RadCom

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

FEBRUARY 2011
VOLUME 87
NUMBER 02

£4.25

IOTA Contest

SV9MBH checks out his antenna before the contest

0211

SSB Field Day

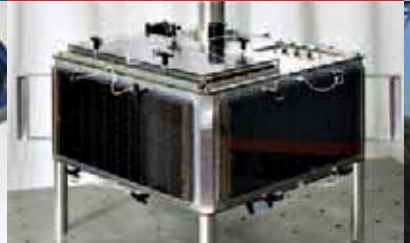
Those taking part enjoyed the 2010 event

RF Sniffer

A simple way of sampling transmitter RF

ARISsat-1

The things they throw out of spacecraft these days…



Light-beam DXing

GHz Bands strays into terahertz territory

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VAT- LAST CHANCE!

Buy Any Of Our Products - We Will Pay The VAT Increase
BUT from February 1st All prices increase by approx 2%

KENWOOD

Amazing TS-590S!

"equal to the best radios available, but at a fraction of the price"
says RadCom Review Jan. 2011.

Excellent dynamic range, dual 500Hz and 2.7kHz roofing filters, Built-in auto ATU, 32bit floating point DSP, Digital processing IF chain, USB connectivity, Large display with dual colour backlight screen. Received a superb review in RadCom.

Get £50 Heil Discount Voucher
With all TS-590s purchased before end of February.

160m - 6m with superb receiver inc. dual roofing filters, Auto ATU, 32 bit f/p DSP & USB PC connection. **£1489.95 D**

NEW TH-D72E *JUST ARRIVED!*

The very latest handheld from Kenwood is a dual bander with GPS, APRS and TNC capability. The TH-D72 has a built-in SiRF Star III GPS receiver and its antenna, so that you can enjoy various GPS functions with the radio stand-alone. You also can output its GPS data (NMEA-0183) to a PC through the USB port. You can even operate dual receive on the same band.

£419.95 D

TS-480 Transceiver *GREAT PRICES!*

TS-480SAT	HF-6m 100W with remote head & ATU	**£749 D**
TS-480HX	HF-6m with remote head and 200W!	**£849 D**

TS-2000 Series *GREAT PRICES!*

A great choice for everything in one box from HF-70cms!

TS-2000E	100W 6m/2m/70cm + DSP & ATU	**£1489 D**
TS-2000X	As Above + 23cm 10W	**£1749 D**

VHF Mobiles & Handhelds

TM-V71E	Dual band mobile with echo link	**£289.95 D**
TM-271E	2m FM with mighty 60W output	**£165.95 D**
TM-D710E	Dual band mobile 50W with APRS	**£429.95 D**
TH-F7E	2m/70cm 5W SMA +FREE Clip Mic	**£229.95 D**
TH-K2E	2m 5W 4-Key Keypad SMA + FREE Headset	**£159.95 D**
TH-K2ET	2m 5W 16-Key Keypad SMA + FREE Headset	**£165.95 D**
TH-K4E	70cm 5W SMA + FREE Headset	**£159.95 D**

ICOM

Thinking of buying an Icom Radio?
Then why not trade in that old "boat anchor" radio! We even take dead ones. Call us today and reduce your cost!

IC-7600 HF-6m 100W

Take a closer look!
This HF-6m transceiver is the successor to the IC-756 series. It takes features from the flagship IC-7800 and the more recent IC-7700, putting them into a package that brings the price within reach of many more hams. The central display is pure joy with its easy to read & informative screen.

+ FREE USB keyboard! **£3195 D**

IC-7800	Deluxe HF / 50MHz All-Mode 200W Transceiver	**£8699 D**
IC-7700	1.8-54MHz 200W with built-in PSK-31 + keyboard	**£5999 D**
IC-7000	160m-70cm 100W (hf) Mobile, portable or base station	**£1149 D**
IC-718	160m-10m 100W transceiver that brings HF to those on a budget	**£574 D**

IC-7200 HF-6m 100W

The IC-7200is a robust transceiver with some nice touches for the price. You get a 6kHz roofing filter and a receiver that goes from 30kHz - 60MHz! You even get DSP digital filtering! If you are looking for a great deal, this should be on your list. We love it.

£799.95 D

IC-T70E 2m/70cm NEW

The IC-T70E VHF/UHF dualband transceiver is great value. It has many impressive features including 700mW loud audio, long-lasting power, rugged construction, and plenty of memory channels.

£159.95 D

IC-E80D 2m/70cm NEW

- *2m/70cm Handheld*
- *D-Star +D-Star Repeat Mode*
- *Extensive GPS Compatability*
- *CTCSS & DTCS + Airband Receive*
- *1000+ Memories*
- *FREE software on Icom site*

£314.95 D

VHF Mobiles & Handhelds

IC-V80E	2m 5W Handheld	**£99.95 D**
IC-E90	Triple band 6m/2m/70cm handheld	**£234.95 D**
IC-E92D	Dualband 2m/70cm handheld fitted D-Star	**£369.95 D**
IC-E2820	Dual band 2m/70cm 50/50W mobile	**£474.96 D**
IC-E2820+	Dual band mobile fitted with D-Star	**£689.95 D**
IC-910H	Dual band 2m/70cm base station 12V	**£1249.95 D**
IC-910HX	Triple band base station 2m/70/23cm 12V	**£1499.95 D**

ID-E880 NEW

- *2m/70cm 50W Mobile*
- *D-Star +D-Star Repeat Mode*
- *Extensive GPS Compatability*
- *CTCSS & DTCS + Airband Receive*
- *1000+ Memories*
- *Detachable Head*

£429.95 D

QUANSHENG *FROM CHINA*

TG-UV2 2m/70cm Dual Bander

The TG-UV2 is a dual band 2m/70cm handheld. It covers 136.00 - 173.995 - 400 - 469.995MHz and FM broadcast 88-108MHz. The radio includes 7.2v 2Ah Li-ion battery for extended life. You also get a built-in LED torch and the option to program you radio from PC based software.

- *3 Power Levels: 5W / 2.5W / 1W*
- *Steps: 5, 6.25, 10, 12.5, 20, 25, 30, 50 & 100kHz*
- *CTCSS, DCS & 1750Hz Tone*
- *Dual Watch*
- *200 Memories Alpha Numeric*
- *2 Deviation Levels*
- *2 Bandwidths*
- *CTCSS & DCS Scan*
- *Built-In LED Torch*
- *Backlit Screen*
- *PTT or VOX*

Accessories

Car Charger	£9.95
Case	£9.95
Program Cable	£19.95

NEW

Amazing Dual Band Value!

£79.95 D

HB-1A Mk III 5W Transceiver NEW

Completely self-contained CW transceiver with LCD digital readout and great performance - Look at the Price!

£199.95 D

Provisional Specification:

	40 & 20m or 40 & 40m (2 models) Full band coverage
Tx: CW	**Rx:** SSB CW & AM
Filters	Crystal for CW and SSB
Keyer	Built-in
Power Out	3W dry cells 5W 13.8v
Memories	20 Channels
Volts	9 - 14V
Current	Tx 950mA max on Rx 55mA
Internal	8 x AA cells
External	13.8v
Tuning Steps	100kHz - 10Hz
Size	140 x 95 x 35 (mm)
Ready Built	

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

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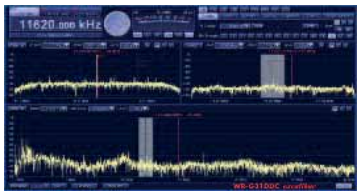
WiNRADiO WR-G31DDC "Excalibur"
Receiver 9kHz - 49.995MHz



"It out-performed my 100dB HP Spectrum Analyser"

Meet the new industry standard receiver for serious HF work. Just plug into your PC USB port for a new experience in sensitivity and dynamic range. No hardware design can match the way that signals are extracted, demodulated and both visually and audibly reproduced. Serious DXer or casual operator, you will be amazed.

£649.95 D

Tokyo Hy-Power
HF Linear Amplifiers

HL-1.5KFX

160 - 6m
1kW Out
Auto ATU
Solid State

This is brand new and completely self contained with AC PSU. Approximate Size: 272 x 142 x 363 mm **£3559.95 D**

HL-2.5KFX

160 - 6m
1.8kW Out
Auto ATU
Solid State

Brand new and completely self contained with AC PSU. Approximate Size: 325 x 145 x 405mm **£6459.95 D**

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.

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MFJ-998 AUTO TUNER

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

W&S **£649.95 C**

MFJ-929 AUTO TUNER

1.8-30MHz 200W, LCD readout, 20,000 memories, long wire & coax, radio interface. A great Auto ATU that needs just a single coax feed and 12V DC. Press the PTT and you are tuned! W&S **£209.95 C**

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-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-1625	Window Ant + Tuner	£199.95 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-442	Slim electronic keyer	£199.95 C
MFJ-461	Pocket morse reader	£99.95 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 D

West Mountain Radio

RB/PP USB Interface

The USB Data Jack Plug & Play is the simplest RIG-blaster. Allows operation on all bands & modes while supporting proper mic operation. Adaptors are required for most radios priced £10.95. **£119.95 C**

RB/PL RigBlaster Plus

Modes: CW, RTTY, AMTOR, PACKET, PSK31, STREAM/HELL
* Serial or USB output
* CD -ROM with software
* Supply 10-16V DC
* Size 135 x75 x 34mm

Included: CD-ROM, USB cable, RJ-45 to 8-pin mic. cable, 2 x audio leads 1.5m long with 3.5mm stereo plugs, 12V DC Power lead plus instruction booklet. **£159.95 C**

Info: www.westmountainradio.com

Tigertronics

SignaLink USB

From £89.95

* FCC Class B Certified
* Built-in Low-noise Sound Card
* Simple Installation and Setup
* Complete Radio Isolation
* USB Port Powered
* Works with virtually ALL Radios
* Uses Mic, Data, or Accy Port
* Supports virtually All Soundcards
* Digital and Voice Modes

SL-USB-13PDI	13 pin DIN for Icom	£94.95 C
SL-USB-13PDK	13 pin DIN for Kenwood	£94.95 C
SL-USB-5PD	5 pin DIN cable	£89.95 C
SL-USB-6PMD	16 pin mini DIN	£89.95 C
SL-USB-8PD	8 pin DIN cable	£89.95 C
SL-USB-8R	8 pin round mic cable	£89.95 C
SL-USB-NC	Unterminated radio cable	£89.95 C
SL-USB-RJ-11	Terminated RJ11 cable	£89.95 C
SL-USB-RJ-45	Terminated RJ-45 cable	£89.95 C

SP-170F Mobile Speaker with Filter

WATSON

Mobile communications extension speaker with filter
* *8 Ohms*
* *Power rating 1.5W*
* *Variable volume control*
* *Switchable filter*
* *3m of lead*
* *3.5mm mono jack plug*
* *Adjustable mobile mount*
* *Size 97 x 67 x 27mm*
* *Weight 189g*

£12.95 A

HEIL SOUND
Bob Heil's Pro-Set-6

NEW

The new Pro-Set-6 headset offers a complete new way of operation with its comfortable headset and adjustable boom mic. giving hands-free operation. But why the Pro-Set 6?

Many of todays modern radios now have EQ (equalisation) controls which allows you to finely tune the mic. preamplifier audio response to match your voice and your method of working. Bob Heil recognises this and has designed a wide response mic. insert that gives you the freedom twiddle those knobs in your transceiver and adjust the response to suit your needs.

Pro-Set-6 £139.95 C
AD-1 Rig adaptor leads £18.95 C

Yaesu
HF Linear Amplifier

Yaesu QUADRA Bargain!

1kW Solid State

This amplifier is in immaculate condition, and boxed. It has had very little use and comes just as it would from the factory. If you are looking for a solid state linear that gives 1kW with ease and quietly, this may be what you want. **SAVE £900** on new price!
ONE ONLY! **£3499 D**

Vibroplex
Morse Keys

UK Distributors

V-CM
A compact straight key with super movement.
£59.95 C

V-CW
High quality iambic key in the style of Vibroplex
£149.95 C

Watson
Cross Needle Meters

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**

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

WATERS & STANTON

Present

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YAESU
Choice of the World's top DX'ers

The Fabulous FT-DX5000

All prices subject to approx 2% Increase on 1st February

The FT-DX5000 Series HF/50 MHz 200 Watt Transceivers are a new Premium Class of Yaesu radios with 2 Independent Receivers plus many unique options and accessories designed to meet the Performance Requirements of even the most demanding serious Amateur Radio operator.

FT-DX5000	The basic 200W transceiver	**£4339.95 D**
FT-DX5000D	Adds SM-5000 SMP station Monitor	**£4795.95 D**
FT-DX5000MP	Adds above + 300Hz Roofing Filter	**£5295.95 D**

The most exciting radio this year. It embodies Yaesu's latest technology receiver performance and operating convenience very much at the forefront! This radio will carve a milestone in ham radio. Performance like this does not come cheap, but as an investment it is an absolute bargain. Available in three flavours, This new range embodies many features developed by Yaesu for their top range models - all with 200 Watts output! Features include:Internal PSU, Two independent receivers, Amazing 3rd order IP3, Sharp roofing filters, 32 bit floating point DSP, Variable Audio Filter, Separate IF out (9MHz), and a host of user friendly features and programmable functions.

Get £50 Heil Discount Gift Voucher
With any FT-5000 purchased before end of February

The FT-2000

This radio needs no introduction. Covering 160m to 6m, it is the favourite of contesters and DXpeditions. Available as 100 Watt or 200 Watt version.

"When I switch my FT-2000 on I never cease to be amazed at what this radio offers in terms of value for money. I love the filtes and the variable IF - it always seems to be able to pull the weakest of signals out of the noise. For me it is both my DX machine and chat box - you guessed it, I love it."

FT-2000	100W 160m - 6m	**£2299.95 D**
FT-2000D	200W with AC PSU	**£2899.95 D**

Special Offers!

Add **MD-200** Microphone for Half Price! Just **£105**

Add **SP-2000** Speaker for Half Price! Just **£75**

Get £50 Heil Discount Gift Voucher
With any FT-2000 purchased before end of February

The FT-450

Amazing value for a base station. You get 100 Watts with variable IF bandwidth and even a 10kHz roofing filter. **For an extra £80 we will include the ATU!**

FT-450 £619.95 D
FT-450AT £699.95 D

The FT-857D

FT-857D - Mobile transceiver or base station, this compact radio with detachable front panel. Up to 100 Watts output and coverage from 160m - 70cms, makes this a great buy. **£659.95 D**

The FT-950

The FT-950 is an advanced class base station transceiverinc 6m, 3 roofing filters and intennal ATU. **£1289.95 D**

The FT-897D

Very compact portable transceiver 100W radio from 160m - 70cms. You can even run it at 20W from optional internal batteries. DSP & memory electronic keyer inc. Ideal one-man expedition radio. **£759.95 D**

VHF-UHF Mobiles & Handhelds

Exclusive Mobile Offer! Get a free extension cable kit with some mobile models!

^ FT-1900E

^ FT-7900E

^ FT-8900R

FTM-350E	NEW LOW PRICE 2m/70cm Mobile + Bluetooth	**£469.95 D**
FTM-10SE	50/40W 2m/70cms stereo FM Mobile	**£299.95 D**
FT-1900E	NEW 2m Mobile 65W	**£129.95 D**
FT-2900E	NEW 2m Mobile 75W	**£139.95 D**
FT-7900E	NEW 2m/70cm Dualband Mobile 50/45W **+ FREE YSK-7800**	**£229.95 D**
FT-8800E	Dualband Mobile 50W / 30W	**£299.95 D**
FT-8900R	10/6/2m & 70cm Mobile **+ FREE YSK-8900**	**£359.95 D**
VX-3E	2m / 70cm Handheld Wideband receive **+ FREE Case**	**£149.95 D**
VX-7R	Waterproof dualband handy (silver / black) **+ FREE Case**	**£279.95 C**
VX-6E	2m/70cms handy, 5W Wideband Receive **+ FREE Case**	**£229.95 C**
FT-60E	2m/70cms, 5W handy Wideband Receive	**£169.95 C**

The VX-8 Handheld Series

VX-8DE Triple Band

The VX-8DE 5W Triple Bander offers Bluetooth Hands-Free Operation with GPS/APRS and Real RF-Dual Wideband Receive from 500kHz - 1GHz FM & AM. The next generation Amateur Handheld transceiver from Yaesu, who has been introducing Leading-Edge Transceiver Technology for years. Shower proof and shock proof. **£359.95 C**

VX-8GE Dual Band

You get all the (dual band) features of the standard VX-8DE plus:

- *Smart Beaconing ™ Function: beacon timing is automatically adjusted to your traveling speed & location.*
- *Station List memories increased from 40 to 50.*
- *APRS Message memories increased from 20 to 30.*
- *DIGI-PATH route indication function .*
- *Head up compass display to the GPS Screen*
- *The Message received LED flashing rate is selectable.*

£349.95 C

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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(individual & club)
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P&P on RSGB orders:
£1.95 for 1 item, £3.50 for 2 or more items. Different postage rates may be available online. Overseas rates on request.

SV9MBH climbing his tower for a pre-IOTA contest antenna inspection.

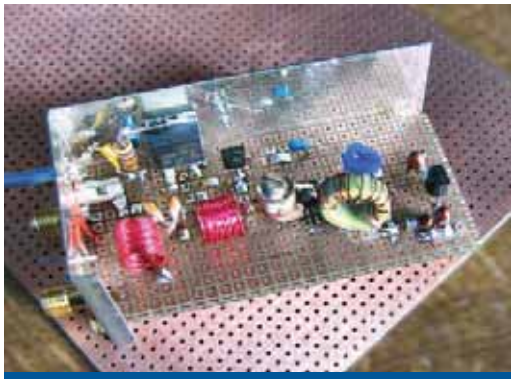
News and Reports

JUMA QRP kits – P54

Reviews

Features

Put your bandpass filters on standby – P19



A new kind of RF prototyping board – P24

Technical Features

HF mobile with variable aerials – P74

Regulars

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded in 1913 incorporated 1926.
Limited by guarantee
Member society of the
International Amateur Radio Union

Patron: HRH Prince Philip, Duke of Edinburgh, KG, KT

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

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Neil Whiteside, G4HUN - 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 without the leading zeros (see *RadCom* address label) as the password.

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

"Are we letting ourselves down?"

Happy New Year everyone, I know this is the February edition but as I sit here writing this leader it's the first week in January, the snow has just disappeared and we are all back from the Christmas holiday.

New Year is a strange phenomenon, we are still in the depth of winter, the weather is generally dull and dank and there is that anti climatic feeling following Christmas yet everyone tends to be positive in outlook and looking forward to the New Year ahead.

Some people own up to making New Years resolutions and some people don't but I would like to make a New Year's resolution on behalf of the whole of the UK radio amateur community. And that is 'Let's try and clean up our act in 2011'.

Over the last couple of years there has been a real push to improve operating standards, but this has generally fallen on deaf ears. Standards are still falling and the complaints still come tumbling in regarding contesters operating outside of the band, deliberate interference of DXpeditions, repeater abuse, profane language, general poor operating during QSOs. It's all in there. And who is responsible? We are! It's no good passing the buck, it's those in the hobby that have allowed the standards to drop. It's not the people coming into the hobby, it could be said that they know no different.

When the RSGB introduced the Foundation licence, part of the negotiations prior to the introduction of the licence was a relaxation of the old 'Greetings Message' format. Candidates under training can now go on the air under supervision every day if they want but how many have access or are encouraged to do so by their instructors or the clubs that are running the courses? Most newcomers entering the hobby take the QSO practical test while they are doing their Foundation course and that is it. Their next exposure to amateur radio operating is when they get their licence and go on the bands – and what a fine example we experienced operators set them. Just spend some time monitoring 40 and 80 metres and you see what I mean. Long rambling conversations, no callsigns given or in most cases abbreviated calls and every interpretation of the phonetic alphabet apart from the real one! Try breaking into a net… Sometimes the response is not what you would expect from mature 'adults' taking part in what is supposed to be a scientific hobby.

Why do people jam and abuse over repeaters? What do they gain? DXpeditions are costly to mount and those fellow radio amateurs that go off to far-flung countries and islands so that we can work towards our DXCC and IOTA awards do so voluntarily and without remuneration and in almost every case covering the cost of mounting the DXpedition, sometimes even risking their lives in doing so. Why do some of us want to cause disruption by jamming? It just doesn't make sense. It's all there on our bands, gutter language, poor operating, bad manners and WE are responsible for it.

