylight and shouting "Come out little bunny I want to catch you for my dinner". As a DXer in a 'common' country you will spend most of your time listening. But there are a few exceptions. CQ calls may work during a contest and it will work if you have a fancy call even if it isn't rare. I seized the opportunity of a GQ call during the Queen's Jubilee last year (thank you RSGB) and on the first day pointed my antenna at Japan and called CQ on 21MHz. Three hours or so later I had a large pile-up with 300 contacts in the log, 66 with Japan. The high point was when Ed, P5/4L4FN, in North Korea called me. When did you last have a P5 come back to a CQ call, and now that Ed has had to close down when will you again?

TUNING AROUND

A dying art in the era of the packet cluster? It shouldn't be. A DX station must start transmitting some time and if you find it before the wolf pack you can have a nice quiet easy QSO. I worked EP6KI on a new IOTA island off the Iranian coast with 50 watts and my antenna beaming west in just that way. Of course, I was very weak but the frequency was clear and he had no problems copying me. It was his first CQ call on that band for the day. It's also worth occasionally tuning the high end of the DX bands. You won't find ultra rare stuff up there but a satisfying QSO with Australia or the West Coast of the USA may result. The pack does not often listen above about 14280, 21280 or 28520kHz.

FOLLOW THE FOOTPRINTS

Most DX stations work split to keep their own transmit frequency clear. Usually they listen 5 to 10kHz up on SSB and 2 to 5kHz up on CW, but if

. . . AND HOW

NIPpers...

NON-UNIFORMED Ionosphere Police (NIPpers). This secretive group of plain clothes police (they never give callsigns) attempt to enforce discipline on DX frequencies. NIPpers are only allowed a very restricted vocabulary for security reasons. New recruits may only say "Split", "QSY" or "Up" and the officers are allowed to add "Idiot". DXers tempted to hit back should remember the EU ban on corporal punishment for young children.

QSO RUSTLERS (the QuORUS, pronounced chorus). A DX station struggling with a weak caller comes back "number six mike alfa only please". Immediately one of the lead singers in the QuORUS steps forward to say "Thank you very much this is ## three alfa bravo charlie, you are five and nine". After this has happened successfully a few times a jammer may be borne. Curiously the NIPpers never attempt to arrest members of the QuORUS. Some believe that they have secured reciprocal recognition of their qualifications under EU regulations.

Quorus!

This my frequency!

SPECTRUM OWNERSHIP "This my frequency" an imperious voice announces. A tough one this. I always ask at least twice whether a frequency is in use before I call on a crowded band. Changing propagation or a distant station turning his beam can cause perfectly innocent parties to believe that they were both on the frequency before the other. But sometimes it is a tactic to grab a clear

By Colin Dollery, G3GAF,
101 Corringham Road, London NW11 7DL.

Operating

Left: Colin's wife Diana, heroine of many a fraught antenna building project, with his pump-up 1/4-wave vertical for 80 metres.

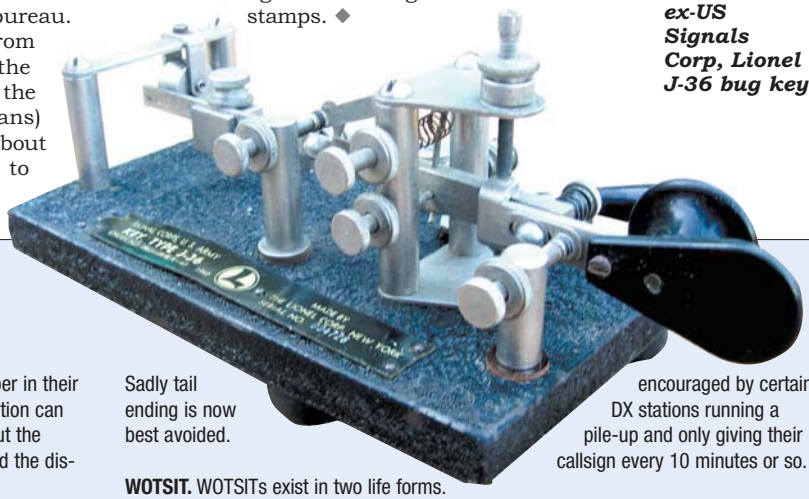
they have a big pile-up the limits may be much wider. Often you can find the station they are working by listening carefully – although it is made more difficult by the LOOFers (see 'How Not To', May 2003). Try a call on that frequency when he says "QRZ?" If it's a very big pile-up there may be many DXers using that technique, so the DX station moves to another listening frequency. Usually that means shifting his receiver tuning about 0.5 to 0.8kHz up or down, just enough to get out of the worst of the noise. Work out the interval and the direction he is moving and the next time call him by that amount along the path he is going. It often works.

RAKE THE DYING EMBERS

If you have a modest station, the first days of a big DXpedition or the first day of a big contest like *CQ* World Wide are tough as there are so many 'mega stations' on the air. Time to dig the garden or cut the hedge. But most DXpeditions try to stay on the air over two weekends. On the second weekend you may see a notice on the packet cluster: "21190 3XY7C …lonely". All the mega stations have worked him but he still wants contacts, and now it is your chance. Similarly on the second afternoon of the CQWW DX Contest (it lasts 48 hours) it can be quite easy to work the many Caribbean stations that have been set up specially for the contest.

BRINGING IN THE QSLs

Some old hands are bored with QSLs, but I am not, they are really an exciting part of DXing. You can send cards via the bureau. DXpeditions from Germany and the UK (and most of the western Europeans) are pretty good about responding to bureau cards, the USA and Japan a bit less so. But it may take years for the card to arrive. The rest of the world is erratic, to say the least, about replying to bureau cards and many of the rare countries do not even have a functional QSL bureau. You will have to QSL direct enclosing an international reply coupon (IRC) or a US one dollar bill ('green stamp'), sometimes two. This by no means guarantees a direct reply. About half the cards I send direct these days seem to come back via the bureau – but at least most of them come back. A few DX stations in poor countries are in it strictly for the money and never reply – they just pocket the green stamps. But be realistic guys, printing cards and mailing them costs money and time, so as long as they respond some way don't be too critical. In a materialistic world if we want QSLs we have to help out poor DX stations that get inundated with requests. You must also realise that much of the mail to South America, Eastern Europe and the poorer parts of Asia is systematically raided by postal employees, looking for those green stamps. ◆



Last vestige of G3GAF's 1950s station, an ex-US Signals Corp, Lionel J-36 bug key.

NOT TO

frequency. Try to remain polite and exchange callsigns and agree who will QSY. If the other station will not give his call that makes one suspicious. Some regular nets consider that they own particular frequencies at certain times of day and are not above strong arm tactics (including deliberate jamming) to secure it. It doesn't endear one to their controllers.

NUMBAGS!

NUMERICAL AGNOSIA (NUMbAGs). This unusual condition is characterised by a temporary inability to recognise numbers between zero and nine. It is rare in the general public but often afflicts DXers. The DX calls "Number eights only please". All the NUMbAGs on frequency reply irrespective of the number in their callsign. An iron-willed DX station can affect a cure in most cases but the slightest sign of weakness and the disease spreads like wildfire.

Tail ending...

TAIL ENDING. It used to be a legitimate tactic to slip in your callsign immediately after the last station the DX was working had signed off. The problem is that everyone does it now and many European stations start calling on top of a QSO after one over on the assumption that is his ration. I say "his" deliberately as YLs are usually better operators. Mayhem follows when the DX is unwise enough to accept a station that has persistently called during his QSO. Sadly tail ending is now best avoided.

WOTSIT!?!

WOTSIT. WOTSITs exist in two life forms. The minor irritant type have a mega station and work anything promising in a pile-up without first finding out the callsign and then have to ask what the call is during the contact and waste everyone's time. The major irritant variety persistently ask "What is the DX?" on the DX station's transmit frequency. Often they jam your hard-won QSO and if they do not their friend in short skip range does so when he comes on the DX frequency to tell his buddy it is XY0ZZ. Unfortunately both types of this behaviour are encouraged by certain DX stations running a pile-up and only giving their callsign every 10 minutes or so.

PRAT...

PERSISTENTLY REPREHENSIBLE Amateur Transmitting (PRAT). It is unfortunate (but not entirely coincidental) that the eponym for this phrase resembles an uncomplimentary Anglo-Saxon word. A generic description of the operating practices, and operators, listed above. Not to be used on the air though. Let's face it, European DXers have a well-deserved reputation for being the most undisciplined operators in the world, bar none, so maybe we should all make a resolution to improve?

ACCURATE FREQUEN

Digitally-synthesised transceivers with readouts to the nearest Hertz appear superficially to have solved the frequency-measurement problem. Years ago, the RSGB used to run frequency-measuring tests, but dropped them when they became too easy. So why this article? Well, if you're only ever going to use traditional CW, SSB, FM, etc which can manage with a few hundred Hertz accuracy, save time by skipping to the *RadCom* DX pages right away! On the other hand, that nice 1Hz readout may look impressive, but does it actually mean anything?

Narrow-band techniques for LF and EME and spectrum analysis programs will show straightaway whether it does – they demand first-class frequency accuracy and stability from both transmitter and receiver. For optimum results, a tuning accuracy and stability of better than 1Hz are essential. Transceiver manufacturers have realised that and most now offer special 'high-stability' oscillator options, sometimes even installing them as standard. Fine, but crystals age and need re-setting and what do you use as a standard? And how do you know whether you need the hi-stab option anyway? If you have access to a laboratory full of the latest gear there's no problem, but most of us haven't. This article will show you how to obtain atomic-frequency-standard levels of accuracy without having one; and how to avoid some common pitfalls on the way.

'ACCURACY' AND 'STABILITY'

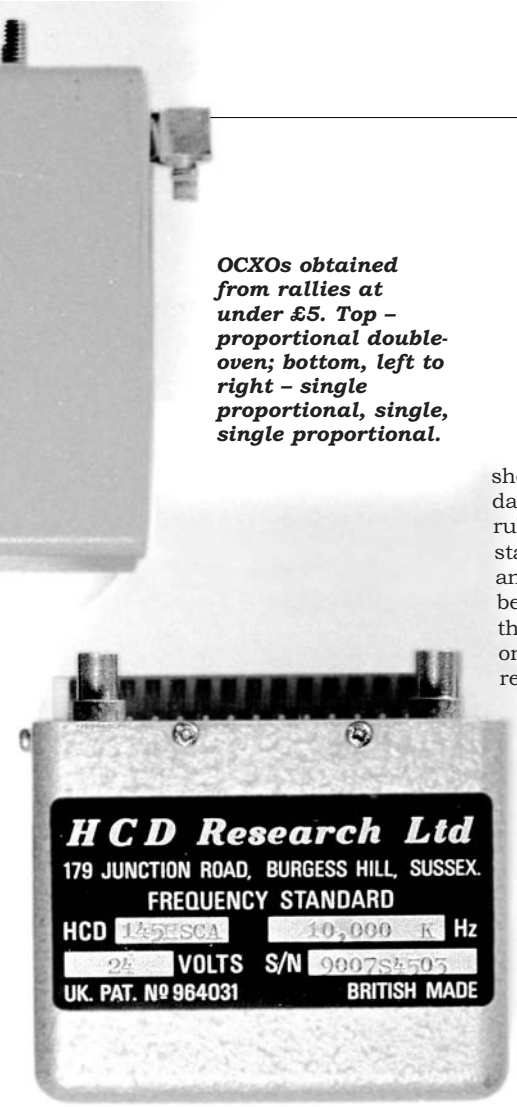
What's the difference? Briefly, 'accuracy' means how close a readout is to 'truth', while 'stability' means how well a frequency can be maintained (**Fig 1**). Stability is what interests most of us, because it's never nice to have to keep re-tuning, whereas we can always leave arguments about whether we're spot-on to the nearest Hertz to experts. Handbooks only give stability figures because manufacturers have some control over them by their choice of oscillator, while accuracy depends on how well it is kept calibrated after it has left the factory. Before attempting re-calibration the first step should always be to check stability because there's no point attempting accurate calibration if your oscillator drifts off a few seconds later. It will teach you quite a lot about your transceiver's performance and, in the process, you might also be pleasantly surprised to find drift is to some degree predictable and can be limited by taking simple precautions. Some idea of what to expect can be obtained from the precision of the readout itself and the manufacturer's stability specification. If it's a 10Hz readout and stability is given as something like '…within 10ppm' (1 part in 10^5) – fairly typical of middle-range transceivers – then there's not going to be much point trying to emulate MSF. On the other hand, if you have a 1Hz readout and the spec. is '…less than ±0.5ppm' (5 in 10^7), it will be well worthwhile spending a little time getting it spot-on.

DRIFT

Most transceivers have only one master oscillator from which all other frequencies are derived. It is invariably crystal-controlled, but the actual type may vary from a straight CXO upwards through TCXOs to an OCXO (these types are described later). Drift has many causes, but temperature is by far the most important. Manufacturers' stability specifications normally quote drift in terms of parts per million over a typical temperature range of –10° to +50°C because the actual drift , apart from depending on temperature, also depends on the frequency in use. For example, at 30MHz, assuming a stability of 10ppm, there will be drift of 300Hz – ten millionths of 30,000,000Hz – if the temperature changes between the two extremes, around 5Hz/°C. Of course, lower frequencies would experience less drift – at 136kHz, drift would only be 1.36Hz – ten millionths of 136,000Hz. As regards temperature, a practical situation might be that transceiver temperature starts off at 15°C first thing in the morning and stabilises at around 45° after an hour or so, which would result in a drift of 150Hz (5 x 30).

If the rig could somehow then be held exactly at 45° it would not drift any more, but this is of course impossible; room temperature will vary and the rig will get hotter and cooler as you trans-

By Walter Blanchard, G3JKV, The Trundle, Tower Hill, Dorking, Surrey RH4 2AN. E-mail: blanch@pncl.co.uk



OCXOs obtained from rallies at under £5. Top – proportional double-oven; bottom, left to right – single proportional, single, single proportional.

mit. A few things worth trying to keep its temperature excursions down are: make sure there is free air circulation; don't put it next to a hot power unit or a fan; maybe install a computer CPU-type fan to keep the oscillator unit cool or wrap a bit of heat insulating poly-foam round it. It is quite surprising what simple measures of this type can do. Sometimes there are problems having nothing to do with heat; digitally-controlled oscillators (DTCXOs) although quite good as regards long-term stability, often hop back and forth a few cycles every few seconds. If you have one of them, there is unfortunately not much to be done, but it may not actually be all that important if you're not striving for the last little bit.

REFERENCE SIGNALS

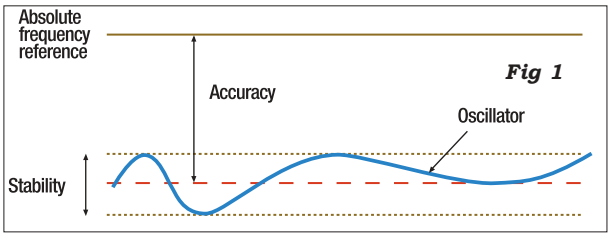
Something is needed to act as a standard frequency reference, and long-term drift-checking requires that it should be available continuously for many hours or even days. Specialist laboratories use atomic standards; the standard definition of frequency still quotes a transition state of the caesium atom as the ultimate reference, although nowadays hydrogen masers show better stability. Caesium standards and their slightly cheaper rubidium brethren are, by amateur standards, fairly expensive to buy and maintain properly, and they are best left to those who know about them (be careful when buying second-hand units – often the atomic reference resonator has gone and they're expensive to replace). Failing one of these, the next best fundamental reference, and far cheaper, is a very precise free-running crystal oscillator that can be checked periodically against a caesium standard and corrected whenever it goes off. Correction can be done continuously and automatically, as in 'disciplined' standards, or, if it is really first-class, manually every few days. But we're still stuck with the need for an absolute reference from somewhere.

Fortunately, there are several available in the form of off-air standard radio signals, courtesy of the various time and frequency national laboratories round the world. The well-known and often-recommended HF transmissions such as WWV or RWM are examples, but they are not actually a very good idea for precise frequency checking and are not used for that purpose professionally. Apart from the fact that they exhibit short-term propagation-induced Doppler shifts, fading and noisiness prohibit their use for hours on end and, being primarily time signals, they transmit only a series of pips that are difficult to use as a carrier reference. Also, when these pips are displayed on a spectrum analysis program, the characteristic broad spectrum of a switched carrier is produced which obscures the exact frequency.

Much better in every respect are the low-frequency transmissions which are strong, continuous, fade-free and clear of QRM. This is why the HF standard frequency transmissions formerly broadcast from Rugby were dropped. The best to use in the UK are MSF on 60kHz and the BBC Radio 4 transmission on 198kHz, although HBG 75kHz (Switzerland, DCF77 77.5kHz (Germany) and France Inter on 162kHz are also usable. All have carrier accuracies well up in the 10^{-11} region which is ample for performing a calibration, even at 144MHz. This brings up the question of what accuracy we should be seeking. Many HF rigs nowadays have a 1Hz readout and more and more are covering 2m, so it seems reasonable to take 145MHz as the upper limit for calibration and 1Hz as the desired accuracy there. The accuracy of the BBC R4 carrier (198kHz) is 2 parts in 10^{11} which, multiplied up to 145MHz, is equivalent to 0.029Hz. MSF at 60kHz is quoted at about an order better, 2 in 10^{12} , which multiplies up to 0.0029Hz at 145MHz.

Sometimes GPS is mentioned as a frequency standard. While there are certain professional GPS receivers designed specially for this application (Symmetricon Truetime, etc) the easily-available low-cost sets have only a 1pps output which is unusable directly, not being a carrier, and only of comparatively low accuracy (1µs). The usual way of using GPS is to lock an oscillator to these pips using a very long-term averaging algorithm, but it is not at all simple to get them up to the accuracy needed for 1Hz at 145MHz, although they are perfectly satisfactory for lower frequencies (see 'disciplined oscillators', later).

Fig 1: Accuracy and stability.



The method of using MSF or R4 seems fairly obvious at first sight. Tune your receiver to 60 or 198kHz, switch to CW, and measure the beat note with a well-warmed up frequency counter to check that it is whatever your manual says it should be, or whatever you've set it to, often 800Hz. Leave it on the counter for an hour or two and see if the 800Hz stays steady. Actually, if it doesn't then you really have a major problem, because any modern receiver should pass this test easily. The reason is that everything, including drift, has ▶

ICY MEASUREMENT

Fig 2: Stabilities of different types of oscillator.

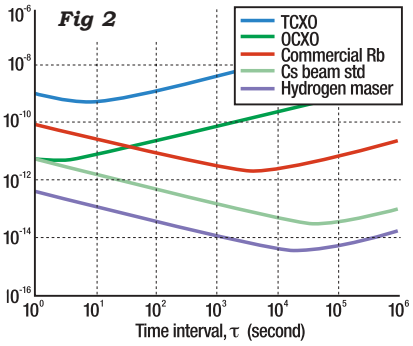
Fig 3: TCXO compensation.

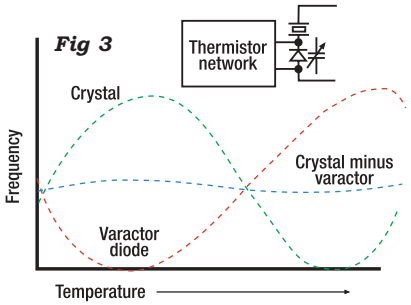
been divided down very considerably. It can be as much as 1kHz off at 145MHz, and only appear to be 1.4Hz off at 198kHz. In reverse, to set to an accuracy of 1Hz at 145MHz would need a counter able to measure to 0.0014Hz at 198kHz – and how many counters are calibrated that well? Or, for that matter, are that stable themselves? Since the problem is caused by dividing down, the obvious answer is to eliminate division by performing the check directly at the frequency of interest, at 145MHz (or as high as the transceiver will go), but this now means that the reference R4 or MSF signals must be multiplied up to 145MHz.

PRODUCING REFERENCE SIGNALS AT HF OR VHF

As already seen, R4/MSF are fundamentally accurate enough to be used right up into the VHF spectrum, but the problem is how to get them there. Being off-air, there are no harmonics to be used and they cannot be heterodyned up because that would contaminate them with another oscillator of unknown stability. Nor can they be used *directly* to trigger fast switches whose harmonics could be used because phase noise (jitter) would be excessive. The slightest noise on the radio channel would be multiplied up, and this includes the one-second breaks in MSF and the data modulation on R4.

The elegant solution to the problem is to use a separate very-stable oscillator, that is either kept directly phase-locked to MSF/R4 (as in 'disciplined' standards) or can be compared with them periodically. It will then replicate their carriers and will have the same high stability as the original. The advantage of doing this is that, because the oscillator output is noise-free, it can be used to trigger switches and produce harmonics without jitter. However, the phase-locking circuits must be very carefully designed to ride over noise, breaks or modulation and this can be difficult to arrange using low-cost oscillators that are not particularly stable. Some compromise always has to be made but, in spite of that, it is a powerful technique that lends itself to the use of a wide variety of oscillators all the way from CXOs right up to double-ovened OCXOs with inherent stabilities rivalling R4/MSF. CXOs and low-grade TCXOs need continuous pulling into phase, which is itself a form of jitter but, as the oscillator gets better and better, less and less correction is needed and, if high-grade OCXOs are used, the result is almost jitter-free. In the ultimate, a really excellent free-running OCXO stable enough to stay in phase with R4/MSF for days on end without correction will enable even periodic resetting to be done away with. A very slow long-term drift can be measured manually from time to time and applied as a mathematical correction without having to use electronic or mechanical





pulling at all. Completely free-running temperature-controlled oscillators are the most jitter-free sources of standard frequencies there are.

TYPES OF CRYSTAL REFERENCE OSCILLATORS

Because of the wide variety of reference oscillators, it is important to be aware of their characteristics. **Fig 2** shows how the accuracy of a number of different types of oscillator varies with time. It demonstrates well the difference between short- and long-term accuracy - note that atomic resonators are not actually as good as first-class crystals over short periods.

The main cause of crystal drift is very slight changes in shape due to temperature and ageing, mainly temperature. **Fig 3** shows how the frequency changes with temperature for a typical low-cost CXO of the type often used in transceivers – note the almost sine-wave shape. At the peak and trough of the sine-wave there is a small range of temperature over which frequency changes very slowly, but in cheap crystals these points are unpredictable and change randomly with time so it is impossible to take advantage of them. Stability of such CXOs is usually in the parts in 10^5 range, equating to a few hundred Hertz at 30MHz or perhaps 1kHz at 145MHz over normal temperature fluctuations. The obvious step up is some form of temperature compensation. A varactor diode driven by a thermistor can be made to have a temperature coefficient almost the inverse of that of a crystal and placed in series with the crystal the two to some degree cancel out (Fig 3 again). In large-scale production exact matching of the combination is not possible, so it only gives about one or two orders of improvement over a CXO, perhaps to parts in 10^7. Slight jitter often remains, but it does provide some guard against large fluctuations of ambient temperature and improves long-term stability. These are known as 'TCXOs' – temperature-compensated crystal oscillators; note the word 'compensated' – TCXOs do not stabilise temperature. A variation is the numerically-compensated TCXO (DTCXO) which does much the same thing digitally. It is always wise to fit a TCXO if a manufacturer offers it – the gain in stability is worth-while.

More precise crystal grinding and selection of cut makes the temperature 'turnover' points better defined and more stable. Turnover temperature is often around 65°C for standard AT-cuts, but special high-temperature cuts ('SC' and 'IT') running at over 100°C can be found in ex-military equipment. Not only the crystal but its electronics may need temperature control, often at a different temperature. Temperature is controlled by enclosing the crystal in an oven – an 'OCXO' – oven-controlled crystal oscillator. The heater in simple ovens is controlled by an on/off temperature sensor which keeps the oven within perhaps 2–3°C and this results in an improvement of stability up to the 10^{-8} region. More sophisticated versions use proportional control; the switch is not 'bang-bang' but heater power is controlled in proportion to how far off-temperature it is. This requires more electronics, but holds the oven to a fraction of a degree, resulting in stabilities around parts in 10^9.

Even with this degree of control, there is still some residual temperature change which can be reduced by adding a second oven around the first. This, plus using a very carefully-cut (and rather expensive) SC or IT crystal results in stabilities of parts in 10^{10} or even 10^{11} short-term. These are known as 'proportionally-controlled double-oven' devices but, because of their cost, are not often seen in general test equipment, although they are sometimes offered as optional extras. These devices virtually eliminate temperature as a cause of drift and the main remaining cause is ageing of the crystal. OCXOs of this type are used in every caesium or rubidium atomic frequency standard to smooth output because atomic resonators themselves are rather noisy in the short-term.

OCXOs are invariably contained in hermetically-sealed metal boxes, the size of box being a good indicator of which type they are (see the photograph). Physically small ones will very likely be plain ovens, but bigger ones, perhaps 120x80x60mm, may be double-oven types. Before use, they should be checked for stability while lying on each of their four faces in turn. Crystals are mounted so as to eliminate gravity effects and the mounting can become damaged along one axis, which is often why they are scrapped. The four-face test will show up anything like that immediately but, even if it is found to be damaged, it doesn't mean to say it's unusable. If kept in one position and

not shaken, rattled or rolled, it may still be very good. Having got a good one it's best to leave it switched on permanently - switching off and on again makes them change frequency very slightly. The performance of small single-oven OCXOs can be improved markedly by enclosing them in a DIY polystyrene-lined box, especially if it is turned into a simple oven by incorporating a heater and thermostat.

