RadCom

THE RADIO SOCIETY OF GREAT BRITAIN MEMBERS' MAGAZINE. WWW.RSGB.ORG

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Excalibur

Peter Hart reviews the WiNRADiO WR-G31DDC

1010

MyDEL HB-1A

3-band CW QRP transceiver reviewed

HAM WEEK UK 2010

National Hamfest
1 & 2 October

RSGB Convention
8-10 October

GHz Bands

Full report on the 14th International EME Conference

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YAESU — UK's Largest Stocks

NEW FT-DX5000 Series

The new FT-5000 series of transceivers has arrived. Available in three flavours, This new range embodies many features developed by Yaesu for their top range models - all with 200 Watts output!

FT-DX5000	Basic Transceiver HF-6m 200W	£4999.95 D
FT-DX5000D	With Station Monitor SM-5000	£5349.95 D
FT-DX-5000MP	With Station Monitor & Roofing Filters	£5799.95 D

HF Transceivers

Ask About Part Exchange Deals!

FT-2000	100 Watt 160 - 6m "Industry Standard" Rig	£2299.95 D
FT-2000D	200 Watt version of FT-2000 with built-in PSU.	£2899.95 D
FT-950	100W HF - 6m transceiver with DSP & Auto ATU	£1289.95 D
FT-450AT	100W HF - 6m with automatic ATU & latest updates	£699.95 D
FT-450	100W HF - 6m transceiver - great value.	£619.95 D
FT-DX9000contest	200W HF - 6m "formula one" contest machine	£4899 D
FT-DX9000D	Deluxe fully loaded base station	£8199 D
FT- DX9000MP	Amazing 400W "legal limit" radio	£8999 D
FT-857D	HF to 2m mobile. portable or base - up to 100W	£659.95 D
FT-817ND	HF - 70cms 5W all-mode transceiver	£499.95 D
FT-817BHIDSP	Fitted with DSP module exclusive to W&S	£599.95 D

VHF Mobiles & Handhelds

FTM-10SE	50/40W 2m/70cms stereo FM Mobile	£299 D
FTM-350E	Blue Tooth/GPS 2m/70cms FM Mobile	£529 D
FT-1900E	*NEW* 2m Mobile 65W	£129 D
FT-2900E	*NEW* 2m Mobile 75W	£139 D
FT-7900E	*NEW* 2m/70cm Dualband Mobile 50/45W	£229 D
FT-8800E	Dualband Mobile 50W / 30W	£299 D
FT-8900R	10/6/2m & 70cm Mobile	£359 D
VX-3E	2m / 70cm Handheld Wideband receive	£149 D
VX-8DE	*NEW* Triple band 6m-70cms APRS etc	£389 C
VX-7R	Waterproof dualband handy (silver / black)	£279 C
VX-6E	2m/70cms handy, 5W Wideband Receive	£229 C
FT-60E	2m/70cms, 5W handy Wideband Receive	£169 C

FTM-350E

* *Bluetooth Ready*
* *Built-in Barometric Pressure Sensor*
* *Large Dot Matrix Display*
* *Selectable Eight Colour Display*
* *Extended Receive*

VX-8DE *NEW*

Triple Band Transmit 6M 2M and 70cms with 5W FM transmit power and 1W AM power plus wide Band receive from 0.5 - 999.90 MHz The VX-8D is a technological break through with Bluetooth Hands free operation with GPS/APRS and Real RF Dual wideband Receive. technology for decades.

FT-857D Best HF Mobile?

* *160m - 70cms*
* *Detachable head*
* *100W (to 6m)*

With a price tag of £659, this had to be the best HF mobile buy! Mobile, portable or even base - there is no competition!

West Mountain

Rigblaster PLUS The standard for an automatic switching interface. Your mic always works, no manual switching, no unplugging. USB operation.

£159.95 C

Rigblaster Pro Complete system designed to perfectly integrate PC & radio. Whatever the mode, this will provide the answer. Inc a complete set of leads.

£279.95 C

Wuoxon KG-UVD1P

2m & 70cms Transceiver

A 5 Watt 2m & 70cms handheld with DTMF, CTCSS and DCS. Also has WFM broadcast. This keypad entry radio with LCD display is supplied with LI-ion battery and AC charger.

NEW

£89.95 D

SSB MastHead PreAmps

Range of high performance mast-head pre-amps with optional coax DC feed boxes. 6m - 13cms. Phone for prices.

Work D-Star from PC / Mac direct or via your own DVAP Repeater!

The **DV-Dongle** connects to your PC / Mac via a USB, and provides encoding and decoding for D-Star communications. Just connect to an internet active repeater and you can work any station operating through that repeater. All you need is PC or Mac (with mic.), Dongle inserted in USB socket and an internet connection. £179.95 C

NEW

DV-ACCESS (DV-DC Access Point) contains a 10 mW transceiver that permits a 2 metre D-Star handheld to work into a PC from up to 100 metres. £219.95 C

Proset-Elite-6 *NEW*

The ProSet-Elite 6 uses the new HC6 element that is ideal for the latest transceivers with DSP tx audio EQ. Heil have published a list of recommended EQ settings for many popular radios.

Designed in the style of previous ProSets, you get dual head-phones & adjust-able boom mic. You need to add the appropriate AD-1 adaptor lead. Tell us your radio and we will supply correct one. £179.95 C

For Icom radios, **ProSet-Elite-6-IC** is available. You get the same functions but element is matched for Icom. £194.95 C

ProSet continues for those who don't have EQ in their radios and is offered at a great price.

ProSet-4 or 5 £114.95 C
This is fitted with HC-4(DX) or HC-5 (Normal) insert. Needs AD-1

ProSet-Plus £189.95 C
This has dual inserts switchable

FAST SAME DAY DESPATCH SERVICE!
Orders must be received before 3pm.

KENWOOD *NEW*

TS-590E W&S are pleased to announce the new HF radio from Kenwood.
Expected November £TBA

HF Transceivers

TS-2000E £1489.95 D

The TS-2000E is the classic all-band, all-mode base station covering HF - 70cms at up to 100W. Includes dual channel receivers & DX-cluster monitor with built-in TNC.

TS-2000X +23cm £1749 D

TS-480HX Ideal for mobile, portable or base station. Gives a massive 200W on HF and 100W on 6m. £849 D

TS-480SAT This model gives 100 Watts on all bands up to 6m, but adds a built-in automatic ATU. £749 D

Handhelds

TH-F7E	2m/70cm 5W (2-pin Kenwood) SMA +FREE Clip Mic	£229.95 D
TH-K2E	2m 5W 4-Key Keypad (2-pin Ken) SMA +FREE Headset	£159.95 D
TH-K2ET	2m 5W 16-Key Keypad (2-pin Ken) SMA +FREE Headset	£165.95 D
TH-K4E	70cm 5W (2-pin Kenwood) SMA +FREE Headset	£159.95 D

VHF Mobiles

TM-V71E £289.95 D

2m/70cm Dualband Mobile Transceiver. Features;- *Wideband Receive, Built-In Echolink, Simultaneous 2 Frequency Receive, Removeable Control Head, CTCSS Encode / Decode, 1000+ Memories, DTMF Mic.*

TM-271E	2m FM 60W mobile. CTCSS, 200 Memories, DTMF Mic	£165.95 D
TM-D710E	2m/70cms 50/50W mobile. APRS +EchoLink, DTMF Mic	£429.95 D

Carriage Charges: A=£3, B=£4, C=£6.95, D=£10, E=£12

Orderline

01702 206835

Online Catalogue

www.wsplc.com

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National Hamfest

The 2nd Annual **RSGB National Hamfest** @ Newark & Nottinghamshire Showground

Friday October 1st & Saturday October 2nd 2010

We shall be at The Show as usual with our large stand and lots to see. This year we are adding TenTec, AOR and RF Space products. These are all professional quality products. If you have been to the show before, then you know you won't be disappointed. If you haven't, then make a special effort, as this new venue is proving extremely popular. It has a great buzz about the place and there are lots of bargains to pick up - MOST of them on our stand. So gather round the W&S stand and check our prices, ask about deals and above all meet the guys that you speak with on the phone. We look forward to meeting you there. Make it a date.

NOW IN STOCK!

NEW AIRNAV RADARBOX-3D

RadarBox 3D - The world's ultimate virtual radar system with Google Earth as a map overlay & new 3D aircraft picture library.

Full Package **£489.95 C**

Current owners can upgrade to 3D with **RadarBox-UG** for just **£109.95 C**

RadarBox-Pro Basic Package - No 3D **£399.95 C**

MicroHam Interfaces

microKEYER

Multimode USB Interface gives you radio control, dual-channel USB sound card, hardware FSK, digital voice keyer, improved WinKey CW keyer, true all mode operation, unparalleled auxiliary control.

£229.95 C

MK2R+

Two radio Controller gives you radio control, hardware FSK, flexible receive audio switching, digital voice keyer, WinKey 2 CW keyer.

£699.95 C

Diamond Switch Mode Power Supplies

New Lower Prices!

GSV-3000

**Output voltage: 1 - 15V DC*
**Output current 30A continuous*
**Built-in cooling fan*
**Supply 230V AC 50Hz *Weight 9kg*
**Size 250x150x240mm*

£199.95 D

GZV-2500 **£139.95 D**
Output 25A, 5-15V DC, supply 230V AC Switch mode over volts protected.

GZV-4000 **£189.95 D**
Output 40A, 5-15V DC, supply 230V AC Switch mode over volts protected.

GZV-6000 **£369.95 D**
Output 60A, 1-15V DC, supply 230V AC Switch mode over volts protected.

Ameritron Amplifiers **USA Manufactured**

AL-811XCE 600 Watts 3x 811A 230V AC. **£899.95 E**

AL-82XCE 1.5kW QSK 2 x 3-500Z 230V AC. **£2729.95 E**

AL-800HXCE 1.25kW QSK 1 x 3CX800A7 230V AC. **£3179.95 E**

AL-1500XCE 1.5 kW 1 x 3CX1500 230V AC **£3469.95 E**

ALS-500MXCE 500W Solid State 12V @ 100A. **£949.95 D**

Exclusively Imported by Us

Ameritron amplifiers are rugged with typical USA engineering. Valves still give more watts to the £ and lower distortion.

MFJ *The World's Largest Range From Europe's Largest Stockist.*

MFJ-998

W&S £649.95 C

**Digital & Analogue x-needle VSWR*
**1.5kW SSB & CW *1.8 - 30MHz*
**20,000 memories*
**Built-in antenna selector*
**Auto bypass protection*

MFJ-925 Compact auto tuner **£169.95 D**
MFJ-927 200W remote auto atu **£249.95 D**
MFJ-928 Basic auto atu **£199.95 D**
MFJ-931 Artificial ground **£112.95 C**
MFJ-932 Mini loop tuner **£139.95 C**
MFJ-934 Artificial ground + ATU **£199.95 C**
MFJ-935B Portable loop system **£199.95 C**
MFJ-945E Mobile atu 300W **£129.95 C**

MFJ-929

AUTO TUNER 1.8-30MHz 200W

LCD readout, 20,000 memories, long wire & coax, radio interface.

W&S £209.95 C

MFJ-991B Auto atu 150W **£209.95 D**
MFJ-993B Auto atu 300W **£249.95 D**
MFJ-994B Auto atu 600W **£339.95 D**
MFJ-962D 1.5kW ATU **£289.95 D**
MFJ-969 160m - 6m 300W **£209.95 D**
MFJ-971 Portable atu **£118.95 C**
MFJ-974B Balanced ATU 3.5-30MHz **£189.95 D**
MFJ-986 3kW differential tuner **£349.95 D**

MFJ-112B

World map clock.
Was ~~£32.95~~ Now £22.95 A

MFJ-1260 Mic control 1 in/2 out **£99.95 C**
MFJ-1263 Mic control 2in/2 out **£109.95 C**
MFJ-1275 Sound card adaptor **£109.95C**
MFJ-1625 Window Ant + Tuner **£199.45 D**
MFJ-16B01 Dipole centre SO-239 **£21.95 A**
MFJ-16C06 6x dog-bone insulators **£4.95 A**
MFJ-16E01 300Ω end fed SO-239 **£10.95 D**
MFJ-1796 40m-2m vertical **£239.95 D**
MFJ-1798 80m-2m vertical **£299.95 D**
MFJ-1908H 43ft fibre glass mast **£239.95 D**
MFJ-1922 Digital screw driver control **£99.95 D**
MFJ-1924 Prog. screw drvr control **£129.95 C**
MFJ-1925 ATAS-100 controller **£72.95 C**
MFJ-202B Receiver noise bridge **£79.95 C**
MFJ-250X 1kW dummy load (x-oil) **£55.95 C**
MFJ-260C 300W dummy load **£44.95 C**
MFJ-261 100W dummy load **£32.95 C**
MFJ-265 2.5kW load fan cooled **£199.95 C**
MFJ-403 Micro CW keyer **£66.95 C**
MFJ-403P Micro travel iambic **£79.95 C**
MFJ-4103 PSU for FT-817 **£52.95 C**
MFJ-417 Pocket morse tutor **£76.95 C**
MFJ-4403 Trcvr volt conditioner **£109.95 C**
MFJ-442 Slim electronic keyer **£199.95 C**
MFJ-461 Pocket morse reader **£99.95 C**
MFJ-4714 4-way remote ant switch **£87.95 C**
MFJ-4726 6-way remote ant switch **£159.95 C**
MFJ-490 Memory keyer + paddle **£244.95 C**
MFJ-495 Memory keyer **£189.95 C**

VIBROPLEX UK Distributors

V-CM A compact straight key with super movement. **£63.95 C**

V-CW High quality iambic key in the style of Vibroplex **£154.95 C**

Watson Cross Needle Meters

NEW

These are high quality, accurate VSWR meters with large, clear display featuring X-needle movements.

WCN-200 **£69.95 C**
* 1.8 - 160MHz * 0 - 30 / 300 / 3000W
* 600W max above 30MHz * 2x SO-239

WCN-400 **£69.95 C**
* 140 - 525MHz * 0 - 30 / 300 / 600W
* 2x SO-239

WCN-600 **£89.95 C**
** 1.8 - 525MHz * 0 - 30 / 300 / 3000W*
** 600W max above 30MHz * 2x SO-239*

Butternut Vertical Antennas

These antennas are extremely efficient and use no traps. The large, air-spaced coils are the secret, and resonant adjtments can be made at ground level.

HF-2V 80, 40m DX vertical. 9.75m, Easy erect. **£289.95 D**
HF-6V 80,40,30,20,15,10m self support 7.9m **£389.95 D**
HF-9V As HF-6V but adds 17,12 & 6m. 7.9m **£449.95 D**

Watson Coax Switches

NEW

These Watson premium grade RF coax switches have been created to fulfil a cost effective need for RF switches that are able to cater for the ever widening commercial RF spectrum.

CX-SW4PL 4-way SO-239 **£56.95 C**
CX-SW4N 4-way N sockets **£59.95 C**
CX-SW3PL 3-way SO-239 **£41.95 C**
CX-SW3N 3-way N socket **£49.95 C**
CX-SW2PL 2-way SO-239 **£26.95 C**
CX-SW2N 2-way N sockets **£32.95 C**

Radio Works Carolina Windom Ants

G5RV-PLUS Efficient All-Band Antenna, 80-10m with Balun. 102ft length.

£79.95 C

All windoms include WARC bands

CW-160 160-10m 252' l. **£159.95 D**
CW-80 80-10m 133' l. **£129.95 D**
CW-80LP 80-10m 133' l. **£119.95 D**
CW-40 40-6m 66' l. **£119.95 D**
CW-40LP 40-10m **£116.95 D**
CW-40PLUS 40-10m 66' l. **£139.95 D**
CW-620 20-6m 33' l. **£119.95 D**

Baluns

B1-2kPLUS 1:1 2kW **£39.95 C**
B4-2K 4:1 1.5kW **£49.95 C**
Y1-5KPLUS 1:1 1.8-50MHz **£52.95 C**

Carriage Charges: A=£3, B=£4, C=£6.95, D=£10, E=£12

WATERS & STANTON

General Enquiries

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Present

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Part Exchange that Old Radio - even dead ones!

That's right - we will even take ham radio items that are faulty or dead! With the coming VAT increase it makes sense to buy now and at the same time turn your unwanted ham radio gear into cash you set against the price of your new Icom radio. Just call us on **01702 203353 (Hockley) or 0845 5050128 (Scotland)**

IC-7600 *Transceiver*

The IC-7600 HF/50MHz transceiver is enhanced with some of the main features tried and tested on our flagship IC-7700/7800 models, highly regarded by Amateur operators world-wide. Add over 45 years of analogue RF circuit expertise and the result is the IC-7600, a new rig with outstanding performance and a multitude of innovative features including a newly employed double conversion superheterodyne system and dual DSP units and 3kHz IF (roofing) filter.

£3379.95 D

IC-7200 *Transceiver*

The IC-7200 HF/50MHz transceiver maintains all the traditions of high quality engineering that you expect from Icom. Rugged in design and easy to operate, the IC-7200 utilises the latest digital functions including digital IF filter, twin PBT and manual notch filter which are normally associated with more expensive models. The IC-7200 is ideal for field operation or at home in your shack and is designed to be one of the most practical rigs available.

£799.95 D

IC-7700 *Transceiver*

* *1.8 - 50MHz*
* *20W Output*
* *3 x Roofing Filters*
* *Dual AGC Loop*
* *7" Colour Display*
* *Dual USB Ports*
* *4-Way Antennas SW*

£5499.95 D

The IC-7700 HF/50MHz transceiver shares many features with its "big brother", the world famous IC-7800. With two independent DSP units, a +40dBm* 3rd order intercept point and ultra wide dynamic range to name but a few of the features.

IC-7000 *Transceiver*

In your home or on the move, this radio is ideal for any occasion. The IC-7000E pack so many features and so much power into such a small space. HF-6m 100W, 2m 50W and 70cms 35 Watts. You get dual processors, multiple AGC loops, Twin pass band tuning, Digital IF filtering and Dual notch filters. You also get an extraordinary large and crisp colour display.

£1089.95 D

IC-E92D *D-Star Ready*

The IC-E92D is a waterproof dual band transceiver. The IC-E92D is ideal for D-STAR enthusiasts, active amateurs who are fans of outdoor pursuits or organisations that are looking for a simple GPS position reporting system.

The IC-E92D provides waterproof protection, equivalent to IPX7. If used with the optional HM-175GPS, the IC-E92D provides GPS position reporting functions in DV mode; GPS functions are fully compatible with the IC-E2820 series.

£369.95 D

IC-718 *Transceiver*

Aimed as an entry-level product, the IC-718 continues all the traditions of high quality engineering that you would expect from Icom. Conveniently sized and easy to operate, the IC-718 utilises all the latest RF and digital technology and is designed to be one of the most practical rigs ever! The IC-718 offers an excellent overall specification coupled with ease of use.

£519.95 D

IC-7800 *Transceiver*

* *1.8 - 50MHz*
* *20W Output*
* *3 x Roofing Filters*
* *Dual AGC Loop*
* *7" Colour Display*
* *Dual USB Ports*
* *4-Way Antennas SW*

£7999.95 D

A fusion of forty years analogue RF circuit development expertise, with cutting edge digital technology. The result is 110dB dynamic range, +40dB 3rd order intercept point in HF bands and other phenomenal performance features. 200 Watts output and +40dBm IP3.

ID-E880 *Transceiver*

The ID-E880 is designed to be easy to use and contain a new 'DV mode' feature which allows the operator to access D-Star repeaters in just two steps. The ID-E880 mobile is the successor to the ID-800H mobile. 50W dual bander with GPS capability, Airband receive etc.

£429.95 D

IC-E2820 *Transceiver*

The IC-E2820 dual-band mobile transceiver includes popular features such as VHF/VHF, UHF/UHF simultaneous receive capability, wideband receive, independent tuning knobs and a separate controller. In addition to this Icom has introduced new features including diversity receive capability, a full dot-matrix display and 50W output power in both VHF and UHF bands, all in one stylish mobile set.

£424.95 D

IC-E80D

VHF/UHF dualband, D-Star transceiver. The IC-E80D is designed to be easy to use and contain a new 'DV mode' feature which allows the operator to access D-Star repeaters in just two steps on Icom site.

£314.95 D

IC-E90

The IC-E90 multi-band handheld transceiver covers 50MHz, 144MHz and 430MHz bands and is equipped with a wide band receiver, which covers 0.495-999.990MHz in AM/FM/WFM modes.

£234.95 D

Other Radios

IC-910H Dualband + Optional 23cm Satellite Trnscvr	£1249 D
IC-910HX Dual Band + 23cm Satellite Transceiver	£1449 D
IC-2200H 2m FM mobile 65 Watts	£199.95 D
IC-R3 Scanner with TFT Colour Display	£385.95 C
IC-R6 Handheld scanner 0.1-1309.995MHz	£172.95 C
IC-R20 Scanning Wideband Receiver	£389.95 C
IC-R1500 Comms Rcvr 0.01-3299.999MHz	£449.95 C
IC-R2500 Dual Communications Receiver	£559.95 C
IC-R8500 Comms Receiver 100kHz - 2GHz	£1379.95 D
IC-R9500 Comms Receiver 0.005 - 3335.000MHz	£9799.95 D

IC-T70E *2m/70cm Handheld* NEW

The IC-T70E VHF/UHF dualband handheld transceiver is the successor to Icom's best selling IC-T7H. It has many impressive features including 700mW loud audio, long-lasting power, rugged construction, plenty of memory channels, all at a competitive price. In short, the IC-T70E offers practical dual band operation & ruggedness, updated for today's radio enthusiast

£159.95 D

IC-9100 NEW

VHF/UHF Satellite + HF + D-Star

100W on HF, 2m 75W on 70cms & 10W on 1296MHz.

Due In October!

£TBA

RadCom

THE RADIO SOCIETY OF GREAT BRITAIN'S MEMBERS' MAGAZINE

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No responsibility can be assumed for the return of unsolicited material (if in doubt, call us first!)

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E-mail. radcom@imotea.com

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P&P on RSGB orders:
£1.95 for 1 item, £3.50 for 2 or more items. Overseas rates on request.

The Excalibur receiver is Peter Hart's new No. 1.

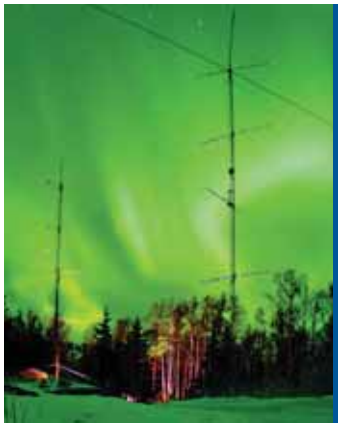
See page 25 for the full review.

News and Reports

Reviews

A self-contained PSK31 terminal – P79

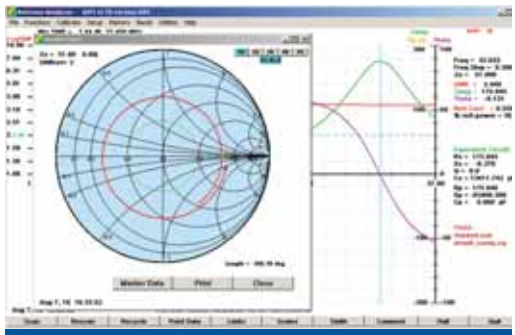
Features



Aurora chez Kevin Forster, NL7Z – P50

Help run GB4FUN and the National Radio Centre at Bletchley Park – P8

Technical Features



Vector impedance analysis – P66

Regulars

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded in 1913 incorporated 1926.
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International Amateur Radio Union

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H Scrivens, G0UGE - Region 4
T Bailey, M0KMB - Region 5
M Harper, MW1MDH - Region 6
J Sneddon, MW0EQL - Region 7
P Lowrie, MI5JYK - Region 8
A Johnston, G8ROG - Region 9
G Keegan, G6DGK - Region 10
P Helliwell, G7SME - Region 11
P Brooks, G4NZQ - Region 12
J Stevenson, G0EJQ - Region 13

Details of the Society's volunteer officers can be found in the RSGB Yearbook and on the RSGB website.

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Website: www.rsgb.org
Members Area: www.rsgb.org/membersonly
Log-in using your callsign in lower case as the user name, and your membership number (see *RadCom* address label) as the password.

The online *RadCom* can now be found at www.rsgb.org/radcom.

The National Radio Centre – Moving forward

Over the coming months, through the pages of *RadCom* and via the RSGB website, we will regularly update you on the establishment of the National Radio Centre (NRC) at Bletchley Park. We are pleased to report that the National Radio Centre building is now complete and work on the fitting out of the displays will shortly be getting under way.

Before the centre opens to the general public at Easter 2011 there is much work still to be done to ensure that when you come through the door the first word you utter is "WOW".

The centre is being designed *to showcase radio communications technology as a force powering the 21st century economy and to present amateur radio as an exciting, stimulating, educational, multi-faceted hobby, which provides a sound technical grounding in radio communication for those within its ranks. Amateur radio is fun, fast moving and within reach of anyone who can undertake a short period of training.* Your Board has determined that this be the objective of the centre from day one.

We are spending a lot of time working through how best to achieve this objective and we are now investing in the development of individual displays, which together will form the 'Bletchley Park Experience'. There will be seven main areas of the 'experience' and here's a brief preview of each.

Welcome to the National Radio Centre – an introductory video programme showing not only how radio technology affects our daily lives, but also how anyone can become practically involved in the technology through amateur radio.

The wall of radio history – a wall showing the timeline of radio from the late 1800s to the present day. In particular it will show the major technical developments over the years, and in many cases highlight the contribution of radio amateurs to these.

The *interactive displays* will take two forms. There will be six hardware displays to present the basic technical elements of a radio communications system: concepts like resonance, bandwidth, modulation etc will be explained through simple 'touch and play' hardware exhibits. There will also be seven touch screen computer displays covering topics such as radio signal propagation, radio communications in the 21st century, an introduction to amateur radio, how an interest in radio through amateur radio can lead to a stimulating career in high technology etc. There will also be 'elective' displays that can be reconfigured to suit a particular theme that the NRC may wish to present, and these will 'drill down' into specific aspects of amateur radio.

There will also be a *demonstration station*. Here we want to be very careful. Past demonstration stations have achieved mixed success. They are often enjoyable for the operators, but the audience gains limited value from the experience. At the NRC, we will have two operators, one operating the station and the second speaking to the visitors, explaining what is happening and answering questions. The station will also be visually accessible via the use of CCTV.

Whilst the NRC is not a museum there will be a *legacy area* where outstanding examples of amateur radio equipment through the 20th century will be exhibited. There will also be a *library reference area and archive*, access to which will be on a by-appointment basis. This will allow those who wish to research the extensive archives that the RSGB has built up over nearly 100 years can do so. To enable this, a large quantity of documentation is being archived on CDROM, so that access will be made easier and the integrity of the documentation preserved.

The plan is for the centre to be open six days a week and it will have a full time manager and curator supported by a trained volunteer staff, and if you want to become involved there are details in this edition of *RadCom*.

A visit to the NRC will we hope be of interest to a wide audience, and in particular we want to attract those who know nothing about amateur radio.

The NRC will not be a museum in the recognised sense; it will be an experience that will take you from the birth of radio communications to the present day whilst at the same time plotting the history of amateur radio and the role the RSGB has played in it.

Current plans will see the NRC opening just before Easter 2011. Between then and now there is a huge amount of work to be done to bring the NRC into being. This is an exciting project and one which the Society is determined will succeed.

Peter Kirby, G0TWW,
RSGB General Manager

DX Operating

Working DX, on whatever part of our spectrum, is one of the absorbing and fun aspects of our hobby. So I have decided to take this opportunity to highlight and support the excellent article on page 14, written by G3PJT and G3RWF, on working HF DX. Their article gives the background to some recent work that led Bob, G3PJT and Randy Johnson, W6SJ to publish their *DX Code of Conduct*. This code of conduct aims to redress the gradual slide that many of us have made in terms of how we operate. Poor operating can quickly escalate and ultimately lead to a few jamming or disrupting the DX pile-up deliberately. It is worthwhile therefore addressing how well we operate.

The RSGB raised the profile of 'deliberate QRM' at an IARU conference in 2002. This was repeated, with proposals in 2007 and 2008. Although we were successful in working with others to get the IARU to endorse the *Ethics and Operating procedures for the radio amateur* booklet by John Devoldere, ON4UN and Mark Demeuleneere, ON4WW, we could not gain the support for a pan-European system to locate the culprits who perpetrated the worst forms of abuse. Maybe our proposals were optimistic. Maybe some Europeans are less affected by 'deliberate QRM' than us because of better propagation to many of the DX locations, beneficial skip in terms of the 'European wall', etc. However, two years on, I am convinced that more amateurs across Europe are getting concerned about the problem.

Bob and Nick's article states the problem very well and crucially underlines that deliberate QRM, unnecessarily high power, 'policemen' etc are symptoms of the problem – not the cause. Bob, Nick and others see the cause as being more deeply rooted, amongst the gradual decline in operating practice. This leads to pent up frustration, which, amongst a small minority, compels them to perform high-powered jamming and other forms of destructive behaviour.

Probably, poor operating has always been a facet of the hobby – in part this is understandable as we all have to develop experience on how to apply what we have learned when gaining our licence. The tools that we have today, such as the DX Cluster, propagation software, Skimmer, etc, may have made those of us who have been licensed a long time overly dependent on information technology. It may have given us a degree of false expectation and/or overconfidence about being able to work the DX. Some of us need to learn how to operate more effectively and within our true limitations with these operating aids. The sad truth is that what we are talking about here cannot all be attributed to inexperienced operators; as Bob and Nick point out, a significant cause of the 'deliberate QRM' problem is a decline in operating practice amongst experienced operators. There are important differences between experience, competence and capability.

At an IARU meeting earlier this year there was agreement to an RSGB proposal to study the causes of 'deliberate QRM'. With the help of the Chiltern DX Club (CDXC) the UK's effort looked into the so called 'me-me' syndrome. If we are honest we probably have all done 'me-me' operating at one time or another – it is when an operator uses whatever it takes to be the next one in the DX station's log. I had the opportunity during the summer to outline the findings of the CDXC's study to a number of national societies and DX clubs, for example the Clipperton DX Club, German DX Foundation, etc. I hope that they will follow the CDXC's example to undertake and share their own analysis of the problem.

The CDXC work identified the lack of mentoring as one of the causes of the 'me-me' syndrome. Mentoring used to be one of the key benefits that one gained from the local club or from nearby amateurs. Maybe mentoring in our local clubs these days is more focused upon helping newcomers to gain their licence. Without wishing to dilute this effort, we need to find ways to see how we could extend this culture so that it addresses not just the newcomer but also provides benefit for the more experienced club member. Even some experienced DXers have habitually developed some DX operating practices that are disrespectful of other amateurs. Mentoring is something that we need to discuss with local clubs, but as yet we are not quite sure how the desired outcome can be achieved, so your thoughts will be appreciated.

I am convinced that there is no 'silver bullet' that can address the causes of the 'deliberate QRM' problem. We have now got some excellent educational and training material; the latest – the *DX Code of Conduct* – helps to complement the earlier publications along with the growing practise of people 'signing' up and 'walking the talk'. What we need is a real change of behaviour, not just occasionally, but every time we put on the transceiver.

I will be manning the Spectrum Forum booth and running a session on the subject on the Saturday at the National Hamfest. I also plan to attend the RSGB Convention the following weekend. Please come along and have a chat, especially if you have some fresh ideas or want to berate me for pointing the finger at the more experienced DXer. However, just moaning about the problem or expecting someone else to fix it is not an option – we all need to do something!

John Gould, G3WKL, Board Member, Spectrum & HF Manager

RSGB EMC Pages

The RSGB EMC Committee has now totally refreshed the RSGB website pages covering EMC matters. The new information contained in the pages should be of practical help to anyone experiencing interference on the amateur bands, or causing interference to nearby electronic equipment. Just as importantly, the site now contains a survey questionnaire to capture information about the extent of interference to amateur band reception. Please, if you are experiencing regular local interference to your reception, report it on the short questionnaire available under the "I am experiencing interference" pages. This will enable the RSGB to build a creditable database of interference cases, which will help in its discussions with Ofcom.

5MHz Experimenter's Forum

The RSGB's 5MHz Working Group have recently reviewed how best to support experimental work on the 5MHz channels. As a part of the changes that will take place over the next few months, Peter Martinez, G3PLX, has kindly offered to assist in creating a forum for those interested in discussing and undertaking experiments at 5MHz. The idea is that those currently carrying out experiments or considering doing so could meet and share thoughts. What shape the forum might have, and how it might operate is open for discussion. Those interested in joining and helping to form this group are asked to contact Peter, QTHR or via e-mail to peter.martinez@btinternet.com.

Coming Soon!

On 1 October, at the National Hamfest, the RSGB will be launching a major internet based survey, which will be open to all radio amateurs. The survey will run for three months and the data collected will be used to determine the direction that amateur radio in the UK takes over the next 10 – 20 years. Full details will shortly appear in all elements of the amateur radio press, notices of invitation will be placed on all amateur radio reflectors and the RSGB website. If you want your voice and opinions to be heard, please take part.

RSGB meets Ofcom again on PLAs

Two significant meetings have been held in the last two months to progress discussions on the impact of Power Line Adaptors on HF radio reception. Members may be interested in the main outcomes.

On 3 August, Ofcom hosted a meeting of interested parties to present and discuss the findings of a Report by PA Consultants on the Likelihood and Extent of Radio Frequency Interference from in-home PLT devices. This report is available on the Ofcom website **[1]**. Radio users present (not just the RSGB) expressed concerns about the PA report, claiming that it painted an over-optimistic picture of the likely impact of possible future mitigation measures on interference levels. Dynamic Power Control and Dynamic Notching are new technologies that have not been deployed in real life situations and many feel that their effectiveness will be extremely limited in an environment where PLA device market penetration levels are high. Without these technologies working effectively, PA confirmed that it assessed the probability of interference to radio services as high. The 3 August meeting was in effect an opportunity for PA to present its findings and for questions. The meeting seriously questioned the findings and, in particular, the likely effectiveness of these mitigation measures, raising serious doubts about the conclusions of the report.

In a second meeting on 8 September, the Society met with Ofcom Chief Operating Officer, Jill Ainscough, and members of her team. The Society again presented its concerns about the growing threat to HF Radiocommunication, asking Ofcom to become more proactive in assessing the threat and influencing the course of standards and legislation to protect the radio spectrum. In reply, Ofcom repeated its view that the level of complaints about PLAs was not high enough to justify any general action and that individual cases were being resolved. The society expressed its concerns that current trends suggest that before long there will be a high deployment of PLAs, not just from BT vision (where the remedial action has been taken by BT). With general availability of PLAs over-the-counter, the Society asserted that management of individual cases would become increasingly difficult and that Ofcom lacked powers under the Wireless Telegraphy Act to take action to take offending devices out of service.

The 8 September meeting was inconclusive, but the Society asked Ofcom to be more specific about what would constitute a sufficient body of evidence to take generic action on PLAs and also encouraged Ofcom, as UK spectrum regulator, to be more proactive in the discussions on protecting the radio spectrum.

So what should RSGB and its members do about this? Well, first the Society plans further meetings with relevant organisations both in the UK and in Brussels to progress the arguments about PLAs and their adverse impact on radio reception. Secondly, it's important to remember that not all interference is down to PLAs. In fact, within the amateur bands, it is relatively unlikely that there will be many problems from PLAs as the devices are notched so that high levels of emission do not take place on amateur frequencies. It's far more likely to occur on the shortwave broadcast bands. The new EMC website explains how to check whether interference you are experiencing comes from PLAs or not.

The problem is much more serious in the rest of the HF spectrum and it is clear from our discussions that Ofcom needs a clearer picture of the extent of interference. We are aware that a very significant number of those experiencing interference have not lodged a formal complaint to Ofcom. Lodging a complaint with Ofcom is the only way to help paint the true picture of the seriousness of interference.

We encourage everyone who is suffering serious interference to short wave radio reception to follow the guidelines on the RSGB website **[2]** and to report to both RSGB and Ofcom using the links available.

REFERENCES

[1] http://stakeholders.ofcom.org.uk/market-data-research/technology-research/research/emerging-tech/PLT

[2] www.rsgb.org/emc/i-am-experiencing-interference.php

National Radio Centre Bletchley Park

DO YOU WANT TO HELP? The National Radio Centre at Bletchley Park will be opening at Easter 2011. The NRC will be the centre and focal point of amateur radio in the United Kingdom.

The NRC will be open over 300 days a year and to assist us in running the centre we are putting together a team of well motivated, enthusiastic volunteers.

There are four areas we want to cover, the centre reception, general guides, archive and demonstration radio station operators. We are also seeking volunteers to assist with GB4FUN and the Bletchley Park Trust/RSGB joint educational outreach programme.

The Society will provide the training and the uniform and you will receive travelling expenses and meal subsistence when on duty.

Ideally you will live within a fifty mile radius of Milton Keynes.

If you are interested please write to The Manager, NRC Bletchley Park, c/o RSGB 3 Abbey Court, Fraser Road, Priory Business Park, Bedford MK44 3WH or e-mail GM.Dept@rsgb.org.uk.

Last Call for Nominations

There is still time to apply for the vacancies on the RSGB board and RSGB Regional Council. There is one vacancy for the RSGB Board and five vacancies for the Regional Council – Regions 1, 2, 4, 6 and 12. All present incumbents come to the end of their terms of office on 31 December 2010.

Members of the Society who wish to stand for the Regional Council and serve as a regional manager must reside in the relevant region and be prepared to play an active part in the region and as a member of the Regional Council. This commitment includes attending a minimum of six Regional Council meetings per annum.

You must have been a corporate member of the RSGB for at least two years and need to obtain the nominations and supporting signatures of at least five, but no more than 10, corporate members in good standing and residing in the region in which the candidate is standing.

Requests for election papers should be forwarded to Michelina Gramson, PA to the General Manager. Telephone 01234 832 700 or e-mail GM.Dept@rsgb.org.uk. The closing date for the receipt of election papers is 1 October 2010.

CONGRATULATIONS

To the following members whom our records show as having reached 50 or 60 years' continuous membership of the RSGB.

60 years

Mr R G Clement	RS18978

50 years

Mr A J Melia	G3NYK
Mr D J Walker	G3OLM
Mr A F Notschild	G3RSF
Mr D Gray	M0DLL

Donations

Members of the Reading & District Amateur Radio Club have been selling items of equipment at club meetings. Much of the equipment had been gifted to the club from silent key members. The money raised, £404, has been donated to the Spectrum Defence Fund. The RSGB would like to thanks the Reading & District ARC for their continued support of this worthy initiative.

The RSGB would also like to note that they have received a donation of £738.88 from the UK Cluster Working Group for the Spectrum Defence Fund.

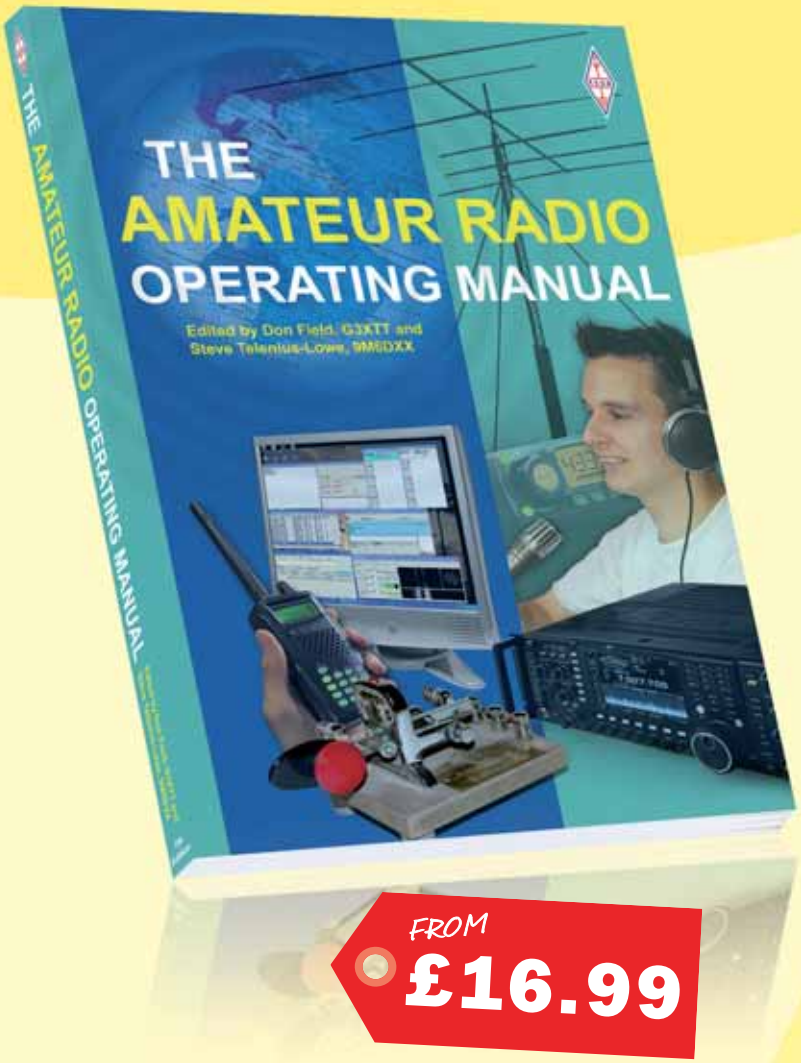
RSGB shop

NEW

The RSGB Amateur Radio Operating Manual

7th Edition

Edited by Don Field, G3XTT and
Steve Telenius-Lowe, 9M6DXX



FROM **£16.99**

Despite what many believe, amateur radio is a fast-moving hobby and the last five or six years in particular have seen numerous changes. The *RSGB Amateur Radio Operating Manual* provides the best practical guide to the hobby as it is today.

Since the first edition of the RSGB *Amateur Radio Operating Manual*, it has provided practical information on many different forms of amateur radio operating. This latest edition covers subjects from the basics of setting up a station for maximum efficiency, DX Operating, Radio Sport's many guises, through to D-Star, Satellites and much more. Readers will find information detailing the numerous changes to the amateur bands as more countries have gained frequencies at, or around, 136 and 500kHz, as well as 5, 7.1 – 7.2 and 70MHz. The newer datamodes such Winmor are covered along with the developments in the WSJT suite of software and the whole datamode field. The use of computers in amateur radio is extensively covered, as are basic operating practices and there are even guides to making the most from the various bands available. You will also find subjects as varied as the RSGB IOTA programme, China's first amateur radio satellite, XW-1, Skimmer, ClubLog, on-line DXpedition log checking, and DXpedition operating.

With more than 25 new contributors, this Seventh Edition of the RSGB *Amateur Radio Operating Manual* has lots of brand new material, as well as significantly rewritten sections. No matter if you are new to the hobby, or an established amateur, everyone will find this book a mine of useful and practical information about all aspects of amateur radio operating.

Non Members' Price £19.99

RSGB Members' Price £16.99

Radio Society of Great Britain
3 Abbey Court, Fraser Road,
Priory Business Park, Bedford, MK44 3WH
Tel: 01234 832 700 Fax: 01234 831 496

www.rsgbshop.org

E&OE All prices shown plus p&p

Donate online at www.rsgbshop.org
Spectrum Defence Fund

G5RP Trophy

The G5RP Trophy is an annual award to encourage newcomers to HF DXing. However, the award is not limited to youngsters or the newly-licensed: the HF DX bug can bite at any age or after many years of experience on other bands. If you are an established HF DXer and want to recommend someone to be awarded the G5RP Trophy for 2010, now is the time to send in your nomination. Your nominee should be an up-and-coming HF DXer who has made rapid progress in the last year and has some real achievements to show, for example, a good total of new countries worked or some serious HF DXpedition activity.

This prestigious award will be presented this year at the RSGB HF Convention on 8-10 October. Please send your nominations to John Gould, G3WKL, QTHR, or by e-mail to g3wkl@btinternet.com to arrive no later than Friday 24 September.

QSL Matters

This month we've packed 10kg boxes for, Brazil, Belgium, Czech Republic, Germany, Italy, Romania, Serbia, Ukraine and USA-2. Smaller packages have also been sent to Kazakhstan and Republic of Ireland.

We are currently around half way through the latest UK despatch cycle to all UK volunteer managers, which may be complete by the time you read this. GW and MW0-5 calls need to be aware that your hard working sub manager is taking an extended break so they should not expect card deliveries to start until mid to late October.

We aim to deliver cards to sub managers every 12-14 weeks. Many cards remain with managers waiting for the stamp/weight limit to be reached before they are sent on to you. A first class stamp gets you around 10-12 cards, according to weight and size. It's possible that you may be short of just one or two extra cards to make the limit and then wait months for those last few cards. Some members are OK with this but others want their cards ASAP. To avoid waiting unnecessarily write 'Send Any' next to the envelope number in the bottom left hand corner of your envelope.

The Cyprus QSL bureau is making a plea for stations to check the real destination for QSL cards to all 5B, C4, H2, P3 and ZC4 stations before sending. Alan, 5B4AHJ has produced a list of some 80 callsigns who either do not reside in Cyprus or who have overseas managers. The list can be found at www.shacklog.co.uk/5BForeignManagers.htm.

Former Lambda House Museum – Disposal of equipment

Over many years the Society has been in receipt of equipment gifted or loaned for display. In 1993 for the first time the Society established a museum at its former headquarters Lambda House. Since the move to Abbey Court, the equipment and the Society's archive has been in secure storage.

You will read in this edition of *RadCom* the Society's plans for the National Radio Centre, Bletchley Park. These plans do not allow for the establishment of a traditional museum in the same way as the museum at Lambda House. We therefore have an enormous amount of items that we will have to re-home.

The Society has identified, from our records, the equipment that we hold on loan and if it is not possible to use this equipment/exhibit at the new centre then in the first instance we will write to the organisation or persons that loaned the equipment to seek their wishes. If they wish to have the item(s) returned this will be done. If they wish the RSGB to find a new home for it we will be happy to do this.

The equipment that has been given or bequeathed will, where possible, be offered to other museums for display. This has already been done with some of the historic military radio equipment that will be loaned to the Bletchley Park Trust for display in their museum.

Equipment that cannot be re-homed will be disposed of via eBay and the proceeds of the sale will be used towards the fitting out costs of the NRC. It is expected that the eBay auction will commence towards the end of October, but details of this will placed on the RSGB website.

We will, of course, be retaining a small stock of representative amateur radio equipment through the ages. These will be good/mint condition examples of iconic equipment or significant homebrew equipment from the 1920s to the present day.

After the above actions have been taken any items left will be disposed of.

Before any of the above actions are taken all equipment that we hold will be photographed and indexed.

The documentation and historical archive material including many thousands of photographs will be electronically archived in high quality scans. All scanned material will be properly indexed. This will form part of the archive and will be readily available to the public at the NRC.

We are very conscious that the disposal of this equipment must be handled with sensitivity and we will endeavour to do this in every case.

If you have an interest in items that we hold and you wish for further clarification on our intentions please write to the General Manager or e-mail GM.Dept@rsgb.org.uk giving full details of the item(s) concerned.

Welcome

The RSGB would like to welcome to the RSGB family the following new Members who have joined their voice to ours and are helping to keep the RSGB strong.

2E0IJS	Mr I Saturley
2E0LDJ	Mr L Jepson
2E0PCH	Mr PC Haywood
AC0C	Mr J Blaine
DO7OM	Mr O Muehlenbrock
G0HWL	Mr A Browne
G0JKN	Mr N R Fenton
G17IMU	Mr AD Reid
G3LNF	Mr MJ Furness
G4PYW	Mr M E Zubrzycki
G6DUT	Mr M D Bluck
G6WHI	Mr C F Shorto
G7KTD	Mr W D Walker
G8CVF	Mr P Dobson
G8EQA	Mr P G Wood
GI3UZJ	Mr DW Singleton
GM3YKA	Mr J Wiewiorka
GW0HYU	Mr KJ Richards
GW4YOM	Mr M Roberts
HB9AFT	Mr H Wehren
HB9DSU	Mr P C Parisetti
KC2VWR	Mr NM Evetts
KQ4DO	Mr JP Plessis
M0KMV	P Di Bella
M0NJP	Mr N Pettefar
M0SGJ	Mr S James
M1DSE	Mr P A Gibson
M3PJI	Mr P Jones
M3XNU	Mr A Hollis
M6AET	Mr G C Hunt
M6AFE	Mr S Paice
M6DPH	Mr D P Hancock
M6MPT	Mr P Thompson
M6PSV	Mr M Beard
M6RLH	Mr R L Hijjawi
M6UJI	Mr P Blyth
M6WJJ	Mr W J Jones
MI6GDN	Ms G Nelson
MM2TNK	Mr J D'Arcy
MM6JJW	Mr J B Wallace
MW6KDA	Mr D Henderson
MW6YDP	Mr P D Warburton
N1DDY	Mr R Landsman
N4SGL	Mr S G Lowman
OK8RF	Mr R Furbacher
RS206533	Mr I Watson
RS206544	Mr T Brown
RS206558	Mr T Percival
RS206572	Humber Fortress DX ARC
RS206576	Mr N Whitley
RS206598	Mr AM Crawford
RS206618	Mr C.J Rowan
RS206633	Mr DJ Moris
RS206638	Mr D F Drake
RS206640	Mr P M Baker
RS206642	Mr M Walsh
RS206649	Mr J Fay
RS206657	Mr JP Knight
SWL	Mr D M Brown
VK2WD	Mr B Dolphin

The RSGB would like to thank the following Members who have renewed their membership for another year.

2E1HQY	Mrs Proctor
2E1LJL	Mr LJ Lewis
G0BYK	Mr M P Jackson
G0FJS	Mr P J Copeland
G0ORC	Mr V L Shirley
G0RAT	Mr W B Barnes
G1FDL	Mr V W Kelk
G1ICK	Mr D V Winton
G1PIE	Mr M J Proctor
G1YYV	Mr TRB Schofield
G4FYM	Mr D G Wiggs
G4OHC	Mr R Poore
G6EGN	Mr M J Paul
G8ECZ	Mr P A Barker
GM4SNP	Mr H H Christie
GW0TKX	Mr A F Mason
GW3FSW	Mr M I Wilks
M3LHX	Mr A G Woodsford
MM3ZIB	Mr I McConnell Berridge
N9RE	Mr J Oglesby
VK4KZR	Mr R D Preston
WB2FVE	Mr C J Blaine

BARTG

The British Amateur Radio Teledata Group recently made some fundamental changes to the way it operates, which they hope will bring some exciting changes to the RTTY contesting world.

The post of BARTG Contest Manager has been replaced with a Contests/DX/Software Sub-group, consisting of Phil, GU0SUP and Ian, GM4KLN, assisted by John, GW4SKA and Arf, G1XKZ. The same applies to the post of Awards Manager. This has been replaced with an Awards/QSLs Sub-group, consisting of Phil, GU0SUP and Andrew, M5AEX, assisted by Arf, G1XKZ.

The rules of the existing BARTG HF and BARTG Sprint will be updated to remove any current ambiguities and an additional contest, the Sprint75, has been introduced after its successful pilot this year.

New software is being developed that will allow quicker, easier log submission, accommodating a wider range of log formats consistent with the revised rules, although final adjudication will still be done by a human being!

The group's website is at www.bartg.org.uk.

GB0TGN on the Air

Bushvalley Amateur Radio Club continued its outdoor programme by activating the World War II airfield at Toome, County Antrim with a special event station. Using the callsign GB0TGN on Sunday 15 August, a total of 75 contacts were made, with a special QSL card being offered.

Jack & Mel on the radio operating GB0TGN.

VQ4RF

Mary L Hind and Frances Marlton would like to thank most sincerely all the radio hams far and wide who responded to their appeal for their Dad's QSL cards. Mary said, "You were all so helpful and kind and through you we have learned a lot more about our Dad, Frank Featherstone. Many, many thanks".

Ham Week UK Operation

Furness ARS will have the permanent station GB2GW at Gleaston Water Mill, Ulverston on air throughout 1 to 10 October. A separate station under the club call G4ARF will be operational 4 to 10 October using 'Field Day' aerials from land nearby. This operation will be publicised locally. The club is also having a BBQ on Monday 4 October and hope to have other events taking place on other days.

Bird 43 Meter Addition

Array Solutions have recently launched AS-43A, a digital replacement kit for any Bird 43 wattmeter. The digital Model 43's accuracy is the same as the original analogue meter (average reading) but the meter is much easier to read accurately as the digits are 3/4in high. A data sheet is available at www.arraysolutions.com/Products/as-43a.htm.

Table Top Sale

The Denby Dale Radio Society will be holding its table top surplus sale on 6 October. Doors open at 6.30pm for unloading and it will be a 7.30pm start. The cost of hiring a table is £4. The event will be held at the Denby Dale Pie Hall, 297 Wakefield Road, Denby Dale and includes licensed bar. Details at www.g4cdd.net.

History of Electronics

A special event station to celebrate the History of Electronics in Wells, Somerset has been organised on 2 and 3 October. Using GB4EMI, GB8EMI and GB2SB, potentially on all bands from 80m to 70cm, operation will be from the EMI Sports and Social Club in Wells. Visitors are very welcome to come along and visit the station. All contacts will be confirmed via the bureau or direct by a special multi-colour QSL card produced by Thales.

The ex-EMI Electronics Penleigh Works in Wells is currently owned by Thales and its closure has been announced for early in 2011. Thales is producing a book of the site history to be published shortly.

Winning Operation?

The Bristol Contest Group was on Jersey for the IOTA contest operating as GJ6YB, operating 'Field Day' style. The photo shows the GJ6YB Multiplier station, being operated by Geoff, G4FKA and Ian, G4FSU, while GJ/AC0W is keeping guard. Apparently, they did actually work the real AC0W in Minnesota during the contest!

The Contest Group feel the event went very well for them and they're keeping their fingers crossed for a win this year.

New Dual Band Handheld

The TYT TH-UHV1 is a dual band hand-held that covers the 2m and 70cm bands. It also has wideband receive and is packed with features. The radio has a fully adjustable repeater shift function, direct entry keypad, a standard SMA fitting for the antenna, built in CTCSS/DCS/1750Hz toneburst and multi colour choice of display lighting. It is supplied complete with drop-in charger and rubber antenna and is fully CE and ROHS approved.

Nevada has been appointed exclusive UK distributor of the TYT TH-UHV1, which will cost £99.95. Details at www.nevadaradio.co.uk.