What can we do about it? Well the first thing you can do is look at yourself. What is your operating like? Do you follow the procedures? I bet most of us would say we could do better and that's were it must start. Unfortunately, what we do on the bands and how we behave is open to public scrutiny and it is being noticed more and more.

It is spoiling the hobby and the reputation of amateur radio and the only people that can do anything about it is US. That's my New Year's resolution on behalf of us all. Please help me to keep it.

Peter Kirby, G0TWW
RSGB General Manager

Handbook Author Wanted

Mike Dennison, G3XDV, is coordinating the editing and production of a new edition of the Society's flagship publication, the *Radio Communication Handbook*. He is looking for one or more people who are able to revise and update the chapters on HF Receivers and HF Transmitters/Transceivers. A royalty fee is paid based on the size of the contribution and the number of books sold. If you are interested or need further information, contact Mike by e-mail to mike.dennison@ntlworld.com.

CONGRATULATIONS

To the following members whom our records show as having reached 50, 60 or 70 years' continuous membership of the RSGB.

70 years
Mr A Ellis, GW2HFR

60 years
Mr C N Wridgway, G3GGO
Mr J Allan, G3IJA
Mr J L Hall, G3TOK
Mr J D Nias, G3VRB

50 years
Mr A S Foster, GM3OXA
Mr D C Griffiths, G3RDQ
Mr A G Rumbold, G3ORX

Band Plan

At last November's Spectrum Forum meeting it was suggested that when we make the annual publication of the Band Plans in *RadCom*, I would say a few words on the thinking behind the way Region 1 does its band planning, and also emphasise the need to adhere to the then-new band plan for 40m.

First, let me outline the thinking that has been driving band planning since major changes were made in 2005. The change that was brought in by IARU Region 1 was to plan on the basis of 'necessary bandwidth'. This was subsequently copied by Region 2. Necessary Bandwidth is an ITU definition that broadly means that bandwidth needed by the mode of transmission – look in the notes page of the Band Plan for the precise definition! Thus, we have our bands segmented in 200Hz, 500Hz, 2.7kHz, etc, bandwidths. Additionally, we give broad designators as to the types of mode in these segments, eg telegraphy, digimodes, etc, and for the larger bandwidths we often say 'all modes'. That includes SSB, but not exclusively! The thinking was to allow more flexibility and frequency re-use as well as reduce the amount of re-planning, particularly for the HF bands, whenever a new mode is invented or modes change in popularity.

With this change of emphasis there was an intention to limit the gradual proliferation of spot frequencies for various special interest groups. This is particularly for the bands below 30MHz, where we only reference certain activities like QRP, Image and Digital Voice and then use the term 'Centre of Activity' (CoA) to denote roughly where they can be expected to be found. These CoAs don't imply a right to move whoever is using the frequency as the normal etiquette should be followed for starting to operate on a clear frequency, QSYing if necessary from the actual CoA. The only possible exception are the Emergency Communications CoAs – it is hoped that all amateurs will keep quite a wide area of the band clear around these CoAs during planned exercises and particularly when real emergencies exist; in many cases usage won't be just a single channel or to a single mode, but a number of separate channels using whatever mode is required, roughly centred on the CoA. Remember that these are in the 'all modes' parts of the bands and that www.iaru-r1.org would be a good place to see whether a 'real' emergency or regional exercise is ongoing.

Finally, I would like to underline the need for operators to respect and follow the 40m band plan that was introduced in 2009. This was a re-allocation of the whole of the band at a time when the broadcasters officially vacated 7,100 – 7,200kHz. Some countries have been slow in allocating this additional spectrum to their amateurs, and Regions 2 and 3 needed to time to consider re-harmonising their 40m band plan to that of ours. Much of this has now happened, so please make a special effort as part of your New Year resolutions to operate in accordance with the current plan. Make sure that you check the 40m band plan before you go on the band and try your best not to stray outside the limits for the mode in which you are operating.

John Gould, G3WKL
Board member - Spectrum

RSGB Archive

The RSGB is looking for a volunteer to help with the archive and library in the National Radio Centre at Bletchley Park. Ideally we are looking for a radio amateur with librarian and archival experience as well as an enthusiasm for the history of amateur radio. The archive consists of many photographs, letters, documents and books from some of the most interesting times within amateur radio. There are letters describing some of the early trans-Atlantic experiments, log books from well-known amateurs and documents relating to the confiscating of amateur radio stations at the outbreak of war.

If you are interesting in helping sort this information into a useful archive for researchers in the future, send an e-mail to Carlos Eavis, carlos.eavis@rsgb.org.uk.

23cm Band Plan Notice

In this edition of *RadCom* the band plan for 23cm continues for the moment with the notes that it is subject to re-planning. The aim of the exercise is to both resolve licensing and interference concerns as well as position ourselves for the future. Its scope is the entire band from 1240 to 1325MHz.

This process is under way and was discussed at the November 2010 Spectrum Forum meeting. A future *RadCom* edition will feature the result later in the year. There is though little doubt it will entail changes in advice, use, frequencies and equipment in what is a particularly sensitive allocation for Primary Users. RSGB-ETCC and special interest groups such as BATC, AMSAT-UK and UKμG are involved. Please contact the Society Microwave Manager, Murray Niman, G6JYB if you have any particular concerns or legacy usage that may not have yet been accounted for.

RSGB AGM 2011

The 2011 RSGB AGM will be held on 16 April at the Menzies Mickleover Court, Etwall Road, Mickleover, Derby DE3 0XX. Registration will take place at 11am and the official proceedings commence at 12 noon. A buffet lunch will be available at 1pm (tickets will be on sale nearer the date). The Open Forum runs from 2 to 4pm. The AGM Dinner will be held in the evening, again tickets will be on sale nearer the date.

The Menzies Mickleover Court is 6 miles from Derby rail station and the taxi ride from the station costs approximately £8. There is free parking at the hotel and the nearest motorway junctions are 24 or 28 of the M1. A special AGM rate has been negotiated of £69 for single or double occupancy for the Saturday night.

During the official proceedings, the National Club of the Year trophy, sponsored by Waters and Stanton, will be presented.

Other trophies such as the Norman Keith Adams prize, awarded for the most original article published in *RadCom* in 2010, as will the Courtney-Price Trophy, awarded for the most outstanding published technical contribution to amateur radio in 2010.

Just some of the awards and trophies that are presented at the RSGB AGM.

The winners of the 2009 National Club of the Year were Chelmsford ARS. Who will win the 2010 award?

QSL Matters

DESPATCHES. Writing this at the start of the New Year, home and overseas despatches were smaller than expected last month. Before the weather closed in we were able to send 10kg packages to Germany, Hungary and Poland. We were also pleased to get some 50,000 cards out to the UK, before couriers advised that they could not accept packages for many parts of the country, due demand, weather conditions and subsequent lack of depot storage space.

Last month we announced that throughout the coming year we will be advising users, both directly and through this column, how to follow the RSGB Yearbook rules more closely.

Not including an original *RadCom* label as proof of membership (affiliated clubs and GB calls exempt), cards not pre-sorted and failure to give to include QSL route information are three of the biggest causes of in-house delay. These issues ultimately and, somewhat unfairly to our way of thinking, affect all members, especially those who do follow the guidelines and who help to make our lives easier.

Unfortunately, gremlins crept in and the most significant part of the announcement got mangled, so here is part of it again: The correct size for a single page, standard postcard size QSL card is, 140 x 90mm and must printed on 130-230 gram board, not paper – have you checked yours lately?

Around 30% of all UK cards are now the wrong size and weight, compared to less than 10% from overseas. Recently, one bureau returned a number of cards to us sent by a UK station as too big and heavy to process, with a request to send no more. Obviously we are not alone in recognising this growing problem.

Perhaps with the start of a New Year, it's time for you (or your club) to re-look at your QSL card? With digital photography and online QSL print companies, it has never been easier to produce a stunning card, but please remember the size.

In general, if more cards were similar to the typical example shown on page 20 of the current 2011 Yearbook, we know that we could handle many more of them in a shorter time.

WALES, GW-MW-2W. Members will be pleased to know that the new GW-MW manager Lloyd Thomas, 2W0LLT is settling in well to his hugely expanded role, again receiving cards from us, having cleared the backlog built up during the changeover.

SCOTLAND, GM0 SERIES, GM0M-Z. Volunteer sub manager, Michael Whitehead, GM0PHW is stepping down, due to work commitments. The bureau is extremely grateful for his support and help. Existing manager, Fred Roe, GM0ALS has kindly agreed to consolidate all GM0 calls into a single sub group and it now becomes the GM0 Series, see website for details.

FINALLY… One very happy user, Steve, EA5FJF/G0JFM e-mailed to say that he has just received from us a QSL card from HI3TEJ for a QSO on 30 December 1991, almost 19 years to the day! Where has that one been? … Not here!

HF Manager

The RSGB is looking for an HF Manager. This voluntary positon would be ideal for an experienced HF operator with some knowledge of band planning. The position will involve keeping the RSGB Board advised on all international aspects of HF and to ensure that all HF matters within the Society are properly coordinated. The HF Manager will be expected to monitor technical and operational developments; to encourage the flow of design and operating information within the UK and also between the UK and other countries to assist in developing common licence conditions, operating standards and safety philosophies. Other duties will be to serve as a core member of the Society's Spectrum Forum and to produce an annual report for presentation to the Board.

If you are interested in the volunteer post, please write to Peter Kirby, G0TWW, RSGB General Manager by e-mail to GM.Dept@rsgb.org.uk.

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.

2OCBX	Mr MI Connors	M6AIS	Mr K Noakes	RS206719	Mr J Bethell
2E0CMM	Mr CW Moss	M6AUK	Mr TJ Taylor	RS207146	Mr D M Peck
F5IRO	Mr F Laigu	M6BAK	Mr C C Baker	RS207260	Mr A A Van Lieburg
F5VIG	Mr M Rolfe	M6BCE	Mr B C E Eddy		
G4IDY	Mr J Lamberton	M6BWA	Mrs V S K Archard	RS207275	Mr A J Park
GW4KDI	Mr B Stanton	M6DXD	Mr D Parkins	RS207276	Mrs S Park
I4KRF	Mr R Franco	M6JEP	Mr D L Jepson	RS207287	Mr T Ryder
JA1NLX	Mr A Yoshida	M6MCI	Mr S McIntosh	RS207292	Mr H R Spooner
K1AWB	Mr S C Laroe	M6TCB	Mr P Deluce	RS207378	Mr B Luc
K1FPV	Mr W R Bibeau	M6TCV	Mr T Curnow	RS207379	Mr F Michel
KI4PQY	Mr E F Pendley	M6XBX	Mr M J Wheeler	RS207380	Mr V Walter
LA4SGA	Mr R Saue	M6ZAW	Mr D J Packham	RS207395	Mr D Bugmann
M0NLP	Mr C Bowman	MM6VAB	Mr V Julius	RS207433	Mr J G T Jeffryes
M0UAT	Mr I L Marsh	N9WUB	Mr A Duff	VA3KS	Mr K Shepherd
M3IDW	Mr J M V Espin	RS191723	Mr J S Escrig	VE3OKK	Dr J Ouellette
M3XYP	Mr G P Thompson	RS204743	Mr M S D Granatt	VK5CX	Mr N Bluhm
M6AIJ	Mr R J Tarling			ZS6RHZ	R H Zuidema

The RSGB would like to welcome back the following Members who have rejoined the Society.

2E0DMQ	Mr K G Henney	GW4ZVQ	Mr S Evans	MW3VKM	Mr R W Morgan
G0IVO	Mr B R Singleton	K1MF	Mr E E Eckert Jr	RS199126	Mrs L Spencer
G0JCG	Mr A J Butler	M0BYA	Mr R W Swannell	RS199127	Miss L B Spencer
G0UJK	Mr C L Eloie	M0DSO	Mr R De Ieso	RS199128	Mr A J Spencer
G4LFU	Mr A W Bircher	M0OFL	Mr D Gunn	RS199129	Miss K R Spencer
G7JWD	Mr T F Place	M6CIG	Mr E Black	RS93668	Mr R D Poole
G7LGS	Mr N M Green	MD1CLV	Mr D Ankers		
GM1USN	Mr J O Challis	MM0ZRN	Mr J Milbourn		

NEW

RSGB shop

Inside Enigma

from £12.74

The Secrets of the Enigma Machine and other Historic Cipher Machines

By Professor Tom Perera, W1TP

The breaking of the Enigma Codes in WWII was one of the defining actions of the whole war. Many books have been written about this as one of the best kept secrets of WWII. Few have looked right inside the Enigma cipher machine itself, but Inside Enigma does just that.

Inside Enigma brings to life how the Enigma machines were used, how the messages were encoded and why the Enigma code was virtually unbreakable. With more than 500 pictures this book explains exactly how these machines were constructed and worked.

Written by Enigma expert Professor Tom Perera, W1TP, *Inside Enigma* provides a history of these fascinating machines from their predecessors through to the cipher machines of the Cold War. The wartime Enigmas used by the German Army and Navy are covered in much depth, as is, the development of coding machines, into the post-war variants such as the Swiss NEMA, Russian Fialka and American M-209. Readers will even find a guide to finding and buying their own Enigma machine and, if that fails, instructions to build their own modern day version. Inside Enigma includes translations of original Enigma operating instructions and much more.

Inside Enigma is a comprehensive and copiously illustrated handbook covering the secrets of the Enigma Machine and the theory and practice of cipher machines in the 20th century.

Size 202x254 mm, 208 pages, ISBN 9781-9050-8664-1

Non Members' Price £14.99
RSGB Members' Price £12.74

The Spies Who Lost the Battle of Britain DVD

from £9.99

A groundbreaking new 60 minute documentary

This brand new DVD explains the story of how on the brink of the Second World War a top-secret invention joined Britain's frontline. *Chain Home* was the radar network that gave the RAF its vital early warning and enabled Air Chief Marshal Dowding and Air Vice Marshal Park to put their fighters exactly where they needed to be. In just four frantic years Watson Watt's brilliant team of boffins had designed and built *Chain Home,* the radar system that was to play such a decisive role in the victory of 1940.

The rapid construction of the huge *Chain Home* radar towers had not escaped the attention of the Germans. On 3rd August 1939 the Graf Zeppelin crossed the North Sea on a daring spy mission. The Luftwaffe's top wireless experts scoured the airwaves from Essex to Scapa Flow looking for evidence of British radar. From the moment the Graf appeared on British radar screens the Fighter Command feared its greatest secret was lost. When war was declared just four weeks later the radar stations braced themselves for a knockout blow - but it never came.

Why the Germans failed to destroy Chain Home before the Battle of Britain has been an enduring mystery. This DVD explains through reconstructions, exclusive interviews and expert analysis how the Zeppelin spies came to make the greatest intelligence blunder of the war.

DVD: Format 16:9, PAL Colour & B/W, 63 minutes, DVD Region 0

Non Members' Price £12.99
RSGB Members' Price £9.99

POST & PACKAGING FREE
See page 80 for full details

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Tel: 01234 832 700 Fax: 01234 831 496
E&OE **All prices shown plus p&p**

Radio Society of Great Britain
www.rsgbshop.org

NEWS IN BRIEF

• The Geoparks Communication Weekend will take place on the weekend 28/29 May. The English Riviera Geopark callsign will remain as GB6GEO. All those wishing to take part in the event with the special Geoparks callsigns should please contact Martin, G3VOF by e-mail to martin@riviera.fm.

Wartime Amateur Listeners

The reunion of the Radio Security Service ex-members on Sunday 17 April in the Mansion at Bletchley Park will include an illustrated lecture on how radio amateurs helped to win the war. More than a thousand amateur radio volunteers listened on the short wave bands, in secret in their own homes, for illicit signals in the UK. What they uncovered were the transmitters of the German Secret Service operating all over Europe and beyond. Besides penetrating the most secret aspects of the service they also learnt about spies sent here. Some of them were 'turned' to work for us under the supervision of radio amateurs, notably Ronnie Reed, G2RX.

More can be found at http://secretlisteners.org/. More information about the reunion can be obtained by e-mail from Bob King, mail@bob2king.plus.com.

Exam Success for South Cheshire ARS

In December, four members of the South Cheshire Amateur Radio Society took and passed their Intermediate exam after working very hard. The club would like to thank Dave, G8DHQ and Geoff, G3XHP for their training. Thanks also go to Dave, M0OBW (RGSB President) for organising a revision day that was unanimously agreed to have been extremely helpful. The successful members have now obtained their new callsigns and are shown in the picture from left to right as follows: Pete, 2E0NPP, Christian, 2E0HST, Shaun 2E0IRT, Chris 2E0ZHG. They are now looking forward, with others, to taking the Advanced licence in 2011.

Silent Key Sale Helps Charities

The recent sale of amateur radio equipment from the estate of the late Mr V C Whitchurch, G4HSA raised monies that his family donated to the RCF and Children in Need. Mr Whitchurch, who lived in Radstock, had spent a great deal of his life working in Germany. He was very active on the bands until the end of his life and was a keen QRPer.

80th Year Award

As part of the Midland Amateur Radio Society's 80th anniversary celebration, an award is being issued to amateurs who work/hear a certain number of MARS members during 2011. All MARS members are asked to participate. When in a QSO just mention the award and tell people that if they gain 20 points, they can part with £5 and will be issued a certificate to grace the wall in their shack.

Amateurs and listeners gain 1 point for every member of MARS worked / heard (for SWLs, both station callsigns are needed). 5 points are available for working / hearing the club callsign (GX1MAR, GX3MAR or M5M). The full 20 points is available for working GB8OTH.

Send a log extract, with payment, to MARS Award Manager whose details are correct on QRZ.COM under GX3MAR.

Crystal Palace Foundation Success

Crystal Palace Radio & Electronics Club's first Foundation course has finished with all four candidates passing their examinations. It was a very rewarding result for all involved and the candidates are looking forward to getting their callsigns.

The photo shows, from left to right, candidates Peter and Wayne, Instructor and Club Chairman Bob, G3OOU and candidates Cliff and Rufus.

Icom IC-7410 expected Spring 2011

The IC-7410, the much awaited replacement for the IC-7400, is due in the UK sometime this Spring. An HF and 6m rig with standard 15kHz first IF filter and optional 6kHz/3kHz first IF filters, the radio is aimed as a mid range rig for amateurs who are looking to enjoy the HF bands.

Full details can be found on Icom UK's website at www.icomuk.co.uk/categoryRender.asp?categoryID=3508&cCID=17134.

MKU PA 101 HLK

This new 10GHz power amplifier uses PHEMT technology and provides high linearity and high efficiency. Since the amplifier is thermally very stable and highly linear, it can be used for all operating modes. The amplifier features a detector output (DC voltage) for monitoring of the forward output power.

More information is available on the Kuhne Electronic website www.db6nt.com.

Foundation Success

Cockenzie & Port Seton ARC were pleased with the success on the recent Foundation course. Shown here, from left to right, are Gary, MM0FZV invigilator, Dr David Bushby, Paul Rice, Michael Flynn, Bob, GM4UYZ instructor, Aaron Dobie (11 years old), Colwyn Jones, Scott Ramsay, Ron Kiss and Cambell, MM0DXC lead invigilator.

Is this a UK record?

During a visit to the Rainham Radio Rally in 2007, Louise Flynn (together with her father M0OZH and mother M3ZIZ) visited the RSGB book stand and was inspired to join the hobby by a piece of 'RSGB rock'. After this she never looked back.

Louise, who is only eight years old, continued her energetic activity in gaining her Brownie Communication badge at the special event station GB1CR to celebrate Charles Rolls' epic flight across the English Channel and then went on to pass her Foundation Licence. She is now M6LYL.

At the recent Dover Club's Christmas dinner, the big question was raised is Louise, age 8, (DOB 5 June 2002) is the UK's youngest radio amateur?

GB2RAF Back On Air

It has now been confirmed that GB2RAF will again be back on the air as from Saturday 9 April from the Air Defence Radar Museum, RAF Neatishead, Norfolk. Due to a Health and Safety fire issue, the Museum had to close down in September 2010 and consequently the permanent special event station GB2RAF has been unable to go on the air since then.

GB2RAF will be back on the air every second Saturday of the month from 10am to 4pm primarily on 80m SSB around 3.710MHz. For further information contact Terry, G4PSH QTHR (correct on qrz.com) or via GB2RAF (details correct on qrz.com).