CHOICE OF REFERENCE OSCILLATOR

A single or double-proportional OCXO is the one to go for. They're not difficult to find on the surplus market; at several rallies in 2002 they could be had for a few pounds. If you have a professional-quality frequency counter or signal generator such as those made by Racal, Marconi, Tektronix, HP, etc, you will have inside it at least a single-oven OCXO and perhaps even a double-oven device. A signal generator of this quality will also very likely be able to output frequencies in 1Hz steps and produce reference signals wherever wanted, a very useful feature.

Sometimes, devices known as 'disciplined oscillators' can be found. These are OCXOs or TCXOs continuously phase-locked to an off-air standard such as MSF, R4, or GPS. In particular, the HP Z3801A GPS-locked unit is currently on surplus offer – check the web. It is well worth buying, although not offering quite the accuracy and stability of a prime stand-alone crystal. HP (now Symmetricon) quotes a frequency accuracy of 1 in 10^9 *averaged over a day* for the Z3801A and manufacturers of MSF/R4-locked units usually quote 1 in 10^8 short-term, broadly equivalent to 1Hz at 145MHz. Some of these units, excellent as they may be long-term, exhibit fast short-term jitter due to their locking mechanism, which may make deciding whether jitter is in the transceiver or not rather difficult. As an example, **Fig 4** shows the jitter experienced at 145MHz with a commercial unit locked to MSF.

If you have none of these devices, it might just be worth trying lower-quality TCXOs or CXOs, provided you're prepared to re-set them manually to MSF/R4 every few minutes. Actually, this is not particularly difficult if they're put up on one trace of a scope and MSF on the other, as long as there are no random frequency jumps.

CALIBRATING THE REFERENCE OSCILLATOR

The drift rate of a high-accuracy oscillator is very slow and the only feasible way of measuring it is to use an oscilloscope and a stopwatch. The MSF or R4 carrier is put up on one trace and the oscillator on the other; some point on the sine-wave is selected, a zero-crossing perhaps, and the oscillator trimmer adjusted until drifting stops. Seems simple, but there are always snags.

The first is how to display the 198 or 60kHz carrier on the scope. The basic RF. carrier must, of course, be used; a CW beat note is useless because it is contaminated by another oscillator. A plain ferrite loop tuned to 198 or 60kHz (taken out of an old transistor radio or a radio clock – Maplin sell ferrite loops pre-tuned to 60 kHz for use in radio clocks) may produce enough RF to be seen on a scope directly if you have a good one; otherwise a stage of RF amplification may be required. If an LF receiver is available, try taking a 198 or 60kHz output just before the mixer stage. An old wartime R107 valved LF adaptor covering 50–600kHz proved excellent for this job, having first-class selectivity (0.5kHz) right at the aerial, and the AR88LF is also very good. If nothing like this is available, it is not difficult to make a 20 – 30dB LF amplifier – see The *LF Experimenter's Handbook* (RSGB) – the only difference is that the loop will have to be tuned to 198 or 60kHz rather than 136kHz. If a loop is used, set up for maximum amplitude and clarity and thereafter do not touch tuning or orientation. Either will introduce a phase shift which, by shifting the position of the peaks, falsifies drift timing. If a wire aerial is used this does not happen.

The second is getting stationary and easily-recognisable traces simultaneously for both frequencies. If the 198kHz signal is used for triggering a one-cycle sweep then an OCXO at 5 or 10MHz will be seen as a broad trace of noise without distinguishing features. Simple decade division cannot give 198kHz from either 5 or 10MHz. Of course, if the reference oscillator is inside a signal generator it is quite easy – just select 198kHz output. MSF at 60kHz is much better if a bare OCXO is all you have – divide it down to 100kHz using a couple of 7490s and use this to trigger a 50µs sweep (5 cycles of 10µs). Three cycles of MSF is also 50µs (16.6666*3) and, although there will be multiple cycles visible, at least there will be a stationary display (**Fig 5**).

As regards trimming the oscillator itself, if it is a long way off – drifting at an easily visible rate – initial correction can be done by carefully turning its trimmer capacitor, normally reached by unscrewing a small sealing screw. Only use small corrections and wait to see where the oscillator settles each time – each time the screw is taken out cold air gets in and has to warm up. Don't forget to put the screw back after each adjustment! Once visible drift has been eliminated and drift is down to less than, say, 1 cycle in 15 minutes, it is better to note the remaining drift rate and apply it as a mathematical correction rather than try to get rid of it by using the trimmer.

Your hard work will now be rewarded by giving you a first-class frequency reference traceable right back to NPL's quadruple atomic standards (they check R4 as well as MSF) and, by using it to drive a series of decade dividers, you can use the harmonics to produce reference signals at almost the same accuracy anywhere in the spectrum right up to VHF and beyond.

TRANSCEIVER CALIBRATION

Having solved the reference problem, we come at last to the business of checking the transceiver itself. Theoretically, stability checking can be done using either a transmitted or a received signal – transceivers derive transmit and receive frequencies from a single source and, if one drifts, so will the other. Checking the frequency of a transmitted signal is easy - just transmit into a dummy load and leak some signal across into a frequency counter which, of course, you will already have calibrated as outlined above. This will give a snap frequency check, but not much else – a good stability check needs continuous readings over several hours. Staying on transmit and writing down the readings every few seconds is boring and won't show up short-term jittering anyway. Also, most counters when set to their most accurate ranges (1–0.1Hz) take several seconds to count each reading which will hide jitter. All in all, using a frequency counter to count a transmission is not recommended for high-accuracy work; it is far better to use the radiated signal from a signal generator/OCXO.

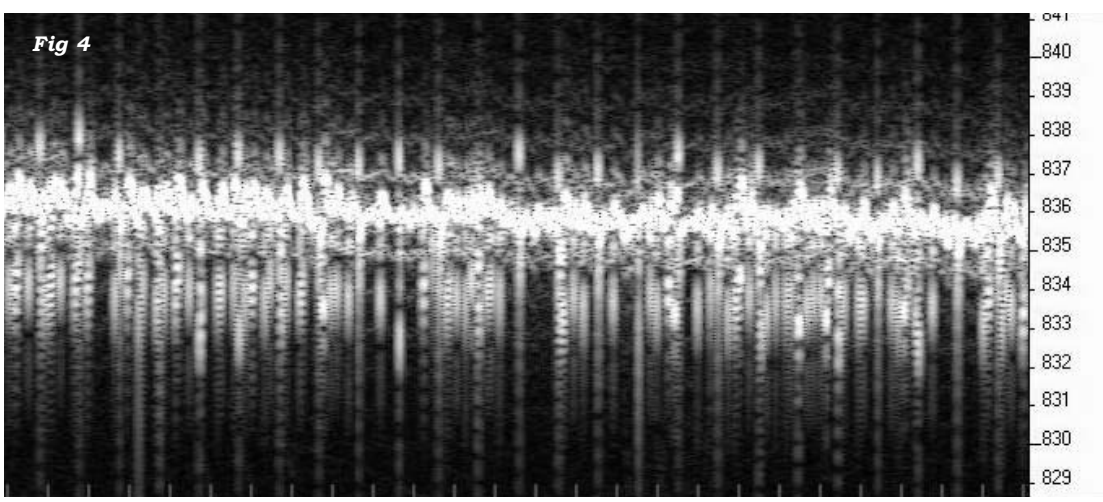


Fig 4: Jitter at 145MHz of commercial timelock system phase-locked to MSF 60kHz.

Fig 5: Phase-comparing MSF and local reference.

The procedure is first to tune the transceiver, on its highest range and using its 1Hz readout, to either a harmonic of the reference oscillator if it is fixed frequency, or a convenient signal from a calibrated digital signal generator. Use CW narrow bandwidth and set the BFO pitch to a nice round figure like 800, 900, or 1000Hz. Then couple the audio output into a counter (which has also been calibrated) and, if the transceiver is reasonably good, this number will only change by a few cycles an hour. Watching a counter over this sort of time period is extremely boring and it is better to use some form of recorder. You could, of course, log the output from a modern digital counter into a PC and graph the results or set up a real-time trace, but a better way, which eliminates the need for a counter, is to use a spectrum analysis program - there are several available as freeware on the web such as *Spectrum Lab* and *Spectran*. They enable measurement of audio frequencies to accuracies as great as 0.02Hz – good enough to reveal the slightest drift.

They can measure frequency so accurately because, although they use the sound card oscillator (often a 14MHz crystal) as a time-base, it is divided down so much it can drift or be off frequency quite considerably without affecting accuracy. An audio accuracy of 0.01Hz only requires the board oscillator to remain stable within a few hundred Hertz, although if you really want to be precise it can be calibrated by adding more dividers to the reference oscillator until audio is reached – 1kHz perhaps – and using this as a calibration frequency. The waterfall display speed on these programs can be slowed down to accommodate several hours' analysis on one screen and they can be programmed to take screen shots at fixed periods, so everything can be recorded pictorially. A block diagram of the total set-up is shown in **Fig 6**.

Fig 6: Complete stability check set-up.

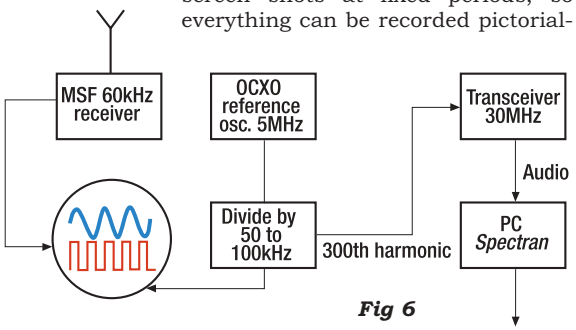
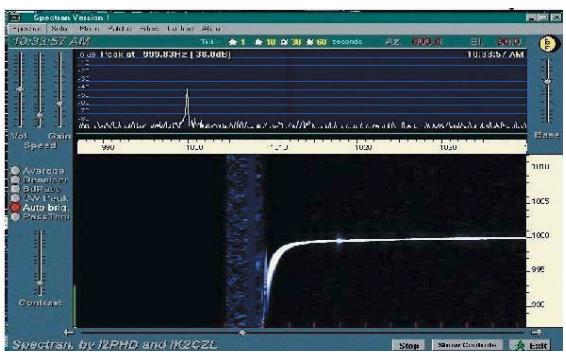
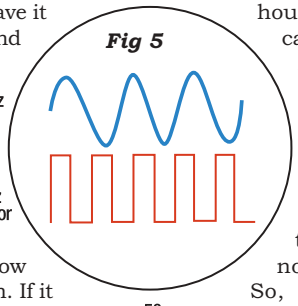


Fig 6



Having loaded the program, plug the receiver audio into the sound card and there should appear on the spectrum waterfall a trace fairly close to the BFO beat note frequency. Leave it running for an hour or two and see if the frequency varies while the temperature around the transceiver is allowed to go up and down a bit; open a few windows or doors, or blow hot/cold air over it from a fan. If it doesn't change much, go ahead and calibrate out any offset, but if it does, try some of the measures outlined earlier to see if it can be reduced. Whatever the result, take an average of the extremes of frequency and calibrate out the difference from what it ought to be. And that should be it - now you'll know it's safe to claim on air that *you're* the one on frequency!

Fig 5



A lot of this work could be avoided if some kind manufacturer would allow his future equipment to use an external 5 or 10MHz sub-standard as a frequency reference in place of the one already on board. Conceptually, it shouldn't be difficult – just divide down whatever internal oscillator there may be to 5 or 10MHz and use a 5 or 10MHz input from an OCXO to phase-lock it. Some equipments already use oscillators at nice round frequencies like 30 or 33MHz, but it requires a bit of digging into their internals to connect up an external unit – all right if you're confident dealing with SMCs and don't mind invalidating the warranty!

SOME RESULTS

Stability-versus-temperature runs are notoriously difficult to do; should the temperature be that of the air around the unit, the unit's interior, or the oscillator itself? How can temperature be changed rapidly and held precisely? Under amateur conditions exact tests are not really possible, but simpler and more practical tests that measure only how frequency varies as the unit warms up are much easier. The results given below are not exhaustive tests and are only presented to give some idea of what to expect. The reference oscillator was a proportionally-controlled double-ovened OCXO driving a Marconi 2019 signal generator providing outputs at 10Hz intervals up to 1GHz. The OCXO is kept running continuously and, at the time of the checks, had been on for 2 years; its drift rate measured against MSF over the last year was always in the 10^{-10} region and sometimes rather better.

Kenwood TS-870S (CXO; frequency not known)

A standard unit having a readout accuracy of 10Hz. No TCXO. Claimed stability is '…within 10ppm, –10° to +50°C'. Tested at 30MHz, it started off at a case temperature of 12°C and a CW audio frequency of 690Hz and took just under an hour to reach its nominal 800Hz. Thereafter, it slowly increased to 850Hz after two hours, by which time the case temperature had reached 38°. At that point, room heating was switched off and, two hours later, the frequency had decreased to 770Hz, temperature 28°. There was no discernible jitter. So, for a temperature change of 26° from cold, there was a change of 160Hz and later 80Hz for a 10° change, averaging about 7Hz/°C. If this extended over the full claimed temperature range, it might be expected to change 420Hz at 30MHz, roughly 10ppm as claimed.

ICOM 756PRO (TCXO, 32MHz)

Readout accuracy 1Hz, TCXO standard. Claimed stability '…less than ±0.5ppm 1min after switch-on, –10° to +50°C'. Tested under the same conditions and at the same time as the TS-870, it showed a change of frequency of only 5Hz at 30MHz in the first hour, and thereafter stayed within 2Hz throughout the various temperature changes. This is almost exactly as specified, 0.5ppm, a very good performance.

ICOM 706 MkII/IIG (TCXO, 60MHz)

Two variants were tested; a MkII and a MkIIG, both with1Hz readouts. Both had the hi-stab option fitted, but they are two different units – that for the MkII is a DTCXO while the IIG has a traditional TCXO; a physically larger item. Claimed stability for both is '…±0.5ppm, –30°C to +50°C'. Each proved difficult to test because it has an internal fan cycling at around a 2–2.5-minute rate when warm, which falsified temperature measurements. Both also displayed considerable jitter; the MkII had a 30Hz jitter, the MkIIG, 15Hz, period 2–3mins, measured at 145MHz (see **Figs 7** and **8**). When this jitter was averaged out, long-term drift was very good. The MkII, at a starting temperature of 14°C, produced a CW beat note, averaged between sawteeth, of 859Hz. 30mins later, it was at 30°C and 832Hz. Its fan cut in at 35°C and, from then on, the temperature stabilised at 38°C and the frequency averaged at 825Hz. This change of 35Hz at 145MHz over a temperature range of 24°C is equivalent to about 1.5Hz/°C; over a range of –30° to +50°C it would be 120Hz, or 0.8ppm, very nearly as claimed. It is a pity that jitter overwhelmed this basically good performance.

ICOM 821H (OCXO, 30.2MHz)

This unit only covers 2m/70cm and was tested at 145MHz; it has a readout to 1Hz and had the optional OCXO fitted, providing a nominal stability of '...±0.5ppm, 0°C to +60°C'. Five minutes after switch-on it stabilised at 910Hz measured at 144MHz; 30mins later it was at 879Hz for a case temperature change of 20°. This is 31Hz which, for a temperature change of 60°C, would be 93Hz, or 0.65ppm, near enough to the claim, assuming, of course, the frequency/temperature curve is linear.

SUMMARY

While these results show that manufacturers' specifications can be trusted, they do not quite tell the whole story. Calibrating the TS-870 or the IC-821H to better than 10Hz is obviously hardly worth while, and considerable caution would be needed with an IC-706 MkII. On the other hand, going to 1Hz with an IC-756PRO would definitely be worth it. ◆

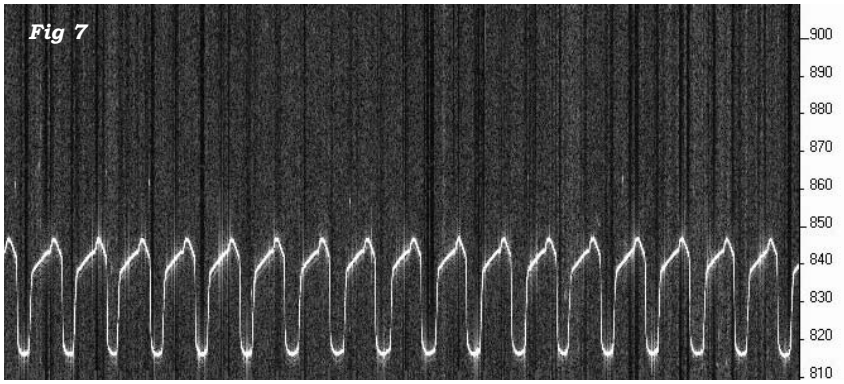


Fig 7: Jitter of DTCXO in ICOM 706 MkII measured at 145MHz. 30Hz p-p.

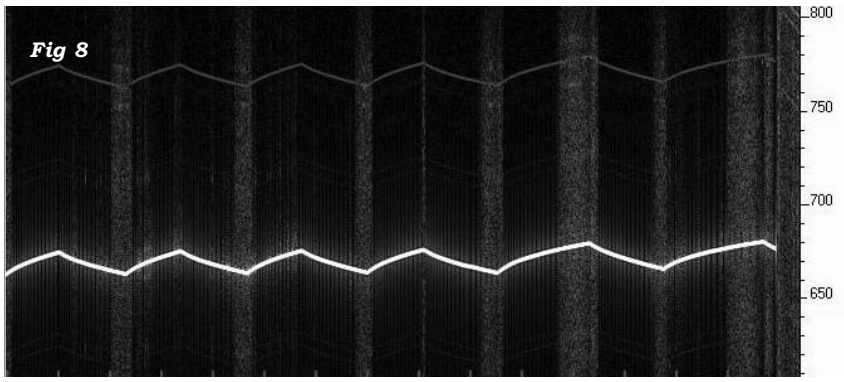


Fig 8: Jitter of TCXO in ICOM 706 MkIIG measured at 145MHz. 15Hz p-p. Note smaller scale than Fig 7.

HELPLINES

IMPORTANT NOTICE
Respondents to items in the 'Helplines' column are advised not to send original documents, but to copy them and send the copies. This is to protect your (often valuable) property in those very few instances where the originals are not returned.

- **DAVID, G4DHF**, is trying to obtain the book Radio Astronomy for Amateurs, by F W Hyde, published by Lutterworth Press in 1962. G4DHF, **e-mail**: david@g4dhf.freeserve.co.uk
- **DANIEL RODZEN, SP9EME**, is a 22-year old radio amateur from Poland. At present he is an electronics student. He would like to spend his holidays in the UK, because he wants to improve his English. He says "I think that it will be fantastic if somebody can give me accommodation and board. I would repay with some work (eg housework, etc)." SP9EME, **e-mail:** sp9eme@poczta.onet.pl
- **DOUGLAS, G3KPO**, Hon Curator of the National Wireless Museum at Puckpool Park, Isle of Wight, is seeking a copy of Radio Bygones No 23, to complete his collection. G3KPO, QTHR. **Tel:** 01983 567 665.
- **RAY, G3LHA**, needs the operating instructions for the Aiwa model XRM55K tuner/ cassette amplifier. A photocopy is acceptable and all expenses will be reimbursed. G3LHA, QTHR. **Tel:** 024 7641 4333.
- **DOUG, G4BEQ**, needs information in order to program an elderly scanner he has acquired, a Handic 0050. He has, without success, tried to set the clock and program the frequencies. Can anyone help? G4BEQ, QTHR. **E-mail**: g4beq@bigfoot.com
- **RICHARD, G3AAT**, needs three Mullard AEY25 tunnel diodes, and a data sheet if possible. He is restoring a Cossor model 3200 oscilloscope, and the diodes are for the Main and Delayed timebase, PCBs A and B, in dual timebase model 3122. G3AAT, **tel:** 023 9247 5077.
- **HOWARD, M1DRD**, would like to thank all those who replied suggesting possible causes for the demise of his vertical antenna. The favourite was ingress of water which, on freezing, split the casting.
- **MR EDWARDS** requires information (in English) for the Italian-made STE AR10, 28 0MHz MOSFET receiver, AD4 455kHz FM discriminator and AA1 audio amplifier. These were sold as separate units together with associated parts to construct a transceiver or a tunable IF for various converters. All costs refunded. **Tel:** 0151 632 0614.
- **BRIAN, G3HJK**, requires a 12-way Paignton socket, as used in the Yaesu FT-101 family for mains/mobile power input. Complete leads are acceptable. G3HJK, QTHR. **Tel:** 0161 437 3045.
- **PETER, G3CQR,** recently purchased a Lake TU4 Antenna Tuner in a Silent Key Sale, Unfortunately the user manual was missing. Can anyone provide the connection instructions for the eight-terminal rear panel to enable him to use the unit to its full potential? All costs will be paid. G3CQR, QTHR. **Tel:** 01935 813 054 or **e-mail:** petercqr@ukgateway.net
- **GRAHAM, G8AKM**, needs a circuit diagram or, ideally, full service information for the Icom IC-R1 receiver. All expenses will be paid. G8AKM, QTHR. **Tel:** 01635 43501 or 07710 966 322.
- **JOHN, M3LGC**, is the secretary of 'SEAREG' – Special Events Amateur Radio Educational Group based in South Yorkshire. He has a KW1000C Four-Band Linear Amplifier, the commercial version of the amateur equipment. He would appreciate help in the form of a copy of the manual/circuit and other conversion information and parts, in order to get it operational on all the amateur bands from 80 to 10m. All agreed costs will be met. M3LGC, QTHR. **Tel:** 01709 860 769 or **e-mail:** john-williams@tinyonline.co.uk
- **JOHN, GM1ZVJ**, needs the original handbook/operating notes supplied with the BNOS 160W 144MHz linear amplifier. A photocopy would be acceptable. All expenses will be gratefully refunded. John, GM1ZVJ, QTHR. **E-mail:** j.hilton1@ntlworld.com
- **STAN, G3MEA**, would like to contact anyone who owns radio equipment produced by companies associated with the late Cliff Harvey, W1RF. These were Harvey Radio Laboratories, Harvey Wells, and Harvey of Cambridge, and operated during the period 1933 to 1968. G3MEA, QTHR. **Tel:** 01670 503 525 or **e-mail:** stan@g3mea.fsnet.co.uk
- **DERRICK, G3LYU**, would greatly appreciate the manual or circuit diagram for a Taylor All-Wave Signal Generator, Model 65B. G3LYU, QTHR. **Tel:** 0116 287 6459.
- **DON, G0BDL**, has two variable power units, model 152, made by Solartron Laboratories. The top 19in rack unit (serial No 157305) is powered by the bottom one (serial No 151288), and both have 4in meters. He needs maintenance information on these units, and any other details relating to them. G0BDL, QTHR. **Tel:** 01208 821 203.
- **GEOFF, G3ZOF**, has a BBC 'B' computer fitted with a 'sideways' board, disc drive and Z80 second processor. He would appreciate any information on interfaces, etc for using it with CW, RTTY, etc. Expenses will be reimbursed. G3ZOF, QTHR. **Tel:** 01366 388 031.
- **CLIFF, RS93638**, needs operating and service manuals for the Taylor Valve Voltmeter, Model 172A. Postage and photocopying expenses will be refunded. RS93638, **tel:** 020 8656 3137.
- **JON, G1OSP**, is looking for any accessories for the JRC NRD-515 receiver, in particular the Memory Unit type NDH-518 that allows frequencies to be stored, or the NCM-515 Frequency Keypad Controller, that stores fewer frequencies. G1OSP, QTHR. **Tel:** 01723 365 034 or **e-mail:** castlecolumbus@tinyworld.co.uk
- **PATRICK, G4PWY**, would appreciate constructional details for a small 2m Yagi, with a boom length less than 10ft (3m). Copying costs will be reimbursed. G4PWY, QTHR.
- **DES, G3LCS**, wishes to thank all those who replied to his request for help with the 19 Set. He has been buried with circuit diagrams and pages from handbooks and is considering opening a '19 Set Helpline' himself. "Please – no more help on that subject," he asks!

KENWOOD

The Digital Flagship

"YOUR SIGNAL'S 59, LOVELY AUDIO!"

Lets face it, you have to get used to hearing that every day when you own a Kenwood TS-870S – its digital technology has transformed the world of amateur communications. This HF all-mode transceiver is equipped with powerful twin 24-bit DSP (digital signal processors) at the IF stage – an innovation that leads to such benefits as high-efficiency digital filtering, powerful noise/interference reduction, equalizers and DSP detection. And the TS-870S is digital in other ways: it can be fully computer-controlled using a high-speed link. There's an antenna splitter, dual antenna connectors and an automatic antenna tuner that works on transmit and receive. All of this, plus the full range of high-performance features for which Kenwood rigs are renowned. By any measure, Kenwood's TS-870S merits true distinction.

▮ IF-stage digital signal processing & digital filtering ▮ SPAC noise reduction (CW/SSB) ▮ Built-in K1 Logi-Keyer with full contest mode ▮ Built-in Com port (to 57k bps) – standard Kenwood protocols ▮ AIP and IF auto notch ▮ Menu system ▮ 100 memories ▮ Multiple scan functions ▮ Time or carrier scan-stop ▮ All-mode squelch ▮ Optional digital recording unit ▮ Optional voice synthesizer for CQ calls, etc.