NEWS IN BRIEF

• The BARTG Golden Jubilee station GB50ATG made nearly 8000 QSOs during the BARTG Golden Jubilee Year, which ended on 30 June. Special QSLs and awards are available. Details at www.bartg.org.uk.

Bromley & District Success

Alan Betts, G0HIQ led a small team of tutors at Bromley & District ARS during the summer with five candidates studying for their Intermediate amateur radio licence examination. All five passed with flying colours in early August. All the candidates had passed their Foundation exam earlier in the year and were insistent on sitting the next step in the scheme as soon as possible. Their enthusiasm has certainly not diminished; all five are actively planning for an Advanced course as soon as possible.

50th Anniversary

The Royal Naval Amateur Radio Society is celebrating its 50th anniversary this year. A special event callsign, GB50RN, has been obtained for the week from 2 to 9 October and will be aired on CW and SSB on the HF and WARC bands from 80 to 10m and with FM on 2m and 70cm. The frequencies used will be the Society's meeting frequencies, which are:

CW: 3520, 7020, 10118, 14052, 18087, 21052, 24897, 28052kHz
SSB: 3740, 7055, 14335 (or 14294), 18150, 21360, 28940kHz

The special callsign GB50RNARS is continuing to be aired by members of the Society from various locations in the UK.

A special Anniversary award is available to listeners and licensed amateurs who hear or contact RNARS members and the special event stations during 2010. RNARS is on the web at www.rnars.org.uk.

Foundation Passes

The Cockenzie and Port Seton ARS recently held another successful Foundation course. All five candidates passed. The photograph shows Bob, GM4UYZ instructor, Nicholas Kinloch, Neil Rodger, Gregory Lailvaux (14 years old), William Cambell and Cambell, MM0DXC lead invigilator.

Newbury Radio Rally

The Newbury Radio Rally in June was a tremendous success, says the club. The number of visitors was up and the number of traders increased by 18% compared to previous years. Also in attendance were the RAF and Royal Navy clubs, exhibiting along with the International Short Wave League. In addition there was a display from the Group for Earth Observation (enabling amazing earth images and weather satellite information available to everyone in your home) as well as a very impressive restored Police radio command truck and support vehicle.

In the NADARS Demonstration Marquee there was a demo of live Air Traffic Control. It was interesting to see all the planes flying over the south of England. The NADARS contest team took part in the 6m contest, enabling members of the public to see how it is done when you have all the equipment (including a huge 6m beam on top of the club's 80ft trailer mast). First indications are that they may have come second in their section of the contest – a good entry considering it was the first time from the rally and they needed more operators! But a display that attracted a lot of attention in the NADARS Demonstration Marquee was the HF station because this was using the very latest from Yaesu – the FT-DX5000.

Next year's Newbury Rally will be on Sunday 19 June.

New RAYNET Group

A new Network-Affiliated RAYNET Group is attempting to form in the mid-Pennine region of Lancashire. The envisaged operating area will be the boroughs of Rossendale, Hyndburn and Burnley. Members of the amateur radio community who are interested in joining are invited to e-mail mid.pennine.raynet@gmail.com for further information.

Morse Enthusiasts Group

The frequency for the Morse Enthusiasts Group (Scotland) is changing frequency from 3530kHz± to 3555kHz±. The day and time will be every Monday at 1800UTC.

The changes will take place on Monday 6 December, although up to that date Don, GM0AIR will call on 3530 and QSY to 3555kHz. He has made these changes to comply with the band plan and with time constraints.

South Notts Foundation Course

Over a weekend in August, the South Notts ARC ran a Foundation course and exam. The two students, Lenny and Paul, had worked hard over the preceding weeks to complete the practical elements of the course. They both studied hard over the weekend and passed the exam with flying colours. This was John, G4EDX's first course and he was assisted by Terry, M0RIA and David, M0BWY. The photo shows John flanked by Lenny, M6LEN and Paul, M6PEG shortly after being given their results in the grounds of Greens Windmill, the home of South Notts ARC. Well done to both and congratulations to John on a well run and interesting course weekend.

Wakefield Visit

In August the Wakefield & District Radio Society enjoyed a visit by the RSGB President Dave Wilson, M0OBW. He gave a presentation on the work of the RSGB in general and himself in particular. During the quite fascinating (and often humorous) presentation, Dave revealed the RSGB's plans for Bletchley Park, GB4FUN and other 'public facing' activities. This tied in very well with the plans of Wakefield & District who are actively increasing their involvement in public exhibitions at schools and other places and extended work for charity, including the Scouts, Guides, Children In Need, British Wireless for the Blind, etc.

After his presentation, there was a question and answer session, during which most of the members' questions were answered.

The photo shows some of the members with Dave. Left to right, Ken, 2E0SSQ (Chairman), Bill, 2E0IPC (tutor), Sarah, M3WUC (exam secretary), John, G7JTH (treasurer), Dave, G0EVA (tutor), Dave M0OBW, Sue Barton, Richard, 2E0RJF, Dave, G4CLI (secretary and head of training) and Andy Barton.

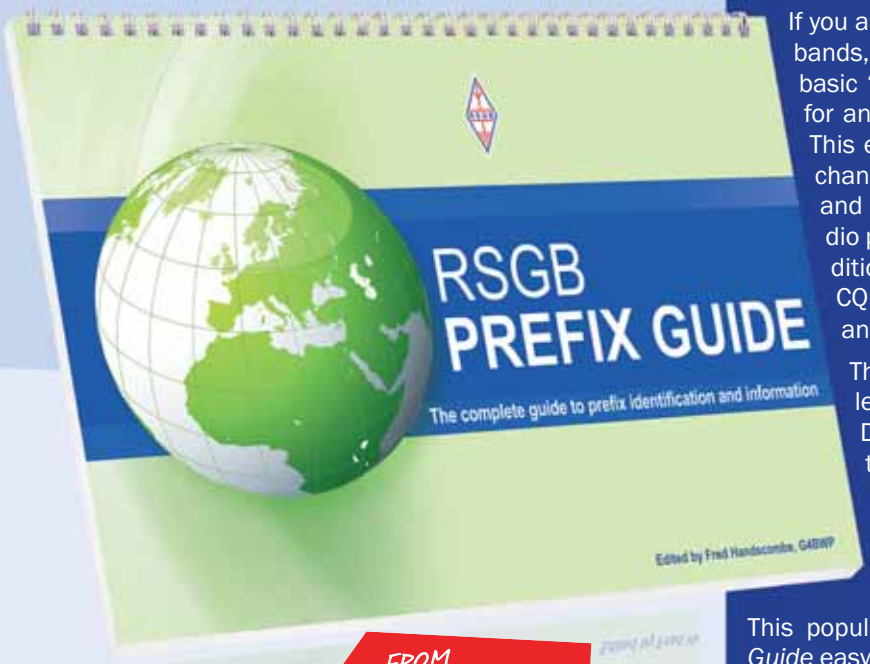
RSGB shop

NEW

RSGB Prefix Guide

9th Edition

Edited by Fred Handscombe, G4BWP



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The *RSGB Prefix Guide* also includes lists of DXCC deleted entities, Russian & CIS entities etc. The popular DXCC checklist is here, along with very latest information on various award programs including IOTA, CQ WAZ, DXCC, WAS and others. There is also an index of countries and their callsign allocations divided by continent as are more detailed listings for the wide range of RSGB awards for HF and 50MHz.

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New Radio Shack

Inventor Tim Hunkin, presenter of the TV series *The Secret Life of Machines* is set to open the Norfolk Amateur Radio Club's new radio shack at 7.30pm on Wednesday 6 October.

The club has been meeting at the Eaton CNS School for a couple of years, but has now put together a large dedicated, lockable cabinet in one of the classrooms, which will hold the club's HF and VHF/UHF equipment. New permanently-installed antennas have also been added giving members the chance to operate at the club's regular meetings, held every Wednesday throughout the year.

Tim Hunkin, who is a talented engineer and skilled cartoonist, will be guest of honour at the club's grand opening night during Ham Week UK unveiling the new shack and giving a talk about his life and work.

Chorley Visit

Dave Wilson, M0OBW, RSGB President, visited Chorley and District Amateur Radio Society in August. He gave an interesting technical talk on the north-west repeater systems. This was part of an ongoing monthly diary of talks, the next one being on Wednesday 29 September at 7pm by Mick, M0ICK, on low cost antennas. If you would like to know more please contact Allen, G4PF, on 07740 582 316.

Wythall New Licensees

The July Foundation course at Wythall Radio Club resulted in successes for Stacey, M6STJ, Gary, Glyn, M6AKA and Mark, M6RKX when they took their exam in August. The Advanced Course has six club members who hope to achieve their Full licences in the November exam.

Glyn, M6AKA, Stacey, M6STJ, Gary and Mark, M6RKX

Silver Anniversary

Twenty five years ago, Peter, G4ZSX, Ron, G0BGL and Ken, G0DLC started the Appledore Radio Club in the local pub. They met on Sundays to talk about radio and, as word spread, more amateurs came along. It was decided to form a radio club and meet properly. The landlord allowed the back room of the Coach & Horses to be used, a meeting night was agreed, a committee elected, the club affiliated to the RSGB the Appledore Radio Club was in business. As the Club got bigger a new venue was needed; the Appledore Football Clubhouse.

To commemorate the 25th anniversary, GB2ARC was set up at the QTH of Laurence, G4XHK and Viv, G0OXW. The station operated for two weeks in August, during which time over 400 contacts were made on SSB/CW and PSK31.

The club now has almost 50 members and runs Foundation licence classes and slow Morse transmissions in addition to its normal club nets. Club members are now looking forward to a further 25 years of serving North Devon's radio amateurs.

GB4GD

Guide Dog Week takes place between 2 and 9 October. GM4DAE and his guide dog Emmet will put GB4GD on the air to commemorate 79 years since the first four guide dogs were trained in Cheshire. Keith, GM4DAE does a lot of work in local schools with Emmet, who comes from the Norwegian Guide Dog Training Centre in Oslo. The youngsters find it amusing that the dog it bi-lingual and can be commanded in both Norwegian and English!

SYLR Contest

The Scandinavian Young Ladies Radio Amateurs contest will take place on 23 and 24 October from 1000 to 1000UTC. The aim of the contest is to promote YL activity around the world. Operators may operate 18 of the 24 hours and off times must be a minimum of 60 minutes during which no QSO is logged. Full details of the rules can be read on the British Young Ladies Amateur Radio Association website http://bylara.net/sylra_2010.html.

Annual Summer Camp

Friday 20 August saw Braintree club members setting up the tents and equipment for the annual Summer Camp, thanks to John, M5AJ, for the loan of a field or two. The weather, apart from some pretty strong winds, was kind to them and they had all the tents and equipment up and running by late afternoon. The camp was split into two sections; the main paddock was the club tent where visitors could bring along their own equipment to try and, in the smaller paddock, there was the experimental tent with its own quite substantial antenna system. There was quite an array of antennas this year; a 6m beam was installed after it was realised that there was an opening on this band, be it short-lived, with some openings to Scandinavia and Spain. Equipment was set up to work some PSK and RTTY stations, however there were some interference issues due to the close proximity of the two HF stations. Over the two days there were a total of twelve walk-in visitors. Numerous contacts were made by those who operated, the best of which were a VK and a VE station with many more being made to UK and continental stations.

This particular weekend was made more special as it was International Lighthouse/ Lightship Weekend (ILLW) and many contacts were made to these stations.

It was a very successful and enjoyable club event.

QRP Convention

The Rishworth QRP Convention is held just off junction 22 of the M62, about half way across the Pennines between Liverpool and Hull. It draws visitors from across the UK and Europe with its wide range of lectures and now practical workshops.

Richard, G3UGF organises a book stall with a difference for charity. Last year the Bring-a-Book-Buy-a-Book stall raised over £100 Children in Need. Visitors donate a book and, hopefully, buy at least one. So if you are going to the event, why not take a technical or radio book with you that you can donate – and buy another to bring home again!

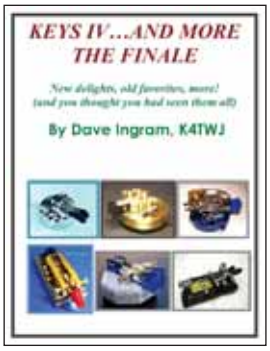
More Exam Successes for Wythall

It has been a busy 2010 so far for Wythall Radio Club trainers with two Foundation courses and two Intermediate courses run already and now an Advanced Course is under way. The demand for courses has meant that they've carried on right through the usual summer break.

Recent Foundation successes include 9 year old Phillip, the son of long time members Darren, GW7HOC and Carol, MW3YKL, who now live in Cardiff. He took the exam in August to become MW6YDP. Mum and Dad taught Philip using Wythall course materials and when they visited over VHF NFD weekend, Chris, G0EYO put Phillip through his practical assessments, which he achieved with flying colours. The family's next trip for the Bromsgrove Vintage Transport Rally special event station allowed Phillip to take the exam under the invigilation of David, G0ICJ. Wythall reckon they have some of the youngest (9) and the oldest (88) licensed members of any club in the country!

Phillip, MW6YDP with his proud parents Darren, GW7HOC and Carol, MW3YKL.

K4TWJ Posthumous Publication



Dave Ingram, K4TWJ was a prolific writer and CW enthusiast. He was just finishing his latest book when he suddenly passed away at the start of this year. His final request was that *KEYS IV… AND MORE (The Grand Finale)* should be bequeathed to the ham community and made freely available. His XYL Sandy, WB4OEE, has now launched www.k4twj.com from where the book can be downloaded without charge.

Garex Flexiwhip for 4m Wouxun

Garex Electronics is pleased to announce a dedicated 70MHz Flexiwhip for the Wouxon KG-699E 4m handheld (reviewed last month). It measures 520mm overall compared with 180mm for the supplied aerial and offers a higher gain. The manufacturer says that on-air tests comparing the two antennas show a marked improvement using the Garex antenna, which uses a centre loaded quarter wave design. It is terminated in a SMA socket to fit the Wouxun.

Garex either stock, or make to order, Flexiwhips for 50MHz upwards, terminated in any standard connector. Full length quarter waves are available for 144MHz upwards. Below 144MHz, the centre loaded design is used.

More details of the Flexiwhip range are online at www.garex.co.uk/aerials/flexis.htm or you can phone Garex on 07714 198374.

GR2HQ Station

The UK Headquarters station GR2HQ that was active in the IARU HF Championship in July has sent out 75 award certificates to amateurs that worked GR2HQ on more than 6 bands / modes. Some 4000 QSL cards have also been printed. The team of 41 operators, who were at 15 different locations are grateful to Icom UK and Martin Lynch & Sons for their sponsorship. It's a little too early for the results to be out but they are keeping an eye on the *CQ* magazine website.

Milton Keynes Club Visit

The Milton Keynes ARS were pleased to welcome Roland Lefebre, ON7LDR to the club house recently. Roland was on a short visit to the UK and a trip to Bletchley Park was included within his things to do.

Roland brought with him his excellent homebrew replica Mk 7 Paraset to show to the club and, continuing the wartime theme, he was dressed in an original khaki uniform of the Free French forces.

Exam Success in GI

The West Tyrone Amateur Radio Club recently helped three local people gain access to a new hobby by obtaining their Foundation licence. Their tutors were Ian Morrow, MI1CCU and Eddie McCrystal, GI7FHZ.

This recent exam for the Foundation licence was the first amateur radio exam held in Omagh for over twenty years and, having gained such success, West Tyrone Amateur Radio Club are keen to hold many more exams, allowing others to engage in the hobby. Three more members of the club have applied to become registered tutors. The club meet on the first Tuesday of every month from 8pm and visitors are welcome to come along. More information can be found at www.wtarc.co.uk.

QRP in the Country 2011

Tim Walford, G3PCJ has announced that, following the very successful first occasion for this event this year, he will be hosting it again in 2011 at Upton Bridge Farm, Long Sutton, Somerset. The date will be 17 July. The theme will be low power radio operation and home construction, in a country setting! The event will take place outside in the field (like this year) if it is dry, or in the farm barns if wet. Tim is particularly keen to increase the attendance by West Country Clubs or individuals who are able to show off their activities; just drop him a line at walfor@globalnet.co.uk.

Working DX should be fun – shouldn't it?

How we can all improve our operating for the benefit of other amateurs

DXpedition to French Polynesia 2010 – VE2TZT, FO5JV, F6BEE & FO8RZ. Photo: G3TXF.

"….The desire to work DX is high, and that makes one eager to find ways to build a station as efficient and competitive as possible. It doesn't have to be 'megabig' to be successful. Above all, good operating practice delivers the key to success".

Mark, ON4WW

CHASING DX. Working DX is for many people one of the most fascinating aspects of our hobby. Despite global telephone systems and the internet there is still a thrill in contacting someone far, far away or in some unusual place, using just your own skills as an operator. It isn't for everyone – but then part of the magic of amateur radio is that you can choose the activity that interests you. Here we would like to reflect on one aspect – chasing and 'working' distant and rare stations on the HF bands, known as DXing.

Over the years, the DX scene has changed greatly. In the 1960s, for example, you might expect regularly to work operators living and working in some remote spot for whom amateur radio was a unique way of 'talking home'. These days there is a far more focussed approach – more competitive, more technically advanced and more accessible – supported by both mobile phones and the internet. For many, DXing remains absorbing because it tests skills: the most successful DXers are great operators who have also optimised their stations and antennas.

The challenge today is to still get the maximum of fun and interest out of our hobby. But something has changed.

CHANGE FOR THE WORSE. Many people would agree that working DX these days is less fun than it used to be – too much noise, interference (QRM) and the generally chaotic behaviour of many DX pile-ups. We all have our own theories about the causes. There isn't one simple reason and the problems exist worldwide, to a greater or lesser extent. It may be unpopular to say so, but poor operating practice is not confined to the inexperienced. These issues involve everyone, both 'experts' and newcomers alike.

So what can we do about these problems? Doing nothing or just moaning continues to be a popular option. Taking legal action against licence violators is also possible but is often difficult to pursue. Deliberate QRM, misuse of high power, the 'Band Police' etc are major symptoms of the problem – not the cause. We all know that the only real chance of improvement will come through improving the skills and attitude of those in the hobby – a slow and difficult task. If we accept the challenge we might, just might, kick-start a change for the better.

BACK TO BASICS. What are we trying to achieve when we chase DX? The bottom line is getting that QSO in the log – two stations exchanging some simple information. That requires two stations who can *hear* each other. No surprise there, but this is where much of the problem lies. The DX station needs to be able to hear one station sufficiently well to work it. The non-DX station needs to be able to hear the DX station well enough to be sure of getting in the log. How is it possible to make that easier?

First of all, the DX station will usually go to 'split' operation, transmitting and receiving on different frequencies. Typically that would be up 1-2kHz for CW and up 5-10kHz for SSB. The aim is to ensure that the DX station is in the clear. The non-DX stations then transmit on and around the 'receive' frequency (known as the QSX slot) making it easier for the DX station to identify a callsign to work. That is how it should work but often it does not – especially, sorry to say, when propagation favours Europe. In practice, the DX frequency is often ruined by callers who have not bothered to listen for long enough to find out what is going on. Meanwhile the QSX slot becomes a non-stop roar of callers. Some callers continue even when the DX station is transmitting. That is particularly strange when the DX station is totally in the clear – presumably they cannot hear and have discovered the frequency from the internet. Sheer lunacy!

INTERNATIONAL ACTION. Some of the most experienced DX operators have now got together to try and do something about this sorry state of affairs. Mark, ON4WW and John, ON4UN wrote *Ethics and Operating Procedures for the Radio Amateur* last year. Randy, W6SJ, wrote about 'DXEtiquette' in QST March 2010. Roger, G3SXW and Gary, ZL2IFB, have both also published good advice.

It was also recognised a few years ago that this is a two sided problem: the DX operator has a role to play too. Wayne, N7NG wrote about this in *DXpeditioning Basics*. But today we are concerned with the DXer. We will return later to the DX operator. Recently Bob, G3PJT and Randy, W6SJ, in conjunction with others, published a *DX Code of Conduct* for use either in self-education or as a sharp reminder of some simple rules to follow so as to get more fun out of working DX (Last Word, RadCom May 2010).

"…Most DXpeditioners want to put on the very best show possible. When the skills of the operators on both ends of the pileup are up to the task, the operating is a joy to hear. When the skills are lacking maybe it's better to turn off the radio".

Wayne, N7NG

"The problem of chaotic pile-ups is getting so bad that folks are finally paying attention."
Roger, G3SXW

Expert DXer Fred Handscombe, A65BD/G4BWP skips through the pile-up at 9L5A in 2009. ZL2IFB is in the background. Photo: AA7A.

DX CODE

1. **I will listen, and listen and then listen again before calling.** This seems so obvious but it is the most vital thing to do. Careful listening rather than rushing to transmit will get the DX into the log. We need to listen to find out whether the DX is working split and, if so, where is he listening? Then we need to listen to the calling stations in order to work out what the DX station is doing. He (or she) is probably working gradually up or down the pile-up on the QSX slot – and you need to know the best spot to call. But ask yourself: "Do I really need to work this bit of DX, right now? Can I wait a while for the pile-up to subside?"
2. **I will only call if I can copy the DX station properly.** We also need to listen to optimise how well we receive the DX – to be sure we will hear any reply to our call – and to avoid causing interference by transmitting at the wrong time. It is hugely frustrating as a DX station to be called by a station that is unable to hear you and causes incessant QRM.
3. **I will not trust the Cluster and will be sure of the DX station's callsign before calling.** Cluster spotters often get callsigns wrong and, more importantly, the DX will not want to be slowed down if you ask what his callsign is. You should never call if you do not know the DX callsign. How are you going to log a blank? By the same token the DX station must send its call at regular intervals (not all do this!).
4. **I will not interfere with the DX station nor anyone calling him.** Sadly, this covers a multitude of poor operating practices, including stations talking to each other over the DX signal. In Europe particularly we are afflicted with 'policemen'; people who keep jumping in to tell callers that the DX is listening 'up' – sometimes adding a gratuitous insult. This rule is quite simple – if working split, don't ever transmit on the DX frequency for any purpose whatsoever.
5. **I will wait for the DX station to end a contact before calling him.** It may seem clever to nip in as the previous contact is ending but DX stations don't like it – it breaks the pattern of operating, which is what helps everyone to know when to transmit and when not. Do not 'tail end'.
6. **I will always send my full callsign.** This is essential for CW and SSB, because incomplete calls require an extra transmission and slow down the pileup.
7. **I will call and then listen for a reasonable interval. I will not call continuously.** Continuous calling is selfish and arrogant. With a computer it is so easy to send continuously – you just hold down the key on your PC. It goes totally against the principle of listening and listening again. More significantly it greatly raises the QRM floor – making life virtually impossible for the DX station.
8. **I will not transmit when the DX operator calls another callsign, not mine.**
9. **I will not transmit when the DX operator queries a callsign, not like mine.** Not exactly rocket science: in life outside amateur radio it would simply be considered rude to answer when someone else is asked a question! Again, it raises the floor level of QRM and slows things down. DXers soon get the 'feel' of when the DX station has come back to them (by the callsign but also through the timing of the response). Pretending you have been called is just silly. Also, knowing the DX operator personally doesn't give you the right to just jump in and maybe deny someone else a QSO.
10. **I will not transmit when the DX operator calls geographic areas other than mine.** We need to recognise when the operator is calling a geographic area (ie NA for North America, AS for Asia etc). Then we have to accept that the DX operator has decided to give that area priority and we should not call until the pattern changes. A small detail but when a DX operator is working, say, North America and fails to send or say so at the end of each transmission, stations from elsewhere often jump in. Don't: it is polite and sensible to wait for some clear instructions from the DX operator.
11. **When the DX operator calls me, I will not repeat my callsign unless I think he has copied it incorrectly.** This is to reduce time and thus allow more time for others. If you repeat the callsign, the DX station will listen very carefully (thinking you are correcting it) – unnecessary hassle if all is well.
12. **I will be thankful if and when I do make a contact.**
13. **I will respect my fellow hams and conduct myself so as to earn their respect.** These are both about behaving well – DXing is very competitive and works best with some politeness, mutual respect and even, dare one say, a bit of humility!

WORKING TOGETHER FOR IMPROVEMENT.

Now having read this far we can hear you saying: 'Yes I know all of that, just good operating common sense. You need to tell everyone else'. Well let him who is blameless cast the first stone! And before you say UK operators are indeed blameless, some of the poor operators are located right here – and some of them are very well known indeed.

There is a very strong feeling among some of the most active and successful HF operators that we need to work together and over a period of time to improve standards of operating. So now read the DX Code of Conduct again, sign up to it on the DX Code website and, whilst you are at it, also put the code on your QRZ.com page.

We need to remember it's a hobby and the starting point is demonstrating and encouraging good practice by operators all over the world and indeed also by those at the sharp end of DXing. We need to help and encourage new entrants to the hobby – we all have to start somewhere and we learn by mistakes. In amateur radio it has been normal to learn by example – as true now as ever. Good practice encourages good practice. Let's work together to raise standards worldwide.

"The global ham radio community shares the same HF bands, so it's important that we all get along together and play fair. The DX Code lays out the rules, making it a level playing field when chasing DX. I hope all DXers will respect the DX Code and help everyone enjoy this fine hobby."
Gary, ZL2IFB

WEBSEARCH

DX Code of Conduct website: www.dx-code.org/
Ethics and Operating procedures for the radio amateur ON4UN and ON4WW:
www.ham-operating-ethics.org/index.html
Modern Pile-Ups, *The DX Magazine*, G3SXW:
www.dx-code.org/g3sxw.pdf
Pile Up Tips, ZL2IFB:
www.g4ifb.com/html/dxing.html#PileupTips
DXEtiquette, *QST* March 2010, W6SJ.
DXpeditioning Basics, N7NG, ARRL and INDEXA 1994.
Suggestions for DX Pile Ups, *QRZ-DX News*, N4AA
www.dxpub.com/dx_news.html

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Nick Henwood, G3RWF.
Nick has been very active as 5X1NH during the past three years.

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Homebrew

After a few months of more advanced projects, this month we get back to basics and take a look at frequency multipliers and low pass filters.

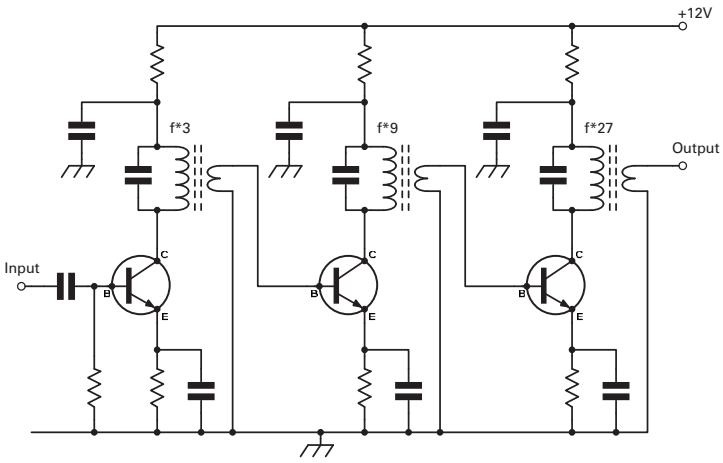

FIGURE 1: A chain of frequency triplers based on a simple Class C, common emitter amplifier showing bad multiplier design.

MULTIPLICATION. A frequency multiplier produces an output signal at a frequency which is an exact multiple of the input signal frequency. There are many different types of frequency multiplier. The more complex circuits based on phase locked loops can produce outputs at a frequency that is many times the frequency of the input signal. Our recent experiments with PLL and DDS synthesisers have shown how a low frequency oscillator can be used as a reference for generating HF or VHF signals. This month we will look at simple frequency multipliers that use non-linear devices like diodes or transistors to produce harmonics at multiples of the input frequency. Most of the multipliers used in amateur radio applications have low multiplication ratios, typically 2:1 in the case of a doubler or 3:1 in a tripler circuit. Higher ratios are usually achieved by cascading several multiplier stages.

In many of our previous projects, I have gone to great lengths to make circuits that are as linear as possible. Carefully designed linear amplifiers will be relatively free of harmonic distortion, but even the best designs are not perfectly linear. This is why the linear power amplifiers in our transmitters are fitted with low pass filters at the output stage. In a frequency multiplier, distortion is regarded as a desirable characteristic. Some of the simplest frequency multipliers are based on transistor amplifiers that are biased for Class C operation. **Figure 1** shows a chain of frequency triplers based on a simple Class C, common emitter amplifier. The parallel tuned circuit in the collector of the first stage is resonant at three times the input frequency. The second stage is tuned to 3*3= 9 times the input frequency and the final stage is tuned to 3*3*3= 27 times f. An input frequency of 16MHz would result in an output frequency of 432MHz.

Although this arrangement was once quite common in simple VHF and UHF transmitters, it is not a good example of a frequency multiplier chain. Because there is just a single tuned circuit in each individual stage, the output signal will contain spurious signals at unacceptably high levels. Spurious signals that fall very close to the intended output frequency will be most problematic. Spurious signals at 432MHz ±16MHz will be almost impossible to suppress. The selectivity of the three tuned circuits will be limited because of the relatively low impedance of the transistor collector circuit. This situation can be improved by connecting the transistor collector to a tapping point in the middle of the inductor. Even with carefully optimised matching and the use of high Q components in the L/C circuits, it is unlikely that such a simple circuit will ever produce a signal clean enough for use in a transmitter. International standards call for spurious signal suppression of 43+10log(P)dB. This is -43dBc for a 1W QRP transmitter – and a rather stringent -60dBc for a 50W transmitter. Using a double tuned arrangement in the collector of each multiplier would result in a dramatic improvement in spectral purity.

For a 432MHz transmitter based on Figure 1, I would use a double tuned filter (a coupled pair of parallel resonant L/C circuits) in the collector of the first two stages and a triple tuned circuit in the collector of the final stage. As the three 432MHz tuned circuits in the final stage would most likely be PCB stripline resonators, only one extra trimmer capacitor would be required. It is just as easy to make a PCB with three or more striplines as a PCB with only two striplines, although the PCB will be slightly larger.

Simple single-ended transistor or diode multipliers can be used at any frequency from LF to the microwave bands. Active devices like bipolar transistors and FETs can give some power gain. Passive diode multipliers always have a power loss. The use of balanced circuits can lead to a significant reduction in the number of spurious signals appearing at the multiplier output.

Figure 2 shows two of the most widely used frequency doubler circuits. The push-push doubler at 'A' uses a pair of transistors in a balanced circuit. The top transistor conducts when the input voltage swings positive, the bottom transistor conducts when the input swings negative. As both collectors are connected in parallel, two pulses will appear across the L/C tuned circuit for every full cycle of the input signal. If the circuit is perfectly balanced, the input signal and odd harmonics (3rd 5th 7th...) will not appear at the multiplier output. A similar circuit with balanced push-pull input and output circuits can be used as a frequency tripler.

The circuit in **Figure 2B** is the classic diode frequency doubler. This simple circuit is capable of excellent performance over a wide range of input frequencies. You will recognise this circuit as being identical to a full-wave rectifier as used in a mains to DC power supply. The operation of the circuit is simple and quite easy to understand. As with the transistor push-push doubler, one diode conducts on positive swings of the input signal, the other

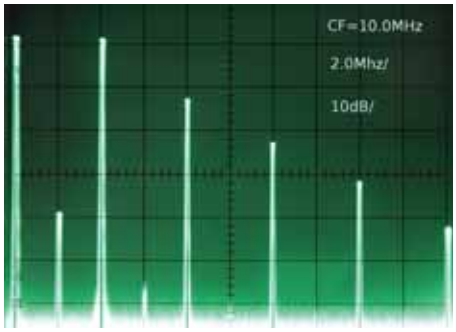

PHOTO 1: The output spectrum for a simple frequency doubler with a 2MHz input.

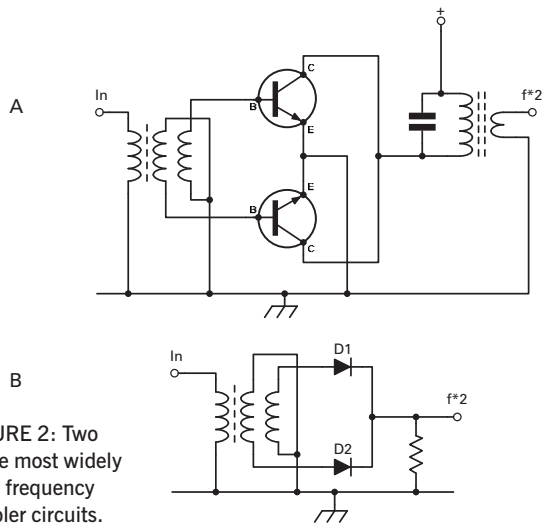

FIGURE 2: Two of the most widely used frequency doubler circuits.

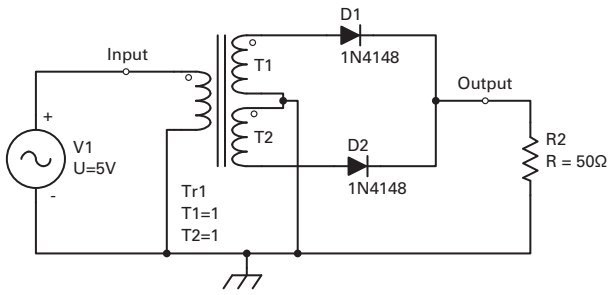

FIGURE 3: A QUCS simulation of a diode frequency doubler.

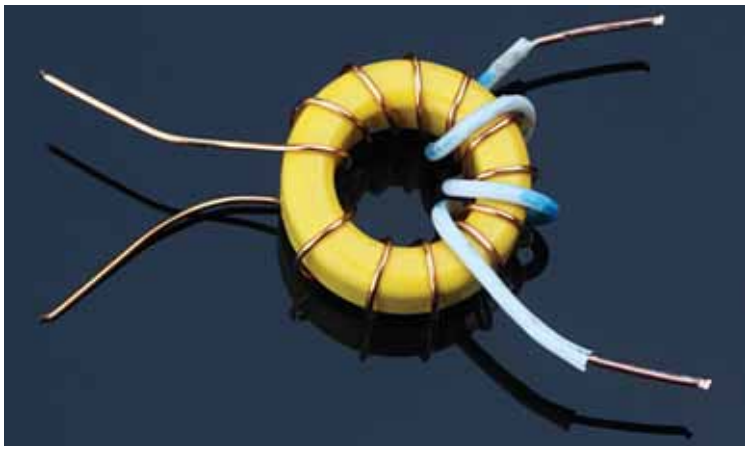

PHOTO 2: Close up details of T2 and T3.

on negative swings of the input signal. Two pulses for each input cycle gives a frequency doubling action. **Figure 3** shows a QUCS simulation of a diode frequency doubler. **Figure 4** shows the input signal voltage (blue) and output signal voltage (red).

If the balun transformer and diodes were perfect lossless devices, the peak to peak output voltage would be half the input peak to peak voltage. This is a loss of 6dB. There will be some loss in the transformer, although this will be negligibly small for a trifilar wound, ferrite cored balun as used in my test circuit. There will be significant losses due to the forward voltage drop across the diodes. Some of the input power will end up as unwanted harmonics. Provided the circuit is well balanced, the input signal and odd harmonics will be very well suppressed at the doubler output. Due to these various losses, the conversion loss of the doubler will always be greater than 6dB. A typical device will have a loss of about 10-12dB. High speed Schottky diodes with a low forward voltage drop and small junction capacitance are ideal for use in frequency doublers. Readily available silicon switching diodes like the 1N4148 and 1N914 will also perform well in this circuit.

I built a simple frequency doubler using a pair of 1N5711 Schottky diodes. The transformer is 7 turns of enamelled copper wire, trifilar wound on a FT37-43 toroid core. The circuit was built dead bug style on a strip of PCB laminate. BNC sockets were use for the input and output connections. As I would be testing the doubler at various input levels ranging from a few hundred mV up to several volts, I used a 20dB attenuator between the doubler output and the input of the spectrum analyser (see April 2010). This will protect the analyser input from damage when testing the doubler at high input levels. I used a home made low distortion 2MHz crystal oscillator as a signal source for the tests. Just to make sure that the generator was free of harmonics, I used a 7th order LPF between the generator and the doubler input. The tests showed that the doubler was well behaved at input levels ranging from +7dBm to +16dBm.

An input level of around +10dBm gave a good compromise between conversion loss and high order harmonic generation. Input frequency to second harmonic conversion loss was around 11dB. **Photo 1** shows the output spectrum for a 2MHz input. The Zero-spur at the left of the screen should be ignored. The wanted output is at 4MHz, the 2MHz signal is 40dB below the wanted output or 51dB below the input signal level. The 3rd and 5th harmonics are 50-60dB down and all other odd harmonics are below the noise floor. Each of the even harmonics falls off at a rate of 10-15dB compared to its nearest neighbour. For example: the 4th harmonic is 14dB below the second. This type of doubler produces a much cleaner output spectrum than the simple unbalanced multipliers described earlier.

10MHZ TX. Our first project is a bit of a leap of faith. At the time of writing, the 10m band is very quiet. The Sporadic-E season is grinding to a halt and there is no sign of any long distance F layer propagation. However, sunspot activity is increasing and, hopefully, we can expect to see improved conditions in the coming autumn and winter months. Our first project is a very simple 28MHz CW transmitter. To keep circuit complexity to an absolute minimum, I used a 14MHz crystal oscillator and a diode frequency doubler to generate the 28MHz signal. For the more advanced constructor, a PLL or DDS synthesiser as used in some of our recent project would allow greater frequency coverage. **Figure 5** shows the schematic of the oscillator, doubler and BPF. The oscillator is a common-collector Colpitts type running at just over 14MHz. A small variable capacitor is used to tune the frequency ± a few kHz. This can be very useful if you need to move by a small amount to avoid QRM. The choice of crystal frequency is left to the individual constructor. 14.030MHz would be a good choice because the 2nd harmonic falls on the 10m QRP frequency at 28.060MHz. Any junkbox crystal with a frequency slightly above 14MHz would produce an output frequency at the CW end of the 10m band.

As usual, the circuit was built on a strip of PCB laminate. I used a BC547 transistor for the oscillator stage. T1 in the frequency doubler circuit is 6 turns, trifilar wound on a FT37-43 or a similar medium to high permeability ferrite toroid. I used 1N4148 silicon switching diodes in this doubler circuit. The 14MHz oscillator produces several volts across the primary of T1. Unlike the beautiful sine wave used for our earlier frequency doubler test, the waveform at this point in the circuit is quite distorted. A consequence of this distortion is that the output of the doubler is not as free of fundamental input signal and odd order harmonics as the earlier 2MHz test circuit was. The output from the frequency doubler is passed through a BPF that removes all traces of the 14MHz signal from the crystal oscillator and any unwanted harmonics, particularly the third harmonic at 42MHz. A 2nd order BPF would probably have done the job, but just be sure that the output signal is as clean as possible, I used a 3rd order BPF. Each of the three inductors in the BPF are 12 turns on a T50-6 powdered iron toroid. L1 is just a simple inductor made from 12 turns of enamelled copper wire, equally spaced on the toroid core. The other two inductors T2 and T3 are also 12 turns on a T50-6. These coils have a three turn coupling winding for the 50Ω input/output connections. **Photo 2** shows close up details of T2 and T3.

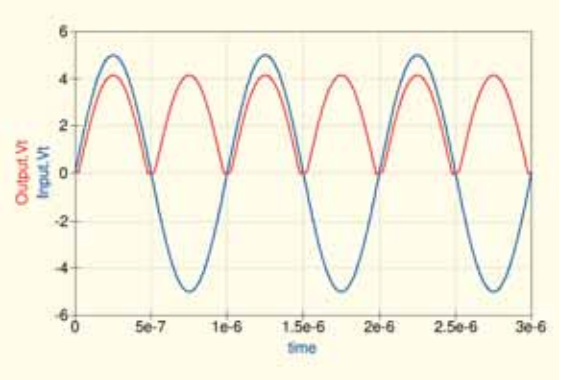

FIGURE 4: The input signal voltage (blue) and output signal voltage (red) for the simulation in Figure 3.

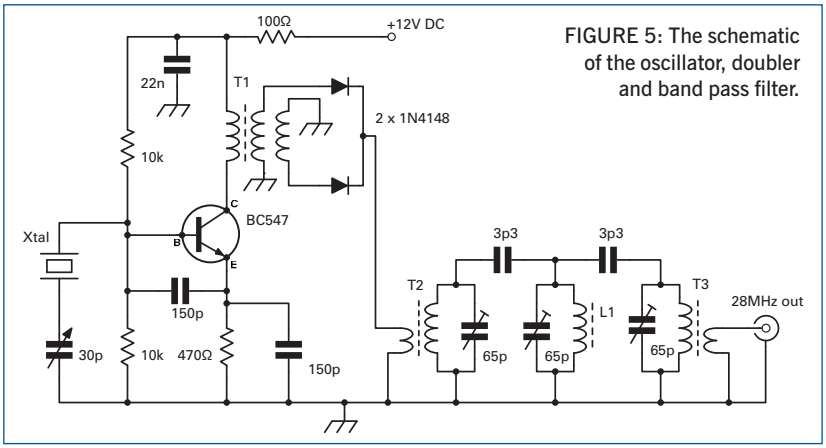

FIGURE 5: The schematic of the oscillator, doubler and band pass filter.

12 turns on a T50-6 should have an inductance of AL*N^2 nH which works out at 4*12^2 = 576nH. As often happens, I have found that making inductors is not an exact science and the measured inductance of all three coils is a little over 600nH. I used the methods described in last month's Homebrew to design a 3rd order Butterworth BPF with 2MHz bandwidth and 50Ω I/O impedance.

The capacitance required to resonate a 600nH inductor at 28.5MHz is around 52pF. I used three Philips 65pF (yellow) trimmers as the filter tuning capacitors. The filter was terminated with a 50Ω resistor for testing and alignment.

I used an oscilloscope to monitor the output voltage while tuning the three trimmers in the BPF. Once the BPF was peaked for maximum output, the measured voltage was 1Vpp. As you would expect after such extensive filtering, the output signal was a perfect sine wave on the oscilloscope display. **Photo 3** shows the completed oscillator/doubler/BPF.

The 28MHz signal from the oscillator/doubler/BPF unit is amplified by a simple broadband linear amplifier. I used a 2N3553 in this circuit. Any similar VHF/UHF transistor like the 2N3866, 2N4427 or 2N5109 should work just as well. The amplifier schematic is shown in **Figure 6**. The transistor must be fitted with a clip-on heatsink. The RFC (radio frequency choke) in the collector circuit is 10 turns on a FT37-43 toroid. I placed a straight Morse key in the emitter circuit for CW keying. This works well enough in practice. A more sophisticated semi break-in keying circuit can be found in Homebrew for December 2008.

The measured output from the amplifier is 160mW (8Vpp into 50Ω). The output from this amplifier was used to drive the broadband driver and PA from Homebrew for January 2007. 160mW from the low level amp is enough to drive the PA to its maximum output of 14W on the 10m band.

A GENERAL PURPOSE 31MHZ LPF. Before the 10m CW transmitter can be used on air, I will need a good low pass filter between the PA and the aerial. Our second project for this month is a low pass filter with a cutoff frequency of 31MHz. This filter can be used with the simple CW transmitter or as a general purpose LPF for any transmitter operating between LF and 29.7MHz. My normal procedure for designing a LPF is to calculate the required component values using handbook tables of normalised values **[1]**. If I'm feeling lazy, I will use the QUCS filter synthesis tool instead. Unless there is a good reason to do otherwise, I will use one of the standard filter types such as the PI configuration Chebyshev 7th order with 0.1dB of passband ripple. This is just about optimum in terms of stopband attenuation and input return loss. Greater stopband attenuation can be achieved at the expense of greater passband ripple and/or reduced I/O return loss (higher SWR).

The 1MHz, 50Ω normalised component values for such a filter are:

C1/C4=3759.8,
C2/C3 = 6673.9,
L1/L3 = 11.32,
L2 = 12.52.
Capacitance is in pF, inductance is in μH.

The component values for a 31MHz cut-off are 121.3pF, 215.3pF for C1/C2 and 0.365μH, 0.404μH for L1/L2. As I am using home made, air core coils for the inductors, I can easily wind a coil of any arbitrary value. Finding suitable capacitors for a low power LPF is not much of a problem. A standard value capacitor of 120pF is perfect for C1/C4, 220pF is close enough for C2/C3 or, if you want to be even more precise, a parallel combination of 180+33 = 213, which is only about 1% below the required value. I have built and tested a filter using these values and found that it works exactly as expected. Finding suitable components for a high power, general purpose LPF can be more difficult. The inductors are easy enough to make, but high voltage capacitors are more difficult to find. Under perfectly matched conditions, a 400W transmitter generates a peak voltage of 200V into a 50Ω load. When there is a mismatch at the filter output, much higher voltages are possible. I have found that the best and most reliable capacitors for use in high power low pass filters are large silvered mica types with a voltage rating of at least 500V. Good quality disc ceramics with a voltage rating of 1kV or more are a good alternative. Smaller 63V or 100V types are only useful for low power filters. High voltage mica or ceramic capacitors are only readily available in a limited range of values. 100pF, 470pF, 1nF and 2.2nF are relatively easy to find. In between values from the E12 and E24 series are not readily available.

This filter can be used with any HF transmitter. The maximum power rating depends on the voltage and dissipation limits of the capacitors. The only capacitors that were available were a handful of 100pF, 500V silvered mica types. This means that some compromises must be made in the filter

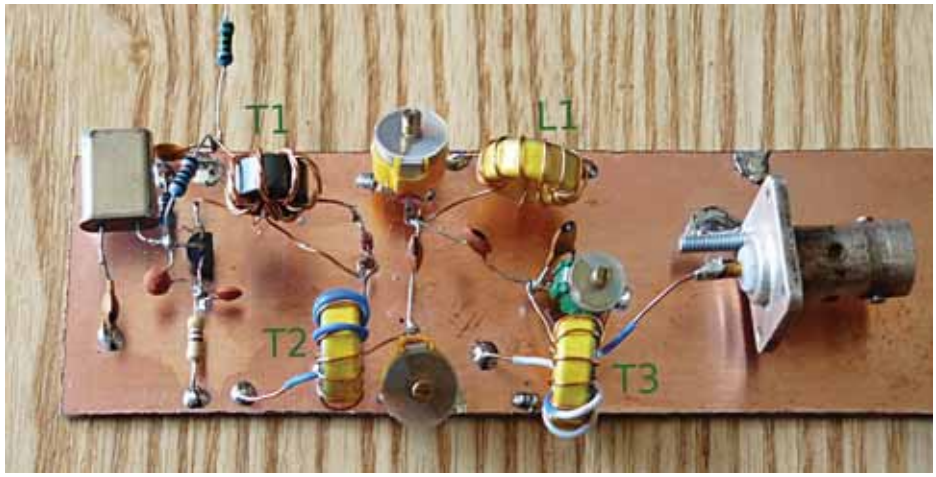

PHOTO 3: The completed oscillator, doubler and band pass filter.

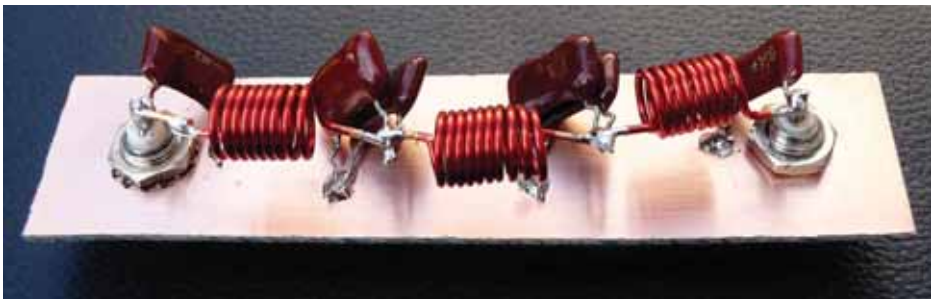

PHOTO 4: The finished filter.

design. As no other high voltage capacitors are available, parallel combinations of any values other than 100pF are not possible. I eventually settled on a 7th order Chebyshev with passband ripple of 0.04dB.

1MHz normalised values for this filter are:

C1/C4=3165,
C2/C3 = 6136,
L1/L3 = 11.43,
L2 = 12.93.

This results in capacitor values of 102pF and 198pF for our 31MHz LPF. This matches the value of my capacitors to within 2%. The inductor values are 369nH and 417nH. These values were rounded to 370nH and 420nH for the final design. It would be absolute folly to try and make inductors with a value within 1nH of the required value. The filter schematic is shown in **Figure 7**; the finished filter is shown in **Photo 4**. The 200pF capacitors are made from a parallel pair of 100pF. L1/L3 are made from 8 turns of 1.25mm enamelled copper, close wound on an 8mm drill as a temporary former. L2 is 9 turns wound in the same fashion. The filter has been tested at power levels of more than 400W up to 14MHz and my 10m rig maximum output of 250W at 29MHz. Using the specified components, it should easily handle the EI legal limit of 400W at all frequencies up to 29.7MHz. Testing the simple 10m CW transmitter at 14W output through the LPF gives a remarkably clean signal with all spurii at better than 65dB below the 28MHz output carrier.

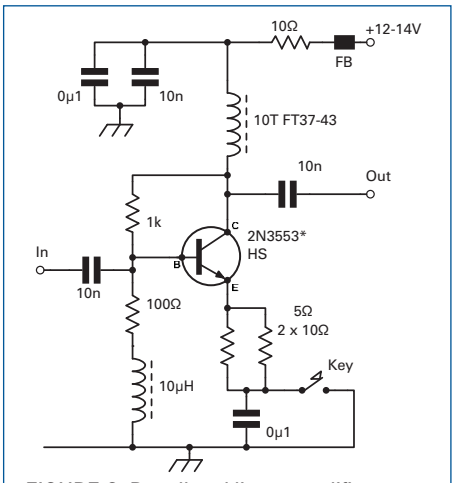

FIGURE 6: Broadband linear amplifier with keying.

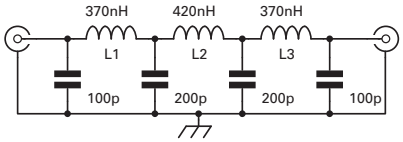

FIGURE 7: The general purpose 31MHz filter schematic.

REFERENCES:
[1] *The Radio Communication Handbook* 10th edition. A.4. RSGB.

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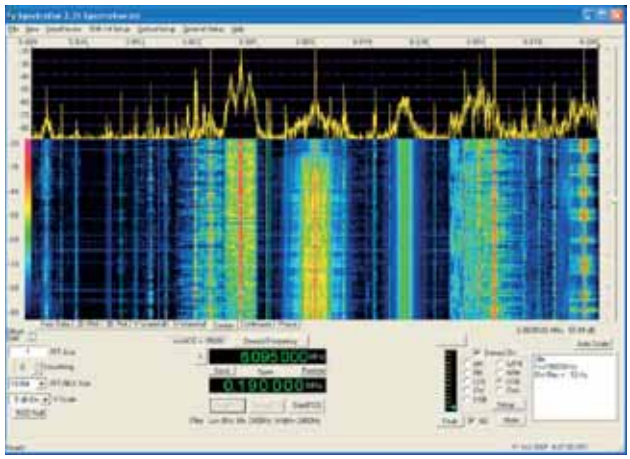

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A direct digital sampling receiver for use up to 50MHz

PHOTO 1: The Excalibur receiver hardware is contained in a small shielded box inside a clear plastic case.

INTRODUCTION. WiNRADiO have been developing and manufacturing PC controlled receivers and receiver systems since 1996. An Australian company supplying professional, government and hobby markets, they have an extensive product range and are one of the leaders in software defined receivers. Their latest model is the WR-G31DDC Excalibur, a direct digital sampling receiver for use up to 50MHz. Boasting a high performance specification, I was keen to check it out to see how well it performed.

RECEIVER HARDWARE. The Excalibur receiver hardware is contained in a small shielded box inside a clear plastic case. Interfacing to a PC is via USB2 and the receiver is powered from an external 12V supply. Linear-mode power supplies are preferable and a small 800mA unit is provided with the receiver. A somewhat unconventional USB connector is fitted but fortunately a connecting lead is provided. The antenna connector is SMA but an adaptor to BNC is also provided. The only control on the box is a power on-off switch and a blue LED indicator is fitted that flashes in various sequences to indicate USB interface status.

The latest software defined receivers, such as the Excalibur, are tending to use direct digital conversion and this avoids the image and harmonic responses inherent in the QSD analogue down-conversion approach. The Excalibur uses a 16-bit A to D converter sampled at 100MS/s and covers the frequency range from 9kHz to a little under 50MHz. This is followed by the FPGA digital downconverter (DDC) that reduces the data transfer rate to the PC to a level that the USB2 port and PC can handle. The DDC selects a slice of the input spectrum between 20kHz and 2MHz in width by a process of decimation and this DDC spectrum is passed to the PC for all further processing. Within the PC a further stage of decimation reduces the spectrum width to a few tens of kHz, the demodulator spectrum width (analogous to the final IF in analogue receivers), where channel filtering and demodulation is performed.

A sharp cut-off filter at 50MHz is fitted in the path to the A to D converter to suppress the image that appears between 50 and 100MHz as aliasing from the 100MHz sampling process as well as further images higher in frequency. A 1.8MHz high pass filter may be selected to prevent overload from medium wave signals. No other filtering is fitted; the feed to the A to D converter is wideband to 50MHz. This may be regarded as a recipe for strong signal problems but in reality the A to D converter has sufficient dynamic range to make this unnecessary, and small filters with small cored inductors are themselves prone to strong signal distortion effects. An input attenuator from 0 to 21dB in 3dB steps is provided and a front end amplifier to improve sensitivity is in-circuit continuously.

Inside the box, the receiver is contained on two printed circuit boards. One board contains all the components except the front end, with the key areas well shielded. The other board contains the front end components.

INSTALLATION AND SOFTWARE. Although the receiver is provided with a CDROM, I downloaded the latest software version and drivers from the WiNRADiO website. The software requires Windows XP, Vista or 7 operating systems and the installation process was straightforward and trouble free. WiNRADiO recommends a PC with 2GHz dual core CPU and 1GB RAM to make full use of the available features but it will run on a slower PC if the DDC bandwidth and filter sharpness settings are set to lower levels.