Special Event Station

Mr W H Bradshaw DSM, ISM, G4SKS was born on 1 February 1920 and died on 11 February 2006. He was an RN Leading Telegraphist in the War before joining GCHQ, where he stayed until retirement. On his death, his son G4DTD obtained the callsign G4SKS to hold with his own. Since 2007, G4DTD has operated as G4SKS from 1 February until 11 February each year in memory of his father. This 'special event' station will be on the air again in 2011, operating CW on the 20m band during the day and the 40m band in the hours of darkness. All QSOs will be sent a QSL card.

Isle of Skye DXpedition

Amateurs from the Dudley and District ARS will be active as MS0RSD, from the Isle of Skye (EU-008) in June. The team consists of Simon, M0VKY, Brian, G0JKY, Drew, G7DMO and Graham, 2E0VPT. They plan to be QRV on HF from 5 June until late on the 10th on the 80, 40, 30, 20, 17, 15, 12 and 10m bands using SSB and PSK31. They also plan to be QRV on 2m SSB on the Tuesday afternoon for the UKAC 2m contest. Antennas will be a 3-element beam for 20/15/10 and various dipoles and verticals for other bands. A 9-elememt Tonna is planned for 2m use. QSL will be either direct to M0VKY or via the bureau to M0RSD. On their return, EQSL cards will be available. More info at http://dadarsdxpedisleofskye.webs.com/.

More iPhone Apps

Ham Dashboard is designed to be useful to radio amateurs whilst on the move or away from home. It shows a searchable list of nearby repeaters in the UK and Ireland, along with details of input and output frequencies, a map and a handy bearing arrow for each repeater. It also includes a basic APRS tracker that allows your position to be sent to the APRS-IS network. It's at http://itunes.apple.com/gb/app/ham-dashboard/id397752661?mt=8#.

Ham Tracker allows amateurs on the move to send location updates to APRS-IS (the Internet side of APRS) from their mobile device. Once sent, your position can be tracked using services such as aprs.fi. Don't worry though, you're in control of your privacy and can turn off the sending of position reports at any time. Get it at http://itunes.apple.com/gb/app/ham-tracker/id406552499?mt=8. More details can also be found at www.kramstuff.com.

NEWS IN BRIEF

• The first Douglas Byrne Marconi Lecture, to be delivered by Professor Peter Scott (University of Reading), will be held at the Museum of the History of Science, Broad Street, Oxford, on Tuesday 1 March at 5.30 to 6.30pm. The subject of the lecture will be, 'The sources of competitive advantage and innovation in the interwar British radio industry'. Entrance is free to the lecture and the reception following in the Bodleian Library. For further information, e-mail bookcentre@bodleian.ox.ac.uk. The Fellowship was established to recognise the contribution made by Douglas Byrne, G3KPO to radio history as the Founder of the Wireless Museum on the Isle of Wight.

Farnborough's Cadet Success

Farnborough and District Radio Society, working together with 1075 (Camberley) Sqn Air Training Corps, ran a Foundation course for 12 Cadets. The lead instructor was Julian, M0XPJ, invigilator Colin, G8BCO, with significant support from the Farnborough club members. Of the 12 Cadets and one civilian instructor from the ATC, ten obtained very high pass marks.

In December, 3 Cadets joined 7 other candidates taking the Intermediate exam. All passed, achieving some of the highest marks to date.

Planning for 2011 courses is well under way, with four candidates looking to take their Foundation exam in January and some 20+ Air Cadets keen to follow the first group early in the year.

The Amateur Radio Foundation course is recognised by the Air Training Corps as an official module in their detailed Communicator Badge training. 1075 Squadron (Camberley) is using the Foundation exam as a means of demonstrating operational proficiency and technical competence. They have a comms and radio room at their HQ with HF capability, so look out for them in competitions. F&DRS see this association as a means of generating future active local amateurs.

Foundation photograph: Rear left Julian, M0XPJ lead instructor, rear right civilian ATC instructor Dave. Front row Rex, M6REX assistant instructor, Colin, G8BCO invigilator, Kevin, G7BCS instructor and John, G3KND instructor.

Intermediate exam photograph. Rear left civilian ATC instructor Dave. Rear three to the right, John, G3KND invigilator, Colin, G8BCO lead instructor and rear right Kevin, G7BCS.

Railways on the Air

At the recent Railways on the Air event, the Tooth Radio Group again operated a station at the Hollycombe Steam Collection in Hampshire. Using a Windom antenna into a FT-1000MP transceiver they managed to make contacts throughout the UK and Europe as well as contacts with many other railways, mainly on the 40 and 80m bands that were particularly open over this weekend. Pictured are Dave, G1MAL and Amanda Fox, a Hollycombe volunteer, in front of the narrow gauge locomotive *Jerry M* that started its life working in the slate mines in the Snowdonia area of North Wales.

Six Metre News

The United Kingdom Six Metre Group (UKSMG) has launched an initiative initially to UK radio clubs and societies, to keep them informed regarding operating on 50MHz. A bi-monthly newsletter will be e-mailed to club secretaries who have registered to receive it, containing a wide variety of information including practical operating tips specifically targeted at the large number of operators who have not previously experienced the enhanced F2 propagation expected during the sun spot cycle peak in 2012.

Any club secretaries who have not already registered to receive the newsletter can do so at www.uksmg.org/phplist/.

NEWS IN BRIEF

• The 2011 International Museums Weekend special event will once again be a double-weekend and will take place on 18 and 19 June plus 25 and 26 June. Radio amateurs are encouraged to participate in this event by setting up stations in their local museums. Harry, M1BYT, who is organising the event, asks that all those intending to take part should register their museum via e-mail to harry.m1byt@tiscali.co.uk. Full details of the event can be found on the International Museums Weekend website at www.ukradioamateur.co.uk/imw.

Who is this?

The photo shows the membership of the Rhondda Wireless Enthusiasts' Society, taken back in 1923. It belonged to club member Isaac Jenkins of Ton-Pentre, Rhondda, who died around 1965, aged 75 years. He used to build his own wireless sets in about 1929, to which he invited his neighbours to listen. It is thought that the man sitting just above the word 'RHONDDA' is Georgie Morton of Gelli, Rhondda.

The club would be interested to discover more about this photograph – the occasion and the people in it. If you have any idea, please contact John Howells, GW4BUZ by e-mail to bronllys.vicarage@virgin.net.

Plymouth Exam Success

Plymouth Training Team held a Foundation examination in November that resulted in passes for all seven candidates who had attended the training course. This was the 15th Foundation course for Plymouth Training Team, making a total of 97 students. There is already a waiting list for the next Foundation course but first the seven successful candidates now want an Intermediate course and examination.

In the photograph, proudly showing their Plymouth Training Team Certificates are, in the back row, Bob, G7NHB lead instructor, Barry Eddy, Ray Reilly, Scott, M6OZI, Peter, M6CPW and Colmcille Murphy. Seated in the front row are Ian Duffie, Chris, M5CJW lead instructor and Liz, M6AKN.

NEWS IN BRIEF

• The Romanian Amateur Radio Federation, ARDF Section, is inviting ARDF teams, individual competitors and visitors from IARU Region 1 as well as guests from all over the world to the 18th IARU Region 1 ARDF Championships to be held in Romania from 5 to 10 September. More information from ardf.ro@gmail.com.

• The usual date of International Marconi Day 2011 would have fallen on the Easter weekend so the organisers have changed the date to Saturday 30 April.

Long Distance Training

The Wakefield & District Radio Society recently completed the training of Nicholas Bates who had visited from the North East of England as he had not been able to find a suitable Foundation licence course in his local area. He had been searching for a course for several months and had set his own target of gaining a callsign before the New Year.

Because of his lack of success in his home area, he made enquiries and was directed to Ken, 2E0SSQ – a fellow HGV driver. Ken is the Society's Chairman and, naturally, he arranged for Nicholas to be trained, some four short weeks before Christmas. The training was largely conducted by Bill, 2E0IPC with assistance from other in-house instructors in only four evenings – quite a task, considering all the practical sessions had to be incorporated in that period!

Towards the end of his training, Nicholas asked if it would be possible to take the exam just before he returned home for the Christmas period. As this request was made less than two weeks before Christmas, the club had to pull out all the stops. David, G4CLI contacted Julie Venison at RSGB HQ and she managed to process the exam request on receipt and got the exam script out the same day. The club was specially opened on Thursday, 23 December so that Nick was able to sit the exam. He passed with a score of 23 out of 25 and is now looking forward to getting on the air.

The Chairman and Training Team of the Wakefield & District Radio Society and Nicholas himself wish to express their sincere thanks to Julie and her colleagues who were instrumental in bringing Nick's dream to fruition.

RSGB shop

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Most Secret - Orford Ness

from £11.24

By Paddy Heazell

Orford Ness was so secret a place that most people have never even heard of it. Yet this remote stretch of the Suffolk coast has seen the development of Radar, testing of atom bombs, Secret US projects and much more in its eighty year history.

This book details how Orford Ness developed from its WW1 origins testing and developing all manner of aerial weaponry through to highly secret radar projects of the cold war. In between, Watson Watt and his team worked in the 1930s developing the highly secret radar systems that were to prove so crucial in WW2. All manner of ordinance was tested at Orford Ness from hand held WW1 bombs to Barnes Wallis WW2 bouncing bombs, all manner of rockets and missiles and even Cold War Atom bombs (without fissile material). The top-secret UK-US COBRA MIST project was built at Orford Ness with its antenna that alone covered a massive 132 acres. Always at the forefront of military technology from 1913 to the 1990s, Orford Ness was involved in much else as well and readers will find it all detailed here.

This extraordinary book details the story of Orford Ness and the work conducted here by some of the greatest 'boffins' of past generations. The role Orford Ness played in inventing and testing was crucial over the course of the twentieth century and this book published in conjunction with the National Trust recounts the history of one of Britain's truly historic sites.

Size 156x254mm, 288 pages, ISBN 9780-7524-5741-3

Non Members' Price £14.99

RSGB Members' Price £11.24

SAVE 25% OFF RRP

Images Across Space

from £14.99

The Electronic Imaging of Baird Television

By Dr. Douglas Brown

Written Dr. Douglas Brown a leading authority on TV *Images Across Space* provides a unique and fascinating insight into the pioneers of television and in particular to Scottish inventor John Logie Baird. From the initial concept of television though to the patent for 3D TV that far surpasses that offered to modern consumers, this book gives a fascinating insight into the man and his developments.

Lavishly illustrated, *Images Across Space* not only provides the background to the development of TV but the story of the Baird Television Ltd. up to its demise and its continuation as Cinema Television Ltd. There are many previously unpublished photographs that illustrate the level of sophistication practiced by the Baird Television Ltd. and revealing photographs of the Baird cathode-ray tube facility, laboratories in the Crystal Palace and Rotunda outbuilding, equipment installed at Alexandra Palace. The book reveals the implications of the devastating fire that spectacularly razed the Crystal Palace to the ground in 1936, taking with it the Baird facilities and an analysis of the television systems on trial for the BBC at Alexandra Palace. Readers will find this book a mine of fascinating material with even a comprehensive listing of the British patents of Baird and his associates at Baird/Cinema Television.

John Logie Baird is remembered as the inventor of the first working system of television but *Images Across Space* shows that there was much more to the story. *Images Across Space* is a rare book of technical detail and an extraordinary story - thoroughly recommended reading.

Size 176x250mm, 192 pages, ISBN 9781-8742-8921-0

Non Members' Price £19.99

RSGB Members' Price £14.99

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Scouting Success at Warrington Amateur Radio Club (WARC)

Warrington Amateur Radio Club was delighted to assist four Scouts from the local community in achieving both their amateur radio Foundation licences and Scouting Communications badge. The lads, with their leader Pete Houghton, can be seen being presented with their Foundation pass certificates. Back row is Paul, G7ODJ Secretary, Alan, G8WQE Chairman, Pete Houghton, Mike, G4VSS President. Front row is Albert, G3ZHE lead instructor, Thomas, M6TLP (1st Appleton Scouts), Chris Quinn, Liam Hancock, Stephen Carr (28th Warrington Scouts), Carmel, M3CFI instructor. Warrington Amateur Radio Club is delighted to welcome young people from other organisations within the community to their introductory amateur radio Foundation licence courses. The Club meets at the Grappenhall Community Centre at 7.30pm every Tuesday evening and welcomes any interested visitors.

New UK Antenna Manufacturer

Vortex Antenna Systems is owned and run by IOTA enthusiast Steve Lawman, G0UIH/VK2IAY/3D2FI. Initially the line up will include the 'Tornado' range of HF Yagis and the 'Whirlwind' range of HF Delta Loops with mono and multi-band variants. The mainstay is a heavy duty range, but certain products are also available as a lightweight alternative. All antennas and accessories can be ordered directly online at www.vortexantennas.co.uk. Alternatively, Steve can be contacted at the workshop on 07943 871 893 or by e-mail to enquiries@vortexantennas.co.uk.

Vortex Whirlwind 3-element lightweight 6m antenna.

Radio Signals aid Healing The Wounds

Radio signals from Swiss Valley have been transmitted all over the world, from Wales to Canada and various states around the US when members of Llanelli Amateur Radio Society took part in a 24 hour special event in October to raise some much-needed funds for the Golden Grove Mansion Appeal – Healing The Wounds. The appeal has been launched to raise funds to develop the Golden Grove Mansion near Llandeilo into a convalescent home; the first of its type in Wales dedicated specifically for both our wounded Armed Forces personnel and veterans.

The small team of radio amateurs from the club, which included a few ex-service men, managed to make contact with 378 different radio amateurs from around the world. They included contacts from 44 different DXCCs and 12 IOTAs. Many QSOs were made with various countries around Europe, however some of the more exotic places contacted were South Africa, Argentina, Brazil and even a few into Australia. During the 24 hour event, various members of the group took it in turns to use GB1HTW using the three radio stations that had been set up in the club HQ. The equipment included a Yaesu FT-920, a Yaesu FT-897D and an Icom IC-7400. The antenna setup included a Hustler 5-BTV, a Cushcraft R-6000 and a homemade inverted-L wire antenna for 80 & 40m made by members of the club.

Special thanks to the committee running Swiss Valley Community Centre for allowing the club to use the hall at the HQ for the 24 hour event free of charge. A big thank you must also go to all involved in helping out with operating the stations and raising funds for the charity. The final amount that has been raised to date for the appeal is £668.

More details of the Golden Grove Mansion - Healing The Wounds appeal can be found at www.goldengroveappeal.com.

New M6 Members

Chorley & District Amateur Radio Society has four new M6 members, having run Foundation courses in November and December. The four new radio amateurs are Jack, M6OWA, Graeme, M6AJY, Ken, M6DLT and Brian, M6MIV. This makes a total of 14 Foundation licences passed in 2010, three of whom are school pupils. The youngest one, who passed in April is Alex, M6CDA who is 8 years old. At the club, they are very proud of them all.

Chorley & District Amateur Radio Society meet on Wednesday evenings at 7pm, at the Tatton Community Centre in Chorley, Lancashire.

Marine Products

Two of the well-known names in amateur radio also have a large presence in the world of marine radio. Icom UK and Yaesu (trading under their Standard Horizon brand name) both had stands at the recent London Boat Show. On Friday 7 January, Icom UK launched the IC-M23 buoyant 5W VHF marine handheld transceiver. An important safety feature of the radio is that it has a bright internal red LED incorporated at the bottom of the radio that automatically starts flashing when the radio detects contact with water.

Icom UK are continuing its promotion of the RNLI Ambassador Scheme and will be working to promote the RNLI's membership through selected marine radio communication products.

Sheffield Amateur Radio Club Honours Former Chairman

18 October was a date to remember for Sheffield Amateur Radio Club members as it was the first Club Awards and Trophies Presentation Evening. This well attended event saw the new G4EJL Memorial Plaque awarded to the overall winner of the annual SARC Home Construction competition. Robert Hart, G4EJL, became a Silent Key in his early 70s, just a few days before Christmas 2009. He was a highly respected former chairman of the club and members could not let his passing go without some sort of memorial in his honour. His interest in building amateur radio equipment meant that a suitable memorial trophy was an obvious choice.

The club were delighted to welcome Bob's widow, Mary Hart, to the Presentation Evening. She kindly agreed to say a few words to those present before she presented the new trophy to the winner, David Middleton, G6DCT. David won the trophy for his outstanding selection of homemade transceivers. The three judges were unanimous in their decision. The transceivers were entirely homemade and designed by David, including the printed circuit boards. A certificate and a prize of useful tools was award to Roland, G0NUE, for a novel VHF portable antenna for 2 and 4m, entered in the low cost (under £5) section. The winner of the beginner's section was Josh, M0JMO, who showed his beautifully made miniature ATU, constructed from a kit. In addition to a certificate, Josh received a 40m QRP transceiver kit.

The evening was also used as an opportunity to present framed certificates of achievement and appreciation to seven club members who had made a distinct contribution to the club during the year. These were Carol, 2E0CJH, Krystyna, M6KSH, Michael, G7MLL, SWL Michael, Andrew, G0HSA, Keith, G0CXP and Tony, G1TKX. G1TKX has been lead instructor at SARC for some 20 years and it was felt appropriate at this event to officially recognise his considerable contribution to the club.

G1TKX receives the outstanding service award from Mary Hart.

G6DCT receives the G4EJL memorial award.

Exam Success

Mexborough & District ARS would like to give their congratulations to two more club members that have been successful in upgrading to the Advanced licence. Mark is a new club member and now has the callsign M0TGW. Allan Farrar has also passed the Advanced exam and is now M0GVX. Allan is now going to be teaching at Mexborough & DARS: it's great that he has decided to pass the knowledge on to other candidates.

Another success is Adam Marsden, who passed his Foundation exam following in his father's footsteps. Adam's callsign is M6AXX.

The photograph shows (back row l-r) Mark, M0TGW and Allan, M0GVX and Adam, M6AXX in the front.

NEWS IN BRIEF

• Rhondda Amateur Radio Society meets at the St Barnabus Church Hall, Penygraig, Rhondda on Tuesday evenings at 7pm. The club is about to begin the next Foundation and Intermediate courses at the club venue. Please contact John Howells, GW4BUZ by e-mail to bronllys.vicarage@virgin.net for more details.

• Henry Wainwright has started his own company manufacturing amateur radio equipment with the support of Sheffield Hallam University's Graduate Entrepreneurship Scheme (GRADE). The company, Antenna Engineering, has a comprehensive range of amateur radio antenna equipment ranging from mono band single element verticals to multi element phased arrays. Antenna Engineering produces a range of vertical antennas for the serious DX enthusiast. More information on all of Antenna Engineering's products can be found at www.antennaengineering.co.uk.

• The theme for the 2011 Orlando HamCation is Ham Radio Brings Communities Together. Held at the Central Florida Fairgrounds in Orlando on 11 to 13 February the organisers are hoping for over 150 commercial traders, 400 swap table sellers together with the largest 'Tailgate Area' in the southeast US. Admission is $12.00 and parking is free.

Waterways on The Air

Did you know that over half the population live within five miles of a canal or river and every year more then ten million people visit Britain's waterways to fish, walk the towpath, observe wildlife or go boating and enjoy the sheer splendour of our canals and navigable rivers?

A number of radio amateurs operate from aboard craft on the inland waterways where the canal gives a good ground plane and S0 noise levels. M0JAV is interested in organising Waterways on the Air in a similar manner to Railways on the Air – not a contest but an opportunity to rag chew with fellow amateurs operating close to inland waterways. The suggestion is to hold it on the weekend of the Inland Waterways Festival and to try to illuminate as many of the inland waterways as possible. In 2011 the festival is on 29-31 July and is held at Shobnall Fields, Burton-upon-Trent. It is likely some narrowboat amateurs will be attending. This is the IOTA contest weekend on HF so it is suggested that activity should start before and/or end after IOTA (noon Saturday for 24 hours) to get some access for local contacts on the HF bands. Operators can take advantage of the low noise levels to attempt IOTA contacts from their canal locations, which will give plenty of signals for demonstration to interested gongoozlers (a person who enjoys watching activity on the canals in the United Kingdom).

If people are interested in this idea, please contact John, M0JAV on 07836 731544 or by e-mail to drm131@rsgb.org.uk. Further information about the inland waterways can be found at www.waterscape.com.