HF ALL-MODE TRANSCEIVER TS-870S

Available from all official Kenwood amateur radio dealers. For full details of our dealer network and all Kenwood amateur products contact your local dealer or Kenwood Electronics UK Ltd. 01923 655284.
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PIC-A-ST

PART 11 SOFTWARE TRANSMITTER AND

This month we take a break from construction and discuss some of the rationale behind the PIC-A-STAR User Interface (UI). This has had significant impact on the front-panel layout and ultimately on the entire transceiver enclosure.

UNTIL RECENTLY

I had followed a philosophy of fixing the front panel controls with those anybody could reasonably need to drive any transceiver, on the grounds that these controls were essentially independent of the inner workings. That approach bought me 25 years development of four fundamentally different transceivers - all using the same housing and front panel.

But times they are a-changing! I have come to appreciate that the opposite approach is more appropriate for a transceiver with a significant software content. **Fig 16** shows, not least, the consequences to the overall dimensions.

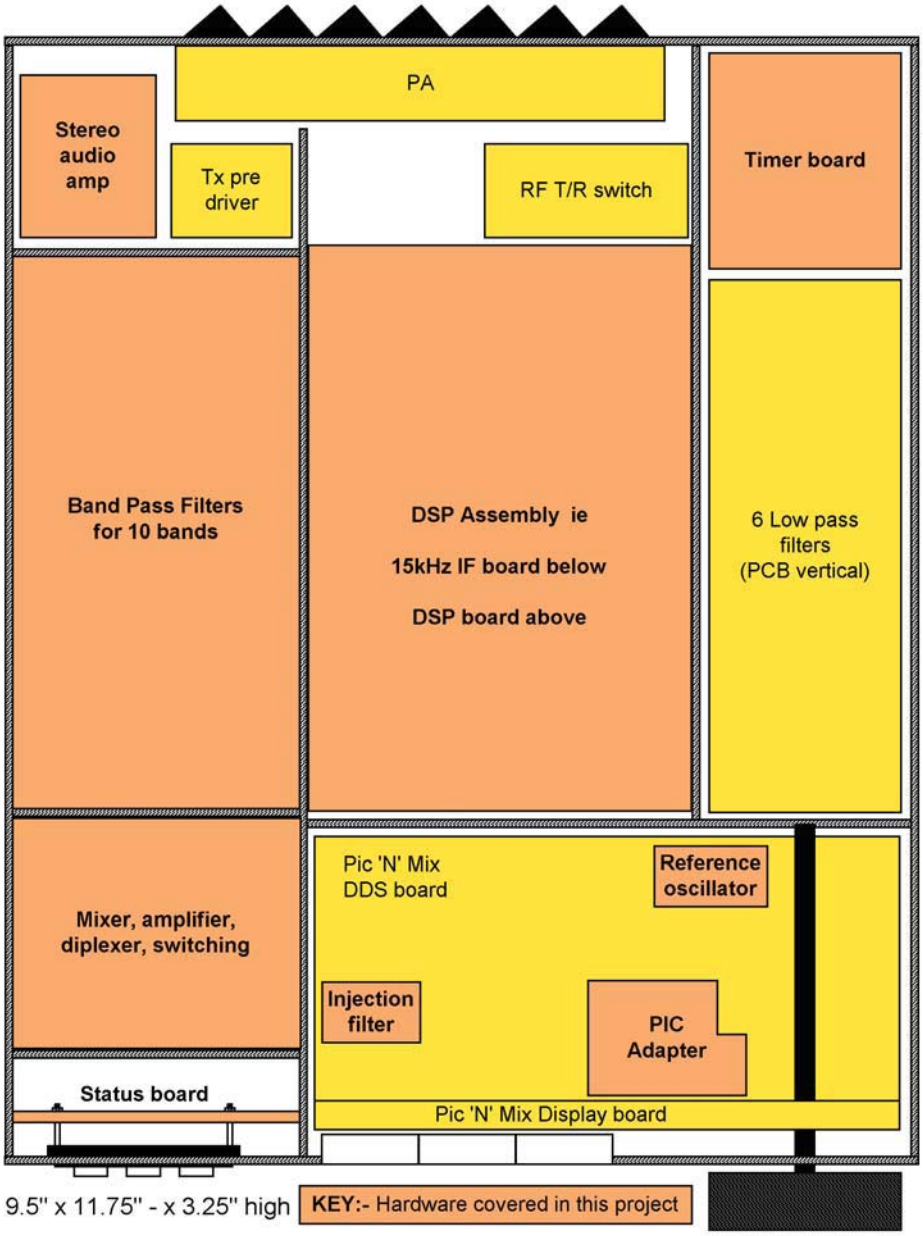

Fig 16: A possible transceiver enclosure illustrated at half-scale. Mine is fabricated from 2mm double-sided fibre-glass PCB stock. This gives excellent access from both sides.

PIC-A-STAR UI

A significant amount of effort has gone into achieving an effective UI. The challenge is to avoid the extremes. On the one hand, it is easy to end up with a system whose complexity exceeds human intellectual capacity. We have all listened in on those amazing menu-comparison QSOs which usually end in "I know I am supposed to hit 'Return'. How hard?". On the other hand, personal preferences do vary and you shouldn't be prevented by the designer from adjusting a parameter merely for the sake of a simpler UI.

The clue to the best approach came very early.

NO PAIN – NO AF GAIN

During the early evolutionary development, there was, of necessity, a period of several weeks when I had absolutely no adjustable controls whatsoever. To increase the AF Gain, for example, I had to edit the DSP code, re-assemble it and download the whole suite – including this one changed parameter. As you can imagine, I did not bother very often. Actually, it encouraged me to focus on improving the functionality so that the built-in control systems would take care of the 'variables' without undue manual intervention.

The background thought here is that as a design evolves – perhaps over several years – the number and purpose of the controls can swing wildly. And as technology evolves, so do the opportunities. Who would have thought I would need an Auto-notch on/off switch even 15 years ago? And when I designed Pic 'N' Mix, I can assure you the thought that it had the intrinsic flexibility to control the entire transceiver never crossed my mind.

SO THIS TIME...

I have taken the minimalist approach - starting with the observation that all controls can be classified under two generic categories, namely "switches" and "amounts". Thus PIC-A-STAR

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AR RECEIVER

has two (and exactly *only* two) corresponding physical controls, namely: a knob which alters 'amounts', and a keypad which handles the 'switches' – as well as specifying which 'amount' the knob is connected to.

By 'amounts' I mean, for example, amount of AF Gain, amount of RF Clipping and, indeed, amount of Frequency. By 'switches', I probably better mean 'choices' eg '80m' instead of '15m' and 'Autonotch on' as opposed to 'Autonotch off'.

Having settled the mechanical format, then at any time I can have more or less as many 'free' knobs as I like - by simply assigning them in the software. And at the same time, saving much cash on real pots, knobs, switches – and that real nightmare, the consequential system cabling.

Now that my STAR is in daily operational use – besides changing bands and frequency – the biggest strain on the UI has been turning the VOX off when the fast jets go over - and turning the transmitter power up and down to suit conditions. All the other controls have to be set up correctly, but most are essentially set-and-forget.

FRONT PANEL

The template used to make my front panel is shown in **Fig 17**. This is designed to last a lifetime in the sense that I can allocate any function to any switch - including a cluster of related controls as a simple sequential menu list. And thereafter, any range of values to the menu items – and so on.

The worst-case change issue is that one day I may need some new legends on my keypad overlay. I have never been an advocate of beautiful home-made radios versus functional home-made radios (given a finite life-time, you have to choose) – but one non-trivial benefit of this approach is that the front panel is less than A4 (and US Letter) in size – so I can print off a new one on photo-paper and stick it on anytime. Upholstery or foam-backed carpet adhesive is the answer to your next question.

A bar-graph S-meter is shown, but is not mandatory. A small edge-wise movement could be accommodated above the keypad, but a 'real' one would need an increase in the front-panel width to accommodate. The bar-graph LEDs, six status LEDs and the keypad all mount on the Status board. ◆

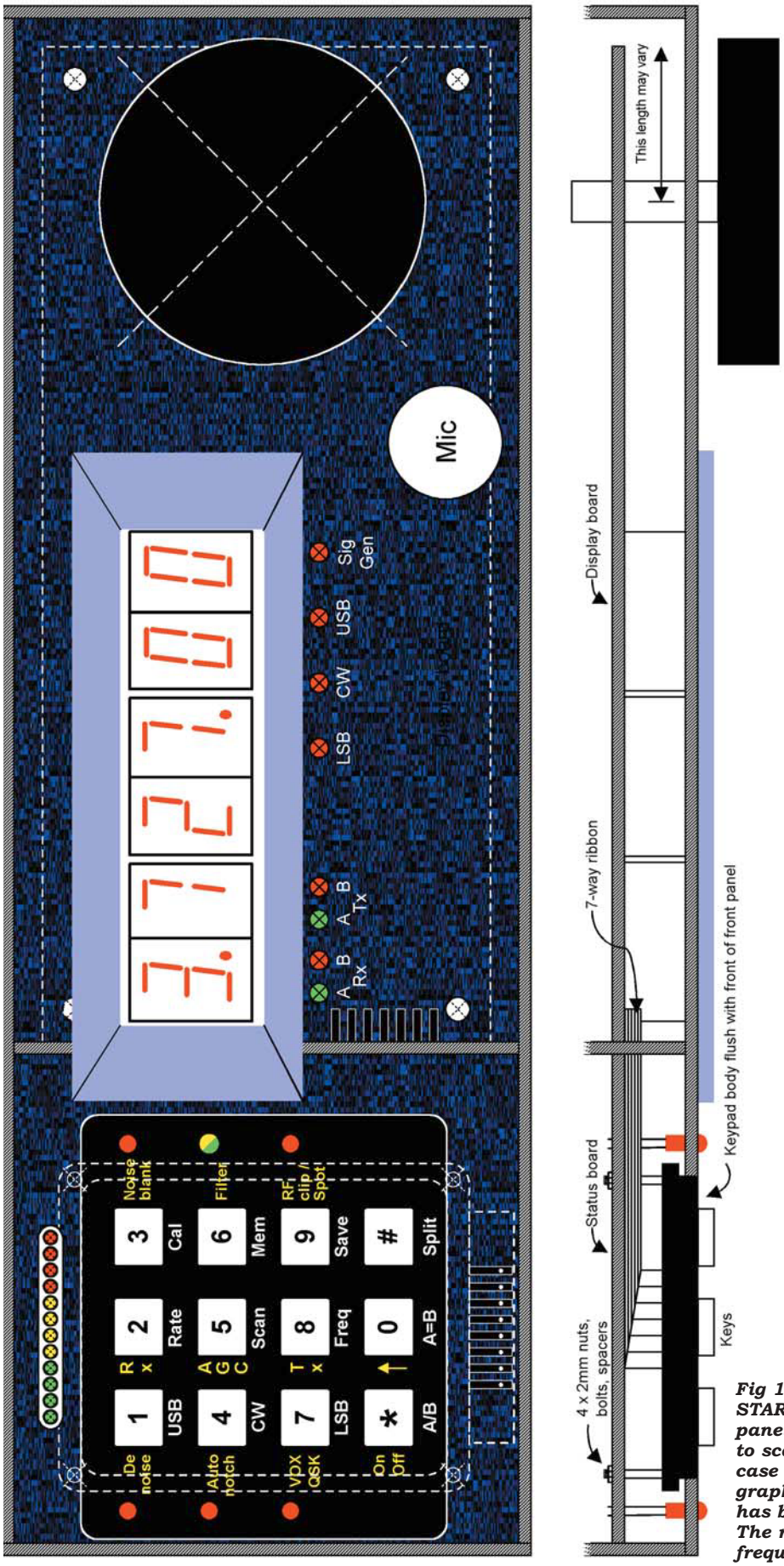


Fig 17: My STAR front panel layout, to scale. In this case a bar-graph S-meter has been used. The nine most frequently used DSP control groups (in yellow) are assigned to the 1–9 numeric keys.

NEXT MONTH
Building begins on that Status board – as well as the PicAdapter board.

By Pat Hawker, G3VA,
37 Dovercourt Road, London SE22 8SS.

TT technical topics

FRACTAL ANTENNAS & MINIATURISATION

During 1998 and 1999, (April, June, August, 1998 and January, June 1999) a series of items was published in 'TT' on fractal antennas, based largely on the pioneering work of Professor Nathan ("Chips") Cohen, N1IR, as published in a series of articles totalling over 50 pages in *Communications Quarterly*. Fractals represent a class of geometry with unique properties of particular interest to computer scientists and are proving enticing for antenna designers. As quoted in the IEEE *A & P Magazine* article discussed below, "Fractals are space-filling contours, meaning electrically-large features can be efficiently packed into small areas. Since electrical lengths play an important role in antenna design, this efficient packing can be used as a viable miniaturisation technique." Fractal designs have been developed for dipoles, loops, patch elements and linear phased arrays. A facet of a fractal loop brought near to resonance is the raised input impedance.

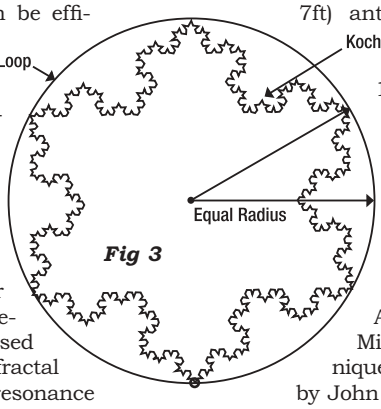


Fig 3

N1IR presented copious background information on a new family of antennas with their elements shaped in fractal geometric forms as dipoles, folded dipoles and loop antennas. Many of the loop designs were based on various iterations of the Minkowski Island (MI) fractal, **Fig 1**. This shows how each straight segment of the geometry is replaced with the generator. The initiator, the square, is shown, along with the first three generating iterations, or pre-fractals. For the basic square loop, the perimeter at resonance will be 1.110 of the physical wavelength, and each side 0.2775λ. These dimensions will decrease with increasing iterations and with increasing width scaling factors.

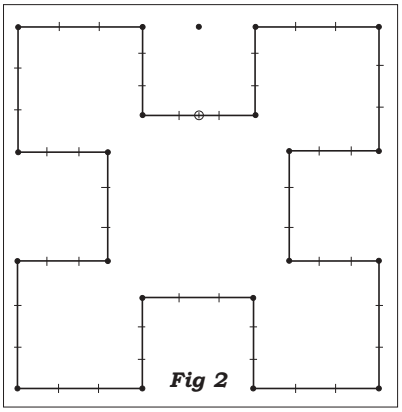


Fig 2

Fig 2 is a first-iteration Minkowski Island fractal developed from the basic quad square loop element and used in several N1IR designs. The input resistance of a circular loop with a perimeter of 0.25λ is 1.17Ω. However, after the fourth generating iteration of the Koch island, which has a perimeter of 0.68λ, the structure as a loop antenna has an input resistance of 26.7Ω (**Fig 3**).

I recall that John Heys, G3BDQ, described some results using an experimental 28MHz fractal dipole (span 7ft) antenna in *Practical Wireless* (November, 1999, pp46/47). Fractal antennas have since aroused considerable professional interest.

A useful overview article 'Fractal Antennas: A Novel Antenna Miniaturisation Technique and Applications', by John P Gianvittorio and Yahya Rahmat-Samii of UCLA, California, appeared in *IEEE Antennas & Propagation Magazine,* February 2002, pp20 – 35. This notes that "A fractal can fill the space occupied by the antenna in a more effective manner than the traditional Euclidean antenna. This leads to more effective coupling of energy from feeding transmission lines to free space in less volume… The space-filling abilities of fractals fed as loop antennas can exhibit two benefits over Euclidean antennas. The first benefit is that the increased space-filling ability of the fractal loop means that more electrical length can be fitted into a smaller physical area. The increased electrical length leads to a lower resonant frequency which effectively miniaturises the antenna. The second benefit is that the increased electrical length can raise the input resistance of a loop antenna when it is used in a frequency range as a small antenna".

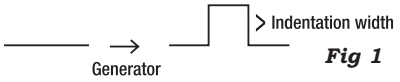
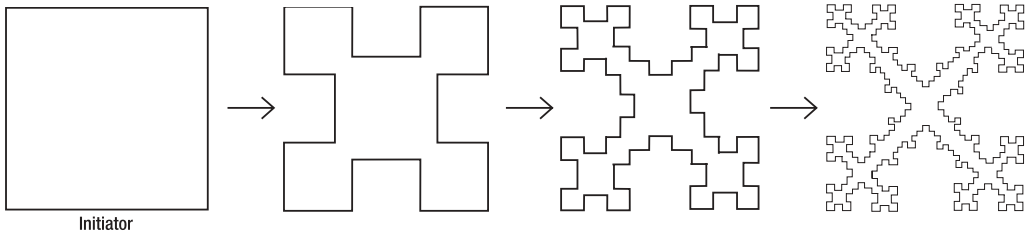


Fig 1



It was noted in 1998 that one of the problems in erecting a fractal loop antenna was to predict the dimensions required for a specific resonant frequency. The IEEE paper gives some useful design information including a table providing fractal dimension, perimeter and height for various indentation widths and generating iterations, together with a diagram providing design curves for predicting the resonant frequency of the associated Minkowski loops.

HF LOOP RECEIVING ANTENNAS

Whatever doubts may exist about the radiation efficiency of compact transmitting loops, there can be little question about the effectiveness of well-designed active receiving loop antennas. It is less a question of the signal level received than the improved signal/noise ratio that can be achieved. As G3NOQ puts it: "Loops of around one square metre work very well as receive antennas at all frequencies below 1MHz when tuned and buffered from the receiver by a high-input-impedance amplifier. This is explained by the high level of background noise at the lower frequencies, so that inefficiency in the receive antenna can be offset against the external noise level." Over the years, significant progress has been made in extending the frequency range upwards at which a tuned loop can perform effectively.

Recently, John Wilson reviewed (*Short Wave Magazine,* November 2002, pp30–35) and gave the thumbs-up to the compact AOR LA-350 Loop Antenna. The standard kit comes with two loops, one covering 3 to 9MHz and the other 9 to 30MHz (optional elements cover the lower frequencies 200 to 500kHz and 500kHz to 1.6MHz). But be warned, the retail price in the UK runs to some £200 plus another £100 for the two LF/MF optional loops.

His list of the pros and cons: *in favour* – the small size, the E-field rejection which comes with a loop, the additional selectivity which a tuned loop provides, the directional properties, and the fact that the entire system

Fig 3: Showing how advanced fractal designs can raise the input impedance of a small loop, see text. (Source: IEEE Ant & Prop Magazine)

Fig 1: The iterative-generation procedure for a Minkowski Island fractal. (Source: IEEE Ant & Prop Magazine)

Fig 2: First iteration Minkowski Island (MI1) fractal developed from a quad square element and used in several N1IR designs.

is sitting conveniently inside the house and not out at the end of the garden. *Against* –the cost, somewhat offset by the performance and quality that you get from AOR, and the fact that if you have a firmware-controlled receiver scanning a number of widely spaced frequencies, the antenna can only be peaked on one section of the spectrum. He adds: "My own view is that the LA-350 is an impressive performer and will prove to be popular with enthusiasts who need a high performance antenna that will sit right on top of the receiver and still be as good or better than a traditional wire antenna strung down the garden – and of course the LA-350 will reject local noise interference which would drown LF signals from the wire antenna."

Good HF performance requires a well-balanced input with the loop feeding into a very high impedance. In 'TT' November 1996, Chris Towns, G8BKE, drew attention to the design of a tunable HF loop antenna that was originally contributed to the 'Ideas for Design' feature of *Electronics for Design* by M J Salvani. This design subsequently brought letters from satisfied users – and could be put together for a fraction of the cost of the LA-350.

M J Salvani wrote: "Tuned loop active receiving antennas have tended to be confined to low- and medium-frequencies, primarily due to the difficult requirements associated with the active circuitry. Good performance in the 5–30MHz range requires an amplifier with extremely high input impedance and low noise that can drive 75Ω loads at high signal levels at frequencies to 30MHz. Combining dual FET source-followers and the Maxim MAX436 wideband transconductance amplifier can provide just such an amplifier: **Fig 4**."

He added: "A balanced configuration is used for the tuned loop to preserve the symmetry of the figure-of-eight polar antenna pattern. As a result of using FET source followers, only the 1MΩ gate resistors load the tuned circuit, so tuning is very sharp and resistance to off-frequency interference is very high. The FETs drive the differential inputs of the MAX436 which amplifies the balanced signal and converts it to a single-ended output."

Voltage gain is switch-selectable (8dB or 20dB) into a 75Ω load. Maximum undistorted output is 1500mV across 75Ω. The 470Ω resistors prevent gate damage from accumulated static charge when handling the loops to change the frequency range. A three-turn, 15in-diameter loop made from No 8 aluminium ground wire, spaced 0.5in between turns, will cover from 4.4 to 16MHz with a dual 10–330pF variable capacitor. A single loop using a 48in-long strip of 1.25in-wide sheet aluminium should cover from 13 to about 55MHz, although performance falls off beyond about 40MHz. If the site has very strong AC fields, adding 100pF input capacitors can reduce hum pickup, otherwise they are not needed. The only adjustment is to zero (balance) the output by means of the 330Ω potentiometer

DYNAMIC POWER LIMITING

Brian Horsfall, G3GKG, provides a possible solution to a problem that quite a lot of newer licensees – such as the M3s – may not realise that they need to confront – and which could also be useful to older licensees interested in low-power operation when using a 100W-class transceiver.

He writes: "It appears that the still-popular Yaesu FT-101 (and probably other older transceivers) do not have a facility for setting the maximum power output level to anything like as low as the 10-watts limit imposed by the licence conditions. The commonly-used alternative of trying to limit the power by keeping microphone gain turned down is patently unsatisfactory (as with some of the M3 signals on 7MHz!), even if some form of true 'peak power' measurement is in use. What is needed is a system that produces suitable voltage feedback into an existing ALC control circuit. There is often a connection on the back of a transceiver that is normally used for the purpose when working with an external linear amplifier. John Norton, G/N9LYE in the 'Star Letter' of *Practical Wireless* (June 2002, p10) outlined one method of overcoming the problem of reducing the output of many 100W-class transceivers to 5W or less using a simple battery-plus-potentiometer circuit. My solution represents a more dynamic approach.

"My workings and component values assume that up to about 8V negative will be required for use with, for instance, the FT101. However, the maths are simple enough to be adapted for different situations. The circuit (see **Fig 5**) is also pretty simple and assumes that the input impedance to the rig will be fairly high, so as to produce a time constant of the right order with the value of C as shown. If this is the case, a more sophisticated, active peak detecting and buffering circuit should not be strictly necessary, but could improve performance by making this independent of the internal circuit values in the transceiver.

"A power of 10W produces an RF current of 0.45A into a 50Ω load. This is the current in the conductor passing through the centre of the toroidal core (that is the primary winding of a current transformer. The current induced into a secondary winding of *n* turns will be in the ratio of *n*:1. So, a secondary winding of 18 turns would produce a current of 450/18 = 25mA through any resistive load connected across it. For valve transceivers, we need to develop up to about – 8VDC (for solid-state transceivers up to about – 1.5V). In order to grab an instantaneous voltage closely equivalent to the peak value of the constantly-changing current produced by an SSB signal, we need a reasonably low impedance source. Mr Ohm tells us that a resistance of 240Ω will give 6VRMS from 25mA (ie when the RF output is 10W. This will produce a peak DC voltage of slightly over 8V when rectified by the diode. (There will be a small price to pay in the shape of the 0.15W dissipated in the resistor).

"The *actual* feedback voltage produced by the 10W is set precisely to what is required (by the transceiver) by making the bulk of the resistance continuously variable. Use a carbon or cermet component having a maximum value such that the total load is equal to that calculated as above. This resistor could be the pre-set type and should be adjusted initially so as to produce no output when the transmitter is delivering, say, an indicated fifteen watts of CW to a 50Ω dummy load. If the value is then increased so as to reduce the indicated output to 10W, it can be left there. The device should automatically limit the output to that level on the *peaks* of the sideband signal. Note that the microphone gain or level control should still be kept low to avoid the signal being over-compressed. This device is intended only to prevent inadvertently exceeding the desired power level while excited, for instance in a contest. If a peak-reading power meter is not available it will still be difficult to be convinced that the peaks are actually reaching the legal 10W!"