SOFTWARE FEATURES. The Excalibur is more than just a receiver; it is also a high performance spectrum analyser over a wide range of frequencies and a useable dynamic range in excess of 110dB. The user interface has been developed to enable easy access to all the features and provide effective control whether it is used as a normal receiver, an analytical receiver or spectrum analyser. The control panel continuously displays three spectrum scans. The full span of the receiver, either 50MHz or limited to 30MHz is shown in the lower part of the screen. The DDC spectrum is shown separately and the third display shows the demodulator spectrum or the audio spectrum. Point and click or mouse drag tuning operates on all three displays and multiple markers can be set. Display averaging, resolution bandwidth and baseline settings are features familiar to spectrum analyser users and all are implemented in the Excalibur. The wideband and DDC spectrum displays can also be set in waterfall mode, which is useful particularly to identify certain types of signals and signals that come and go with time.

Three receivers can be set within the DDC spectrum and these receivers are fully independent allowing separate modes, bandwidths and all other parameters with mixed or separated audio outputs (within the stereo limitation of two channels) and may be separately recorded to hard disc. Modes include USB, LSB, CW, AM, synchronous AM, FM and FSK. DRM is available with a suitable licence. FSK uses USB with a shifted passband and gives inverted RTTY according

PHOTO 2: The receiver main printed circuit board.

TABLE 1

Frequency Offset	Reciprocal mixing 2.4kHz bandwidth	Reciprocal mixing 500Hz bandwidth	Equivalent Phase noise
1kHz	99dB	106dB	-133dBc/Hz
2kHz	106dB	113dB	-140dBc/Hz
3kHz	111dB	118dB	-145dBc/Hz
5kHz	112dB	119dB	-146dBc/Hz
10kHz	111dB	118dB	-145dBc/Hz
15kHz	115dB	122dB	-149dBc/Hz
20kHz	117dB	124dB	-151dBc/Hz

TABLE 2

FILTER	BANDWIDTH					
LENGTH	-6dB	-60dB	-70dB	-80dB	-90dB	-100dB
200	2400Hz	3032Hz	3075Hz	3462Hz	4342Hz	5128Hz
5000	2400Hz	2425Hz	2430Hz	2513Hz	2741Hz	3407Hz

to the normally used LSB convention.

The radio can be tuned in many ways – point and click, spectrum drag, virtual tuning knob, keyboard arrow keys, mouse wheel tuning, direct frequency entry, digit tuning, channelised frequency stepping, memory recall and probably more that I did not discover. 1kHz steps are fundamental to many of these methods but 1Hz, 10Hz or 100Hz steps can be accessed with the ctrl, shift or alt keys pressed.

The channel filter bandwidth is adjustable over a vast range from 10Hz to 62.5kHz in 2Hz steps. Again there are several shortcuts and convenient ways of setting the bandwidth. The passband is shown on the spectrum displays and the position, edges and width can be dragged to provide IF shift, bandwidth and passband tuning functions. Filter length is a software processing function that determines the sharpness of the filter edges. The default setting is 200 but it can be adjusted over a wide range and at the highest setting of 5000 the shape factor is phenomenal. The highest settings do require a high CPU speed. A notch filter is included with adjustable frequency and width, and a noise blanker with adjustable threshold. An audio filter is provided with adjustable low and high cut and selectable de-emphasis. Again these are settable numerically, via drop-down boxes or by dragging the passband shape.

The S-meter is calibrated in dBm, μV or S-units and can be set to show the peak, RMS or average values. Strong signals that result in ADC clipping are indicated and the input attenuator switched in automatically if desired. A fully adjustable AGC system is provided with fast, medium and slow presets and three user presets. Attack and decay times are adjustable together with reference level and maximum gain. The AGC can be disabled and gain adjusted manually.

The memory capacity for storing and recalling frequencies is virtually limitless, determined only by the capacity of the hard drive. Names and notes are stored against memory items and the names are displayed when tuning close to the stored frequency. HFCC and EIBI broadcast databases freely available on the internet are also supported.

A built-in recording feature allows two different recording modes. The DDC spectrum can be recorded and played back later with all the receiver controls such as tuning, mode selection and bandwidth fully operational. It uses a considerable amount of hard disc space to record at the higher bandwidth settings. Alternatively the audio output from each of the three receivers can be recorded separately and simultaneously. Associated with the audio recorder is a comprehensive timer or scheduler that allows multiple recordings and repeat recordings at any time in the future.

Virtual Sound Card software is available from WiNRADiO at extra cost to pass the receiver digital audio directly to following applications such as data decoders without the need to pass through soundcards or audio cables.

MEASUREMENTS. Sensitivity measurements for 10dB S+N:N on USB in 2.4kHz bandwidth showed 0.4μV (-114dBm) across most of the tuning range, reducing substantially above 40MHz and below 100kHz. The medium wave filter introduced a 6dB loss at 1.8MHz but negligible loss at higher frequencies. AM sensitivity was typically 1.8μV (-102dBm) for 30% modulation depth and 6kHz bandwidth. ADC Dither is a mechanism within the converter to reduce spurious signals and if selected reduces sensitivity by raising the noise floor by 2dB to 6dB.

The signal strength meter calibration was excellent, within 1dB or so over the whole range of signal levels and frequencies and relates to the level at the antenna socket independent of the attenuator setting. S9 is 50μV and each S-unit is 6dB.

The rejection of spurious signals was dependent very much on level. Strong signals were exceptionally clean with spurii down 100dB or more. Lower level signals around S9 (-70dBm) resulted in spurii appearing as sidebands at about –120dBm. Other low level responses at about –120dBm could be eliminated by engaging dither in the ADC but not these sidebands. Sampling images at VHF were over 90dB down across the HF range, reducing rapidly above 40MHz.

No hole was observed in the AGC characteristic as seen with many DSP implementations. With software version 1.10, current at the time of this review (August), the AGC attack time was excessive (20 - 80ms), much slower than the set values. This resulted in attack distortion on SSB and CW modes. Radixon UK investigated this problem and released software version 1.13 with improved AGC. This measured close to the set values and a fastest attack time of 2-3ms in user settings.

Direct sampling SDR receivers respond in a completely different way to strong signals compared to analogue receivers and do not follow the 3dB/dB intermodulation rule. Intermodulation products are seen at a level of about –120dBm for input signals as low as –70dBm but do not increase substantially until the input signal levels are within about 3dB of the ADC clipping level. Unlike the Perseus receiver, ADC dither makes only a marginal improvement. The clipping level was reached with –3dBm input from a single signal or –9dBm from each of two equal signals as used for IMD testing. Signal handling collapses when the ADC clipping level is reached. When measured at the point where intermodulation starts to increase substantially, two-tone dynamic range measured around 106dB in 2.4kHz bandwidth or 110dB in 500Hz bandwidth and was independent of signal spacing. This equates to an analogue receiver with a 3rd order intercept of +36dBm. Once again the bar is raised on the highest close-in dynamic range I have ever measured. Spurious sidebands (see earlier paragraph) are likely to be more of an issue than intermodulation.

Reciprocal mixing measurements showed that the phase noise performance was excellent. Indeed, the figures are the best for any radio I have ever measured. However, there were some noise effects seen at much lower input levels around –70dBm for reasons unknown. The results are shown in **Table 1** measured at 16MHz using a low noise Wenzel oscillator source.

The excellent phase noise results enabled the channel filter skirts to be measured down to an incredible 100dB, a result I have never achieved before. The shape factors depend

PHOTO 3: The control panel continuously displays three spectrum scans.

on the filter length and are given in **Table 2** for the default setting of 200 and maximum length 5000 with the 2.4kHz bandwidth filter.

ON THE AIR PERFORMANCE. I liked very much the user interface, a good balance between ease of use and well presented information. The various spectrum displays were excellent and give a good visual impression of the radio environment. The main design focus of the radio appears to be AM broadcast for which it is excellent. Tuning with step sizes other than 1kHz, such as 10Hz or 100Hz on SSB, is a two handed process. It would be a big bonus if the fundamental tuning step size could be made selectable or mode specific.

The audio quality was generally very good, particularly so on AM. On SSB and CW signals, selecting an audio filter bandwidth a little wider than the channel (demodulator) bandwidth gave best results. With software v.1.10 distortion due to AGC attack was apparent but the later v.1.13 resolved this problem. The latest software version is readily downloadable from the WiNRADIO website. Best results on SSB/CW were achieved with a user AGC setting of 1ms attack and 2s decay times. Overall signal handling was excellent and the receiver was clean and sensitive. The channel filter features were excellent and easy to use and the notch was effective particularly on wider modes but difficult to tune on SSB. The LF time code transmissions were very well received, a good indication of low phase noise and a clean receiver.

The performance as a spectrum analyser was first class, with better resolution, wider display range and faster sweeps than my 100dB display range Hewlett Packard instrument.

CONCLUSIONS. The Excalibur receiver is a top rate performer supported by excellent software and the spectrum displays are a superb bonus. The 16-bit analogue to digital converter results in unsurpassed strong signal performance and once again my league table of close-in dynamic range receiver performance has a new No. 1. However, this must be tempered by the spurii seen with lower level signals, albeit at a weak level. The current price is around £650.

My thanks to Radixon and WiNRADiO for the loan of the receiver.

Both Waters & Stanton plc and Martin Lynch & Sons are authorised dealers for the WiNRADiO Excalibur, check out their adverts on pages 24 and 28 respectively for details.

WiNRADiO®

WR-G31DDC 'EXCALIBUR'

The WiNRADiO WR-G31DDC 'EXCALIBUR' is a high-performance, low-cost, direct-sampling, software-defined, shortwave receiver with a frequency range from 9kHz to 50MHz. It includes a real-time 50MHz-wide spectrum analyzer and 2MHz-wide instantaneous bandwidth available for recording, demodulation and further digital processing.

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QRP

There are some excellent QRP kits on the market

Inside the Limerick Sudden kit from G QRP Club.

AND THEN THERE WERE TWO... In the mid 1980s, designs for receivers and QRP direct conversion transceivers using the NE602 chip began to appear in amateur radio literature. The NE602, with its onboard mixer and oscillator, was ideally suited for the building of simple, low component count, direct conversion receivers. I set about producing a receiver using the NE602 and the Toko range of coils that would work across a range of amateur bands and called it the 'Sudden'. The original Sudden receiver began life over 20 years ago in the G QRP Club Journal *SPRAT* and was then published in *Practical Wireless*, followed by *73* magazine in the USA. Since then, several versions and modifications to the Sudden receiver have been written up, although very few of them were written by me.

The original naming of the 'Sudden' had nothing to do with 'rapidity' or 'hastiness' but was taken from the name of the place where I lived and worked. I was the vicar of St, Aidan, Sudden, Rochdale for 24 years up to my retirement.

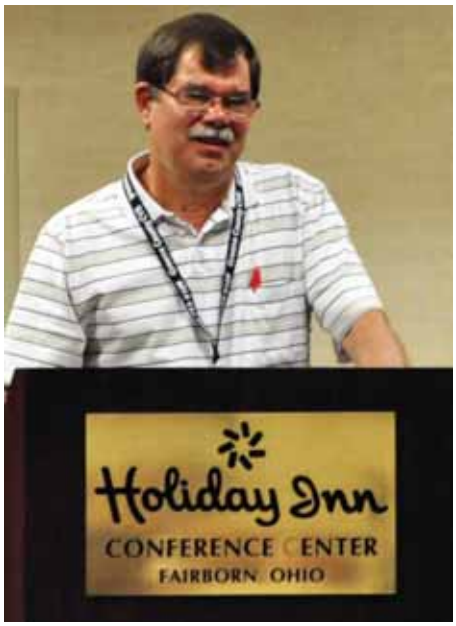
The simplicity of the Sudden made it a favourite of beginners. A kit was produced by Kanga Products and it became widely used as a training aid for radio clubs and youth groups. It is also featured in the RSGB book *QRP Basics*. Sadly, with the demise of Kanga Products the kit was no longer available, although I received many enquiries about it. This year the problem of building a kit version of the Sudden has been solved. From no kits there are now two Sudden kits available.

Dennis Anderson, G6YBC, has revived Kanga Products and is building up a range of kits including an updated Sudden. On the new Kanga Products website (www.kanga-products.co.uk) Dennis says, "The Sudden-2 Direct Conversion Receiver is based closely on the original Sudden but with the following differences: tuning is by variable capacitance diode, removing the need for an expensive tuning capacitor. The SA602 mixer/oscillator chip is fed from a 5 volt regulator, so a 9V or 12V supply can be used. The audio amplifier circuit, based on an LM386, now has hiss-reducing components. The audio gain control, RF attenuator and tuning control are mounted on the PCB. The kit is supplied with Toko 10K coils. There is provision on the board for a switched-bandwidth audio filter and a mute circuit with adjustable side tone. The printed circuit board has a solder mask and the component positions are marked in white screen printing. The audio filter/mute circuit will be available soon."

The G QRP Club has produced a kit called the 'Limerick Sudden'. The 'Limerick' version of the Sudden is a re-think of the original design, this time with a VFO to cover the full band and minor improvements to the circuitry. The kit uses a new method of construction, based on Manhattan design, but called 'Limerick'. With this method, developed by Rex Harper, W1REX, (who lives in Limerick, Maine), pads are etched on the board and the interconnections between them are PCB tracks, hidden under the solder masking. No 'through-hole' connections are used, although through-hole components are used; neither are there any coils to wind, as manufactured coils are used. The kit includes all components, the complete case and even a PP3 battery. All builders need to supply is a soldering iron and solder and a few simple hand tools. The completed receiver needs a reasonable antenna and a pair of Walkman style earphones, although the audio stage will drive a small loudspeaker in a quiet room. Although the original Sudden was for 40m, the club kits are available in 80, 40, 30 and 20m versions. Further details may be had at www.gqrp.com/sudden.htm.

QRP HALL OF FAME. Three American QRPers were inducted into the QRP Hall Of Fame at the Four Days in May QRP event at Dayton, Ohio, in May 2010. They are Rex Harper, W1REX, Dave Ingram, K4TWJ and Jim Stafford, W4QO. Rex, W1REX is well known to kit builders; he runs QRP.me and is famous for the production of the Tuna Tin range of amateur radio kits. Dave, K4TWJ was known to many hams through his QRP Column in *CQ* magazine. He had written for *CQ* from 1981 to 2010. Dave died in January 2010. Jim, W4QO has been associated with QRP ARCI for many years serving as president, webmaster and Four Days in May chairman.

QRP ON EBAY. The main American QRP organisation, the QRP ARCI, has added a feature to their excellent website called 'QRP on eBay'. Access the main site at www.qrparci.org and click on 'QRP on eBay'. This offers current QRP related items for sale in the USA, the UK, Canada and Germany. There is a selection of items for each country but all of the items particular to a country can be view by clicking on 'view all items on eBay' at the end of each country listing. This is a very useful feature not only for members of the club but also any radio amateur who is interested in QRP related items. It saves a lot of searching on the eBay site. Another feature I like on the QRP ARCI website is the 'Distance Calculator'. Based upon the *QSL Mapper* program it provides the distance between two callsigns typed into the 'Transmit Callsign' and 'Receive Callsign' boxes in miles or kilometres. Adding the transmitter power to the 'Transmit power in watts' box will yield the miles per watt figure. One of the basic awards offered by the QRP ARCI is the 1,000 Miles per Watt certificate. The rules are simple. This award is issued to any amateur transmitting from, or receiving the transmission of, a QRP station such that the direct Great Circle bearing distance between the two stations, divided by the QRP stations power output, equals or exceeds *1000 miles per watt*. Over the years this has been a very popular and achievable QRP award. Incidentally, the webmaster for the QRP ARCI website is an English QRPer, Steve Fletcher, G4GXL.



Rex Harper, W1REX receiving his nomination into the QRP Hall of Fame.

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ALL PICTURES ARE FOR REFERENCE ONLY

The end-fed half wave

A practical and cheap monoband vertical antenna that's great for DX on 10, 20m or any other single HF band

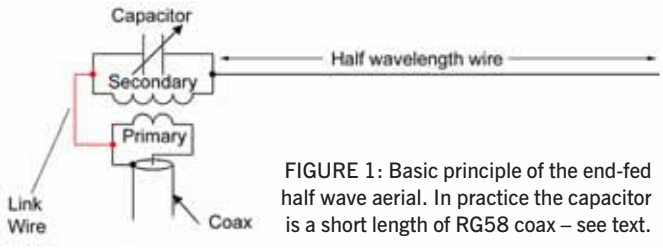

FIGURE 1: Basic principle of the end-fed half wave aerial. In practice the capacitor is a short length of RG58 coax – see text.

PASSION. I like half wave dipoles. They are easy to make and easy to set up. They also perform very well and usually beat a compromise antenna hands down. With 10m about to come alive again as solar cycle 24 gets going, what I wanted was an efficient, low-angle radiator that could be put up and down in a couple of minutes.

My experience with ground plane verticals has been OK, but they are only as good as the earth beneath them. That is, they really need an extensive array of ground radials to work properly – not easy to put down when you are in a hurry.

I also like to use fibreglass fishing poles as antenna supports. These are available cheaply (I have 7m and 10m versions that I bought at a rally from Sandpiper). The only problem is that they don't have lateral strength – they are good for supporting verticals, but not so good for half-wave horizontal dipoles.

What I really wanted to do was have a vertical half wave dipole. The problem is that while the impedance at the centre of a dipole is about 50-75Ω and very easy to match to coax, an end-fed half-wave has a very high impedance – around 3000-4000Ω. If you just connect it to your coax or rig you will be disappointed.

WHAT CAN YOU DO? After a lot of searching on the web I found the answer. Steve, AA5TB of Fort Worth Texas has a great site with lots of information **[1]**. It was this site that helped me build my end-fed half wave for 10m, although the design can be modified for any of the HF bands.

First, you need a half wave length of wire. Using the formula length (in feet) = 468/ frequency in MHz, I cut a piece of wire to 16 feet 5 inches. This comes out at precisely 5m.

Next you need a T200 (red) toroid. These cost about £4 from JAB Electrical Components **[2]** among other sources and can be picked up at many rallies.

I wound 17 turns of enamelled copper wire on the toroid as the secondary winding – each time the wire passes through the toroid counts as one turn. My wire was some I had lying around and was about 1.25mm diameter (18 SWG). JAB can supply this too.

Leave a little at the end for connections and then wind two turns over this for the primary, again leaving a little spare.

Across the 17 turn winding you need to connect a capacitor. I tried a small variable but as the minimum capacitance was about 22pF I couldn't get the circuit to work.

But never fear, the answer is very simple and very cheap. RG58 coax has a capacitance of about 28.8pF per foot, so cut off about 10 inches and connect that across the ends of the winding. You'll find that an electrical screw connector block (choc block **[3]**) makes life easier.

Now, connect your coax across the two turn primary, connect your antenna to one of the secondary wires and connect another price of copper wire from the other secondary wire back to the braid of the coax (shown in red in the diagram).

An end fed normally requires an earth or ground plane to work. But with an end-fed half wave there is very little current flowing in the ground and it becomes almost unnecessary.

The usual way of feeding an end fed half wave is against a short counterpoise, but I have found that you can feed this one without an earth stake, counterpoise, or radials. The impedance is so high that little current actually flows down the braid.

If you do get any RF problems, just form a coax choke by coiling about 8-10 loops of coax in a six-inch coil about a foot or two from the antenna. If that doesn't tame it then just use a single earth rod – in all the time I've used this antenna I've never needed to.

SETTING UP. Now the fun starts. If you have an antenna analyser it will make life a lot easier. If not, you can do it with a transmitter and SWR meter.

If you're using an analyser, connect it to the end of the coax and see where the antenna resonates. It will probably be lower than 10m. Snipping off half-inch lengths of the coax will reduce the capacitance and move the resonant frequency higher. If you get down to about four inches and are still not there, try removing a turn off the secondary coil.

I ended up with 15 turns on the secondary and a piece of coax about four inches long – it is better to remove turns than snip too much off the coax. The end result was an SWR across the entire 10m band of less than 2:1. In fact, at resonance it was about 1.2:1. But did it work?

TESTING. As always, the 10m band wasn't open as I connected it to my rig to test, but I was able to hear CB stations on 27.6MHz that were at least 20 miles away from my QTH. On switching to my usual 10m half-wave dipole they just vanished, indicating that the antenna is working quite well.

The angle of radiation of a vertical half-wave is quite low so it should be quite a DX performer. It would be very easy to build the matching network into a plastic box to waterproof it.

MORE BANDS. It was at this point that I had a brainwave – if the antenna could be made to work on 10m, it should be easy to scale for other bands. I worked out that if I doubled the length of the wire radiator to 10.05m (33 feet) I would have an effective low-angle half-wave radiator for 20m. As one of my fishing poles was 10m long it was able to support the new wire quite easily, even it did look a little unwieldy.

A couple of minutes with a pen and paper and I soon realised that the equation for the resonant frequency of an LC network

$$f = \frac{1}{2 \times \pi \times \sqrt{LC}}$$

showed that halving the frequency meant that I had to multiply the capacitance value

PHOTO 1: The transformer is wound on a T200 (red) toroid. The coax capacitor is connected to the upper terminal block.

by four to make it resonant. So I cut another piece of coax at four times the length of the original piece, hooked it all up and plugged it into the MFJ analyser. I couldn't believe it – the instant result was an SWR of 1:1.1 on 14.150MHz, rising to only 1:1.5 at the edges of the band.

Tests showed that it was at least as good as a half wave 20m dipole at 30 feet and US stations were romping in during the afternoon on SSB. It outperforms a regular quarter wave vertical with radials laying on the ground by a couple of S points and is a lot easier to put up.

I used it at a Jamboree On The Air station, GB0CAW in Norfolk, and it outperformed a G5RV at 30 feet by about 1 S-point. I now have a ground spike for mounting the 10m fishing pole, which is available in the UK from Coopers of Stortford [4]. This corkscrews into the ground and is very solid. In April we used the EFHW for 20m at GB0CMS – the station set up for International Marconi Day at Caister Lifeboat.

The antenna functioned very well and we were able to work around the world, including VK4, KP2, and numerous US and EU stations. Two friends have also built 20m and 17m versions and rave about them.

The matching unit has now been put in a Maplin waterproof box and the 10m pole

PHOTO 2: At resonance the aerial is quite well-behaved.

has been put up through a tree in the garden. While some signals are weaker by 1-2 S-points, invariably it works better on DX – notably the USA and the Caribbean.

For a really stealthy antenna I could take the pole down and put a fishing line over the top branch (using the pole) so that I can haul a wire up into the branches. It should be virtually invisible.

CONCLUSION. These antennas are very easy to make and only need a few components. If you have little space in your back garden for dipoles a vertical half-wave could be the way to go. Why not try one?

PHOTO 3: The aerial in use at GB0CMS, set up at Caister Lifeboat for International Marconi Day in April 2010.

WEBSEARCH & REFERENCES

[1] www.aa5tb.com
[2] www.jabdog.com
[3] screw terminal strips were originally made from brittle brown plastic that could be snapped easily to the required length, thus resembling a bar of chocolate in more ways than one.
[4] http://www.coopersofstortford.co.uk/coopers-of-stortford-screw-in-soil-spike-prodst06811i

IOTA

Islands On The Air at the RSGB Convention

Left to right you can see KB5SKN, AD5A and AB5EB on Kalgin Island.

EXCELLENT LECTURES. By the time you read this the RSGB Convention will only be a few weeks away. Make a note now to come along – particularly to the IOTA session on Saturday 9 October from 9.30am. We have a great programme featuring Cezar, VE3LYC, Derek, G3KHZ and Mike, AD5A talking about their recent activations of new and rare IOTAs in the Arctic, central Pacific, and Alaska.

A GREAT SUMMER. Summer 2010 was another great season for IOTA hunters as island activators took advantage of the northern hemisphere warmth to head out into the wilds. 106 different IOTAs were the destination of announced IOTA contest expeditions – and there could have been almost as many that were unannounced.

Not content with finally pulling off the Pen Islands, NA-231 back in the spring, Cezar, VE3LYC headed off to Pelly Bay in August to activate Qimivvik Island in NA-208, the Nunavut (Kitikmeot Region) East group. His call was VY0X. This was only the second activation of the group – the first being my own visit about 14 years ago. I still remember being greeted on a cold and windy day at the airstrip by a young Inuk who had the job of 'activities coordinator', with the words, "You must be the crazy British guy who wants to freeze to death"!

The KL7RRC team succeeded in the first ever activation of IOTA's Semidi Islands group in Alaska, NA-235, at the end of July. They made 5,300 QSOs including 630 in the IOTA contest. They were also active from Kodiak Island, NA-019 but conditions were extremely poor while they were there and they managed fewer than 20 QSOs.

Mike, AD5A and his two sons, Michael, AB5EB and Jake, KB5SKN, were active for three days in August from Kalgin Island, NA-158, in Alaska. They were hit by poor ionospheric conditions at the start of the operation but made 1169 QSOs. Sadly this included only 17 UK stations. Surprisingly, there were 25 QSOs with Belgium where there is a smaller amateur population – where were we all? Mike, AD5A, who is also President of the Island Radio Expedition Foundation that provides financial support for IOTA trips, will be at the RSGB Convention in October and is looking forward to chatting about past and future expeditions. He will be giving a talk about the Kalgin Island trip on the Saturday morning.

Wayne, K9YNF was active /KL7 from Fox Island in the rare NA-197 IOTA group from 16 to 20 August to celebrate 50 years in amateur radio. He was QRV on SSB and PSK using solar power and seems to have been rather weak in Europe.

PLANNING FOR 2011. Rick, K6VVA, has been busy planning a major IOTA DXpedition to Alaska for summer 2011. He has permission from the local Eskimo village council to operate from one of the North Slope County West group of islands near Point Lay, NA-242, and is scheduling a visit with Mike, K9AJ, for 3 days between 21 and 25 July – before the walrus and polar bears return to the area and make an operation more dangerous. Rick is looking into two other new ones for next year; the Bethel County group, NA-240, and St Matthew Island, NA-232. He may also activate the rare groups of North Slope County Centre, NA-004, and North Slope County East, NA-050.

To keep his hand in during the rest of 2010, Rick will visit Quadra Island, NA-091, in British Columbia from 27 to 30 September. Activity will be mostly CW on 40m-15m. Check his website for more information (www.k6vva.com/iota/na091). His long term plans are more ambitious even than the Alaska trips as he is in regular correspondence with the North Korean authorities about activating their islands! If dogged persistence can do it I'll bet on working P5/K6VVA/P before too long.

Also in the planning stage, the Russian Robinson Club are looking into a trip to the unactivated Ujelang Atoll, OC-278, where they hope to operate as V73RRC in the January-March 2011 timeframe. They are still looking for operators to join them so contact Yuri, N3QQ, if you are interested – n3qq@na-234.com.

MORE ISLANDS COMING SOON. You may just get your *RadCom* in time to work JA1NLX/VK4 who will be active from Dunk Island (OC-171) on 17 to 24 September. He plans to operate CW only on 80m-10m with a 5 metre vertical and lots of radials. QSL via JA1NLX.

John, 9M6XRO, Steve, 9M6DXX, Amin, 9W6AMC, Lee, 9W6LEE and Gordon, G3USR plan to activate the rare IOTA island of Pulau Sebatik from 24 to 27 September. Activity will be on 80-10 metres, but with an emphasis on 40-15 metres. They will have two stations on the air with amplifiers using a HexBeam and verticals located directly above the sea water. Callsigns will be 9M6XRO/P on CW and 9M6DXX/P on SSB, and they hope to have both stations on the air during all the major openings to Europe and North America. OC-295 is a very rare and much needed group having been activated just once before in July 2006. QSL both callsigns via M0URX, direct, or via the bureau. For more info check their web page at www.m0urx.com/sebatik.html.

Listen out for a major DXpedition to Sable Island, NA-063, from 22 to 31 October. Check www.cy0dxpedition.com for the latest details. This is a major DXCC destination to be bagged as well as an IOTA – but is one of the more insubstantial islands on the planet. It's basically a 44km long, moving, sandbank that is home to a few scientists and a large number of wild horses. The only practical way to access the island is by light aircraft, landing on the beach.

SIGNING OFF. I have decided it is time to make way for a fresh approach to this column and will be handing over the pen to Cris, GM4FAM, from the next one in two months time. Cris was responsible for getting me interested in island activation about 30 years ago so I'm sure he'll be an enthusiastic reporter in the future.

The KL7RRC/P Team Expedition by the Russian Robinson Club to Chirikof Island. Left-right Yuri Zaruba, UA9OBA, Alex Kuznetsov, RW3RN, Yuri Sushkin, N3QQ and Merle Elson, K5MT.

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IC-RX7 - Handheld Receiver £179.00
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Icom IC-R6 Handheld Receiver £159.00
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Yaesu YO-901 scope £299.00
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Icom IC-490E 70cms Mobile £250.00
Kenwood TS-271E £165.00
Yaesu FT-8100R 2m / 70cms Mobile £220
IC-7400 HF, 6m & 2m transceiver £999.00
Yaesu FT-857D Multi-band Mobile £529.00
Yaesu FT-690R II 6m transceiver £275.00
Kenwood TS-2000 £1,099.00
Yaesu FT-736R 6m/2m/70cm Base £799
Yaesu FT-480R 2m Transceiver £220.00
Yaesu FTV-901R Transverter £275
Kenwood TS-790E Dual-Band £999.00
Yaesu FT-817ND £399.00
Icom IC-910H 2m/70cms base £999.00
ICOM IC-2200H 144–146 £189.00
The TINY-2 MK-II - With Open Squelch Board £109.00
Kenwood TM-741E - VHF/UHF £229.00
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Design Notes

Making your own amplifiers and transmitters

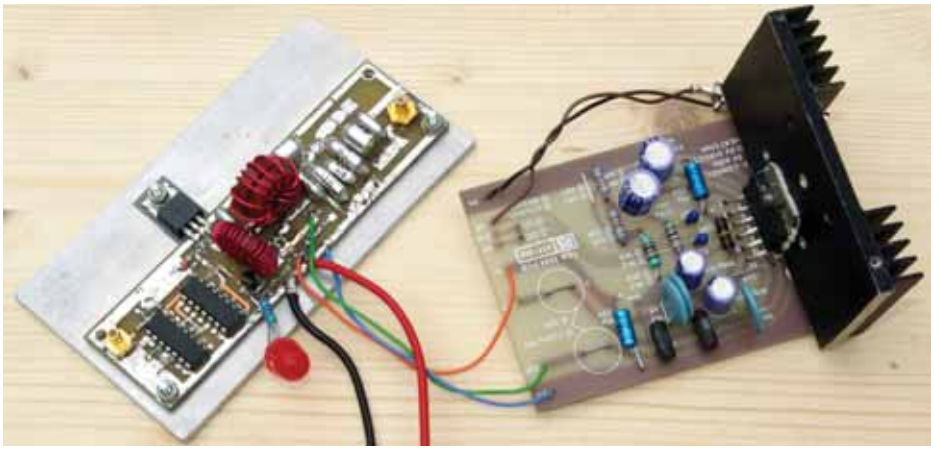


PHOTO 1: Class E PA with an audio amplifier used as an amplitude modulator.

SIMPLE BUT NOT CW. In August's Last Word C Williams, G8SFD commented that it would be nice to revisit some simple transmitters. Other comments heard include "... the only designs seen are for QRP 40m CW transmitters..." So, here are a few ideas to stimulate your imagination. While not, perhaps, the simple straightforward build-it-in-a-weekend projects that G8SFD was requesting, I hope the ideas presented will stimulate your inventive spirit to cut and try some simple designs.

CLASS E PA STAGE FOR TOP BAND. This module formed the PA stage for a WSPR beacon for some Top Band propagation tests. Originally it was to be a simple Class C stage for the constant envelope carrier, delivering an output of around 10W [1]. The final design (shown in **Figure 1**) was arrived at after one of those serendipitous moments when I realised the original PA was not doing exactly as intended – it appeared to be working much better than it should have been. In throwing together what should have been a dead simple switching PA stage, I'd inadvertently 'almost' made a highly efficient Class E one and, after a bit of optimisation, the final Class E design was arrived at.

In Class E transmitters the output device is operated as a switch, either hard on or hard off. The matching components are specially optimised to ensure that when the final device switches on, it does so at the point where the RF waveform crosses zero – minimising switching spikes and greatly reducing resistive losses in the transistor. The main component that ensures this is the capacitor connected directly across the device's output terminals. At first sight this appears rather odd. Surely you'd expect the capacitor to be shorted and draw a high current when it switches on? But values are chosen so the resonant flywheel effect forces the voltage across this to zero at the switch on point, hence there's no current spike. Optimum Class E design is quite an art but Alan Melia, G3NYK has done a lot of work in this area and he wrote a spreadsheet design process for Class E PA stages for any frequency, power rating or supply voltage. See [2] for more details. He notes that the finished products are quite benign. Even at very high power levels of many hundreds of watts they have proven almost impossible to destroy due to mismatched or open/short circuit antennas.

Returning to **Figure 1**, the PA stage needs a few volts of RF with a near-enough 50% duty cycle square waveform to hard-switch the MOSFET device on or off. Paralleled logic gates do remarkably well here. As the output stage is a modest Q resonant structure, voltages are magnified and when running from a nominal 12V supply the capacitors should be rated at 100V or more. The capacitors can be made up from parallel combinations – in fact, several capacitors in parallel will give higher efficiency that a single one of the correct value due to reduced loss resistance inherent in those of lower value; the resulting paralleling of these gives even lower unwanted resistance.

Inductors are wound on T68-2 iron dust cores. The output tank consists of 10 turns of 1mm diameter wire on a pair of cores. The DC supply choke is 30 turns of 0.5mm diameter on a single core. **Photo 1** shows the finished module. In deference to G8SFD's comments, a nice etched printed circuit board is not necessary – I just prefer to breadboard on a home made PCB, using surface mount techniques. Dead bug construction would work just as well and the original Class C module was made with point to point wiring. Polystyrene capacitors were used in the output stage as I just happened to have more of these at higher voltage ratings than I did ceramic types.

Attempts to measure the efficiency were a bit fraught. While the DC input power could be measured accurately, my HP power meter doesn't go down to 2MHz. Attempts to use a

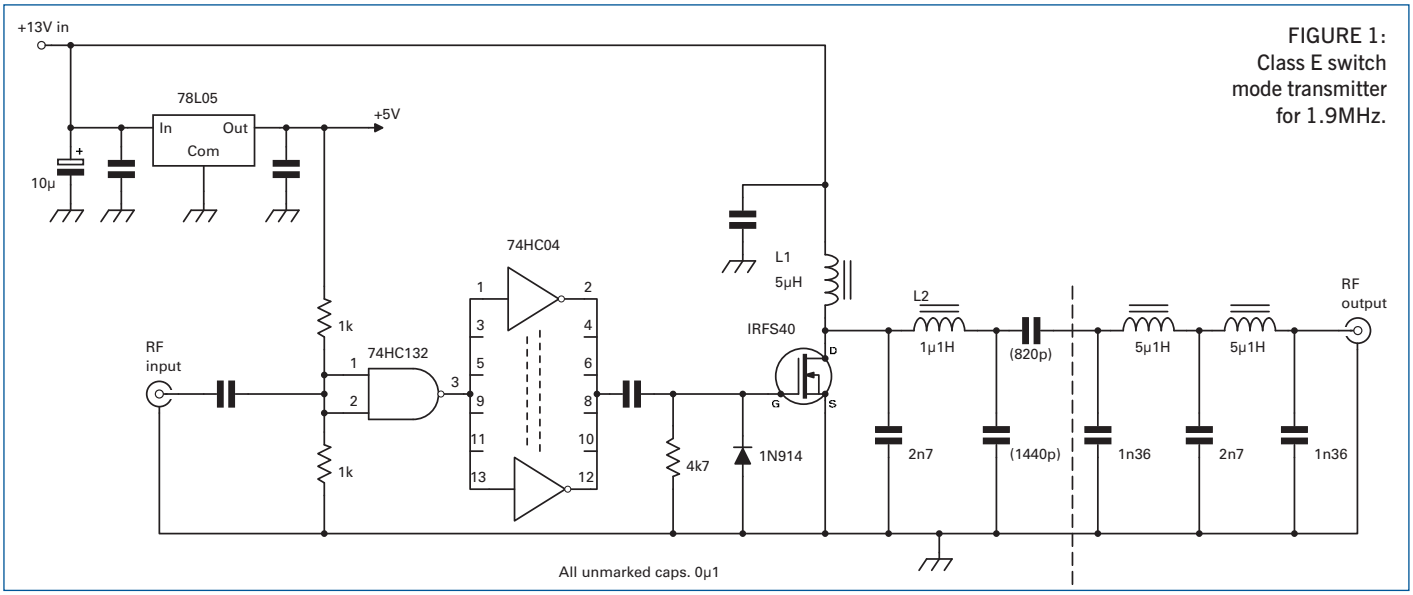


FIGURE 1: Class E switch mode transmitter for 1.9MHz.

scope to measure the RF waveform at one point showed an apparent efficiency of greater than 100%! After much careful calibration and retesting, I finally arrived at an efficiency figure of somewhat better than 85% – certainly at 30W output the small aluminium plate heatsink was only running lukewarm. The hottest component was the tank inductor, suggesting that that this is the most critical component and worthy of more attention to reducing its losses.

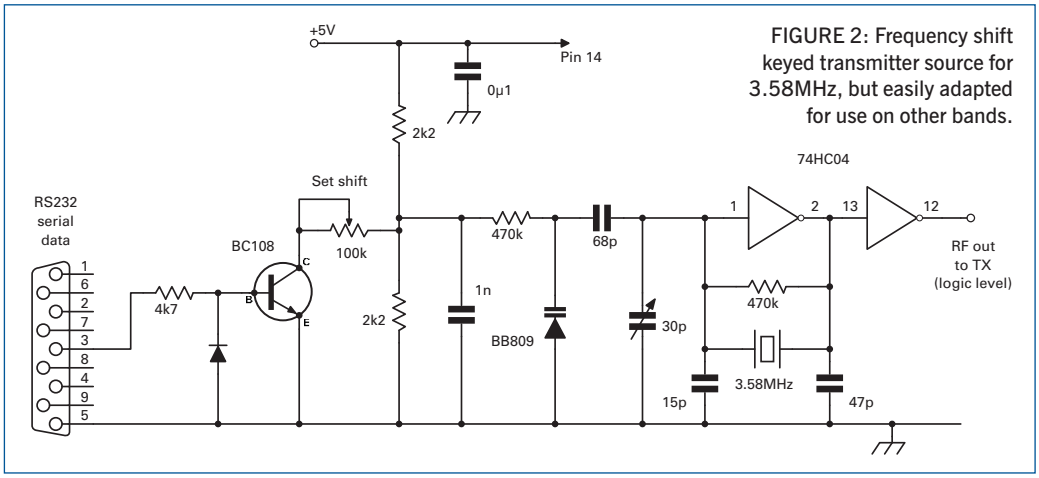


FIGURE 2: Frequency shift keyed transmitter source for 3.58MHz, but easily adapted for use on other bands.

Although Class E PA stages are operated as switches, the use of a resonant tank circuit means the output waveform has a surprisingly low level of output harmonics and only a modest degree of additional filtering is usually necessary. If used with a small resonant antenna through at ATU, it is arguable whether any additional low pass filter is needed at all. But a 5th order Chebyshev design is included in Figure 1 for completeness. The two inductors can be made from 30 turns on a T68-2 core.

But... it's still just a simple amplifier for a constant envelope carrier. One nice thing about any switching type PA stage is that the RF output waveform is directly dependant on the supply voltage, without any change to the matching network being needed. Power output can be directly controlled by the DC supplied. So, after reading the Last Word letter, my thoughts turned to modulation.

AMPLITUDE MODULATOR. Integrated audio amplifier chips are very popular these days and devices such as the TDA2040 can provide more than 12W into a 4Ω load. They are DC coupled and the output pin sits at half the supply voltage. Using such a device as the power supply to the Class E PA and driving the amplifier at a level that allows the output to swing between about 2 to 10 volts turns it into an amplitude modulator. Not very efficient, but quick and easy.

Photo 1 shows an obsolete but roughly similar TDA2004 dual stereo amplifier on an old RS Components development board. Some results from using one half of this module to generate AM can be seen in **Photo 2**. The linearity is not perfect and some distortion of the AM envelope is visible but, in practice, the modulation sounded perfectly satisfactory and rather nicer than SSB.

Running AM on Top Band is rather 'retro' these days, but perhaps worth a try using modern components. The Class E PA stage can be adapted for higher frequency bands using Alan's spreadsheet to derive component values.

RTTY / FSK DRIVER STAGE. What else can we drive the PA with? **Figure 2** shows a typical design for a simple crystal controlled drive source that can be frequency shift keyed for RTTY or, with a suitable reduction in the frequency shift, for WSPR. The values shown allow 170Hz shift RTTY operation, tuneable over the range 3.57 to 3.6MHz if a low cost ceramic resonator is used. There are a number of off-the-shelf crystal frequencies that fall into amateur bands (or do so when divided down) and it is worth perusing the component suppliers' websites. Most can be pulled in frequency a bit by adding series or parallel capacitance (or inductance). Ceramic resonators can be pulled over a significantly wider range. The frequency divider circuits from last month can be used to get additional frequency division ratios from odd crystal frequencies.

The BB809 varicap diode has up to 50pF capacitance variation over 0 to 5V so there will be plenty of scope for adjusting series and parallel trimmer capacitance values to give the desired frequency shift for RTTY, even with a fundamental frequency crystal on Top Band. To set the frequency shift without a counter, any standard SSB receiver can be used, feeding its audio to a soundcard-based spectral analysis program such as I2PHD's *SPECTRAN* **[3]** or *SPEC LAB* by DL4YHF **[4]**.

If you're feeling really adventurous, the crystal can be replaced by a parallel capacitor / inductor combination for a fully tuneable transmitter source. When going this route, a frequency counter is essential during both setting up and operation on the air.

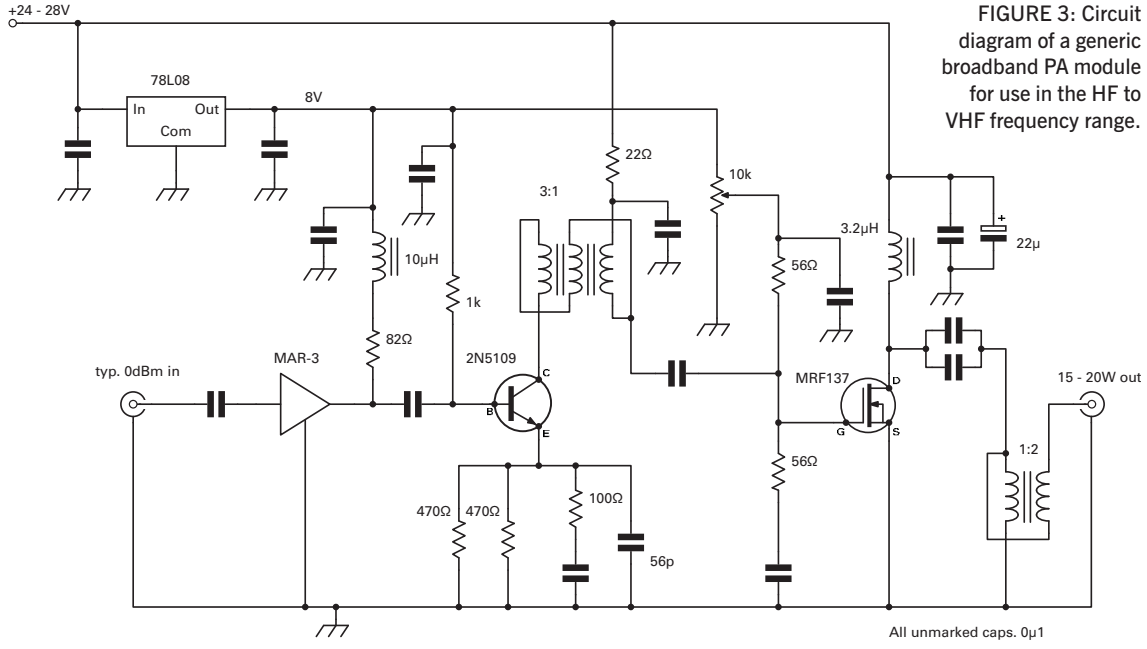


FIGURE 3: Circuit diagram of a generic broadband PA module for use in the HF to VHF frequency range.

LINEAR TRANSMITTERS. For most modulation types we need linear amplification and a more traditional approach to amplifier design has to be adopted. **Figure 3** shows the circuit diagram for an inherently broadband

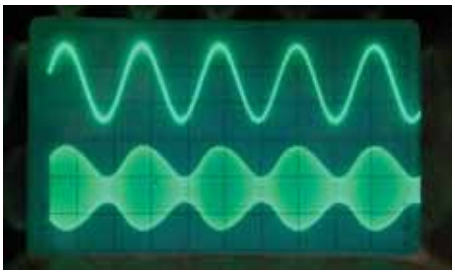


PHOTO 2: The AM waveform and 1kHz modulator input.

generic MOSFET based amplifier module useable over the HF to VHF range with little change in components. A very nearly identical circuit is in use on the GB3ORK beacon on 5.29MHz and for one of the GB3RAL VHF beacons. The MFR137 is part of a family of devices with power levels ranging from a couple to many tens of watts, all from a 28V supply rail. When used at low frequencies in the HF region they can give an almost embarrassing amount of gain and are usually operated there with a simple resistive feedback network around the device which both flattens the frequency response and stabilises against spurious oscillations. The 2N5109 (or the similar 2N3866) device used in the driver is operated in Class A with feedback provided by the resistors in the emitter. It supplies around half a watt of drive to the MOSFET PA. On the input, a MAR-3 modamp provides enough gain for full output to be achieved with about 3dBm input power, sufficiently sensitive for the PA to be used directly from most upconverter designs.

FERRITE CORES. Judging from the comments seen on the various internet discussion groups, constructors are often concerned about choice of ferrite materials for use in power amplifier and matching stages. But in fact, used as shown in Figure 3, the choice of core is a lot less important than you might think provided a few basic criteria are met. One of the least understood maxims is that *provided the core is wound as a transmission line transformer the ferrite material does not affect the upper frequency range of operation at all.* At VHF and UHF, it is possible to build broadband power amplifiers that use only air cored transmission line transformers. It is the *lower* frequency limit that sets the number of turns and ferrite material type. We will be looking at transmission line transformers next month, hoping to dispel some of the myths surrounding them, but here is a rule of thumb to be going on with.

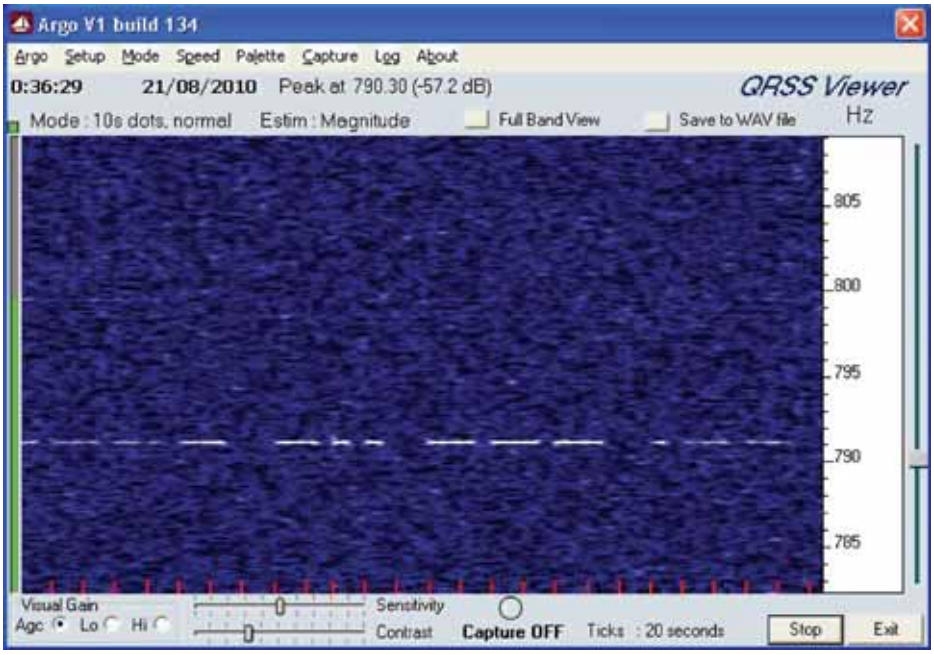
The total shunt inductive reactance across the impedance to be matched should be at least four times that impedance. So the 50Ω winding should have sufficient turns on the right type of core to present more than 200Ω reactance. For high power at low frequencies there is another criterion to be met to prevent the core saturating, but we'll cover that next time. For the PA module shown in Figure 3, just one of many suitable toroidal core types would be the Amidon FT-50-67 (available from [5]). This particular core has a specified inductance of 22mH per 1000 turns (or 22nH per turn^2, as inductance is proportional to the number of turns squared). So, at 1.9MHz, the 50Ω output winding needs to have a reactance greater than 200Ω, or an inductance of 17μH. The minimum number of turns is given by $\sqrt{(18\mu H / 22nH)} = 28$. The impedance transformation is 1:2, so the winding can be made up from 14 turns of bifilar wound wire.

REFERENCE

[1] Original Top Band Tx: www.g4jnt.com/Top BandPA.pdf
[2] G3NYK Class E PA design: www.alan.melia.btinternet.co.uk/classepa.htm
[3] Spectran: www.sdrham.com/spectran.html
[4] Spec Lab: www.qsl.net/dl4yhf/spectra1.html
[5] RF Elettronica: www.rfmicrowave.it/catalogue.php?lang=eng

LF

Let's go fly a kite



LU8YD's reception of LU1DOW. You can see part of 1 then D, O and the start of W.

VLF AERIALS TAKE TO THE AIR. In early August Stefan, DK7FC attempted his most ambitious VLF experiment yet – to run 600W RF into a 200m vertical kite-supported aerial. He planned to use the same enormous coil as in his previous 8.97kHz experiments and expected the resonant frequency to come down to about 6.5kHz due to the greater length of wire. Much discussion of probable advantages and disadvantages of the lower frequency had taken place, so the event was eagerly anticipated by a band of listeners all over Europe. If all went well, an ERP of 16mW was to be expected.

On the day, Stefan's calculation of the resonant frequency proved to be correct and he was able to tune between 6.4 and 6.6kHz, which was fortunate, as all the listeners were concentrating on this part of the spectrum. Then disaster struck, the wind dropped and the expensive kite came down in a tree and stuck fast. Stefan couldn't pull it out by himself, so he tied the strong nylon flying-line to the car and drove away until the line was taut. He then got out and pulled it clear of the corn field that it was lying across, whereupon the line kicked into the air and the kite jolted out of the tree catching a gust of wind, which took it up into the air again. Much relieved, Stefan drove back to the transmission site with the kite still attached to the car!

The wind then stayed relatively constant and the transmission was recorded by several stations, the furthest being F5WK at 460km. The best UK reception was by Paul Nicholson in Todmorden who had to use some post-processing to winkle the signal out of the noise. Paul points out that the noise in August is some three times stronger that it would be in the quiet winter months so the potential for greater distances is there.

Marcus, DF6NM was also out with a kite this summer. He operated on 8.97kHz from an airfield near his home QTH in Nuremberg and achieved a calculated 0.2mW EMRP from his 100m wire. The signal was received by several listeners and on Stefan's grabber in Heidelberg, about 180km away.

Stefan had his big kite in the air again over the weekend of 4 and 5 September, this time on 136kHz from France! His club has a long-standing arrangement with the Bar-de-Luc club and they get together near Verdun for a 2m contest. On Saturday, after a disappointing lack of wind in the afternoon, things improved and the kite flew late into the night. Stefan's signal was received strongly all over Europe and pretty well in Connecticut by W1VD.

JAPAN TO NORTH AMERICA ON 136. JA7NI has been improving his 136kHz signal for some time and has been received by VE7TIL, VE7SL and VE7BDQ in Canada on many occasions and by Laurence, KL1X in Alaska. Laurence also logged some signals from JA1CGM. As we head towards the winter season it is to be expected that signals will reach a bit further. Sure enough, at the end of August, KU7Z near Salt Lake City caught a little of JA7NI's QRSS signal, all the more remarkable as the Japanese are only allowed to use 100W transmitters.

Kuni, JA7NI has been working on his receiving equipment too and has set up a grabber. He is planning to try a receiving loop soon and has already copied some signals from VE7TIL. Scott has been putting out a good signal on his QRO transmitting loop for a while, after discovering that verticals don't work due to all the environmental losses at his forest QTH. He is hoping to achieve 1W ERP soon and hopes to try for a QSO with JA.

136kHz DX IN ARGENTINA. Also testing a new high-power setup on 136kHz is LU1DOW. He uses a 400W transmitter into a 100m inverted L aerial (height unknown). Recently the transmission was received by Alex, LU8YD at a distance of 1035km. Alex is able to receive European LW broadcast stations quite regularly on his Icom R75 and inverted L aerial, so his quiet QTH was obviously a great help in the test.

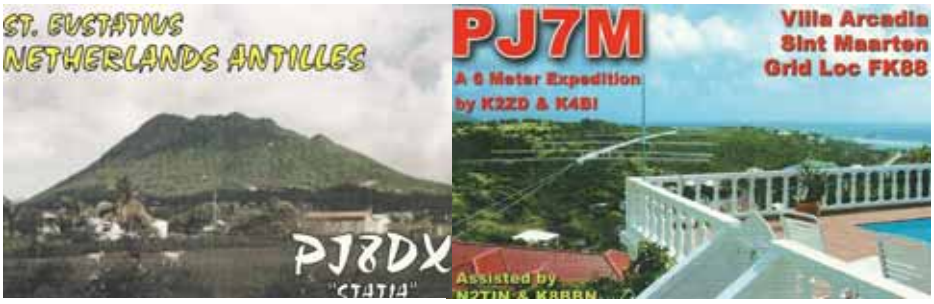
NORTH AMERICAN LORAN CLOSES DOWN. On 3 August all Canadian and US Loran C transmitters on 100kHz were switched off. This navigational service has been running in one form or another since World War 2 and although the sideband lines could be useful as a frequency calibration aid, the 'galloping horses' sound is annoying when trying to work weak CW stations on 136kHz. At the time of writing the European, Russian, Saudi and Japanese Loran chains were still active and it seems unlikely that the Loran sites close to the UK will close down any time soon.

AUSTRALIA ON 500kHz. The Wireless Institute of Australia has finally agreed a system of special licenses for VK amateurs interested in conducting experiments on the 505-515kHz band. The power limit will be 25W EIRP and the licences will be issued under similar conditions to the UK NOVs, with detailed applications having to be made. A CW beacon, AX2VKW, has been on air for some time on 507kHz and is being received over a wide area. As of the end of August a few permits are starting to come though so activity will be ramping up. VK listeners are reporting good signals from the seven active ZLs so it should be possible for the VKs to cross the Tasman Sea in the reverse direction.