IARU Appointment

IARU President Tim Ellam, VE6SH/G4HUA has appointed Ian Greenshields, G4FSU as an IARU Technical Consultant to represent IARU at various regulatory meetings such as ITU meetings and to promote IARU objectives at those meetings. Congratulations to Ian.

SSB Field Day 2010

Still poor conditions but most stations enjoyed a dry contest this year

Stockport Radio Society, G3LX/P. Bernard, G3SHF, Dave, G0LZL & Tom, M0DCG work on the mast. Photo by Nigel, G0RXA.

EXCELLENT TURNOUT. The weather in the early summer of 2010 was pretty good and even Glastonbury was dry. By September things were not quite so stable, so most parts of the country were lucky to have a dry weekend. SSB Field Day 2010 was quite eventful this year. A single operator won the Restricted Section – the first time this has been done. And in the Open Section the club with the most QSOs did not win, which demonstrated the importance of multipliers in this contest. There was also an excellent turnout with 55 entries, the highest number we've seen in recent years. Although the weather was dry in most areas the sunspot cycle was still showing little sign of picking up at that time. Few openings were seen on 15m and virtually none on 10m.

RESULTS. The result was very close in the Open Section and multipliers proved to be the key. Cray Valley RS, G3RCV/P, were in first place and take the Northumbria Trophy for the third year running. Bristol CG, G6YB/P, returned to the Open section after a few years and came second. Although Bristol's QSO total was higher, G3RCV/P found 16 more multipliers, which made all the difference. East Notts CG, G3TBK/P, was in third place not far behind.

The winner of the Restricted Section by a convincing margin was Adrian, MW1LCR/P working as a single-op with no club affiliation. In spite of some painful dental work just before the contest he managed to operate for most of the 24 hours and will pick up the G3PSH Memorial Trophy for his efforts. Second place was taken by Worthing & District ARC, G3WOR/P, and in third place was the Central Contest Association, G3SJJ/P.

LOGS. All logs were entered online this year using the RSGB entry robot. Not only does this give the user immediate feedback that the entered log is received and readable, but it also makes the adjudicator's life easier by reducing the number of format errors in logs. It was reported that a few continental stations were being inconsistent with their use of /P. In adjudication we generally assume that the receiving station is in error, but where a lot of errors are created by a particular station the adjudicator may decide otherwise.

The DX cluster is a valuable tool in contests like this one. If you have access to the cluster in the field it allows you to monitor for new multipliers. Also, getting spotted on the cluster drives more stations your way by telling them your frequency. Obviously such a powerful tool is open to abuse and for that reason the rules dictate that operators and club members should not place cluster spots for their own team. This year warnings were sent to some stations for self-spotting. Contestants and their club members need to be aware that their team is likely to be penalised if they persist in this practice.

CONDITIONS. HF propagation was very poor. It was almost identical to the previous year and typical for the sun-spot low. 15 metres opened for a while on Sunday, but most Restricted Section stations were unable to make much of this. A small Sporadic-E opening on 10 metres seems to have only favoured one or two locations and many stations recorded zero points on the band. As usual it was the top Open Sections stations that made the most out of 20 metres late on the Saturday evening. 40 metres produced some good results with a lot of US stations being worked overnight. Some groups reported difficulty with stations in the All Asia contest refusing to work them. This would most likely be non-Asian stations, as Asian stations are usually only too happy for the points, provided you supply your age for their contest as well as your serial number for Field Day.

This contest manages to provide a great vehicle for clubs to organise a social event as well as the excitement of the contest itself. The fact that it runs concurrently with the 2m Trophy event provides an opportunity to bring HF and VHF contesters together. Though this doesn't suit everyone, as a good HF site is rarely the best site for VHF, but it does seem to be a popular feature with some clubs. We will all be looking forward to the long awaited upturn in the sunspot cycle and a lively event in 2011.

Many thanks to all who entered and those who sent check logs. The results are available on the Contest Committee website, www.rsgbcc.org/hf/results/2010/ssbfd2010.shtml.

Nigel, G0RXA operating for Stockport Radio Society, G3LX/P.

Norfolk ARC, G4ARN/P. Tower being towed to site. Photo by Roger, G3LDI.

Norfolk ARC, G4ARN/P. Norfolk ARC antennas and tent. Photo by Roger, G3LDI.

SOAPBOX

Thank you everyone who recorded comments in their log or sent photos. It all helps form a picture of the event.

Let's start with the headaches...

Burnham Beeches RC, G3WIR/P: "Getting the StepIR up on the mast was a real trial, one member was taken to hospital with a broken head"

and over in Wales...

Adrian, MW1LCR/P: "a dental incident a few days earlier resulting in a pronounced lisp, slight tooth ache and four missing front teeth..."

And with slightly less serious problems...

Wythall RC, G4WAC/P: "Too many hornets not enough Red Bull"

Dragon ARC, GW4TTA/P: "So where do all those that we put through the RAE go to? Well not here obviously! The station was pulled down and put up by myself who is getting cardiac surgery in three days and our treasurer John who by his own admission is well past his sell by date!"

Wisbech AR & EC, M5ARC/P: "disappointed with low rates struggling to understand where we are going wrong. Any pointers would be helpful!" *well, 6th out of 33 isn't that bad*

Bristol CG, G6YB/P: "decided to go back to the Open section this year but with a few experimental aspects. ...still building the station up to 90 minutes after the start! Weather mostly dry but windy; however heavy rain came to visit for a few hours on Sunday and around 30 minutes were wiped out by static rain."

Scarborough ARS, G4BP/P: "Super 10m opening on Saturday afternoon, but only to Denmark. Aerial erected dusk Friday evening perhaps explaining why wire wrapped around mast. All had to be redone Saturday morning."

But all of these folks seemed to enjoy the weekend...

RAFARS, G8FC/P: "We can claim 2 separate fly pasts by the Red Arrows, can any other Field Day station beat that?"

Sheffield ARC had two stations this year – A team, G2AS/P (Open section) and B team, G3RCM/P (Restricted section): "At G3RCM/P we concentrated on giving a contest experience to some of our newer licensees and making the weekend a real social event."

Basingstoke ARC, G3TCR/P: "How fantastic to work VK. Pity distance isn't in the score! Anyone know how best to persuade All Asia participants to give points to Field Day participants?" *... see article.*

Cray Valley RS, G3RCV/P: "Great fun as always but with G6YB/P back in the section we don't think our best-ever QSO total of 1692 will be enough to retain the trophy." *How wrong can you be?*

Central Contest Assoc, G3SJJ/P: "An excellent weekend. Wx on Friday and Saturday was perfect Sunday was cooler but still good. 20m on Saturday was disappointing but a great opening on 15m during Sunday."

East Notts CG, G3TBK/P: "Better condx on 20 & 15 than last few years. Pity about 10m though!"

Echelford ARS, G3UES/P: "A relaxed traditional club effort with plenty of helpers many visitors and a Saturday evening BBQ."

Reading & DARC, G3ULT/P: "We were lucky with the WX dry for set-up and tear-down. No major technical problems. An enjoyable weekend."

Chippenham & DARC, G3VRE/P: "This is our first entry to HF SSB Field Day and 1st use of N1MM Logger. An enjoyable contest and lessons learnt."

Havering & DARC, G4HRC/P: "enjoyable weekend playing radio in the sun"

Ripon and District ARS, G4SJM/P: "Excellent day (my first contest). Medieval tent as operating base."

York RC, G4YRC/P: "Great weekend enjoyed by all who attended. All food cooked over an open fire again."

West of Scotland ARS, GM4AGG/P: "Good operating this year great to get club call back in this contest!"

Cockenzie & Port Seton ARC/Mid-Lanark ARS, GM5CX/P: "First serious attempt at this contest since 2001."

Lowestoft District & Pye ARC, G3JRM/P: "all in all a good weekend in the countryside."

Homebrew

We continue the HF transceiver project by building the band pass filter unit and low-level transmit amplifier stages

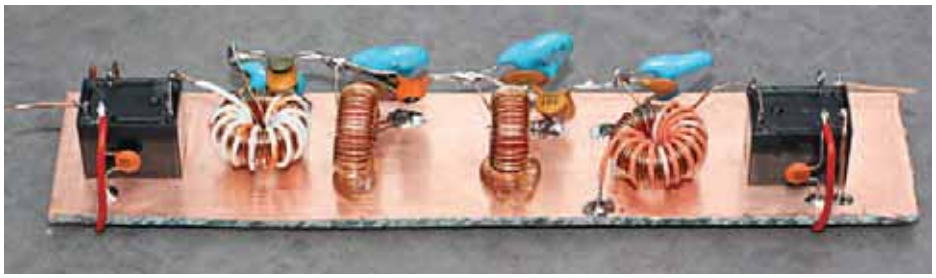

PHOTO 1: Finished 160m filter. Filters for other bands appear similar.

FILTERS EVERYWHERE. Building a switched BPF unit with separate filters for each of the nine HF amateur bands can be quite a daunting task. If we add filters for the 5MHz and 50MHz (6m) bands, we could end up with as many as eleven filters. Using fourth order filters, that is 44 hand wound coils, 22 miniature relays and several dozen capacitors. To make the task a bit more manageable, each filter will be built as a separate sub-module. After testing and alignment, these filters will be incorporated into the main BPF unit. The constructor may choose to build a full set of filters or a smaller number of filters to cover just a few favourite bands. I have left room for at least ten filters in my BPF unit. At the time of writing, I have built and tested six sets of filters to cover the 160, 80, 40, 17, 10 and 6m bands. I will add a few more when the next batch of relays arrives. I hope you won't be put off by the apparent complexity of this project. Building the filters is reasonably easy once you have a good stock of powdered iron toroid cores, fixed capacitors and trimmer capacitors. Building the filters for the LF bands is a bit more difficult because of the larger number of turns on the inductors. The large ratio of fixed to variable capacitance in the LF resonators gives a lot less scope for tuning out construction errors at the testing/alignment stage. If you start with the LF filters, your task will get progressively easier as you work your way up through the bands. I found the 10m and 6m filters were trivially easy to build and align.

The filter for the 17m band was described in detail last month. The design procedure was covered in Homebrew for September 2010. Further information can be found on the web [1]. Each filter uses Amidon T50 type powdered iron cores for the inductors. The filters from 1.8 to 10MHz use the T50-2 (red) core. Coils wound on this core will have an inductance of approximately $N^2 \times 5$nH where N is the number of turns. The filters from 10MHz to 52MHz use coils wound on T50-6 (yellow) cores. These coils have an approximate inductance of $N^2 \times 4$nH. Make sure you use the correct cores. Using random cores from the junkbox is almost sure to end in failure, even if the cores happen to be the correct colour. Toroid colour codes are not universal.

I have written a very simple computer program that can be used to calculate the component values. The C source code for this program can be found on the project web page [1]. The key lines of this program are:

```
w = 2*PI*f;
C0 = 1/((w*w)*L);
k=0.8409;
Ck_12 = C0 * ((k*B)/f);
C1 = C0-Ck_12;
k=0.5412;
Ck_23 = C0 * ((k*B)/f);
C2 = C0-Ck_12-Ck_23;
q=0.7654; Qu=200;
Qe = (q*f*Qu) / ((B*Qu)-(q*f));
Rp = w*L*Qe;
```

Note that "w" is used in place of omega "ω".

PRACTICAL WORK. We will start with the filter for the 160m band, the filter centre frequency of which is 1.9MHz. Most filter design calculations define the bandwidth as the frequency difference between the upper and lower -3dB frequency points. This is not particularly useful when designing a maximally flat Butterworth filter or a Chebyshev filter with passband ripple of much less than 3dB. Attenuation graphs from Zverev [2] show that a 4th order Butterworth filter will have a -1dB bandwidth that is 0.84 times the -3dB bandwidth. A filter with a -3dB bandwidth of 300kHz will easily cover the 160m amateur band of just under 200kHz (300kHz*0.84=252kHz).

Applying the usual rule-of-thumb that says XL should be in the range 50-150Ω, I decided to use an 8μH inductor for L1, 2, 3 and L4. This is an inductive reactance of (2*PI*1.9*8) = 95.5Ω. Rearranging the earlier formula for the inductance of a coil on a T50-2 core gives us √(8000÷5) = 40 turns. 40 turns of 0.375mm enamelled copper wire (Maplin YN86T) on a T50-2 core showed a measured inductance of 8.03μH, surprisingly close to the required value. The standard formula for finding the value of capacitor required to make a resonant LC circuit is based on the basic Hz,

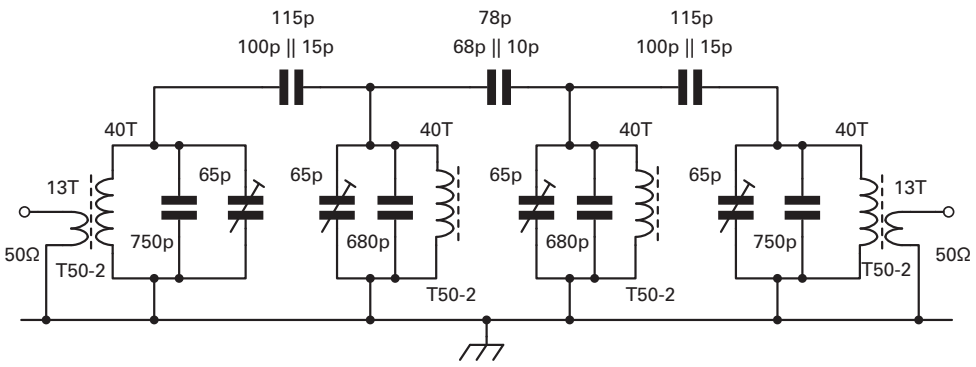

FIGURE 1: Circuit diagram of the 160m filter. Other bands use the same circuit with different component values.

PHOTO 2: Part way through constructing the filter bank, with four sets completed.

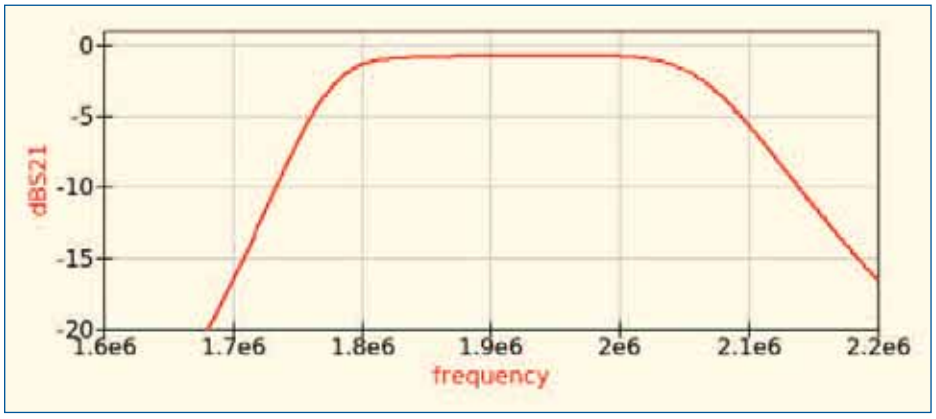

FIGURE 2: Expected response for a resonator unloaded Q of 200.

Henry and Farad units. The modified formula $10^6 \div ((2*\pi*f)^2*L)$ allows us to use the more familiar units of MHz, µH and pF. This can be used to find the total capacitance for each resonator (nodal capacitance).

$10^6 \div ((2\times\pi\times1.9)^2\times8)=877$pF.

To find the correct values for the inter-resonator coupling capacitors, we can use Zverev's k (coupling) values as used in our previous examples: k12 = 0.8409 and k23 = 0.5412.

877 * (0.8409*0.3)/1.9 = 116pF
877 * (0.5412*0.3)/1.9 = 75pF

I used 100pF in parallel with 15pF for C12. This is within 1% of the required value. 75pF is a standard E24 value so you can use one if it is available: I had to resort to using 68pF in parallel with 10pF. Subtracting the coupling capacitor values from C0 gives the correct values for C1, C2, C3 and C4. 877-115 = 762pF for C1 and C4 and 877-115-78 = 684pF for C2 and C3.

End Q (Qe) and optimum load resistance (Rp) is:
Qe = (0.7654*1.9*200) / ((0.3*200)-(0.7654*1.9))
= 4.968
Rp = ω*L*Qe = 475Ω

A Qu value of 200 was used for all filters except for the 6m filter where the measured value of 89 was used. The usual model of an LC resonant circuit shows loss resistance as a resistor in series with the inductor. Qu is simply XL/r. Capacitors are often assumed to be completely lossless. This approach was probably valid back in the days when air spaced capacitors with large metal plates had Qu values of over 1000. I have learned to my cost that some modern miniature ceramic capacitors can be quite lossy.

Now that we know the value of all components and the optimum I/O load resistance, all we need to do is add the I/O coupling windings to L1/L4. The required turns ratio is √(Rp/50) = √(475/50) = 3(ish). For our 40 turn coil: 40/3 = 13 turns.

Figure 1 shows the filter schematic. **Figure 2** shows the expected response for a resonator Qu value of 200. Insertion loss of below 1dB is unlikely to be achieved in practice. Passband ripple of well below 1dB should be readily achievable. The QUCS simulation shows the expected -3dB bandwidth of 300kHz and -1dB bandwidth of around 250kHz.

The filter was built on a 135x26mm strip of double sided PCB laminate. The finished unit is shown in **Photo 1**. The filter is built in the middle of the board using point-to-point wiring. The switching relays can be seen at each end of the board. I used 13 turns of insulated wire for I/O coupling. The wire was stripped from four core telephone cable. Instead of using trimmer capacitors, I used hand picked fixed capacitors for the 160m filter. The capacitor values were measured using the VK3BHR LC meter. Carefully

TABLE 1: Component values for the different band filters.

Band	-3dB BW	L	C0	Ck12	Ck23	C1/C4	C2/C3	Rp	Toroid	Built/Tested
Generic filter: -3dB BW = f/10. Normalised to 1MHz.										
1MHz	100kHz	10µH	2533pF	213pF	137pF	2320pF	2183pF	500Ω	45/14 turns T50-2	No
160m	300kHz	8µH	877pF	115pF (100+15)	78pF (68+10)	762pF (750+trim)	684pF (680)	475Ω	40/13 turns T50-2	Yes
80m	400kHz	4.5µH	422.5pF	39pF	27pF	383pF (330+trim)	356pF (330+trim)	747Ω	30/8 turns T50-2	Yes
40m	400kHz	2.2µH	228.4pF	10pF	6.8pF	218.4pF (180+trim)	211.6pF (180+trim)	1430Ω	21/4 turns T50-2	Yes
30m	300kHz	1.4µH	177.4pF	4.7pF	3.3pF	172.7pF (150+trim)	169.4pF (150+trim)	2628Ω	19/3 turns T50-6	No
20m	900kHz	1.0µH	126.1pF	6.8pF	4.7pF	119.3pF (100+trim)	114.6pF (100+trim)	1142Ω	16/3 turns T50-6	No
17m	850kHz	0.9µH	85.9pF	3.3pF	2.4pF	82.6pF (47+trim)	80.2pF (47+trim)	1816Ω	15/2 turns T50-6	Yes
15m	1000kHz	0.68µH	82.9pF	3.3pF	2.2pF	79.6pF (68+trim)	77.4pF (68+trim)	1600Ω	13/2 turns T50-6	No
12m	1000kHz	0.576µH	70.7pF	2.4pF	1.5pF	68.3pF (56+trim)	66.8pF (47+trim)	1900Ω	12/2 turns T50-6	No
10m	3000kHz	0.576µH	53pF	4.7pF	3.3pF	48.3pF (33+trim)	45pF (33+trim)	800Ω	12/3 turns T50-6	Yes
6m	4000kHz	0.256µH	39.3pF	2.7pF	1.8pF	36.6pF (22+trim)	34.8pF (22+trim)	870Ω	8/2 turns T50-6 Qu=89	Yes

selected 680pF capacitors were used for C2/C3. I managed to make a couple of 762pF capacitors from selected parallel pairs of 560 and 220pF. The first test of the filter gave very disappointing results. The passband was accurately centred on 1.9MHz but insertion loss was around 6dB and return loss was all over the place! All component values were checked and found to be accurate. Checking the Q of one of the resonators revealed that Qu was just 26! The capacitors were miniature ceramic disc types that came from a very low cost kit. Substituting a high quality air spaced capacitor resulted in a radically improved Q of just over 250. Clearly these cheap and nasty capacitors are just not up to the job. When the capacitors were replaced by larger ceramic types, filter insertion loss improved to an acceptable level of 3dB and return loss is now better than 20dB (SWR 1.2:1) across the entire 160m band.