THOSE SMALL TRANSMITTING LOOPS

I had hoped that, following the April item 'The Small Loop Controversy', it might have proved possible to give the question of the radiation efficiency of

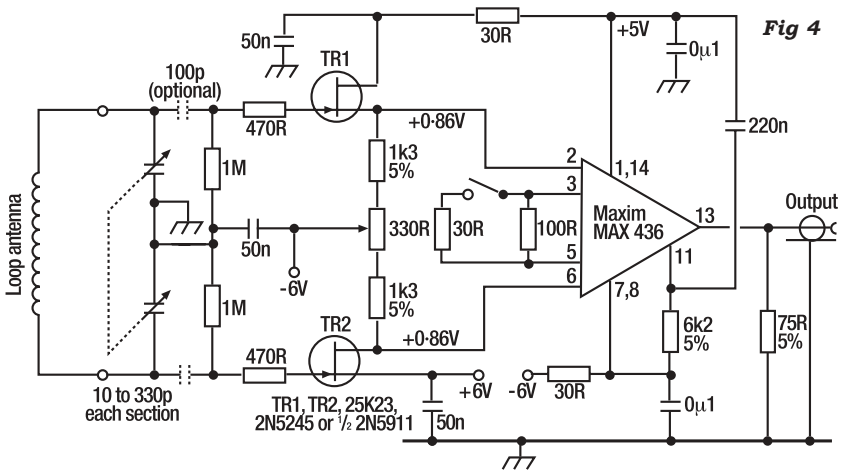


Fig 4: Balanced HF tunable 'active' loop antenna, using dual-FET source-followers with Maxim 436 transconductance amplifier to create a high-impedance, low-noise amplifier that makes it possible to use loop antennas effectively throughout the HF spectrum.

small transmitting loops a rest, at least for a time. There is no doubt that, for the amateur with restricted space for a conventional antenna, the small loop can be an effective system, no matter whether the radiation efficiency at the lower end of its frequency range is only one or two per cent or, as G3LHZ insists, is over 90%. It is always worth remembering that, provided an antenna radiates a few watts along a desired great circle path (right direction, right elevation), it will perform as well as or better than an antenna spraying out hundreds of watts in the wrong direction or wrong elevation. It is worth remembering that, in the lower HF/MF region, typical aircraft antennas may have a radiation efficiency of only 1% – but can still contact their control stations.

However, following the April 'TT', Professor Mike Underhill, G3LHZ, sent me a long letter firmly rejecting the comments from Alan Boswell, G3NOQ, that reflected the views also of several other professional antenna engineers. G3LHZ firmly believes that loop *Q* does not scale equally with size and frequency and that the conventional measurements made in the conventional manner are flawed when these are made with a small antenna and field sensor ($<\lambda/2\pi$) close to any ground surface. "In essence, he has not taken account of the behaviour of antenna modes in the presence of ground. These distort the antenna pattern to give less radiation along the ground in the case of a PEC ground and, in the case of a real ground, introduce a substantial close-in ground absorption…

"For the record, my definition of efficiency is derived from simple physics. It is exactly the one that the IEEE has standardised and that G3NOQ explained in the April 'TT'. The only difference is that physics demands that efficiency should be measured close to the surface of the antenna conductor, and not in the far-field. His proposed measurement method (as used by professional antenna engineers) can be up to 20 times too low, depending on the ground constants and antenna height. It is, however, a good method for finding antenna ERP in the far-field, where it is important to know this. It is not a measurement of antenna efficiency independent of the environment…

"Let me offer a method of assessment… the well known A / B substitution method. Choose, as a reference antenna, either a half-wave horizontal dipole or a vertical with the same (peak) height. With the same power input, compare the field strengths on 3.5 or 1.8MHz from these by successive substitution with a *balanced* loop of say 1m-diameter of 10mm copper tube at the same height. If it can be shown that the loop's efficiency is more than 10dB worse than either of these I will start to listen to the counter-arguments. If it can be shown that the loop losses are 1000 times greater than either on 1.8MHz, the Chu-Wheeler criterion and Kraus's loop formula can be restored to their former glory.

"Incidentally, Kraus's formula is not incorrect. We always see it occurring in our measurements as a contributory component of radiation at the high-frequency end of the tuning range, sometimes 'amplified' by ground coupling, depending on antenna height and location. My point is that, at the low frequency-end of loop tuning range, the (un-amplified) Kraus formula is overshadowed by other radiation modes by

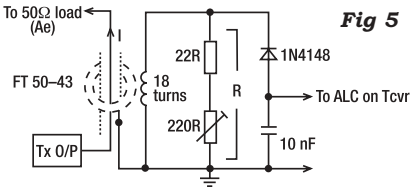


Fig 5: Circuit diagram of a dynamic power-limiting device devised by G3GKG Note that the screen on the primary 'turn' coax is grounded at only one end (ie the 'earthy' side of the RF connection does not go through the toroid).

typically a thousand times or more… It is highly probable that the commercial loop manufacturers have been seriously underestimating the performance of their products."

These are brief extracts from a long and detailed letter, though I have to admit that it has not convinced those who regard G3LHZ's views as heretical. He is not the first to recognise the existence of additional radiation modes on small loops. It has long been accepted that measurements in the near-field can be misleading. The A/B substitution method of comparing antennas poses the problem that the reference antenna may be re-radiating signals from the antenna under test. It would be nice, but improbable, to think that the makers of professional loop antennas have so seriously underestimated the performance of their products at the lower end of the tuning range! It also seems questionable to take into account the 'super-gain' of ground reflection. If applied to half-wave dipole antennas, this would give them an 'efficiency' of well over 100%. (ERP is hardly a measure of an antenna's 'radiation efficiency'). It has been stressed before that the recognised measurement of far-field performance (HRP and VRP) of an HF antenna requires measurements taken by flying an aircraft around the site to supplement measurements near ground.

But, undoubtedly, the A/B substitution checks made by G3LHZ show the effectiveness of small loops even on 1.8 and 3.5MHz. A letter from Brian Kendal, G3GDU, who, for several years has, with other members of a local 3.5MHz net, been in regular contact with G3LHZ over a distance of the order of 12 miles (other members of the net live up to 30 miles from G3LHZ. G3GDU writes: "As the net time is in the morning, signals are ground-wave (Possibly often NVIS as favoured by loops? – *G3VA*). Over several years, I cannot recall any instance when Mike's indoor loop has failed to match or outperform, his outdoor 250ft long-wire antenna."

G3GDU has, himself, built and tested loop antennas having diameters of 3ft and 6ft. On 7MHz the 3ft loop was, in general, about one or two S-points down on his doublet. The 6ft loop was located in his loft, remotely tuned. It proved very successful. On 7MHz, it always matched and frequently outperformed the outdoor doublet. On 3.5MHz, over ranges up to 200 miles, it was 1 to 2 S-points down on the doublet; from 200 to 400 miles, ? to 1 S-point down; over 400 miles, nothing to choose between the two. It would appear that these variations are more the result of different VRPs than radiation efficiency, with the loop demonstrating a much lower elevation angle of radiation. On 1.8MHz, no comparisons were made, but contacts were made from West Sussex as far as the north of Scotland. "More recently, I have experimented with loops at their highest frequency of operation. First a 1m-diameter loop tuned to the middle of the 24MHz band. The bandwidth was adequate to cover the whole band without retuning. This proved extremely effective and outperformed my doublet, working into the Far East on a number of occasions. Most recently, I have used a 1.5m loop for 14MHz CW, its 2.0:1 VSWR bandwidth being in excess of 100kHz. It seems to match the outside doublet in transmission performance. All my loops have been constructed using either 10mm copper tubing or using the outer screen of UR-67, fed directly from my Ten-Tec Corsair without using an ATU. On reception, every loop has far outperformed my external doublet in terms of signal/noise ratio."

G4KKI in an article '8 Bands – No Outside Antennas' (RSARS's *Mercury*, No134, March 2003 pp22–25) describes some effective results using home-built loops concluding "So if outside antennas are out for you, why not try a small magnetic loop? Take it from me, they work". One of his constructional hints to meet the need for a slow-turning electric motor (as slow as 1RPM) is to use one of the little barbecue-spit motors working off a 1.5V cell available from garden centres for about £3, adding: "You still need at least a 6:1 slow motion drive between the capacitor and the motor." With twin wires and a DPDT switch, he can reverse the motor - easily and quickly, setting the VSWR to show resonance. For his main loop, he uses eight 300mm lengths of 22mm copper tube (with eight 45° fittings). He notes that the large DIY stores charge nearly £4 per length and suggests trying your local Plumb(ers') Centre where they can be half the price.

All of which confirms the effectiveness for amateur operation of well-built compact loop antennas, but does not indicate a radiation efficiency of over 90% throughout the HF spectrum as G3LHZ claims! I would stress that nobody wishes to discourage Mike in his undoubtedly interesting experimental work on loops, but there is a fear that some of his claims ▶

could be misleading. Effective, yes! But over 90% radiation efficiency at 1.7MHz with a 1.2m-diameter loop?

POWER SUPPLY UNDER-VOLTAGE DETECTOR

Eric Christer, Z21FO, suggests that the simple under-voltage-detector arrangement shown in **Fig 6** may be useful to others. He writes: "I use the device with a 13.5V regulated power supply. It also detects a power supply overload condition when the voltage regulation is at its limit.

"Silicon and/or germanium diodes in series provide a voltage drop and are selected to adjust the required voltage setting of the detector. This could be about 0.1 to 0.2 volts less than the regulated supply voltage. [The forward voltage drop across a germanium diode is about 0.2V, across a silicon diode about 0.7V – *G3VA.*] There is a hysteresis effect in the circuit so that the LED will be either full on (indicating an under-voltage) or off. As a guide, in my case, 11.7V was measured at the end of the diode string with the diodes that I used.

"On first switching on the power supply, the electrolytic capacitor at the base of TR1 causes the LED to light up momentarily. Any high-gain small-signal silicon transistors may be used."

BACK TO MEDICAL MORSE?

In the December, 1985 'Members' Mailbag' (*Radio Communication, p922),* Alex Comfort, MB, BCh, DSc, Adjunct Professor, Neuropsychiatric Institute, UCLA, pointed out that while much work was being done in medical robotics to provide speech and environment control for people disabled by various forms of paralysis, there remained problems in making patients able to communicate effectively. "Many current systems operate by, for example, scanning the alphabet and providing the patient with an on-off switch operated by head or finger movements, or with the mouth or tongue, which stops the scan at the required letter - a strikingly cumbersome arrangement. Quite remarkably, I have seen no system which operated with Morse. Even an incoordinate patient, who can manipulate an on-off switch, could almost certainly form slow Morse characters. Moreover, commercial equipment exists: a paddle can easily be adapted to be operated by head movements, and alphanumeric decoders, or decoding programmes for PCs are a familiar technology… Radio amateurs, many of whom are also interested in robotics and computer programming, would do well to bring this resource to the notice of prosthetic engineers… One of the striking things I have learned in medicine is the speed with which motivated people of 70 or 80 learn this very abstract skill…"

Professor Comfort's letter sparked off several subsequent items in 'TT' (February May and June, 1986). Bob Smith, G6TQ, described a project of the RAIBC in conjunction with the West Kent ARS whereby a young man, Mark Brown, who was confined to a wheelchair, blind, profoundly deaf and, due to his deafness from birth, with a severe speech impediment, had achieved a fantastic ability to copy Morse: "We talk to him at 25 to 30WPM, reading in his head like a book. Communication is achieved through a wheelchair-borne microcomputer that is programmed to translate plain language typed on a keyboard into fast Morse. This he reads through effects by bone conductivity which can sense the vibrations." The sender needed only keyboard skills. B J Frost, G6UTN similarly reported a successful project undertaken by the Great Yarmouth and Lowestoft branch of REMAP involving a totally deaf girl.

Nigel Neame, former G2AUB, wrote to confirm the value of Morse to the extremely hard-of-hearing: "For many of the hard-of-hearing, Morse is the only aural means of communication. Even for the profoundly deaf, it is possible to receive Morse by means of a vibrating sensor, etc." He urged that Morse should be taught in all schools for the deaf. His letter was followed by contributions in support or endorsement from Archie Couser, G3CZG, and others.

There have been other examples. One of these included the use of Morse as an aid to communicating with a Belgian amateur apparently in a deep coma as the result of a motor accident. A visiting fellow-enthusiast recognised that the patient's eyes were flickering Morse symbols. It soon transpired that the injured amateur, although apparently in a deep coma, was aware of what was going on. He later recovered.

Since the 1980s, robotics has moved on, but the need remains the same. As emphasised in an article 'Hear my Voice', by Laura Spinney (*New Scientist,* 22 February, 2003, pp36–39), when someone is trapped inside a paralysed body, finding a way for them to communicate is vital, For many 'locked-in' patients, being able to make contact with people and interact with the outside world makes a vital difference to quality of life, bestowing a sense of autonomy and even sustaining the will to live. But technical cunning is only half the answer.

Her article describes how a 32-year-old German lawyer – Hans-Peter Salzmann – suffering from ALS (a disease that gradually destroys all voluntary movement, locking an intact mind into a paralysed body no longer even able to breathe for itself), is using the latest wonder 'Thought Translation Device (TTD)'. As the most successful user yet of TTD, he was able patiently to spell out some 265 words of the article. But it took him some 10 hours of intense concentration working a machine that is 'unimaginably difficult to control'. Most people who try using it simply give up.

A TTD uses two electrodes stuck to the scalp to measure an electrical signal produced in the brain's cortex immediately before a thought or action. As explained by Laura Spinney: "These signals are fed into a computer; by manipulating his thoughts to cause shifts in the signals' amplitude, Saltzmann can move a cursor to select one of two halves of the alphabet, which appear successively in the bottom half of the screen. His cursor starts off in the top half. If he can see the letter he wants, he moves the cursor down to the lower half of the screen. If it doesn't contain the letter he wants, he must clear his thoughts to prevent the cursor moving, and thus reject the letters on offer. Each time he chooses, the bank of remaining letters divides again. Eventually he is left with just the letter he wants."

As explained in the article, it is a slow and difficult exercise and requires immense control of his thoughts by the user. In the early period, Salzmann took 16 hours to compose a message of 400 characters: "Now, on a good day, he can do it in three hours. After two years, he wrote his first letter, thanking the scientists who built the device".

Salzmann was the first person to master the TTD, the brainchild of Niels Birbaumer at the University of Tübingen. 15 severely-paralysed patients have worked with TTD, but a high proportion have failed to reach the threshold at which they are deemed proficient enough to use it for communication.

Clearly, the process would be simplified if, instead of choosing a letter from the complete alphabet, there were only three choices: dot, dash and letter spacing (used twice to indicate word spacing). This idea must have occurred to Ian Walker of Newbury who wrote to the *New Scientist* (March 29, 2003 p30): "Some years ago, a colleague and I helped someone with a similar problem to Hans-Peter Salzmann. At the time, she was using a sequential-selection device known as 'Possum' to write books and we devised a system based on Morse code to speed letter-selection. The structure of the Morse alphabet assigns the shortest codes to the most frequently-used letters, and appears to be an almost optimum solution. The ternary system used on mobile phones is a very frustrating input method, as it is not letter-frequency optimised."

TTD is a system of last resort, with many patients able to use, for example, their breath to select letters, etc. It is evident that Morse can contribute much to many paralysed people or those otherwise disabled or handicapped by deafness, etc. ◆

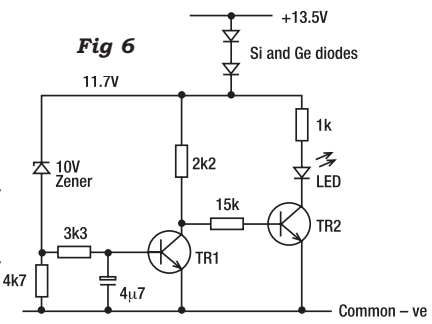


Fig 6: Power supply under-voltage detector devised by Z21FO.

MICROWAVE PROJECTS

Edited by Andy Barter, G8ATD

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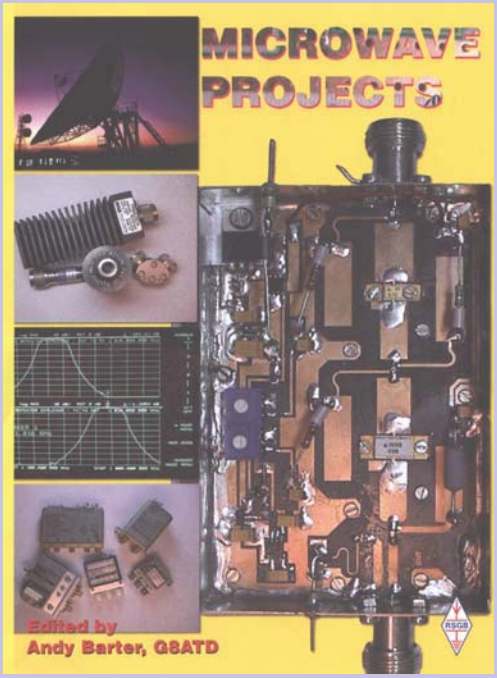

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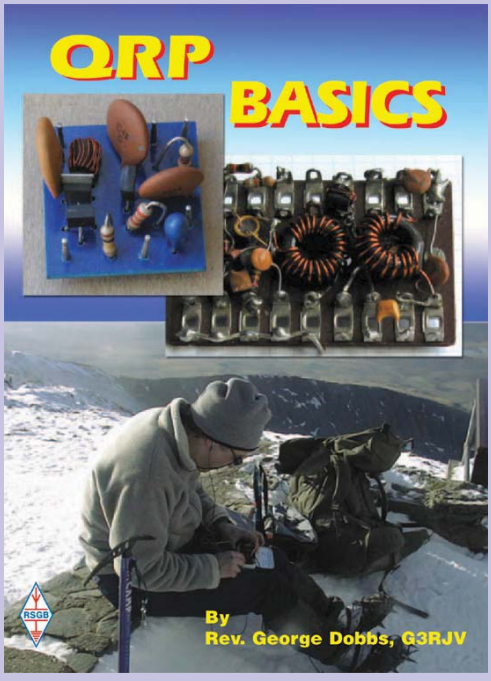

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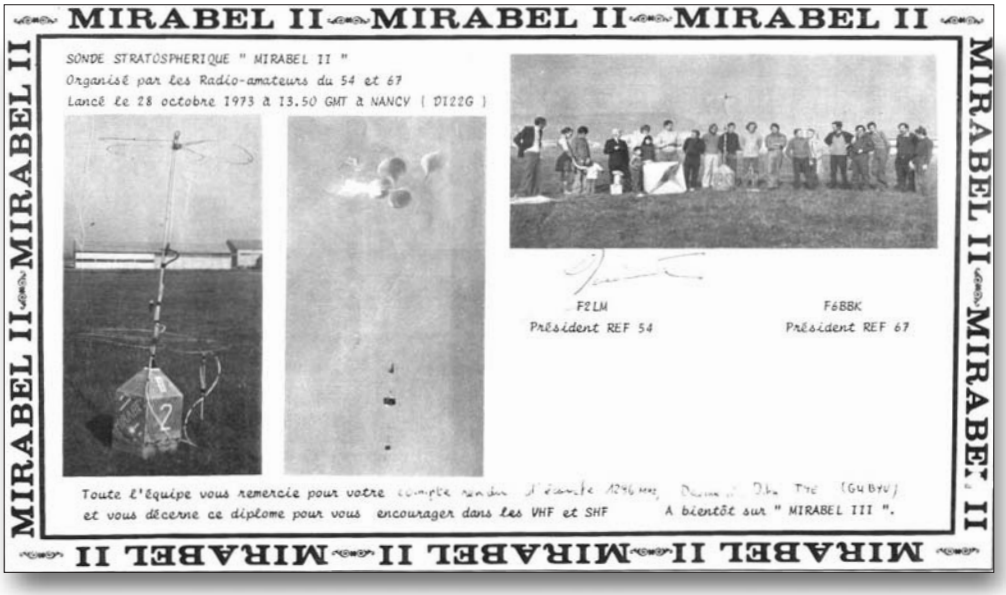
By Steve White, G3ZVW, 31 Amberley Road, London N13 4BH. E-mail steve.white@rsgb.org.uk

Whatever next



Below: the certificate received by John Tye, G4BYV, in 1973, as a result of hearing the 23cm transmissions from Mirabel II.

BEEN THERE, DONE THAT

John Tye, G4BYV, wrote to say that he has been following the ongoing theme of airborne amateur radio, adding the comment "In 1973, a group of French hams put the same type of thing up from Nancy. Called Mirabel II, it was on 23cm. I still have a QSL card from them with a photo of the Mirabel in a large motor oil can and a photo of the group". It was on 28 October 1973 that Mirabel II reached a height of 29,200m (nearly 96,000ft) before the first of its two helium-filled balloons burst and it began its descent.

Nancy is about 180 miles east of Paris and about 280 miles from the closest part of Britain. John was only able to hear Mirabel II but, according to the list of stations that worked through it, G3LTF managed to put a signal through. According to the statistics, amateurs from nine countries worked through it – 50% German, 30% French, and the remaining 20% split between Czechoslovakia, England, Holland, Switzerland, Austria, Luxembourg and Belgium.

As you can see from the photograph of the card, it just goes to show that there's not much in the world that's new.

SHRINKING FUEL CELLS

Many of us now own notebook computers, and know exactly what it is like to run out of battery power. Needless to say, this invariably happens at a critical moment. If you carry a spare battery, fine, but if you don't you need to find a mains outlet to continue and to recharge the battery. Toshiba has now demonstrated a prototype Direct Methanol Fuel Cell (DMFC) that could power a notebook computer for five hours from a 50cc methanol cartridge. Recharging the fuel cell will take as long as it takes to change cartridges. Toshiba's DMFC employs the same electrodes as found in lithium-ion batteries, allowing it to connect directly to a PC or other portable device in the same way as a lithium-ion battery. It can also be used as an alternative to lithium-ion batteries. The prototype measures 275 x 75 x 40mm and delivers an average of 12W (20W peak) at 11V.

According to Toshiba's Press Release, "Methanol in a fuel cell delivers power most efficiently when it is mixed with water in a 3 to 6% methanol concentration – a concentration requiring a fuel tank that is much too large for use with portable equipment. Toshiba overcame this by developing a system that allows a higher concentration of methanol to be diluted by the water produced as a by-product of the power generation process. This technology allows methanol to be stored at a much higher concentration and achieves a fuel tank less than 1/10 the size of that required for storing the same volume of methanol in a 3 to 6% concentration." Apparently, Toshiba is now working on reducing the size of the DMFC to that of a typical notebook computer battery.

One possible disadvantage of fuel-cell powered devices is that you may not be very welcome to carry them on board an aircraft, but no doubt that issue will be well debated before they become commercially available.

Of course, there would be nothing to prevent the manufacturers of amateur radio equipment from incorporating a fuel cell along the lines of Toshiba's in their products, so maybe one day there will be a transceiver that takes a bottle instead of a battery. Inevitably though, manufacturers will seek to maximise their profits by adopting their own standards of cartridge connectivity and fuel mix, so you won't be able to connect one company's cartridge to another company's fuel cell. However, just like ink cartridges for printers, third parties ought to spring up and offer cheaper alternatives.

SINGLE-MOLECULE SWITCH

In April's 'Whatever Next', I highlighted the work that had been taking place at the University of Chicago into developing a single-molecule diode. Now I have come across news of a single-molecule electrical switch.

Developed by George Kirczenow, a physics professor at Simon Fraser University in British Columbia, and Eldon Emberly, a physicist at Rockefeller University in New York, the switch they have developed contains a single molecule of a sulphur-containing organic compound known as benzene-dithiolate (BDT) that can morph from a stable 'off' configuration to a stable 'on'. The BDT molecule, which is sandwiched between two gold surfaces, switches between states by changing the way it is orientated in space. Switching is achieved by moving the tip of a high-powered scanning tunnelling microscope. At present the switch is strongly conductive in its 'on' state and weakly conductive in its 'off' state, but there's no reason to suppose that future development will not result in improved performance. The BDT switch represents a giant leap in this small world, because it is "about three times smaller than the smallest previous molecular switch and hundreds of times smaller than semiconductor switches used in today's high-tech devices."

While the molecular switch could become the heart of nanomemory chips of the future, there are many unknowns and questions that still need to be answered. Practical methods of making a single-molecule switch open and close also need to be resolved, so don't expect to find this kind of technology on the high street for a few years. ◆

WEB SEARCH

Direct methanol fuel cell	www.toshiba.co.jp/about/press/2003_03/pr0501.htm
Single-molecule switch	www.techextreme.com/perl/story/20697.html

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In practice

LIGHTNING PROTECTION

Q What precautions can I take against lightning damage?

A This is a very complex subject, but at least I can make a start here. In this country, even the most affected areas average less than one ground strike per square kilometre per year, so lightning is quite unlikely to land on your particular patch. This low risk of a direct strike is reflected in the UK domestic wiring regulations, which require no special precautions beyond the normal mains earth. The risk changes when you put up high outdoor antennas - but perhaps not as much as you may imagine.

The most likely threat is always from the network of overhead mains and telephone lines, which collect strikes and induced surges (**Fig 1**) from a very large area and deliver some of that energy to your house. The effects illustrated in Fig 1 can also happen to your antenna, of course, but only if the strike is relatively close by, and that is much less likely. However, a near-miss also has other ways of causing damage. The peak current in a lightning strike is tens or even hundreds of thousands of amps at the strike point. When this current reaches the ground, it will spread outwards in all directions until the electrical charge is eventually dissipated. Close to a lightning strike there is no stable 'ground potential', because there is a large voltage drop within the earth itself. If you have an 'RF ground' outside at the antenna as well as your mains earth connection, **Fig 2** shows how a large surge current can flow along your feed-line. This is entirely due to the multiple earthing at different points, so it can happen even when the antenna has been lowered to the ground. If the antenna is still up, it's vulnerable to the effects of Fig 1 in addition.

Feeling just a little worried? Good, because you need to think about this... but don't panic, because there *are* some useful things you can do. The other good thing is that if you get organised to deal with lightning surges, it can also help with a variety of EMC problems.