SAQ SUCCESS. The historic VLF station at Grimeton in Sweden had a successful 'Alexanderson day' test in July when the 17.2kHz alternator transmitter was run up to commemorate the pioneering engineer. Despite the summer static the transmissions, which took place between 0900 and 1200GMT, were received by over 200 listeners in Europe and by three in the US.

HF

Four new DXCC entities are expected this month



QSLs from St Eustatius and Sint Maarten, two of the islands affected by changes to the Netherlands Antilles (see text).

LOOKING AHEAD. August was yet another dull month as far as HF propagation was concerned – and the weather was pretty dismal too (coldest August for 17 years, apparently)! But October looks set to see plenty of band activity as the DX news below reports. That said, it looks as though the planned expedition to Jarvis Island (KH5) has been delayed due to problems in getting the necessary permits from US Fish and Wildlife, the latest news being that it will now take place in November next year. This seems to be an all-too-frequent problem nowadays with certain locations. Obviously radio amateurs have no wish to affect local ecosystems, but it should generally be feasible to find a solution that is acceptable to all parties. Apropos of which, I saw one report to the effect that the radio amateur due to take up a work assignment on Gough Island (reported below) is being restricted to vertical antennas as Yagis might pose a hazard to birdlife. It isn't the first time this has happened and I find it quite astonishing. From my own experience, and that of others, birds absolutely love Yagis, which they treat exactly the same as trees. The biggest problem I have is that the thin ends of my antenna elements sag worryingly when an overfed pigeon alights on one of them! In contrast, wind turbines are, I believe, a serious hazard to birdlife, as the tips of the blades move too fast for the birds to get clear, and yet wind turbines are supposed to be beneficial to the environment. It's a funny old world sometimes.

NETHERLANDS ANTILLES. The big excitement this month takes places on 10/10/10, an easy date to remember. On that day two DXCC entities cease to exist and four new ones will emerge (we believe). How so? On 10 October the Netherlands Antilles will cease to exist as a country within the Kingdom of the Netherlands and the status of the various islands which have formed the Netherlands Antilles will change as follows:

- St Maarten and Curaçao will become an independent country within the Kingdom and will be granted the same status that Aruba attained in 1986.
- Bonaire, Saba and St Eustatius (also called BES islands) will be given the status of a public body (a kind of special municipality) in the Netherlands and will therefore fall directly under Dutch rule. What exactly this means for the DXCC status of these entities isn't 100% clear until the ARRL makes a formal announcement, but the best guess at the time of writing appears to be that the two current DXCC entities of PJ2/PJ4 (Leeward Islands) and PJ5/PJ6/PJ7 (Windward Islands) are expected to be deleted. At the same time, new entities are likely to emerge as follows:
- Both St Maarten (PJ7) and Curacao (PJ2) will become a new DXCC entity.
- Bonaire (PJ4) will become a new DXCC entity.
- Saba (PJ6) along with St. Eustatius (PJ5) will become a single DXCC entity due to their proximity to each other.

In anticipation of these changes several groups have announced their intentions to operate from the 'new' entities. I won't list them all here, except to mention that one of the teams going to Bonaire hopes to have access to the antennas of the Radio Nederland relay station on the island for at least some of the time, which should make for some loud signals! Your best bet is probably to watch the main DX news feeds such as DX World at the time or, indeed, to listen to the explosion of activity on the bands, which will almost certainly take place. Although all these islands are easy to reach and will undoubtedly be activated regularly in the years to come, that certainly won't prevent a feeding frenzy on Day 1 when DXers join in the excitement of adding some new band countries to their totals.

Just as a historical note to the above, the *Daily DX* reported that, during the creation of the ARRL's first post war (WWII) *DXCC Countries List*, the Netherlands West Indies (PJ) was one DXCC entity, which included the islands of Aruba, Bonaire, Curacao, Saba, St Eustatius and St Maarten. During the late 40s and early 50s these islands were forbidden radio communications between their amateur stations and amateur stations of other countries. The ban was lifted on 11 March 1952. In 1954 The Netherlands advanced the Netherlands West Indies from a colonial territory to a domestic autonomy within the Kingdom of the Netherlands, which was the beginning of the Netherland Antilles. The May 1955 issue of QST magazine announced the recognition of two DXCC entities within the Netherland Antilles, which was effective 1 July 1955, but with a starting date back dated to 15 November 1945 for DXCC credit purposes. At that time there was no set distance rule but rather a 'does it have adequate geographical separation from a parent nation' rule. So then there were two DXCC entities. One in South America, which at the time included Aruba, Bonaire and Curacao, and a second in North America including Saba, St Eustatius and St Maarten. On 1 January 1986 Aruba was constitutionally separated from the Netherland Antilles, shortly afterwards receiving the P4 prefix directly from the Netherlands and not the ITU.

OTHER DX NEWS. RI1FJ is now active from Franz Josef Land. Note that this is a new prefix, not a typographical error. This is the former R1FJT station from 2006-2008. Eugene, UA4RX is on a one-year tour at the weather station. He has been on 20 and 17 CW so far, typically between 0130-0200Z and 0900-1200Z. QSL via Eugene Chepur, PO Box 1122, Kaliningrad, 236019 Russia.

Pierre, ZS8M has been increasingly active on the bands from Marion Island since the supply boat left and since he was able to erect his SteppIR vertical antenna. He seems gradually to have been learning to cope with the inevitable pile-ups and more and more UK stations are reporting successful contacts with him.

K5LBU and others will activate Botswana from 21 October to 4 November. Each team member will use his own call, so look out for A25CF, A25BI, A25AN, A25ZY, A25DF, A25MB and A25ASL. They expect to be in the CQWW DX Phone contest with the call A25HQ. QSL that one via K5LBU. Other callsigns, QSL via the relevant home call.

An Italian group will sign 5V7TT from Togo from 10 to 23 October active on 160-10 CW, SSB and RTTY. QSL direct only, to I2YSB, Silvano Borsa, Viale Capettini 1, 27036 Mortara, Italy. Follow the link on I2YSB's website for further details.

G4XUM, G3NKC, G4BWP and G7VJR are going to the Seychelles (S7) from 26 October to 2 November. They plan to be on all bands and modes with vertical antennas by the beach. The main focus will be the CQWW

Phone Contest. Most of the operating outside the contest will be on CW.

Willi, DJ7RJ, goes to Reunion Island (FR) from 23 September to 3 October, followed by Madagascar as 5R8RJ from 4 to 29 October, hoping to be on 160-10 CW and SSB. QSL to his published address.

John, ZS1LF (ex ZR1JON), was heading to Gough Island (AF-030) in September for a one year work assignment as the team leader and radio technician. This will be his second time to the remote island. He is brand new to HF but plans to be active in his spare time as ZD9GI. Activity is not expected until after the *SA Agulhas* drops off the team and their supplies. This will most likely be sometime in October. He will have a TS-480, an amplifier and dipoles. Initially he will be on SSB only and then afterwards on the digital modes. ZS1A (ex ZS6JHS), will be the QSL manager.

A four-man team will operate from Sable Island this month (21 to 29 October), signing their own calls as follows: CY0/AA4VK, CY0/AI5P, CY0/N0TG and CY0/VE1RGB. Further details from the team's website.

Members of the Virginia DX Century Club will activate Guantanamo Bay between 5 and 19 October, with the following callsigns: KG4AS, Tip (N4SIA); KG4QW, Quint, (K4CQW); KG4SS, Stu (K4MIL); and KG4WV, Bill (W4WV). They will operate all bands and modes. It is worth mentioning here that KG4+ two letter calls are generally Guantanamo, whereas KG+three letter calls are the same as any other US 4-area callsign. This is often a source of confusion, particularly to PC-based logging programs

Bill, N7OU, is heading back to the Cook Islands and plans to operate as E51NOU from Rarotonga (OC-013), South Cooks between 18 October and 13 November during his spare time from volunteer work. Bill will be running 100 watts into a vertical on 40 through 10. QSL via N7OU.

SP5DRH and SP3BQ are off to Temotu Province (H40), from 7 to 22 October, targeting 160 and 80. H40KJ will be Jacek, SP5DRH, and H40BQ will be Jerzy, SP3BQ. They say their Fiji experience in October 2009 got them ready for another operation. They might also operate as much as three days from Honiara, H44. As with their 2009 operation, SP5EWY will be their pilot. Main mode will be CW, but some digital operation is planned on 30 and 20. They will do some high bands operation if propagation is good. AC availability will limit them to one station at a time. They will be well equipped, with a pair of Elecraft K3/100 rigs and two 600W amplifiers, a 26m Spiderbeam pole, a second 18m one, a GP7 antenna made by SP7GXP, two laptop computers and various interface devices, preamps, etc. Ongoing details and log search are on the web. QSL direct or bureau to their home calls.

Kevin, VK4KEV (ex VK4FRAT), expects to be operating as VK0KEV from Macquarie Island sometime between the end of October and beginning of December, for as much as 18 months. He expects to be active mostly on 40 and 20 SSB and digital. He is "presently waiting on the shipping schedule firming up. I also require formal approval from the base," he says.

Finally, do remember that the CQWW Phone Contest (30/31 October) will be a magnet for contest expeditions, many of which tend to appear before and after the weekend on other modes and/or the WARC bands. As always, the most comprehensive list of announced contest operations is to be found on the NG3K website. If you plan to send in a log for this year's contest, do note that the submission deadline has been brought forward.

CORRESPONDENCE AND TABLES. Peter, G3HQT says the bands have been so quiet that he even considered starting a 'Worked all Italian stations' list to fill the time! Nevertheless, on 30m he managed to bag V31BD, C6AMS, T6MB, AP2TN, 3B8CF, A71EM, VQ9JC, FO5RH and DU9/DL5SDF on CW, A61AB on RTTY, plus ZL30MDG and C5YK on PSK31.

Karol, G0UNU says, "I wrote to you well over a year ago, prior to my trip to Ascension Island in May 2009 where I operated as ZD8KR. On this occasion I wish to drop just a note about 30m, a totally new band for me. In late June I put-up a Marconi type of wire aerial as described by Mike, G7FEK. My activity was restricted to evening hours only and despite only fair propagation conditions, there were regular good openings worldwide. Using 200W of CW I was able to have QSOs with 6 continents, 60 countries with DX stations like LU5FF, ZS6X, 5N5OK, VE3EGN (used 80m long kite vertical), 4LIUN, EK6LP, EX2A. Stations like T6MB 9X0TL, AP2TN were also heard well. 30m is a lovely band for CW enthusiasts including operators who wish to rejuvenate their skills, like myself". To which I can only say, I couldn't agree more Karol.

Steve, GW4BKG says, "I was interested to read in your HF column in the latest *RadCom* about working NA during the Sporadic-E season with a basic setup. I can report that I was able to work K1IED on 12m SSB on 3 July using just 100W to a low dipole. However I suspect a lot of this was contributed to by Larry's 5 el quad at 80ft. However, right time, right place as the saying goes!"

Nigel, G0RPM writes, "This year is going well so far and getting up early in the morning has been productive in catching some early DX. Had lots of fun in the IOTA contest too. Best DX in last couple of months is as follows: JY7RAC on 20 SSB, JW5E, J28AA, 4K9W, KH7XS and A65BD on 20 CW, FM5LD, KP2CW, ZA0/HA5X and UA2FL on 40 CW, 5N7M on 40 SSB, 5Z4ES, TR8JH, CE1TKL, ST2AR, TL0A, E21YDP and KP4JFR on 20 RTTY. What surprises me is that CW is yielding more entities than my favourite mode RTTY!" Perhaps not surprising, Nigel. The death of CW has been greatly exaggerated!

2010 ANNUAL TABLE
(starting 1/1/10, sorted this month by 12m totals)

Call	10m	12m	80m	160m
MD0CCE	13	94	85	101
G3SED	27	85	46	68
MU0FAL	49	72	65	51
G3TBK	35	58	79	100
G3HQT	52	47	81	0
GW1PJP	36	39	0	0
GW4BLE	89	28	41	57
G1UGH	37	26	0	0
GW0RYT	40	24	6	0
G4XEX	10	14	29	1
MW0MAU	7	12	6	0
GW0LKJ	0	9	0	0
MW0DNF(qrp)	5	7	10	0
G6CSY	12	2	44	21
G4FVK	13	1	29	0
MM0DXH (SSB)	14	0	26	14
M0VKY	13	0	38	38
G4ATA	0	0	105	0

Though the datamodes continue to increase in popularity. And for many of us, both CW and data have one great advantage, in that we can operate them at all hours without disturbing other members of the household!

SILENT KEYS. Seattle native Dr. Leonard J Kaufer, KH0AC (ex KG6SW, W7DXH), passed away recently. He was 86. Len moved to the US trust territory of Saipan in the 1960s and was a Jesuit priest. There he met and married a local island girl, thus ending his career in the ministry. Len then began working for the Headquarters Division of the Department of Education for the Trust Territory of the Pacific Islands (TTPI) in 1970. For many, Len was their first contact with this semi-rare DXCC entity.

Fergus, YV1NX has also become a Silent Key. He was a member of FOC (First Class CW Operators Club) and widely known in ham radio. His daughter says Fergus was seemingly in perfect health when he had an aneurism and died suddenly. Fergus gained prominence in DX circles as MP4QAL in Qatar in the 1950s, starting in November, 1955. Qatar was a very rare and exotic DX entity at the time.

Finally, I hope to see many of you at the RSGB Convention in October. It is a great opportunity not only to see DXpedition presentations, but to meet many fellow HF (and indeed VHF) enthusiasts, hear about the latest hardware and software, and much more.

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 **December** issue by **Friday 22 October**.

WEBSEARCH

5V7TT: www.i2ysb.com
A25 expedition: www.qsl.net/a25-2010
DX World: http://dx-world.net/
H40 by SPs: http://www.sp5drh.com/h40/
NG3K: www.ng3k.com
Sable Island: www.cy0dxpedition.com

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IF-2000
IF Interface board for the FT2k & FT-950. £219.95
See http://www.hamradio.co.uk/acatalog/RF_Space.html for more details. Both on DEMO at Chertsey.

Perseus VLF-LF-HF Receiver

PERSEUS is a VLF-LF-HF receiver based on an outstanding direct sampling digital architecture.

See Peter Hart's review in May 2010. "Currently my new No.1 in terms of close-in dynamic range"

ML&S are Sole Distributors for Perseus in the UK and Ireland NOW IN STOCK!

£699.95

PERSEUS = Pretty Excellent Receiver for Software-Eager Unperceivable Signals

It features a 14 bit 80 MS/s analog-to-digital converter, a high-performance FPGA-based digital down-converter and ...eed 480 Mbit/s USB2.0 PC interface.

Only £99.95

...ADiO WR-G31DDC ...ALIBUR

A high-performance, low-cost, direct-sampling, software-defined, shortwave receiver with a frequency range from 9kHz to 50MHz.

NOW IN STOCK, Only £649.95

Want to dabble in D-Star without the expense of a radio?

New Product!

DV-AP-Dongle

NEW

The DV Access Point Dongle, (DVAP for short) by Internet Labs, provides a way to connect to the international D-Star network. The DVAP is used with a PC/Mac and an Internet connection. Unlike the DV Dongle, the new product allows amateur radio operators to walk away from the computer and transmit/receive D-Star voice and data using a two meter D-Star radio. Note that a D-Star radio is required to communicate with the DVAP and an Internet connection is required to communicate with the D-Star network. **NOW IN STOCK! £219.95. See web for more details.**

DV-Dongle

The DV Dongle connects to your PC or Apple Mac via a USB port and provides encoding and decoding of compressed audio using the DVSI AMBE2000 full duplex vocoder DSP chip. AMBE technology is used in all D-Star radios to provide efficient voice transmissions. It is also used in some HF digital protocols by vendors like AOR. The DVTool application used with the DV Dongle may be installed and run on Microsoft Windows XP/Vista, Mac OS X Leopard, or many flavors of Linux.

In stock, works with MAC or PC. £199.95

HB-1A Ultra Compact 3 Band CW Transceiver

Offering up to 4 Watts output on 40/30/20M Bands, this tiny HF portable is powered by 8 x AA cells and is aimed at the serious QRP enthusiast and has performance similar to that of the Elecraft KX-1.

- 20 meters, 30 meters and 40 meter amateur bands.
- CW Transceive, SSB receive.
- Receiving from 5 MHz to 16MHz.
- Maximum transmission power of about 4 watts on external 12V.
- Weight 350Grams (approximate).
- Battery compartment to hold 8 rechargeable AA cells.
- Built-in auto function keys.
- DDS VFO with 20 frequency storage memory.
- Digital dial with LCD technology.
- Automatic keyer with the CQ programmable with your call.
- RIT 10 Hz, 100 Hz.
- Frequency conversion super- heterodyne receiver.
- Unit will operate with voltage supply from 8-14 VDC.
- Built in AGC function.

ML&S Price: £249.95.

Call or see website for further details.

BACK IN STOCK!

The SR2000A Frequency Monitor

ML&S: £1959.95

Combines a spectrum display unit and receiver in a single cabinet. Up to 40MHz display bandwidth may be selected and minimum 1kHz RBW. The embedded receiver provides continuous coverage from 25MHz to 3GHz in AM, FM & WFM modes. The FFT SEARCH function enables you to locate elusive transmissions FAST, a free PC package (from the AOR web site) further enriches operation. Video images can be displayed on the LCD (PAL + NTSC). The interconnections are incorporated "in the box" along with an internal speaker.

Super Antennas USA

Super Antenna ChapStick
MP-1 80m-10M Portable Antenna supplied complete with tripod & 80m coil. .....Only £159.955

Super Antenna MP-1 Rotary Dipole
10-80M with (Incl. 80m Coils) Collapses into a small carry bag. .....Only £299.95
Or Deluxe version with Tripod. £389.95

Super Antenna YP-3 "Beam in a Bag" 80-10M (inc WARC) 3 ele portable beam supplied with carry bag £399.95

The complete range of Super Antenna products and accessories can be found on our web site

Hustler Antennas

Base Station Range
Free standing, max 7.3m tall, 1kW
4-BTV 40/20/15/10m £178.95
5-BTV 80/40/20/15/10m £218.95
6-BTV 80/40/30/20/15/10m .£245.95
17-BTV-S 17m add on for 5-BTV or 6-BTV.....£53.95

Mobile Range
200W or 1kW, both stocked. RM10 to RM-80 10M to 80m single-band whips. £24.95 to £56.95
The full mobile and base range and accessories available from stock, including the high power 1kW mobile range.

Morse Keys at ML&S

Begali

For the entire range with choice of bases and contacts and prices please see our website or BEGALI on www.i2rtf.com


Begali Sculpture


Begali Signature


Begali Camel Back

Begali chose ML&S because they wanted a quality company to sell the very best Morse Keys in the World. ML&S are sole distributors for these beautifully crafted keys in the UK.

For full details see our website or send 40p in stamps for full colour catalogue.

Kent Morse Keys

The best British range of keys money can buy!

The Kent twin paddle Morse key. £84.95. Kent Single Paddle Key. £72.85. Kent KT-1 Professional. £79.90.

VENTUS WX-928-ULTIMATE

The NEW WX-928 really is the ULTIMATE in professional weather stations, offering the usual feature set of the WX-831 but uses a Anemometer with solar cells , Satellite Meteotime forecast over the next 4 days and a massive split screen.

Only £199.95

Description:
This weather station is as called the ultimate weather station. It provides you with local weather data from anemometer, rain gauge and thermohygrometer sensor. All these local measurements from your garden can you save on your pc by using the pc-software included. Furthermore it receives a 4 days forecast by satellite from cities all around in Europe. Just find your city and the weather station updates automatically.

VENTUS WX-831

New much improved wireless Weather Station

ML&S Price: £119.95.

Options: Additional wireless temperature monitors: £24.95. PSU to run the WX-831 from 240V: £19.95

DX Engineering Products stocked at ML&S!

New! DXE-UT-8213 Coax Cable Stripper
ONLY £45.99!

This tool prepares RG-8, RG-213, 9913F7, LMR-400 (not LMR-400UF) and other similar size coax cable for installation of a PL-259 connector - or DXE-N1001S two-piece Type N connector (requires a slight additional trimming of the cable center conductor length).

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

Open six days a week. Mon - Fri: 9.30am - 5.30pm Sat: 9.00am - 5.00pm

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The World's Favourite Ham Store

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Web: www.hamradio.co.uk
E-mail: sales@hamradio.co.uk

NISSEI — One of the oldest names in Ham Radio

Compact metal body Cross Needle Meters.
Fantastic value all PEP & Average reading.

Nissei	RX-103	1.6-60MHz, 20/200/2kW	£49.95
Nissei	RX-203	1.8-200MHz, 2/20/200W	£49.95
Nissei	RX-403	125-525MHz, 2/20/200W	£49.95
Nissei	RX-503	1.8-525MHz, 2/20/200W	£69.95

New Range to ML&S, HUGE DISPLAY, PEP & Average reading.

Nissei	TX-102	1.6-200MHz, 2/20/200W	£59.95
Nissei	TX-402	125-525MHz, 2/20/200W	£59.95
Nissei	TX-101A	1.6-60MHz, 20/200/2kW	£84.95
Nissei	TX-502	1.6-525MHz, 2/20/200W	£89.95

DAIWA — Beautifully constructed. Benchmark performance.

Cross Needle SWR Power Meters

Daiwa	CN-801S	900MHz-2.5GHz, 2/20W	£99.95
Daiwa	CN-801VN	140-525MHz, 20/200W	£99.95
Daiwa	CN-801HP	1.8-200MHz, 20/200/2kW	£99.95
Daiwa	CN-101L	1.8-150MHz, 15/150/1.5kW	£89.95
Daiwa	CN-103LN	140-525MHz, 20/200W	£89.95

NEW Mini VNAPro Now with Bluetooth! Only £349.95

The new miniVNA PRO, the big brother of the well-known miniVNA, is an extraordinary and unique handheld vector network analyzer that makes available a multitude of new features and capabilities which are perfect for checking antennas and RF circuits for hams and commercial users. Together with your PC/Laptop, you can add to your laboratory the further advantages of having this first-class VNA instrument. This is the first world's wireless analyzer able of scanning and sending the data using an integrated Bluetooth module to a remote PC/Notebook up to 100 meters from the miniVNA PRO's location. This makes real-time antenna setup easy!

MiniVNA original still available (without Bluetooth): £259.95

MyDEL CG-3000 £289.95

CG-3000 shown with optional remote

With 200W and 200 memory channels

● Tunable frequency: 1.8 - 30 Mhz with long wire antenna from 8 meters ● Input impendence: 50 ohms ● Input power: 10 - 200W PEP ● SWR: <2:1 ● Power supply voltage: 12V +/- 10% ● Current consumption: <0.8A ● Auto tuning time: Approx. 2 seconds (first time tuning) Less than 1 second (return to memory frequency) ● Memory channels: 200 ● Weight: 1.8 KG ● Size: 310 x 240 x 72mm (L - W - H)

NEW! Remote control for the CG-3000 and CG-5000. £39.95

CG-5000MkII £559.95

At last! 600W PEP High Speed Remote Tuner from MyDEL

● Tuneable frequency: 1.8 - 30Mhz with long wire antenna from 8 meters ● Input impendence: 45-55 ohms ● Input power: 10 - 600W PEP ● SWR: <2:1 ● Power supply voltage: DC 13.8V ● Current consumption: <1.5A ● Memory channels: 800 ● Auto tuning time: 0.5-6 seconds (first time tuning), less than 0.2 second (return to memory frequency) ● Weight: 3 Kg. ● Size: 385mm x 280mm x 110mm (L - W - H)

Palstar

New! Palstar Commander HF-2500 1.5kW Amplifier

Palstar are pleased to announce a new range of HF Linear Amplifiers built to the highest standard. We have started with the "Commander HF-2500" which is available from stock. The 2m & 6m versions will be available during early 2010.

ML&S: £3499.95

AT-500 600W PEP Antenna Tuner	Special Price £349.95
NEW AT-Auto Now handles a massive 1500W	£1099.95
AT-1500DT 1500W Differential Antenna Tuner	£449.95
AT-2KP (2000W) Antenna Tuner	£459.95
NEW AT-2KD The AT-1500DT and the AT-1KP have been combined into a new 2Kw Tuner	£429.95
AT-4K (2.5kW) Antenna Tuner	£769.95
AT-5K (3.5kW) Antenna Tuner	£999.95
BT-1500A Balanced Antenna Tuner	£599.95
PM-2000AM Power/SWR Meter	£159.95
Palstar Dummy Loads	
DL-1500 (1.5KW)	£119.95
DL-2K (2kW)	£229.95
DL-5K (5kW)	£349.95
Palstar R30A Receiver	
Palstar R30A, fitted Collins filters for SSB & AM	£649.95
MW550P Active Preselector & ATU for AM & 160M reception	£259.95
SP30 Matching Desk Speaker	£69.95
AA30 Active Antenna Matcher 300kHz-30MHz	£109.95

LDG

LDG Auto Tuner Range

NEW AT-600pro	600W Auto ATU	£329.95
AT-100proII NEW	Desktop tuner covering all frequencies from 1.8-54 MHz	£199.95
AT-200pro	Designed for new generation of rigs	£214.95
AT-1000Pro	1kw 160m-6m (1.8-54MHz) High speed Auto ATU, tuning range 6-1000Ohms	£510.95
AT-897Plus	Bolt-on Alternative Auto Tuner for the FT-897. Wider tuning range and cheaper too!	£183.95
IT-100	New version of the AT-7000	£159.95
YT-100	NEW AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control	£173.95
Z-817	Ultimate autotuner for QRP radios, including the Yaesu FT-817D	£122.95
Z-100Plus	Ultimate autotuner for Yaesu FT-817D	£143.95
Z-11ProII NEW	Portable compact & tunes 100mW to 125W	£159.95
RCA-14	4-way DC Breakout Box	£49.95
KT-100	Dedicated tuner for Kenwood radios	£173.95
RBA-1:1	Probably the best 1:1balun out there	£35.71
RBA 4:1	Probably the best 4:1 balun out there	£35.71
FT-Meter	Neat Analogue back-lit Meter for FT-897/857. S-meter, TX Pwr, ALC Etc	£45.95
	NEW FTL- Meter Jumbo version of the famous FT-Meter	£79.95

Flex SDR Radio

Flex 5000A Ultimate, fitted Second Receiver & Internal Auto ATU	£3395.95
Flex 5000A Basic	£2495.95
Flex 3000	£1399.95
Flex 1500 New!	£549.95

Miracle Antenna

Miracle Antenna is back!

With some important Hot New products.

Introducing the New MMD Mixed Mode dipole.

The first and only electrically centre-fed mechanically end-fed dipole ever offered to the Ham Radio market, the MMD provides a host of benefits never available in an end-fed dipole.

** Tunes its main band with no tuner - tunes other bands with a regular tuner*
** Feedline not frequency-dependant - may be lengthened or shortened at will*
** Feedline currents and RF in shack eliminated without extra chokes or baluns*
** No tension required to support feedline - opens endless installation possibilities*
** Common-mode noise eliminated for the quietest receiver performance ever*
** Connector and 16-ft feedline included - ready to operate right out of the box*

MMD-17	17M MIXED MODE DIPOLE, + 5 BANDS WITH ATU	£89.95
MMD-20	20M MIXED MODE DIPOLE, OTHER BANDS WITH ATU	£89.95
MMD-30	30M MIXED MODE DIPOLE	£99.95
MMD-40	40M MIXED MODE DIPOLE	£99.95
Miracle Ducker iL	HF-70cm Mini ATU with BNC	£109.95
Miracle Ducker	HF-70cm with PL-259	£109.95
Miracle Antenna	HF-70cm fitted with telescopic	£109.95

Wonder Wand Antennas U.K.

The UK's favourite rig-mounted antenna system

NEW! WonderWand Widebander
1.8-460MHz with Monster 1.8M Whip! £119.95

NEW! WonderWand Mk4
7-432MHz antenna with 1.8m Whip £89.95

Wonder-TCP
40-10m Tuneable Counterpoise £59.95

HF Linear Amplifiers

Yaesu VL-1000 Quadra	£3999.95
Icom IC-PW1Euro	£3979.95
Ameritron ALH-811HXCE	£999.95
Linear Amp Ranger 572B	£1275.00
Linear Amp Challenger Mk1V	£2295.95

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

WE WANT YOUR USED EQUIPMENT!

Used equipment sitting at home gathering dust?
MAXIMUM PRICES PAID
For genuine good condition equipment

Call us now and get an instant quote to buy & collect from your home. Or send your list to: sales@MLandS.co.uk

New! GAP Antennas Available from stock

GAP ANTENNA PRODUCTS

Eagle-DX 6-Band, 40-10m 2kW .....Only £325.95
Titan-DX 8-Band, 80-10m 2kW .....Only £345.95
Voyager-DX 4-Band 160-20m, 2kW 45ft tall!.....£385.95
Challenger-DX 8-Band 80—2m (no 17).....£295.95

Alpha Delta Antennas

ALPHA DELTA COMMUNICATIONS, INC.

Alpha Delta are a USA Manufacturer of high quality coax switches, lightning (surge) protectors and the best wire antennas money can buy.

Delta-2B	2-way position SO-239 switch (1kW) for use up to 1.3GHz **£54.15**
Delta-4B	4-way position SO-239 switch (2kW) for use up to 500MHz..... **£75.60**
Delta-4BN	4-way position N-type switch (1.5kW) for use up to 1.2GHz **£86.80**
AD-ATT3G50	0MHz to 3GHz (200W) surge protector. N-Female Connector..... **£49.95**
AD-ATT3G50/HP	0MHz to 3GHz (2kW) surge protector. N-Female Connector. **£48.89**
AD-ATT3G50U	0MHz to 500MHz (200W) surge protector. SO-239 Connector..... **£39.95**
AD-ATT3G50U/HP	0MHz to 500MHz (2kW) surge protector. SO-239 Connector..... **£44.95**
End Insulators	Dog Bones. They are extremely rugged, UV and RF resistant **£1.53**
Delta-DX-A	160m, 80m and 40m 1/4 twin slope trap antenna. This antenna combines the tremendous DX firepower of the 1/4-wave slope with the wide bandwidth of the 1/2-wave dipole. One leg is 67ft long and the other is 55ft long **£79.95**
Delta-DX-B	160m, 80m, 40m and 30m single slope trapped antenna. This antenna is designed for limited space installations, were room does not allow for large wire antennas; it only requires 60ft of space providing amazing DX performance at installation heights of 35ft **£84.96**
Delta-DX-CC	80m, 40m, 20m, 15m and 10m dipole. This antenna is parallel length dipole with no traps; overall length is 82ft **£136.90**
Delta-DX-DD	80m and 40m dipole. This antenna is parallel length dipole with no traps; overall length is 82ft **£89.95**
Delta-DX-EE	40m, 20m, 15m, 10m dipole, it can be used on 30m, 17m, 12m with an ATU. This antenna is not trapped, and has an overall length of 40ft..... **£119.95**
Delta-DX-LB	160m - 80m, and 40m Low Band dipole. This antenna performance and 2:1 VSWR bandwidth depends on the height and surrounding objects; overall length is 100ft. **£119.96**
DX-LB-PLUS	160m, 80m, 40m and 20m - 10m Low Band dipole. This antenna performance and 2:1 VSWR bandwidth depends on the height and surrounding objects; overall length is 100ft. **£162.45**
DX-Series	Full-size utilized monoband dipole. These dipoles are using the Delta-C Centre Insulator with built-in Arc-Purge Surge Suppressor. **DX-20:** 20m Monoband Dipole at 33ft long **DX-40:** 40m Monoband Dipole at 66ft long **DX-80:** 80m Monoband Dipole at 133ft long..... **£44.95**
DX-Ultra	Medium wave to 30MHz 80ft AM Broadcast Dipole. Efficient, low-noise dipole for military, government, etc., use. **£119.95**
Hardware Kit	contains the following: 1 x Dipole Centre 2 x Dog Bones 1 x Surge Protection Block .....
Delta-SEP	Replacement/spare Arc-Plug™ Static Electricity Protector. This unit is usually attached to the back of the Alpha Delta Centre T Balun **£12.95**

bhi

Great British designed and built products

British Designed & British Built!

DSPKR £154.95
New Desk Top "Noise Away" £154.95
NES10-2MKII DSP Noise cancelling speaker £99.95
NEIM1031MKII £139.95
ANEM "Noise Away" MKII £124.95
NEDSP1061-KBD £99.95
NEDSP1062-KBD £104.95
Radio Mate Compact Keypad £89.95
CAT-MATE Electronic "Y" splitter for Yaesu FT-817 FT-857 & FT-897 .....£49.95
1042 Switch Box £24.95

Super Antennas USA

Super Antenna ChapStick
MP-1 80m-10M Portable Antenna supplied complete with tripod & 80m coil.Only £159.955

Super Antenna MP-1 Rotary Dipole
10-80M with (Incl. 80m Coils) Collapses into a small carry bag. .....Only £299.95
Or Deluxe version with Tripod. £389.95

Super Antenna YP-3 "Beam in a Bag" 80-10M (inc WARC) 3 ele portable beam supplied with carry bag £399.95

The complete range of Super Antenna products and accessories can be found on our web site

Hustler Antennas

HUSTLER

Base Station Range

Free standing, max 7.3m tall, 1kW

4-BTV	40/20/15/10m	**£178.95**
5-BTV	80/40/20/15/10m	**£218.95**
6-BTV	80/40/30/20/15/10m	**£245.95**

17-BTV-S 17m add on for 5-BTV or 6-BTV **£53.95**

Mobile Range

200W or 1kW, both stocked. RM10 to RM-80
10M to 80m single-band whips.. **£24.95** to **£56.95**

The full mobile and base range and accessories available from stock, including the high power 1kW mobile range.

Yaesu Rotators

The best available at very special prices.

Only £319.95

G-450C The most popular medium duty rotator available today. ML&S always guarantee to have the largest stocks in the UK and of course the best prices. Cable extra.

G-250 Ideal simple to use remote control Antenna rotator for light weight antenna installations. Ideal use for turning 4/6/9 element Tonna 2m antennas, 9/19/21 element 70 cm antennas. Also V/U Log periodic (i.e. Maldol LP-1300) and small single and HF dipoles..... **Only £129.95 (Usual RRP £189.95)**

G-550 Elevation rotator for satellite operation .....**Only £299.95**

G-5500 Heavy-Duty PC Controlled Vertical rotator for satellite and EME applications. .....**Only £469.95**

G-650C Medium duty with higher brake torque than the G-450. Supplied with 25m control cable.....**£359.95**

G-1000DXC This new, high-performance rotator is ideal for heavy-duty applications. Its slim-line constructions is ideal for many crank-up tower installations. Rotation range: 450°, with presets..... **£429.95**

G-2800DXC Yaesu's top-of-the-line rotator is for extra-heavy-duty antenna installations. It includes Auto Slow Start and Auto Slow Stop features to avoid sharp jolts to the antenna array and tower. The G-2800A includes a mast clamp and 40 metres of control cable, to simplify installation. Total rotation range: 450°, with presets..... **£819.95**

For the full range of the worlds most reliable Yaesu Rotator products, see our website.

COMET

Comet SWR/Power Meter
CMX 2300 2 separate SWR/Power Meters in one box!...£153.21

Comet Antenna Tuner
CAT-300 300W Antenna Tuner £194.08

Comet Wide-Band Vertical
NEW! Comet CHA 250BKII
80m to 6m with no ATU and no gaps.....£299.95

Comet Rotary Dipole
H-422 4 Band trapped dipole £275.82

Comet HF/VHF/UHF Base Antennas

CWA1000	80,40,20,15,10 trapped dipole	£99.95
GP1	144/430 MHz 3.0 / 6.0dbi 1.25m.....	£59.95
GP3	144/430 MHz 4.5 / 7.2dbi 1.78m.....	£69.95
GP6	144/430 MHz 6.5 / 9.0dbi 3.07m.....	£99.95
GP9	144/430 MHz 8.5 / 11.9dbi 5.15m.....	£139.95
GP15N	50/144/430 MHz 3/6.2/8.6dbi 2.42m	£99.95
GP98	144/430/1200 MHz 2.94m long.....	£139.01

Comet Handy Antennas

BNC-750	BNC HF whip 7-50MHz TX/RX	£81.69
CH32	BNC 144/433/900Mhz 45mm	£20.39
CH-99	BNC Tel Whip 70-1000MHz 195-1135mm L	£20.38
CHF816	16 3.5/28/50MHz 74cmL 10W/Yaesu FT817 ...	£51.03
RX5	144/430/900MHz 44cm L 8W SMA.....	£30.60
RX7	144/430/900MHz 44cm L 8W BNC	£30.60
SH95	144/430/1200MHz 37cm L 10W BNC	£30.60
SMA3	144/430/900MHz 25cm L 10W SMA.....	£25.50
SMA99	70-1000MHz 1.1mm max L Tele SMA	£17.32

Comet Duplexers

CF360A	28/50MHz w/leads SO239 - PL259/PL259	£40.82
CF416A	44/430MHz w/leads SO239 PL259/PL259.....	£35.71
CF416B	144/430MHz w/leads SO239 PL259/N male ...	£35.71
CF503C	50/144MHz Sockets SO239 - PL259/PL259 ...	£45.93
CF530C	50/144MHz w/leads SO239 - PL259/PL259 ..	£45.93
CF530A	50/430MHz w/lead PL259 SO239/SO239	£40.825
CF4160B	144/430MHz Sockets SO239 PL259/PL259	£33.66

Comet Triplexers

CFX431A	144/430/1200MHz N socket/PL259/N/N	£51.03
CFX514N	50/144/430/MHz SO239/PL259/PL259/N	£51.03

DIAMOND

Base Antennas

X-30	2/70, 3/5.5dB, 1.3m Long	£69.95
X-50N	2/70, 4.5/7.2dB, 1.7m Long.....	£75.95
X-300	2/70, 6.5/9dB, 3.1m Long.....	£129.95
X-7000	2/70/23, 8.3/11.7/13.7dB 5m Long	£225.95
V-2000	6/2/70, 2.15/6.2/8.4dB, 2.5m Long.....	£124.95

Mobile Antennas

NR-770R	100W, 2/70, 3/5.5dB, .98m Long.....	£35.71
NR-770RSP	As above but spring loaded	£40.82
NR-7900	2/70, 3.2/6.4dB, 1.46m Long.....	£51.04

Duplexers/Triplexers

MX-72N	1.6-150/400-460MHz Duplexer.....	£45.94
MX-62M	1.6-56/140-470MHz Duplexer.....	£69.44
MX-610	HF/6+2+70 (for FT-8900)	£73.52
MX-2000	6/2/70 Triplexer	£85.78
MX-3000N	.....	2/70/23 Triplexer

Switches

CX-210A	2-way, SO-239 Die Cast.....	£47.98
CX-210N	2-way, N-Type, Die Cast	£74.54
CX-310A	3-way, SO-239, Die Cast.....	£83.74
CX-310N	3-way, N-Type, Die Cast	£109.28

SWR/PWR Meters

SX-100	1.6-60 MHz, 30W-300W-3KW	£132.78
SX-200	1.8-200 MHz, 5-20-200 Watts.....	£91.91
SX-1000	1.8-1300 MHz, 5-20-200 Watts.....	£230.87
SX-40C	144-470MHz X needle Mobile Meter	£88.85
SX-20C	3.5-150MHz X needle Mobile Meter	£88.85

Huge selection of Diamond products always available ex-stock.

See www.hamradio.co.uk for more details on all of these items ... and much, much more! E&OE

VHF/UHF

Exciting ionospheric propagation on the VHF bands

PHOTO 1: The 50MHz and 28MHz Yagis at the QTH of David Gillies, MM0AMW.

PROPAGATION SYNOPSIS. Ionospheric propagation during August was probably better than many VHF operators had dared hope for. Sporadic-E (Es) propagation continued to be reported throughout the month although the intensity and duration of openings were considerably reduced compared to events at the beginning of the summer season. Openings in August via Es were reported nearly everyday on the 50MHz band but as few as eight days higher up on the 70MHz band. Surprisingly there were two openings reported on the 144MHz band during the first week of August with DX contacts being made on paths over 3000km distant.

With solar activity on the rise, August was a good month for Auroral (Au) back-scatter and Auroral-Es (Au-Es) openings. The latter mode was reported on the 50MHz band throughout much of the month, but only two events noted on the 70MHz band and none whatsoever on the 144MHz band. Although there were considerably less auroral openings, some did reach as high as the 144MHz band with contacts being made up to 1800km distant.

The Perseids meteor shower that peaked on August 12 brought with it an increase in meteor scatter (MS) activity on the 50MHz, 70MHz and 144MHz bands with contacts being reported beyond 2000km in some cases. This shower was particularly intense and even allowed a few MS contacts to be made on the 432MHz band.

Tropospheric propagation on the 144MHz and 432MHz bands were generally poor throughout August. However if you were located near the coast in eastern and southern England you could take advantage of marine ducting paths to Scandinavia (LA, OZ, SM) and the Iberian peninsular (EA, CT). For the third month running a few lucky stations situated on the tip of south-western England could also make tropo contacts into the Canary Islands almost 3000km distant.

SPORADIC-E. Single-hop Es events were reported on the 50MHz band throughout much of the month with pan-European contacts being made up to 2000km away. The openings weren't particularly intense, not surprising as August is generally regarded as being on the downward slope after the summer activity peak in June and July. The creation of sporadic ionisation in the E-layer was probably hampered by an almost incessant period of solar wind streaming from coronal holes on the surface of the Sun. High latitude auroral warnings were issued virtually every day throughout the month, indeed it was only on 8, 14 and 30 August that no such warnings were issued.

Despite the downturn in conditions 6m operators reported contacting stations in over 40 countries that included 4O3A (Montenegro), 4Z4TL (Israel), 9A4A (Croatia), 9H1CG (Malta), CN8YR (Morocco), CT7/G3SED (Portugal), D4C (Cape Verde), DL7DF (Germany), E73CW (Bosnia & Herzegovina), EA1JJ (Spain), EA6/M0DLL (Balearic Islands), EA8TX (Canary Islands), EA9IB (Ceuta), ER1SS (Moldova), ES2EZ (Estonia), F2MY (France), HA1XR (Hungary), HB9US (Switzerland), IC8TEM (Italy), IS0/I2MOV (Sardinia), IT9NVA (Sicily), LA5YJ (Norway), LY3B (Lithuania), LZ1CY (Bulgaria), OE3DHS (Austria), OH5NZ (Finland), OK2EI (Czech Republic), OM5MZ (Slovakia), OP2A (Belgium), OY1CT (Faroe Islands), OZ3ZW (Denmark), S53F (Slovenia), SM2A (Sweden), SQ1K (Poland), SV8CS (Greece), T77C (San Marino), TA2AD (Turkey), TF3CY (Iceland), UY1HY (Ukraine), YL2CA (Latvia), YO6EV (Romania), YU5B (Serbia) and ZB3G (Gibraltar).

A multi-hop transatlantic opening to North America was reported on 6 August. Operators in the W1, W3 and W4 call areas were worked on CW between 1340-1615UTC by UK stations in southern England and Wales. On the following afternoon between 1200-1430UTC there was another USA opening, this one favouring stations located in Scotland and the north of England. Amongst the DX stations worked on 7 August were those of K1SIX (FN43), K1TOL (FN44), KA1R (FN42), W1JJ (FN41), W3EP (FN31) and VY2ZM (Prince Edward Island FN86).

Ken Osborne, G4IGO (Somerset IO80) reports that he worked the West African stations of XT2EME (Burkina Faso IK92) on 2 August and TR8CA (Gabon JJ40) on 22 August. Ken mentions that he contacted the station of TR8CA twice, once using the JT65A digi-mode and then an hour later using JT6M, both QSOs being made on 50.220MHz. Alain, TR8CA uses a variety of modes on the 50MHz band and has been known to work into the UK using PSK31, PSK62, RTTY, JT65A, JT6M, SSB and CW.

There were considerably less Es openings on the 70MHz band with only eight events being reported during August.

One of the lengthier openings occurred between 0800-1300UTC on 2 August and later the same evening around 1830UTC. Stations from Somerset (IO80) in the south through to Lanarkshire (IO85) in the north made CW, FM and SSB contacts with stations in Croatia (9A), Czech Republic (OK), Italy (I), Portugal (CT), Slovakia (OM), Slovenia (S5) and Spain (EA). Amongst the DX being worked on the 70MHz band were the stations of CT1FJC, CT1HZE, EA1GAR, EA1KV, IW4BET/4, IZ8DWF, OK2POI, OM3PV, S51DI, 9A2SB and 9A/PA2M. The beacon stations of CS3BFM (Madeira 70.162MHz), CS5BFM (Portugal 70.166MHz), I0JX (Italy 70.088MHz), OE5QL (Austria 70.045MHz) and S55ZMB (Slovenia 70.029MHz) were also heard during the opening.

It is not unknown for Es openings to be reported on the 144MHz band during August but they are relatively rare. So it was good to hear reports of two openings that occurred on 2 and 7 August. The event on 2 August took place between 1145-1240UTC with stations in Ireland (EI), Northern Ireland (GI) and Scotland (GM) working into the Canary Islands (EA8), Portugal (CT) and Spain (EA). Tom Cocking, EI4DQ (Ireland IO51) running an Icom IC-910 transceiver, a GS35B amplifier and 4 x 11-element Yagis contacted the SSB stations of CT1HZE (IM57), EA7AHA (IM76), EA7AJ (IM87), EA8TJ (IL18) at 2705km and EA8TX (IL18) at 2707km. He also heard the station of EA8CQW and the CS3BTM beacon (Madeira IM12) peaking 529.

Gordon Curry, GI6ATZ (Co. Down IO74) reports working CT1HZE and two stations on the Canary Islands, EA8TJ at 3020km and EA8TX at 3022km. He also heard the Madeira Island beacon CS3BTM peaking 599 on 144.401MHz. Unfortunately stations in Scotland didn't get any propagation to the EA8-stations some 3400km distant. Their path was restricted to Portugal with both GM3WOJ and MM0BQN reporting a solitary SSB contact with the station of CT1HZE. John, MM0BQN was only using a Yaesu FT-290

portable transceiver, 25W and a vertical antenna to make this 2060km contact.

The final 144MHz Es opening of the 2010 season occurred between 1720-1810UTC on 7 August. An ionised cloud over northern Spain enabled stations in England and Wales to contact stations in Morocco (CN) and Portugal. As the opening coincided with the RSGB 25W low power contest it created much excitement for both the contesters and the more distant stations. The Moroccan station, CN8NK (Rabat IM63), reported working G4OCO/P (IO70) at 1790km, G4LOH (IO70) 1798km, 2E0NEY (IO81) 1978km, GW7SMV (IO81) 1979km, G4PBP (IO82) 2105km, G4ARI/P (IO92) 2127km and G8XVJ/P (IO93) for best DX at 2167km. Joe Kraft, CT1HZE (Algarve IM57) mentioned working the SSB stations of GW7SMV, G0VHF/P, M0MCV, G3SPJ, G6NHU, G8HGN, G8KQW and G0LMV/P (IO93) at 1901km. Other DX stations heard working into the UK during this opening included CT1EAT (IM68), CT1FJC (IM57), CT1JPK (IM67), CS7/PD0HNL (IM67) and CT7/G3SED (IM57). And that opening brought to an end the 144MHz Es season. It started off really well with many openings in May and June but the months of July and August were most disappointing.

AURORAL-Es. You are probably familiar with temperate zone (mid-latitude) Sporadic-E as this is the type that we in Europe enjoy every summer on the lower VHF bands. But there are other types of Es propagation that you may not be so familiar with and one of them is termed auroral-Es (Au-Es). Auroral zone Es differs from the more familiar temperate zone Es by being generally found at higher latitudes, at night as well as the day and at other times besides the summer. This is because the ionisation originates from incoming auroral particles rather than solar ultra-violet radiation, hence the time and place of Au-Es tends to follow that of the aurora. Often Au-Es is formed from the ionisation remaining from an auroral storm and after its associated geomagnetic disturbance have subsided though it can precede an aurora if sufficient ionisation is present from particle precipitation. At times Au-Es openings can appear, more often on the 50MHz band, when there is little or no indication of any auroral back-scatter opening. It is easy to differentiate between the different propagation modes as signals heard via Au-Es possess pure T-9 notes whereas those scattered back from the auroral curtain sound extremely rough.

During August a considerable number of high latitude auroral warnings were issued either as a result of solar wind streaming from a coronal hole or from a coronal mass ejection emanating from a sun spot on the surface of the Sun. This geomagnetic activity gave rise to at least 10 days during August when Au-Es openings were reported. One such opening occurred during the evening of 4 August following a large-scale auroral back-scatter opening earlier in the day. The first to spot the northerly activity was probably Jim Rabbitts, GM8LFB (Caithness IO88) who heard the JW9SIX beacon (Bear Island, Svalbard JQ94) at 2000UTC peaking 549 on 50.049MHz. At 2150UTC Jim worked the SSB station of OX3KQ (Greenland GP47) with 55 signals at 2514km distant. Later in the evening at 2300UTC he heard the Icelandic beacon TF3SIX (HP94) on 50.057MHz peaking 569 but unfortunately didn't hear any other activity. Other operators in the UK, even as far south as G7RAU on the Isle of Wight (IO90), did manage to hear and work the station of TF8GX (Iceland HP84) but little else. With the vast distances involved in the Arctic region you are more likely to hear an unmanned beacon station rather than an active 50MHz operator. The station of David Gillies, MM0AMW (see **Photo 1**) reported hearing the beacon stations OX3VHF (Greenland GP80) at 2300km, VE8BY (Canada FP53) at 3578km and at 2225UTC the VE4ARM beacon (Canada EN09) peaking 539 over an amazing 5962km path.

Other Au-Es openings during August were directed to the Scandinavian and Baltic regions where there is considerably more activity to be found. Operators throughout the UK reported working 50MHz stations such as ES4EQ (Estonia),

LA2MOA (Norway), LY2X (Lithuania), OH0/DK2ZF (Aland Islands), OH7TE/9 (Finland), OY1CT (Faroe Islands), YL2JZ (Latvia) and 7S5LH (Sweden).

Au-Es events are quite common on the 50MHz band but become much less frequent as the frequency rises. At least ten openings were reported on the 50MHz band during August but only two events were reported on the 70MHz band during the same period. The first occurred during the afternoon of 7 August when 70MHz stations in England and Wales reported working GM4VVX (IO78), GM8RBR (IO67), LA4LN (JP50), LA9DL (JO59) and hearing the OY6BEC beacon (IP62) on 70.035MHz. A less significant Au-Es opening was reported on 21 August by the stations of GM0USI and MM5AJW who heard the OH2FOUR (KP20) and OH5RBG (KP30) beacons and worked the CW station of ES1CW (Estonia KO29).

CQ AURORA! The Sun has been quiet for the last few years but on 1 August it woke up with a vengeance producing a small C3-class solar flare, radio noise bursts and coronal mass ejections (CME) that impacted the Earth on 3 August and 4 August. This gave rise to auroral back-scatter openings (see **Photo 2**) during this period on the 50MHz, 70MHz and 144MHz bands. I've never regarded contacts on the 50MHz and 70MHz as being particularly rewarding during small scale openings such as this as most activity is generally inter-UK (GM to G) or to the nearer reaches of Scandinavia. Often though there is much better DX to be found on the 144MHz band especially if you use CW to winkle out the weak stations. Indeed during the opening on 3 August from 2200UTC through to 0100UTC all the reports were of CW contacts. You can never be a real VHF DXer if you do not use CW! Amongst the contacts made by UK operators were the stations of LA0BY (Norway JO59), LA8NK (JO48), LA/DG5CST (JO39), LY2WR (Lithuania KO24), SM7GVF (Sweden JO77) and many others, particularly in northern Germany.

TABLE 1: Top VHF DX contacts made from the UK during 2010

Band	Mode	Date	UK/Locator	DX/Locator	Distance
6m	Es	31 May	G0JHC (IO83)	9M2TO (OJ05)	10,370km
4m	Es	5 July	G4DEZ (JO03)	D44TD (HM86)	4530km
2m	Es	2 Aug	GI6ATZ (IO74)	EA8TJ (IL18)	3020km
2m	Au	2 May	G4RRA (IO80)	LY2WR (KO24)	1943km
2m	Tropo	18 July	G4CBW (IO83)	EA8TX (IL18)	2989km

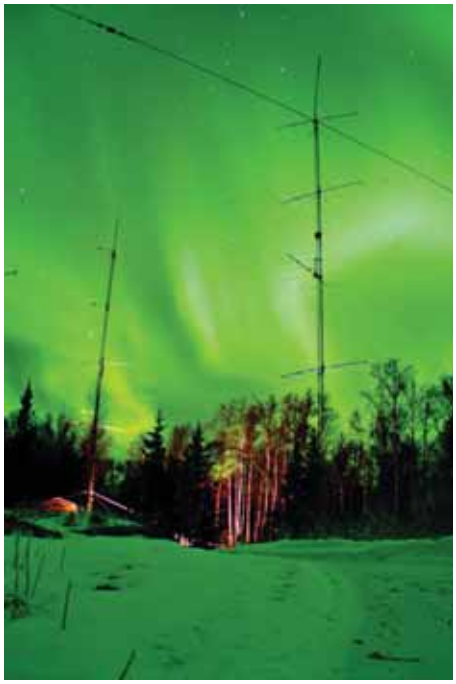

PHOTO 2: Aurora highlights the antennas at the QTH of Kevin Forster, NL7Z.

DEADLINES. Good luck and if you do hear or work any DX stations on the VHF or UHF bands then please send your reports to g4asr@btinternet.com to reach me *by the end of each month*. Alternatively you can send letters to Yew Tree Cottage, Lower Maescoed, Herefordshire, HR2 0HP.
73 David G4ASR

GHz Bands

14th International EME Conference was an outstanding success – and it's coming to the UK in 2012

PHOTO 1: WA5WCP's portable EME dish set up in the car park of the Westin hotel. Paul has towed his dish to 7 States in the USA to give 23 and 13cm operators the chance to gain WAS.

THE CONFERENCE. Every two years the amateur Moonbounce (EME) community comes together to attend the International EME Conference. Dallas, Texas, was the venue in 2010 and this was the 14th Conference in the series, the first two being held in the USA in 1966 and 1968 respectively. However it was a suggestion by Geert, PA3CSG that resulted in the first official International EME Conference being held in 1988 at Thorn in The Netherlands. Since then the International EME Conference has alternated between the USA and Europe, with a visit to Rio de Janeiro in 2000 and two consecutive events in Europe in 2006 and 2008.