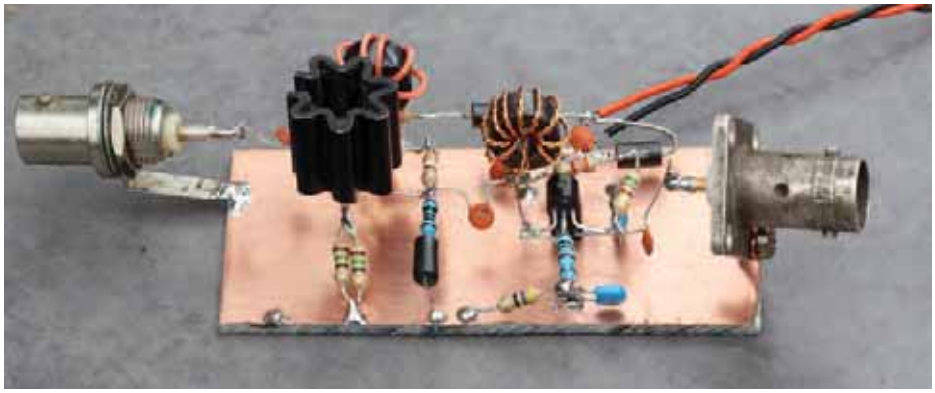

PHOTO 3: The completed low level transmit amplifier.

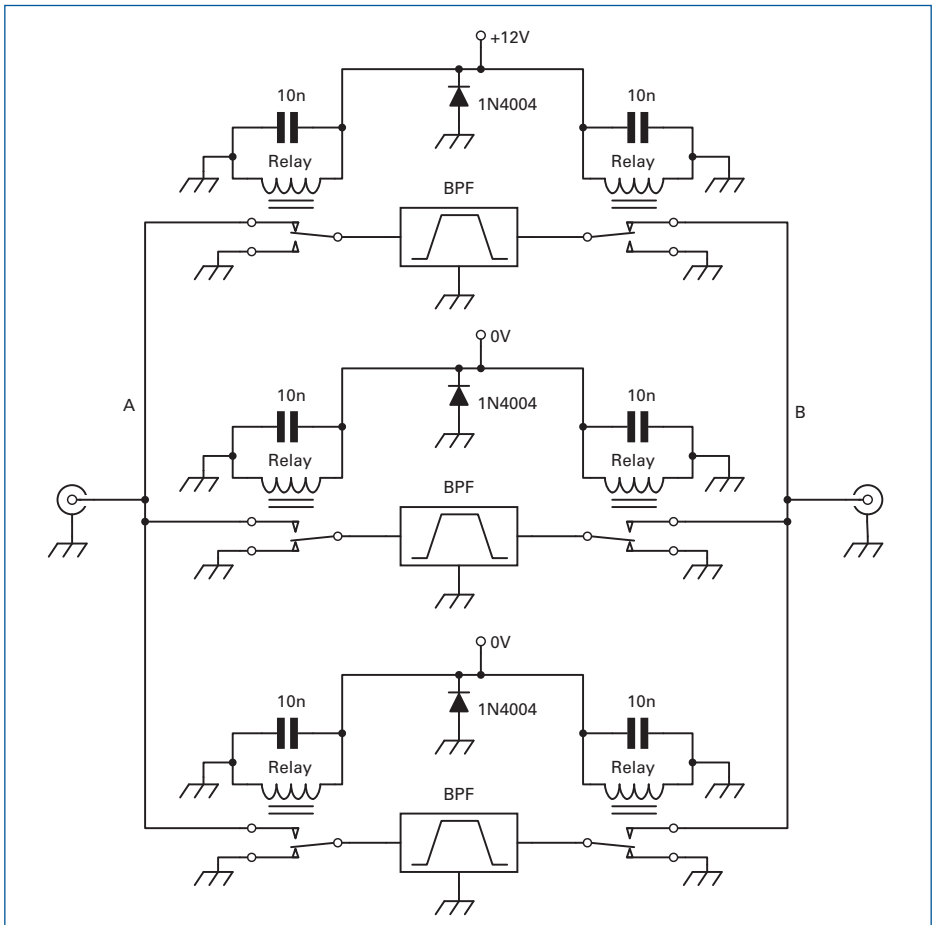

FIGURE 3: How the switching relays are arranged.

CONSTRUCTION. The remaining filters were built on identical 135x26mm strips of double sided PCB. The filter specification, component values and toroid details are listed in **Table 1**. Six of the filters have been built and tested. The untested filters were designed using the same formula. Any amendments and additional filter details will be posted on the web [1]. Most of the filters use a combination of fixed and trimmer capacitors. 65pF trimmers were used for the 80m filter. Filters for the higher bands used cheap and readily available 40pF trimmers that can be bought on eBay for about 25p each. The T50 toroids were bought in bulk from a well known US seller **[3]**. None of the other filters were as troublesome as the 160m filter. The 80m filter performs particularly well, with a measured insertion loss of 1.5dB, passband ripple well under 1dB from 3.5 to 3.8MHz and I/O return loss of 20-30dB.

Each filter is mounted vertically on a sheet of PCB laminate. **Photo 2** shows the first four filters in the BPF unit. The filters are soldered to the main PCB. The first filter is seam soldered along the entire length of the back of the filter PCB. The component side is soldered to the main ground plane at several strategic points close to C1/2/3/4 and the I/O switching relays. There is less working room for filters at the centre of the cluster, but you should make sure that each filter is soldered to ground at several points. The height of each filter is about 18-20mm. When they are mounted edgeways on the main filter unit, you should allow a few mm clearance between the relay pins and the adjacent filter PCB. This means you need about 23-25mm per filter or, if you prefer, one filter per inch. A small blob of adhesive from a hot glue gun was used to secure L2 and L3 of each filter to the PCB.

Figure 3 shows the arrangement of the switching relays. I used Rayex LU series subminiature relays (Maplin N15AW) with a 12VDC coil. Any similar miniature SPDT or DPDT relay should be equally suitable. The relays are wired so that the I/O terminals of all unused filters are shorted to ground. This gives much improved isolation at virtually no extra cost. There is no requirement for the filters to be mounted in any particular order, eg 160, 80, 40… There may even be a case for mounting the filters in a staggered manner so that filters for adjacent or harmonically related bands are physically separated, for example 160, 17, 40, 12, 80… The 10nF capacitor across each relay coil prevents RF leakage around the filter via capacitive coupling between the relay contacts and coil. Isolation can be further improved by placing a ferrite bead on the 12VDC wire to each relay. The 1N4004 diodes suppress negative voltage transients caused by back-EMF from the relay coils. The choice of diode is not critical. Other 1A rectifier diodes like the 1N4005/6/7 would be equally suitable.

The wires connecting the switching relays to the 50Ω input/output connectors should be as short and straight as possible. These wires are marked A and B in the schematic. Filters for the highest frequency bands (10m and 6m) should be placed near the centre of the filter cluster so that the length of the connecting wires is as short as possible. A extra few cm makes no difference on the lower frequency bands where wavelength is measured in several tens of metres.

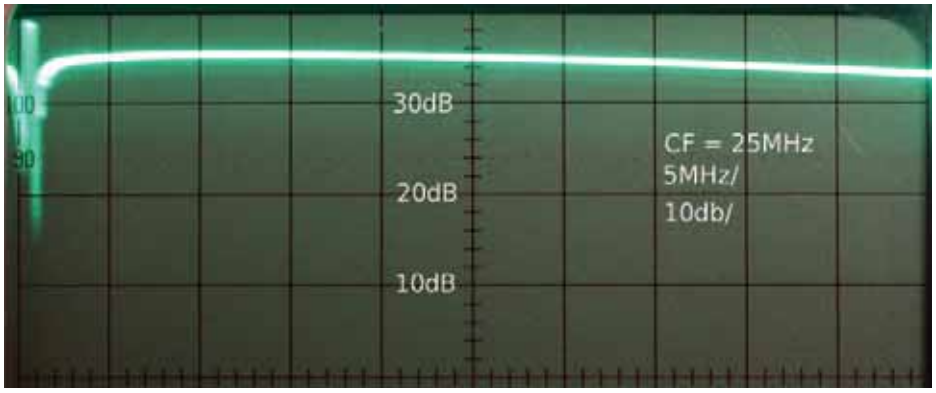

PHOTO 4: Low level transmit amplifier gain versus frequency.

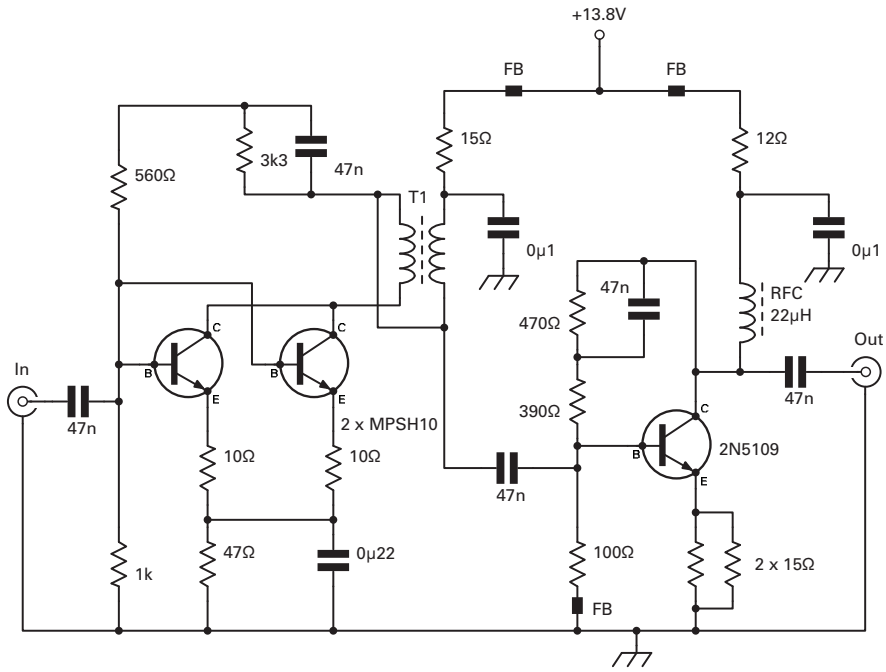

FIGURE 4: Circuit diagram of the low level transmit amplifier.

TESTING. I used a spectrum analyser with tracking generator for most of the filter tests. The home made return-loss bridge from January 2009 was used for return loss measurements. Filter insertion loss was generally between 1.5-3dB for the six filters built so far. Measured I/O return loss was generally around 20-30dB, which is in the expected range for this type of filter. The 17m filter return loss was a bit lower at just 16dB (SWR=1.4:1). I didn't bother to investigate the reason for this because I was quite satisfied with the IL, BW and passband ripple performance of this filter. Filter on/off isolation was generally better than 70-80dB. This represents the limits of my test instruments rather than the ultimate attenuation of the switching relays. Stopband attenuation is generally greater than 60dB. This type of filter has an asymmetrical response that gives greater attenuation of frequencies below the passband. This works well in practice because the transceiver will have band switched low pass filters which will greatly reduce the level of any spurious signals at frequencies well above the BPF passband.

LOW LEVEL TRANSMIT AMPLIFIER. I haven't yet chosen a driver and PA for the transceiver. A rig with a maximum output of 5-10W would be an ideal match for my MOSFET linear amplifier (August 2008). I could use the linear amplifier from January 2007, or I might build a new high linearity Class-A PA unit. I will proceed with a working assumption that the PA will produce 10W and the driver will produce 1W. Assuming 10dB of gain for each stage, 100mW of drive from the low level amplifier should be sufficient.

Last month saw the MPSH10 chosen as the standard low power VHF transistor at EI9GQ. I have been looking for a suitable VHF/UHF power transistor in the 1W range. The surface mount Philips BFG135 looks like a possible candidate. As I have recently bought a new batch of 2N5109 transistors, I will use one in the prototype low-level amplifier. The 2N5109 is a 1W transistor with an fT of 1.2GHz and a proven record of excellent performance in linear RF amplifiers.

The first stage of the low level amplifier (LLA) is a parallel pair of MPSH10 transistors. This is very similar to the post-mixer amp described last month. The second stage is a 2N5109 common-emitter amplifier with shunt feedback and emitter degeneration. Both stages are designed for 50Ω I/O impedance. The amplifier schematic is shown in **Figure 4**.

AMPLIFIER CONSTRUCTION. The amplifier was built dead bug style on a strip of PCB laminate. T1 is 10 turns of enamelled copper wire, bifilar wound on a FT37-43 or similar medium to high permeability ferrite toroid. Wire diameter is not that critical: I used 0.375mm. The second stage requires a heatsink; the 2N5109 dissipates about 500mW in this circuit. After one hour of testing, the small clip-on heatsink seen in **Photo 3** was quite hot. A larger heatsink would be desirable, especially if you are a rag chewer or use SSTV or data modes. The choke in the collector circuit is 8 turns of insulated wire on a FT37-43 toroid. As usual, the wire came from standard telephone cable. At pennies per metre, this type of cable is an excellent source of general purpose insulated hookup wire.

TESTING THE AMPLIFIER. This was one of those happy projects where the initial design survived the transition from computer screen to the finished hardware without needing any modification. The measured gain is very close to the design value of 35dB. **Photo 4** shows the measured gain from LF to 50MHz. Gain is almost perfectly flat from 1.8MHz to 30MHz and stays above 33dB up to 52MHz. Input return loss is better than 16dB from 1.8MHz to 100MHz, output return loss is better than 10dB (SWR=2:1) from 1.8MHz to 100MHz. The amplifier is very well behaved at output levels up to 200mW and saturated output is about 500mW.

All of the modules built so far were wired up on the bench. The local oscillator signal was provided by the DDS signal generator (March 2010) and the output from the LLA was fed to my HF doublet via a 31MHz LPF (October 2010). With the LO generator set to 17.803MHz (28.5-10.697) and the 10m BPF selected, I received a 53 report from Gary, EI8GQ at a distance of 8km. Not bad for an output of 100mW, especially since Gary uses a vertical aerial and I have a horizontal wire doublet. Reports on the modulation quality were very good. At last there is some indication that this odd looking collection of bits has the potential to be a viable transceiver!

WEBSEARCH & REFERENCES

[1] http://homepage.eircom.net/~ei9gq/bpf.html
[2] The Handbook of Filter Synthesis, A Zverev, Wiley, 1967
[3] www.kitsandparts.com

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Design Notes

A new type of prototyping board and how to stop drift at microwave frequencies

RF-Matrix-Padboard is excellent for RF prototyping.

THE PERFECT RF PROTOTYPING BOARD?

A new RF construction medium, RF-Matrix-Padboard, looks to be the ideal solution for RF prototypes and for finished products. It can be used for mounting all types of components from standard wire ended ones, right through to the tiny surface mount packages used for modern high frequency semiconductors. The board is made up from a matrix of 0.1" isolated pads on the top side of 1.6mm FR4 printed circuit material, each pad being drilled with a 1mm hole. On the underside of the PCB there is a continuous ground plane isolated from the pads (the holes are not plated though). Components can be installed between pads, with adjacent pads linked with a short length of wire, or by running solder to close up the gaps. Ground connections are formed by passing a wire link or Veropin through the nearest hole to connect to the ground plane.

This way, RF circuits can be made up using the most direct and shortest path between component terminals, with all ground connections going on a direct path to a solid low inductance ground plane. **Photo 1** shows a 50MHz preamp constructed by GM3SEK using a piece of RF-Matrix-Padboard, illustrating the use of both wire ended and SMT components with pins for the grounding. I hope to feature a number of other designs using this medium in the future.

RF-Matrix-Padboard looks to be a very useful product, falling into place neatly between birds-nest construction and home-made PCBs; it should be useable well into the UHF range with modern SMT components. This Dar-Tec product is being sold through eBay **[1]**, where you can also find other types of matrix board with pads or strips, in one- or two-sided versions.

TRANSVERTER LOCAL OSCILLATOR LOCKING. Operating on the higher frequency and microwave bands generally involves a transverter to convert from a low IF, often 28, 144 or 432MHz, up to higher bands. These days there is a need for high frequency stability and accuracy to operate modern narrow band data modes, or just to remove one of the unknowns searching for weak signals with highly directional antennas. For improved frequency control, the local oscillator used for the conversion ideally has to be stabilised. In the GHz region a simple crystal oscillator with an accuracy or drift over temperature of a few parts-per-million (ppm) just isn't good enough any more. A good crystal, maintained at room temperature, can just about manage 1ppm. At 10GHz this corresponds to 10kHz frequency uncertainty, or three to four SSB bandwidths. The proliferation of GPS-locked and other high stability sources means that obtaining a high stability master reference at 5 or 10MHz is not a complicated matter these days. But how can we lock our transverter, which typically has an overtone crystal oscillator running in the 80 – 120MHz region followed by frequency multipliers, to such a reference? The answer is to phase lock it.

The crystal oscillator first has to be turned into a voltage controlled crystal oscillator (VCXO) so it can be steered onto frequency by the phase locked loop (PLL). This often involves little more than the addition of a varicap diode in series with the crystal along with a few DC blocking and decoupling capacitors and a couple of resistors. A tuning sensitivity in the region of 80 – 150Hz per volt is typical for such a modification to a series resonant overtone oscillator.

Next we look at what frequencies are needed for each of the microwave amateur bands. **Table 1** lists crystal oscillator frequencies and RF multiplication for transverters for most of the narrowband segments in use today. The column highest common factor or frequency (HCF) is the maximum value that can be generated by dividing down by a factor N from the crystal oscillator and also from a 10MHz reference by a factor of R. HCF = FXTAL / N = 10MHz / R.

Two things become obvious: All the comparison frequencies can be derived from a 10MHz reference with simple logic divider chips for the divide by R function and all the comparison frequencies are over 200kHz. So a phase locked loop can be made with wide loop bandwidth. Now the only difficulty is providing the divide by N from the crystal frequency. A conventional PLL chip like the LMX2300 family could be used, with a PIC or other microcontroller to program in the correct N and R values at switch on. But dividing by a factor of around a hundred times from a VCXO with a sensitivity of 100Hz/V also divides down the tuning sensitivity and results in an output to the phase detector that moves by around just 1Hz/V. Without diving into the complex control theory and maths associated with PLL design, we can say to a very rough approximation that 1Hz/Volt tuning sensitivity at the PLL phase detector means the loop bandwidth can only ever manage 1Hz or so maximum. This means a long lock up time, and the PLL will most likely take several tens of seconds to stabilise. Any perturbations such as knocking it or from draughts of air cooling the crystal will shift the frequency, resulting in the PLL taking some time to correct itself – the resulting chirp is certainly not what we want when listening for weak signals. So is there a way of increasing the bandwidth of the PLL by not actually dividing down from the VCXO?

One solution lies in the sampling phase detector, or sampling mixer. Here the VCXO output is applied directly to one port of a balanced mixer used as a phase detector. The other port of the mixer is supplied with a sequence of narrow pulses at the comparison frequency formed using an impulse generator to give short sharp spikes. The theoretical spectrum of such a sequence of impulses consists of all the harmonics of its repetition frequency, with a reasonably constant amplitude up to a frequency equivalent to about a third of the width of the pulse, as shown in **Figure 1**. So, if we generate a sequence of pulses a few nanoseconds wide at a repetition rate of

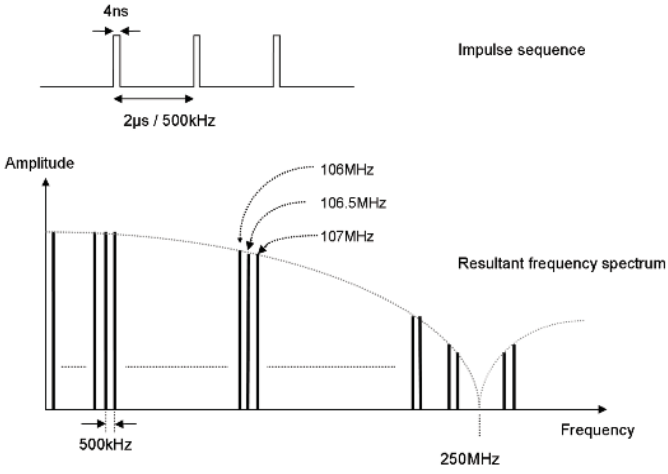

FIGURE 1: Frequency spectrum of a sequence of narrow impulses.