What causes the damage to your radio equipment indoors? Basically it's due to excessive voltages and currents applied to delicate electronic components inside the equipment. If you can prevent these surges from ever getting inside the box, the equipment will probably survive. The way to do this is to keep all the equipment and its interconnecting leads as close as possible to *the same potential*, by bonding it all together and making sure that the incoming surges go *past*, and not *through*. Note carefully: I did *not* say 'connect everything to ground' – the priority is to *connect everything to everything else*. The aim is to create an 'equipotential zone' inside of which there can be no damaging voltages or currents. During the surge, everything is going to 'bounce' a long way from true ground potential – but that doesn't matter, so long as it's all bonded together at the *same* potential. This idea is the key to equipment protection.

The basis for your in-shack equipotential zone is a nice wide strip of metal across the back of your operating table. Not a thick bar, but a wide, flat strip for large surface area and low inductance. A strip of copper-clad PC board about 15-20cm wide is ideal – you can pick one up for pennies from under some table at a rally, and you can easily solder to it wherever necessary. All of your major items of equipment will have a ground (chassis) terminal at the rear; connect each one to the strip by a short, heavy wire or braid. Also connect the shields of your incoming coax feeders to the strip, as shown in **Fig 3**, and your station RF earth if you have one (it isn't always necessary). What you're trying to do is to create a simplified version of a proper ground entry panel such as you'd find in a purpose-built installation, where every incoming conductor passes through that panel. 'Earthy' conductors such as coax shields are bonded directly to the panel, and other conductors that carry power or RF voltages are bonded through surge protectors. The entry panel is bonded to a good earth, but that is almost incidental - the main protection comes from the panel itself, which bonds everything *together*. That's why I call the strip of PC board across the back of the operating table an 'equipotential' strip. It's a long word, but it keeps reminding me what it's really there for – to keep everything at the same potential. The strip configuration will not be as effective as a panel that all conductors must pass through, but it certainly will help to take the sting out of incoming surges.

Fig 1: Lightning can either strike overhead lines directly, or induce currents via its magnetic field.

Fig 2: Strike currents flowing outward through the earth can create damaging surges in multiply-earthed systems.

Fig 1

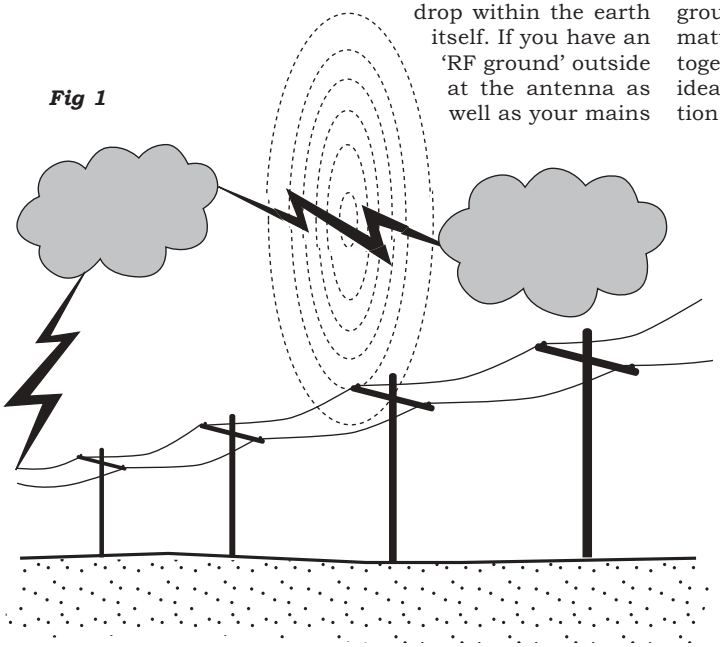
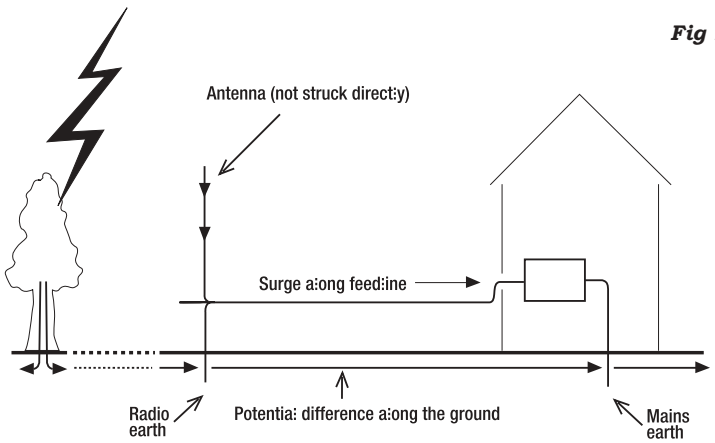


Fig 2



By Ian White, G3SEK, 52 Abingdon Road, Drayton, Abingdon OX14 4HP.
Website: www.ifwtech.co.uk/g3sek E-mail: g3sek@ifwtech.co.uk

Now what about the mains, and what about incoming conductors that can't be directly bonded, such as rotator cables... and the inner conductors of your coax cables?

I hate RF on the mains! It has always been my worst source of RF interference problems – in both directions. This is largely because stray RF currents in the shack will always try to use the mains as an extra RF ground. And if RF can get out onto the mains, incoming surges on the mains can also cross over into the RF equipment. The solution is the same for both problems. I recently put up some new 'lightning attractors' for HF, and immediately had TVI due to RF on the mains. This prompted me to get organised and do something about it. All the radio equipment is now fed through a three-wire mains filter (eg Farnell 439-666 rated at 16A). Unlike a conventional two-wire filter, this one has an RF choke in the earth line as well. The choke does not affect the mains safety earthing, but it does stop RF very effectively [1]. The TVI is gone, the general level of computer and other noise on the bands is lower, and the filter will also do a good job of suppressing incoming surges on all three mains conductors. The filtered mains earth should be bonded to the equipotential strip, at the same end as the other incoming cables so that any surges don't create potential difference along the strip itself (Fig 3).

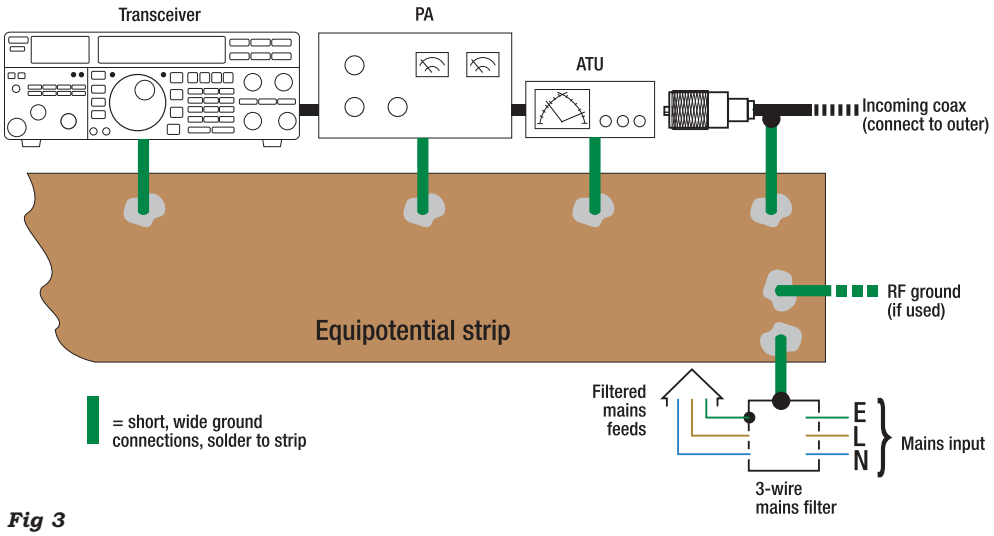


Fig 3

Fig 3: The equipotential strip. Make all external connections to one end.

It's vital to get all the mains connections organised – yes, the time has come to sort out that rats-nest! Everything that is bonded to the equipotential strip must get its mains feed through the filtered AC inlet, or else it will bypass the filter and you've wasted your time. Other equipment such as the soldering iron or testgear need not be powered from the filtered supply, but any temporary connections to the radio equipment will always need to be removed when not in use. When you think you have everything organised, try these two simple tests. Switch on all the radio equipment, and then switch off at the mains plug that feeds the filter. Does everything go dead? When it has passed that test, check that there are no 'sneak' earth paths. Disconnect the shield bonding of the coax feed-lines, and anything else that could bring in an earth connection from outside the shack. Now pull out the mains plug and measure the resistance between mains earth and the equipotential strip. If your ohmmeter doesn't read 'infinity', you've missed a sneak earth connection somewhere. (Now would also be a good time to take off all the plug-tops and check the screw connections... you probably haven't checked them since I last wrote about that subject in January 1999 – and neither had I.) By the time you have all this sorted out, I promise that you'll feel very noble and virtuous – and more to the point, a good deal safer.

Rotator cables are only at risk from a nearby strike, but they are typical of conductors that cannot be bonded directly to the equipotential strip. Since the individual cores are carrying only low-voltage 50Hz AC or DC, it's very easy to protect them by gluing an insulated terminal block to the strip, and connecting a small metal-oxide varistor from each conductor to the strip. A 50V DC type such as the V47ZA7 (Farnell 318-425) should be fine, and will also act as a potentially useful RF bypass capacitor. You have to protect every single wire in the cable, but you can do the lot for well under £2.

The RF signal lines – the inner conductors of your coax feeders, for example – are vulnerable points because they are connected directly to your receiver input. The traditional way to protect against lightning is to disconnect the antennas from the outside, and throw the feed-lines well clear. This works fine – but only if you remember to go out there and do it. In practice you'll get better protection from an antenna changeover switch that has an extra 'shorting' position, because you're actually much more likely to use that. Another amateur tradition is to use spark plugs, home-made spark gaps or those PL-259 adapters with a screw in the side. Quite honestly, those inspire no confidence whatever [2]. In contrast the sealed, gas-filled ceramic spark gaps made by Siemens (now Epcos) really *are* reliable, and will spark at voltages as low as 90V – which is why you'll find one in your telephone master socket. Recent editions of the *ARRL Antenna Handbook* describe a low-cost protector that you can make from a coaxial T-adapter and one of these spark gaps [3].

Until recently, the telephone line has not been connected to a UK amateur radio station, but it probably is now, if you use your computer for both the Internet and your radio. As mentioned earlier, the phone line can be a potent source of incoming surges. The most vulnerable items are, of course, your modem and/or your computer, so you should probably treat this as a computer-protection problem. Telephone line protectors seem to be either low-cost and possibly not very effective, or too expensive for amateur use. And this brings me to the final point...

How much lightning/surge protection you decide to attempt is entirely up to you. None of the precautions described above will protect your station from a direct strike, or even a very near miss, but nothing you could install in a typical UK home ever will. The aim is to ensure that your equipment isn't knocked out by the lesser but much more frequent surges that it *could* survive with a few reasonable precautions. In the UK, the rest of your money is probably better spent on equipment insurance, which will also cover other kinds of damage.

NOTES AND REFERENCES

1. A simpler alternative to a three-wire mains filter is to wind several turns of all three mains conductors through a large stack of ferrite rings (use superglue) or through the core rescued from the deflection yoke of a scrap TV set.
2. The test of true confidence in a home-made spark gap is: dare you apply a piezo gas igniter to your feed-line, with your transceiver still connected? No, I didn't think so...
3. Most parts of the USA need lightning protection far more than we do, so US publications are a good source of further information. As a primer, I recommend a recent series in *QST* which is also available on the web; this and a number of other sources are listed on the 'In Practice' pages. ◆

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ANTENNAS

The debate on PL259/SO239 coax connectors continues to generate comment. Bryan Young, GW6TYO, sent the following (edited) e-mail exchange between W8JIT and K7FR that he found on the Internet:

To K7FR from W8JIT, responding to "…allow 0.1dB for the connectors at each end or 0.2dB total"; "I keep seeing this thing about connector loss everywhere I look. It's become accepted as fact in our community, but it's folklore. Here's an example why. With 0.1dB loss per connector, power loss in a PL259/SO239 combo would be about 35 watts at 1500W. Loss is concentrated in the centre pin and dielectric of the SO239 section, in an area less than one half-inch long. The PL259 section has almost no loss or impedance bump when properly installed. 35W of connector heat (with a 1500W transmitter), when concentrated in the inside of the SO239, would quickly make the connector so hot it would be untouchable. In a few minutes [it would] melt the solder connection and dielectric. If you doubt this, turn on a 35W lamp for a few minutes and touch the glass. Now imagine how hot the glass would be if it was all within a quarter inch of the filament. At 30MHz, the loss caused by a 239/259 combo is totally unimportant. One foot of 9913 cable has much more loss. Tom, W8JIT."

"Back in senior year at Washington State University we had to do a project in the measurements lab. Since there were two hams in the lab we decided to measure losses in coax connectors. We set up a calorimeter and measured I^2R losses from DC to 2GHz for a PL259/SO239 combo, with the output increased in 100 watt steps until we observed a sharp up turn in losses. The results from my lab notes are shown in **Table 1**… Before this experiment I was paranoid about my connectors. Since then I have only been concerned with the quality of the assembly and water ingress. Gary, K7FR."

LOSSES MEASURED IN A PL259/SO239 CONNECTOR AT 1000 WATTS INTO A BIRD DUMMY LOAD
(SEE TEXT)

f (MHz)	Loss (W)	dB
0.1	1	-0.00435
1	1.2	-0.00521
10	1.3	-0.00565
20	1.5	-0.00652
30	1.8	-0.00782
50	2.2	-0.00957
100	2.6	-0.01131
200	3.5	-0.01523
400	7	-0.03051
1000	15	-0.06564
1500	28	-0.12334
2000	100	-0.45757*

* CONNECTOR FAILED BEFORE CALORIMETER STABILISED

LOADED VERTICALS

Des Vance, GI3XZM, while querying that the I5TGC antenna ['Antennas', *RadCom* April 2003] was a vertical dipole, was nevertheless inspired to try the following idea. All the lengths are given in imperial measurements (to convert feet to metres multiply by 0.3048 and inches to mm multiply by 25.4).

"I have often used a vertical about 5/16 or 1/3 wavelengths long, working against ground or elevated radials. A variable capacitor tunes out the extra length, giving 1/4-wave resonance and direct connection to coax. As is well known, this raises both the radiation resistance and the impedance (resistance) seen by the feeder. If the extra height arising from this arrangement is removed by using a top loading coil and capacity hat the radiation resistance is only slightly reduced. Could one optimise a vertical of limited height by 'stretching' the bottom until the maximum current point is half way up the permitted height and absorbing all the excess height in the top loading coil and capacity hat?

"Suppose one had a 20ft pole and wanted a vertical for 80 metres. Now we want the current maximum 10ft from the base so if we had a full 1/4-wave vertical, plus the 10ft, it would be, say, 66+10=76ft high which would resonate (with suitable earth) at about 3MHz. Suppose we top load the 20ft pole with inductance and capacitance until it resonates at 3MHz, then bring it up to 3.55MHz with a series capacitor we should have the current in the pole optimised.

"I thought I would see if this idea might be easily implemented. I found a length of alloy tube in my heap about 13ft long, stood it in a jam jar on the lawn and guyed it with plastic rope as shown in **Fig 3**. With a one-turn link, see **Fig 1**, and the GDO I found this arrangement resonant at about 15.7MHz." The variable capacitor is shorted out to measure the antenna's natural frequency. The loop is replaced with a coaxial socket when used with a transceiver and the capacitor adjusted for minimum SWR.

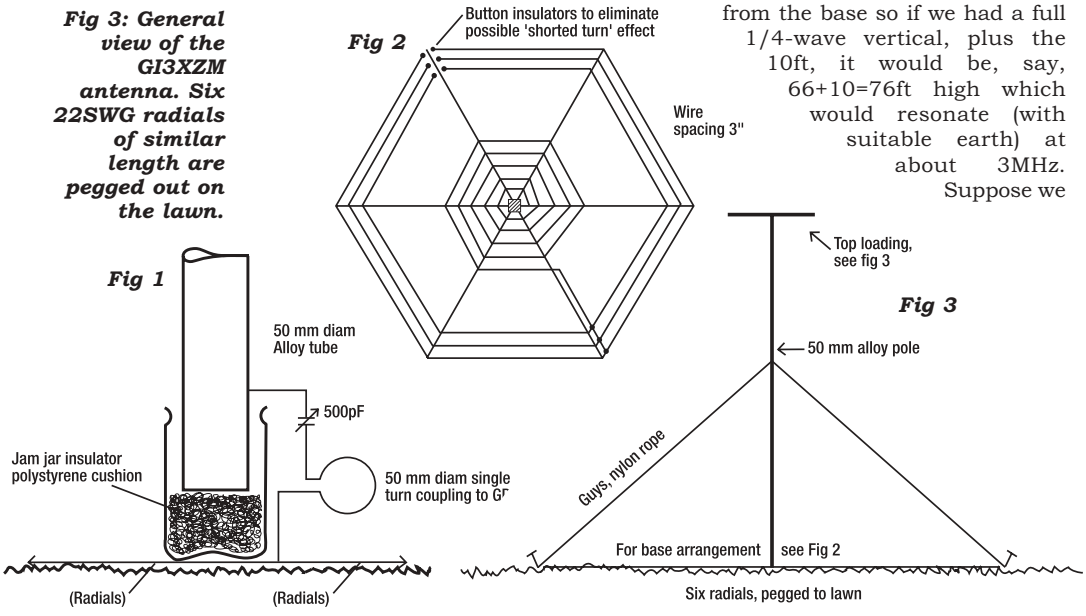
"Top loading was added and the resonant frequency fell to 10.8MHz. The five-turn helical coil shown in **Fig 2** was inserted (another stab in the dark) and the resonant frequency became 6.4MHz." The top loading frame was made by supporting three 5ft garden canes fixed in holes in 1.5 x 1.5 inch timber, chamfered to fit the 50mm alloy pole. It has an inductive centre section with five helical turns 6in to 30in diameter, approximately 23ft wire total, and a capacitive outer section, with three broken loops connected in parallel. By including the variable capacitor the system was easily tuned to 7MHz.

"Not having a transmitter in working order I could not try my 40m vertical in the standard way. Undaunted, I drove off in the car, listening to the ground wave from the GDO. With an FRG7 [receiver] beside me and a length of hook-up wire tied to a garden cane taped to the door pillar I got a fair signal about 3 miles (5km) away. Since the input to the GDO is less than 5mW the output, with no matching, could hardly have exceed 1 or 2mW." ◆

Fig 1: Base insulator and feed method for coupling a GDO.

Fig 2: Top loading frame.

Fig 3: General view of the GI3XZM antenna. Six 22SWG radials of similar length are pegged out on the lawn.



By Andy Talbot, G4JNT, 15 Noble Road, Hedge End, Southampton SO30 0PH. E-mail: data.radcom@rsgb.org.uk

DATA

In April, the possibility of using two soundcards in the same PC for different functions was raised. Two replies came in almost immediately after the article appeared, and the idea looks to be quite feasible.

Roger, G0AOZ writes: "Regarding the possibility of using two soundcards in a PC – yes, it will work, I've done it successfully under *Windows 2000 Pro* with *UI-View32*, using one soundcard for decoding the signals and the other to announce the received callsigns, usual Windows sounds, etc. It is possibly slightly easier (although not essential) to use different makes or models of soundcard so that, when you come to set up the software applications, each soundcard will have a well-defined identity, ie PCI128, Live!1024, etc. The other point worth making is that there should be sufficient free resources, ie motherboard slots and IRQs!"

Also, from Bill Rothwell, G0VDE: "A short note about the comment on the use of two (or more) soundcards in PCs for applications like *AGWPE* (soundcard packet), *MMTTY*, SSTV, PSK31 etc. Actually it is dead easy. I have done it for a couple of years in my old P2 400MHz computer. I installed two PCI sound cards, using one for soundcard packet with *AGWPE* and the other for system sounds or RTTY and similar with *MMTTY*. No problems at all - just get the setup correct in *AGWPE* to use one soundcard and use the other for RTTY. You may have to change settings in the 'Control Panel' sounds sections also. I am now building a new computer – P4 2.5GHz and am trying a similar thing – but a different approach. The motherboard has on-board sound, and I hope to use the onboard sound to act as one soundcard, and I have installed a PCI soundcard for use with other programs. So there is really nothing to it. You just have to try by plugging in the extra card to a spare PCI slot (or ISA on an older computer) and check there are no conflicts – the modern operating systems will normally tell you if this is the case."

This may be one solution for those who find the on-board soundcard supplied with low cost PCs unsuitable for LF low-data-rate signalling or signal analysis – for example, incorrect sampling rates or incompatible audio-mixer settings. A true SoundBlaster PCI card, or any other quality make, can be plugged in and used instead. Unfortunately, this solution doesn't help users of laptop computers whose soundcards are not up to the task, though.

MULTIPLE SERIAL PORT DRIVERS

And while we're on the subject of multitasking on a PC – I was recently using a PC to send commands to a Siemens TC35T GSM module, intended for data communications over the mobile phone network, by using the *Hypertrm* communications software supplied with *Windows*. The GSM module is controlled over a serial link via COM1 on my PC. To test the system with data traffic, I needed to dial-up the GSM module from another modem via my domestic phone line and send some data across. *Hypertrm* on my computer has several settings adjusted for different scenarios and bit rates, and one setting drives the internal modem which behaves as if it were on COM4. So I started this up, meaning that two different versions of *Hypertrm* were now running in different windows. After issuing the AT command to dial the data number for the GSM module, the modems eventually connected at 9600b/s and the word 'RING' appeared in the *Hypertrm* window controlling the TC35 module, which was set to auto-answer. Now, anything typed in one window appeared after a short delay in the other. So it is quite possible to use multiple serial ports simultaneously on a PC, and it proved I could open a completely transparent data link over the mobile network.

These modules are controlled by a modified set of the commands that are used with standard modems - the so-called Hayes command set. The TC35T Siemens module is available 'ready to go' with RS-232 interface, handset connector, antenna and power supply, plus all the documentation on CD-ROM from TDC Ltd. See the URL in the box. A SIM card will also be needed and, for receiving data calls, a separate data number will have to be obtained from the service provider.

This use of simultaneous and independent copies of the same software can only work provided you do not try to drive the same piece of hardware - eg the same COM port or soundcard. If this is attempted, an error situation will arise and the software may crash or lock up

REVERSE BEACON WITH SIGNAL DIGITISATION

Using a mobile phone module for data can hardly be deemed 'amateur radio' by most people's definition, but the target will be! The GSM module may eventually be used in a reverse beacon project (**Fig 1**). Instead of a traditional beacon transmitting from a remote site, with its attendant licensing and switch-off issues, this system will just passively listen on a specific frequency. Then, to test the RF path, a prospective user dials the phone number of the remote receiver and transmits on the frequency. Then, either the audio can be replayed down the phone line, or the received signal can be digitised and sent back as data at 9600b/s. Neither solution is perfect. The first, audio-based method is subject to distortions caused by the voice coding used on the GSM network, which is not very good at transmitting non-voice type signals.

However, for microwave beacons where a CW signal will stand out from noise as a tone, results are reasonably acceptable using this method. For LF however, especially if further processing is needed on the signal fed back to the originating station, digitisation of the received signal is required at the receiver. The GSM network will support 9600b/s signalling, which doesn't give much bandwidth capability. But, if we are looking at LF, a bandwidth of a few tens of Hertz will suffice and so we can calculate the bandwidth that can be utilised. Allowing 16-bit digitisation to give a respectable dynamic range of signal strengths, the absolute maximum sampling rate that can be supported is therefore 9600/16 = 600Hz. If we keep to simple start-stop signalling and allow some overhead for data framing, that reduces to something like 200–300Hz maximum. To keep within the Nyquist sampling criteria this dictates a maximum bandwidth in the region of 100Hz – quite a reasonable requirement if an active audio filter is used.

WE0H is doing something similar, but using the *ARGO* narrow-band spectrum analysis software and making the screenshots available on the Web. See his page, detailed below, for further information.

No room for meteor scatter signalling this time, the saga will continue in the August column. ◆

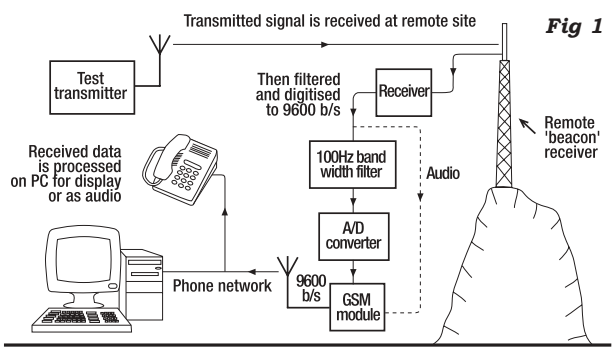


Fig 1

Fig 1: The Remote Beacon concept.

WEB SEARCH

TDC Ltd, GSM modules	www.tdc.co.uk
WE0H LF page	www.we0h.us/lf

EMC

The RSGB EMC Committee has launched a 'three-pronged attack' on Power Line (Tele)Communications (PLC/PLT) by technical measurements, standards committee activity and political lobbying.

SCOTTISH PLT TRIALS

PLT trials are being conducted in Scotland and more are proposed in Winchester, Hants.

On 12/13 November 2002, Robin Page-Jones, G3JWI, spent two days in Crieff, Perthshire (plus another four days travelling there and back by car with test equipment). The object was to assess interference from PLT systems and its effect on radio amateurs and short wave listeners. Robin's report can be found on the RSGB EMC Committee Web Site (see 'Websearch').