Around 150 enthusiasts attend each Conference, often accompanied by their partners and families. The Conference has become a bi-annual fixture for family holidays for some enthusiasts!

The 14th International EME Conference was held between 12 and 14 August 2010 in the Westin Hotel, Grapevine, Texas, close to the Dallas – Fort Worth (DFW) airport. The hotel is immediately under one of the many DFW runway approaches. However, there was no real noise problem due to exceptional sound proofing. You may recognise this hotel as the same one I mentioned as being used for the 2009 Microwave Update. It is an excellent venue for such events. **Photo 1** shows the WA5WCP portable EME dish set up in the car park of the Westin hotel. I will say more about this later.

Although the programme started on the 12th this was actually scheduled as a 'tour' day for early arrivers and their families who were on the organised Fort Worth stockyards and downtown Dallas tours. Many of those who had already seen these sights during previous visits to the Metroplex elected to stay at the hotel and chat with other early arrivals or take an impromptu tour of several Dallas electronic surplus stores. It was also an opportunity to browse the various Conference flea market and vendors' booths.

TECHNICAL PROGRAMME. Without doubt it is the quality of the talks that make EME Conferences stand out from the many other Conferences I attend. This year was no exception. It would be unfair to pick out any particular talk as my favourite, but several did stand out as particularly interesting.

Alex Artieda, HB9DRI described a development of the well-known moon tracker by Hannes Faching, OE5JFL **[1]**. Alex's controller, developed in conjunction with Hannes, is a stand alone (no PC required) controller that uses the new, low cost, rotary absolute encoders from German company Megatron. These are available at a fraction of the cost of the better-known US Digital encoders.

Known as the DRIACS-G2, the new tracker features stand-alone operation with tracking of the moon, sun and other celestial sources such as Cassiopeia, Sagittarius, etc already programmed into the Atmel controller chip. The controller features soft start and stop of the mount antenna drive motors, using pulse width modulation for smooth operation. DRIACS-G2 can be interfaced with 10, 11 or 12 bit encoders, like the Megatron MAB25, as well as with US Digital A2-S-S encoders. Stand alone operation reduces noise from shack computers and frees the shack computer for other uses such as displaying signal waterfalls, moon noise, etc.

Tommy, WD5AGO discussed whether LNA cooling is required for amateur L and S band low noise amplifiers. After reviewing the current state of the art in amateur LNAs and presenting a new LNA design with good dynamic range, Tommy concluded that at LNA noise temperatures below about 21K, cooling is less likely to produce significant benefits in system noise temperatures and that concentrating on improvements in antenna noise temperatures might actually provide better returns on effort.

Joe Taylor, K1JT presented a paper entitled 'Frequency Dependant Characteristics of the EME Path' in which he discussed lunar propagation from 144MHz to 10GHz. Some of the conclusions were that lunar reflections are produced from something between a smooth moon and a rough surface moon, with a spread of frequency of 4Hz (limb to limb) at 144MHz and 295Hz (limb to limb) at 10GHz. Lunar echoes are nearly specular at VHF and increasingly diffuse at higher frequencies. Interestingly, Joe gave a good, reasoned rationale for using digital modes such as JT65C rather than CW at 432 and 1296MHz to overcome the troublesome fading that can be particularly difficult on these bands.

Joe also gave a brief overview of what we can expect to see in the forthcoming release of the WSJT9 digital modes suite **[2]**.

Our own Charlie, G3WDG, included a paper in the proceedings on the subject of predicting libration fading minimums. The paper was supported by measurements made on 10GHz EME during the year **[3]**. Although libration minimum prediction is apparently well known by the professionals, this is perhaps the first time anyone has attempted to use it for amateur EME work. Libration predictions are now included in several of the popular EME tracking programmes.

Peter Blair, G3LTF, gave a presentation on the subject of 'Practical Optimisation of 432MHz and Up EME Systems Using VK3UM's *EMECalc* Program'. This should be required reading for anyone starting out to build their first EME system. Peter acknowledged VK3UM as the author of the program, but I think Peter was being modest as we know he had considerable input to the latest versions of *EMECalc*.

There were many more excellent presentations over the 2½ days of the Conference and all of these appear in the weighty tome that is the Conference Proceedings. Arrangements are being made by NTMS to make copies of the Proceedings of the Conference available **[4]**.

AWARD PRESENTATIONS. There were several award presentations during the Conference. Al Katz, K2UYH, was awarded a trophy in recognition of his efforts in having produced the *432MHz and Up EME Newsletter* for many, many years. The Newsletter is available free of charge as a download over the internet. It appears every month and contains all the latest news on expeditions, technology and other items of interest to the EME operator above 432MHz.

Closer to home, the RSGB Fraser Shepherd award was presented to Joe Taylor, K1JT, in recognition of his work

PHOTO 2: Joe Taylor, K1JT (right) receiving the Fraser Shepherd award from Dave, G4HUP.

on weak signal digital modes. The award was announced at the RSGB AGM but, unfortunately, Joe was unable to attend in person to collect the award. Dave, G4HUP, as the UK Microwave Group Trophies manager (UKMG recommend the award-recipient on behalf of the RSGB), made the presentation to Joe. **Photo 2** shows Joe receiving the award from Dave.

CONFERENCE ACTIVITIES. In addition to the Conference talks programme there were two other very interesting activities during the 2½ days. Paul, WA5WCP, brought his portable 12 foot dish and trailer, towed behind his pickup/RV, into the car cark at the hotel and erected it to show just how easy portable 1296MHz and 2304MHz EME could be. In 2005 Paul towed the dish to four states in New England and then in 2006 he took the dish to a further three states in the north west to give several EME operators the chance to achieve worked all States (WAS) on 23cm. W5LUA was the first operator to achieve 23cm WAS. Paul's portable EME system is shown in **Photo 3**.

Noise figure measurements are a popular activity at these Conferences. Three separate systems were set up in one of the side rooms. These consisted of an HP8593A, HP8970A and an Eaton 2075. Some of the large selection of preamplifiers presented for measurement is seen in **Photo 4**. The preamplifiers covered from 50MHz to 24GHz. The measurement team of Tommy, WD5AGO, Al Ward, W5LUA and Chuck, AF8Z spent a great deal of time making the measurements and cross-comparing readings between the various sets of test equipment, to ensure that the results made sense and to remove anomalies. Tommy, WD5AGO is shown in **Photo 5**, in front of his Eaton 2075 noise figure and gain analyzer, making one of the many noise figure and gain measurements.

The results of the measurements have already been published in a moon-bounce reflector posting. However, it is expected that the full results will also appear on the North

PHOTO 3: WA5WCP and RV with the 12 foot portable EME dish on its trailer.

Texas Microwave Society (NTMS) web page by the time this appears in print.

The conclusions are that amateur-built low noise amplifiers (LNA) noise figures at 1.3 and 2.3GHz are now regularly approaching 0.2 and 0.25dB respectively, without cooling or anything other than careful attention to circuit design and implementation. I'm pleased to say that my own preamplifiers fared very well in the final results.

CONFERENCE BANQUET. An important feature of every EME Conference is the Saturday evening banquet. The banquet is held in the hotel and consists of a sit-down three course meal, preceded by a cash bar for buying beer, etc. After the meal there is the ever-popular door prize draw. Everyone at the Conference gets a prize and there is a separate category for the ladies. All prizes are donated by vendors, Groups or individuals. The two top prizes at this Conference were an SDR-IQ and a Flex1500. Both of these went to amateurs on our table, but not me! My own prize (selected by me) was a very nice ATC capacitor development kit. Other prizes included Conference tee shirts and Proceedings, component development kits, antennas and test equipment.

NEXT CONFERENCE. I am pleased to announce that the 2012 International EME Conference will be coming to the UK, the first time that it has been held here.

Dave, G4HUP and I presented the UK's 2012 Conference bid during the Saturday technical programme. The result of the bid-voting was then announced at the banquet. All attendees at the Conference get to vote on the location of the next Conference. There was overwhelming support for the Conference coming to the UK, in the face of a counter bid from the Japanese. Mike Watanabe, JH1KRC, placed a late bid for Japan, after consulting with his colleagues back home. We were fortunate to have prepared a comprehensive bid over the previous two years (starting not long after the 2008 EME Conference) and had the backing of the RSGB, UK Microwave Group and EME 'Guru', G3LTF. Our condolences go to JH1KRC and his team. We hope that they are successful in their bid for 2014.

The 2012 EME Conference will be held

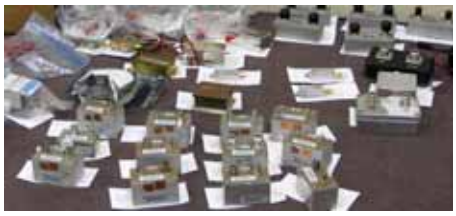

PHOTO 4: Some of the preamplifiers lined up ready for measurement at the Conference.

PHOTO 5: Tommy, WD5AGO, in front of his Eaton 2075 noise figure and gain analyser, making one of the many noise figure and gain measurements.

FORTHCOMING MICROWAVE EVENTS - 2010

RSGB Convention (with VHF and Microwave stream), Horwood House, Milton Keynes, 10 - 12 October 2010. Details: www.rsgb.org/rsgbconvention

Microwave Update, Cerritos, California, 21 – 24 October 2010. Details: www.microwaveupdate.org

Martlesham Microwave Round Table, 13 and 14 November. Details: John Quarmby, G3XDY, G3XDY@btinternet.com and http://mmrt.homedns.org

at one of the Cambridge Colleges from 16 to 18 August, 2012. This is immediately after the Olympics and just before the Paralympics. A venue has been chosen and plans are well-advanced for the Conference. The two years will, no doubt, pass very quickly.

The 2012 EME Conference is sponsored by the UK Microwave Group and supported by the RSGB.

I would like to pass on my thanks to the organisers of this year's Conference. It was an outstanding success and the NTMS members involved in the organisation of the event can justifiably be proud of their achievement. Well done guys.

Because of the breadth of EME Conference coverage in this month's column I have had to hold over the second part of the 'Getting started in 24GHz' series until next month.

WEBSEARCH

[1] OE5JFL - www.qsl.net/oe5jfl/ant_cont.htm
[2] K1JT - www.physics.princeton.edu/pulsar/K1JT
[3] G3WDG - www.g3wdg.free-online.co.uk
[4] NTMS - www.ntms.org

Designing and building a 70cm repeater aerial

Excellent performance at very low cost

PHOTO 1: The completed aerial with G0EVV for scale.

THE REQUIREMENT. In May 2009 the newly formed Northumbria Repeater Group decided to make an application to Ofcom to install a 70cm D-Star repeater to provide coverage of Northumberland. This would be located at Lynemouth on the North East coast. Colin, G7RWC applied for the repeater NOV with the callsign GB7NE. The application was soon approved for 439.450MHz.

We decided to go down the homebrew route. The repeater equipment was based on Tait 850 ex PMR equipment with a Satoshi GMSK node adaptor, (like GB7MH described in the February *RadCom*). Colin undertook to prepare the node adaptor systems and I was to build the aerial. What we needed was an aerial that would be robust and weatherproof whilst providing some gain to counter the 3.1dB measured feeder loss. The aerial was also needed as soon as possible so that we could undertake simplex tests. These were required in order to validate the computer coverage predictions prior to the completion of the hardware.

INVESTIGATIONS. I commenced the design by looking at the material on the web. One design in *Repeater Builder* by WB2EDV was a good start but the construction and matching looked to be difficult to achieve. Tetra–style 4-stack commercial dipoles also gave some inspiration. Slowly a plan came together: a stack of four folded dipoles, 3m high (**Photo 1**) should provide 8 to 9dB gain over a dipole for the 180° inland from the coast.

I have long believed that when designing aerials, the electrical bit is easy. The mechanical bit is difficult and keeping the water out is all but impossible. It was with this in mind that a trial folded dipole was constructed from 15mm copper water pipe and solder fittings. These materials are accurately made, plentiful, light and – most importantly – cheap!

When I constructed a test dipole, the resonant length was estimated using the usual formula for thick dipoles, but the length came out too long. The resonance was 50MHz below the desired frequency. Some hacksawing later, resonance at 435MHz was achieved. At resonance the feed point impedance of a folded dipole is about 280Ω, making matching to 50Ω difficult. If, however, the dipole is brought close to the support pole, the feed impedance falls. For 435MHz, a 50Ω match can be achieved at a spacing of 10 to 15mm. In addition the radiation pattern is offset, giving radiation predominantly on the side where the dipole is fitted. I found that the pole had only a slight effect on the resonant frequency, lowering it about 10MHz. The minimum SWR at resonance (measured with an aerial analyser) was 1.2:1. The dimensions for the dipole were 274mm long x 78mm wide (both dimensions to the outside of the pipes). The bandwidth of the aerial was found to be 10MHz at 1.5:1 SWR, just the job to cover the 9MHz transmit / receive split of the D-Star repeater. I also found that a 1mm change in dipole length changed the resonant frequency by about 2MHz.

Now came the cunning bit.

Instead of taking the coaxial cable to the gap in the dipole, I fed the cable through the hollow dipole from the support opposite the feed point. The RF current cannot therefore flow down the outside of the cable because the dipole tube becomes a Faraday shield; the cable also comes away from the dipole at the radiation-neutral on the blind side of the pole.

As a repeater, the aerial has to function satisfactorily receiving picowatts of power whilst simultaneously transmitting several watts on an adjacent frequency. The power ratio is more than 10^{16}:1. 'Rusty bolt' effects on repeater aerials (caused by corroded dissimilar metals) can cause havoc to signals due to intermodulation between the transmitted and received signal. For this reason I insulated the dipoles from the pole using plastic blocks (**Photo 2**) and secured them with stainless steel bolts. Similarly, all RF-carrying connections were either soldered or made with good quality N plugs.

To compress the azimuth response onto the horizon, the vertical spacing for the dipoles is important. Make it too narrow and the optimum gain would not be achieved. The spacing I used was copied from that used in *Repeater Builder*, corroborated from other sources. This spacing nicely fits onto the 3m pole, leaving 300mm for engagement with the support scaffolding tube.

FEED SYSTEM. Having understood how to make dipoles I began to look at how to feed the four dipoles in phase. Clearly the cable lengths had to be the same to avoid phase differences and tilt on the radiation pattern. Also, the cable had to pass inside the dipole so 6mm (RG58) diameter cable seemed to be the only practical solution. However, to minimise the losses, RG223 silver plated cable (the same diameter as RG58) was used. It cost just £8. The cables were cut to 1180mm, an electrical length of 5 half wavelengths (allowing for the velocity factor), to minimise mismatch issues.

To feed the aerials in phase I needed some form of 4-way power splitter. These devices are usually based on quarter- or half-wave transformers in the form of concentric tubes to form a transmission line of a particular characteristic impedance. Commercial devices are expensive, £100 not being unusual. I tested a couple of examples but I found that the matching performance was not as good as I had hoped.

PHOTO 2: Two of the plastic blocks fabricated to insulate the dipoles from the support pole.

Another cunning plan was needed!

If two load-matched 50Ω cables are terminated in a tee piece, the centre point impedance will be 25Ω. If two balanced feed cables are terminated at another tee where the centre point impedance is 50Ω, the input impedances must be 100Ω.

The formula for a quarter wave transformer is

$Z_0 = \sqrt{(Z_1 \times Z_2)}$

Where:
Z_0 is the characteristic impedance of the transformer
Z_1 is the input impedance
Z_2 is the output impedance.

Following the formula for a quarter wave transformer, the characteristic impedance of the cable making up the transformer needs to be

$Z_0 = \sqrt{(25 \times 100)} = 50\Omega$

So, to make the power splitter (**Photo 3**), all I needed was three N type tees, four N plugs and two 100mm pieces of RG213. To adjust the splitter I purchased four 50Ω N type terminations and used the aerial analyser to determine the cut length of the cable, making up the transformer for minimum reflection at 435MHz. This was a tedious job because two cables had to be cut equally to an accuracy of better than 1mm. The final length of my cables was 111mm from end of plug to end of plug. Eventually the transformers were satisfactory and could be coupled to the four stacked dipoles. Perhaps because I was coupling four tuned circuits and the resonant power splitter, I now had a double dip to 1.2:1 SWR: one at 432MHz and one at 438MHz. Perfection!

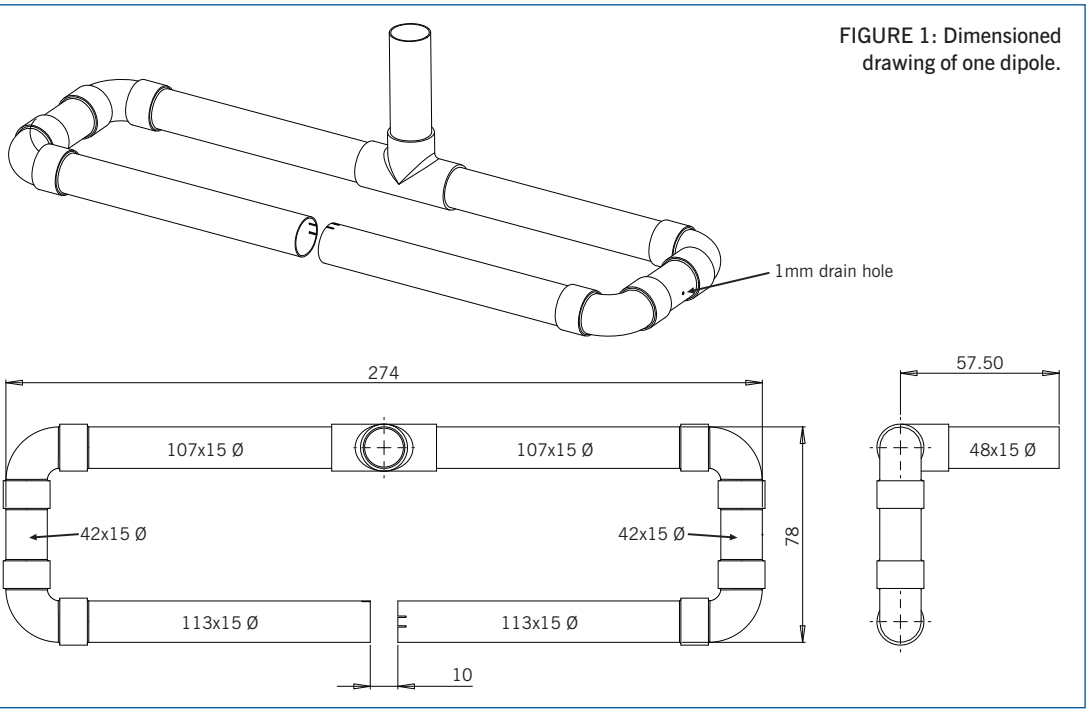

FIGURE 1: Dimensioned drawing of one dipole.

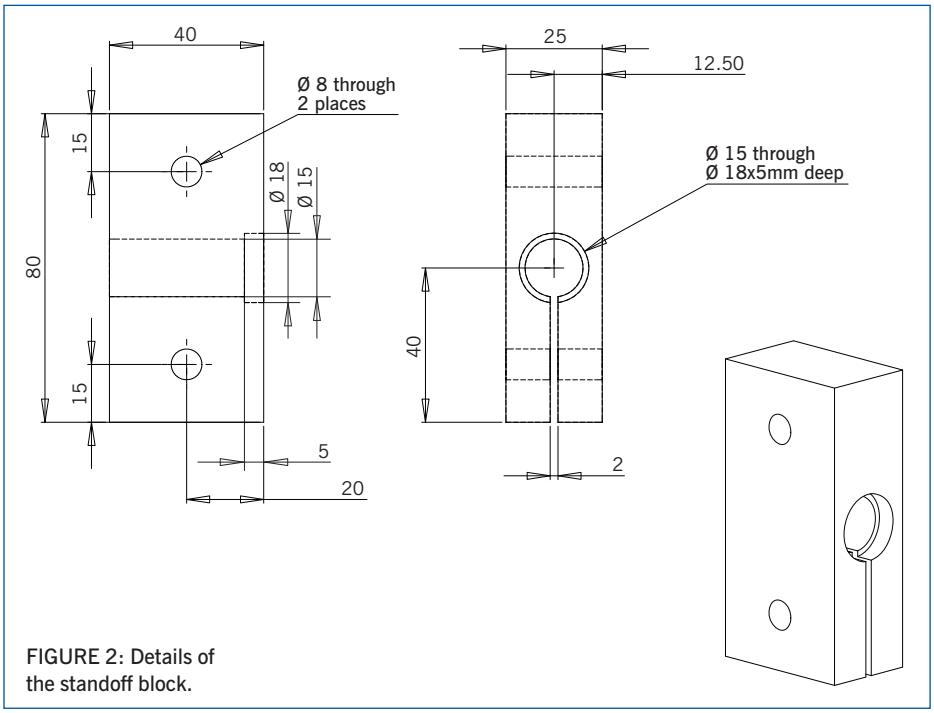

FIGURE 2: Details of the standoff block.

CONSTRUCTION. To construct the dipoles I used a range of hand tools including a hacksaw and junior hacksaw. A pedestal drill is needed to drill the support brackets and the support pole. There are 11 soldered plumbing joints on each of the dipoles, for which a gas blowtorch is essential. I used the plumbing fittings without the solder ring to make the finished dipoles as neat as possible. To ensure repeatability, I constructed a simple metal jig from steel angle purchased from the local hardware shop. This ensured that the length of the dipoles was consistent when assembled but remember, copper expands when hot. Material and cutting lists are in **Tables 1** and **2**. Don't forget, measure everything at least twice before you cut it.

All of the pipe ends were carefully cleaned with wire wool, wetted with Bakers fluid and tinned, using a cotton cloth to remove surplus solder. The pipes were cut and filed square according to the cutting list, allowing 8mm for engagement inside the elbows. The feed connections are easy to solder because they're made from copper. To keep the water out, the feed point was covered with another plumbing fitting, this time a plastic, non-soldered straight coupling intended for 15mm pipe. This fitting uses O rings to seal against (mains) water pressure and is therefore very suitable for keeping the rain out. I also applied a small amount of impact

PHOTO 3: The 4-way power splitter.

adhesive to the cable screen at the termination to help prevent damp ingress into the cable.

To allow the dipole to breathe, I drilled a 1mm vent hole in the pipe that was to be fitted in the bottom arm of the dipole. At the feed point, four 3mm long slots were cut in the lower pipe and two in the upper pipe. After carefully tapping them inwards at 30°, they made perfect 'landing' areas for connections to the co-ax screen and core. I soldered these using an old copper block soldering iron, but a hot 100W electric iron could be used.

As supplied, the plastic straight coupling had a small step at the centre of the bore. This was removed using a 15mm drill before being loosely assembled on the upper side of the feed point (with a little silicone grease on the O ring seals).

I made several attempts to feed the cable from the support all the way round to the feed point. All attempts failed miserably! I found It was necessary to solder one 15mm coupling with the cable inside. The method I adopted was to feed a PTFE coated instrument wire through the part assembly and then use this to pull the cable through. Then, I covered the cable with a double wrap of plumber's PTFE tape 40mm either side of where the 15mm coupling was to be soldered. Finally, the dipole was assembled and quickly soldered, using a wet cloth to remove heat as soon as practicable. To plug the cable entry, a short piece of wooden dowel was drilled and fitted over the cable, using adhesive to close all the gaps. Outdoor grade silicone sealant would also probably have worked well. **Photo 4** shows a completed dipole.

I measured each dipole for resonant frequency and minimum SWR when mounted in position on the pole. Should the resonant frequency need adjusting I could free off the waterproofing coupling over the feed point and melt the joint on the support side upper leg. ±2mm adjustment could be made in this way, changing the resonant frequency by ±4MHz. Minimum SWR should be 1.2:1. A check at this stage is worthwhile to make sure that all of the vent holes are at the bottom. Not only does this mean they will drain correctly, it also ensures that the dipoles are all in phase, ie the cable passes through the lower leg.

The pole I used was a standard 38mm aluminium television aerial pole. Heavier gauges are available, but practice suggests that these are not necessary. The support blocks were cut from 25mm thick PVC based plastic sheet. The holes were marked out and drilled on a pedestal drill. The 15mm hole was counter bored to take the end of the tee piece. A 2mm wide slot was cut in the lower half of the block to finally clamp the dipole support. The vertical spacing for the dipoles on the pole was 530mm with 265mm above the top dipole (after WB2EDV).

During final assembly I cleaned all the metal surfaces with glass paper to ensure good paint adhesion. After the support blocks had been tightened to secure the dipoles to the pole, I applied silicone sealer to all of the gaps. Finally, when all was satisfactory, the whole assembly was given three coats of Hammerite smooth metal paint and the cable entries and power splitter was wrapped with Denso greasy tape.

SAFETY. To prevent the pole falling, should it snap from metal fatigue caused by the buffeting of the wind, I fitted a safety rope up the inside of the pole, securing it with a stainless steel bolt near the top of the pole. To prevent water ingress a rubber bung was also fitted at the top and the aerial pole was fitted into a short stub of aluminium scaffolding pole for clamping into position. The pole was connected to the tower's main lightning conductor to provide a measure of lightning protection and static drain. The dipoles were also earthed where the feed cable was connected to the lightning conductor.

TABLE 1: Bill of materials for four dipoles and feed assembly

3m 15mm copper pipe
8 x 15mm elbows
4 x 15mm tee
4 x 'Speedfit' 15mm straight couplings
8 x 80mm M8 stainless bolts nuts and washers
1 x 80mm M6 stainless bolt nut and washers
Piece of 25mm plastic sheet
6m RG223 coaxial cable
200mm RG213 coaxial cable
100mm of 15mm dia wood dowel
4 x N plugs, 5mm entry
3 x N tees
4 x 10mm N type plugs
Denso and PTFE tape

TABLE 2: Per-dipole copper pipe cutting list

2 x 113mm
2 x 107mm
2 x 42mm
1 x 48mm
Also, coaxial cable cut to 1180mm

FOOD FOR THOUGHT. GB7NE went on air at 1800 on 8 September 2009 and has worked reliably to date. For mobiles it covers most of Northumberland and up the valleys of the Wansbeck, Aln and Coquet. This suggests that the aerial is radiating as required.

There is a possibility that the matching arrangement, dropping 280Ω to 50Ω may however be compromising performance. I have therefore considered fitting a quarter wave transformer made from 72Ω cable at the feed to the dipoles. This would step up the impedance from 50Ω to 103Ω, making the mismatch less severe.

PHOTO 4: One completed dipole with feed cable.

PHOTO 5: A completed dipole mounted on the pole with part of the power splitter on the right.

$72 = \sqrt{(50 * Z_2)}$
$Z_2 = 103\Omega$

The transformer could be installed within the dipole pipe and the dipoles mounted further from the pole with perhaps a positive effect on the polar diagram.

Should the aerial be required to provide omnidirectional coverage, this could be accommodated by mounting two dipoles on each side of the pole, providing 6dB gain over a dipole. For the more ambitious, eight dipoles could be fitted and suitably phased to deliver 9dB of omnidirectional gain.

REFERENCES
[1] 440MHz Folded dipole Repeater Antenna, WB2EDV, *73 Amateur Radio* September 1987 and www.repeater-builder.com
[2] UHF Stack Side Mount Dipole Array, www.benelec.com.au
[3] 4 Element stacked dipole array, www.skymasts.com
[4] Cable and connectors from WH Westlake or others

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- **BNC type** connector (part: 7720) ...**£3.25**

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- Loss per 100m: 6.28dB @ 100MHz, 4.52dB @ 50MHz

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MyDEL HB-1A 3-band CW QRP Transceiver

A portable setup that could appeal to the traveller

PHOTO 1: The HB-1A QRP transceiver with the portable Palm keys.

INTRODUCTION. The HB-1A transceiver is a 3-band CW QRP rig that covers the popular 20, 30 and 40m bands. RF output is up to 4 watts depending on the power supply used and it includes a CW keyer and internal battery cases for true portable operation. In addition, the receiver features continuous coverage from 5MHz through to 16MHz along with USB and LSB reception. The HB-1A was originally produced as a kit by Chinese amateur Bu Xianzhi, BD4RG but the current model is now manufactured as an assembled and tested unit employing surface mount devices (SMDs) and modern construction techniques.

WHAT'S INSIDE? Although the supplied manual was pretty scant, it did come with a full circuit diagram, which was good to see. The local oscillator and transmit carrier frequencies are all generated by an Analogue Devices AD9834 low power direct digital synthesis (DDS) chip, which in turn is controlled by a crystal reference oscillator. The output of the DDS is fed through a low-pass filter and then into a 3-stage RF amplifier and PA with a two-stage low-pass matching section to the antenna. The final stage of the PA has a preset to adjust the drive, which could be useful if you want to try some real QRP.

The receiver uses the same antenna matching circuit as the transmit section and this passes to the first mixer via a 2N7000 FET configured as an attenuator. Just prior to the NE602 mixer is a varicap tuned filter to further help reject out-of-band signals. The NE602 mixers are susceptible to strong signal overload so the additional filtering is good to have. The receiver is a single conversion superhet and the NE602 provides gain as well as conversion to the IF of 4.9152MHz. The main IF filtering is provided by a four-pole crystal filter located immediately after the first mixer. This filter is tuned by three varicap diodes to provide a selection of IF bandwidths. Demodulation uses a second NE602 and this feeds into a LM386 amplifier to provide the drive for the headphone socket.

The HB-1A is fully processor controlled with a PIC16F73 providing most of the control logic. This PIC drives the LCD display, controls the DDS chip and manages all the mode selection. A second PIC (12F629) is employed to provide the keyer functionality as the HB-1A can handle straight or paddles keys with automatic detection. Internal power regulation is supplied by a couple of 78Lxx devices but the PA operates directly from the incoming supply. For reverse power protection the HB-1A includes a Schottky diode in series with the +ve line from both battery and external power.

CONNECTING UP. Connections were all pretty straight forward and clearly marked. The antenna connection was a standard 50Ω BNC jack mounted on the top panel. If you're using an external power supply, the HB-1A requires 9 to 14V DC at up to 950mA when transmitting. On receive, the consumption drops to around 55mA. For fully portable operation the HB-1A can be run from a set of 8 AA cells mounted internally. To access the battery compartment there are two screws on the back panel that release the two halves of the case. The only connections remaining are the two 3.5mm jacks on the lower panel for the key and headphones. The headphone jack is a stereo type wired as mono so you can plug-in standard stereo headphone and listen through both earpieces. The key jack is also a stereo jack and in this case the plug configuration is used by the keyer to check what type of key you are using. When using a straight key or your own keyer, the ring of the plug is grounded or you can use a mono jack for the same effect. When using a paddle, the tip connects to the dot paddle and the ring goes to the dash paddle. The check for key type is only carried out when you power up, so you need to make sure you plug the key in before turning on the HB-1A.

OPERATION. The front panel of the HB-1A has a central LCD that's used to show the operating frequency, mode and S-meter/power meter. To the right of this is the main tuning knob that drives a 20-click shaft encoder with a push-button action that's used to change the frequency steps. For normal tuning around, the HB-1A uses 100Hz tuning steps but a click of the tuning knob and the steps toggle to 1kHz for faster tuning. A coarse tuning step of 100kHz is also available if you press and hold the tuning knob for a few seconds. In addition to the main tuning, the HB-1A includes receive incremental tuning (RIT), which is essential for CW operation as it allows you to separately tune the receive section for best tone and to avoid QRM. The RIT was very simple to use with a single press of the RIT button to switch the main tuning knob to RIT use. The default RIT steps were 10Hz, which is ideal for this use but a click of the tuning knob would toggle this to 100Hz if necessary. To show that you are in RIT mode there is a dash displayed next to the frequency display.

To make tuning around even simpler, the HB-1A included a set of 20 programmable memories that can be used to store favourite frequencies. I found these memories particularly useful for changing bands and I set the first few to the important CW frequencies in the 40, 30 and 20m bands. In addition to storing the operating frequency, the memories also retained the operating mode and IF bandwidth settings which was very handy. Switching between VFO and memory mode was done with a single button press and the tuning knob was then used to scroll through the memory channels. Storing frequencies into the memory was equally simple – just select the memory you want to use then tune to the desired frequency and press/hold the SAV button to compete the transfer. A particularly useful feature for portable operation was the frequency lock, which was activated by simultaneously pressing the memory and RIT buttons. Once activated, the tuning knob is disabled so you

can't accidentally disturb the tuning.

When receiving CW, the IF bandwidth can be altered to suit conditions and the settings available were 400Hz, 500Hz, 700Hz and 900Hz. However, I ended up using the 400Hz setting pretty much all the time for CW work. For SSB reception the bandwidth options were 1.6, 1.8, 2.0 and 2.2kHz and these were useful for listening under a variety of conditions.

Most of my testing during the review was carried out using a direct connection to my Butternut HF9V vertical antenna. I recently refurbished this antenna so I know it provides a particularly good match over the 20, 30 and 40m bands. On-air sensitivity was surprisingly good and there were always plenty of stations to be worked. For a portable rig, the inclusion of a built-in keyer was very helpful as I prefer to operate with a paddle. The key connection was via a 3.5mm stereo jack on the front panel as mentioned before and the HB-1A detected the key type during power-on. I used my trusty old Spacemark ETM-5C keyer for most of the time but I also used the internal keyer.

After some tuning around it was clear that the HB-1A was bringing in plenty of signals and there was no shortage of sensitivity. However, I did find a tendency to overload when there were lots of strong signals around. The trick here was to use the attenuator to reduce the level of everything and bring the strong signals out of overload. For such a simple, single conversion receiver this is only to be expected and the built-in attenuator was sufficient to bring this under control. The LM386 audio amplifier provided plenty of audio and was able to drive all sorts of different headphones from 8Ω low impedance types through to high impedance units. The RIT worked a treat and it was easy to adjust the received signal for best tone.

The HB-1A's keyer was configured as an iambic mode B keyer and included a basic automated CQ call, which is useful for portable operation. The call sequence was CQ (3 times) de your call (3 times) PSE K, which was fine. Before I could use this I had to enter my own call and that was done by pressing and holding the CQ/SET button till I heard the letter 'I' in the headphones. Following that, I could send my call using a paddle connected to the internal keyer. Although this was a very useful feature it is only available when using a paddle connected to the internal keyer.

PALM RADIO PORTABLE KEYS. During the HB-1A review I also had a couple of German made Palm Radio portable keys available for review so it seemed appropriate to cover them at the same time. Both keys are about the same overall size, measuring just 30 x 84 x 31mm when in their stored position. In this state the key/paddles slide neatly up inside the body, making them very convenient for travel as the vital parts are protected from damage.

The paddle was the first for me to try and that was supplied with a separate mounting base and a plug-in connector lead with a 3.5mm jack for connection to the rig. The key was very sturdy with a powder finished cast aluminium outer case. The main key assembly could be slid out of the outer case for adjustment/cleaning simply by depressing a release button in the bottom of the case. Once removed from the case, there were three adjusting screws available for each paddle. These provided adjustment of the final stop, contact spacing and paddle tension. To help with adjustment the paddle came with a hex key neatly mounted in the base thus making field adjustment simple. The main housing was fitted with some silicone foot pads but was not very stable on its own. However, when the supplied base, was fitted all became much more stable. The base was fitted with a pair of small magnets that had good adhesion if you were operating on a ferrous surface and in my case it worked well on the front panel of the HB-1A. The base is fitted with protective rubber pads to avoid damaging the surface. Alternatively, you could just screw the base down using the built-in screw holes for more stability. With the wide range of adjustment I found it easy to set up the key to my preferences.

The straight key had a number of common features with the paddle model – the cast aluminium outer case, detachable base system and the facility to retract the key into the case for transport. In this case the cable was supplied pre-wired into the key with a 3.5mm stereo jack for connection to the rig. Access to the key for adjustment of the spring pressure required the removal of a single screw with the supplied hex key, though the contact spacing could be adjusted without removing the key. Once the key had been slid out of the outer case there was a spring adjustment to alter the key tension. The range of adjustment was good and should be plenty for most operators.

PHOTO 2: Inside the QRP transceiver.

SUMMARY. The HB-1A is a very easy to use portable QRP rig, which is ideal for CW operators. The 3-5 watt output power was about right for this purpose and the simple receiver was fine for portable operation. The HB-1A was great fun to use and is ideal to take away with you when you're travelling.

The Palm Radio portable keys were also very interesting and again ideal for portable operation. Both keys had a good range of adjustment so should suit a wide range of operating styles.

The HB-1A is available from Martin Lynch & Sons priced at £256.96. The Palm Radio keys are also available from Martin Lynch & Sons with the MP-817 Mini-paddle available at £75.96 and new PPK Mini-Key at £59.95. All prices are inclusive of VAT at 17.5%. My thanks to Martin Lynch for the loan of the review models.

HAM WEEK UK 1-10 October 2010

Ten Days of Amateur Activity

National Hamfest

The biggest rally in the UK kicks off Ham Week UK

OPENING TIMES. The National Hamfest will take place on Friday 1 and Saturday 2 October at George Stephenson Pavilion, Newark & Nottingham Showground, Lincoln Road, Winthorpe, Newark NG24 2NY. The doors will be open from 10am to 4pm each day. The Lincoln Short Wave Club information tent will be located close to the main entrance and will have details on the show layout and facilities as well as a display board for amateurs to leave their QSL card displayed.

SHOW HIGHLIGHTS. We are delighted to announce that the ARRL will be attending the National Hamfest. This is the first time they have attended a UK show in many years. The *RSGB Yearbook* is being launched at the show and anyone purchasing the *Yearbook* will receive a free goody bag (whilst stocks last). All the main manufacturers will be represented. Yaesu UK will have the FT-dx5000 for visitors to try, Kenwood expect to have the demonstration model of the TS-590S on their stand and Icom are hoping to bring the IC-9100.

More traders than ever before will be exhibiting including more component and surplus traders. The full and up-to-date list is on the National Hamfest website, www.nationalhamfest.co.uk. Local clubs and special interest groups will also be present, in the form of sixteen different groups and societies – more than last year. As well as special interest groups, many of the RSGB Committees will also be represented; ARDF, Contest, EMC, Emerging Technology Co-ordination Committee, Planning, Propagation Studies, QSL bureau, RCF and Spectrum. Ofcom will once again be present and will also be giving a talk – and no doubt answering questions – on Friday 1 October at 1pm.

Many visitors returning to this year's National Hamfest will be pleased to hear about the new and improved café on site. Comments from visitors last year prompted the organisers to make much better arrangements for this year's event.

TICKETS & COACHES. It's not too late to order your tickets online and save on the 'on the gate' price of £4.50. You'll receive a special discount if you buy your ticket online in advance, saving £1 on each ticket. (All prepaid tickets can be collected on the door). Under 16s have free entry when accompanied by a paying adult. If you are buying more than one ticket there are even more discounts available. Buy four discounted tickets and pay for only three, or buy ten discounted tickets and pay for only seven, making even more savings.

Several Clubs are planning day trips to the National Hamfest. We've heard from Bolton Wireless Club, Swansea ARS, Midlands ARS and Sheffield ARS and look forward to meeting their club members on the day.

COMPETITIONS & AWARDS. Co-host Lincoln Short Wave Club is running a competition for visitors and an Award for all amateurs and short wave listeners. All visitors to the show are invited to submit their photos of the event that they feel best capture the atmosphere of the show. A prize will be offered for the best photo submitted and it will go up on the website for all to see. The information tent will have application forms, so drop by and pick up a copy.

The Ham Week Award will be available to stations to work (or hear) GB10NH, the National Hamfest special event station and four other special event or club callsigns that are on the air during Ham Week UK. Look out for GB2CWP run by Lincoln Short Wave Club, GB1CHF from Coalhouse Fort in East Tilbury, GB2RAF, the permanent special event station at the RAF Air Defence Radar Museum, RAF Neatishead in Norfolk, GB2GW at Gleaston Water Mill in Ulverston, G4ARF operated by Furness ARS using 'Field Day' style antennas from land near the club house and GB2SPY will be on the air from the B2 SPY museum in Dover. Details on the website www.nationalhamfest.co.uk.

The three main manufacturers will be at the National Hamfest.

HAM WEEK UK. As well as the special event stations mentioned previously, other events are happening during Ham Week UK. Godfrey Manning, G4GLM is opening his aircraft museum as part of Ham Week UK. Godfrey runs a small but technical aircraft museum in the north-west London suburbs and this will be of interest to those who want to know how aircraft function, are flown and navigated. There are no whole aircraft as the site is too small; the emphasis is on practical demonstrations of what goes on in the cockpit. Radio plays an important part for navigation as well as Air Traffic Control and Godfrey also holds a Flight Radio Licence. Visitors are welcome on Sunday 3 October from 1pm until early evening. It's recommended to ring in advance to confirm, also to arrange talk-in if required on 2m. It's at 63 The Drive, Edgware, Middlesex HA8 8PS, 020 8958 5113.

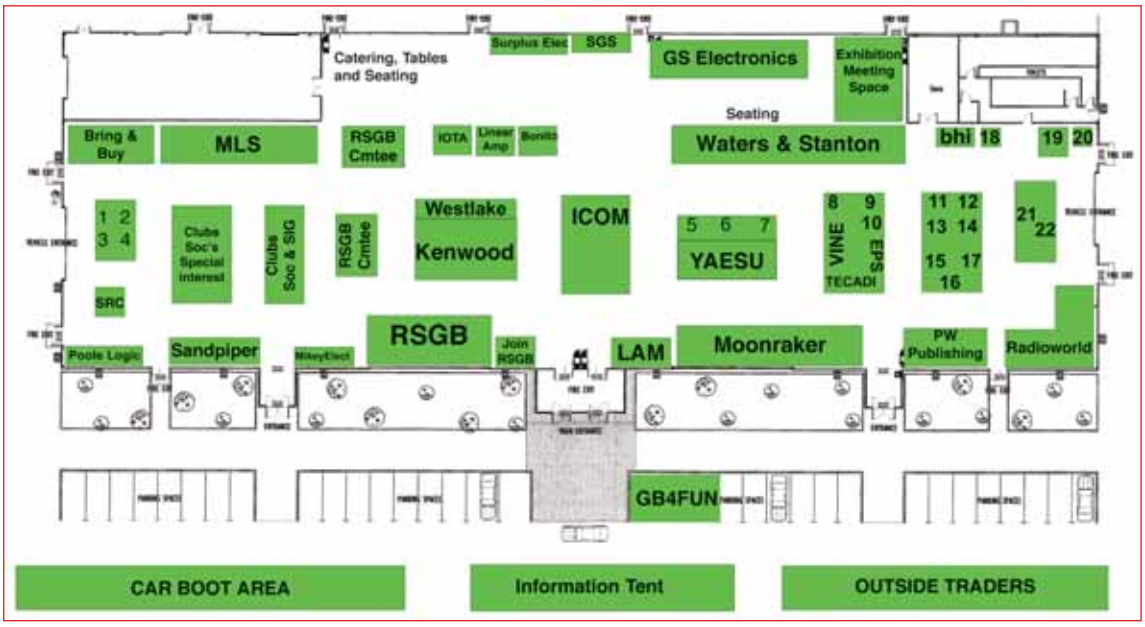
Ian, G3ROO runs the B2 SPY Museum in Dover and is regularly on the air using the callsign GB2SPY, with CW on 160 through to 17m using the clandestine sets. Between 1 and 10 October he will be on the air as often as time allows. He is also open for operators to come and use the sets by appointment. He can be contacted by e-mail to ian.g3roo@gmail.com. Operational sets at present include a Type 3 Mk 11 set (B2 suitcase wireless), a Mk 119 and Mk123, a reproduction Paraset and a MCR1 Receiver. Check out the Yahoo group for more of interest, http://uk.groups.yahoo.com/group/b2spy.

INFORMATION TENT CONTAINS:

- Lincoln Shortwave Club
- First Aid
- GB1ONH
- Lincoln Repeater Group
- Local Club Displays
- Meeting Point

NUMBERED TABLES LIST:

1. ByVac
2. Cech Keys
3. G6NHG
4. Kanga Products
5. S Yorks RG
6. G1EPL Bob Ocallaghan (Friday only)
6. M0CVO Antennas (Saturday only)
6. G4TPH Magloops (Saturday only)
7. Marconi Kits
8. Contralube
9. Kent Keys
10. Peter Hall Embroidery
11. Chase Electronics
12. J Birkitt Electronics
13. HARP
14. Radio Kits
15. Bowood Electronics
16. Weymes Embroidery
17. Mastrant
18. Peak Electronic Design
19. Radixon
20. Rig Expert
21. Don Iyen
22. Saulius Purvinas



LECTURES. Last year, several visitors thought that the event would be improved by a lecture stream. The organisers would like to thank those who have offered their services. The full lecture programme is as follows:

Friday 1 October

11am: Operating Practice/QRM by John, G3WKL
12noon: RSGB Membership by Jim, G0EJQ
1pm: Ofcom
2pm: HF Propogation Prediction Software by Steve, G0KYA
3pm: Exams by Alan, G0HIQ

Saturday 2 October

11am: RAIBC AGM
12 noon: Connector Lubricants by Peter Wilks
1pm: BYLARA AGM
2pm: Circuit Simulation by Dave, G4UGM
3pm: Spectrum Forum by John, G3WKL

HAM WEEK UK 1-10 October 2010

Ten Days of Amateur Activity

RSGB 2010 Convention

RSGB Convention 2010

World class lectures on all areas of amateur radio

Please apply

IMPROVES WITH AGE. The RSGB Convention continues to go from strength to strength and this year takes place on 8 to 10 October. Since 2007 the Convention has moved venue several times as it has continued to grow. This year the RSGB Convention has exclusive use of its new venue, Horwood House near Milton Keynes. Everyone there is taking part in the event in way or another, as a delegate or visitor to the event, as a presenter delivering great lectures or as staff and volunteers making sure visitors have a great weekend.

This year there are four full streams of lectures and presentations going on over the whole of the weekend, with various specialist activities going on around the venue, including the ubiquitous card checking facility. These guys deserve a huge vote of thanks for the work they do – checking and verifying your cards and invariably not seeing any of the event itself – so, on behalf of all that make use of this facility, many thanks.

SPONSORS. Icom UK, who together with Martin Lynch & Sons sponsor the RSGB Convention, will be displaying a comprehensive range of the latest equipment for you to examine and try out, including their D-Star display, Martin has a stand where you can pop across to buy that latest piece of equipment to help you win that contest or break that pile up.

2010 marks 20 years of trading for Martin and, to celebrate this, Friday evening will be the Martin Lynch and Sons 20th Birthday Buffet. The evening will include close-up table magician, Steve Dean, who will move amongst the guests throughout the evening. Tickets for the MLS Birthday Buffet cost £27.50 for the three course meal, coffee and entertainment.

DX DINNER. Saturday evening is the DX Dinner and tickets are £32.50 for the three course meal, coffee and wine on the table.

PRINCIPAL SPONSORS

ICOM 20 MLS

MC for the evening will be Jim Lee, G4AEH, probably better known for his work as a newsreader and announcer on Radio Four. During the evening, the presentation of the G5RP trophy and ROTAB Cup will take place. Both evenings will have discounted beer at £1 a pint.

PROGRAMME. At last year's event a VHF Stream was introduced to the usual programme and, this year, another great VHF programme will be in evidence. Alongside will be some thought provoking technical presentations, another Contest University session on Saturday and a mixed bag of presentations on Sunday. The DX stream includes some fascinating lectures and presentations from some of the world's most well known DXpeditioners.

Proceedings open on Saturday morning with a welcome from the RSGB President and after that it's straight into a great programme of lectures/presentations with a short coffee break between slots. At lunchtime there's an opportunity to dine and relax in the restaurant (£6 for one course, £9 for two). Saturday's programme runs through till 5.45pm, which then gives you just enough time to freshen up before the Gala Dinner starting at 8pm in that same restaurant. Throughout both days you'll have ample opportunity to chat with old friends and new friends as well as chat to many of the lecturers outside the confines of the lecture theatre.

For partners, who might not be that interested in that great DXpedition to far flung corners of the world nor the latest technical innovation to help you crack that pile up, the plan is to spend Saturday in Buckingham including a visit to the Old Gaol, coffee, visit the Flora Thompson Exhibition (she of *Lark Rise to Candleford* fame) and a tour of the town lasting 1 to 1½ hours. That should still leave time for some retail therapy in Buckingham. At the very least there will be a facility for partners to meet up again on Sunday morning and it's hoped to be able to include a demonstration or similar which they'll find interesting. If you wish to take up the Partners Programme and want to know more, contact the RSGB Convention Chairman Dave, M0OBW either by phone on 01270 761 608 or e-mail to dwilson@btinternet.com.

Sunday morning sees the four streams continue with a varied programme with coffee and lunch available as before. The event draws to a conclusion with the Grand Draw where some lucky ticket holder will walk off with the star prize, an IC-7000 HF/50MHz/VHF/UHF mobile transceiver, generously donated by Icom, or a Yaesu FT-450 kindly donated by MLS & Yaesu UK.

At the RSGB Convention, every lecture and demonstration is top quality, but some of this year's deserve highlighting.

Chesterfield Islands 2009 (TX3A) by Tomi, HA7RY and Chris, HA5X/M0XXA. TX3A was on the air from Chesterfield Reef in November 2009. This was another simple low-band DXpedition by only two operators, George, AA7JV and Tomi, HA7RY. During 28 days of operation a total of 36,148 QSOs were put in the log, of which 3,425 were on 160m. This presentation will give you an insight into the life of the crew and help relive the best moments of the expedition.

Peter Chadwick, G3RZP is always a popular lecturer at the RSGB Convention. This year his double session talk in the Technical Stream is on linear amplifiers. They are an integral part of any SSB transmitter at any power, although the term is usually applied to an external power amplifier. In his lecture, he's going to look at the basics of what is meant by linearity, how it is measured and how linear amplifiers work. Additionally, the way in which the requirements contained the international radio regulations on spurious emissions affects the design will be examined. The advantages and disadvantages of the solid state versus valved amplifiers at high power will be described, the basic design techniques and the construction techniques involved in building amplifiers illustrated. And he'll identify some of the pitfalls that can trap the unwary!

The VHF & Up stream team has pulled out all the stops and will have Dr Lucie Green talking on her study of coronal mass ejections from the Sun. Come along and hear how these ejections can seriously disrupt the Earth's environment when intense radiation can alter the Earth's outer atmosphere, disrupting long-distance radio communications. Dr Lucie Green is a solar researcher based at the Mullard

RSGB shop

NEW

RSGB Yearbook 2011

Edited by Steve White, G3ZVW

With more calls and information than ever before!

There are now in excess of 72,500 amateur radio licences on issue in the UK, a number that has grown by over 15,000 in less than ten years. If you want to have the very latest listing of UK licences then the best source is as always the *RSGB Yearbook 2011*. With nearly 200 additional pages of the very latest amateur radio information from the UK and worldwide, the *RSGB Yearbook 2011* is an indispensable guide for everyone.

This book is more than the latest update of these callsigns. If you want details of the UK's D-Star repeaters, the dates of the 2011 RSGB contests, contact details of your local Regional manager and EMC help, only one book contains it all – the *RSGB Yearbook 2011*. There are details of how the Society is organised, the services it offers, committees, who to contact for assistance, etc. You will find all manner of local information organised into regions so you can find clubs, trainers and examination centres in the area alongside details of the RSGB Regional Manager Team. There are features covering National Affiliated Societies, Local Clubs and even special features such as coverage of the Derby Wireless Club centenary. There are details on operating abroad, satellites, propagation and much more. As you would expect the latest licensing information is included along with a complete list of UK Special Contest callsigns, Irish callsigns, plus listings of UK licensees in surname and Postcode order.

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Spectrum Defence Fund

The G5RP Trophy is awarded at the DX Dinner.

Who will win this year's top prize, kindly donated by Icom UK?

Space Science Laboratory, UCL's Department of Space and Climate Physics and often works in radio and television discussing the UK's current research into solar system science.

Many visitors to the Convention will know Jim Bacon, G3YLA as a TV weatherman. Jim is also researching the causes of Sporadic-E and has been looking to see if there is any correlation between meteor showers, gravity waves and the jet stream over Europe. In his talk he will explain his latest research, what the results could mean and where the research will go next.

Another very interesting talk in the IOTA/DX Operating Stream is Line Islands (T32) by Derek Cox, G3KHZ. In March 2010, a small team of IOTA devotees activated several uninhabited island in the Line Island (Eastern Kiribati) group, involving many days in a small boat travelling South from Kiritimati. Derek, G3KHZ will give a PowerPoint and video presentation of the exciting 2000 nautical mile sea journey to four new IOTA locations. It is probably the only DXpedition in recent times to notch up four new IOTA entities in a single trip. These islands are all uninhabited but, as you will see, they found plenty of evidence of past human activity.

The Contest University will be enjoying its 3rd year at the Convention, again generously sponsored by Icom UK. The talks on Saturday 9 October have been designed to help a newcomer to start contesting and provide the more experienced contester with some new ways to improve their standings in the next contest. Chris Colclough, G1VDP will talk about his Club's IOTA Contest DXpedition showing ways that other clubs can organise an IOTA/Contest expedition for their members too. Everything will be covered from looking for a site, getting suitable permissions to operate, planning, logistics and equipment. And it will include a small section by a non-ham on feeding the group! Or you could travel with Nick Totterdell, G4FAL to the tiny Caribbean island of Montserrat. Get up close to a very active volcano whilst pursuing an (almost) winning strategy for the RSGB Commonwealth Contest. Nick will continue to develop the theme of contest preparation with the story of his operation as VP2MCC in March 2010.

As well as technical lectures by names such as Peter Chadwick, G3RZP and Dr Ian White, GM3SEK, a hands-on session has been organised for Saturday. Richard Brett-Knowles, G3AAT and Leslie Butterfields, G0CIB will be giving a practical hands-on demonstration with test equipment such as dip meter, noise meter, operation of antenna tuning units and antenna analysers. They will be only too happy to advise on any aspect of setting up a station for the first time and the test equipment. Visitors can drop in at any time during the day. In addition, Ian Wade, G3NRW is giving two presentations on the AIM4170 antenna analyser at the RSGB Convention. The first will cover the basics of antenna measurement and the second will illustrate the use of the 4170 as a design tool. Live demonstrations of the AIM4170 will be the main feature of the presentations and will include tuning a 4m ground plane, trap tuning, designing a 160/80m trap dipole, measuring quartz crystal parameters, using the Smith chart, quarter-wave stub tuning and measuring the impedance at the antenna feedpoint. The final demonstration will show how to control the analyser remotely via a Wi-Fi link, allowing you to tune your antenna while standing in the garden (or on the roof or at the top of the tower).