TABLE 1: Crystal oscillator frequencies and RF multiplication for transverters.

Band, GHz	IF, MHz	LO, MHz	RF multiplication	Crystal frequency, MHz	Division, N	HCF (kHz)	R divider for 10MHz ref
1.296	144	1152	12	96.00000	48	2000.00	5
1.296	28	1268	12	105.66667	317	333.333	30
2.32	144	2176	24	90.666667	136	666.667	15
3.4	144	3256	36	90.444444	407	222.222	45
5.76	144	5616	54	104.00000	52	2000.00	5
10.368	144	10224	96	106.50000	213	500.000	20
10.368	144	10224	108	94.666667	142	666.666	15
24.048	144	23904	240	99.600000	249	400.000	25
24.048	432	23616	240	98.400000	246	400.000	25
47.088	144	46944	432	108.66667	163	666.666	15
47.088	432	46656	432	108.00000	54	2000.00	5

500kHz, the result will contain a comb containing ... 105.5MHz, 106MHz, 106.5MHz, 107MHz etc, all at a roughly similar amplitude. Here is the secret to the sampling detector. This sequence of impulses (or comb spectrum if you want to think of it that way) is multiplied by the VCXO signal, and the output passed though a low pass filter (LPF). The output will consist of the mixer product(s) |FVCO – N. FCOMP|. By ensuring the LPF has a cut off lower than the pulse repetition rate, only the component from the nearest spike mixed with the VCXO will appear. So a VCXO operating close to 100MHz will mix with the 100MHz spike and produce a product close to DC. This is exactly what we need to give a correction voltage that can tune the VCXO to bring it onto frequency, so completing the phase locked loop. **Figure 2** shows the complete circuit diagram of such a sampling PLL used to generate a 106.5MHz reference for multiplication by 96 for a 10GHz transverter. The master 10MHz reference input is divided by 20 in a single logic chip to give a 500kHz square wave. For other division ratios, such as /18 to give 222.222kHz for a 3.4GHz transverter, a programmable divider such as the one in the September 2010 edition of this column will suffice. The propagation delay of several cascaded fast logic gates generates a narrow impulse for every positive going edge of this waveform. The impulses are applied directly to the mixer.

The VCXO input at a level of around 0dBm goes to the other input to the mixer. The actual level of the one single spike of the comb spectrum that we are interested in is of very low amplitude, due partly to the low duty cycle of the impulse stream (typically 4ns repeating every 2μs). Also, the total energy is shared out over all of the several hundred spectral spikes, whereas we are only interested in one of them. Thus the resulting output from the mixer is quite low – being typically only a few millivolts in amplitude. A low noise opamp with a gain of several hundred times can amplify this to give 0 – 5V swing, enough to tune the VCXO over the range of interest and to lock the loop precisely onto frequency.

What we now have is a PLL with a comparison frequency equal to the VCXO, so we get the maximum loop bandwidth we are allowed consistent with the 100Hz/V tuning sensitivity; a loop that can lock up in a few tens of milliseconds and correct for perturbations faster than we are likely to hear them happen. With a loop bandwidth of a few hundred Hz and a reference frequency based around 500kHz, there is no need for careful PLL loop-filter design, so long as we have enough DC gain from mixer to VCXO tuning voltage and adequate filtering to get rid of any 500kHz component before it reaches the varicap. The loop will lock up and reference frequency spurii won't appear. The biggest downside is that with such a low voltage appearing at the mixer output, considerable attention needs to be paid to supply decoupling and screening and to the elimination of hum loops – this is probably the most difficult part of getting the practical sampling PLL operational.

INTEGRATED PLL / VCO CHIP. The latest edition of *VHF Communications* contains a description of the Analog Devices ADF4360 fully self-contained phase locked loop. The chip contains a voltage controlled oscillator with programmable reference and VCO dividers and a phase detector and loop filter. All are programmed over a three wire SPI interface from a microcontroller. The chip is offered in ten different versions as ADF4360-0 to ADF4360-9, covering the frequency range 1.1MHz to 2725MHz. The integrated VCO cannot offer as good a phase noise specification as any custom built one will, but for many 'average' type jobs it should suffice. It does allow construction of a simple frequency source covering quite a wide frequency range. See the Analog devices website **[2]** for more details and the chip datasheet. However, beware: it is a very tiny component, with 24 connections around the four sides of 4mm square package. The *VHF Communications* article goes to some lengths about the mounting, explaining how the author, DC1OP, managed to successfully fit it on a home-constructed PCB.

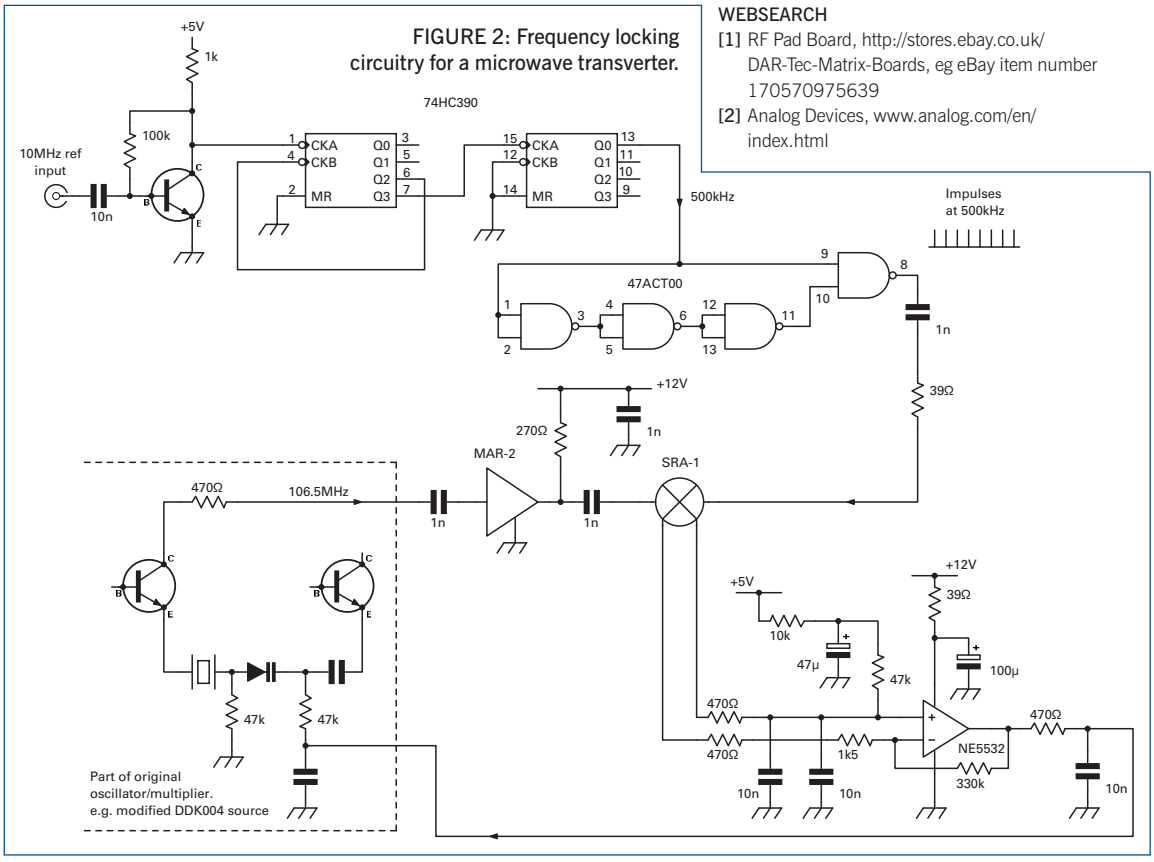

FIGURE 2: Frequency locking circuitry for a microwave transverter.

WEBSEARCH

[1] RF Pad Board, http://stores.ebay.co.uk/DAR-Tec-Matrix-Boards, eg eBay item number 170570975639

[2] Analog Devices, www.analog.com/en/index.html

The 2010 IOTA Contest

Even non-island stations go into the fields for this one – RA3VE in the 12-hour CW section.

ANOTHER RECORD ENTRY. The IOTA contest continues to flourish, even though we still seem to be waiting for the long-expected upturn in solar activity. 2010 brought yet another record entry and, as always, some stiff competition among the more serious entrants. But equally, the contest is attractive to the more casual entrants hoping to pick up a few new counters towards their IOTA awards. As such, the 12-hour section is hugely popular; indeed, it remains a mystery to me that other contests don't offer something similar. By the time this appears, the adjudicated contest logs should have been uploaded to the IOTA awards database, so that claims can be made against your validated contest QSOs. (Remember that you cannot claim contest QSOs unless the other log has been received for cross-checking. The good news is that nearly all significant island expeditions will send in their logs as a matter of course.)

RESULTS. Having last year been edged into second place by the narrowest of margins, the Bristol Contest Group travelled to Jersey once again, with the avowed intention of bringing home the trophy that had eluded them in 2009. Their efforts were well rewarded. Not only did they triumph in the hotly-contested multi-operator category, but in fine style, with plenty of clear blue water between them and runner-up SY9M, operating from the island of Crete. Third place went to another UK team, GM7V on Benbecula. CS2K, operating from Pessegueiro, won the Low Power multi-operator category by a very substantial margin, their closest rivals, M8C, operating once again from the Isles of Scilly, having put in a much more modest effort than usual in 2010.

As always, congratulations also to all the leading stations in the various single-operator and non-island categories. A full results listing can be found on the IOTA contest website. It is sometimes said that there are too many categories in the IOTA contest, but remember that, unlike some contests, we do not offer country, or even continental, awards so every category is truly a global competition. The highest single-operator score in the contest was by OE2VEL, operating Assisted (ie with the use of the Cluster network), who achieved roughly half the score of the leading multi-op stations.

Once again there were some rare islands to be found participating in the contest, of which special mention has to be made of KL7RRC/P, operating from Chirikof Island. The team debated whether they should make a contest entry; we are delighted that they did. Many more, as always, made the contest the focus of their holiday plans. We have the occasional request, and it happened again this year, to reschedule the event to the northern hemisphere winter, when propagation is generally better and QRN is lower. But the summer date is quite deliberate, to make it easier to activate those islands which, in winter, would be tough if not impossible to reach. Of course, we realise that this is less applicable to island stations in the southern hemisphere, though most such activity tends to be from more moderate latitudes, such as Indonesia or Brazil, where winter activations are less of a problem. For those who think this contest is only fun from Europe, do take a look at the Soapbox comments from elsewhere. The one from VC9A gives a flavour of how the contest appears from one location in North America, by way of a *for instance.*

As far as propagation is concerned, the majority of QSOs took place on 20m. At this time of year the nights are short, so the low bands are less productive and, in 2010, 15 and 10 were patchy, to say the least. As always, we keep our fingers crossed that the next contest will see those bands come increasingly to life.

Once again, the Mediterraneo DX Club of Italy ran an SWL competition in parallel with the IOTA contest and results appear on their website. As always, we thank them for taking on this activity.

This short report can only give a flavour of the event and the results. Full results were posted on the Internet some time ago, along with soapbox comments, photographs and links to both *Google Maps* and *YouTube*.

OBSERVATIONS. This year the number of paper logs fell dramatically and is now down to only a dozen or so, compared with around 200 just a few years ago. This does make the adjudicators' life a lot easier!

SDI by EI5DI continues to be the most popular logging program, with *N1MM* and *Win-Test* also in use (mainly by multi-op stations, which SDI does not support). Paul O'Kane, EI5DI, has always supported the IOTA contest very well, including creating a master file of announced expeditions prior to the contest and he deserves our thanks

SV9MBH checks out his antenna on Crete.

Some great QSLs are available for IOTA contest QSOs – VC9A were the highest-placed North American entry.

for his continued efforts. Although he now makes a charge for SD, a free older version of SDI is available on the RSGB Contest Committee website, albeit without support or an updated island list. But the log that it outputs is absolutely fine for the requirements of the adjudication team.

As always, please ensure that you check the rule changes before this year's contest though, at the time of writing, no changes are anticipated. However, we do plan a review post-2011, as it will be close to 10 years since any significant rule changes were made and the contest has grown and evolved substantially in that time.

2011 CONTEST. The 2011 contest takes place, as always, on the last full weekend of July, so in 2011 that's 30 and 31 July, from midday UTC on the Saturday for 24 hours. Make a note in your diaries now.

THANKS. My thanks to all who helped make the 2010 IOTA contest a success, including MM0BQI, G0WWW/5B4WN, EI7CC, G3YMC, G4OGB, GM4UYZ, G3LZQ, MDXC, the RSGB Contest Committee, the various trophy sponsors including principal IOTA sponsor Icom, staff at HQ, to those who sent in checklogs and, of course, the entrants themselves.

WEBSEARCH
RSGB Contest Committee: www.rsgbcc.org
IOTA Awards Programme: www.rsgbiota.org
MDXC: www.mdxc.org/
Results Page: http://iotacontest.com/contest/iota/2010/finalScore.php

SOAPBOX EXTRACTS

Hi Gang. We debated all morning whether or not to operate in the contest, our equipment did not cooperate, but we did the best we could. Tnx to UA9OBA for convincing the other operators to work the IOTA contest from A to Z – KL7RRC/P.

Owing to some family activities I was doing only search and pounce this time. Nevertheless, IOTA is turning into one of my favourite contests: enough activity, well managed, certificates arrive in a timely fashion, the QSOs contribute towards IOTA Awards, even luxurious 12-hour classes provided! Could one ask for more? – DM1TT.

This was our 4th trip to the White Head Is. (pop. 160) elementary school for the IOTA contest. Previously on White Head we were XJ9GM, (1997); VE9W (2002); VC9W (2005); and this time we were VC9A. The bushes had grown, making setup of our two light towers with TA-33 tribanders challenging, but fortunately the bushes were covered with ripe blueberries and the view across the water was wonderful. Propagation was very poor on 15m, and non-existent on 10m, but 20m pileups were huge, islands were numerous, and propagation held until well past local midnight, with exciting bits of skip from the Far East. Grey-line propagation on 40m brought in some ZL and VK contacts. Most of the equipment worked just as it should, and the eight members of our team worked together very well to achieve our best score ever! – VC9A.

The IOTA-Contest is just like fine champagne, lubricating heart and brain – DC9ZP.

Just dabbling this year, looking for new IOTAs. 10 new ones worked – 5B4AHJ.

Mr. Murphy was very persistent. Too much problems in first 8 hours of the contest. We had problems with generator, batteries, QRM on 15 & 40 from laptop power supply. Strong winds outside up to 150km/h. Very difficult band conditions but we managed 1000 QSOs and 322 mults. CU next year! – 9A1CKL.

First time to work this contest. Had a great time and was surprised to see 20m open to ZL @ 0200Z. Worked 2 new CW entities, which made it even more rewarding. Thanks to all – David, AJ4FM.

Unfortunately conditions didn't meet expectations. Hence, score is a little bit down compared to last year. Good fun and great activity anyway. Many thanks to all operators who travelled and activated islands and congratulations to OE3K – DQ4W.

After winning last year the IOTA contest in fixed island category with EI/ON4EI, I called Bernard, EI4II in April to propose him to activate the Great Saltee Island EU-103, one of the most wanted islands in Europe. We faced huge pile-ups as we never experienced. During the expedition and the contest the weather was lovely and we also suffered from sun burn (no cream and hat). A wonderful experience but very physical, we had to transport almost 250kg of equipment on 500m distance and 40 meters elevation.
This was a duo expedition Bernard, EI4II and myself Olivier, EI8GQB/ON4EI. See you next year! – EJ4II.

G1N gets its first airing. Putting up and taking down LF dipoles as I changed bands was not ideal – a single band option would be nice. Must get a beam for the higher bands next year – G1N.

First time I have taken part in this contest, enjoyed it very much. Learnt a lot about strategy and got some ideas for next year. Will make a serious attempt to be on an island next time out with the same setup – G4EOF/P.

QTH - Staffin, Isle of Skye. Brilliant sunshine to start with but driving rain and high winds during the contest. 10m completely dead. This is our highest score ever in the IOTA contest, so the weather didn't dampen our spirits in the slightest – GM0ADX.

9A7B (EU-016) claim the youngest team of operators – average age 16.

A camper van can make an ideal operating environment for the contest. This is DL7AOS.

Even the microphone is on a tower, but does it rotate? 2E0HTS, 24-hour SSB entry.

7K1CPT operates QRP mobile from Japan's island of Honshu.

RF Sniffer

A simple way of sampling transmitter RF

PHOTO 1: Completed sniffer. The sniffed output is available at the SMA socket.

INTRODUCTION. I have always been of a practical nature, finding solutions to any number of problems. This time I presented myself with the task of making an RF sniffer that would be useable over the HF bands and beyond. Commercial designs exist but they cost more than I was prepared to pay, so a homebrew sniffer was fabricated.

The design is very simple, using readily available components. There is no need to adhere to the specific mechanical design, using N and SMA connectors, although it is advisable to use the same material of transformer used in this design. The Micrometals type 52 used in the toroid core gave the most consistent coupling over a very broad frequency range, more so than any other material tested. The whole unit fits neatly into a small diecast aluminium box. The prototype was 90mm long x 35mm square.

DESIGN DESCRIPTION. The sniffer is simply a current transformer made with ten and a half turns of 0.6mm enamelled copper wire wound around a toroid core. **Figure 1** shows the rather simple circuit diagram and you may also find it useful to refer to **Photo 2**. One end of the winding is earthed to a solder tag through which the SMA socket is mounted. The other end of the coil is soldered onto the centre contact of an SMA socket located between two N-type sockets. The N-type sockets pass the transmitter signal and the coil samples off the RF signal at approximately 22dB down from the main carrier frequency (when terminated with 50Ω). Further attenuation can be achieved with in-line attenuators on the sampling output.

COMPONENTS. The parts used are freely available, with the possible exception of the T68-50A toroid. When I obtained mine there was a minimum order quantity of 170, so I now have a hundred and sixty nine looking for new homes. If you want one, at nominal cost, contact me by e-mail to G8NDL@AOL.COM. A suitable, though smaller, substitute is the T50-52 toroid, which may be more widely available. The 0.6mm enamelled copper wire isn't critical; you can use virtually any size you've got that will fit.

CONSTRUCTION. Putting the sniffer together is quite straightforward, once you've drilled the necessary holes in a suitable enclosure. There's no need to use the same sort of box I used; any reasonable size is OK.

The coaxial line is made from a short length of RG58. This was cut to suit, and the shield was grounded to the case only at one end to form an electrostatic shield. (If it was grounded at both ends it would form a shorted turn on the toroid).

The coaxial line is passed through the completed toroid. To make the toroid a snug fit around the coax, I put a layer of heat shrink sleeving at the point where the toroid sits on the coaxial line.

PERFORMANCE. The VSWR was measured from 1 to 160MHz and found to be less than 1.7:1 over the whole frequency range. In the HF region (1.8 to 30MHz) the VSWR was less than 1.15:1. **Figure 2** shows these

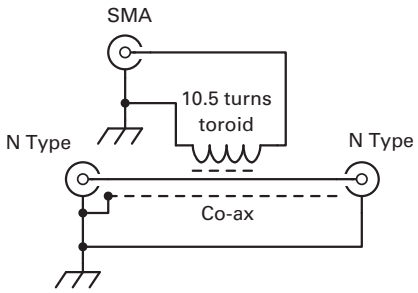

FIGURE 1: RF sniffer circuit diagram.

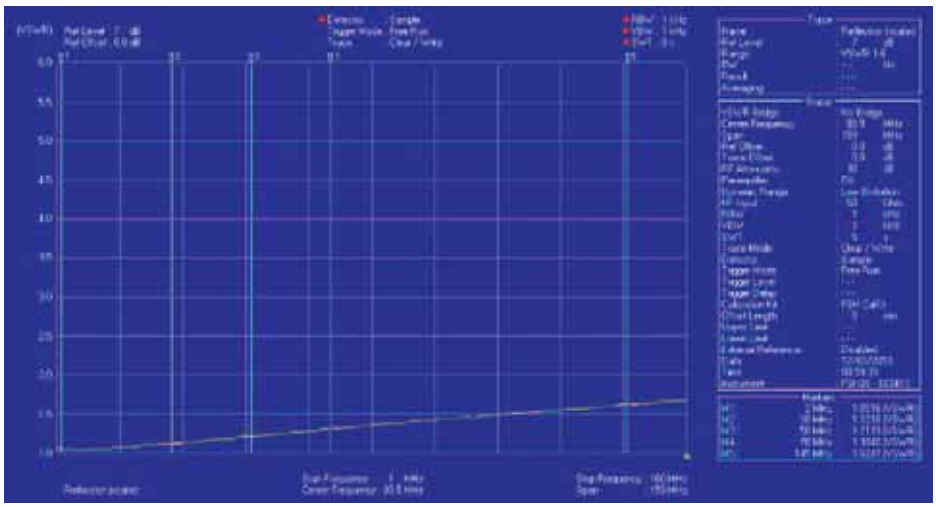

FIGURE 2: VSWR of the sniffer.

measurements. Loss was checked and found to be less than 0.5dB across the HF range.