SSE Telecom, who are conducting the trials, had invited HF radio users to visit Crieff and make measurements on the two trial PLT systems, which use equipment supplied by Ascom and Mainnet. Robin spent one day looking at each system. SSE had organised visits to three private houses, including one occupied by an RSGB member and also their own shop in Crieff.

Robin was informed that the Ascom system uses three different carrier frequencies for the 'access' system (sub-station to house). These were 2.4, 4.8 and 8.4MHz, each occupying a nominal bandwidth of ±500kHz either side of the carrier. The Ascom equipment also uses other frequencies for 'in-house' communications. These were 19.8, 22.6 and 25.2MHz.

Fig 1 shows the 'access' frequencies of the Ascom system at Crieff in relation to the amateur bands. Due to the relatively high levels of the PLT signals in relation to signals on amateur bands, it is important to consider how far the 'significant' sidebands extend. Fig 1 shows an estimate of the bandwidth occupied by 'significant' sidebands. This is not intended to be quantitative and there may be significant sidebands outside the ranges shown.

Robin checked the 3.5, 7, 10, 14, 21 and 28MHz amateur bands. There was some interference between 3.7 and 3.8MHz, but no other significant interference was noted on the amateur bands listed above, when using a Datong active antenna and portable receivers. The level of interference on 5.1MHz from the 4.8MHz Ascom carrier was severe, however. Due to limitations of time, equipment and weather, the 1.8, 18 and 24MHz amateur bands were not checked. The 1.8MHz and 24.9MHz amateur bands may be affected by the lower sidebands of the 2.4 and 25.2MHz Ascom carriers respectively.

The second system, Mainnet, is described as a direct-sequence spread-spectrum (DSSS) system. It can have one or more repeaters between the sub-station and the furthest houses.

Fig 2 shows the approximate frequency range occupied by 'access' signals in the Mainnet system, in relation to the amateur bands. The bandwidth occupied by 'significant' sidebands of the PLT signals has been estimated and there may be significant sidebands outside the ranges shown. Although the Mainnet system may be able to operate with lower power levels than the Ascom system, its significant sidebands appear to spread more widely.

Robin's subjective assessment of interference from the Mainnet system using a Datong active antenna was that the 3.5 and 7MHz amateur bands were badly affected. On 14MHz the interference was present but much less severe than at 7MHz.

The audible effect of the Mainnet DSSS system is interference in the form of continuous 'crackles' while downloading data. When not downloading (quiescent), there are short pulses of signal at intervals of approx. one second, probably due to some sort of 'polling' protocol. There was also another source of significant 'white noise' type interference which may have been a nearby Mainnet repeater or something else.

This investigation has raised some serious concerns about PLT and has showed the need for further work to quantify its effects using more detailed measurements. It is also necessary to assess the immunity of PLT systems to amateur HF transmissions.

PLT POLITICS

There is political pressure to permit widespread use of PLT from the DTI in the UK and from the European Commission, which has issued Mandate 313.

The stated view of the EC Directorate General Enterprise is that it is the task of the European Commission to promote access for all citizens to the Information Society and that technologies opening new areas of competition are beneficial to the community.

DG Enterprise has also expressed the view that demand for digital telecommunications is growing rapidly and that, although developing telecommunication networks technologies will cause interference to radio services, this will affect frequencies which fewer and fewer people are using now. It is claimed that most of the services offered by short waves can be replaced more efficiently by 'modern communications technologies' on higher frequencies.

Clearly, with such strong political pressure, radio amateurs and other HF users have to fight hard to defend the radio spectrum. In an article on PLT in February 2003 *RadCom* (pp24–26), Hilary Claytonsmith, G4JKS, outlined RSGB involvement on various European committees and working groups. Hilary also established a group of HF radio users including other non-amateur users.

Mark Bogers of the European Commission, DG Enterprise met with Hilary Claytonsmith, G4JKS, Robin Page-Jones, G3JWI, and other HF users in London on 30 October 2002. Mr Bogers and a colleague, Thierry Brefort, then met a delegation of European amateur radio societies in

AMATEUR RADIO TRANSCEIVER MODELS AVAILABLE WITH E-MARK APPROVAL FOR INSTALLATION IN VEHICLES

Alinco: DR-605E, DR-M06TH, DR-620E, DR-435E, DR-135E. The Alinco DX-70TH is not e-marked and now sold for use only as a base station.

Icom: IC-F110/F110S, IC-F210/F210S, IC-F510/IC-F610, IC-F1610/IC-F2610, IC-F310/F310S, IC-F410/IC-F410S, IC-M401euro, IC-207H, IC-2100H, IC-2725E, IC-706MkIIG, IC-A110.

Kenwood: TS-870S, TS-570DG, TS-2000/2000X/B2000/RC-2000, TS-50S/AT-50, TM-D700E, TM-V7E, TM-G707E and TM-241E. In addition, the PG-3J vehicle cigarette lighter adaptor that can power most Kenwood hand-helds is itself e-marked.

Yaesu: FT-847, FT-8900, FT-1500 are e-marked and e-marking of some other models is in progress.

By David Lauder, GOSNO, 20 Sutherland Close, Barnet EN5 2JL. E-mail: emc.radcom@rsgb.org.uk

Brussels on 24 March 2003. This was attended by delegates from national amateur radio societies in Germany, Belgium, France, The Netherlands and Austria. In addition, there were two representatives of NATO Frequency Management.

On 3 April 2003, there was a meeting with Mark Bogers at Radio Netherlands in Hilversum. In addition to radio amateurs and Radio Netherlands, the meeting was attended by representatives of other HF users, the Netherlands Ministry of Defence, Astron (radio astronomy), Nedap (short range devices), Nozema (Netherlands Broadcasting Transmission Company).

It was also pointed out to Mr Bogers that Digital Radio Mondiale (DRM) a new system for digital HF broadcasting is an EC-funded Eureka project in which the EC has already invested approx. 40 million Euros of tax-payers' money. DRM has a promising future, but needs to be protected from interference by PLT.

We hope that the message is starting to get through in Brussels.

E-MARKED AMATEUR TRANSCEIVERS

An item in April 2003, 'EMC' explained how radio amateurs are affected by UK Statutory Instrument SI 2002 No 2126, *The Road Vehicles (Construction and Use) (Amendment) (No. 3) Regulations 2002*. Under these regulations, amateur radio equipment installed in cars needs to be e-marked under certain circumstances, The following information applies only to new equipment fitted to cars which require e-marked equipment, as explained in April 2003 'EMC'.

The latest information from UK importers of leading brands of amateur radio transceiver is that most models intended to be installed in a vehicle are now e-marked. The box opposite gives further details as of mid-April 2003. For updated information, please see the various manufacturers' websites (see 'Websearch').

Some manufacturers have not e-marked their larger HF transceivers, whereas others such as Kenwood have e-marked all models that operate from 13.8V. In general, hand-held transceivers are not e-marked as they are not intended to be fitted into a vehicle. If a hand-held has an accessory cradle or charger for mobile use however, this interface accessory needs to be e-marked, rather than the radio itself.

Mobile antennas do not need to be e-marked provided they are passive antennas but if an automatic antenna tuner is used with a mobile antenna, the tuner would need to be e-marked as it contains active components.

VEHICLE EMC

The e-marking of radio transmitting equipment, as explained above and in April 2003 'EMC', is an approval mark, but an e-mark does *not* mean that the transceiver in question can be installed in any car and operated at full power on any band with any antenna.

Whether or not radio transmitting equipment installed in a car is required to be e-marked, it needs to be installed in accordance with equipment and vehicle manufacturer recommendations and any relevant Codes of practice, such that vehicle electronic systems are not put at risk. Such systems include electronic engine control, anti-lock braking, airbags and in some models, electrically operated power-assisted steering.

In addition to possible safety hazards, there is a slight possibility that an electronic unit in a vehicle could be damaged by excessive levels of RF, which could lead to an expensive repair not covered under warranty.

Vehicle manufacturers have various recommendations about fitting transmitters. There may be some basic information in the owner's handbook, but some members have reported that it is not always easy to get further information from motor manufacturers.

We have some information obtained by the EMV Referat of DARC, the German national amateur radio society, and intend to publish further details when we have information for recently-introduced models.

MORE TRAFFIC LIGHT QRM

David, G5HY, commutes from Chelmsford, Essex to Hertfordshire via the M25 each day and listens to the London local radio station LBC for its rush hour traffic reports every 10 minutes. Although Chelmsford is outside the intended service area of LBC on 1152kHz MW, reception in that area is adequate except at one particular set of the latest-generation traffic lights at the junction of Springfield Road and Arbour Lane in Chelmsford. David reports that his stop at the lights always seems to coincide with the start of a traffic report, which disappears under very localised 'end stop' white noise/hash. Is it the LED lights themselves, the traffic sensors or even the pedestrian detectors?

VARIABLE SPEED MOTOR DRIVES

An item in February 2003 'EMC' on electronic switch-mode three-phase converters prompted several replies. Richard, M0LLY, has such a unit fitted to his Myford wood turning lathe. He has done some tests and discovered that the lathe is a source of considerable RFI over most of the HF spectrum, including the amateur bands.

In Richard's lathe, a three-quarter horse-power three-phase AC motor is fed from an electronic converter which is powered from a single-phase 240V mains supply. The converter unit is housed in a metal case, with a separate metal box to house the controls. The two are connected via wires contained in a flexible plastic conduit and the motor is connected in the same way.

Richard reports that the RFI peaks at around 4.7MHz and is well over S9. The noise is almost absent from the 18MHz band, but 7 and 10MHz suffer S9 noise. Levels on all other bands are around S5–S7. The lathe and the radio equipment are about 25 feet apart.

Peter, G3RZP, reports that he has a three-phase inverter with variable output frequency for his lathe and milling machine. The speed control box itself comes with warnings about needing screened cables to meet EMC requirements, but the supplier of the unit has not used screened cables.

Martin Hengemühle, DL5QE, e-mailed details of a Motorola application note AN-766 which shows how a variable-speed AC motor drive can be designed using Motorola power MOSFETs. The AN-766 circuit does not show any filtering in the AC output to the motor and claims that the inductive component of the motor coils is sufficient to 'convert' the three-phase rectangular pulse waveform into a 'sine wave' field current.

Driving an AC motor with a 'chopped' rectangular pulse waveform may be acceptable if the wiring to the motor is properly screened and the cable screens are properly grounded at RF, but it seems that this is not always the case. In some cases, such as industrial machinery, ventilation or water pumping installations, variable-speed AC motor drives are being installed without adequate attention to EMC. ◆

Fig 1

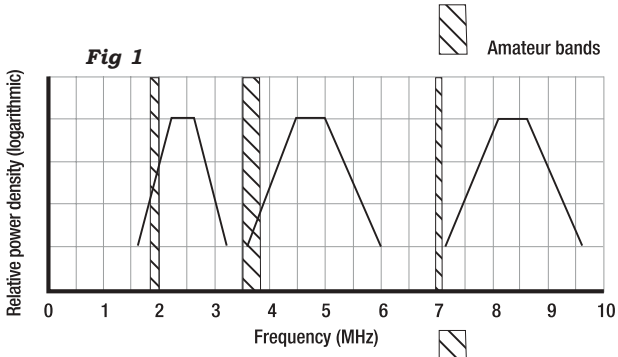


Fig 2

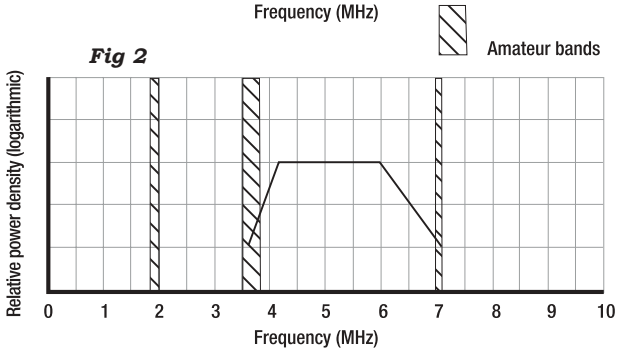


Fig 1: Approximate frequency ranges occupied by 'access' frequencies in the Ascom PLT system at Crieff.

Fig 2: Approximate frequency range occupied by 'access' frequencies in the Mainnet PLT system at Crieff.

WEB SEARCH

RSGB EMC Committee web site.
Includes notes on the RSGB Investigation of PLT systems in Crieff including audio clips — www.qsl.net/rsgb_emc

Amateur radio equipment manufacturers' web sites for updates on availability of e-marked equipment

Alinco	www.alinco.com
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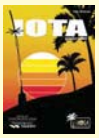

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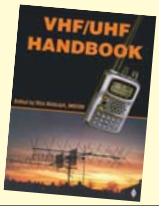

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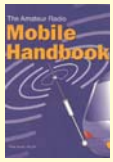

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www.rsgb.org/membersonly/membersads

200+ copies of *RadCom* from 1984-2002, £20. Buyer to collect, G3NGA, 01536 770 164 (nr Market Harborough).

ANTENNA sale – following upgrade to monobanders! Cushcraft A3WS WARC bands antenna with A103 30m extension. As new. Mans available, £245. Gem Quad – 4-ele, 5 bands, reinforced boom, 16 fibreglass spreaders. Exc cond. Most original elements unused and available together with detailed man, £395. Cost £1,000+ ex-Canada. Buyers to collect, please. G3NUG, QTHR, 01442 262 929 (Hemel Hempstead). E-mail: g3nug@btinternet.com

AR88 RCA man, £10. Pair 4X150A with bases and chimneys, £50. 1300V@ 220mA transformer, £20. G3SKI, QTHR, 01273 506 418 (Brighton). E-mail: ron@bravery53.freeserve.co.uk

AR88D, HRO-M, Racal RA1217, all gwo, mounted in enclosed racks plus table top cabinet for AR88. Full mans, full set HRO coils bandspread and general coverage, £150 for complete set. Buyer collects, bring heavy lift gear. G3GIB, QTHR, 01953 885 243 (Thetford).

ARCHITECT barn conversion with studio, garage, parking, gardens, private lane, 3 miles from Penzance, ideal radio site, 600ft ASL, below hilltop for Moxon effect, sloping south, good views over Mounts Bay. Only one house nearby. G3GYE, QTHR. E-mail: peterpitts@aol.com

CUSHCRAFT A50-5S 5-ele 6m beam. Good cond, instructions, boxed, £75 carriage extra. Sony/Tektronix type 326 oscilloscope, battery/mains, dual-trace 7cm screen, h/book, £95 carriage extra. CX-401 4-way coaxial switch, good cond, boxed, £25 carriage extra. 01986 798 524 (Woodbridge). E-mail: steve@sboldvic.demon.co.uk

CUSHCRAFT MA5B, as new 3 months portable use only, £225. TS-120V, 10W HF/SSB tcvr VF-120, SP-430, 7A reg PSU, no WARC, M3 or QRP station. Around £250 complete, Hokushin HF5, 5-band vertical ant, £35. Kent keyer with above station, £30. Separate, £40. Junkers WWII Morse key, £45. Creed key, signed & dated 1936, £40. All gwo. Bill, M0AWW, 01509 813 367 (Loughborough).

ELECRAFT K2 c/w 160m module, ATU, SSB module, noise blanker and PC interface, all mans, £525. Rotator PST 2051 + preset controller, only 8 months old, £395. Heil headset Proset 5, 6 months old, £95. Tennamast 15m free-standing c/w head unit and top bearing, £250. 01803 392 969 (Paignton).

ELECTRONICS or *Wireless World* 1983-1994 (1 copy missing), *Wireless World* 1978-1982, 179 copies, £45 ono. Max, G3BSK, 0121 744 4671 (Birmingham).

FREE to anyone who will collect – 444 teleprinter, R-206 rcvr and PSU, frequency adapter, both ex-WD. G4FGP, QTHR, 01922 453 680 (Walsall).

FT-736R VHF/UHF/1296 tcvr fitted all modules, good cond, h/book, box etc, £750. FT-90R Micro Commander dualband miniature mobile 50W, 144MHz & 35W, 432MHz, boxed, very clean, £170. G8BCL, QTHR, 01844 208 074 (Aylesbury). E-mail: anmar@tiscali.co.uk

FT-920 100W HF + 6m, FM fitted auto-ATU, DSP exc cond, £795, prefer collect. John, M0JBD, 023 8039 2424

G4NCF going QRT. Complete ham rig exc cond. TS-830S tcvr with YK88 filter, AT-230 ATU, SP-230 spkr, Heathkit keyer HD-410, mic MC-50, LP filter, dummy load, spare set valves, key, phones HS-5. No split, buyer collects, £665 in total. 01793 848 348 (nr Swindon).

GM6INR / MM3INR silent key. Kenwood TS-570D (60 hours airtime), £650. Kenwood TH-D7E h/held 2/70 spare Lithium-ion battery, drycell battery pack, spkr mic, £250. Kenwood TW-4100E 2/70, £175. Yaesu 1500M 2m, £110. Ferromagnetics 1:1 balun/choice, £25. 01261 833 298 (Macduff). E-mail: gm0caq@btinternet.com

IC-775DSP tcvr + Heil Sound Proset-5 (headphones still boxed), £1,200. IC-728 tcvr AM-FM unit fitted, £330. Kenwood TR-751E 144MHz all-mode tcvr, £290. RS-746 remote control software for IC-746 tcvr, never used, £40. All items exc cond, non-smoking operator, buyer must collect. 01592 757 831 (Glenrothes). E-mail: ken@mm0awj.freeserve.co.uk

ICOM 207H 2m/70cm mobile tcvr 50W/35W o/p, mobile mount, £170. Microset RV45 2m linear amp 5W-15W i/p 50W o/p, in-built GaAsFET preamp, £40. Kenwood MC-43S mic with up/down buttons, brand new, £20. Kenwood YG-455CN-1 CW filter, cost new, £160, sell for £100. Icom T-42E 70cm h/held & spkr mic, £70. 5W o/p charger & case. G4OXD, 01462 435 248 (Hitchin). E-mail: tm.rose@thersgb.net

ICOM 735. HF 9 bands 100W, gen cov rcvr, CW filter, mic, DC lead, man, boxed, vgc, £375. Icom 251E, 2m multimode, Mutek, mic, DC lead, man, boxed, £275. Prefer buyers collect. G4LWA, QTHR, 01462 811 208 (Shefford). E-mail: gard@btinternet.com

KENWOOD TR-715E, 144MHz all-mode 25W tcvr, little used, £250. Manson EP-815 12A PSU for same, £35. Diamond DP-CP5 5-band vertical HF antenna, vgc, £60. Prefer inspect & collect or carriage extra. David, G4EBT, QTHR, 01482 876 702 (Hull). E-mail: david@crofters89.freeserve.co.uk

KENWOOD TS-120S QRP HF tcvr, £120. Yaesu FT-290RII, 2m, £140. 01677 423 349 (Bedale).

KENWOOD TS-440S tcvr, HF bands plus gen coverage, built in ATU, £360. Matching PS-50 PSU, £75. Kenwood MC-60 desk mic, £60. Yaesu YS-2000 pwr/SWR meter, £50. RAF type D Morse key, £25. All items, good cond and appearance, carriage extra. Realistic offer for the lot considered. 01732 833 807 (Hildenborough). E-mail: billcrossan2@aol.com

KENWOOD TS-50S HF rig, £400. Kenwood AT-50 antenna tuner, £100. Kenwood PS-430 PSU, £50. Kenwood TH-21 h/held, £25. Kenwood HS-6 headphones (2), £20. Icom IC-765 HF rig, £600. Icom SM-8 desk mic, £60. Heil Proset 5, £80. Daiwa 2-way switch, £5. PacTOR TNC, £100. All ono. 01202 891 770 (Ferndown). E-mail: nick@g0eov.freeserve.co.uk

KENWOOD TS-570D. I bought this superb set in April 2002 and have since been almost inactive, using it for three contacts only (logbook may be inspected). It has DSP, in-built ATU and two antenna inputs. Obviously it is in mint cond and is in original box. At £650 you save nearly £200 on the new price, carriage at cost. G3EGS, 0121 414 0443 (Birmingham).

KENWOOD TS-570DGE, hardly used, perfect for Foundation Licence holders, £600. David, M3CWJ, 01767 680 126 (Bedfordshire).

KENWOOD TS-870. SP-31 speaker. MC-60 mic. HS-5 headphones. Yaesu FT-225RD. MFJ-962C 1.5kW Versatuner. Daiwa PSU 32A. AEA DSP-232 TNC with Windows and DOS software. AEA MM3 keyer. Revex W520 meter 1.8 to 200MHz. Cushcraft R7 vertical. Diamond CP5 5-band vertical. Reasonable offers for quick sale. Poles and other antennas, test gear etc, please e-mail for list. G4CEQ, QTHR, 01775 762 125. E-mail: ernest.les@virgin.net

CONGRATULATIONS to the following, whom our records show as having reached 50 years' continuous RSGB membership this month:

50 years

G3IYT Mr S R Walker
G3IZJ Mr M J Faulkner

KENWOOD TS-950SD, vgc mans, £850. MFJ-989C 3kW VersaTuner V, £290. NIR-12 JPS dual DSP noise/interference reduction unit, £70. Palomar M-872 automatic SWR/PWR meter 20W-2kW, £60. MFL-490 memory keyer, £75. Drake L7 2kW linear amp with some spares, £750. All vgc. Huge list of ham equipment from LF to satellite freqs. Buyer collect, Dorset. Details and list by e-mail. (Yeovil). E-mail: viccopley@aol.com

MARCONI Marine Electra and Mercury rcvrs with type 889 power supply, h/book, no split, £150. Marconi RC oscillator type TF1370A near mint cond, h/book, £25, inspect and collect. Key, Vibroplex original, £80. 01926 424 210 (Leamington Spa).

MAST and rotator, comprising 30ft Tennamast and Yaesu G-400RC rotator c/w thrust bearing and controller, all vcg, £200. Eddystone 670A rcvr, £20. Harold, G3UYM, QTHR, 01462 629 871 (Hitchin). E-mail: harold.groves@ntlworld.com

MAST pump-up 45ft, £200. Linear 1?kW HF, £200. Aerial 4-ele HF beam 10-15-20m A4S Cushcraft, £300. 01924 408 440 (Liversedge).

PACCOMM Tiny-2 MkII packet controller c/w man & leads, £50 ovno. Quad spider for HF 20m etc, £20. Collins 30L1 HF linear amp, 4 811s etc, £500 ovno. G3DQY, 01424 424 319.

PSU for sale 30A @ 13.8V. Now surplus to requirements has run faultlessly since owned (1992); make unknown (no label/identifier) but rugged & reliable, £60. Steve, G0UIH, 01832 274 831 (Oundle). E-mail: g0uihsteve@aol.com

RACAL 1772 rcvr ex RAF, vgc, inspect, collect, £300. 020 8813 9193 (Middlesex).

RADIO books and h/books from RSGB, ARRL and Terman. Send e-mail or phone for list. Harry, G3NGX, 01491 872 919 (Reading). E-mail: harryhogg@waitrose.com

REDIFON HF transmitter drive unit model GK203N, £100. R&S Polyskop SWOB1, £50. R&S SKTU noise generator, £50. R&S NRD power meter, £50. SMLR high power signal generator, £100. R&S NAN power meter, £50. Siemens T-100 teleprinter, £100. Tono 9100E communication terminal, £25. Marconi TF-144 signal generator, £30. Advance audio signal generator, £20. Racal MA79 HF drive unit, £400. CT432 frequency calibrator, £15. Dressler HF active aerial, £75. Roller coaster inductor and vacuum variable capacitor for 1kW high frequency ATU (as new), £120. Nigel, G0UGD, 01323 486 822 (Eastbourne). E-mail: nigel@irisys.co.uk

RTTY station comprising Creed 8B printer/keyboard, 7TR3 reperforator, 6S6M auto-tx and ST6+ terminal unit. All fully operational and in exc cond with cables, diagrams & spares etc. Offers please? Peter, 020 8866 1305.

SHURE desk mic, model 550L, brand new, sealed box, unwanted gift, £50 inc post. John, 01256 465 126 (Basingstoke).

SILENT key (GW3IEQ) Strumech 40ft tower, fully restored, power-winched, erect on groundpost. Complete station, 12 items, including mint linear 811A (May 03), lists. We negotiate, you dismantle. Remaining cables, accessories, leads, traps, components, valves, reference books, mans by shack contents sale during July & August as required to best benefit the estate. All details on request. 'Heulwen', Dinas Dinlle LL54 5TW. 01286 831 340 (Caernarfon).

SILENT key G6DP**,** FT-208R h/held tcvr 2m, £60. FT-708R h/held tcvr 70cm, £60. 023 9258 0114 (Gosport). E-mail: roger.forster@solent.ac.uk

SILENT key sale (G3GNB) Trio TS-520S HF tcvr, Kenwood R-5000 HF rcvr, KW Ezmatch ATU, R&D electronics Wx monitor Scanmaster GaAsFET preamp, Datong VLF converter, AVO model D, plus smaller items. Further details from G3TCT. 01372 459 605 (Leatherhead). E-mail: g3tct@lineone.net

SILENT key sale. Kenwood TR-751E, all-mode tcvr, 25W, £180. FT-208R h/held tcvr, £70. Microwave Modules MML/30-LS 144MHz 30W linear, £40. Daiwa NS-660P SWR/pwr meter, £30. Kenwood TS-850S tcvr with matching spkr in exc cond, books, original packaging, £600. Carriage extra. G3ZZS, 01752 216 455 (Plymouth). E-mail: g3zzs@aol.com

SILENT key sale. Yaesu FT-101Z with CW filter. Rcvr FRG-8800 with VHF converter, FC-301 ATU. Morse keys HK702, HK707. Heathkit dummy load. Offers? 01246 234 715 or 277 819 (Chesterfield).