A full up-to-date timetable is available on the website with brief details of all the lectures, demonstrations and talks.

EXAMINATIONS. As in previous years the RSGB Convention is the place where, over the weekend, you have the opportunity to take the full range of the Ofcom/RCF UK Licence examinations. The usual format applies: Foundation and Intermediate exams will be held on Saturday, morning and afternoon respectively, with the Advanced exam being held on Sunday morning. For more details check out the RSGB Convention website, www.rsgb.org/rsgbconvention. Please note that the Foundation and Intermediate exams cannot be taken unless the assessments for the respective exam have been signed off. Candidates must book their examination(s) in good time, prior to the event and provide evidence that they have completed the required practical assessments. Contact Julie Venison at RSGB HQ on 01234 832 700 or by e-mail to julie.venison@rsgb.org.uk for further information on how to register for an exam. Candidates are requested to contact Brian Reay, G8OSN, Chairman of the ARDC, at ardc.chairman@rsgb.org.uk to discuss their progress on practical assessments. Brian can help candidates find a local tutor to guide them through the practical assessments before the RSGB Convention. Additionally, on Sunday it will be possible to take the US Licence examinations at the RSGB Convention. The team plan to offer all three exams: Technician, General and Extra. As with the UK licence scheme candidates need to start with the Technician and move through each level to get the top one, Extra. Unlike the UK scheme, candidates can start the session with no US licence and take each exam in turn and, having passed, move on to the next level. Many candidates in previous years have started the day with nothing and left with an Extra class licence.

The session will be classed as a Walk in session so that anyone can turn up and take the exams if they so wish no need to pre-book. It is however nice to know that there are some people coming so a phone call or e-mail is also very welcome. For study material, the ARRL website is a good place to start at www.arrl.org.uk, which will give you access to the question pool and the Part 97 to read / download on line. There are many others just place the question in your favourite search engine for a wealth of information. The important piece of information to read is the FCC part 97, which is the equivalent of our Terms and Conditions. On the day, please bring with you some form of photo ID, the exam fee (sterling equivalent of £15) and a USA postal address for the FCC to send your licence. If you're interested and for further details contact Paul Steed, G0VEP on 023 9237 1677.

How to find Horwood House.

RSGB Convention Timetable

Saturday	IOTA/DX Operating	Technical	VHF & Up	Contest University
09.30-10.15	IOTA Update by Roger Balister, G3KMA followed by Kaglin Is, Alaska by Mike Crownover, AD5A	Planning applications by Len Paget, GM0ONX	Amateur Satellites - history, techniques, operational, under development and thank you RCF! Dave Johnson, G4DPZ, AMSAT-UK & AMSAT-NA	Preparing for the Contest by Roger Cooke, G3LDI
10.15-10.45	**COFFEE**	**COFFEE**	**COFFEE**	**COFFEE**
10.45-11.30	Line Islands (T32) by Derek Cox, G3KHZ	Design of linear amplifiers byPeter Chadwick, G3RZP	The next step in low temperature VHF and up Yagis by Justin Johnson, G0KSC	Home Constructed Antenna Systems (for the smaller station) by Steve Knowles, G3UFY
11.45-12.30	VY0O and VY0V: Two eventful expeditions in theCanadian Arctic by Cezar Trifu, VE3LYC	Design of linear amplifiers by Peter Chadwick, G3RZP	Beginners Guide to Working DX and Contesting on 70cm and 23cm Ray James, GM4CXM	Contest Propagation and Tools by Steve Nichols, G0KYA
12.30-13.45	**LUNCH**	**LUNCH**	**LUNCH**	**LUNCH**
13.45-14.30	Remote Radio - ready for prime time? By Olaf Lundberg, G0CKV	Ferrite chokes for baluns & EMC by Dr Ian White, GM3SEK	The Earth's Magnetic Field and its influence on radio propagation by Dr Geoff Grayer, G3NA	World Radiosport Team Championship by Dave Lawley, G4BUO
14.45-15.30	Chesterfield Islands 2009 (TX3A) by Tomi Pekarik, HA7RY & Chris Hildebrand, HA5X/M0XXA	HF antennas for the new radio amateur by Leslie Butterfields, G0CIB	The study of Coronal Mass Ejections from the Sun by Dr Lucie Green	A Year of Contesting by Jonathan Constable, M5FUN
15.30-16.00	**TEA**	**TEA**	**TEA**	**TEA**
16.00 - 16.45	Blowing away the smoke and mirrors of antenna operation by Roy Lewallen, W7EL	Military Communications by Michael O'Beirne, G8MOB	Beacons & Band Plans: 6m, 70cm, 23cm by Murray Niman, G6JYB	RSGB Commonwealth Contest from the Caribbean by Nick Totterdell, G4FAL
17.00-17.45	TX4T French Polynesia & LF to Europe by Nigel Cawthorne, G3TXF	NVIS by Anthony Wedgewood, G0TJD		A Club's IOTA Contest DXpedition by Chris Colclough, G1VDP
Sunday	**IOTA/DX Operating**	**Technical**	**VHF & Up**	**Something New**
09.00-09.45	Chesterfield Islands and other small-scale expeditions by Tomi Pekarik, HA7RY & Chris Hildebrand, HA5X/M0XXA	Introducing the AIM4170 antenna analyser by Ian Wade, G3NRW	VHF Contests Open Forum	HF for Beginners by Brian Reay, G8OSN
10.00-10.45	Clublog by Michael Wells, G7VJR & Alan Jubb, 5B4AHJ	Using the AIM4170 antenna analyser as a design tool by Ian Wade, G3NRW	Portable Microwave Contesting; how to win a contest with 50 contacts by Peter Day, G3PHO	VLF
10.45-11.15	**COFFEE**	**COFFEE**	**COFFEE**	**COFFEE**
11.15-12.00	HF Contest Awards by RSGB Contests Committee	Top Band propagation by Carl Luetzelschwab, K9LA	The Bodger's Guide to Solid State QRO on VHF by Dr John Worsnop, G4BAO	UK 6 Metre Group AGM
12.15-13.00	HF Contest Open Forum by RSGB Contests Committee	Electrical Safety for the Radio Amateur by Rupert Thorogood, G3KKT	Sporadic E - An update on the prediction research by Jim Bacon,G3YLA	Digital/D-Star by Darren, G7LWT & Gavin, M1BXF
13.00-14.00	**LUNCH**	**LUNCH**	**LUNCH**	**LUNCH**
14.00 - 14.45	Skimmer and RBN - more fun or the end of amateur radio? By Olof Lundberg, G0CKV	Tuneable multi-mode small antennas eg CFA, CFL, EH by Mike Underhill, G3LHZ	Deep space reception on 8.4 and 32GHz by Paul Marsh, M0EYT	
15.00-15.30	**RAFFLE**	**RAFFLE**	**RAFFLE**	**RAFFLE**

LOCATION. Horwood House is located 11 miles from Milton Keynes in Buckinghamshire. Set on the outskirts of Little Horwood Village, Horwood House is just off the A421 between Buckingham and Milton Keynes. It is signposted from the A421 and for satnav users the postcode is MK17 0PH. On our map it's the red X. Be warned that there are TWO unconnected Whaddon Roads south of the A421 – you do NOT want the one from Bottle Dump Roundabout.

ADMISSION. Visiting the RSGB Convention is easy, you can join in for a day, or take advantage of the packages available and stay either overnight Saturday or from Friday through to Sunday. The costs have been maintained at 2007 prices and range from a day ticket giving admission to RSGB Convention at £6.50 per day, through to the full 2 day, 2 night package at £214, which includes 2 nights accommodation, 2 days entrance to the RSGB Convention and the MLS 20th Birthday Buffet and the DX Dinner on Saturday evening. If you're planning to travel as a group you can pre-book five day tickets for the price of 4 and remember that under 18 year olds get in free to the lectures.

Full details are at www.rsgb.org/rsgbconvention/ including a link to the online booking pages or you can phone RSGB Events on 01844 263 950.

THANKS. Just a quick note of thanks to all those involved behind the scenes in putting the event together not least the two major sponsors, Icom UK and Martin Lynch and Sons. Thanks also to the 40 plus presenters who will, no doubt, make the whole weekend one to remember and visitors for supporting another RSGB Convention.

Antennas

More on HF magnetic loops and impedance measurements

PHOTO 1: HP4085 vector impedance meter. The meter on the left indicates Zmag in ohms while the right hand meter indicates Theta in degrees.

RF CONDUCTORS. In the September Antennas I described a loop antenna tuned by a capacitor that consisted of two aluminium plates fixed on hinges at the ends of the copper loop. One of the issues with this design was how to reduce the RF resistance across the capacitor hinges. The mechanical arrangement of these hinges, although made of brass, would probably present a relatively high RF resistance, which I said could be circumvented using coax cable braid.

The advantage of braid in this application is its flexibility. Some people question the effectiveness of braid at radio frequencies. The argument is that each strand of the braid weaves in and out and back and forth across the braid. Currents must either follow that inductive weaving path, or jump from strand to strand where strands touch. There are, of course, many individual strands in parallel, so overall inductance should be low. Tinned copper braid is probably best because oxidation between various strands of bare untinned copper braid may degrade performance.

Having said that, most coaxial cables for RF applications have a braided outer conductor to give them flexibility. The better grades use tinned braid. Very high performance low-loss coaxial cables use a solid outer conductor.

Copper strip is the best type of RF conductor because has the greatest surface area for a given amount of copper. Due to the skin effect, RF currents tend to flow along the outside surface of a conductor. Copper strap has a large, smooth surface area to take full advantage of this effect.

The disadvantage of copper strap is that it is not flexible and is unsuitable for bonding straps across the hinges of our loop capacitor. G8JNJ [1] tried thin sheet brass (obtained from a model shop) to make the bonding straps on the capacitors of his loop antenna. While brass does not have the conductivity of copper, he does report that it seemed to improve the Q slightly compared to using copper braid, although no actual figures are supplied. Another type of material that might be suitable for this purpose is phosphor bronze strip (used in door draught excluders).

MAKING COPPER STRIP. If you have difficulty in finding a source of copper strip for parts of a loop made from copper tubing (other than the capacitor hinge bonding strip mentioned above) you can make it from readily available 22mm or 15mm copper pipe. A short length of heavy duty strip suitable for fixing the SO239 socket to the loop can be made by flattening a short length of 22mm copper pipe in a vice. Smaller and thinner copper straps for making the shunt match connection to the loop can be made from flattened 15mm copper pipe. The edges of the flattened pipe are then filed down until it breaks into two thin strips.

OTHER COMMENTS ON THE LOOP. One of the oddities of the model shown in **Figure 1** is that the nulls in the sides of the azimuth plot are not very deep compared with a free space dipole. Measuring the nulls of the real loop using a selective level meter resulted in nulls of –20dB on one side and –11dB on the other; the cause of this asymmetry at the time of writing is unknown. The coax feed to the loop should be routed vertically down from the loop to the ground to get the best SWR and to minimise common mode currents on the coax. A current choke would also be of some help in this regard.

G8JNJ suggests making the capacitor plates teardrop shaped. This would give a smaller minimum capacitance and make the angular movement of the plates relative to frequency more linear.

RF MEASURING INSTRUMENTS. Many of you are aware my main interest is RF measuring instruments and their uses. For many years, the most popular and practical instrument for measuring the most useful of parameters, impedance, was the R±jX noise bridge.

There are times when measurements accuracies greater that provided by the standard noise bridge are required, particularly when the results have to be committed to print. I had used the 3-meter instrument [2] to good effect for many years but what was really needed was some sort of standard. Over a period of time, I acquired two old commercial instruments capable of making precision measurements.

The first was a General Radio 1606 Impedance Bridge, which I bought in 1985. This instrument comprises a precision bridge with variable calibrated components. As with all bridges of this type the bridge is energised using a signal generator. The bridge measures

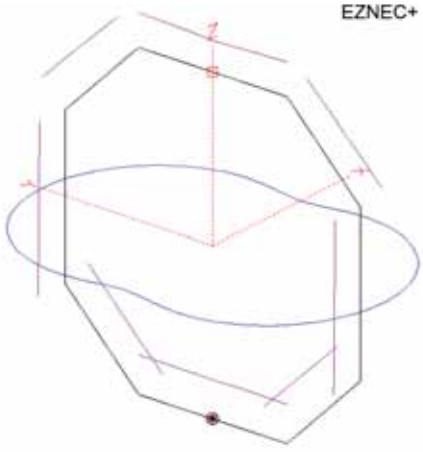

FIGURE 1: *EZNEC 5* free space model of the G3LDO magnetic loop antenna showing current distribution (red) and azimuth radiation diagram (blue).

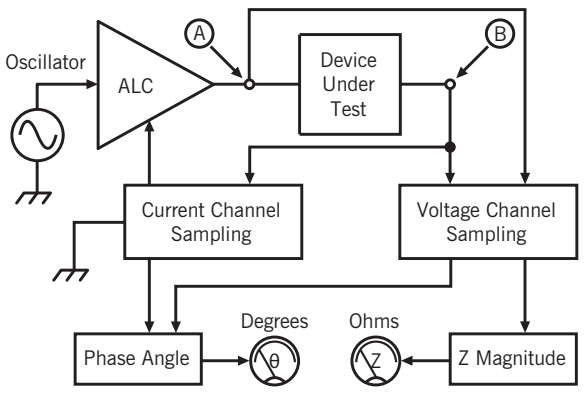

FIGURE 2: Simplified block diagram of the HP 4085 vector impedance meter. The device under test is connected to terminals A and B.

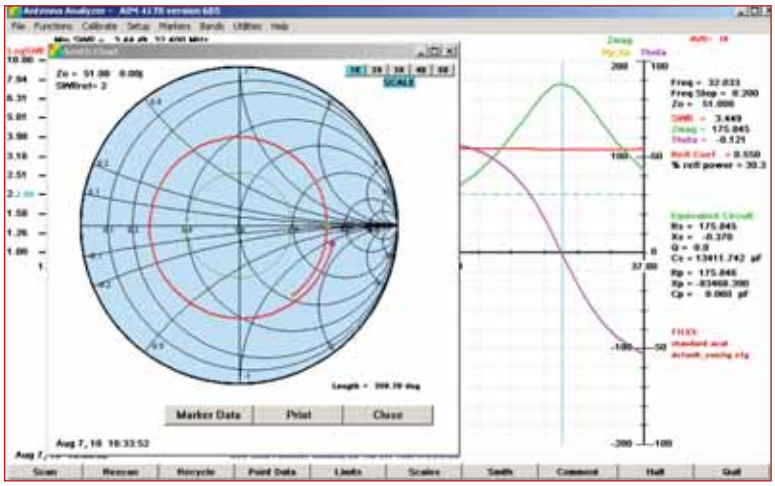

FIGURE 3: An AIM 4170 display showing a Smith chart superimposed on swept frequency graph, the result of measuring a 200Ω resistor over a three metre length of RG58.

the impedance presented to the UNKNOWN socket by adjusting calibrated components for a dip (or null) in a detector, usually a communications receiver with an S-meter. The impedance (R±jX) is measured on the dials of the bridge-calibrated components at the point of maximum dip.

While the GR 1660 gave good results, its weight of 10.5kg (23lb) together with an appropriate signal generator and communications receiver represented a lot of equipment for making an impedance measurement.

Later, I obtained a HP4085 vector impedance meter at a radio rally. At 17.6kg (39lbs), this instrument is heavier than the GR 1660 but has the advantage of being self-contained with its own signal generator supplying test signals from 0.5 to108MHz. This instrument doesn't have calibrated bridge components and a null detector. Instead, it measures impedance directly by comparing the ratio of voltage and current injected into the circuit or antenna under test. An automatic level control circuit (ALC) holds the current constant so that the impedance magnitude is directly proportional to voltage. Phase angle is measured by detecting the phase relation between the voltage and current waveforms. Impedance is read out directly on two meters, one showing impedance magnitude and the other phase as shown in **Photo 1** and **Figure 2**.

It measures the impedance using a probe and presents these measurements in terms Zmag/Theta. In the days when this instrument was state of the art (circa mid 60s), HP provided a slide rule calculator to convert these polar coordinates into the more familiar R±jX format.

VECTOR IMPEDANCE ANALYSERS. These instruments have been around for some time now (the first I heard of them was in the September 2004 Technical Topics). Vector impedance analysers are now commercially available. There is the miniVNA from Mini Radio Solutions and the AIM 4170, designed by Bob Clunn, W5BIG, which was reviewed in *RadCom* **[3]**.

I bought an AIM 4170 early in 2007 after being inspired by it during a visit to Dayton. It has been used for the analysis of antennas and baluns in Antennas columns since August 2007. It is very intuitive to use with only occasional recourse to the instruction book being necessary.

A length of feeder acts as an impedance transformer, the ratio of which varies with frequency. This means that the impedance you measure at the end of the feeder will generally not be the feed impedance of the antenna if you are using one of the instruments described earlier. There is an exception and that is when the feeder is an electrical half wavelength long. In this case the transmission line theoretically acts as a 1:1 transformer but note the measurement described below.

One of the features of the AIM 4170 is its ability to calibrate the feeder between the instrument and the device under test, which circumvents the problem described above.

The AIM 4170 performs a number of parameter measurements over a given swept frequency range; the most well known being SWR and impedance. This latter parameter is given in Zmag/Theta and/or the more familiar R±jX. It will also plot Reflection Coefficient and Return Loss; it'll even do all these parameters at the same time if so desired. Mind you, if you try to display them simultaneously the display gets a bit messy so in practice I generally stick with just SWR and impedance.

The AIM 4170 also has Smith chart display. This is a useful feature for checking the accuracy of this type of instrument. The display shown in **Figure 3** is Smith chart superimposed on a swept frequency graph, being the result of measuring a 200Ω resistor (one that came with the calibration pack) over a three metre length of RG58.

The green circle is a SWR 2:1 marker. It can be seen that the actual plot (shown in red) is a smooth circle showing a tendency to spiral towards the centre as the frequency is increased; an effect caused by coax cable loss. Any errors with measurements will cause irregularities in the smoothness of this plot.

In the background plot of Figure 3, you can see a green marker placed over the point where Theta is zero. This is the half wavelength point away from the 200Ω load. The data to the left of the display shows the Zmag and Rs both 175.8Ω. At a full wavelength, it was 158Ω. I had not appreciated how much the cable attenuation would affect the divergence from the 1:1 transforming ratio but it is obvious when you think about it.

I have only just scratched the surface of what this instrument can do. If you wish to know more then I recommend you attend the RSGB 2010 Convention on Sunday 10 October **[4]** where Ian Wade, G3NRW, is giving two presentations on the AIM 4170 antenna analyser. The first will cover the basics of antenna measurement, and the second will illustrate the use of the 4170 as a design tool.

Live demonstrations of the AIM 4170 will be the main feature of the presentations, and will include tuning a 4m ground plane, trap tuning, designing a 160/80m trap dipole, measuring quartz crystal parameters, using the Smith chart, quarter-wave stub tuning and measuring the impedance at the antenna feedpoint. The final demonstration will show how to control the analyser remotely via a Wi-Fi link, allowing you to tune your antenna while standing in the garden (or on the roof or at the top of the tower). The presentations will be based on the material at G3NRW's website **[5]**.

REFERENCES

[1] http://g8jnj.webs.com
[2] *The Antenna Experimenter's Guide*, Second Edition, Peter Dodd, G3LDO.
[3] *RadCom* July, 2007
[4] RSGB Convention: www.rsgb.org.uk/rsgbconvention
[5] http://homepage.ntlworld.com/wadei/aim4170.htm

EMC

More testing of Gigabit PLT plus TV aerial amps and solar cells

PHOTO 1: VHF radiated emission testing of PLA devices from 30-300MHz.

GIGABIT POWERLINE NETWORKING.

An item in June 2010 EMC related to home powerline networking adaptors that transmit data via mains power wiring at bit rates that are described as 'Gigabit'. Further tests have been done to assess the typical level of VHF radiated interference from such devices. The VHF LISN shown in June 2010 EMC was used to characterise the emission into the mains more thoroughly, using Quasi-peak (QP) detection and a much larger number of measurement points. The PLAs were exercised by transferring a large file between two networked PCs via a powerline network. The conducted emission spectrum was measured at 2401 spot frequencies from 20-320MHz with frequency steps of 125kHz and a resolution bandwidth of 120kHz. The results are shown in **Figure 1**. The vertical scale is the conducted emission in dB(μV).

Figure 1 shows the conducted emission into a 50Ω load but, due to the design of the LISN, this is half the total amplitude of the signals that are emitted into mains wiring. Adding 6dB gives the total amplitude into a 100Ω load and this can be used to calculate the power in 100Ω. If the power into a 100Ω load is scaled from 120kHz bandwidth to 1Hz bandwidth assuming the characteristics to be noise-like then the power spectral density (PSD) can be found, ie the power in 1Hz bandwidth. It has been calculated that a QP conducted emission of 74.8dB(μV) in Figure 1, measured in 50Ω using a VHF LISN, is equivalent to a QP PSD of -80dBm/Hz in 100Ω. The chipset used in the PLAs tested is said to transmit with a QP PSD of -80dBm/Hz at VHF and is claimed to be able to achieve radiated emissions below the CISPR 22 limits. Whether this can be achieved in practice clearly depends to a large extent on the characteristics of the mains network to which the PLA is connected. It can also be seen from Figure 1 that some peaks are up to 81dB(μV), which corresponds to a PSD of -74dBm/Hz. This is 6dB higher than the nominal PSD of -80dBm/Hz, although this depends on the load impedance and the test method.

Figure 1 also includes part of the HF emission spectrum, from 20-27MHz for comparison, but this is measured in the 120kHz measuring bandwidth that is used above 30MHz. This makes it 11dB higher than it would be if measured in the 9kHz bandwidth that is used below 30MHz. The conducted emission falls between 27MHz and 50MHz then rises again in a sharply-defined range between 50MHz and 300MHz. This range includes the 88-108MHz FM broadcast band, civil aviation, mobile radio services and DAB as well as the 50MHz, 70MHz and 144MHz amateur radio bands.

It was shown in August 2010 EMC that if a VHF PLT device is to pass the EN55022 radiated emission test, it needs to be connected to mains wiring with an antenna gain of lower than -27.7dBi from 30-230MHz and lower than -21.7dBi above 230MHz. It was shown in June 2010 EMC that to allow such products to pass the EN55022 Class 'B' radiated limit up to 300MHz, the mains supply wiring needs to be well-balanced right up to 300MHz and this is not realistic. Clearly an actual installation is likely to be substantially different so tests have been performed in a real installation.

VHF RADIATED EMISSION TESTS.

A home powerline network was set up at the author's QTH. One PLA was plugged into a socket upstairs inside the rear wall of the house and the other was downstairs towards the front. The two PLAs were on different ring main circuits. The PLAs operated on HF and VHF bands simultaneously.

An HP EMC analyser with a pre-amplifier and a biconical EMC measuring antenna were set up in the garden, 10m from the rear wall of the house, as shown in **Photo 1**. The test equipment was powered from an isolated supply using an inverter and a 12V battery. A large file was transferred from the PC upstairs to the PC downstairs. Horizontally and vertically polarised measurements were performed with the feed point of the antenna 2m above ground level. The vertically polarised measurements were generally at a higher amplitude than the horizontally polarised measurements and only the vertically polarised measurements are shown.

The spectrum analyser was remotely controlled from a laptop PC and was used to make a series of 541 spot frequency measurements from 30MHz-300MHz in steps of 0.5MHz with 120kHz resolution bandwidth and QP detection. The result is shown in **Figure 2**, with the vertical axis showing field strength in dB(μV/m). The lower (blue) trace shows the ambient signals with the PLAs switched off and the upper (red) trace shows the ambient signals and the PLA radiated emissions with the PLAs transferring data.

Although it is difficult to distinguish peaks in the PLA emission from ambient signals, the 'base line' of the PLA emission in Figure 1 can be seen clearly in Figure 2, particularly around 140-190MHz where the 'noise floor' is raised to 30-40dB(μV/m). By comparison with Figure 1, it can be seen that this emission 'base line' (below the peaks) corresponds to a conducted emission of approximately 68dB(μV) which is a PSD of approximately -87dBm/Hz.

It was shown in August 2010 EMC that, in theory, a PSD of -80dBm/Hz would produce a field strength of 30dB(μV/m) at a distance of 10m under 'free space' conditions if the antenna gain is -27.7dBi. If field strengths up to 40dB(μV/m) are measured at 10m with a PSD of -87dBm/Hz then the gain of the mains wiring as an antenna appears to be up to 17dB higher than -27.7dBi, or approximately -11dBi at some frequencies.

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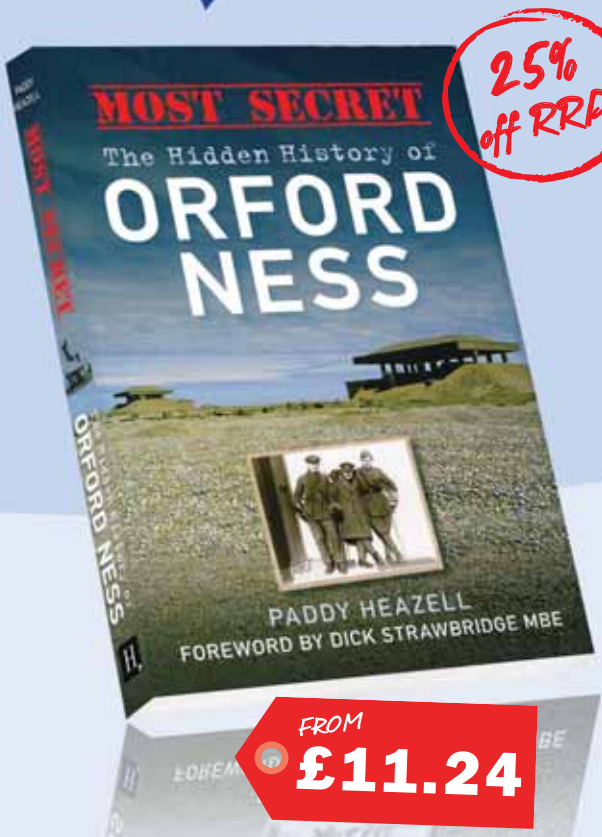

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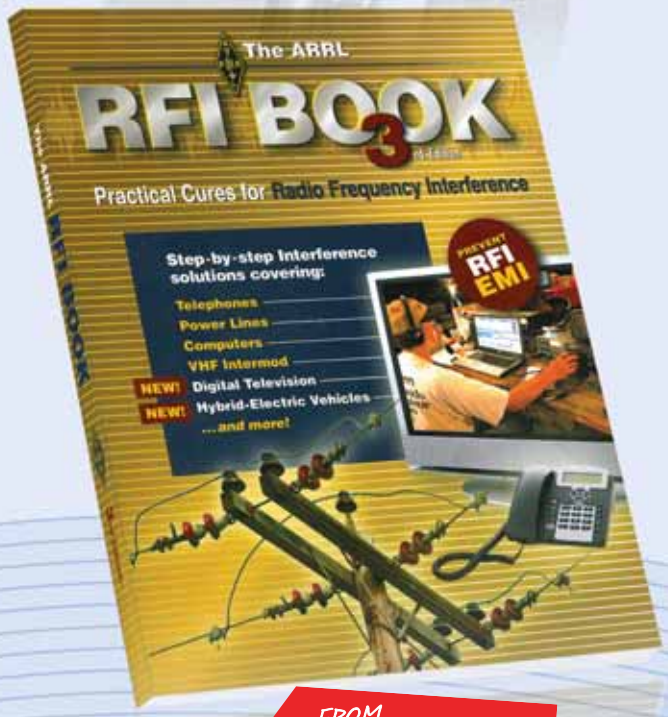

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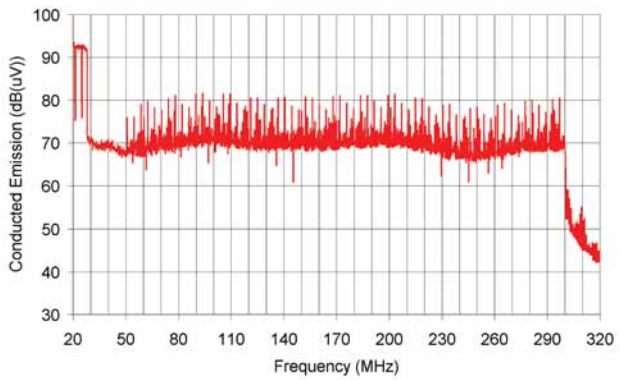

FIGURE 1: VHF QP conducted emissions from PLA devices.

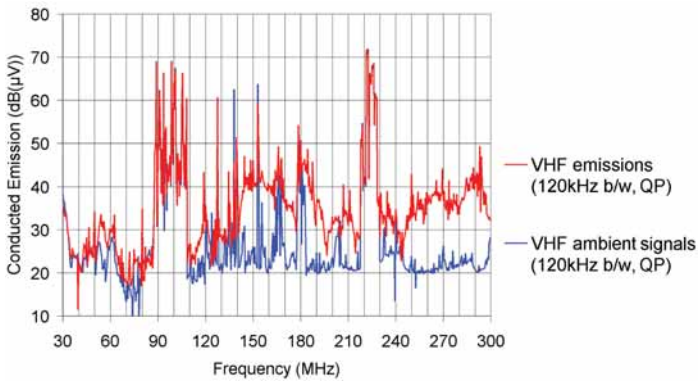

FIGURE 2: Ambient signals and PLA radiated emissions.

The above measurement is based on one particular house with a particular configuration of mains wiring and other connected equipment near the PLAs. It is also subject to significant measurement uncertainties as pre-compliance EMC test equipment was used and no antenna height scan was performed. Nevertheless, the mains wiring appears to have an antenna gain that is significantly higher than the figure that has been assumed by the designers of the PLAs and by the authors of the Ofcom report (see Websearch).

If the antenna gain of mains wiring at VHF is 10dB higher than assumed in section 10.1.1 of the Ofcom report then the probability of interference is increased substantially for VHF radio services including FM broadcasting, DAB, PMR, VHF aeronautical navigation and amateur radio. The Ofcom report applies much the same analysis to PMR and VHF amateur radio bands although the increased gain of some amateur radio receiving antennas including directional antennas is not taken into account. This leads to a higher probability of interference to VHF amateur radio users. Even taking an optimistic value for the antenna gain of mains wiring, the report recommends 'notching' of VHF amateur bands. It states that notch depths to -110 to -120dBm/Hz can be achieved in practice but if the antenna gain of mains wiring is 10dB higher then the notches would need to be 10dB deeper, which may not be feasible in practice.

144MHZ BAND TESTS. Tests were also performed in the 144-146MHz amateur band using a Yaesu FT-480R fitted with a large add-on analogue S-meter that had been calibrated in dB relative to 1μV using an RF signal generator. A dipole antenna was used due to its well-defined characteristics. If perfectly matched into 50Ω, it has a theoretical antenna factor of 11dB, meaning that the RF field strength in dB(μV/m) is 11dB higher than the RF output from the antenna in dB(μV) into 50Ω. Signal levels from PLA signals were measured at various points in the 144 - 146MHz band. After allowing for the antenna factor of the dipole, the 2.4kHz bandwidth and average detection instead of QP, the results are comparable to Figure 2.

STANDARDS ISSUES. EMC standards such as EN55022 were intended to cover direct radiated emissions from the equipment under test. They do not adequately cover the situation where devices generate intentional differential mode broadband VHF conducted emissions into mains because they do not define the RF characteristics of the mains wiring at VHF. This apparent 'loophole' in EMC standards is currently being exploited by PLT devices operating up to 300MHz that claim compliance with the VHF radiated emission limits of EN55022. Nevertheless, there is also the matter of conducted emissions at HF and one device on the market claims overall compliance with EN55022:2007 both radiated and conducted. This is open to challenge and it has been referred to Trading Standards for investigation. Further information will be published when available.

TV AERIAL AMPLIFIER. Peter, LB0K/G8CKB from Norway reports that he suddenly experienced a lot of interference from about 2.5MHz to over 12MHz with levels up to S9 in the 7MHz and 10MHz amateur bands. This effectively prevented reception of anything except the very strongest signals in the SW broadcast bands and the amateur bands. The interference was also audible from around 700kHz up to 21MHz.

The characteristics of the interference could be heard most clearly using AM demodulation. It sounded like modulation at maybe 1kHz. Peter found that the source of this interference was the mains PSU supplying a new TV aerial amplifier and splitter in his house. The PSU was a similar size to a mobile phone charger. It was labelled as made by 'Ktec', model no. KSAA1200050W1EU, input 100-240V – 50/60Hz; output 12V(DC) at 0.5A. It was marked 'Made in China' with the characters 'R5008' embossed into the plastic case just below the label.

The unit should be 'CE' marked as Norway is part of the European Economic Area (although not an EU country). Like many plug-in power supply units nowadays, even the smallest tend to be switch-mode power supplies (SMPS) and any SMPS can generate radio interference. It is not known whether this particular SMPS complies with the applicable EMC standard or whether some EMC filtering components are missing, but in either case, the braids of the connected coaxial cables could radiate interference from the SMPS. Peter has replaced the SMPS with a different PSU that has a 'proper' iron-cored mains transformer.

PHOTOVOLTAIC MICRO-GENERATION. David, G0AIX reports that his neighbour has decided to install a 3kW photovoltaic micro-generation system that will feed surplus power to the National Grid. The neighbour is situated 50 metres from David's property and, as this is a 'retro fit' installation, David is concerned about the possibility of RF interference being radiated from the inverter and associated wiring. He understands from discussions with fellow radio amateurs who have similar systems near them that RFI can occur from medium wave up to 6MHz, making the lower bands unusable.

The RSGB EMC Committee has not received any reports of RFI from photovoltaic micro-generation systems but would be interested to hear of any such problems. Such systems require an inverter to convert the low voltage DC output of the solar cells to 230V AC at 50Hz. Such inverters normally use switch-mode techniques with the potential to generate RFI. Although such RFI could be generated by insufficient RF interference filtering in the inverters, it could also be caused if the manufacturer's recommendations for installation are not followed properly. In either case, the power cable to the solar cells that are normally mounted on the roof could act as a radiating antenna.

WEBSEARCH

Ofcom Report *The Likelihood and Extent of Radio Frequency Interference from In-Home PLT Devices*, http://tinyurl.com/RC-1110-EMC

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Diamond quality PSU **£189.99**

WATSON PSU
(All free delivery)

Power-Mite NF 22amp	£69.95
Power max (25A)	£89.95
Power max (45)	£115.00
Power max (65)	£119.99
Power max (85)	£219.99
W-25AM	£89.99

ANTENNAS

INTRUDER II
11 band (80-10 6/2/70cm). PL-259 fitting. Colapses to 95cm (~ 3 ft).

£37.99
(2 for £70.00)

NEW INTRUDER III
13 band (80-10/6/2). PL-259 fitting. Includes WARC bands. 13 band version of Intruder II.

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ATAS-120
Military spec mobile antenna – superbly made. Covers HF + 6m + 2m + 70cm. *Fully automatic. (*certain Yaesu radios).

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

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OUR PRICE **£299.99**

DIAMOND V-2000
6m + 2m + 70cm. 2 section (2.5m long) PL-259 fitting.

Superb quality
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ACCS

SGC BARGAINS

SGC MAC-200 New auto tuner 1.8-54MHz (200W) wire, vertical, dipole. You name it. (5 selectable outputs).
£289.99

SGC-239 Mini tower ATU (1.8-30MHz)	£199.99
SGC-237 HF+6m Tuner	£309.99
SGC-230 (HF-200W) ATU	£449.99
SGC-Smart lock (specify model)	£69.99

MFJ-259B ANALYSER
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£259.99
Case 259B £29.99
MFJ-269 pro version £359.99
MFJ-260C 300W dummy load £49.99
MFJ-264 1.5kW dummy load £79.99
MFJ-969 Rollercoaster ATU (300W) £199.99
MFJ-962D 1.5kW (metered) antenna tuner ..... our price £269.99
MFJ-994B (600W) intelli tuner £319.99

MFJ-269B ANALYSER
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Dip Coils 259/269 £29.99
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MFJ-993B INTELLITUNER
Fully automatic (1.8-30MHz). 300W SSB.

Easy to use ATU.
SALE PRICE **£239.99**

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● 1.8-30MHz 300W ATU ● Large cross needle meter ● 30/300W PEP power meter ● VSWR ● 3-way antenna selector ● Internal balun + dummy load.

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£135.00

YAESU FT-7900 R/E

Latest commercial built 2m/70cm mobile + wide Rx. (Incl's DTMF mic)
£235.00

NEW YAESU FT-270 R/E

2m FM handie (keypad). Incl's batt/charger.
£105.99

NEW YAESU FTM-350

2m/70cm Tcvr with APRS & dual Rx (50W O/P). Includes wideband Rx.
ESTIMATED PRICE **£529.99**

YAESU FT-8900 R

10m + 6m + 2m + 70cm. (up to 50W).
+ FREE 6m/2m/70cm mobile antenna
Includes DTMF mic + wideband receive
£325.00

YAESU VX-7R

6m/2m70cm + wide RX. An amazing 6W water proof hand-held. Case £19.99/spk mic £32.99. Cigar lead £24.99/ BNC adapter £6.
£259.99

YAESU VX-8E

6m/2m/70cm. "APRS" with Rx:- 0.5-1GHz. Incl's battery & chgr.
FREE EXTRA BATTERY THIS MONTH
£349.99

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NEW NOISE FILTER!

A superb TDK 'snap fix' ferrite clamp for use in Radio/TV/ Mains/PC/Phone etc. *Simply close shut over cables and notice the difference!* Will fit cables up to 13mm diameter. Ideal on power supply leads/mic leads/audio leads/phone leads.
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(with up/down). Many amateurs (over 4000) have been pleased with it's performance. Includes 8-pin round Yaesu mic lead. Icom/Kenwood & other leads available. Phone (£19.99 each).
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SALE PRICE **£79.99**

KENWOOD TH-F7E

2m/70cm Tx. Rx: 0.1-1000MHz (AM/WFM/FM/SSB). Incl's battery pack (Lion) + charger.
Includes free speaker mic
£229.99

ALINCO DJ-596E

2m + 70cm Handie. Includes nickle metal N.M.H.I and charger.
Includes free speaker mic
£149.99

ETON SATELLIT 750

0.1-30MHz SSB/AM
88-108MHz (FM stereo)
118-137MHz airband/rotary antenna. 1000 mems/ rotary tuning/wide-narrow filters & more.

£295.00 Incl del

+ FREE HD-1010 headphones

SONY SW-30

LAST FEW LEFT
MW/ shortwave broadcast +FM. Superb summer portable at just the right price.

£34.99 post £5

NISSEI PWR/SWR METERS

RS-502 1.8-525MHz (200W) ..... £79.95 P&P £6.50
RS-102 1.8-150MHz (200W) ..... £49.95 P&P £6.50
RS-402 125-525MHz (200W) ..... £49.95 P&P £6.50
RS-3000 1.8-60MHz (3kW) Incls mod meter ..... £59.95 P&P £6.50
RS-40 144/430MHz Pocket PWR/SWR ..... £34.99 P&P £5
DL-30 diamond dummy load (100W max) ..... £29.99 P&P £5

HEAVY DUTY SWAGED MAST SET

New extra heavy duty 2" mast set. 4 sections x 5½ foot slot together.

£79.99 each. TWO FOR £135.99 DEL £15.00

NEW SWAGED MAST SETS

20 foot mast. 1½" – 4 x 5 foot sections. (Swaged)
£49.99

20 foot mast. 1¼" – 4 x 5 foot sections. (Swaged)
£46.99

H/DUTY CAR BOOT MAST SET

18 foot (1½" dia).
18 foot – 6 x 3 foot (1½") slot together ally sections.

£44.99 each. TWO FOR £79.99 DEL £13.00

NEW CAR BOOT MAST SET

Superb 18 foot (6 x 3 foot sections) that slot together.
Dia: 1¼" ideal to take anywhere. **£43.99**

2 for £74.99 del £13.00

HANGING PULLEY

Heavy duty die-cast hanging pulley. Hook and go!
£24.99

MAST HEAD PULLEY

A simple to fit but very handy mast pulley with rope guides to avoid tangling. (Fits up to 2" mast) **£12.99** + P&P £4.50
30m pack (4.4mm) nylon guy rope £15.00
132m roll 4.4m nylon guy (480Kg b/f) ..... £45.00 Del £7.50

NEW EASY FIT WALL PULLEY

Pulley will hang freely and take most rope up to 6mm. (Wall bracket not supplied).
£12.99 + P&P £4.50
Wall bracket, screws not supplied. Simply screw to outside wall and hang pulley on WALL BRACKET £2.99 P&P £1.00
30m pack (4.4mm) nylon guy (480kg) £15.00
132m (4.4mm) nylon guy (480Kg) £45.00

BARGAIN WINCH

500kg brake winch. BARGAIN PRICE
£79.99 Del £10.00
(Now includes cable grip)
Winch wall bracket £22.99

LOW LOSS PATCH LEADS

Connectors	Length	Price
PL-259 - PL-259	0.6m	£9.99
PL-259 - PL-259	1m	£11.99
PL-259 - PL-259	4m	£14.99
PL-259 - PL-259	20m	£49.99
BNC - BNC	1m	£9.99

P&P £4.50

EP-300

Over the ear earpiece.
£9.95
P&P £4.00

DB-770H (BNC)

2m/70cm Tx + wide Rx. High gain up to 5.5dB.
£54.99
P&P £5.00

MT-3302

Heavy duty universal mount. Includes 5m cable
£29.99

MT-6601

Adjustable roof rack/window bar mount
£19.99

LIMITED STOCK

10m PNEUMATIC MAST

We have a small quantity of "military spec" pump-up masts (part of a Government order). All brand new in a crate and supplied with cover (close HT ≈ 6 foot). Anodised green finish.
40m guy kit pack £49.99
Ground fixing spikes (3-off) £35.00
2 foot all ground fixing kit £99.99
(Can be hand operated or by compressor/foot pump)

SUPER VALUE **£1089.99** Del £40.00.

CAROLINA WINDOM

CW-160S	(160-10m) 40m long.....	£149.95 P&P £10.00
CW-160	(160-10m) 80m long.....	£159.95 P&P £10.00
CW-80	(80-10m) 40m long.....	£129.99 P&P £10.00
CW-80S	(80-10m) 20m long.....	£149.99 P&P £10.00
CW-40	(40-10m) 20m long.....	£119.99 P&P £10.00
G5-RV	(80-10m) + balum	£74.99

CUSHCRAFT BARGAINS *Delivery £15.00*

MA5B	Mini beam 10, 12, 15, 17, 20m.....	WOW £449.99
A4S	4 ele beam (10 - 20m).....	£649.99
A3S	3 ele beam (10-20m).....	WOW £539.99
R-8E	Vertical (40 - 6m) "special".....	SPECIAL £499.99

Q-TEK PENETRATOR

"We've sold 100s all over Europe"

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

SEND SAE FOR LEAFLET **£215.99**

NEW Wire Penetrator 50ft long (1.8-70MHz)..... £189.99

W-8010 DIAMOND SHORTENED DIPOLE

80-10m & only 19.2m long! (Up to 1.2kW) Includes 1:1 Balun. Bargain. Superb Japanese quality antenna system.
£169.99

Standard & Deluxe G5RV

P&P on either full/half size £7.50

Half size 51ft (now includes heavy duty 300Ω ribbon).....£24.95
Full size - 102ft (now includes heavy duty 300Ω ribbon) ...£28.95
Half size (Deluxe) - 51ft (40-10m) £36.95
Full size (Deluxe)- 102ft (80-10m) £42.95
In-line choke balun for G5RV, etc..... £39.99

Q-TEK INDUCTORS

80mtr inductors + wire to convert ½ size G5RV into full size. (Adds 8ft either end).....£34.99 P&P £4.00 (a pair)

TRAPS BACK IN STOCK

BALUNS & TRAPS (1kW)

Baluns 1:1 or 4:1 or 6:1 .....£34.99 each P&P £4
Traps 80m or 40m or 20m or 15m.....£39.99 pair P&P £5

DOUBLE THICK FERRITE RINGS

A superb quaility ferrite ring with incredible properties. Ideal for "R.F.I". Width 12mm/ OD35mm. 6 for £12.00 P&P £4.00
12 for £20.00 P&P £5.00
30 for £40.00 P&P £10.00

COAX SWITCHES (P&P £6.00)

2 way CX-201 (0-1GHz) SO239.....£19.95
2 way CX-201 'N' (0-1GHz) 'N' £24.95
4 way CX-401 (0-500MHz) SO239.....£79.95
4 way CX-401 'N' (0-500MHz) 'N' £89.95

WATSON COAX SWITCHES

(FREE POST)

CX-SW4N DC-1.5GHz (5xN).....£59.99
CX-SW4PL DC-800MHz (5 x SO-239).£56.95
CX-SW3N DC-1.5GHz (3 x N) £49.95
CX-SW3PL DC-800MHz (3 x SO-239).£41.95
CX-SW2W DC-3GHz (3 x N).....£32.95
CX-SW2PL DC-1GHz (3 x SO-239) £26.95

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DC-1 Standard 6-pin/20A fits most HF .....£22.00 P&P £3
DC-2 Standard 2-pin/15A fits most VHF/UHF .... £10.00 P&P £3
DC-3 Fits Yaesu FT-7800/8800/8900, etc ..... £17.50 P&P £3

YAESU REPLACEMENT MICS

MH-IC8 8 pin Yaesu mic (8-pin round) .....£39.99 P&P £5
MH-4 4 pin fits older HF, etc. (4-pin round) .....£34.99 P&P £5
MH-31A8J 8 pin modular .....£34.99 P&P £5

COAX BARGAINS

True military spec real UK coax

RG-58 Military spec x 100m.
£49.99 or 2 for £90.00
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RG-213 Military spec x 100m (10mm dia).
£129.99/100m or 2 for £229.99

Q-TEK TRI-MAGMOUNT

Very heavy duty. Available:- SO-259 or 3/8 – specify.
£44.99

YAESU G-450C

Heavy duty rotator for HF beams, etc. Supplied with circular display control box

WOW **£309.99** or £349.99 with 25m cable/plugs

G-650C extra heavy duty rotator. £355 or £399.99 with cable
G-1000DXC extra heavy duty rotator. £425 or £479.99 with cable
G-2800DXC The goliath of rotators..... £845.99
GS-065 thrust bearing £54.99
GC-038 lower mast clamps £32.99

AR788

Quality rotator for VHF/UHF. Superb for most VHF-UHF yagis, 3 core cable required. 3 core cable £1 per mtr.

OUR PRICE **£81.99**

AE-201 thrust bearing £24.99

DIAMOND YAGIS

No tuning required

2m/10 element No tuning required SO-239 feed..... £74.99
70cms/10 element No tuning required SO-239 feed..... £48.99

Q-TEK COLLINEARS (VHF/UHF)

Del £12.50

X-30 GF 144/70, 3/6dB (1.1m)..... £44.99
X-50 GF 144/70, 4.5/7.2dB (1.7m)..... £59.99
X-300 GF 144/70,6.5/9dB (3m)..... £79.99
X-510H GF 144/70, 8.5/11dB (5.4m) £139.99
X-627 GF 50/144/70, 2.15/6.2/8.4dBi (2.4m)....£89.99

DUPLEXERS & TRIPLEXERS

MX-2000 50/144/430MHz Triplexer £59.99
TSA-6011 144/430/1200MHz Triplexer £59.99
MX-72 144/430MHz £34.99
MX-72 "N" 144/430 ..... £35.99
MX-62M (1.8-56MHz + 76-470MHz) £59.99

MOBILE ANTENNAS

Del £10.00

DB-7900 2m/70cm (5.5/7.2dB) 1.6m (PL-259)..... £39.99
DB-770M 2m/70cm (3.5/5.5dB) 1m (PL-259)..... £24.99
Diamond HV-7CX 7/14/21/28/50/144/430..... £129.99
Diamond CR-8900 10/6/2m/70cm (1.26m) £99.99
Diamond AZ-506 2m/70cm – only 0.67m long..... £39.99
PL-62M 6m/2m (1.4m) PL-259 ..... £23.99
PL-627 6m/2m/70cm (1.7m) PL-259..... £44.99

SPEAKER MIC

U-120 Fits Alinco, Icom and Yaesu. (Kenwood version available)
£16.99 P&P £4.00

EARPIECE/BOOM MIC

Over ear earpiece + boom mic. Available in Kenwood version or Yaesu/Alinco/Icom.
£24.99 P&P £4.00

ALUMINIUM POLES

20 foot (collection only) 2"..... £69.99
10 foot (collection only) 2"..... £34.99
2.4m (2") Ally pole..... £32.99
SPECIAL OFFER 2.4m x 2" poles (4 off)..... £100.00
5 foot x 2" pole..... £17.99

COPPER ANTENNA WIRE ETC

Hard drawn (50m roll)..... £40.00 P&P £7.50
New: 50m roll, stranded antenna wire..... £19.99 P&P £7.50
Flexweave (H/duty 50 mtrs)..... £44.99 P&P £7.50
Flexweave H/duty (18 mtrs)..... £21.99 P&P £7.50
Flexweave (PVC coated 18 mtrs)..... £24.99 P&P £7.50
Flexweave (PVC coated 50 mtrs)..... £59.99 P&P £7.50
Special 200mtr roll PVC coated flexweave ..... £180.00 P&P £10.00
Copper plated earth rod (4ft)..... £14.99 P&P £8.00
Copper plated earth rod (4ft) + earth wire..... £24.99 P&P £8.00
New RF grounding wire (10m pack) PVC coated ..... £14.99 P&P £5

METALWORK & BITS (Del Phone)

2" mast-floor base plate..... £14.99
6" stand off brackets (no U-bolts)..... £8.99
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12" T & K brackets (pair) £18.99
18" T & K brackets (pair) £22.99
24" T & K brackets (pair) £26.99

All bracket measurements are from wall to end of bracket

U-bolts (1.5" or 2") each..... £1.50
8mm screw bolt wall fixings £1.70
8-nut universal clamp (2" to 2")..... £7.99
2" extra long U-bolt/clamp £6.99
2" crossover plate with U-bolts..... £14.99
15" long (2") sleeve joiner (1.5" also available)..... £18.99
3-way guy ring £5.99
4-way guy ring £6.99
Heavy duty guy kit (wire clamp, etc.)..... £49.99
Set of 3 heavy duty fixing spikes (~0.7m long)..... £29.99
30m pack (4.4m) 480kg B/F nylon guy..... £12.50
Roll of self-amalgamating tape 25mm x 10mtr..... £8.99
Special offer:- Self-amalgamating 3 rolls..... £20.00

RH-9000 BNC

40cm flexible whip for the ultimate in gain.
£29.99 P&P £5.00
Tx:- 2m + 70cm (Rx:- 25MHz-2.9GHz).

RH-9090 SMA

40cm flexible whip that is ideal as replacement. Tx:- 2m + 70cm.
Rx:- 25MHz-2.9GHz **£34.99** P&P £5.00

QS-300

A fully adjustable deluxe desktop stand for hand-helds. Includes BNC to SO-239 lead.
£19.99 P&P £4

QS-200

A superb, no mess, quick fit in-car holder (fits airvent) for hand-helds.
£6.99 P&P £3

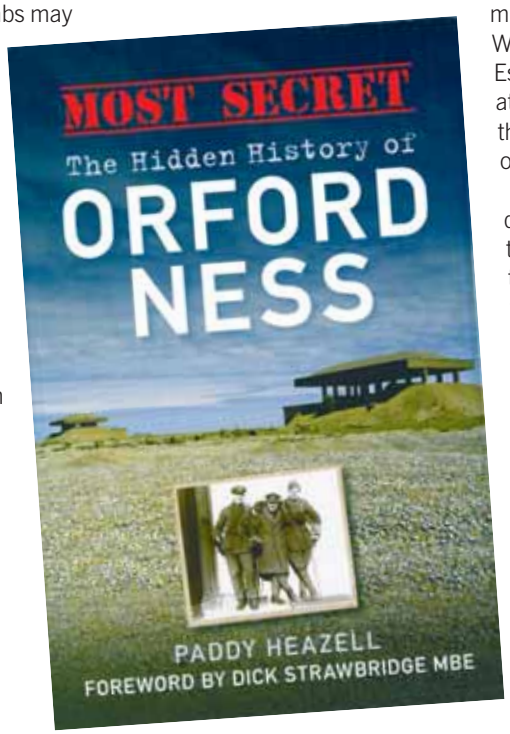
Book review

Everything you need to know about amateur radio operating – and how atom bombs were dropped on Suffolk!

Most Secret: The Hidden History of Orford Ness

By Paddy Heazell

It will probably surprise most that the RAF really did drop Atom bombs on Suffolk in the 1950s. The bombs may not have contained fissile material but it this is one of the many secrets of Orford Ness. This book details an extraordinary story that also includes the development of Radar, aerial bombing techniques, Cold War over horizon radar and even its use today for BBC World Service radio and a National Nature Reserve.



Published in conjunction with the National Trust, this book recounts the history of a remote stretch of the Suffolk coastline that was so secret a place that most people have never even heard of it. Orford Ness operated for over eighty years as a highly classified research and testing site for the British military, the Atomic Weapons Research Establishment and, at one point, even the US Department of Defence.

It is very difficult to do justice to the detail this book contains on the activities that that took place in the less than eighty years of activity at Orford Ness. There is information on the highly secret Cobra Mist project with its antenna that covered a staggering 132 acres. Cobra Mist was a US over the horizon radar project that was intended to detect Soviet and Chinese missile launches. Even today is Cobra Mist is shrouded in mystery and for some is a cover up involving UFOs.

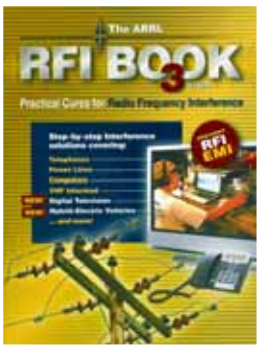
With origins in WW1, Orford Ness began life developing aerial weaponry of all sorts, from the first tests on how to drop bombs from an aircraft through to weapons to fight the Zeppelin threat. This continued through tests of some of the Barnes Wallis special bombs of WW2 into the Cold War ballistic testing of atom bombs. Orford Ness was also where, in the 1930s, Watson Watt and his team tested the highly secret radar systems that were to prove so effective in the Battle of Britain. Orford Ness was often the place chosen when the military (in its various guises) needed secrecy for those early radar experiments, the cold war developments and the testing of all manner of explosive ordnance.