The coupling factor was found to be -22dB ±1dB across the working frequency range. The variation is shown in **Figure 3**. (Note that the displayed values differ in scale from the -22dB: this is simply due to the way the analyser was configured).

If the -22dB output is too high for your application, additional attenuation can be achieved with inline coaxial attenuators on the sniffed output. These attenuators are often available at rallies or, at higher cost, from the traditional suppliers. They typically have attenuations of 3, 6, 10, 20 and 30dB and can be added to the sampled output to give the desired figure of attenuation. The sniffer has been used on an Icom IC-718, four metre Pye Olympic and a Yaesu FT-8800 on two metres; it appears to work fine.

The maximum power that would be advisable through the sniffer largely depends upon the component attached to the sniffed output. Bearing in mind the attenuation is approximately 22dB, a 200 watt transmitter would give a little over 1 watt of RF at the sniffed port. The equipment or attenuator attached to this port would have to be designed to cope with this level of power. In practical terms I would recommend limiting through power to about 200W at HF, declining to about 50W at 2m.

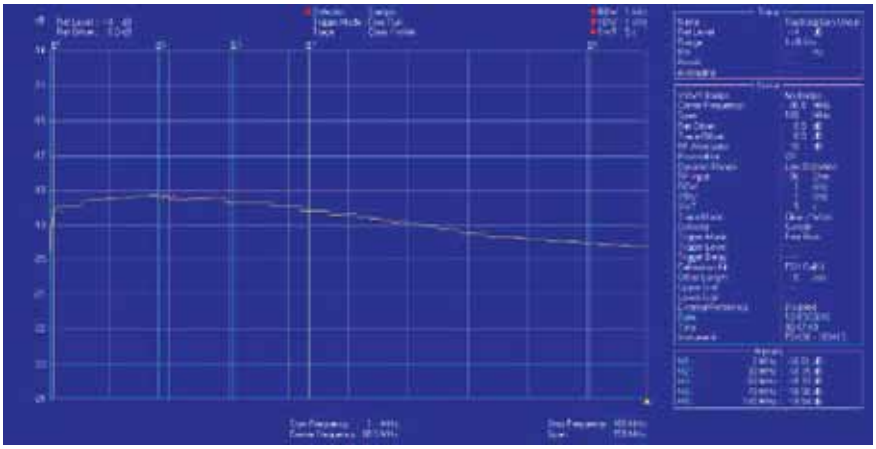

FIGURE 3: Sniffed output variation with frequency – within ±1dB from 1.8 to 160MHz.

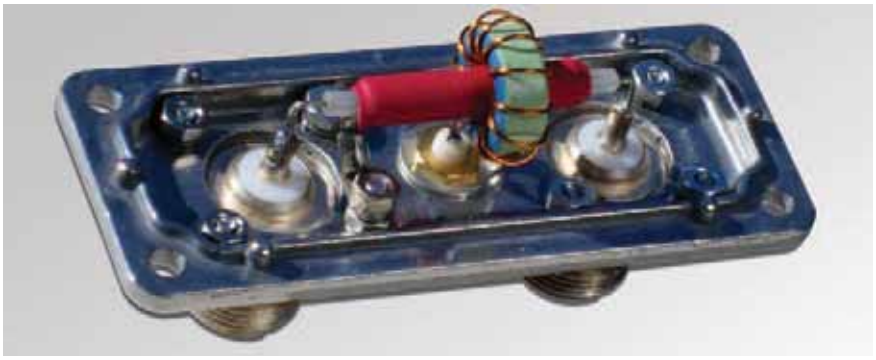

PHOTO 2: Construction details.

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NES10-2 Mk3 noise eliminating speaker .. **£109.95**
The NES10-2MKII Noise Eliminating Speaker removes unwanted background noise, hiss, hash computer hash, plasma TV interference, white noise etc from speech so that you can hear the speech much more clearly.

DESKTOP "noise away" robust base station speaker **£154.95**
The Desk Top "Noise Away" is a stylish robust base station speaker for use in radio communications, especially amateur radio

Telescopic Masts

TMA-1 Aluminium mast ★ 4 sections 170cm each ★ 45mm to 30mm ★ Approx 20ft erect 6ft collapsed..... **£119.95**
TMA-2 Aluminium mast ★ 8 sections 170cm each ★ 65mm to 30mm ★ Approx 40ft erect 6ft collapsed..... **£199.95**
TMF-1 Fibreglass mast ★ 4 sections 160cm each ★ 50mm to 30mm ★ Approx 20ft erect 6ft collapsed **£129.95**
TMF-1.5 Fibreglass mast ★ 5 sections 200cm each ★ 60mm to 30mm ★ Approx 30ft erect 8ft collapsed..... **£179.95**
TMF-2 Fibreglass mast ★ 5 sections 240cm each ★ 60mm to 30mm ★ Approx 40ft erect 9ft collapsed **£199.95**
TMF-3 Fiberglass mast * 6 sections 240cm each * 65-23mm * Approx 50ft erect 8ft collapsed..... **£249.95**

20ft Mast Sets

(5ft Sections)

These heavy duty masts sets have a lovely push fit swaged sections to give a strong mast set. Ideal for portable or permanent installations . . . also available singly

MSP-125 4 section 1.25inch OD mast set... **£29.95**
MSP-150 4 section 1.50inch OD mast set... **£39.95**
MSP-175 4 section 1.75inch OD mast set... **£49.95**
MSP-200 4 section 2.00inch OD mast set... **£59.95**
MSPX-150 4 section 1.50 inch 5mm scaffold gauge (very heavy duty) **£69.95**

Portable Telescopic Masts

LMA-S Length 17.6ft open 4ft closed 2-1" diameter..... **£79.95**
LMA-M Length 26ft open 5.5ft closed 2-1" diameter..... **£89.95**
LMA-L Length 33ft open 7.2ft closed 2-1" diameter..... **£99.95**
CARPLATE-HDT brilliant drive on plate with tilt – ideal to be used in conjunction with the portable telescopic masts and only..... **£39.95**

Patch Leads

PL58-0.5 ½m Standard RG58 PL259 to PL259 lead **£2.95**
PL58-10 10m Standard RG58 PL259 to PL259 lead **£7.95**
PL58-30 30m Standard RG58 PL259 to PL259 lead **£14.95**
PL58M-0.5 ½m Mil Spec RG58 PL259 to PL259 lead **£3.95**
PL58M-10 10m Mil Spec RG58 PL259 to PL259 lead **£10.95**
PL58M-30 30m Mil Spec RG58 PL259 to PL259 lead **£24.95**
PL213-10 10m Mil Spec RG213 PL259 to PL259 lead **£14.95**
PL213-30 30m Mil Spec RG213 PL259 to PL259 lead **£34.95**
PL103-10 10m Mil Spec Westflex 103 PL259 to PL259 lead **£29.95**
PL103-30 30m Mil Spec Westflex 103 PL259 to PL259 lead **£59.95**
(All other leads and lengths available, ie. BNC to N-type, etc. Please phone for details)

Connectors

PL259/6mm Standard plug for RG58 ..... **£0.75p**
PL259/9mm Standard plug for RG213 ..... **£0.75p**
PL259/7mm Standard plug for Mini8 ..... **£1.00p**
PL259/6C Compression type for RG58 ..... **£2.50p**
PL259/9C Compression type for RG213 ..... **£2.50p**
PL259/103C Compression type for Westflex 103 ..... **£5.00**
NTYPE/6 Compression type plug for RG58 ..... **£3.50**
NTYPE/9 Compression type plug for RG213 ..... **£3.50**
NTYPE/103 Compression type plug for westflex 103 .... **£6.00**
BNC/6 Compression type for RG58 ..... **£1.50**
BNC/9 Compression type for RG213 ..... **£3.50**
SO239/N Adapter to convert PL259 to N-Type male **£3.50**
NTYPE/PL Adapter to convert N-Type to PL259 ..... **£3.50**
BNC/PL Adapter to convert BNC to PL259 ..... **£2.00**
BNC/N Adapter to convert BNC to N-Type male **£3.50**
BNC/SMA Adapter to convert modern SMA radio to suit BNC.... **£3.95**
SO239/SMA Adapter to convert modern SMA radio to suit SO239.. **£3.95**
PL259/38 Adapter to convert SO239 fitting to 38th thread..... **£3.95**

New lower prices!

MFJ Antenna Tuners

See our website for full details.

AUTOMATIC TUNERS

MFJ-925 Super compact 1.8-30MHz 200W **£169.95**
MFJ-926 remote Mobile ATU 1.6-30MHz 200W **£419.95**
MFJ-927 Compact with Power Injector 1.8-30MHz 200W **£249.95**
MFJ-928 Compact with Power Injector 1.8-30MHz 200W **£199.95**
MFJ-929 Compact with Random Wire Option 1.8-30MHz 200W **£209.95**
MFJ-991B 1.8-30MHz 150W SSB/100W CW ATU **£209.95**
MFJ-993B 1.8-30MHz 300W SSB/150W CW ATU **£249.95**
MFJ-994B 1.8-30MHz 600W SSB/300W CW ATU **£339.95**
MFJ-998 1.8-30MHz 1.5kW **£649.95**

MANUAL TUNERS

MFJ-16010 1.8-30MHz 20W random wire tuner **£69.95**
MFJ-902 3.5-30MHz 150W mini travel tuner **£99.95**
MFJ-902H 3.5-30MHz 150W mini travel tuner with 4:1 balun **£124.95**
MFJ-904 3.5-30MHz 150W mini travel tuner with SWR/PWR **£129.95**
MFJ-904H 3.5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun **£149.95**
MFJ-901B 1.8-30MHz 200W Versa tuner **£109.95**
MFJ-971 1.8-30MHz 300W portable tuner **£119.95**
MFJ-945E 1.8-54MHz 300W tuner with meter **£129.95**
MFJ-941E 1.8-30MHz 300W Versa tuner 2 ..... **£139.95**
MFJ-948 1.8-30MHz 300W deluxe Versa tuner **£159.95**
MFJ-949E 1.8-30MHz 300W deluxe Versa tuner with DL **£179.95**
MFJ-934 1.8-30MHz 300W tuner complete with artificial GND .. **£199.95**
MFJ-974B 3.6-54MHz 300W tuner with X-needle SWR/WATT **£189.95**
MFJ-969 1.8-54MHz 300W all band tuner **£209.95**
MFJ-962D 1.8-30MHz 1500W high power tuner **£289.95**
MFJ-986 1.8-30MHz 300W high power differential tuner **£349.95**
MFJ-989D 1.8-30MHz 1500W high power roller tuner **£389.95**
MFJ-976 1.8-30MHz 1500W balanced line tuner with X-needle SWR/WATT **£469.95**

MFJ Analysers

MFJ-229 UHF Digital Analyser 270-480MHz **£199.95**
MFJ-249B Digital Analyser 1.8-170MHz..... **£259.95**
MFJ-259B Digital Analyser 1.8-170MHz..... **£259.95**
MFJ-269 Digital Analyser 1.8-450MHz **£349.95**
MFJ-269PRO Digital Analyser 1.8-170/415-450MHz..... **£379.95**

LDG Tuners

LDG Z-817 1.8-54MHz ideal for the Yaesu FT-817 ..... **£122.95**
LDG Z-100 Plus 1.8-54MHz the most popular LDG tuner ... **£143.95**
LDG IT-100 1.8-54MHz ideal for IC-7000 ..... **£159.95**
LDG Z-11 Pro 1.8-54MHz great portable tuner **£159.95**
LDG KT-100 1.8-54MHz ideal for most Kenwood radios **£174.95**
LDG AT-897Plus 1.8-54MHz for use with Yaesu FT-897 ..... **£183.95**
LDG AT-100 Pro 1.8-54MHz **£194.95**
LDG AT-200 Pro 1.8-54MHz **£214.95**
LDG AT-1000 Pro 1.8-54MHz continuously **£509.95**
LDG AT-600Pro 1.8-54MHz with upto 600W SSB **£329.95**
"New" LDG YT-450 designed for FT-450 & FT-950 in stock now **£219.95**

AVAIR SWR Meters

AV-20 (3.5-150MHz) (Power to 300W) **£34.95**
AV-40 (144-470MHz) (Power to 150W) **£34.95**
AV-201 (1.8-160MHz) (Power to 1000W) **£49.95**
AV-400 (14-525MHz) (Power to 400W) **£49.95**
AV-601 (1.8-160/140-525MHz) (Power to 1000W) **£69.95**
AV-1000 (1.8-160/430-450/800-930/1240-1300MHz) (Power to 400W) **£79.95**

MOONRAKER Power Supplies

PS30SWII 25A continuous switch mode PSU with variable output voltage and cigar socket also includes noise offset function. All for just **£89.95**

QJ-PS30II 30A continuous, includes lovely large meter displays and large rear terminals for that thick power cable on high powered rigs.
Amazing at just **£79.95**

QJ-PS50II 50A continuous, same as above with lovely large displays and large rear terminals for that thick power cable on high powered rigs. 50AMPS for under a ton!
..... **£99.95** (intro offer only).

New Reels

New 50m Reels military spec RG58 ..... only **£24.95**
Now longer do you need to buy 100m to get a drum – perfect for any shack

New high quality ferrite clips !

Easy to use with a clip close plastic housing – all sizes now in stock
FCS-S to suit up to 7mm **£1.95**
FCS-M to suit up to 8mm **£2.95**
FCS-L to suit up to 10mm **£3.95**

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77 YEARS
Mr H Whalley, G2HW
Dr AJ Woiwod, G3AWA

76 YEARS
Mr TWD Aliaga-Kelly, EI3G
Mr JCM Greig, G2FBU
PTW Castle, G6CS

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Mr G A Hook, G2CIL
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Mr F H Osborn, G2CVO
Mr LW Smith, G2FSI
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Mr T Knight, G2FUU
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Mr RE Sparry, G3BJC
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Mr J C Pennell, G3EFP
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Mr M J Powell, G3IJE
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Mr J M Read, G3JIZ
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Mr R A Bravery, G3SKI
CBH Bradshaw, G3VHP
Mr MJL Fadil, G4CCA
Mr D C Hepworth, G4LKX
Mr BW Wynn, G8TB
Mr T P Hughes, GM3EDZ
Mr J W Hayes, GW3FPH
Mr J Cairns, GW3ITT
Mr K J Marley, HB9ALV
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Mr D A Pilley, VK2AYD
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Mr F J Crisp, G3GZJ
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Mr J Anthony, G3KQF
Mr JK Eley, G3LMR
Mr JBG Parker, G3SOL
Mr G Lindsay, G4CDB
Mr E H Double, G8CDW
Mr R B Irvine, GM3EWC
Mr J D Hague, GM3JIJ
Mr R Thomson, GM3OBC
Dr D A Wardlaw, VK3ADW

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Mr JA Spicer, G3DNH
Mr L M Airey, G3GEJ
Mr W E Waring, G3GGS
Mr T I Lundegard, G3GJW
Mr F V Kershaw, G3GKI
JE Lacey, G3GLB
Mr T N Green, G3GLL
Mr FEA Green, G3GMY
Mr D Atter, G3GRO
Mr G Halse, G3GRV
Mr F Robins, G3GVM
Mr JU Burke, G3HEA
Mr B J Mitchell, G3HJK
Mr G G Kenyon, G3HMF
Mr J Brodzky, G3HQX
Mr D F Willies, G3HRK
Mr AM Smith, G3IAS
Mr EF Steventon, G3JJA
Mr A G Bounds, G3KDP
Mr J D Smith, G3KGW
Mr E Prince, G3KPU
Mr R Wheeler, G3MGW
Mr Norman Miller, G3MVV
Mr K Frankcom, G3OCA
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Mr RT Palmer, G3YJJ
C D Colbeck, G4IER
Mr J Jackson, GM3DDL
Mr A W Wright, GM3IBU
Mr R G Clement, RS18978
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Mr AJ Gibbs, VK6PG

59 YEARS
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Mr AJF Powell, G3GYF
Mr HC Young, G3HIA
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Mr L V Westmoreland, G3HKQ
Mr F Watson, G3HRE
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Mr D C Youngs, G3JIE
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Mr J W Fox, G3KHR
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Mr T W Mitchell, G3LMX
Mr S Harle, G3MEA
Mr D Rosen, G3MZO
Mr J L Hall, G3TOK
Mr J D Nias, G3VRB
Mr M J Palmer, G8BOP
REW Marshall, G8HLE
Dr G R Sutherland, GM0UPE
Mr JC Watson, VE3EZP
Col GRK Lyon, VK6LK

58 YEARS
Mr A J Turner, G0FMU
Mr CN Chapman, G2HDR
Mr J Wilmot, G3EHP
Mr A L Mynett, G3HBW
Mr D M Mallett, G3HUL
Mr P N Pitt, G3ICH
Mr S J Heard, G3IEW
Mr F H Bliss, G3IFB
Mr K H Coates, G3IGU
Mr J W Birkbeck, G3IGV

Mr D W Bruce, G3IGZ
Mr M J Griffin, G3IIN
Mr RT Craxton, G3IKL
Mr AA Chisholm, G3INL
Mr N R Pascoe, G3IOI
Mr P W Haylett, G3IPV
Mr R D Franklin, G3ITH
Mr J T Parker, G3ITP
Mr J H Lepper, G3JHL
Mr K V Franklin, G3JKF
Mr WF Blanchard, G3JKV
Mr F G Blain, G3JLN
Mr J Guttridge, G3JQS
Mr T Jones, G3JTJ
Mr J Kirby, G3JYG
Mr P O Hooper, G3KSP
Mr K Wallace, G3LQW
Mr H Taylor, G3LWK
Mr E Griffiths, G3LZG
Mr I Miller, G3NXX
Mr S A Gaunt, G3PXJ
Mr M J Mills, G3TEV
J A St. Leger, G3VDL
Mr D M Pratt, G4DMP
Mr DAD Smith, G8IDL
Mr R I Pryde, GM3LGU
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Mr DAS Holmes, GW3JSV
Mr R Jones, GW3MDK
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57 YEARS

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Mr R J Appleby, G3INU
Mr D E Baker, G3IYF
Mr SR Walker, G3IYT
Mr M J Faulkner, G3IZJ
Mr H Hyman, G3IZQ
Mr N B Cottrell, G3JFR
Mr EWG Allen, G3JHP
Mr M Watson, G3JME
Mr V E Brand, G3JNB
Mr T R Whittaker, G3JNM
Mr MH Walters, G3JVL
Mr M G Rimmer, G3KDA
Mr G J McGee, G3MDM
Mr PEW Allely, GW3KJW
Mr A M Ernest, GW3LQE
Mr G C Price, GW3MPP
Mr P A Braham, GW4BYA
Mr M Probert, GW4HXO
Mr A J Kightley, RS20103

56 YEARS

Mr J A Hardcastle, G3JIR
Mr G F Gearing, G3JJG
Mr DA Platt, G3JNJ
Mr F G Whatley, G3JOT
Mr GC Voller, G3JUL
Mr R M Woodman, G3JYL
W J Grainger, G3JYO
Mr W B Capstick, G3JYP
Mr R J Lang, G3KAY
Mr M Pharaoh, G3LCH
Mr P J Aitchison, G3LSQ
Mr DF Owen, G3MCA
Mr A R Smith, G3MPB
Mr P Sorab, G3NDO
Mr AB Woolford, G3SNN
Mr JJ Woods, G3TGR
Mr R J Pye, G4IUH
Mr B J Jayne, G8BFL
Mr G Moore, GM3JQJ
Mr P Cohen, GM3LKY
Dr J E Tindle, GW3JXN
Mr M Harrington, RS20249
Mr L Foster, RS20323
Dr H Maclean, VK3CEC

55 YEARS

Mr I Cable, 5B4AGF
Mr J E Mulye, GOVEH
Mr M E Lambeth, G2AIW
Mr F F Oldfield, G3DVK
Mr J V Hoban, G3EGC
Mr DJS Newton, G3JJZ
Mr R M Page-Jones, G3JWI
Mr J E Smith, G3JZF
Mr G E Mackrell, G3KAX
Mr R Bray, G3KEL
Mr R Robson, G3KGB
Mr D Maclennan, G3KGM
Mr B Alderson, G3KJX
Mr J A York, G3KJY
Mr D G Alexander, G3KLH
Mr D G Enoch, G3KLZ
Mr J Greenwood, G3KRZ
Mr GP Rigby, G3KTJ
Mr H Peabody, G3KUG
Mr J B Butcher, G3LAS
Mr M Hayward, G3LGA
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Start Here

Stacking and baying antennas

INTRODUCTION. There are two key reasons to stack and/or bay antennas into what's known as an array. First, you might want to improve your performance on a band but can't necessarily make a longer Yagi; secondly you may wish to add an antenna for another band in nearby proximity and don't want to diminish existing performance too much due to interactions between the two.