SPY SETS B2, suitcase, £1,600 ono. Mk128 set, £250. Mk301 rcvr, £200. 1950s/60s Embassy station tx, £300. Ian Haggart, G3JQL, 0191 386 1116 (Durham). E-mail: car_g3jql@hotmail.com

TEN-TEC Omni-V HF tcvr fitted 2400, 1800, and 500Hz filters. Legendary performance, mint cond, £750 plus delivery. G3OGQ, QTHR, 01925 267 553 (Warrington). E-mail: g3ogq@aol.com

TOWER Tennamast with ground post and cage. KR-4000RC controller and two heavy duty rotators. Cushcraft A35 triband beam. TET 2-ele triband mini-beam. 3-ele triband beam, 2-ele 6m beam. Carolina Windom 80-10m, 6m vertical, 2 x 2m vertical. 70cm vertical, must sell due to emigration, £650 the lot. G0RNT. 01425 477 651 or 07769 773 352 (Ringwood). E-mail: timrcooper2003@yahoo.co.uk

UNIQUE bungalow, superb quality-built, 4 bedrooms. Set in one acre 250ft ASL. Delightful gardens with woodland, 45ft Versatower and TH3 triband beam with full planning permission, £575,000. 01903 743 147 (West Sussex). E-mail: hduncombe@iee.org

VHF W50 two-band colinear antenna, used, £35. MFJ-921 VHF antenna tuner, £35. Electrostatic voltmeter 2.5kV FSD, £25. Telequipment D67 oscilloscope, dual-beam, dual-timebase, £25. R A Wynn, G4BNB, QTHR, 020 8504 3260 (London).

VX-5R triple-band h/held VHF tcvr with charger, boxed, man, £190. 01952 727 526 (Much Wenlock). E-mail: g3lnp@compuserve.com

W2IHY 8-band mic equaliser and noise gate, new and unused in original box c/w h/book, £170. AEA PK-232MBX multimode data controller/TNC. C/w leads, software and h/book, exc cond, £70. Wayne Kerr B801-B admittance bridge, £15. ZS broadband dipole centre-piece 3-30MHz 2kW PEP / 1kW CW. Just add 2 x 45ft of wire to make a broadband dipole, £20. John, G3VLH, QTHR, 01342 714 402 (Crawley). E-mail: john.longhurst@hfcom.net

YAESU FT-1000MP, new cond, sale on behalf of silent key, can be tested before purchase, £950. 01743 341 167 (Shrewsbury).

YAESU FT-1000MPAC, £1200. Yaesu FT-902 DM, £350. KW Atlanta, £175. KW- 4a remote VFO, £40. KW-107 ATU, £75. Codar AT5 + PSU, £50. Trio/Kenwood TS-790E, £600. B28 rcvr, BC348 rcvr, B2 Minor type A MkIII, offers please? Ken, G4VKK, QTHR, 01482 844 662 or 01482 655 501 (Hull).

YAESU FT-290 MkI multimode tcvr, boxed unmarked, £110. Multiwhip mobile ant 10/15/20 vgc, £15. Mains PSU regulated 13V 6A vgc, £18. Tcvr FM 29MHz, 40 channels, boxed, unmarked, £20. Power/SWR meter (5 bands) unmarked, £18. *Radio Handbook* 10th edition (1946) American, fair cond, £15. *Radio Communication Handbook* 5th edition (1982), vgc, £15. Morse key with audiosidetone, £22. Headphones, Altai 8 ohms, padded earpieces 3.5mm stereo plug & ?in stereo adapter, vgc, £14. Collect, inspect or post extra. 0191 455 2223 (nr Sunderland).

YAESU FT-290 MkII 2m all-mode VHF tcvr, AC charger case Nicads, man, boxed, mint cond, £200 ono. 01386 710 089 (Pershore).

YAESU FT-767GX with 2m module, desk mic and tech, man, £450. Ameritron 400W HF linear with man, £150. Microset 45W VHF linear, £35. Wall-mount Adapt-a-Mast with cage, Yaesu G600RC rotator and stub mast extends to 40ft c/w winches, £400. AKD HF and VHF/UHF wavemeters, £12 each. Timewave DSP-9 digital noise reducer, £80. Telequipment S54A scope, £20. Buyer collects. 01692 671 972 (nr Gt.Yarmouth).

YAESU FT-8100R dual-band FM tcvr. Detachable head, as new, c/w box, man, supplied accessories, £215. Roger, G0KDR, QTHR, 01728 663 476 or 07799 473 374 (Saxmundham). E-mail: g0kdr@btinternet.com

YAESU FT-840 multimode HF tcvr, output 10–100W, adjustable on all modes. Mic, man, boxed, great rig, £350. Kenwood TR-751E 144MHz multimode tcvr, 25W output, mic, mans, mobile mount, boxed, mint cond, £250. Both plus postage. 01202 460 174 (Poole). E-mail: les.g0faj@ntlworld.com

YAESU FT-847 c/w Inrad 2.1kHz xtal filter, exc cond c/w box + mans, £900 ono. G0SSJ, 01457 860 461 (Glossop). E-mail: andy@mozzi3.fressserve.co.uk

YAESU FT-847, 2000 spec, 25A power supply (Watson), MJF-945E ATU, desk mic SJCD-308, Watson tribander, G5RV (full size). All new, immaculate, all boxed with mans, £1000. Trev, M3PAG, 01205 311 610. 199 Woadfarm Road, Boston, Lincs, 01205 311610 (Boston). E-mail: m3pag@byopenworld.com

YAESU VX-7R h/held tri-band tcvr, as new cond, only a few months old, complete with rapid charger and submersible spkr mic, £200 + p&p. J Kempster, 01908 504 140 (Milton Keynes).

SILENT KEYS

We regret to record the passing of the following radio amateurs:

G0OWD	Mr D Weston	11/04/03
G3BYW	Mr W Dunell	02
G3CJ	Mr E H Heaton-Jones	
G3RNR	Mr F Williams	15/04/03
G3WFC	Mr M E Allard	08/01/03
G4AUX	Mr P J Himsworth	23/04/03
G4GIZ	Mr E Waddington	31/03/03
G4LCX	Mr E L Horner	04/03
G4YKA	Mr B Shaw	26/03/03
G5DQ	Mr P J Broom	19/03/03
G6XIK	Mr L A Mobbs	21/04/03
GM2AOL	Mr W S Hall	09/04/03
GW3MMU	Mr P Fulton	06/03/03
M0BAX	Mr B Pope	04/04/03
M3KEB	Miss K E Beech	31/03/03
M3RRB	Reverend R Bowlzer	11/04/03

WANTED

1296MHz linear amp. G8BCL, QTHR, 01844 208 074 (Aylesbury). E-mail: anmar@tiscali.co.uk

AEA MM-3 Morse Machine wanted. Must be in gwo with QSO format feature. Help

me improve my CW! (I can't get any worse!) Steven, MM0DGI, 01856 741 205 or 07760 102 153 (Orkney).

ANY Racal and Watkins Johnson rcvrs, accessories, mans or just spares, wanted by enthusiast. WHY? Especially looking for the following – Racal RA137 LF converter for the RA17, a WJ8888 (Quad-8), also want a JRC NRD535 rcvr, 19in equipment racks, HF multicoupler to feed several rcvrs. Distance to collect no problem. G8WKA, QTHR, 01252 795 234 (Surrey). E-mail: richardreich@aol.com

CIRCUITS for Telequipment D31 scope. Advance sig gen 5G62. Heathkit 82U sig gen. Rapid Electronics scope 7020. Monitor ZNM 1240E. Trio rcvr M 9R 59. Scopex 4010A. Monitor Compaq 472. Zenith monitor ZNM 1240E. Grundig rcvr. Compact Centre M340. 020 8374 9070 (London). E-mail: dennisg@whsmithnet.co.uk

CODAR, Collins, Drake and KW – please let me know if you have any items from these manufacturers for sale; also looking for an HAC single-valve rcvr. Paul, G4CCZ, 01932 342 927 (Woodham, Surrey). E-mail: g4ccz@6metres.com

EARLY valve and crystal wireless wanted, especially interested in early Marconi items. Also looking for good top-end valve comms rcvr and early valve test equipment. G4ERU, 01202 510 400 (Bournemouth).

HF tcvr, either Yaesu or Kenwood, valve or solid state, anything considered up to £200 + carriage available. 07870 617 171 (Portsmouth).

ICOM IC-AT100 auto-ATU including cable, must be good cond, FWO and h/book. Des, G0JCF, 01895 633 118 (Ruislip). E-mail: gonedes@aol.com

SILENT key clearout or just not needed, I collect QSL cards for their historic interest and a research project, especially from periods before 1970. Can collect or arrange collection. 0113 269 3892 (Leeds). E-mail: g4uzn@qsl.net

TELEFUNKEN E-1500 series rcvr mechanical filters, 200kHz USB and LSB plus any other spares. I can also repair these sets including the synthesiser. Straight Morse key also wanted. Charles, M0DED, 07901 513 631 (nr Canterbury). E-mail: charles.frizell@varian.com

YAESU FT-901DM accessories, YR-901 CW RTTY reader, YVM-1 monitor, YK-901 keyboard, FC-901 ATU, FTV-901R tvtr. 01829 760 072 (Tarporley)

YAESU FT-901DM or FT-901DE or FT-901SD, working or not; also FC-901 ATU, FV-901DM VFO, YR-901 CW/RTTY reader, YK-901 keyboard. Ian, 01829 760 072 (Tarporley).

RALLIES & EVENTS

1 JUNE 2003

SPALDING & DARS Annual Rally - **New venue** - Sir John Gleed Technical School, Halmer Gardens, Spalding. OT 10am, £2. CP, TS, CBS, TI, but no camping this year. Ray, M0CTM, 01775 711 953, or John, G4NBR, 07946 302 815. [www.sdars.org.uk]

WEST MANCHESTER RC 7th Red Rose QRP Festival - Formby Hall, Alder Street (off High Street), Atherton, Manchester. OT 11am, £1.50. TS, RSGB, G QRP, B&B, CP free, DF, C, LB, TI on 144.550MHz, construction competition. Les, G4HZJ, 01942 870 634, g4hzj1@ntlworld.com

6–8 JUNE 2003

25th Nordic VHF Meeting - Hotel Gavelstad (JO49XI), 45km N of Larvik, Norway. Accommodation for 90 people, plus caravan park. LEC, FM, barbecue.

8 JUNE 2003

NUNSFIELD HOUSE ARG 34th Elvaston Castle National Radio Rally – Elvaston Castle Country Park nr Derby. RSGB regional stand /bookstall. Les, G4CWD, 01332 559 965 or secretary@elvastonrally.co.uk

YEOVIL & DARC 19th QRP Convention – Digby Hall, Hound Street, Sherborne, Dorset. OT 10am. LEC, C, TS, B&B, Construction Challenge, TI on 144.550MHz via GB2LOW. G W Davis, G3ICO, george@mudford.fsnet.co.uk

14/15 JUNE 2003

INTERNATIONAL MUSEUMS Weekend 2003. Harry, M1BYT, 0113 2866 897, 07812 738 205. [www.ukradioamateur.org/imw]

15 JUNE 2003

MID-LANARK ARS Scottish Mini-Convention – Summerlee Heritage Museum, Coatbridge. John, GM0XFK, 01698 822 860. [www.qsl.net/gm3pxk]

NEWBURY & DARS Amateur Radio Boot Sale – Cold Ash, near Newbury. Free entry for buyers, but donations welcome. MA, MT, TI via GB4NBS on 144.550MHz. [www.nadars.org.uk]

EAST SUFFOLK Wireless Revival – Suffolk Showground, Felixstowe Road, Ipswich. OT 9.30am. CP, CBS, B&B, MA, bookstall, clubs, C, HF station. John, G3XDY, 01473 717 830 or Steve, M1ACB, 07720 412 648. [www.btinternet.com/~thomassg/eswr.htm]

22 JUNE 2003

BANGOR & DARS Summer Radio Rally – Crawfordsburn Country Club, nr Bangor, Co Down. OT 12 noon. TS, B&B. Mike, GI4XSF, 028 4277 2383. [http://welcome.to/bdars]

EPSOM RADIO & Electronics Fair - Grandstand, Epsom Downs Racecourse. MT, B&B, CBS, RSGB, TS, FAM. Paul, M0CJX, m0cjx@lineone.net [www.epsomrally.co.uk]

27–29 JUNE 2003

HAM RADIO 2003 - Friedrichshafen, Germany. OT 9am. [www.messe-friedrichshafen.de]

28 JUNE 2003

REDDISH RALLY – St Mary's Parish Hall, South Reddish, Stockport. OT 11am, £1. John, G4ILA, 0161 477 6702, john@mckae.freeserve.co.uk

29 JUNE 2003

BRISTOL RSGB GROUP 46th Longleat Rally - *** **CANCELLED** ***.

1–3 JULY 2003

THE ROYAL SOCIETY Summer Science Exhibition – 6–9 Carlton House Terrace, London. Admission free. 20 exhibits, with research teams on hand to explain. Exhibits include: optical diagnosis of lung cancer; 'Sting Jet', a new phenomenon causing severe surface winds; how Trinidadian guppies are providing insight into the formation of new species. Tim Watson, 020 7451 2508, tim.watson@royalsoc.ac.uk [www.royalsoc.ac.uk]

6 JULY 2003

NORFOLK ARC Barford Radio Rally – Barford, 9 miles SW of Norwich near the A11 and A47. OT 10am. CP, TI, CBS, B&B, C, TS. David G7URP, 01953 457 322/458 844 or e-mail dpalmer@dcpmicro.com

YORK RC Rally – York Racecourse. OT 10.30am. C, CP free, B&B, DF, WIN, SIG. Arthur, G8IMZ, 01904 787 799 (office hours). [www.yorkradioclub.net]

12 JULY 2003

CORNISH RAC Radio & Computer Rally – Penair School, Truro. OT 10.30. TS, B&B, MT, CP free, C, TI. Ken, G0FIC, ken@jtarry.freeserve.co.uk or John, G4LJY, g4ljy@hotmail.com

20 JULY 2003

LINCOLN SWC Hamfest - **New venue**: Lincoln University Sports Centre, Brayford Pool, Lincoln. OT 10.30am. TS, B&B, FM, MT, C, LB, FAM. John, G8VGF, 01522 525 760.

McMICHAEL Amateur Radio Rally & Car Boot Sale – Reading Rugby Football Club, Sonning Lane, Sonning, Berks, just off the A4 at Sonning. OT 9.15am (approx). TS, CBS, DF, clubs, CP free, LB, C, TI by GB6MMR on 145.550MHz. Dave, G4XDU, 01628 625 720 or g4xdu@amsat.org http://go.to/mcmichaelrally

25–27 JULY 2003

AMSAT- UK 18th Annual Colloquium – University of Surrey at Guildford. Presentations & displays over the three days. Accommodation and individual day tickets will be available. The availability of the amateur satellite service to the new Intermediate Licensees means that this is an ideal time to find out more about this exciting side of our hobby. GB4FUN will be there, fully equipped for satellite operation, and there will be special beginners' sessions on two afternoons. Jim, G3WGM, mailto:g3wgm@amsat.org or g3vzv@amsat.org [www.uk.amsat.org]

27 JULY 2003

COLCHESTER RA Amateur Radio Rally & Computer Fair – St Helena School, Sheepen Road, Colchester. Gary, 01621 818 620 or James, 01255 242 748. E-mail cra2003@garycavie.com or cra2003@mcginty.net

RUGBY ATS Rally – BP Truckstop on the A5 outside Rugby. *** **POSTPONED - see 9 August** ***. The BP Truckstop is no longer available. Tony, G0OLS, thumph3426@aol.com

Vintage Valve Technology Fair – Haydock Park racecourse, Merseyside. On A49, 5 minutes from jn 23 of M6. OT 10am, £2.50. Vintage comms, domestic, military, Hi-Fi, gramophones, telephones, valves & vinyl. Trevor, 01274 824 816 or vvt@supanet.com [www.myciunka.supanet.com/VVTF2003 (case-sensitive)]

3 AUGUST 2003

KING'S LYNN ARC 14th Great Easter Rally Car Boot Sale - Foster's Sports & Social Club sports field, Clenchwarton. OT 10am, £1. CBS, C, LB, TI by G3XYZ on 145.550MHz. Sorry, no dogs on field. George, G6AKC, 07719 874 128 (eves) or george@g6akc.freeserve.co.uk [www.klarc.org.uk]

5 AUGUST 2003

CHELMSFORD ARS Radio & Electronic Table-Top Sale – Marconi Social Club, Beehive Lane, Great Baddow. OT 7.15pm, entrance/CP free. LB. David, M0BQC, 01245 602 838 or cars@g0mwt.org.uk [www.g0mwt.org.uk]

8 AUGUST 2003

COCKENZIE & PORT SETON ARC 10th Annual Radio Junk Night – Cockenzie & Port Seton Community Centre, South Seton Park, Port Seton, E Lothian. OT 6.30pm, £1, proceeds to British Heart Foundation. WIN, DF, C. Bob, GM4UYZ, 01875 811 723 or bob.gm4uyz@btinternet.com

9 AUGUST 2003

RUGBY ATS Rally - **New venue**: Stanford Hall, Lutterworth, Leics. Follow brown signs to Stanford Hall from M1 jn 20. OT 10am, £1. TI on 145.550MHz. Tony, G0OLS, 01455 552 519, or thumph3426@aol.com [www.rugby-ats.co.uk]

10 AUGUST 2003

FLIGHT REFUELLING ARS Hamfest – Cobham Sports and Social Sportsground, Merley, Wimborne, off the A31 (signposted). OT 10am, £3 – correct money, please. TS, CBS, MT (5WPM), MA, LB, C, FAM, TI on 144.550MHz from 8am. Overnight camping on Saturday. Mike, M0MJS, 01202 883 479 or hamfest@frars.org.uk

16 AUGUST 2003

NATIONAL WIRELESS MUSEUM Annual Wireless Rally - Puckpool Park, Ryde, Isle of Wight. OT 10am. Douglas, G3KPO/GB3WM, 01983 567 665.

24 AUGUST 2003

MILTON KEYNES ARS 17th Annual Rally & Car Boot Sale - St Paul's School, Phoenix Drive, Leaden Hall (behind Wroughton Campus). David, G3ZPA, 01908 501 310.

TORBAY ARS Communications Fair - rally@tars.org.uk

25 AUGUST 2003

HUNTINGDONSHIRE ARS Annual Bank Holiday Monday Rally – Ernulf School, St Neots, Cambridgeshire (nr Tesco Superstore on A428). OT 10am, £1.50. C, CBS on hard standing, TI on 144.550MHz. Peter, M5ABN, 01480 457 347, or peteherbert@aol.com

30/31 AUGUST 2003

WEINHEIM VHF Meeting - same venue as last year.

31 AUGUST 2003

TELFORD AMATEUR RADIO RALLY GROUP 2003 Telford Rally – RAF Cosford Aerospace Museum, on A41, one mile south of jn 3, M54. Entrance & CP free. RSGB regional stand/bookstall/ EMC Clinic. Bob, M0RJS, bob@somrob.u-net.com www.telfordrally.org.uk

14 SEPTEMBER 2003

FENLAND RG Horncastle Summer Amateur Radio Rally – Chris, G0PXB, 01526 860 320 or Tony, G3ZPU, 07778 274 535. www.fenlandrepeater.org.uk

19/20 SEPTEMBER 2003

LEICESTER Amateur Radio Show – Geoff, G4AFJ, 01455 823 344, fax 01455 828 273 or g4afj@argonet.co.uk

19–28 SEPTEMBER 2003

HORNSEA ARC Antenna Workshop & Farm – Richard, G4YTV, 01964 562 498 or g4ytv@aol.com

20/21 SEPTEMBER 2003

TRANSMISSION 2003 – 11th annual event to raise money for the British Wireless for the Blind Fund.

RALLIES & EVENTS

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; **s** – Camp Site.

GB CALLS

These callsigns are valid for use from the date given, but the period of operation may vary from 1 – 28 days before or after the event date. Operating details are provided in an abbreviated form as follows: T = 160m; L = 80 or 40m; H = HF bands (30 - 10m); V = 6 and / or 4m; 2 = 2m; 7 = 70cm; S = satellite and P = packet. Please send operational details of your special event station to the RadCom office at least five weeks before publication. The only QSL Bureau sub-manager for special event station callsigns is as follows: GBxAAA-MZZ – Mike Evans, 322 Heol Gwyrosydd, Penlan, Swansea SA5 7BR, e-mail mw0cna@ntlworld.com. Will organisers of special event stations please ensure that they lodge plenty of envelopes with their sub-manager?

1 Jun	GB2CC: Clanfield Carnival. Clanfield, Hants. LH2 (G0FYX)
	GB2ECR: Elvaston Castle Rally. Elvaston, Derby. LH27P (G0IYZ)
6 Jun	GB0POW: Prisoner of War. Crook, Co.Durham. LHV27 (G0NRK)
	GB2ASC: Apollo Sun Club. West Sussex. TLH (G0UFP)
	GB4YOU: Youlbury Scout & Guide Radio. Oxford. (G0RJX)
	GB4YOU: Youlbury Scout & Guide Radio. Oxford. (G0REL)
7 Jun	GB2LOW: Low Power Operation. Sherborne Dorset. 2 (G3CQR)
13 Jun	GB0GWO: Goldwing Owners. Kings Lynn, Norfolk. LHV2 (G0CLR)
	GB0GWO: Goldwing Owners. Kings Lynn, Norfolk. LHV2 (G0ZAA)
	GB2PCC: Portishead Cruising Club. Portishead, Somerset. TLH27 (G4WBV)
14 Jun	GB0JW: John Wesley. Wyke, Bradford. LH27 (G0PFH)
	GB0WAM: Wickenby Air Museum. Lincoln. LH27 (G4DBS)
	GB2EMA: East Midlands Airport. Derbyshire. LHV27 (G0DAM)
	GB2GTM: Grampian Transport Museum. Alford, Aberdeen. TLH2 (GM0VGI)
	GB2HRM: Heckington Railway Museum. Heckington, Lincs. LH2 (G3ZUC)
	GB2LL: Langford Lodge. Crumlin, Co. Antrim. LHV2 (GI0OUM)
	GB2MMA: Maritime Museum Appledore. Appledore, Devon. LH (M0BRB)
	GB2MOF: Museum of Flight. E. Lothian. LH (GM4UYZ)
	GB2NMM: National Mining Museum. Overton, Wakefield. LH27 (G0BFJ)
	GB2NSA: Norfolk & Suffolk Aviation. Flixton, Suffolk. LH (M0DSB)
	GB4SMH:Signals Museum Henlow. Henlow, Beds. LH27P (G3USE)
	GB8NSA: Norfolk & Suffolk Aviation. Flixton, Suffolk. 2 (M1TWO)
15 Jun	GB4NBS: Newbury Boot Sale. Newbury, Berks. 2 (G3RVM)
	GB4SWR:Suffolk Wireless Revival. Felixstowe, Suffolk. 2 (G4YQC)
16 Jun	GB1WIS: First Woman In Space. Leics. (G7HIA)
17 Jun	GB300WES: Wesley. N Lincs. LH2 (G4HOY)
20 Jun	GB8CC: Connisbrough Castle. Conisbrough, Doncaster. LH2 (G0SSC)
21 Jun	GB0MLR: Model Lifeboat Rally. Southport. LH2 (G0ROT)
	GB1MLR: Model Lifeboat Rally. Southport, Merseyside. TLH2 (G0ROT)
22 Jun	GB300WES: Wesley. N Lincs. LH2 (M0RHI)
28 Jun	GB2TEW: Tewin. Tewin, Herts. LH (G3UFA)
	GB4FOL: Festival of Leisure. Swadlincote. LH2 (G4CRT)

The Members' Ads order form is now published here. If members do not wish to cut the form out of the magazine, photocopies will be accepted, as will recent copies of the form from previous months, or recent copies of the 'carrier' sheet. *As a last resort*, members may also send in their advertisements on 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 manner.

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MISCELLANEOUS

GWM RADIO is now open at new premises
63 Victoria Road,
Worthing, BN11 1ON.
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www.gwmradio.co.uk - See you all there.

Business Cards

The Last Word

GB2RS News Headlines by E-mail

I would just like to say that I find this service invaluable because I am a church organist so I am never able to hear the news 'live'. To receive it via e-mail is terrific, and with news of special events and DXpeditions etc, it has rekindled my desire to island hunt for IOTA.

Many, many thanks, and long may it continue.