The role Orford Ness played in inventing and testing was crucial over the course of the twentieth century. The author has set out to tell that tale and record the work of the greatest 'boffins' of past generations. This is highly readable book that provides many surprises about the "Most Secret" Orford Ness.

ISBN 978-0-75245-741-3
Published by History Press
288 pages
Non Members £14.99
RSGB Members £11.24 (25% off)

The ARRL RFI Book 3rd Edition

Edited by Mike Gruber, W1MG



From arcing thermostats to parasitic oscillations, there is a plethora of possible sources of RFI. This book helps you understand the fundamental principles and mechanisms, what to look for and how to fix problems. It is a remarkably comprehensive work that can guide you through the theory and practice of sorting out RFI and some general EMC issues. One example is a chapter on direction finding techniques that can help you track down the source of an unknown transmission.

The third edition of the RFI book has been updated to reflect recent changes and developments and, in the USA, it is undoubtedly a superb practical and reference work. However, for those reading it outside the USA it is important to realise that there significant differences in, for example, mains electrical systems, which must be borne in mind. This book contains a lot of useful information suitable for both the beginner and those more advanced but, here in Europe, people with less experience may be mislead in some areas – possibly with dangerous consequences. But if you want to troubleshoot RFI issues in the USA, every word is a gem.

ISBN 978-0-87259-091-5
320 pages, 210 x 275mm
Published by ARRL
Non members' price £23.99
Members' price £20.39

The Amateur Radio Operating Manual 7th Edition

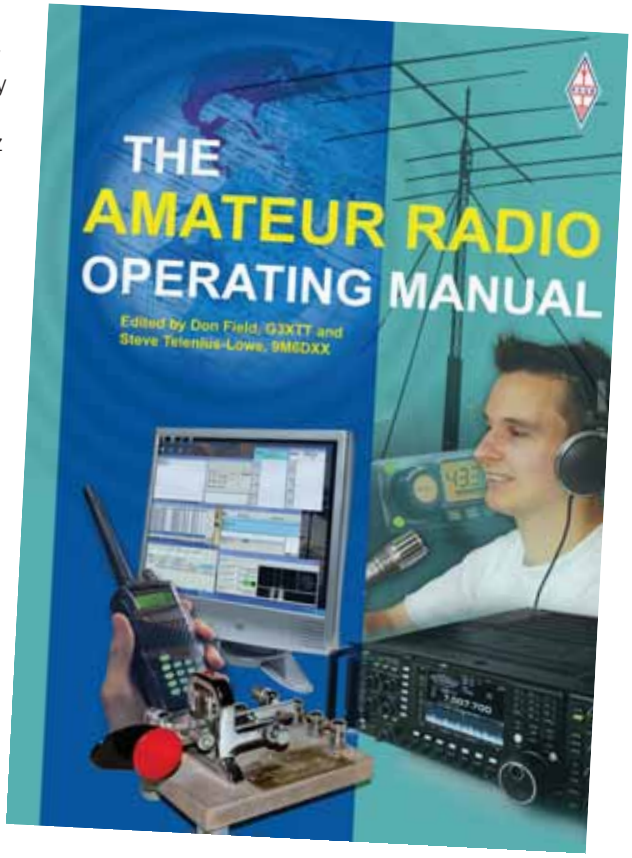
Edited by Don Field, G3XTT and Steve Telenius-Lowe, 9M6DXX

This is simply the most focussed and comprehensive 'hands-on' operating book I've ever picked up. Packed with practical tips, it covers everything from setting up a station to "xtreme" contesting. Along the way you'll find out about the bands, propagation, operating – both DX and locally – contesting, satellite working and even ATV.

In one short review it's impossible to encapsulate a book that encompasses so much. It has something for everyone, no matter how 'green' or 'seasoned' you may be. There is always something left to learn and *The Amateur Radio Operating Manual* is an excellent teacher. It is extremely well written and concise, yet it is very accessible without being remotely patronising. Well illustrated throughout, the editors' choices of photos, drawings and other images nicely complement the text.

There have been quite a few changes in amateur radio in the six years since the last edition. Many sections have been revised or re-written and there are more than 25 new contributors. Much new material has also been added, notably regarding the major changes at 135 and 500kHz, 5, 7.1-7.2 and 70MHz in various parts of the world. New data modes are covered, along with detailed descriptions of established digimodes like WSJT and new developments such as *CW Skimmer*. Computers and the internet are becoming ubiquitous in the shack and a whole chapter is devoted to these.

Offering so much practical information at your fingertips, this is a book that you will return to again and again. *The Amateur Radio Operating Manual 7th Edition* is the best practical guide to our hobby as it is today – and is very highly recommended.



ISBN 978-1-90508-663-4
240 pages, 210 x 297mm
Published by RSGB
Non members' price £16.99
Members' price £14.44

RSGB Prefix Guide 9th Edition

Edited by Fred Handscombe, G4BWP

Simple, unfussy and comprehensive are the three words that sum up this book for me. This is the 9th edition in fifteen years and it has been revised throughout, with particular emphasis on the major changes from Portugal, Russia and the Australian overseas Territories.

As its title suggests, there is a comprehensive list of prefixes and associated information including ITU prefixes, entities, continent, CQ zone, ITU zone, time zone and any earlier prefix or name. Other chapters include deleted entities, the list of Islands On The Air (IOTA) groups and short titles, a DXCC prefix checklist (with band tick boxes so you can see what you've worked), information on RSGB and other award programmes and even several award application forms.

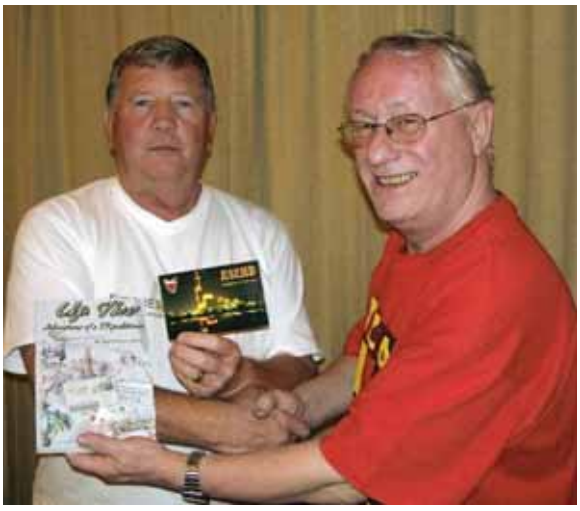
There is a wealth of information of all kinds, all sensibly laid out in the form of tables. Thanks to the clear legends at the top of each page it is easy to find what you're looking for very quickly. This is the sort of useful reference book where everything is literally at your fingertips.

Produced in the popular 'lay flat' spiral binding, this book is very easy to use, durable and contains an enormous amount of information that is invaluable to the serious HF operator.

ISBN 978-1-90508-665-8
80 pages, 210 x 297mm
Published by RSGB
Non members' price £8.99
Members' price £7.64

Sport Radio

A look back at entering the CQWW SSB contest in the 1990s and a look forward at the upcoming Contest University



John Black, GM6TVR/GM0FQV, pictured with Roger Western, G3SXW.

CQWW IN THE 1990s. John Black, GM6TVR/GM0FQV sent me an article about entries he made in the CQWW contest as 9G1BJ, when he was working in Ghana in the 1990s, and it's fascinating to look back at the kind of equipment and techniques in use then. He starts his story; "Having never entered any type of radio contest, my then QSL manager Paul, G4XTA suggested that I give the 1995 CQWW contest a shot during the October SSB event. Disaster struck on the first day, when I was called out to site to deal with an injured worker, followed soon after by a second visit to sort out an engineering problem. Having lost momentum on the Saturday, I spent the second day of the contest giving various stations multipliers. The following week our Project Manager asked how the contest had gone and I told him the story. He told me to stay indoors and give the contest my best shot the following year.

"What seemed a short period of time passed by and the 1996 contest weekend arrived. I entered the All Bands SSB Low Power section and surprisingly received a #5 World certificate, I had been informed by G4XTA that I had done well, but never expected such a result. My station for that contest consisted of a Yaesu FT-890 with the supplied fist mic, two very heavy-duty Caterpillar bulldozer batteries (as the 240V mains was frequently interrupted), an 80-10m Carolina Windom antenna and paper logging. G4XTA did all the calculations and submitted the log, at the same time threatening to throttle me if I ever sent him another paper log to sort out.

"The arrival of the 1997 contest saw me in there again, doing battle for points. It was almost the same station as previous, but this time I chose 15m-only and used a Heil headset with a footswitch. What luxury compared to using a fist mic! On my previous trip home to the UK I had purchased a £2800 laptop computer, but I deleted a file whilst 'preparing' the night before the contest, rendering the computer useless as it refused to load up on the day. Needless to say, Paul received another paper log to sort out. It contained even more contacts than the 1996 log and I got the distinct impression he was really angry this time, but the relevant calculations were carried out by him in the usual efficient manner and a certificate arrived for #3 World.

"As I was now approaching five years of stay in Ghana and the contract I was working on was nearing completion, major improvements were put in place for the 1998 contest because I knew it would be my last from 9G. With an Icom IC-756, a locally found Fritzel triband beam on a 20m high (guyed) homebrew mast, a working computer with proper contest logging onboard, I went for it big time. I was on the air waiting for the first signs of activity before daybreak each morning and stayed there until nothing more was heard each evening. The pile-ups were unbelievable after a couple of hours of operating each day. At times it took me two minutes or more to pick out even part of a callsign between 0800 and 1800hrs. It was possible to log over 1000 contacts on an average casual Sunday at the station, but CQWW found the whole system and myself in overload at times, however I managed to wine and dine at the rig each day and even switched to the loudspeaker in order to pick out one or two callsigns when visiting the loo. My XYL complained bitterly because I refused to disconnect the antenna during four major thunderstorms during the contest (we had seen blue flashes coming from the PL259s when they were laying on the floor during previous storms and a direct lightning strike melted our 6m-diameter satellite dish and all connected equipment two years earlier). I finally made the #1 World and 9G1BJ (GM0FQV) is still featured on the CQWW All-Time Records page, as it has been for eleven years."

First, let me say congratulations for getting into the All Time Records at all, let alone staying there for eleven years! So how have things changed since the late 90s? Well, for starters, a laptop computer doesn't cost £2800! And who wouldn't use a headset-microphone and a footswitch these days? VOIP telephony has resulted in headset-microphones tumbling in price, so you can now get a very reasonable headset for not a lot of money. The most you might have to do is change a plug or equip yourself with an adapter. As for the transceiver, although there have been advances in filtering and strong signal performance (if you buy the right model), 100 watts is still 100 watts, so not a great deal of change there. What has changed significantly since the 1990s is the level of participation in major international contests. Despite the poor HF conditions that have prevailed over the past few years, far more people are taking part, which makes John's (as yet) unbroken record all the more remarkable.

RSGB CONVENTION. The programme of lectures for this year's Contest University (CTU) that will take place at the RSGB Convention on 9 October shows that there is a variety of interesting talks to attend, given by a number of well-known people in the UK contesting scene. Some are intended to help the newcomer get his/her feet wet and some are to help the seasoned op hone his/her skills, this year's CTU programme being:

* Preparing for the Contest, by Roger Cooke, G3LDI
* Home Constructed Antenna Systems (for the smaller station), by Steve Knowles, G3UFY
* Contest Propagation and Tools, by Steve Nichols, G0KYA
* The World Radiosport Team

RSGB HF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Oct 3	21/28MHz	0700-1900	CW/SSB	21/28	RS(T) + SN + District
Oct 14	80m Club Sprint	1900-2030	CW	3.5	SN + name
Oct 27	80m Club Sprint	1900-2030	SSB	3.5	SN + name

RSGB VHF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Oct 2	1.2/2.3GHz Trophy	1400-2200	All	1.2/2.3	RS(T) + SN + Locator
Oct 5	144MHz UKAC	1900-2130	All	144	RS(T) + SN + Locator
Oct 12	432MHz UKAC	1900-2130	All	432	RS(T) + SN + Locator
Oct 17	Second 50MHz	0900-1200	All	50	RS(T) + SN + Locator
Oct 19	UHF UKAC	1900-2130	All	1.3/2.3	RS(T) + SN + Locator
Oct 26	50MHz UKAC	1900-2130	All	50	RS(T) + SN + Locator

BEST OF THE REST EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange/info
Oct 2-3	Oceania DX SSB	0800-0800	SSB	1.8-28	RS + SN
Oct 2-3	IARU 432MHz-248GHz	1400-1400	All	432-248	RS(T) + SN + Locator
Oct 2	EU Sprint SSB	1600-2000	SSB	3.5-14	Both callsigns + SN + name
Oct 9-10	Oceania DX CW	0800-0800	CW	1.8-28	RST + SN
Oct 9-10	WAB HF	1200-1200	All	14-28	RS(T) + SN + WAB area
Oct 9	EU Sprint CW	1600-2000	CW	3.5-14	Both callsigns + SN + name
Oct 30-31	CQWW DX SSB	0000-2359	SSB	3.5-28	RS + Zone (UK=14)

Italics indicate that only provisional information was available.
For all the latest RSGB contest information and results, visit www.rsgbcc.org.

Championship, by Dave Lawley, G4BUO
* A Year of Contesting, by Jonathan Constable, M5FUN
* The RSGB Commonwealth Contest from the Caribbean, by Nick Totterdell, G4FAL
* A Club's IOTA Contest DXpedition, by Chris Colclough, G1VDP

But there's more contesting than CTU at the Convention, because on Sunday morning there's:
* Portable Microwave Contesting - How to Win a Contest with 50 Contacts, by Peter Day, G3PHO
* The presentation of HF contest awards, by RSGB Contests Committee
* HF and VHF Contest Open Forums, by RSGB Contests Committee

And that's not all, because lots of experienced contesters will be attending and staying overnight, so at all times across the weekend there will be knowledgeable people to talk to. If you're a newcomer to contesting you could do a lot worse than to speak to some of them.

If you are not able to attend the Convention, how about asking your local club to arrange a talk on some aspect of contesting. Most clubs have at least one member with some contesting experience and it is not unknown for some members of the Contest Committee to visit clubs to talk about the subject.

EVENT CHANGES. The changes to RSGB contests that I highlighted in my August column were largely greeted with silence, which I take to mean that people either knew about them already or agreed with them. The only comment lamenting the ending of the 21/28MHz Contest came from someone who had never entered it.

Nothing had been discussed – let alone decided – at the time this column went to press, but the 50MHz Backpacker Contest has come under the microscope this year, because the level of entries is very low. 2005 was the last year in which more than ten entries were received. This year it was down to three, so look out for changes to the format in 2011.

A straight key contest has been suggested and from the enthusiasm that was expressed on the UK-Contesting reflector when it was, is seems the idea is popular. What band(s) should it be held on? How long should the duration be? Do you think a straight key event is a good idea? Do let me know.

THIS MONTH'S EVENTS. October HF events begin with the 21/28MHz contest on Sunday 3rd. Despite being popular with its loyal band of followers, this event has not attracted a great deal of participation for some considerable time. In an attempt to boost the number of entries the Contest Committee tried changing the format, but it was to no avail so the event is being discontinued from 2011, so make the most of the final one! After that it's the third month of 80m Club Sprints. The CW leg takes place first (on the 14th) and SSB second (on the 27th). Don't forget, the sprint events do not require exchanging signal reports, just serial numbers and your name.

On the VHF front, the RSGB 1.2GHz/2.3GHz Trophy Contest is the first of the month. There are Single Operator Fixed and Open sections. After that we're into the UKAC series, with 2m on the 5th, 70cm on the 12th, 1.3/2.3GHz on the 19th and 6m on the 26th. Tucked into the middle of the UKACs, the Second 50MHz Contest takes place on the 17th. At only three hours in duration it's a short event with Single Operator Fixed and Open sections.

There are numerous interesting non-RSGB events this month, the first two weekends being very busy indeed. We start with the SSB leg of the Oceania DX Contest, which runs for 24 hours from Saturday morning, October 2nd. There are low- and high-power categories for single-op and multi-one stations, and multi-two and multi-multi categories for multi-op stations. QSOs with Oceania stations are the only ones that score points in this event. Next comes the IARU 432MHz-248GHz Contest. It runs for a full 24 hours from Saturday afternoon, the first six hours coinciding with the RSGB 1.2GHz/2.3GHz Trophy Contest. Finally the EU SSB Sprint, which runs for four hours on Saturday evening. Being a sprint contest, naturally there's a QSY rule. If you initiate a QSO (by calling CQ, QRZ? etc), you are permitted to work only one station on the frequency. You must then QSY at least 2kHz before you may call another station or before you solicit another QSO. The CW leg of the Oceania DX Contest takes place on the following weekend, 9th-10th. Also on 9th-10th is the WAB HF Contest, which runs for 24 hours. UK stations work non-UK stations, while non-UK work everyone. The final event of the weekend is the CW leg of the EU SSB Sprint. Skipping forward to the final weekend of the month, the second of this year's CQWW DX Contests – the SSB leg – takes place. It runs for the entire 48 hours of 30-31st. The exchange is signal report and your CQ Zone (Britain is 14). Expect the SSB sections of the contesting bands from 3.5 to 28MHz to be packed and for some rare countries to be activated.

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Data

News of a standalone PSK31 terminal

The NUE-PSK Modem provides standalone PSK31 and RTTY operation without a PC.

FEEDBACK. Brian, GW4GHF, wrote to say that he has been active on data modes on all the HF bands and 50/144MHz since 2008. With G4VLC at Ross On Wye, they have been conducting various experiments with different antennas and modes on the 5MHz frequencies with a regular sked three or four times per week. They are surprised at the 'apathy' of other operators and Brian states that there are only two other stations he is aware of using data on 5MHz. They are also critical of the vast amount of operators who use only PSK31 (and presumably RTTY, see below) on the HF bands and are just not prepared to try, for example, Olivia or MFSK. In particular, they are surprised by the lack of data mode activity on the 144.138MHz frequency. Brian's message is "Go-Digital", you will work much further than with voice on SSB or FM, at much lower power levels. Even pictures can be sent without an SSTV program using MFSK16 – all good fun and anything above 30W is rare. On 144MHz he has had several successful QSOs into Brecon town 80km away using Olivia 500/16 mode, running 50W to a simple half-wave vertical antenna. He suggests *Ham Radio Deluxe* or *Digimaster 780*. Use a search engine to find more details and download sites.

The author of ROS, Jose Alberto Nieto Ros, replied to the comments in the last Data column about error messages. He says, "the problems outlined are representative of not running install.exe. If this is run as intended, winshock.dll is configured and the software should run normally". He also pointed out that the change from the normal to slow modes, MF-7 to MF-1, will produce a gain of 9dB.

WHY IS RTTY STILL SO DOMINANT? If you tune around the digital segments of the HF band, particularly at weekends, it will soon be obvious that RTTY is still very popular. While there are often plenty of PSK31 signals to be seen (although not always audible), RTTY signals are usually the dominant ones. And RTTY is most certainly the dominant data mode used in contests and DXpeditions. Why is this, we have to ask? PSK31 was written by G3PLX back around 1996 as a replacement for RTTY, offering a similar keyboard-to-keyboard typing protocol with a similar throughput and speed, but taking up a much narrower bandwidth and capable of reliable communications at power levels around only a tenth of those needed for RTTY. Some recent postings to the Yahoo Digital Group may shed some light on this.

PSK31 was designed as a 'rag chewing' mode and the 50WPM speed is not really suitable for the rapid short exchanges needed for contests and DXpeditions. The start preamble and end tone periods add a considerable overhead if the only data exchanged is 5914. RTTY, in comparison, would send just the four characters with no overhead (although most ops would probably repeat these several times for a longer message). One suggestion was to use PSK63 for such purposes. The bandwidth of 63Hz is still significantly lower than that needed for a RTTY signal and still about 6 – 7dB better in signal strength terms, but the throughput due to the doubling of all speeds and halving of pre/postamble delays is more suited to the quick Tx/Rx protocols. Ty, K3MM, says, "I think the key to making it really fly would be to hold some short sprint contests using PSK63 only. That way you could get a lot of guys to try it without a big commitment of time and effort. As it gains acceptance through that and word of mouth, it could be added as an optional mode in more mainstream contests. Hold some sprints and talk it up on the e-mail reflectors and it stands a chance..."

DIRECTLY GENERATING RTTY SIGNALS. RTTY is probably the only data mode that can be used directly with simple transmitters because it is a pure and simple two tone FSK mode. Tx frequency only has to be shifted a few (and often not terribly critical) tens of Hz for a '0' or '1', from a single wire carrying the data in the serial stream – such as that from the venerable mechanical teleprinter still in use by a number of stations in preference to a computer. At the same time this possibly contributes to RTTY's popularity! Even many commercial transceivers like the IC-746 have a dedicated RTTY input pin on their accessory socket. Every other QSO-type data mode in use needs a soundcard that generates audio to feed into the microphone or line input for subsequent upconversion to RF, just as if it were SSB audio. The *MMTTY* software **[1]** can be used to generate RTTY data via a computer's COM port. In Design Notes this month I give a simple driver circuit for generating frequency shifted RF that could form the basis of a tiny QRP station for the mode.

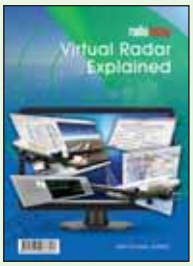
NUE PSK31 TERMINAL. And while on the subject of standalone data comms... The NUE-PSK Digital Modem **[2]** is described as "A digital modem for PSK31 and RTTY field use... without a PC!" – see **Photo 1**. Based around a DSPic, this is a single board modem that can be plugged directly into a transceiver, with only the addition of a computer keyboard (AT or USB type with adaptor) to complete the system. Received data as well as a graphical spectrum display is shown on an LCD. The unit can be purchased in various part or full kit options as well as ready built. It was originally published in *QST* March 2008, with more comprehensive details in the March/April edition of *QEX* for that year.

USEFUL DESCRIPTION OF DIGI MODES. G4UCJ's hfradio.org website **[3]** is a comprehensive one-stop reference for amateur data mode operations. As well as reference material like frequencies and helpful setting up advice, he includes a description of each one of the digital modes used by amateurs. Every item has a screen shot showing the frequency spectrum of the signal, to help listeners identify the modulation type from a waterfall display, and an MP3 audio file to help in identification by ear. Altogether, an invaluable site to keep bookmarked.

PSK31 70MHz BEACON. Take a listen for my personal beacon G4JNT/P sending the telemetry for the South Coast microwave beacons from Bell Hill in Dorset. It runs 0.5W ERP PSK31 on 70.031MHz from locator IO80UU.

REFERENCES.

[1] *MMTTY* RTTY Software: http://mmhamsoft.amateur-radio.ca/pages/intro.php
[2] NUE-PSK Standalone datamode terminal: www.nue-psk.com
[3] G4HCJ Datamodes Summary: www.hfradio.org.uk/html/digital_modes.html



Virtual Radar Explained

By Mike Richards, G4WNC

Virtual Radar Explained covers the world of aeronautical Virtual Radar which is the common name given to the reception and plotting of ADS-B transmissions from aircraft. The use of ADS-B by commercial air traffic has revolutionised the amount of information available to aviation enthusiasts and this unique book covers the subject from just about every angle.

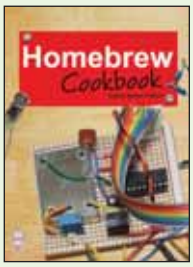
With the majority of commercial flights broadcasting their position twice a second, ADS-B receive systems can produce a virtual radar display on your home PC. From the early days of the wartime pioneers through to the very latest multilateration systems - it's all in the book. ADS-B and Mode-S signals get special attention with a detailed look at their message and transmission systems.

Virtual Radar Explained provides full details and how to get the most from the of all the mainstream hardware and software offerings including: *AirNav Radarbox*, *Kinetic SBS-1*, *Planegadget* and *Planeplotter*. There is also coverage of how to install effective antennas and feeders for Virtual Radar systems. For home-brew fans, there is information on the "build your own" options that are available via the internet, along with an explanation of some of the technicalities of ADS-B reception.

This very comprehensive book covers just about every angle of Virtual Radar from historical development through to home-brew. *Virtual Radar Explained* will be of great interest to the all aviation enthusiasts and existing users of Virtual Radar alike.

Size 174x240mm, 64 pages, ISBN 9781-9050-8660-3

Non Members' Price £6.99 **RSGB Members' Price £5.94**



Homebrew Cookbook

By Eamon Skelton, EI9GQ

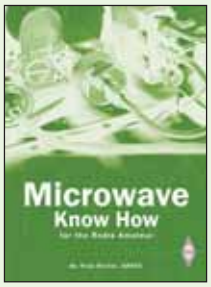
For those interested in home construction, Eamon Skelton, EI9GQ is the acknowledged expert and *RadCom* columnist on the subject. Eamon brings his enthusiasm, common sense and easy to understand approach to the topic in *Homebrew Cookbook*. This book starts with the very basics of homebrew and progresses to advanced topics. There are construction methods that take you through all the main techniques. There is a PCB section packed with simple ideas that will allow you to make PCBs cheaply and easily without any specialist equipment. Construction projects include a simple direct conversion receiver, superhet receiver, an SSB transmitter, PA and a VHF transverter. All the designs are modular, making it easy to extract sections and adapt the designs to suit your needs. Where test equipment is required there are simple circuits on hand to allow you to build your own. There are homebrew antennas made with junk-box components and throughout the projects use simple construction techniques with cheap, readily obtainable, components - Eamon even tells you how to make the most of eBay to find what you need.

The *Homebrew Cookbook* is an edited, updated book of Eamon's writings from the pages of *RadCom* and a fantastic reference with simple, well-proven solutions to most construction problems. *Homebrew Cookbook* will have you itching to dust off the soldering iron and start construction.

Size 174x240mm, 208 pages, ISBN 9781-9050-8657-3

Non Members' Price £12.99 **RSGB Members' Price £11.04**

More Amateur Radio books



Microwave Know How

Edited by Andy Barter, G8ATD

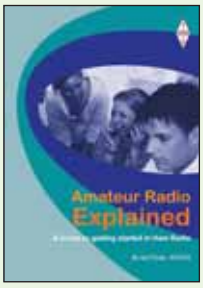
This book is a new compilation of articles aimed at those who are interested in building equipment for the amateur radio microwave bands. The designs in this book are from authors all around the world who are keen microwave constructors themselves. This ensures that the all of the projects use modern techniques and up to date components. The book includes chapters covering:

- Antennas with designs for 23cm, 13cm, 6cm.
- Power amplifiers for 23cm and 10GHz.
- Measuring equipment, with different ways to use a spectrum analyser and a very useful noise source.
- Filters and design of filters, useful for the accomplished constructor and a Hybrid coupler for 13cm.
- Modifying commercial equipment with detail of using surplus equipment to get on 5.7GHz, 10GHz and 24GHz.
- Converter for S band using a YIG LO and a 2m down converter for use with SDRs
- Oscillators showing how to use a DDS and MMICs

If you are already active on the microwave bands or simply looking for interesting projects Microwave Know How will show you how easy it is to become more active using modern devices and equipment.

Size 174x240mm, 192 pages, ISBN 9781-9050-8656-6

Non Members' Price £12.99 **RSGB Members' Price £11.04**



Amateur Radio Explained

A Guide to Getting Started in Ham Radio

By Ian Poole, G3YWX

Written by well-known author and radio amateur Ian Poole, G3YWX, this book provides the ideal introduction to the wonderful world of amateur radio. *Amateur Radio Explained* is for people first taking an interest in amateur radio and those ready to move on from foundation level. This book quickly enables the newcomer to grasp the basic elements of how to get started in the hobby, gaining a transmitting licence and areas of interest in the hobby. The book covers in detail the various types of transmission, what can be heard including the jargon, codes and callsigns. There is discussion of radio propagation, the various radio bands and the use of band plans. There are outlines of typical contacts, repeaters, DXing techniques, QSLs, awards and contests. The reader is also provided with details of receivers and antennas and there are guides to setting up the station and constructing your own equipment. There is even a really useful appendix providing sources of further information so the reader can explore the topics of most interest to them in greater detail.

In a readable and easy-to-understand fashion, *Amateur Radio Explained* is the perfect introduction to the exciting world of amateur radio. But be warned: you may become hooked for life!

Size 210x297mm, 80 pages, ISBN 9781-9050-8632-0

Non Members' Price £5.79 **RSGB Members' Price £4.92**

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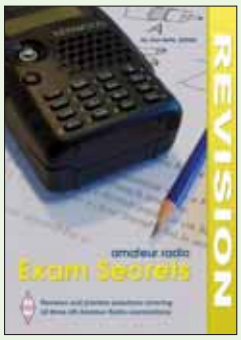

Amateur Radio Exam Secrets

By Alan Betts, G0HIQ

For those who are studying for the UK amateur radio examinations and want more information, then this is the book. Covering all three levels of amateur radio licence *Amateur Radio Exam Secrets* is designed to extend knowledge and test candidate's comprehension.

Amateur Radio Exam Secrets is divided into the topic areas that align with the Radio Communication Foundation (RCF) Syllabus for amateur radio examinations. Each section is numbered as in the syllabus and has a brief introduction to the material, followed by a number of sample questions. The introductions are designed to remind candidates of the important facts and relevant details. The questions provided are in the same style as the actual examinations and are typical of those candidates will meet. There is a full summary of answers, alongside sample papers for the Foundation, Intermediate and Advanced examinations. You will even find copies of the reference material provided to candidates during their examinations.

Amateur Radio Exam Secrets provides the ideal training course companion for both candidates and tutors. If you are by studying for any level of the amateur radio examination Amateur Radio Exam Secrets provides the ideal revision aid and quick reference book.

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ISBN 9781-9050-8649-1

Non Members' Price £12.99
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International Amateur Radio Examination Manual

Edited By Dr. R C Whelan, G3PJT

Size 210x297mm
132 pages
ISBN 9781-905086-13-9

Non Members' Price £14.99
RSGB Members' Price £12.74

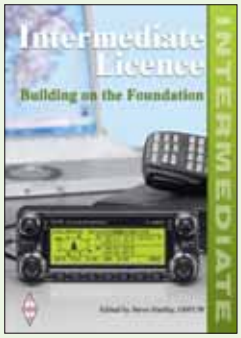
Foundation Licence - Now !

By Alan Betts, G0HIQ

If you want to obtain an Amateur Radio Foundation Licence this book is for you. This is the latest edition of the Radio Society of Great Britain (RSGB) book that contains all that is required to obtain a Foundation licence. Even if you just want to know about Amateur Radio this book provides insight into the technical basics, receivers, transmitters and antennas. How and where to operate with your new licence are covered along with safety considerations and electromagnetic compatibility. Written in an easy to use and understand style this is the ideal book for young and old alike.

Size 297x210mm, 36 pages, ISBN 9781-8723-0980-4

Non Members' Price £4.99 **RSGB Members' Price £4.24**



Intermediate Licence Book

Building on the Foundation

Edited by Steve Hartley, G0FUW

This brand new 5th edition of the *Intermediate Licence - Building on the Foundation* book has been fully updated and revised for the new Intermediate syllabus that starts 1st June 2009. Drawing on the success of the previous editions this book delivers all the syllabus changes in the ideal companion book for those working to pass the Amateur Radio Intermediate Licence exam.

This book is written in an easy to understand style and broken down into manageable half-hour worksheets. Safety tips are covered and there is lots of helpful advice. You will even find two revision sections in the form of exam type questions, to test the knowledge learned.

Intermediate Licence - Building on the Foundation is the standard workbook for the Intermediate Licence and as such contains all the information required during Intermediate Licence courses. If you are studying for the Intermediate Licence this is simply the book you need.

Size 297x210mm, 80 pages, ISBN 9781-9050-8650-4

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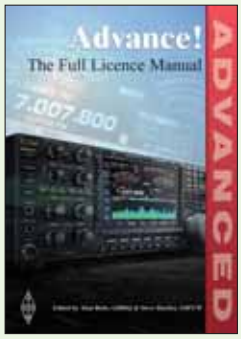

Advance - The Full Licence Book

By Alan Betts, G0HIQ & Steve Hartley, G0FUW

This book is the third course-book in the RSGB series for those interested in obtaining an amateur radio licence. In line with the progressive three-tier UK licence structure *Advance! the Full Licence Manual* completes the natural progression from *Intermediate Licence - Building on the Foundation* and *Foundation Licence Now!*

Advance! the Full Licence Manual contains all of the information required to move to the final stage of amateur radio licensing. Based on the best-selling Radio Amateurs Examination Manual, and has been updated to match the Full licence syllabus. Broken down into logical sections the book is ideal for all those studying for the Full licence. Presented in an accessible style this book contains everything necessary for home study. This book is also the ideal companion to a formal training course. The book provides a useful reference source and so will also find a home on the shelves of many amateurs who have passed the examination.

Advance! the Full Licence Manual is a "must have" for everyone progressing to the Full licence and is the best route to success in the examination.

Size 210x297 mm, 104 pages, ISBN 9781-872309-95-7

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OUR SPECTRUM

Are you suffering from interference or unwanted noise?

If you are go to

www.rsgb.org/emc/are-you-getting-interference.php

for the protection of the radio spectrum and in particular the HF bands. It is IMPORTANT that you report it either to the RSGB or Ofcom. Remember if the interference or noise is found not to be coming from within your home or shack **YOU WILL NOT BE CHARGED** by Ofcom for investigating it.

INTERFERENCE OR NOISE

REPORT IT! REPORT IT! REPORT IT!

RadCom

HF F-Layer Propagation Predictions for October 2010

Compiled by Gwyn Williams, G4FKH

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe								
Moscow	88.....7778	876...268878	..75567887..	..5788887...	...99998....	...89997....	....787.....	.....
*** Asia								
Yakutsk	........143.	4......36775	..53.5333.53	...663......	...46.......	.....	.....	.....
Tokyo	........333.	......67776.	......23....	.....	....4.......	.....	.....	.....
Singapore	........212.	188765	......265...	......55....	.....576....	.....45.....	.....	.....
Hyderabad	.....	5444	45432	......35....	......54....	......5.....	......4.....	.....
Tel Aviv	991.....8899	988....79999	..72...786..	...755777...	...88888....	...67776....	.....	.....
*** Oceania								
Wellington	.....	......256...	...355536...	....554.3...	.....	.....	.....	.....
Well (ZL) (LP)	.....	.....	247.....	537......65.	.....	.....	.....	.....
Perth	.....	.......6765.	......47753.	......554...	.....	.....	.....	.....
Sydney	.....	......5776..	.....47874..	.....7874...	.....	.....	.....	.....
Melbourne (LP)	.....	..59.....	35698.....	5..984.....	...87....4..	.....	.....	.....
Honolulu	.....	...3.....	...654.4....	.....3....	.....4...	.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....5...	.....	.....	.....	.....
W. Samoa	.....	...632.....	...77875....	....787.....	....687.....	.....75.....	.....5.....	.....
*** Africa								
Mauritius	2.....222	7......27777	5......78765	.....873..	.....75...	......46....	.....	.....
Johanesburg	.....	33.....244	77.....9988	..5....79753	.....	.....	......46....	.....
Ibadan	11.....	676....2466	777.....5767	4.84...267..	...7544674..	...776677...	...777776...	...57778....
Nairobi	2.....11	77.....7777	54.....5455	..3....465..	.....366...	...5..565...	...66677....	....4664....
Canary Isles	777.....667	7875....5878	88873..57888	3..77667784.	...6989978..	....7699.7..	......88....	......67....
*** S. America								
Buenos Aires	.....	3222.....2	6338.....64	...8.....3..	...5.....	....4.....	.....	.....
Rio de Janeiro	.....	432.....23	6547.....765	...7.....7..	...44...44..	....5...4...	....4.....	.....
Lima	.....	21.2.....	53.5.....53	.....	.....	.....	.....	.....
Caracas	.....	3332.....3	74.73....277	....7....73.	....675666..	.....7667...	.....7775...	.....644....
*** N. America								
Guatemala	.....	3..4.....	5..72.....34	.....3.....	.....4.....	......4.....	.....	.....
New Orleans	333.....	7666.....6	6..6.....36	.....4...4..	.....	.....	.....	.....
Washington	455.....2	7777.....37	73..5.....77	.....5.346..	.....5.45...	......555...	.....	.....
Quebec	676.....35	7436.....576	...62...37..	....654674..	.....544....	......5.....	.....	.....
Anchorage	..3.....	4363.....	3.....4456.	.....64..	.....6...	.....	.....	.....
Vancouver	.....	233.....	.....	.....	.....6...	.....	.....	.....
San Francisco	.....	2..2.....	.....	.....	.....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.....	.....7....	.....7....	.....6....	.....5....

KEY: Each number in the table represents the expected circuit reliability, eg '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 www.rsgb.org.uk/propagation/index.php. An input power of 100W and a dipole aerial has been used in the preparation of these predictions; therefore a better equipped station should expect better results. The predicted smoothed sunspot numbers for October, November and December are respectively (SIDC classical method – Waldmeier's standard) 22, 24 & 26 and (combined method) 46, 50 & 55. The provisional mean sunspot number for August was 19.6. The daily maximum / minimum numbers were 44 on 11 August and 0 on 21 - 23 August.

Getting listed here and on GB2RS is easy. E-mail details of your meetings as early as possible to GB2RS@RSGB.org.uk and we'll do the rest. We need to know your club name, RSGB Region number, contact name & phone number, date of meeting and detail of meeting. Example: South Bristol ARS, Region 11, Len, G4RZY, 01275 834 282, 29 October, On the Air. It's that simple. The deadline for the October *RadCom* is 1 September and for the November edition it's 1 October. For GB2RS, the deadline is 10am on the Tuesday for the week of broadcast.

1 SCOTLAND SOUTH & WESTERN ISLES

REGIONAL REP: LEN PAGET, GM0ONX, GM0ONX@RSGB.ORG.UK

BORDERS ARS
Ray, GM0CDV, 01573 228730
8 AGM

COCKENZIE & PORT SETON ARC
Bob, GM4UYZ, 01875 811 723
1 Normal club night
15 MM Lighthouse Weekend by Geoff, MM5AHO
30 CQWW SSB Contest

KILMARNOCK & LOUDOUN ARC
Graham, MM3GDC, mm3gdc@btinternet.com
12, 26 Club night

LIVINGSTON & DARS
Norman, 07740 946192, uk.groups.yahoo/group/ms0liv
5, 19 Club evening
12 Operating evening
26 Morse code practice

LOTHIANS RS
Andy Sinclair, lrs_secretary@moosedata.com
6 History & Update of GB3EDN 23cm Beacon by GM8BJF
20 Surplus equipment sale at St Fillan's Church Hall

PAISLEY (YMCA) ARC
Bill Anderson, 2M0BZZ, 01505 613633, bill@3bis.co.uk
6 Training
13 College/October Week Break
20 Training
27 Antennas for Small Gardens by RSGB Region 1 Manager Len Paget, GM0ONX

WEST OF SCOTLAND (GLASGOW) ARS
Fred Coombes, 2M0BIN, 01415715512, www.wosars.org.uk
1, 8, 15, 22, 29 Presentations, guest speakers, raffle & quiz
6, 13, 20, 27 Construction projects & licence training

2 SCOTLAND NORTH & NORTHERN ISLES

REGIONAL REP: DENNY MORRISON, GM1BAN, GM1BAN@RSGB.ORG.UK

ABERDEEN ARS
Lewis, GM4AJR, 01224 575 663, www.radioclubs.net/aars
7 Junk Sale
14 Construction + OTA
21 Beginners CW
28 Talk

3 NORTH WEST

REGIONAL REP: KATH WILSON, M1CNY, M1CNY@RSGB.ORG.UK

BOLTON WIRELESS CLUB
boltonwireless@gmail.com
11 Special Event Stations talk by Mark, M0UFC et al
25 Radio tracking of bees by G4MVU plus honey tasting

CHESTER & DARS
Barbara Green, 07957 870770, www.chesterdars.org.uk
5 Quiz with Wirral & DARC

MACCLESFIELD & DRS
Roger Bell, M0GMG, 0771 258 9163, gx4mws@gx4mws.com
4 OTA
11 Film night - DXpedition
18 Social night
25 Homebrew aerials

PRESTON ARS
Richard, M0RDZ, 07855873566, secretary@prestonars.co.uk
28 Construction evening

SOUTH MANCHESTER R&CC
Ron, G3SVW, 0161 969 3999
7 Comparing and calibrating temperature monitors, G3SVW
14 Chilli con carne evening, Nigel, M6NDG
25 Monthly technical forum
28 CNC machines by Ged, G8RSI

4 NORTH EAST

REGIONAL REP: HAROLD SCRIVENS, GOUGE, GOUGE@RSGB.ORG.UK

ANGEL OF THE NORTH ARC
Nancy Bone, G7UUR, 0191 477 0036, nancybone2001@yahoo.co.uk
4, 18, 25 OTA, natter night
11 GB7NE by David Stansfield, G0EVV

EAST CLEVELAND ARC
Alistair, G4OLK, 01642 475 671, alistair.mackay@talk21.com
1, 15, 29 OTA
8 Bring in something interesting evening
22 Radio components catalogues evening

HORNSEA ARC
Gordon MacNaught, G3WOV, 01377 240573, gmacnaughtwov@yahoo.co.uk
6 Computer Maintenance, Conor, 2E0CPT
13 Prep for rally
14 80m Club Sprint – CW, Home stations
17 Hornsea Rally at Floral Hall
20 Rally washup
27 Activity - 80m Club Sprint - CW

OTLEY ARS
Paul, 2E0PAK, 07768 996370, m6wat@pekae.co.uk
5 144MHz UKAC & Foundation course
12 Open shack night
13, 19, 27 Foundation course
16 JOTA weekend event
17 Second 50MHz contest
26 50MHz UKAC

SCARBOROUGH AMATEUR RADIO SOCIETY
Jerry Scarr G6LBL, 01751 476601, jerryscarr@googlemail.com
4 History of Ever Ready, M0GAP
11 Talk by Gordon McNaught
18 Secret life of amateur radio
25 Quad and low band antennas, G0UVR

SHEFFIELD ARC
Trevor Wood, M0TWS, trevorwood6@yahoo.co.uk
1 or 2 Club visit to National Hamfest
4 Backyard EME by G0EWN
11 Getting started in microwaves, G3PHO
18 Social evening & presentation of club awards & trophies
25 Software defined radio, Josh, M0JMO

WAKEFIELD & DRS
Ken, 2E0SSQ, 07900 563117
30 Foundation licence course commences

5 WEST MIDLANDS

REGIONAL REP: TREVOR BAILEY, M0KMB, M0KMB@RSGB.ORG.UK

BROMSGROVE & DARC
Chris, M0BQE, 01905 776 869, M0BQE@hotmail.com
4 Baluns
11 Filters
18 Committee
25 Shack plans

CHELTENHAM ARA
Derek Thom, G3NKS, 01242 241099, chairman@caranet.co.uk
21 G3JFH Memorial Talk by Tim, G4VXE

COVENTRY ARS
John, G8SEQ, 07958 777363
1 Visit by Warwickshire & Northamptonshire Air Ambulance
8 AGM
16 Quiz night
22 Video night
29 Radio workshop

GLOUCESTER AR&ES
Anne, 2E1GKY, 01452 548478, daytime, www.g4aym.org.uk
4 Iona & Lundy by Road, Rail & Sea by Brian, G4CIB
11 Workshop
18 VHF operating
25 Informal evening
27 GARES/CARA skittles match

MIDLAND ARS
Norman, G8BHE, QTHR, 01214 229 787
2 Visit to National Hamfest
6 OTA, ragchew, Foundation & Morse classes
13 Committee meeting, Foundation & Morse classes
20 AGM
27 New committee, Foundation & Morse classes
31 Visit to Llandudno Rally

MID-WARWICKSHIRE ARS
Don G4CYG on 019 2642 4465
12 Technical topics
26 Programme planning for 2011

SOLIHULL ARS
P T Gaskin, G8AYY, 0121 628 7383
21 AGM

SOUTH BIRMINGHAM RS
Don, 0121 458 1603, www.radioclubs.net/southbirmingham
1, 11 Construction evening
4 Contest planning meeting
6 Lecture in main hall
9 Visit to RSGB Convention
18 Committee meeting, pre AGM report
25 Aerial working party
31 Visit to North Wales Rally at Llandudno

STRATFORD UPON AVON DRS
G0CHO, 01608 664488, cousbey@theiet.org
11 Arduino electronics prototyping platform by G Bulmer
25 Computer control of receivers (not SDRs), G8UKT

SUTTON COLDFIELD ARS
Robert Bird spirit.guide@hotmail.co.uk
11 D-Star radio talk by Paul Smith

TELFORD & DARS
Mike, G3JKX, 01952 299 677, mjstreetg3jkx@blueyonder.co.uk
6 HQ closed, committee meeting at Heath Hill
13 Members' project follow-up
20 SWR and return loss
26 Derek's Soup + website discussion

WYTHALL RADIO CLUB
Christopher Pettitt, G0EYO, g0eyo@blueyonder.co.uk
4, 11, 18, 25 Advanced course
5 2m UKAC
10 Lord Pettitt Shooting Competition
12 Committee meeting
19 AGM
26 Homebrew

6 NORTH WALES

REGIONAL REP: MARK HARPER, MW1MDH, MW1MDH@RSGB.ORG.UK

DRAGON ARC
Stewart Rolfe, GW0ETF, 07833 620733
4 Members' projects
18 Auction of surplus items

MEIRION ARS
John, MW0VTK, 07772 720099, tawelfan@talk21.com
1 & 2 Club stand at the National Hamfest
7 Talk and new product launch from the Snowdonia Radio Company

WREXHAM ARS
Glyn, MW0BNB, www.wrexham-ars.co.uk
5 Steam or Diesel talk by Rhys Lloyd
19 Show & tell

7 SOUTH WALES

REGIONAL REP: JIMMY SNEDDON, MW0EQL, MW0EQL@RSGB.ORG.UK

NEWPORT ARS
Ross Clare, GW3NWS, 01633 880146
1 Ryder Cup operation
8 Ryder Cup post mortem
15 Cheese and wine party. All welcome
22 AGM
29 Half term, no meeting

8 NORTHERN IRELAND

REGIONAL REP: PETER LOWRIE, MI5JYK, MI5JYK@RSGB.ORG.UK

No entries received this month. Please send any information to GB2RS@RSGB.org.uk

9 LONDON & THAMES VALLEY

REGIONAL REP: ALISON JOHNSTON, G8ROG, G8ROG@RSGB.ORG.UK

AYLESBURY VALE RS
Roger, G3MEH, 01442 826 651
13 Discussion evening

BROMLEY & DARS
Andy, G4WGZ, 01689 878089
19 Quiz

BURNHAM BEECHES RC
Dave, G4XDU, 01628 625 720
4 Surplus equipment sale
18 Project construction

CHESHAM & DARS
Terry, G0VFW, 01442 831 491, cdars.club@ntlworld.com
6 General meeting, CW training
13 Shack maintenance - QSL cards
20 SSTV and data modes by Terry, G0VFW
27 OTA

CRAY VALLEY RS
Bob, M0MCV, 020 8265 7735 after 8pm
7 Choosing and using a linear by Colin Wooff, G3SPJ
21 Quiz, Richard, G8ITB

CRYSTAL PALACE R&EC
Bob, G3OOU, 01737 552 170
1 Repairing vintage radios by David, M0SXD

DORKING & DRS
Garth, G3NPC, 01737 359472, www.ddrs.org.uk
26 Behind the scenes at Bletchley Park in WW2 by Brian Oakley

ECHELFORD ARS
John, G4GSC, 01784 451898
14 Annual Quiz, Neil, G8LPA
28 Bring & buy, CW practice, natter night

EDGWARE & DRS
Mike, G4RNW, 020 8950 0658, michael.stewart5@ntlworld.com
1 Operating 20m for the Edgware Activity Period
14 Hints & kinks with Steve, G0PQB
28 Visiting the Galapagos Islands by Mike, G4RNW

NEWBURY & DARS
Rob, G3LMW, 01635 862737, g4lmw@btconnect.com
9 Thatcham Arts & Leisure
16 Jamboree on the Air
27 80m kit talk by Steve, G6ALU

READING & DARC
Pete, G8FRC, 01189 695 697
14 Flying at its hair-raising best, Colin Couston, M0XSM
28 Autumn Junk Sale

SHEFFORD & DARS
David, G8UOD, 01234 742 757, www.sadars.co.uk
7 CQWW planning
14 Autumn junk sale
21 Introduction to Antenna Modelling by Stewart, G3RXQ
30 CQWW

SOUTHGATE ARC
David Sharp, M0XDS, david.sharp1@tesco.net
13 Planning meeting for 2011

SURREY RADIO CONTACT CLUB
Ray, G4FFY, 01732357474
4 Surplus sale
10 75th anniversary lunch

SUTTON & CHEAM RS
John, G0BWV, 020 8644 9945, info@scrs.org.uk
21 Coping with weak signals on HF by Stan Rudcenko, G0KBL

VERULAM ARC
Ralph, 01923 265572, g1bsz@aol.com
4 Committee meeting
7 Informal social at the Queens Head, Sandridge
8-10 At the RSGB Convention
19 Software defined radio by Lee, G3SEW

WEY VALLEY ARG
www.weyvalleyarg.org.uk
1 Have radio, will travel by Roger Western, G3SXW
15 RSGB IOTA programme by Roger Ballister, G3KMA

WIMBLEDON & DARS
Jim, M0CON, 020 8874 7456, www.gx3wim.org.uk
8 OTA
29 AGM

10 SOUTH & SOUTH EAST

REGIONAL REP: GAVIN KEEGAN, G6DGK, G6DGK@RSGB.ORG.UK

ANDOVER RAC
Martin, M0MWS, 07776181646, www.arac.co.uk
5 Club night and return to satellite operating
19 QRP: the extra challenge – workshop and talk

BASINGSTOKE ARC
Clive, G4ODM, 01256 326050
4 AGM & open discussion of club's future
18 Tetra, Norman, G8PLL

BREDE STEAM ARS
Steve, 01424 720815, M0NUC@aol.com
2, 5, 19, 26 At the shack
12 JOTA preparation
16 JOTA weekend at the shack event

FARNBOROUGH & DRS
Derek, G3OFA, mail@farnboroughradio.org.uk
13 Natter night

HARWELL ARS
Malcolm, G8NRP, 01235 524844, info@g3pia.org.uk
12 DXpedition to Bhutan by Vincent Decker, G0LMX
26 Shack activity night

HASTINGS E&RC
Gordon, 01424 431 909, www.herc.uk.net
23 Autumn auction of used & surplus equipment

HORNDEAN & DARC
Stuart, G0FYX, 023 9247 2846, www.hdarc.co.uk
5 Natter night/social evening
26 AGM

HORSHAM ARC
www.harc.org.uk
7 Used equipment sale
21 Social, The White Horse, Maplehurst

MID-SUSSEX ARS
Peter, G4AKG, 01444 239371
1 Spectrum management strategies by John, G0JBJ
8, 29 Radio night
15 AGM
22 Surplus equipment sale

SOUTHDOWN ARS
John, G3DQY, 01424 424 319
4 RAYNET checkpoints, catastrophes by Kate, M1DRB
5 Operating at Hailsham shack

SWINDON & DARC
Den, M0ACM, 07810 317750, www.sdarc.net
7 The London Underground by Paul, G8YMM
14, 28 Natter night
21 Talk

TROWBRIDGE & DARC
Ian, G0GRI, 01225 864 698, E/W
6 Propagation by G3TCT
20 Natter night

WATERLOOVILLE ARC
Rich, G4IBW, 02392680852, g4ibw1@ntlworld.com
29 Talk on the RAF

WORTHING & DARC
Roy, G4GPX, 01903 753 893
6 Discussion evening
13 AGM
20 Surplus equipment sale, Andre, M0RAV
27 GX3WOR OTA – 80m SSB Sprint contest

11 SOUTH WEST & CHANNEL ISLANDS

REGIONAL REP: PAM HELLIWELL, G7SME, G7SME@RSGB.ORG.UK

APPLEDORE & DARC
Brian Jewell, M0BRB, 01237 473251
18 PSU components and operation, G3YGJ & G4CHD

BRISTOL RSGB GROUP
Robin, G3TKF, 01225 420442
25 VK9X/G6AY Christmas Island DXpedition, Phil Whitchurch, G3SWH

CALLINGTON ARS
Chris Harris, G7UDX, 07973 418 371, g7udx@me.com
6 EB104 amplifier discussion with Adrian Trimble

NORTH BRISTOL ARC
Dick 01454 218362, www.nbarc.org.uk
1 Table sale & junk exchange
8 4m operating night
15 Committee
22 Bangkok and New Zealand, Dick, G0XAY
29 Electronics evening – populating a board

SALTASH & DARC
John, 01752 707508
2 Junk sale, visitors welcome

SOUTH BRISTOL ARC
Len, G4RZY, 01275 834 282
7 Talk on old domestic radios by Luke, 2E0VHV
14 Autumn table top sale with Len, G4ZRY
21 Planning for 2011 with Fred, G7LPP
28 OTA

TAUNTON & DARC
William, G3WNI, 01823 666 234, g3wni@btinternet.com
6 AGM
13 Calendar of events for 2011
27 OTA

THORNBURY & SOUTH GLOUCESTERSHIRE ARC
Tony, G0WMB, 01454 417048, tonytsgarc@btinternet.com
6 SDR revisited, Ron, G8NMC
13, 27 OTA
20 Video night

WEST DEVON RC
Jules Cuddy, M1AGY, 01752 291588
5 Open evening, all welcome
19 Military night - VMARS open evening, all welcome

12 EAST & EAST ANGLIA

REGIONAL REP: PHILLIP BROOKS, G4NZQ, G4NZQ@RSGB.ORG.UK

BITTERN DX GROUP
Linda, G0AJJ, 01692 404154, secretary@bittern-dxers.org.uk
14 Informal club meeting
16 JOTA weekend event
28 Planning development and training events

BRAINTREE & DARS
John, M5AJB, 01787 460 947
4 JOTA planning
18 Club history night

CHELMSFORD ARS
Martyn, G1EFL, 01245 469 008, www.g0mwt.org.uk
5 AGM
12, 19, 26 Club net
13 Committee meeting - Danbury

17 Operating from Sandford Mill Museum commemorating airship America 1910

COLCHESTER RADIO AMATEURS
Kevan, 2E0WMG, 07766543784, kevan2e0wmg@live.co.uk
21 General meeting

DARENTH VALLEY RADIO SOCIETY
Ray, G0FDU@G0KDV.com
13 Junk sale
27 Construction by Ray Baker, G0FDU

HARWICH ARIG
Kevan, 2E0WMG, 07766 543784, kevan2e0wmg@live.co.uk
13 Island activations by Kevan, 2E0WMG

NORFOLK ARC
Chris Danby, G0DWV, 01603 898678, cmdanby@btinternet.com
6 Quiz night
13 Informal, construction and workshop evening
17 JOTA weekend
20 Table top sale
27 Informal, construction, workshop and Bright Sparks evening

SOUTH ESSEX ARS
Norman, M0FZW, 01268 692776, secretary@southessex-ars.co.uk
13 The sky at night with Bruce, G1JJS
16 GB2CIS, Canvey Island Sea Scouts JOTA field event

13 EAST MIDLANDS

REGIONAL REP: JIM STEVENSON, G0EJQ, G0EJQ@RSGB.ORG.UK

BRIGG & DARC
John, 2E0III, 01652 632938, info@bdarc.co.uk, www.bdarc.co.uk
14 Linear amplifiers with Dave, M0OGY
28 Sun spots and solar activity by Geoff Tew

FRISKNEY AND EAST LINCOLNSHIRE COMMS CLUB
Chris M0MFP, 01507 442240
5 Fox hunt

LINCOLN SHORT-WAVE CLUB
Pam Rose, G4STO, 01427 788356, pamelagrose@tiscali.co.uk
1, 2 National Hamfest, Newark Showground
3-9 GB10NH from the club shack for Ham Week UK
13 Surplus equipment sale
16, 23, 30 G5FZ OTA and jobs around the shack
20, 27 G5FZ OTA

LOUGHBOROUGH & DARC
Chris, G1ETZ, 01509 504 319
5 Station accessories, Andrew G7SEG
12 AGM
19 Open forum - operating from home
26 Practical evening

MELTON MOWBRAY ARS
Geoff, G3STG, 01664 480 733, G3STG@btinternet.com
15 Solar panel design & installation by Shaun Mowlem

WELLAND VALLEY ARS
Peter D Rivers, G4XEX, 01858 432105, g4xex@fsmail.net
18 Bring your equipment & test gear night

FREE MEMBERS' ADS
Charges are waived for Members' Ads submitted by e-mail to memads@rsgb.org.uk. One ad per member per month; other important terms & conditions apply (see grey box on page 89).

FOR SALE

10m STRUMECH VERSATOWER with Kenwood AZ-EL rotator & cable, not used for some time, £350, buyer collects, or free with 3 bedroom QTH with planning permission in Reading, Berks., £315k. Michael, G6HOM, michael.g6hom@btinternet.com (Reading).

60ft VERSATOWER SP60 in excellent condition, complete with extractable ground post, two safety winches, head unit, large Yaesu G2000 rotator (and controller) plus a Fritzel five element 6 band beam. Buyer to dismantle and remove. All for £650. Henry, G3GIQ, 020 8567 6389, henry@topdx.com (Ealing, West London).

ATU MFJ 949E as new. Manuals, boxed, no scratches, non smoker, hardly used, cost £180 sell at £130 plus delivery. Try before you buy. Fred, M0CVS, 01629 823025 (Matlock, Derbyshire).

COMMANDER 2 2m amplifier, 1kW o/p, £1100. SSB Electronics Super mast head amp, £110. SSB Electronics 2m transverter, £190. Yaesu FT 920/AF, £525. Paul, G8IYG, 01785 259898, paulgobey@tiscali.co.uk (Stafford).

COMPLETE HF STATION from non smoking shack. Yaesu FT-757GX HF transceiver inc WARC bands, matching FC757AT, autotuner, MD1 base station mic, £399. DRAE 24A/12V PSU £40. ICOM IC-04E £35. FT290, MuTek front end, mobile bracket, £75. Matching 25W PA £20. Adrian, G4UVZ, 01823 421751, adrianwhatmore248@btinternet.com (Taunton).

DRAKE SPR4 with ALA, £150. Drake R4B T4XB P/S, £400. Halicrafters SX16 £80. Trio 2000 £200. FR50B, rough, £50. BC221 £50. Yaesu SP767 £50. Jaybeam TB3 mk 3, £100. S Rees, GW0NLB, 01269 871 382 (Llanelli).

EDDYSTONE 870A Rx. Working but needs wave-change switch knob and some realignment, £25. Radio Shack PRO-63 Scanner, £25. Watson W30 2m/70cm vertical £25. Diamond NR-22L 2m mobile whip, 2x5/8 stacked, £25.; Lucas 20/50 CB converted to 29MHz FM £15. Tony, G3XKT, 01159 170082 (Nottingham).

EX FSDXA Cushcraft A3S with balun 10/15/20m £295. Trident TA10M5L (5 el. mono) 10m FM £150. TA15M4L (4 ele mono) 15m £150. TA20M3L (3 ele mono) 20m £150. TA30M2L (2 ele mono) 30m £150. See www.cdxc.org.uk. Neville, G3NUG, 01568 750560, g3nug@btinternet.com.

FREE 60' wind up, tilt-over mast, with base unit. Will require people and kit to get down. Full details on request. G4OII, 01472 813450 (Grimsby, Lincs).

FT290 MK II unmarked, with case, mic and handbook. New batteries with FL2025 clip-on linear. Used portable only, with aluminium carry case, with 7 ele Yagi unused, £325. Mr W F Tully, G0ANX, 01235 868498 (Wantage).

GOOD HF - MICROWAVE QTH with equestrian facilities in rural SW Wales (IO71SV). Closest neighbours are ~100m away. Large 3-4 bedroom house, ~9.5 acres, mainly grassland, menage, stables, machinery shed/hay store. OIRO £345k. Chris, GW4DGU, gw4dgu@blaenffos.org (Carmarthen).

HEAVY DUTY 60FT VERSATOWER trailer tower. VGC, new cables + cage built in. £4,200. 45ft tower inc cage, post cut off at ground, £350. 2 x 17 ele boomers for 2m used once, inc power splitter, £450. Trev, G2KF, 07974 892179 (Cornwall).

HF GEAR FT-1000D 200W Tx/Rx incl service manual, £1000. FT707 100W Tx/Rx + PSU, £200. TS130V 10W Tx/Rx, £200. VFO-120 remote VFO, £40. PS-20 4A PSU, £40, Racal RA17L Gen Cov Rx, £80. Butternut HF4B 2ele Beam 20/15/12/10m, £50. Rupert, G4XRV, 01494 758361, rupert@g4xrv.fsnet.co.uk (Chesham, Bucks).

ICOM706 MK11G boxed with manual, mounting bracket, mic etc, £400 ovno. 2x40m traps, 2x20m traps, 2x20m traps, 1x15m tap, all rated 600W, £15 each. 27m of Aircell 7 50Ω coax, almost new, £1 per metre. David, G0WXZ, 01202 429698 / 07980 353237, david.milne7@ntlworld.com (Christchurch, Dorset).

KENWOOD TS 680 S. Nice clean condition with instruction manual. In daily use but may have a slight fault, hence the price, £275 ONO. G3GTA, 01934 843760 (Somerset).

KENWOOD TS570 D xcvr boxed with original manuals, £475. MFJ 991B automatic antenna tuner, £90. Begali Magnetic Classic iambic key, new condition, £100. Vibroplex Iambic Deluxe Chrome key, new condition, £100. Carriage extra. Colyn, GD4EIP, 07624 413036 (Foxdale, Isla of Man).

KW160 ATU, dedicated 160m, mint condition, for coax or long wire. Realistic offer please; delivery by insured post. Arthur Tait, GM4LBE, 01595 694270, arthurtait@tiscali.co.uk.

MAINS TRANSFORMERS 1000-750-0-750-1000V at 250mA, 12-0-12V at 15A, 350-0-350V at 150ma + 6.3V at 3A + 5V at 3.5A (new). Buyer collects. Offers to John Arscott, G3VSL, 02380 292125 (Ashurst, Southampton).

MORSUM MAGNIFICAT magazines, complete set of all 86 issues. Perfect condition, offers around £20, buyer must collect. Graham, G4PPV, 01634 726307 (Rochester, Kent).

NUMEROUS s/h antennas for sale. E-mail billwrenchg7akj@talktalk.net for details, photos & prices. Buyers must collect (East Devon).

QRT SALE. TS520, VFO520, SP520 £200. TS830S, DFC230 £275. MFJ Versatuner 3, £75. Power meters Hansen FS500H £35, Hammaster SX144/430 £35. KLM KT34A 4 ele tribander, £100. Yaesu G650XL rotator, £75. G4FMO, 07719 319703 (Staffordshire).

SAILOR 76DTx 35/10W 1.6 to 4.2MHz, 12/24V, manual, good condition, £35. Marconi TF801 sig gen 8-300MHz, £15. Belco BR-8S AC bridge, orig box, manual, £20. Racal RA17L £60. Marconi CR100/300 Rxs, P/X Collins TCS parts. Collection Bournemouth possible. C Young, 01637 875848, rcry100@yahoo.com (Newquay).

SILVER PLATED transmitting variable capacitors, 1/4" spindles. Ceramic end plates 5cm square. Jackson 17-500pF, 10cm deep, £18. Eddystone measured 180pF, 7cm deep, £12. 6 slow motion ball drives, 9 fixed & flexible couplers, 16 panel bushes, £7. P&P £5/item. P J Ball, G3HQT, 01489 570735 (Warsash, Southampton).

VIBROPLEX TELEGRAPH KEYS collector's guide book. Brand new. 3rd edition with supplement. 118 pages, £20+£2.50 p&p. Marcelo, marcelo0680@yahoo.co.uk (London).

YAESU FT101E with manual, mic, mains lead. Used 99% on RX. Good cosmetic condition. Unused since 2001 or much before. £45 cash, buyer collects or could deliver at 15p/mile (up to 30 miles). Rex, M0REX, 01962 863784 (Winchester).

YAESU FT-730R 10W FM 70cm radio. Excellent condition, complete with original box and manual. £100 + carriage. Michael, G4OCR, 0161 881 9544, michael@bolton.ac.uk (Manchester).

YAESU FT920 A/F HF / 6m, DSP, 100W, with FM board, AM filter, mic, manual, boxed. Non smoker. Near mint condx. £575. Yaesu FT4700 head separation kit, boxed, £25. Gordon, G4DGM, 01902 340211 (Wolverhampton).

YAESU FT-9320AFC 100W HF/6m xcvr inc CW filter, AM, FM boards, £575 + £20 packing, post & insurance. Yaesu FT-1500M 2m 50W FM plus MH-48 mic, £95+£10 pp&i. SGC MAC200 ATU, £175 + £10 pp&i. PowerMite 20A PSU, £35 + £10 pp&i. John, M1IOS, 01720 423025, m1ios@Aol.com (Islands of Scilly).

Continued on page 88

HELPLINES

IMPORTANT NOTICE

RESPONDENTS ARE ADVISED NOT TO SEND ORIGINAL DOCUMENTS, BUT TO COPY THEM AND SEND THE COPIES.

Helplines is a free service that can be used to ask other members for help on amateur radio related matters. Items for inclusion can be e-mailed to radcom@rsgb.org.uk.

- Geoff Day, G4DED is looking for help with a problem with an ICOM IC-471A 70cm rig. In FM mode all is OK but on USB, LSB & CW Rx the S-meter goes hard over. He has tried to trace the problem but had no luck, so can anyone help please? E-mail g4ded@gmx.com or phone 07775 981088.

- Paul, M0GMO, is looking for a service manual/wiring diagram for a "Radcom" marine HF radiotelephone. Please contact him via e-mail to pchesh-29@hotmail.co.uk.

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TM-D710E 145/430Mhz, 50 watts, APRS ready with built in TNC, EchoLink ready @ **£439.95**

TM-V71E 145/430Mhz Dual bander, 50watts, wide band receive @ **£294.95**

THF-7E 145/430Mhz Handheld Wide band receive inc SSB @ **£234.95**

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IC-910H 2m/70cm Base @ **£1269.95**

IC-910HX 2m/70cm Base including 23cm module @ **£1469.95**

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E&OE

WANTED

BROADCAST TELEVISION CAMERAS and equipment sought. Looking for really old equipment (not domestic), parts and documentation for my camera museum collection, www.tvcameramuseum.org. Please look in the loft as there are gaps or incomplete items in the collection. Long list available. Brian Summers, G8GQS@summershome.co.uk, 01276 677879 (QTHR, Camberley).

DISABLED FAN OF OLD DAYS seeks pre-1975 QSLs, magazines, etc. Mike, 8 Windsor Road, Reydon, Southwold, Suffolk, IP18 6PQ.

EDDYSTONE 598 DRIVE or Jackson Bros (JB) 4103/A drive. Must be in excellent/new condition and unmarked. ie no calibrations. Sensible price please! Pete, G3WXC, 01983 296958, peter.brooker@waitrose.com (Cowes, IOW).

HEATHKIT DX100 transmitter or similar, eg Labgear LG300, working or not. John Beaumont, G4EIM, 07903 720009 (Woodmansey nr Beverley).

JOYMATCH ATU as used with Partridge VFA Joystick Antenna. Tom O'Neill, G4AHC, 0151 691 0729, tom.oneill@talktalk.net (Wallasey, Wirral).

MORSE CODE TUTOR Datong model D70. Eric, G3XXO, 01909 472316, eric.birks@virgin.net (Worksop).

MORSE KEYS wanted please. Avid collector looking for straight keys, bug keys, spark keys etc. In particular Marconi. Please ring or e-mail John, G0RDO, 01626 206090, john@morsemad.com (Newton Abbot).

YAESU FT-690 6m full quarter wave telescopic aerial, with BNC mount, as supplied with this portable when new. Alan, G1EAB, 0115 9612295, g1eab@tiscali.co.uk (Nottingham).

RALLIES & EVENTS

Members of the RSGB Regional Team will be present with a bookstall at the rallies this month marked with an RSGB diamond.

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1 & 2 OCTOBER - **NATIONAL HAMFEST** - brought to you by the RSGB in association with the Lincoln Short Wave Club. George Stephenson Pavilion, Newark and Nottinghamshire Showground, Lincoln Road, Winthorpe, Newark NG24 2NY (close to junction of A1/A46/A17). TS, B&B, CB, C, SIG, Morse proficiency tests on demand, RSGB Bookstall, RSGB Services & Committees, DF, FM [www.nationalhamfest.org.uk].

3 OCTOBER - **AUTUMN MILITARIA & ELECTRONICS & RADIO AMATEUR HANGAR SALE** - Hack Green secret Nuclear Bunker, Nantwich, Cheshire, CW5 8AL. OT 10.00, £2.50. Contact Rod Siebert, 01270 623 353 or e-mail coldwatr@hackgreen.co.uk [www.hackgreen.co.uk].

8-10 OCTOBER - **RSGB CONVENTION** - Horwood House, Little Horwood, near Milton Keynes. Full convention programme with lectures for all interests and all levels of technicality [www.rsgb.org/rsgbconvention].

17 OCTOBER - **BLACKWOOD AND DISTRICT ARS RALLY** - Coleg Gwent, Risca Road, Cross Keys NP11 7ZA. TI V44 (S22), CP, OT 10.30/10.40, £2. TS, B&B, SIG, C, WIN. Details Dave, GW4HBK, 01495 228 516, e-mail gw4hbk@talktalk.net [www.gw6gw.co.uk].

17 OCTOBER - NEW DATE - **HORNSEA AMATEUR RADIO CLUB RALLY** - Floral Hall, 7 The Esplanade, Hornsea, East Yorks HU18 1NQ. OT 10.30, CP, TS, B&B, SIG, RSGB, RAFARS, LB, C, DF, WIN. Details from Rick, M0CZR e-mail R106221@aol.com or Duncan, G3TLI, e-mail g3tli@hotmail.co.uk [www.hornseaarc.co.uk].

17 OCTOBER - **GALASHIELS AND DISTRICT ARS RADIO RALLY** - The Volunteer Hall, St Johns Street, Galashiels, Scottish Borders TD1 3JX. OT 11.00 /10.45, £2.50. B&B, TS, C, WIN. Details from Jim, GM7LUN on 01896 850 245 or e-mail mail@gm7lun.co.uk.

23 OCTOBER - **RISHWORTH QRP CONVENTION** - Rishworth School, HX6 4QA. TI S22 (V44), OT 10.00, £2.Plentiful street parking, on-site for disabled. Large social area, TS, B&B, C. Dick Pascoe, G0BPS, 01303 894 390.

30 & 31 OCTOBER - **NORTH WALES RALLY** - John Bright School, Llandudno. TS, RSGB Bookstall, CP. Details from Liz Cabban, GW0ETU on 01690 710 257 or e-mail lizcabban@vodafoneemail.co.uk.

7 NOVEMBER - **WEST LONDON RADIO & ELECTRONICS SHOW (Kempton Rally)** - Kempton Park racecourse, Staines Road East, Sunbury on Thames, Middlesex TW16 5AQ. OT 10.00. TS, FM, DF, free CP, RSGB, LEC, TI S22 (V44). Paul, M0CJX, 0845 165 0351, info@radiofairs.co.uk [www.radiofairs.co.uk].

7 NOVEMBER - **FOYLE & DISTRICT ARC ANNUAL RALLY** - Best Western White Horse Hotel, 68 Clooney Road, Derry BT47 3PA. OT 12 noon. TS, RSGB, SIG [www.mn0aku.co.uk].

13 NOVEMBER - **ROCHDALE & DISTRICT RS TRADITIONAL RADIO RALLY** - St Vincent's Church Hall, Caldershaw Road, Rochdale OL12 7QL. OT 10.15/10.30am, £2.50, concessions for U12 and seniors. B&B, C. Details Dave, G0PUD, QTHR, 07710 243 107, e-mail dave.shaw1@sky.com. [www.radars.me.uk].

21 NOVEMBER - **33rd CATS RADIO & ELECTRONICS BAZAAR** - 1st Coulsdon Scout HQ, r/o Council Car Park, Lion Green Road, Coulsdon, Surrey. 10.00-13.00, £1, B&B, C, DIS, DF, CP free. Details Andy, G8JAC, e-mail secretary@catsradio.org.

21 NOVEMBER - **PLYMOUTH RADIO CLUB RALLY** - Elm Community Centre, Leypark Walk, Estover, Plymouth PL6 8UE. CP, TI, OT 10.00, £2, TS, B&B, C, WIN.

28 NOVEMBER - **BISHOP AUCKLAND RADIO AMATEURS CLUB RALLY** - Spennymoor Leisure Centre, Co Durham DL16 6DB. CP, TI S22 (V44), OT 10.15/10.30, £1.50 (U14 free). TS, B&B, C, LB, DF, FAM. Details Mark, G0GFG, 01388 745 353.

16 JANUARY 2011 - NEW VENUE - **RED ROSE WINTER RALLY** - George H Carnall Leisure centre, Kingsway Park, M41 7FJ. DF, free CP, B&B, C, LB, OT 11am, TS, SIG, DF, RSGB bookstall. Details from Steve, 07502 295 141 [www.wmrc.org.uk].

16 JANUARY 2011 - **DOVER AMATEUR RADIO CLUB RALLY** - Whitfield Village Hall, Dover CT16 3LY. One of the first events in the 2011 season. TS, TI via GB3KS, C [www.doverradiorally.com].

6 FEBRUARY 2011 - **26th CANVEY RADIO & ELECTRONICS RALLY** - 'The Paddocks', Long Road, Canvey Island, Essex SS8 0JA [southern end of A130]. Free CP, OT 10.30, £2, C, DF, TS. Dave, G4UVJ, 01268 697 978 (evenings) [www.southessex-ars.co.uk].

19 MARCH 2011 - **LAGAN VALLEY ARS RALLY** - The Village Centre, 7 Ballynahinch Road, Hillsborough. OT 11.30, TS, CP, C. Contact Jim, GI0DVU, 02892 662 270, e-mail jim.henry@ntlworld.com.

20 MARCH 2011 - **27th YEOVIL QRP CONVENTION** - Digby Hall, Hound Street, Sherborne, Dorset DT9 3AA (adjoining the central shopping car park). OT 9.30am, TI S22, CP, TS, LEC, B&B, C, DIS. Contact Derek, M0WOB, 01935 414 452.

10 APRIL 2011 - **NORTHERN AMATEUR RADIO SOCIETIES ASSOCIATION EXHIBITION (Blackpool rally)** - Norbreck Castle Exhibition Centre, Blackpool. TI, CP, TS, B&B, SIG, MT, LB, C, DF, RSGB book stand. OT 10:45/11:00. Dave, M0OBW, 01270 761 608, e-mail dwilson@btinternet.com [www.g1gyc.demon.co.uk/narsa].

SILENT KEYS

We regret to record the passing of the following members:

Mr S G Hurd, G0LMV	19/8/2010
Mrs A O Wright, GM0TLX	13/8/2010
Mr B Blattner, G1ORJ	29/7/2010
Mr N D N Belham, G2BKO	8/2010
Mr J H Knowles, G2FXS	
Mr R W P Wilson, G3DSV	9/8/2010
Mr R H Pounder, G3DVQ	2/7/2010
Mr G Lancefield, G3DWQ	24/7/2010
Mr J P Moore, G3IKR	15/4/2010
Mr E H Price, G3JPP	18/8/2010
Mr R A E Fronius, G3MCW	8/7/2010
Mr C S Miller, GM3NEC	8/8/2010
Mr D J Walker, G3OLM	4/2010
Mr A J Nadauld, GM3RFQ	29/7/2010
Mr A J Binning, GM3XIJ	
Mr D Evans, G3ZWL	7/7/2010
Dr W H Etheridge, G4HTS	30/7/2010
Mr N E Head, G6BRB	8/6/2010
Mr R H Tyson, GW6HUV	23/8/2010
Mr M J Hannant, G7FHE	2/7/2010
Mr D W Bowd, G7FQI	4/2010
Mr W J Seeney, G8RFN	7/4/2010

The Society wishes to apologise to Mr D L Pole-Evans, VP8NX, who was inadvertently listed as a silent key last month when in fact it was his father, Tony, VP8HZ, who has sadly passed away.

This list shows all rallies and events we are aware of as at 8 September 2010. If your rally or event is not listed, TELL US ABOUT IT! Send an e-mail to GB2RS@RSGB.org.uk and your event will appear here and on GB2RS. It's free! Guidelines for submissions: Please let us know your event details as early as possible. If you submit by e–mail (to GB2RS@RSGB.org.uk) then we suggest you set your e–mail program to request a 'read' receipt so you can be sure we've seen the details.

TI Talk-In; CP Car Park; £ Admission; OT Opening time - time for disabled visitors appears first, (eg 10.30/11am); TS Trade Stands; FM Flea Market; CBS Car Boot Sale; B&B Bring and Buy; A Auction; SIG Special Interest Groups; MT Morse tests; MA Foundation Morse Assessments; LB Licensed Bar; C Catering; DF Disabled Facilities; WIN prize draw, raffle; LEC Lectures/Seminars; FAM Family attractions; CS Camp Site.

SPECIAL EVENT STATIONS FOR NOVEMBER 2010

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. Details published here are kindly provided by Ofcom.

How to get the best out of the QSL service for Special Event Stations

I sort about 50,000 Special Event QSL cards a year and about 20,000 get destroyed after 3 months because they are unclaimed. If you operate a Special Event station, please send stamped SAEs and claim your cards!

Anyone can lodge stamped SAEs with their QSL manager in order to receive cards. You only need to be an RSGB member to *send* cards via the Bureau.

There is NO VIA system in the GB series (nor has there ever been). Cards will *not* come out to you via your personal callsign – you *must* send separate stamped SAEs to me to receive your own Special Event Station's QSL cards.

I can be e-mailed via qsltrek@hotmail.co.uk and I operate a website at www.gb-special-event-qsl-status.webs.com where you can check your SAE status and get other pertinent information.

Please help out by passing this info on to other Special Event enthusiasts that you know.

Davina Williams, M0LXT, QSL manager for the GB series (GBxAAA-GBxZZZ)
20 Neale Close, Wollaston, Northamptonshire NN29 7UT

Date	Callsign	Phonetics	Location	Bands	Keeper
01/10/2010	GB2MOP	Museum Of Power	Tanygroes, Ceredigion	LH	GW7EUL
	GB4HW	Ham Week	Pontefract, Yorks	TLHV27	G0BPK
	GB0SL	South Lincolnshire (Scouts)	Barr Green	LHV27	G0KYD
	GB1ROC	Royal Observer Corp	Graigavon, Co. Armagh	TLHV27	MI0RYL
	GB2PPS	Papplewick Pumping Station	Rigg Lane, Nottingham	LH	G0UYQ
	GB2SB	Scophony Baird	Wells, Somerset	LH	G7AIS
	GB4EMI	Electrical and Musical Industries	Wells, Somerset	LH	G4DCH
	GB8EMI	Electrical and Musical Industries	Wells, Somerset	HV27	G8BFV
02/10/2010	GB50RN	Royal Navy (ARS)	HMS Collingwood, Hants	TLHV2	G3ZDF
	GB4GD	Guide Dogs	Lindsayfield, Glasgow	LH2	GM4DAE
04/10/2010	GB2WES	West End Scouts	Southampton	TLH27	G4ORF
07/10/2010	GB0NPD	National Poetry Day	Bradford, Yorkshire	LH	G0PFH
	GB2HFC	HF Convention (RSGB)	Milton Keynes	TLHV27	G3LAS
08/10/2010	GB1PS	Pontefract Scouts	Pontefract, Yorks	LH2	G0BPK
	GB5WVR	Worth Valley Railway	Ingrow Railway Station	L	G0FQN
	GB0NDS	Nuneaton District Scouts	Wolvey	TLHV27	G1ORG
09/10/2010	GB4SRF	Segedunum Roman Fort	Wallsend, Tyne & Waer	TLHV27	M1DZT
11/10/2010	GB0SDB	Spitfire District Birmingham	Ward End, Birmingham	L27	G7PUQ
15/10/2010	GB4SBS	2nd Bracknell Scouts	Bracknell, Berks	TLHV27	M0XDF
	GB5FSS	Ferring Sea Scouts	Ferring, West Sussex	LH2	G0PBV
	GB0GDS	Grenock District Scouts	Greenock	LH27	MM1AWV
	GB2RSC	Radio Scouting Chesterfield	Chesterfield, Derbyshire	TLH27	G0THF
	GB8LS	Golf Bravo Eight Luton Scouts	Someries District Scout Hq, Luton	LH2	G1VTK
	GB4DXS	Dewa Explorer Scouts	Forest Scout Camp, Sandiway	LH2	G7GFC
	GB2GCS	Grimsby Cleethorpe Scouts	Cleethorpes	LHV27	G0MNI
	GB4SES	Southend Estuary Scouts	Southend-on-Sea	LH27	G1KEX
	GB1KCS	Knaresborough Castle Scouts	Knaresborough	LHV2	G1GCD
	GB2WYS	West Yorkshire Scouts	Brighouse, West Yorkshire	TLHV27	G0BWB
	GB2EDS	Easingwold District Scouts	Linton -on- Ouse	LH27	G1JKE
16/10/2010	GB1HES	Eastbourne District Scouts	Hailsham, Sussex	LH27	M0LRE
	GB1HS	1st Hainault Scouts	Romford, Essex	LHV27	G0TOC
	GB0SSO	Scouts of South Oxfordshire	Didcot, Oxon	LHV27	G0UGO
	GB0BSS	Braunton Sea Scouts	Braunton, Devon	LH2	G0DUH
	GB2HDS	Halifax District Scouts	Hardcastle Crags, West Yorks	LH27	G4OYZ
	GB2FSS	First Shavington Scouts	Shavington, Crewe, Cheshire	LH2	G4BZI
	GB0TVS	Tees Valley Scouts	Hartlepool	LH27	M0VED
	GB1MSG	Malew Scout Group	Ballasalla, Isle of Man	TLHV27	GD0AMD
	GB4SCL	Settle Carlisle Line	North Yorkshire	L	G0FQN
	GB0PG	Pinkneys Green	Maidenhead, Berks	LH	G0JPE
	GB8CS	Clevedon Scouts	Kenn, Somerset	LHV2	M1EPX
	GB2CIS	Canvey Island Scouts	Canvey Heights, Essex	LH27	G7IIO
	GB0LPS	Lymington Pennington Scouts	Lymington, Hants	TLH27	G8MZF
19/10/2010	GG100SGG	Stoke Gifford Guides	Bristol	LH2	M0BJS
20/10/2010	GG100GGR	GirlGuiding Renfrewshire	Paisley	LH27	MM1AWV
23/10/2010	GB2LSM	Long Shop Museum	Leiston, Suffolk	LH	G4XVE

19 JUNE 2011 - NEWBURY RADIO RALLY AND BOOT SALE - Newbury Showground, next to M4 J13. TI S22 (V44), free CP, OT 9.00, £2, TS, C, DF, FM, SIG. Details from rally@nadars.org.uk [www.nadars.org.uk].

26 JUNE 2011 - WEST OF ENGLAND RADIO RALLY - Cheese & Grain, Bridge Street, Frome, Somerset BA11 1BE. TS, RSGB Books, C, CP, DIS. Contact Shaun, G8VPG, 01225 873 098, e-mail rallymanager@westrally.org.uk [www.westrally.org.uk].

17 JULY 2011 - QRP IN THE COUNTRY - Upton Bridge Farm, Long Sutton, Langport TA10 9NJ. SIG, B&B, LEC, C, LB, FAM. Free entry. Tim Walford, G3PCJ, 01458 241224, e-mail walfor@globalnet.co.uk [www.walfordelectronics.co.uk].

14 AUGUST 2011 - FLIGHT REFUELLING ARS HAMFEST - Mike, M0MJS, 01202 883 479, e-mail hamfest@frars.org.uk [www.frars.org.uk].

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9) Members' Ads are accepted and published in good faith.
10) Members' Ads are accepted at the sole discretion of the Editor, whose decision is final.

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RADIOLOCATION

Bernard Spencer, G3SMW

It is good to see the interest in DF in the form of 'Fox Hunting' with international as well as local contests. The training is useful, healthy and fun. However, reaching the Fox does not generally require accurate direction finding because one is 'homing in' and it adds little to the science of DF.

On the other hand, finding the location of a distant target from DF at fixed points calls for the best possible accuracy. In real life this is just as often a requirement as 'homing in'. Without going into details, I think it would be nice to have events like this in addition to the present Fox Hunts.

If desired they could be in the form of Contests, with perhaps pairs of operators making a team, although contesting is not necessary for those people for whom advancing science would be its own reward!

An even bigger picture emerges if one thinks of possible amateur radio contributions to radiolocation in general, such as distance measurement through repeaters for coastal shipping and so on. In these days when the professionals are worried about the vulnerability of GPS and the back-up with e-Loran may not happen, inexpensive radio amateur solutions, at least for the UK, could be important.

It would be interesting to know if anyone is working on these lines.

Bob Titterington, Chairman RSGB ARDF Committee, replies: Thank you for taking the trouble to write to RadCom about direction finding. The ARDF Committee is always pleased to get feedback from members who are not regular participants in the programme of RSGB events.

It is true that the receivers used in these competitions do not have to be capable of the ultimate in accuracy but there is rather more to events using the IARU rules than your letter would imply. With up to five transmitters to locate, the bearing and signal strength of all five need to be assessed in one transmit 'cycle' in order to decide which transmitter to hunt first. Whilst 'homing in' on this first transmitter, information has to be built up about the location of the remaining transmitters. On VHF things are made more complex when the topography gives rise to multi-path propagation resulting in the direction of arrival of the signals being different to the true direction of the transmitter. These factors can make the events more of a mental challenge than a physical one.

Competitions involving the accuracy of bearings are not new. Many years ago the now defunct Slade Radio Society of Birmingham promoted just such a competition using Top Band. This did not attract much support and rather 'died a death'. However, this does not mean that the format could not be reintroduced in Club level competitions today. In the ARDF column in the January 2011 edition of RadCom I will be suggesting ways in which bearing accuracy could be made a feature of Club competitions.

As far as the bigger picture is concerned, direction finding has been a key component of signals intelligence (SigInt) since the time of the First World War. A great many highly talented engineers have devoted most of their careers to developing accurate, calibrated direction finding stations. The USA constructed a number of AN/FLR-9 Wullenweber arrays around the world (including RAF Chicksands in Bedfordshire) and in the 1970s the Plessey Company developed the more compact Pusher CDAA (Circularly Disposed Antenna Array), both for HF direction finding.

Against this background, it is hard to see how the amateur community could contribute much to the science of assessing the direction of arrival of radio signals. What amateur direction finding does do, especially at VHF, is to give regular participants a real insight into the way in which the terrain affects the accuracy of the results. For a person being trained for any form of professional tactical direction finding, such an experience could make a big contribution to their understanding of the factors that determine the best results.

ANTENNAS

Brian Kendal, G3GDU

I have followed and enjoyed Peter Dodd's antenna articles since they started, however, that in the September issue of *RadCom* really took the biscuit.

Apart from the rather Heath Robinson construction of the loop, the operational comparison with a rotary trap dipole was suspect. Apart from possible losses from an additional 38 metres of coaxial cable, which may or may not have proved significant, the height differential could easily have given rise to the difference in DX performance.

Therefore, could Peter please perform and report on another set of operational tests, this time with the trapped rotary dipole on the end of 53 metres of coax at a height of 2 metres and the loop at 11 metres fed with 15 metres of cable.

In comparison, my own experience over several years using a 1.5 metres diameter magnetic loop on 10MHz was that an indoor loop easily matched the performance of an outdoor dipole at the same height (9 metres) for both short skip and DX working.

Peter Dodd, G3LDO replies: The loop antenna described in September 'Antennas' was inspired by a lecture at Worthing and District Amateur Radio Club by Mike Underhill, G3LHZ. The type of capacitor used in this loop was the result of not having a suitable conventional capacitor to hand. It was also felt that the design would encourage others to build a loop who didn't have the necessary facilities to build a conventional design. Most materials used were easily obtained from DIY stores.

G3GDU describes the construction of the loop as Heath Robinson; this implies poor engineering. I don't feel that this is the case. What the design does have is simplicity, which could be mistaken for poor engineering. Aspects of design regarding losses were considered and, I think, addressed. Improved reduction of capacitor hinge losses are discussed in this month's Antennas.

The loop and dipole antenna comparisons, I agree, are weighted against the loop but it did very well in spite of this. This rough test setup was dictated by time (working to deadlines can be demanding) so existing antenna layouts were used; the dipole on the roof and a length of coax already installed from the shack to the bottom of the garden where the loop was constructed.

I was impressed with this loop antenna and it did better than I expected after reading controversial material on loops in the past. It will be the subject of further modifications and discussions in the months to come.

OFCOM

Frank Garrett, G3MVZ

We have read so much criticism recently in *RadCom* regarding the attitude of Ofcom to the amateur service that I thought it right to acquaint you with my own experience of their service.

I have been suffering with a carrier carrying a modulated tone every 15kHz from 1.8 to 18MHz for the past 18 months. It is unstable and drifts up and down continuously. I did not think it worth while to report as I anticipated a negative attitude. I did, however, tour the area with my mobile rig and found I could detect the signal for a radius of 1 mile and identified the source from premises in the middle of the village. I recorded the sounds on computer.

I contacted Ofcom on 3 August they advised they would inform their technical people in Baldock who would contact me and I was issued with a reference number. Within 24 hours I received a call from their technician and a visit to my QTH was arranged for Friday 13th! He arrived and listened to my recordings and on my own receivers. We proceeded to the village and I indicated where I thought the problem emanated and left him to proceed.

He was unable to obtain access but advised me he would return the following week. Yesterday, the 16th, he called again at my QTH advising he had gained access identified the problem and shut it down. Could he please listen on my gear to confirm the problem was resolved?

You can imagine my joy when there was no sign of the interference and in addition the continuous frying noise across the entire spectrum had also disappeared.

From this you will see the entire operation from instruction to completion took a day short of a fortnight – a remarkable achievement by the agency.

Don Beattie, RSGB Board Member replies: It is always good to present a balanced picture, and there are plenty of reports of sterling work by the Ofcom field staff, who generally want to do a good job. What is more of a concern is the will of Ofcom management to investigate and take action in cases where the solution will clearly not be easy, yet where it is quite clear that the radio service is entitled to protection from harmful interference. It is this aspect that causes the Society considerable concern.

HEARING SOLUTIONS

Brian Davies, G3OYU

Reference Ray Barnes deaf problem in The Last Word; I too am profoundly deaf and have been deaf all my life to one extent or another. Very recently I came across a company who specialise in products for the deaf. They have a massive catalogue and are well worth a look. Their URL is www.connevans.com. They are located in Redhill, Surrey and are local to me, but they do have a good mail order service.

I have been trying to find a way to use my digital hearing aids especially when wanting to use my iPod. The device I have come up with is a 'direct input shoe'. This clips onto the bottom of the aid and provides a direct input via position one of the hearing aid switch. Using any form of induction loop shuts you off from the outside world, not a happy state as you may well miss telephone calls and the front door bell, as well as being unable to hear one's family (though that may not be a bad thing at times!). Using the direct input shoe eliminates this problem; additionally you will now be using the DSP programmed system that will to some extent counteract one's hearing frequency curve.

These shoes are specific to a model of aid and there is a vast range. In my case I have NHS aids made by Siemens, type Reflex M, and they were easy to identify and to select the correct shoe. The shoes come singly, so you require one for each aid. The connecting lead is also purchased separately. Being deaf you can make a declaration that enables purchase VAT free! My two shoes plus suitable connecting lead cost approximately £43. The lead terminates in a stereo 3.5mm jack plug; thus for use with a transceiver it will be necessary to provide a suitable interface for mono to stereo.

It is possible that on first connecting the shoes that they do in fact shut off the aid's internal microphone; with our digital aids this is programmable and a visit to the audiologist will enable the aid to be reprogrammed to have the internal mics active when the shoes are in use. One other point to be aware of is that the connecting lead appears to have a built in attenuator so it may be necessary to interface with a simple opamp amplifier. Alternatively ask for a lead without the attenuator.

Letters published in 'The Last Word' do not necessarily reflect RSGB policy. 'Last Word' letters may be e-mailed to radcom@rsgb.org.uk. Please note that letters submitted for 'The Last Word' may not be acknowledged. The RSGB reserves the right not to publish any letter, with no reason being given. It is a condition of publication that all letters may be edited for grammar, length and / or clarity. Due to the limited space available, please keep letters as short as possible. Additional letters may be published on the RSGB members-only website at www.rsgb.org/membersonly/lastword.

Dave Kemplen, G1NSV

I have a similar problem to Ray and have found that the Connevans catalogue was a great help in finding a solution, I purchased some shoes that fit to my digital hearing aids and I can then plug them straight into a 3.5mm jack socket. This makes the hearing aids act like head phones, they were not cheap but made a huge difference to listening.

The catalogue is available online and the website is www.DeafEquipment.co.uk.

For information, I use audio input shoes for the Siemans Prisma Pro hearing aids and the 3.5mm stereo to euro plug 'v' 1 metre in length lead. These worked for me; I just made up a box to convert from the stereo plug to a mono plug so that I could also when not listening to the amateur band, just by removing the converter I could plug the lead into an iPod or stereo radio.

Ray, G3RXG

Like Ray Barnes, I have digital hearing aids (NHS), and was chairman of a committee studying devices to help the hard-of-hearing.

In amateur radio two problems can arise, interfering sound (much more troublesome with hearing loss) and unsuitable frequency response. Digital signal processing can help with the first and there are bolt-on audio filters such as the MFJ784B. For the second, the MFJ616 Speech Intelligibility Enhancer divides the audio spectrum into four bands, each individually adjustable. I have found both of these units helpful, but they cost real money.

From Ray's letter it seems that frequency response is the problem. So I would suggest contacting solutions@rnid.co.uk or ringing 01733 361199 to request a copy of the Solutions catalogue (it's free!) This is packed with goodies for anyone with impaired hearing, with or without hearing aids. From this catalogue consider a Personal Listener with tone controls and an external input to connect to your headphone socket. For example, the Sonido also contains DSP, costs £55 and should prove useful in situations other than amateur radio. It can be used with headphones or a neckloop. If you have hearing aids, such devices are VAT free and RNID operate a 28 day trial policy, so you can return the goods if unsuitable. Good listening!

Chris Gibson, M0PSK

My suggestion for Ray, G8AZN (The Last Word, September) has its origin in one of my early QSOs as an M3, with a very elderly American living in a care home. George had been active on CW for several decades, but his hearing ability had declined to the point where he felt that he would have to give up amateur radio altogether. His fellow club members came to his rescue. They set up his radio on a small desk, put up a long wire from his window to a nearby tree, and installed a basic PSK program on an unwanted computer, with a simple interface to the radio. From that point onwards George was able to enjoy ragchewing and DXing with 20W or so, and renew his enthusiasm for the hobby he loved. He used macros for sending basic information, but quite happily typed the rest at a dignified speed. There is now considerable PSK activity on the HF bands, and Ray may well want to expand his horizons by experimenting not just with PSK, but with the many other interesting digital modes now available.

Philip Peake, K7UF/G8FVM

In the September edition Ray Barnes wrote concerning his hearing loss and how this was impacting his ability to participate in amateur radio activities.

I don't really have any good ideas about how to improve the signal to noise ratio and intelligibility of voice reception, what I would suggest is that Ray tries operating with digital modes – PSK31 would be the obvious first choice.

In some respects it is quite different from voice communications but can be quite satisfying. The technical and operating skills acquired during Ray's previous amateur life will still apply. The only new one he may have to acquire is the use of a keyboard, but the macro functions available in most software packages help while these are being acquired.

EXCELLENT SERVICE

David Horton, G3RZF

I also received excellent help from Yaesu recently (Last Word - September 2010). A diagnosis of problems with my 19 year old G-600RC rotator revealed a broken drive belt in the controller. An enquiry to Yaesu UK about a replacement brought an immediate response from service manager Sam Ruddy, who despatched one, by return, free of charge! Additionally I had concerns about the rotator thrust bearing on my tower and received very helpful advice via lengthy e-mail correspondence with Richard, their engineer. Many thanks to you both!

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65 Amp Low Noise power supply. Patented Noise Control that permits you to move any noise away from the operating frequency. **£209.95 D**

W-25AM

A really hunky, reliable 25 Amp variable supply that easily runs 100W radios with power to spare. **£89.95 C**

W-5A	5A Analogue fixed 13.8V	£29.95 C
W-10AM	10A Analogue variable	£59.95 D
W-10SM	10A Switched fixed	£49.95 D

Samlex
Power Supplies

SEC-1212

Switch mode PSU offers 10A of cont. current output & 12A peak. Ideal for low power, designed with RF in mind, it is totally noise free & utterly stable. ** Input 230V AC * Output 13.8V DC * Output current 10A cont (12A peak) * HF & VHF filtering* **£79.95 C**

SEC-1223	23A Cont S/Mode	£99.95 C
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Kent
Morse Keys

Hand-made quality morse keys. Fell the difference!

KSKA	Standard straight key	£79.95 C
KSKB	As above in kit form	£59.95 C
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KT1	As KSKA but steel base	£89.95 C
KTPA	Iambic paddle key	£94.95 C
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Power SWR Meters

Great Value Superb Performance!

All models have 12V backlight and include DC Cable.

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AV-400 £49.95 C
140-525MHz 5/20/200/400W

AV-601 £69.95 C
1.8-160MHz / 140-525MHz

AV-1000 £79.95 C
1.8-160MHz, 430-450MHz, 800-930MHz, 1240-1300MHz. 5W, 20W, 200W, 400W.

Cross Needle Models - Even Lower Prices!

AV-20 £34.95 C
30W / 200W, 3.5-150MHz

AV-40 £34.95 C
15W, 0-150W, 144-470MHz

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Dummy Loads

They feature high tolerance, air-cooled housings with extremely efficient heat ducting. This results in a realistic continuous power rating, together with an impressive VSWR curve.

DM-150PL £34.95 C
DC-1GHz PL-259 30W cont 100W 90 secs

DM-200N £49.95 C
DC-3GHz N-Type 35W cont 100W 2 mins

Ramsey
Kits

CW-7C
A complete CMOS CW keyer kit with case and knobs. **£35.95 B**

FR-146C	2m FM receiver + case	£44.95 C
FR-6C	6m FM receiver + case	£44.95 C
QRP-20C	20m 1W VXCO Tx +case	£39.95 C
QRP-40C	40m 1W VXCO Tx +case	£39.95 C
QAMP-20C	20m 20W linear +case	£49.95 C
QAMP-40C	40m 20W linear +case	£49.95 C
RFS-1	RF switch 1-100W	£22.95 C
SS-70C	Speech scrambler	£39.95 C

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A tuneable telescopic whip covering 3.5 to 460MHz. Up to 25 Watts PEP, fitted with PL-259 plug. Great for FT-817 & IC-703 or any other QRP radio. **£109.95 C**

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HF Mini ATU for helical whips

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This amazing little radio covers 100kHz - 1.3GHz AM FM & WFM. 1000 memories, over 30 programmable features including CTCSS and DCS. Alphanumeric memories give meaningful channels and there is a builtin bar antenna covering 100kHz - 5MHz. Inc. NiMH pack and charger. FREE software database for PC loading via www.aorja.com.

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- *10kHz - 3.3GHz.*
- *10 VFOs*
- *High Intercept point*
- *Dual IF Outs.*
- *Two RS-232 ports*
- *Control head port*

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- *40kHz - 3.15GHz*
- *All Mode Reception*
- *Digital Signal Processing*
- *Monitor 3 Ch At Once!*
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Combined Scanner receiver with live spectrum analyser. 25MHz - 3GHZ NFM WFM AM.

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Base or portable station receiver covering 530kHz - 3GHz. All modes AM FM FMW & SSB with standard rotary tuning. Requires external 12V or optional internal batt pack. A great station accessory for general listening or extra receiver.

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There are radios and then there are RADIOS! TenTec have crafted their radios to provide that indefineable feel and performance that comes from low production runs and attention to handling, convenience & operator pleasure. Robust front ends, selectable roofing filters, & audio transmission (and receotion) quality that is a mark of design expertise and conception. Experience the difference!

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Jupiter-538B

£1449 D
With internal ATU £1799

100W SSB CW AM FM 160m - 10m

The Jupiter is TenTec's introduction to HF radio with a difference. Like a specialist sports car it is not mass produced. It is lovingly assembled by fellow hams to give you a new experience in performance and innovation. 160m - 10m with 100 Watts output. The classic TenTec radio with a difference! It can read CW on the screen and you can plug a PC keyboard in to send text.

Omni-VII-588

£2499 D
With internal ATU £2799

100W SSB CW AM FM 160m - 6m

The OMNI VII is the TenTec workhorse. It has gone through steady development in the history of the "Omni" series. When you first switch it on, you know that this is something different. The receiver is a delight and the transmitted audio is superb. This is the only Ethernet ham transceiver. No PC required at the rig to operate remote! Locate your OMNI-VII anywhere you have wideband Internet access. Simply connect built-in Ethernet port to your router with our One Plug connection. Get live receive AND transmit operation from anywhere else in the world.

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£3899 D
With internal ATU £4199

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The best in Amateur Radio is now even better with ORION II. Featuring a color screen, all new suite of roofing filters, new control processor and more. Highest performance HF transceiver available today, analog + IF-DSP, dual 32-bit ADI SHARC processors, lowest composite TX phase noise of any rig available - sounds fantastic on transmit and receive! Optimized amateur bands transceiver plus general coverage sub-receiver.

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Check Out These Amazing Prices!

Flex-1500 Be Amazed!

An HF Transceiver
- All Modes - All Bands
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See what you have been missing!

- *160m - 6m All Modes Transceiver*
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You want a top performing transceiver (or receiver) that covers the full HF spectrum and 6m - you need all modes - a full set of filters (variable) - a panoramic adaptor - waterfall display - STOP!! You have it right here for less than £600!

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Flex-3000 100 Watts!!!

HF - 6m 100 Watts
Base or LapTop
Companion & Built-in
Auto ATU

£1399.95 D

100Watts (down to approx1 Watt) of SSB, CW, FM and AM. About the size of a laptop! It is the go anywhere transceiver of today. This software defined radio offers cutting edge performance that takes advantage of the very latest technology. Built-in auto ATU.

Brief Specifications:
160 - 6m / 1-100 Watts / 1Hz frequency steps / Firewire connection / Yaesu modular mic input / Tx unwanted SSB suppression 65dB / Tx 3rd order IMD -31dB / Rx typical sensitivity -0.3uV / Rx MDS (pre-amp off -121dB / IP3 better than +26dBm / IMD 95dB @ 2kHz / SSB selectivity 2.39/2.54 kHz (6dB/60dB) / Selctivity variable down to 50Hz / Power 13.8V 25 Amp peak (1.5 Amp receiver).

The Mighty Flex-5000A!

Whichever way you look at it - it is the unbeatable SDR RIG!

When Gerald Youngblood conceived this radio, he wanted it to be the best and the most flexible. As an active ham operator who knew what he wanted and he knew what others wanted: a radio that would be at home for regular working, digging out weak DX, coping with noisy bands, great potential for modern digital techniques and as a transverter for high performance VHF UHF operation. And here it is, the culmination an idea and a dream - the Flex-5000.

The SDR-5000 is the most advanced transceiver ever built by Flex-Radio Systems. Not only does it have an amazing front end, it can also accomodate an additional fully independent receiver and a VHF-UHF transverter.

£2495.95 D

Flex-5000A-ATU includes a built-in automatic ATU. **£2795 D**

RX-2 Extra receiver offers SO2R performance + filter banks & signal path. **£629 D**

VU-5000-UP 2m & 70cms transverter module - 60W output - Due Oct **£669 D**

5000-ATU Auto ATU **£319 D**

VFO-Knob Griffin VFO control **£39.95 D**

VFO-Shuttle VFO + buttons **£79.95 D**

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Wouxun KG-UVPD1P 2/70 Full Dual Band FM Handie

- ✓ 5W RF Output 2m & 4W 70cm
- ✓ Frequency Range: 144-146 & 430-440MHz (RX/TX) 136-174 & 420-470MHz Capable
- ✓ Work Mode: V/U or V/V or U/U can be set freely
- ✓ English Voice Guide
- ✓ SOS Function
- ✓ 1750Hz Tone
- ✓ DTMF Encoding Function
- ✓ CTCSS/DCS Scan (Digital/Analog)
- ✓ Bright Flashlight Illumination
- ✓ Band can be set freely on the same Channel VHF TX-UHF RX or UHF TX-VHF RX
- ✓ Built-in FM Radio (76-108MHz RX)
- ✓ Wide/Narrow Bandwidth Selection (25khz/12.5khz)
- ✓ Priority Scan, Add Scanning Channel
- ✓ High/Low Power Selection
- ✓ Channel Name Edit and Display
- ✓ 50 Groups CTSS/105Groups DCS
- ✓ Multi Step Frequency:(5K/6.25K/10K/25K/50K/100K)
- ✓ Multi Scan
- ✓ VOX Transmission
- ✓ Transmit Overtime Voice Prompt
- ✓ Begin/End Transmitting BEEP Prompt
- ✓ Auto/Manual Keypad Lock
- ✓ Wire Clone, Programmable By Computer
- ✓ Stopwatch Function
- ✓ Low Voltage VOICE prompt
- ✓ Busy Channel Lockout

ML&S Price: £89.99

Supplied accessories:
1.3Ah Li-Ion Battery Pack (5W)
Intelligent Base charger (110V-240V & 12V in input)
Belt-Clip
Dualband Antenna
Hand Strap & Handbook

Wouxun KG-679E/2M 2m FM Handie

Also available for 70cm! See below.

- ✓ 5W RF output
- ✓ English voice guide to under 5W RF
- ✓ 144-146MHz 2m Amateur Band (136-174MHz capable)
- ✓ 8 groups scrambler
- ✓ Channel name edit available
- ✓ High/Low power can changeable by top key
- ✓ VOX (Level adjustable)
- ✓ DTMF encoding and DTMF decoding
- ✓ 105 groups D.C.S/50 groups CTCSS
- ✓ DCS/CTCSS of RX and TX can be set respectively
- ✓ Reverse frequency function
- ✓ Busy channel lockout
- ✓ Distant alarm
- ✓ NI (Caller ID)
- ✓ Multi scan mode (TO/CO/SE)
- ✓ Inspection, monitor, stun, kill and emergency alarm
- ✓ All calls, group calls and selective calls
- ✓ Calling ring and ring overtime auto answer
- ✓ Multi silent mode (QT/QTADT/QTXDT)
- ✓ Channel steps (5K/6.25K/10K/12.5K/25K)
- ✓ Wide/Narrow bandwidth selection (25KHz/12.5KHz)

ML&S Prices:

KG 679E/2M..... £58.99
KG-679E/U 70cm
(400-470MHz).....£58.99

or with Voice Scrambler KG-689E/U ..£69.99

Supplied accessories:
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Intelligent Base Charger (110V-240V & 12V in input)
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Dualband Antenna
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Wouxun KG-699E/4M 4m FM Handie

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- ✓ English voice guide to under 5W RF
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- ✓ Dual display and standby modes
- ✓ 128 Memory Channels
- ✓ 8 Groups Scrambler
- ✓ Channel Name Edit Available
- ✓ High/Low Power can be changeable by Top Key
- ✓ VOX (Level Adjustable)
- ✓ DTMF Encoding and DTMF Decoding
- ✓ 105 Groups D.C.S/50 Groups CTCSS
- ✓ DCS/CTCSS of RX and TX can be set respectively
- ✓ Reverse FrequencyFunction
- ✓ Busy Channel Lockout
- ✓ Distant Alarm
- ✓ ANI (Caller ID)
- ✓ Multi Scan Mode (TO/CO/SE)
- ✓ Inspection, Monitor, Stun, Kill and Emergency Alarm
- ✓ All Calls, Group Calls and Selective Calls
- ✓ Calling Ring and Ring Overtime Auto Answer
- ✓ Multi Silent Mode (QT/QTADT/QTXDT)
- ✓ Channel Steps (5K/6.25K/10K/12.5K/25K)
- ✓ Wide/Narrow bandwidth Selection (25KHz/12.5KHz)

ML&S Price: £89.99

Supplied accessories:
1.3Ah Li-Ion Battery Pack (5W)
Intelligent Base Charger (110V-240V & 12V in input)
Belt-Clip
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Hand Strap
Handbook

Don't forget Wouxun have a complete range of Handies available for Commercial, Marine and Ham. Call for details.


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