Elaine Hicks-Arnold, G0CDZ

[Any member who wishes to receive the GB2RS news headlines by e-mail may request the service by sending an e-mail to gb2rscom@rsgb.org.uk –*Ed.*]

Channelise HF SSB

One of the pleasures of operating on the new 5MHz band has been operation on fixed frequency channels. The stability and memory features of modern SSB transceivers enables one to switch around the channels just like on VHF, almost never even having to touch the RIT control. Could we not, as a trial, try introducing channelisation in part of the SSB sections of some of the other HF bands, perhaps starting with 80 metres? To keep the numbers fairly simple, how about a channel spacing of 4kHz? I'm pretty sure that spectrum utilisation would be better than with the free-for-all that we have at present. Choosing a free channel would be much simpler than the current situation of having to try and squeeze in between other stations (sometimes upsetting everybody in the process).

Ray Scrivens, G3LNM

Thanks for 'TT'

I think it's about time I expressed my appreciation to Pat Hawker for his 'Technical Topics' column. It seems he's been writing it since I joined the RSGB, and his column is always a good read and full of interest for me.

Mike Coombs, G3VTO

Give the RSGB 'Clout'

There have been a lot of adverse comments about the new licensing structure, fundamentally these being that "it's easier now to get on the air than it used to be and little technical knowledge is required". Well, that's good news; after all, the UK driving licence does not require you to know how the car works, only that you can drive it safely. . .

We need more radio amateurs on the air and in the RSGB to give it clout when dealing with PLT and the other issues ahead. A special thanks to the RSGB and all those great radio amateurs out there that have helped me to carry on enjoying this hobby (I know they would be too embarrassed for me to mention their callsigns).

John Walker, G4SSW

Abolish 'Detector'

Speaking as a Foundation Course instructor, I would like to lobby for the abolition of the term 'detector' from use by the electronic fraternity, both professional and amateur. This term has come down to us from the crystal set days when finding a 'sweet spot' on a galena crystal allowed the operator to detect a signal. Then and now, it is the aerial that detects the EM waves from a transmitter traversing the aerial element(s)!

In the Foundation Course we teach that, in a transmitter, the audio and RF oscillator signals are mixed together in a modulator stage to produce LSB, carrier and USB. So surely we should teach that, in a receiver, the carrier with its sidebands, are re-mixed in a demodulator to produce the audio signal again? This would also mean that explaining single sideband generation and reception would be much easier, come the Intermediate course.

Mike Street, G3JKX

New Use for Morse?

Inspired by the sounds of Morse code ringing out in public places from Nokia mobile phones – di di dit – dah dah – di di dit – when an incoming SMS message is imminent and occasionally "Nokia connecting people" in Morse, it has inspired me that it would be nice to have other Morse messages available as ring tones, rather than the usual musical tunes! Many Nokia phones also allow a different ring tone depending on who is calling, and the possibilities such as "CQ CQ de XYL" or other amateur calls, would actually be quite useful! Maybe in the future, even the possibility of the caller ID number being sounded in Morse, would not only be useful for drivers, workers and even the visually impaired.

Is there anyone who has done anything similar, and maybe could provide readers with step-by-step details on how to customise one's own ring tone with Morse?

Andy Green, EI3HG

PLT Warning

Firstly, I wish to thank the editorial team for the way *RadCom* has grown in quality and breadth over the past few years. I have been a member since the late 1980s (and as a teenager in the 1970s) and cannot remember a time when I have found it so informative, nor a time when I have found I have read so much of it in detail. In short, I think *RadCom* is currently the best it has ever been in my recollection.

I found Hilary Claytonsmith's article on PLT (*RadCom* February 2003) deeply concerning. As a broadband user myself, I can well understand the desire for an expansion of these services. Given the continued financial difficulties of those companies who invested in state-of-the-art and EMC-responsible infrastructure technologies (Telewest, ntl, etc), it is easy to see why a 'cheap fix' solution could easily be seized upon by government agencies, irrespective of its implications for the wider RF spectrum.

I wonder whether the time has come for us – the amateur radio community – to act in our common interest through democratic channels to register our concerns, or whether we should wait for further negotiations with the RA to come to fruition. If necessary, someone will need to give us a lead should this become necessary. If that time has already come, then we need to know in order to act together.

Paul Roberts, G0OER

Welcome Chatroom Amateurs

I don't think Thomas Wylie ('The Last Word', April) need worry too much. If anything, the computer and the Internet are stimulating interest in amateur radio, both for old hands and new entrants, in all sorts of ways. There is activity on 70cm for instance (see my log via *Google*) and now this is added to by radio-Internet gateways.

The new generation grow up taking the Internet as established fact. It occurred to me recently that one way of explaining the radio medium to young people is "well, it's like the Internet, but you can connect from anywhere – from the Arctic to the Antarctic, from caves underground to the space station to the moon!" The ether is Out There!

One lad I know has got over his mic-shyness by talking to other radio amateurs and SWLs over radio-free chatrooms on *eQSO*. This week he passed his Foundation Licence test at the Sheffield ARC and takes to the air well prepared, due in part to his Internet experience.

Facilities like *Echolink* also open up communication opportunities to radio amateurs who are unable for one reason or another to get the antennas up, but where a computer is practical. I suppose it gives a digital link to a remote station/antenna – in Australia perhaps!

The key to more activity is getting young people on. The rest of us 'oldies' will be talking with dinosaurs on the Ultimate Ether within 25 years or so and I may be being optimistic here... 70cm could be very quiet then.

Recently I joined a chat with a couple of MM3s in the Ayr area. Their conduct was a real credit to the hobby. This contact was over *eQSO*, but the lads are new amateurs and they are on the air too. It is great to hear all the youngsters on the air round here.

Amateur radio is a tremendous hobby for young people with room for all sorts, with all sorts of interests. Let's welcome them in, computers and all.

Graham Coyne, G3YJR

Bureau vs Direct QSLing

I decided to involve myself with the IOTA programme and was extremely impressed with the website, and appreciated all the detailed work which had been carried out. I found I had around 250 IOTAs, which formed a good base, and went into action.

Almost immediately I realised the potential cost, as many operators stated "QSLs direct only". With the number of islands involved, around 1000, I believe the RSGB should stipulate that no QSLs would be accepted from expeditions or stations unless they also process bureau cards. This in my opinion would enable a far larger number of people to get involved. In turn this would be a greater credit to the Society than a very limited number of members achieving high scores.

My suggestion would, in particular, encourage the involvement of a larger percentage of the younger people and pensioners who fortunately have joined the hobby in recent years due to the new non-elitist approach.

Maurice Hall, G0AWA

Then and Now

The approach of Coronation Golden Jubilee day reminds me that my licence came in May 1953. My 10-watt crystal oscillator took five days and 20 calls to produce a contact, with GW3IEQ. I suspect present day starters will do rather better.

As a veteran of 100 CW QSOs on 80m and seven months experience, I travelled to Port Lockroy, Antarctica, to look after the ionospheric recording kit, taking out the call VP8AZ.

I must have driven half the world and the USA in particular doolally as I religiously operated the procedures taught for the UK licence and gave name and QTH for every QSO. I had never heard a pile-up or knew that such things existed until I found myself on the end of it. Experience didn't teach me too much so I can only hope that I did not cause any heart attacks.

For encouragement to the new and little guns in the DX world I have never used other than dipoles and verticals and have worked around 320 of present day DX countries (340 all time) and I rarely use my linear. If you doubt lower powers listen to the difference in the power levels from the NCDXF beacons and how often the AGC of the receiver has removed the difference between 100 watts and 10 watts. It's a matter of timing, frequency, patience and some luck to make it past the pile-up.

Mike Faulkner, G3IZJ

'Not in Log'

QSL cards returned to the sender marked 'not in log' are on the increase due to poor logging by some DX stations: not very encouraging for a newcomer to DXing. In one QSO that I recorded by chance the operator is clearly sending my callsign, but the QSL manager returned my card. I have not heard of a problem with the D68C cards.

Please QSL managers check the date and time, not just the callsign entered: the operator could have got a letter wrong.

Geoff Voller, G3JUL

Recognise Radio Amateur Heroes

An article in my local newspaper revealed that an ex-RAF veteran living in Nottingham had been given the Freedom of Bletchley Park for his work, when stationed in Colombo, in sending on Japanese coded Morse traffic to Bletchley Park, the centre of codebreaking activities. I understand that similar awards have been given to Service personnel in Morse interceptor outstations (such as Kedleston Hall in Derbyshire, Beaumanor in Leicestershire, RAF Chicksands in Bedfordshire and elsewhere in the UK and abroad) who were responsible for sending on Morse coded traffic to the codebreakers at Bletchley Park.

Perhaps it is not appreciated that civilian radio amateurs were also involved. My good friend and neighbour Gordon Treece, G3QD, and several other radio amateurs in Nottingham were involved and did not really receive the recognition they deserved. I would suggest they contact Bletchley Park Trust at Bletchley Park for further information about the way that Service personnel have been rewarded for their wartime activity.

Incidentally the heritage site at Bletchley is well worth a visit. You can see the Colossus computer, the first programmable computer, learn about the Enigma machine code, as well as other ciphers used by the enemy. A great day out for the family.

Henry Balen, G4MHB,
ex-Bletchley Park

Happy K2 Constructor

I completed the construction of an Elecraft K2 [as reviewed in *RadCom* March 2003 – *Ed*] + 100W linear last June/July just before they announced the S/N 3000 version upgrade. I have previous experience in construction using PTH boards and found no difficulties. I have a digital meter and an L/C meter so I measured the value of every L, C, and R before soldering it to the PCB. This turned the three weeks mentioned in the article to about six, but everything was to spec as per the test sections of the manual. It is interesting to see that the toroids were able to produce almost 2:1 change in value according to how the turns were spread out. If you don't have a means of measuring the inductance values I strongly recommend you pay the additional $20-odd for pre-wound toroids.

I was also suspicious of accepting Tx/Rx performance without being able to verify it, but later evaluation with a counter, RF voltmeter, signal generator, an external general coverage receiver, and RWM on 9996kHz set my mind at rest.

I certainly recommend anyone with a little construction experience to build the K2, it is a wonderful piece of kit and you create an added value of at least £500 to the cost of the parts with your labour when you put it on the air.

John Rollason, G3WCO

GT and GP Operations

May I thank all the stations who called into my mobile operation from the Isle of Man on 15 / 16 of January using a rare callsign, GT2UG, belonging to the Halifax and District Amateur Radio Society. The response was excellent. I am pleased to report that one third of my contacts were with M3 or QRP stations and I suspect that many more low power stations did not get through the pile-up.

My next expedition is to Guernsey from 2 to 6 October between 1000 and 1630 daily, mainly on 40m, and I will operate the club callsign GP2UG which has never been used on the island before. Pile-ups are inevitable but M3 and QRP stations can be assured that regular calls will be made to allow low power operators to get through. Special QSL cards will feature the rare callsign as well as IOTA and WAB details. So, M3s and QRP stations, make a note of the above dates in your diaries and let me hear you call in!

Geoff Spurr, G0PFH

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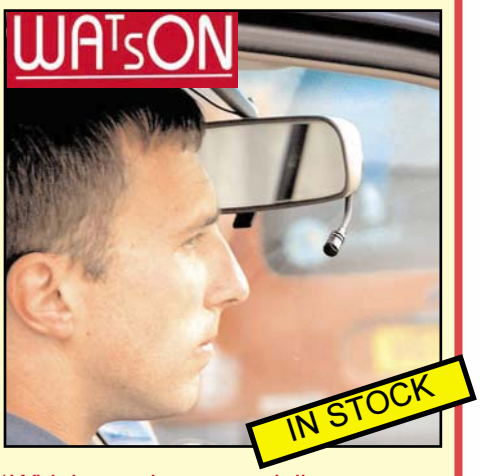


*Widely used commercially
*Approved to Pan-European Standards
*True Hands-Free
*Noise Reducing
*Acoustic Tailored Mic
*Remote (3m) Latching PTT
*Boom mic (3m) with Velcro
*Adjustable gain
*Adjustable Time-Out
*Powered from rig mic socket
*Ready made rig leads (£14.95 extra)
*Also matches handhelds.

The **Safe-2-Way** mobile Interface is made for Watson in the UK by the same company that equips UK Police and Emergency services with similar units. Purchase the ready-made lead to match your radio and tuck the unit out of sight. The plug-in PTT and boom mic both have 3m leads for dressing around vehicle. Don't risk your Licence or people's lives! Drive with **Safe-2-Way**.

Safe-2-Way **£89.95 B**

AUDIO

IR-270 £39.95 B

Mono Cordless Comms Headphones
Infrared headphones designed for mono applications. Padded headset free from trailing wires. Infra red module plugs into receiver or transceiver. Walk round the shack and keep in touch. Even lay in bed!

WATSON WM-308 BASE MIC £59.95 B

The perfect answer for a high quality base microphone. Built-in pre-amp powered from rig or 2 x AA, electronic PTT and FM/SSB response switch. Includes lead with 8-pin plug. The plug needs to be wired for your radio. We can do this but phone for quote.

WATSON WEP-300B EARPIECE £2.95 A

Over-the-ear earpiece, popular for security and emergency use. Its low cost and firm mounting even in arduous conditions make this a popular item. Fitted with 3.5mm mono jack plug.

WATSON QS-112 SPEAKER MIC £16.95 A

Combined speaker-mic. with PTT switch. Models available for Yaesu, Kenwood, Icom, Alinco and Motorola. Specify when ordering.

WATSON HP-100 NEW HEADPHONES £19.95 B

Excellent lightweight communication headphones with tailored response ideal for the modern tranceiver or receiver.
8 Ohms 200-9,000Hz, adjustable headband, 3.5mm stereo plug, 1/4" stereo adaptor

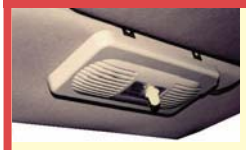
WATSON HP-200 HEADPHONES £22.95 B

These superb headphones have a tailored response for radio communications and are offered at an amazingly low price.
8 Ohms, 200-10,000Hz, Padded earpieces, 3.5mm stereo plug, 1/4" stereo adaptor

WATSON WSM-300 SPEAKER MIC £7 A

Designed for Motorola 2-pin Motorola Hand helds. This is a really tough unit. We have a supply of these brand new at a silly price. Stock up now!

WATSON SP-2000 SPEAKER £19.95 A



No where to place your mobile speaker then consider the SP-2000. This can be easily clipped out the way to your sun visor.
8 Ohms, 1W max, 3m lead, 3.5mm mono plug

WATSON SP-160 SPEAKER £9.95 A

Low cost mobile speaker with adjustable mobile bracket. Also useful in the shack for base rigs.
8 Ohms, 1.5W max, 3m lead, 3.5mm mono plug

AUDIO

HEIL DESK MICS

The Heil Classic studio quality microphone, exact replica of the 1930's RCA 74B type of broadcast microphone. Inside it has the benefit of modern technology. Two inserts are provided, one for broadcast studio quality and a choice of one other Heil insert. Includes base stand, soft-touch PTT back panel switch and cover for microphone. Requires CC1 adaptor.

HCL5	Classic retro-look HC-5 desk mic	**£259.95**	B
HCL4	Classic retro-look HC-4 desk mic	**£259.95**	B
HCLic	Classic retro-look IC desk mic	**£259.95**	B

HEIL HAND MICS

Goldline professional quality dynamic microphone. Three versions available, GM-4 with Studio & HC-4 elements, GM-5 with Studio & HC-4 elements and GM-V Vintage Goldline with Vintage Studio high impedance element, for older valve rigs such as Drake & Collins. Includes stand threaded holder. Requires CC-1 adaptor £29.95.

GM-4	Goldline HC-4 hand mic	**£129.95**	B
GM-5	Goldline HC-5 hand mic	**£129.95**	B
GM-V	Goldline Vintage Hi-z hand mic	**£159.95**	B

HEIL HEADSETS & BOOM MICS

PORTABLE OR MOBILE
The Traveler lightweight single side headset with boom mic. Many models to choose from. Supplied with an interface cable. Choice of extra interface cables, for modular or 8-pin.

HST-817	Traveler single side headset for FT-817	**£89.95**	B
HST-706	Traveler single side headset for IC-706	**£89.95**	B
HST-IC8	Traveler single side h/set for ICOM 8-p	**£89.95**	B
HST-K8	Traveler single side h/set for Kenwood	**£89.95**	B
HST-KM	Traveler single side h/set for Kenwood	**£89.95**	B
HSTA-817	Extra interface cable for FT-817	**£24.95**	B
HSTA-706	Extra interface cable for IC-706	**£24.95**	B
HSTA-IC8	Extra interface cable for IC 8-pin	**£24.95**	B
HSTA-K-M	Extra interface cable for K mod	**£24.95**	B
HSTA-K-8	Extra interface cable for K 8-pin	**£24.95**	B

HEIL HEADPHONES & BOOM MICS

Top quality headphones with boom microphones. Choice of mic. elements, HC-5 ideal for "rag chewing" or HC-4 for DX communications. Icom models fitted with IC element. Choice of AD-1 (£16.95) interface leads for most makes of rigs.

PRO-SET-PLUS	Large H/phones with HC-4 & HC-5	**£199.95**	B
PRO-SET-PLUS-IC	Large H/phones with IC & HC-4	**£219.95**	B
PRO-SET-4	Large H/phones with HC-4 element	**£129.95**	B
PRO-SET-5	Large H/phones with HC-5 element	**£129.95**	B
PRO-SET-IC	Large H/phones with ICOM element	**£149.95**	B

bhi NES10-2 DSP SPEAKER £99.95 B

Combined speaker and programmable DSP unit. Offers dramatic noise reduction, even reduces annoying hetrodynes.
8 Ohms, 8 filter settings, 3.5mm plug, 12-24V DC

bhi NES-5 DSP SPEAKER £79.95 B

Combined speaker and fixed setting DSP unit. Offers same dramatic noise and hetrodyne reduction. (Formally NESCB)
8 Ohms, 3.5mm jack plug, 12-24V DC 500mA

bhi NEIM1031 NEW £129.95 B

NOISE ELIMINATING IN-LINE MODULE
** Noise attn -20dB (typical) * Noise Attn levels 8 * Audio output power 2.5W RMS max (8 Ohms) * Audio connections: Line level in/out (RCA Phono), Audio in/out 3.5mm mono jack * Line i/p impedance 10K * Line o/p impedance 100 Ohms * Line in sensitivity 300mV -2V RMS * Headphone socket 3.5mm mono jack * Power 12-24V DC 500mA*

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PRICE MATCH

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WATSON W-25SM PSU £79.95 B

*Very popular budget switch mode power supply. *Output voltage 13.8V DC *Output current of 22A (25A peak) *Front panel output terminals *Over current & voltage protection *Quiet operation*

WATSON W-25AM PSU £89.95 C

DC power supply for the shack & esp. for use with 100W transceivers. Separate voltage and current meters. *Output voltage 0-15V DC *Output current of 25A (30A peak). *3 sets of output terminals *10A cigar socket. *Over current protection

WATSON W-5A PSU £29.95 B

DC power supply for the shack and low power QRP transceivers. *Output voltage 13.8V DC *Output current of 5A (7A peak) *Front panel output terminals *Over current protection

LOWE SPS-8400 PSU £99.95 C

A general purpose 3-15V DC, 25A (30A peak) power supply able to provide the needs of the modern 100W HF transceiver.

MANSON EP-925 PSU £99.95 C

A general purpose 3-15V DC, 25A (30A peak) power supply able to provide the needs of the modern 100W HF transceiver. *Dual analogue meters *Over current protection *Large power terminals for rigs *Quick snap connectors for ancillaries

AVAIR AV-200 VSWR PWR METER £49.95 B

Ideal for HF and VHF operation. It features high power handling up to 400W * 1.8-180MHz * 5W, 20W, 200W, 400W * Av or PEP

AVAIR AV-400 VSWR PWR METER £49.95 B

Ideal for VHF and UHF operation. It features high power handling up to 400W * 140-525MHz * 5W, 20W, 200W, 400W * Av or PEP

AVAIR AV-600 VSWR PWR METER £69.95 B

Two sensors used for HF and VHF/UHF operation. * 1.8-160MHz, 140-525MHz * 5W, 20W, 200W, 400W * Av or PEP

YAESU Z-11 AUTOTUNER £209.95 B

IDEAL FOR YOUR FT-817

An auto ATU to match the FT-817. 1.8MHz to 30MHz up to 60W. Latching relays means very low current and almost zero when not tuning.

WEST MOUNTAIN RIGBLASTERS

RIGblaster pro	Data interface 8-pin/mod, Cd & cables	£299.95	B
RIGblaster Plus	Data interface 8-pin/mod, Cd & cables	£139.95	B
RIGblaster M8	Data interface 8-pin, software & cables	£109.95	B
RIGblaster M4	Data interface 4-pin, software & cables	£109.95	B
Rigblaster RJ	Data interface RJ45, software & cables	£109.95	B
RIGblaster nomic8P	Data interface 8-pin, software & cables	£59.95	B
RIGblaster nomicRJ	Data interface RJ, software & cables	£59.95	B
FT100-CBL	Adapts all units to FT100 input	£12.95	A
RB-CD	Standard RIGblaster program CD	£9.95	A

FREQUENCY COUNTERS

WATSON

The FC-130 is an ideal frequency counter for the shack, mobile or portable use. Supplied complete with Ni-Cads, charger and telescopic whip.

Super Searcher	RF finder & freq. cnter 10MHz-3GHz	£99.95	B
Super Hunter	Frequency counter 10Hz-3GHz	£149.95	B
Hunter	Frequency counter 10MHz-3GHz	£59.95	B
FC-130	Frequency counter 1MHz-3GHz	£59.95	B

OPTOELECTRONICS

More than just a frequency counter, the Xplorer is a complete mini test receiver. High speed nearfield FM receiver 30MHz to 3GHz. Automatically records up to 500 frequencies in memory, built-in CI-V interface.

Xplorer	Freq. cnter / CTCSS/DTMF decode	£849.95	B
Digital-Scout	Digital Freq. counter 60MHz-2.6GHz	£529.95	C
Scout	Freq. finder 10MHz-1.4GHz	£379.95	B
Mini-Scout	Freq. finder (no memories)	£199.95	B
Micro-Counter	Micro freq. counter 10MHz-1.2GHz	£119.95	B
Cub	Mini counter 1-2.8GHz	£134.95	B

TRANSMITTING LOGBOOK NEW £4.99 A

Traditional Logbook for Radio Amateurs, A4 spiral bound for ease of use plus updated Prefix List and room for extra notes. A logbook is a legal requirement for any radio station.

MOBILE LOGBOOK NEW £4.99 A

You've asked for one so here it is - the Radio Amateurs Mobile/Portable Logbook. A5 size, it also contains relevant repeater information. A mobile logbook is not a legal requirement.

RAMSEY HR RECEIVER KIT SERIES

SPECIAL OFFER

- **Models: 20m, 40m, 80m**
- **NE-602 IC**
- **Output: 8 Ohms headphones**
- **Supply: 9V DC PP3 Batt.**
- **Case & knob set (CHR): Optional**

These single band radios use direct conversion with varicap tuning and have amazing sensitivity. They offer reception of SSB, CW and AM and are ideal as part of a QRP station.

Models: HR-20, HR-40, HR-80 all ~~£31.95 B~~ **£19.95 A**

CHR (optional case & knob set) ~~£14.95 A~~ **£9.95 A**

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3 South
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HF EXCITEMENT

INTRODUCING YAESU'S ALL NEW HF MOBILE

Blending leading-edge technologies developed on the FT-897 and MARK-V FT1000MP transceivers, the FT-857 is the world's smallest HF/VHF/UHF Multimode Transceiver, and it's available now!

FT-857 DESIGN HIGHLIGHTS

The FT-857 is a high-performance, ultra-compact transceiver operating on the 160-10 meter HF bands, plus the 50, 144, and 430 MHz VHF/UHF bands. Providing 100 Watts of power on HF/6 meters, 50 Watts on 2 meters, and 20 Watts on 70 cm, the FT-857 is ideal for mobile, vacation, DX-pedition, or home use when space is at a premium.

Utilising the renowned receiver performance of the FT-897 and MARK-VFT-1000MP, the FT-857 features wide dynamic range, optional Digital Signal Processing, and outstanding audio.
(*DSP supplied as standard in the UK)

The wide array of convenience features includes a 32-colour display; Spectrum Scope; built-in keyer with memory and beacon mode; U.S. Weather Band reception; 200 memories with Alpha-Numeric labels; AM Aircraft reception; detachable front panel (optional YSK-857 required); and much, much more.

You've asked for it, and it's here today: the FT-857 New Mobile. . .from the engineers at Yaesu!

New Remote Control
DTMF Microphone MH-59ABJ (Option)

The optional MH-59A8J Remote Microphone provides control of the major functions of the FT-857 from the microphone's keypad. The MH-59A8J includes a rotary control knob for adjusting the operating frequency and the receiver volume level.

UP/DWN keys
LOCK switch
PTT switch
Keypad
1(DISP) key
2(MHz) key
3(CLAR) key
4(HOME) key
5(MODE) key
6(MODE) key
7(V/M) key
8(BAND DWN) key
SEL/DIAL key and indicator
SEL knob
9(BAND UP) key
* key
0(CNTL) key
ENT(#) key
A key
B key
C key
F(D) key
ACC key
PWR(FAST) key
P1 key
P2 key

Actual Size

HF EXCITEMENT

FT-857

ULTRA-COMPACT HF/VHF/UHF
100 W ALL-MODE TRANSCEIVER
(HF/6m 100W, 2m 50W, 70cm 20W)

YAESU
Choice of the world's top DX'ers

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