Although this article may primarily be thought of in terms of Yagi antennas, it is possible to apply the principles to many different antennas such as dipole arrays, dishes and verticals.

RECAP ON ANTENNA PATTERNS. Every antenna has a radiation pattern that we usually see in the form of E and H plane diagrams (see **Figure 1**). This tells us about the characteristics of the antenna such as its directivity, gain and 3dB beam width. It is important to remember though that our radiated signals are 3 dimensional so we have E and H plane diagrams to give us respective cross-sections through the overall picture. When we consider stacking and baying antennas we have to consider the effect on both planes. Sometimes you will hear of a pattern being referred to as 'clean' or 'ragged', a description of how the pattern looks. 'Clean' antennas have well defined side lobes and generally fewer of them (see E plane diagram of Figure 1), whereas ragged antennas tend to have a large number of uneven side lobes, which are not preferable (see **Figure 2**).

WHAT DO WE MEAN BY STACKING AND BAYING? Stacking is perhaps the most obvious; you place one antenna a set distance above the other(s). Baying is the logical extension of this, placing two or more antennas side by side with a set distance in between. It is possible to combine both stacking and baying to produce an even larger array. This is done with Yagis in the amateur world but is also seen with dishes in radio astronomy.

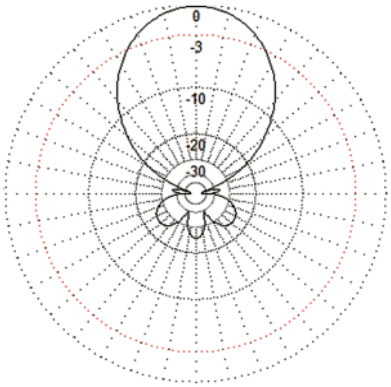
SO HOW FAR APART SHOULD MY ANTENNAS BE? This is a tough question that really depends on the type(s) of antenna you want to combine. There are two distinct cases that usually occur.

Case 1: You want to combine two identical antennas, eg a stack of two 144MHz Yagis.

To get the best possible gain out of the array, you need to consult the antenna patterns and use formula that are given in literature such as the *ARRL Antenna Handbook* and the *RSGB Handbook* to find the optimum spacing. By optimum we mean the minimum distance between the antennas that allows each antenna to avoid capturing signals that the other antenna would have picked up: we use the minimum distance to take into account mechanical construction and practicality. However, whilst the optimum spacing may give the most gain/directivity, it may not give the best radiation pattern for the array. For this reason it's often suggested that you stack at 80% of the optimum distance as this 'tames' the radiation pattern at the expense of a small fraction of the increase in gain/directivity. In other words if it is suggested you stack the antennas 1m apart, you may find that the radiation pattern is rather ragged. However if you reduce the stacking distance to 0.8m (80% of the 'optimum') then the radiation pattern is generally cleaner but gain/directivity is slightly reduced compared to the results when using the 'optimum' stacking distance.

Case 2: You want to add another antenna for a different band to an existing mast/tower.

In order to answer this question it is necessary to consider what is known as the 'capture area' of each antenna. This is a measure (though not in the sense you could find with a tape measure) of how much radio frequency energy the antenna is able to collect. In a way this is a reflection of the antenna's three dimensional radiation pattern and can be thought of as another way of looking at the gain/directivity of the antenna. When you are placing antennas in close proximity to each other it is important for their capture areas not to overlap. This is because of the size of the antennas in relation to the wavelengths involved affects how much they interact. Objects that are (electrically) smaller than the wavelengths involved are essentially minor disturbances to the lower frequency antenna. However objects that are large cause major disturbances to the higher frequency antenna in terms of the radiation pattern and impedance etc. So if you're primarily using wire antennas you want to space them as far apart as possible and even consider running them at 90° to each other, ie the antennas are physically located at right angles to each other. But if you are considering (say) 144MHz and 432MHz Yagis on the same mast, you want to make sure that the smallest possible amount (or none!) of the 144MHz Yagi appears in the capture area of the 432MHz Yagi (see **Figure 3**). Further considerations then include mechanical stability so usually the larger, lower frequency antenna(s) is placed at the bottom of a stack and you progress higher in frequency as you progress up the tower.



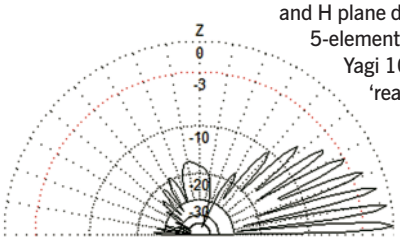


FIGURE 1: E plane (left) and H plane diagram of 5-element 144MHz Yagi 10m above 'real' ground.

SUMMARY. It's worth remembering that there is a form of diminishing returns. The most you can do by adding another identical antenna is double the received signal strength and so to double it again you'd need to double the array to four antennas... The way you feed each antenna when creating an array is also critical, but outside the scope of this article for now. You should also not neglect the mechanical implications of owning a large array! We hope this article has whetted your appetite for experimenting and encourage you to consult literature such as the Antennas column of *RadCom* for in-depth details about building your own arrays.

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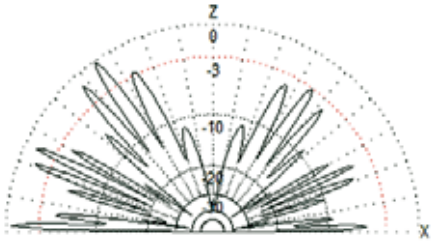

FIGURE 2: A ragged H plane diagram.

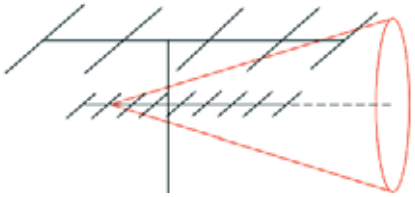

FIGURE 3: 432MHz (bottom) and 144MHz (top) antennas on the same mast. The red cone visualises the capture area of the 432MHz antenna and we can see the top antenna protrudes into it, which may degrade its performance.

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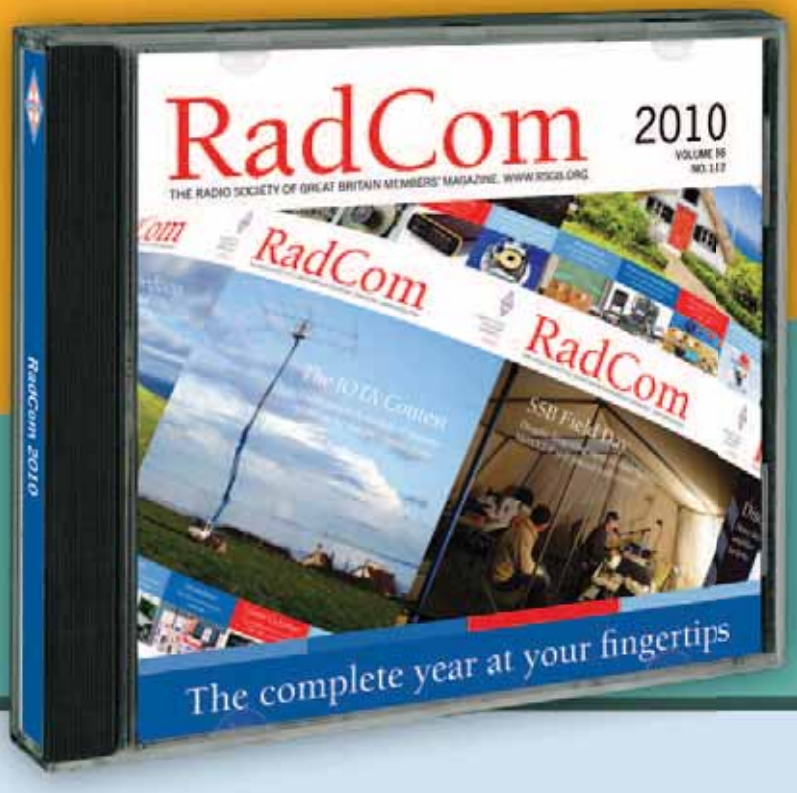

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Icom ID-E880 Review

A handheld for those who would like to try D-Star

The Icom ID-E880 VHF/UHF radio with D-Star capability.

INTRODUCTION. So far Icom UK has released half a dozen or so D-Star enabled radios to the UK market. The ID-E880 is the successor to the ID-800H that was never released into the UK but I have played with one which was imported from the US. Icom UK claims, "The ID-E880 is ideal for a range of users including Foundation licensees, anyone new to D-Star and Ham organisations such as RAYNET that are looking for a simple GPS position reporting system." Being at the lower end of price range of its other D-Star mobiles it may well be suited to those who would like to try D-Star but have been put off previously. Let's find out…

WHAT YOU GET. Icom seem to supply most accessories needed to get you going both if you were to use the radio in the shack or in the car. It is always refreshing to see the extension cable included but sometimes I feel 3.4m is just not enough if you want to mount the radio in the boot and head on the dash. The manual actually recommends mounting the main unit under the driver's seat, on the side of the dashboard centre console or under the glove-box; for any of these, 3.4m is more than enough. However, having recently joined in on a local chat with a few others discussing the same problem of being supplied with too short a remote lead it seems I'm not the only one with this issue – we agreed that 5m would be a more suitable length but I guess 3.4m is aimed at remote mounting in the shack or in any of the positions the manual recommends.

The supplied microphone is the one we see as standard with most Icom radios now, both D-Star enabled and non D-Star enabled. It provides the user will all the functionality and radio control as well as DTMF. This HM-133 multi functional DTMF microphone really does make control of the radio much easier when mobile, just a short list of its controls are the ability to make the PTT 'lockable' with one press of the PTT button to go into Tx and then another to come out, volume, M/VFO switch, direct frequency entry, power level change and the list goes on. This really does make mobile operation simple. The radio also comes with the mobile mounting bracket, a 3m fused DC power lead and a hanger for the microphone, something you don't see so often now.

PHYSICAL CHARACTERISTICS OF THE RADIO. The radio itself is small, the manual says 150mm (W) x 40mm (H) x 199.2mm (D) and that it weighs 1.3kg.

The head is detachable as could be guessed by now. It sits securely in the radio when not used remotely and a button on the side of the radio permits the head to be removed. As it uses pressure pin based contacts for the interface between the head and main unit when mounted on the radio, keep a good hold of it when you release it as the pressure of these pins can launch the head off the main unit when released but it shouldn't cause any real issue - and it does allow quick detaching. The head comes supplied with a rubber stopper in the remote control cable socket to protect it in the event you use the head directly on the main unit.

Also supplied for remote use is the best thing I've seen on mobile radios, magnetic 'pads' that screw onto the back of the head and allow it to mount onto anything that is magnetic. Icom supplies a mount specifically for this that can fit almost anywhere. A tip here if you don't want to mount the head onto a car dashboard using screws, get one of those £5 mobile phone windscreen sucker mounts that clasp the phone, most of these will also clasp the face of a mobile radio. The microphone connector is also in the main unit, why can they put one on the main body and the head unit also I don't know, this was the case on the Icom IC-2725, which had a microphone socket on both the head unit and main unit. That meant if you remote mounted the head you only had to run a single control cable instead of both a control cable and microphone lead. The control cable only has 6 wires so I'm sure they could manage this somehow, other Icom radios have 4 wires but as it's not significant for this review I'll leave it at that.

The LCD employs large alphanumeric digits that can be clearly seen. The menu allows for amber, yellow and green backlighting, contrast adjust, dimmer plus auto dimmer and what messages and memory tags you see. Due to the size of the head, most buttons are dual function. A short press gets function A and long press gets function B. This worked OK for me, the only function that I think is possibly missing from a button is TS (tuning step) but it has been given a dedicated top level menu location instead so it looks like the engineers thought about this and came up with the next best solution. Tuning steps comes in 12 sizes from 5kHz to 200kHz. Pressing the VFO/MHz button gives you tuning options of 10MHz then 1MHz so getting from the bottom of 70cm to the top is a doddle.

As the radio has a single receiver it only requires a single volume and squelch control, it is nice to see they have not compressed this into a single control with an inner and outer variable but have fitted independent volume and squelch controls, again adding to the nice ergonomics of this little radio.

On the back of the main unit we find a single SO-239 socket, a large fan for cooling, a 2.5mm socket for the D-Star serial data, a 6 pin DIN packet port – the radio supports 1200 and 9600 baud – and a 3.5mm speaker socket. The power lead comes out the radio about 15cm with an Icom 2 pole quick release power connector on the end, the supplied 3m power lead plugs directly into this.

INITIAL IMPRESSIONS. My first impression of a radio, like many others, is based on how easy to use it is. So I devised a test to see how intuitive it was. This test was done before I had switched the radio on so I was unfamiliar with it – the test went like this, I timed how long it would take me to program all the settings, the correct frequency, duplex split and CTCSS tone to access my local analogue FM repeater. It only took 1 minute 20 seconds – and who says amateurs don't read the manual! This is pretty fast and really shows the menu structure is well thought out – the large

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Icom IC-E80D digital transceiver

An entry-level D-Star handheld

DESCRIPTION. This handheld from Icom adds an entry level D-Star transceiver to their range and it will hopefully encourage more people to explore the digital modes that are increasing in popularity. The transceiver is a dual VHF/UHF 5 watt FM transmit unit, with wide band receive capabilities from 495kHz to 999MHz, optional GPS fist microphone and built in D-Star modes.

First impressions upon opening the box were good – a well built, solid 290g radio that feels good in the hand, a dual band rubber duck aerial, a 230 volt wall-wart and a 180 page manual. Attaching the supplied 1500mAh 7.4V battery completes the back of the radio and provides a splash-resistant IPX4-rated seal for the main body. The power, data, headphone and microphone sockets have captive rubber covers to keep them sealed against splashes as well, so in the most basic configuration the unit should survive being caught out in the rain.

SETUP AND CONFIGURING. The supplied charging adaptor had the battery fully charged within an hour, so I am guessing it had already had some charge, as rated charging time from fully depleted is around 2 hours. Simultaneous charging and operation is possible, so it is easy to get started setting up the transceiver before having a fully charged battery. The claimed 6 hours of operating time from a charge, based on a 1 minute Tx, 1 minute Rx then 8 minute standby is certainly achievable, based upon my use. There is also little to no phantom power draw when the unit is powered down, as a fully charged battery still performed well after two weeks of being turned off.

The dual band handheld with D-Star built in.

Shortly after receiving the unit, I travelled to the USA. As with most manufacturers, Icom ship the IC-E80D with the UK band plan for 2m and 70cm, which is quite a lot narrower than the Americans enjoy. As most US repeater frequencies lie above our permissible band plan, I knew that transmitting would be an issue. Icom UK kindly supplied the service manual and details on how to modify the unit for wider coverage – a diode move and addition. It is a shame that the supplied power adaptor is single voltage, UK 3 pin, so a trip to a local high-street electronics vendor yielded an inexpensive multi-voltage input switch mode power adaptor. Travelling amateurs need to be aware of the band plans of the countries they are visiting and ensure that their equipment complies if they intend operating, so it is a good idea to check your transceiver and power adaptors before setting off.

As this was my first foray into the D-Star world, I was fortunate to get some pointers from Gavin, M1BXF, who is very knowledgeable when it comes to this digital mode. I can recommend a visit to www.dstarusers.org for anyone new to D-Star, where you will find lists of repeaters and a fairly active forum with plenty of advice and assistance for new users.

The well structured manual covers the basic operations and analogue repeater access within the first 33 pages and then gets into DV Mode setup for D-Star operation. Easy to follow diagrams explain how the technology works, and then step by step menu operations explain initial setup. I am not going to cover D-Star use and operation in detail, as that has been well covered in *RadCom* before, and can also be further researched online. If you are initially setting up just one repeater for access, you should be on the air within about 5 minutes by following the manual.

To use the IC-E80D for D-Star, the first thing that needs to be set is your own callsign (MY on the menu display). You can set up to 6 different MY callsigns in the IC-E80D. You will also probably want to set some callsigns of stations you would like to call - these are called 'your callsign' or 'other station callsign' (UR on the menu). Up to 60 UR callsigns can be stored. Lastly, you would want to store some repeater callsigns (RPT1 and RPT2): the unit can store up to 300 of these.

Entering callsigns is done by scrolling through letters and numbers using the top dial, and then advancing using arrow keys on the keypad. This can get quite tedious for entering a lot of repeaters and UR callsigns, so Icom kindly provide free software at www.icom.co.jp/world/support/download/firm/index.html - the CS-80/880 cloning software revision 1, dated 25 February 2009 at the time of this review. You will need an Icom OPC-478 cable (SP jack to RS-232C) or equivalent, either a genuine Icom part or equivalent from your favourite radio supplier. There are also many homebrew designs for this interface that can be found with a quick Google search. A much simpler option is the Icom OPC-1529R cable, which is merely a 2.5mm stereo plug to DB-9 female. The pin-out is DB9 pin 3 to plug pin, DB9 pin 2 to plug ring and DB9 pin 5 to plug sleeve. A web search will reveal diagrams.

Once you have attached the transceiver to your PC, the software makes managing memory setup a lot easier and faster, and also provides a way to take a backup of the memories, or to import an ICF data file of frequencies, repeaters and setups from another source.

The same OPC-1529R or equivalent cable can be used for low-speed (approximately 950bps) data communications. These are supported in simplex operation, either auto PTT based on data being sent, or simultaneously sending data while voice PTT is in operation.

USE AND PERFORMANCE. As with most handheld transceivers, 5 watts of output creates a fair bit of heat and with a heavy duty cycle you will probably want to be using a headset or the optional HM-189GPS speaker microphone. Wind noise can become a problem when transmitting using the built in microphone, whereas using a speaker microphone normally allows you to cup your hand and provide a wind shield. This accessory will also give you the capability to transmit GPS co-ordinates in D-Star mode. Another option for GPS input is using the same OPC-1529R type cable to take NMEA strings from a 3rd party GPS unit. Received GPS data is displayed on the LCD. Basic direction finding and proximity alarms can be performed.

Received audio quality is good from the built in 25mm speaker, but you may

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p38 ⏩ screen also helped me see what was going on. The buttons are well spaced out and they have a good tactile feel to them. The speaker is plenty loud enough as the repeater ident just woke me up as I'm writing, the volume is only half way so there should be no problems hearing it.

USING THE RADIO. Configuring the radio to work with my local D-Star repeater took me 1 minute 40 seconds and was very easy. The user interface has really been improved to help navigate through the setup procedure – little touches like using the signal strength bar to indicate where in the list you are (think scroll bar), giving one of the best indications I've seen yet of where you are in a list of options. This isn't enabled for all menus but covers the right ones.

I gave a test call and started have a few chats with a station in West Cheshire then local to me in Cambridge.

MENUS, MEMORIES AND MORE. I've touched on how easy the radio is to use and how the menus are grouped together into functional sections much the same way as most of the previous Icom radios I've used, these are: TS (tuning step), DUP.T (duplex and tone), SCAN, SET, DV SET (Digital Voice set), CALL-S (D-Star TX callsigns), RX CAL (D-Star RX callsigns), MESSAG (D-Star messages), RPT-L (???) and GPS (D-Star GPS settings).

It's also about time I mention some of the other features of the ID-E880, after all people shop for radios with specific features and not just the looks and ease of use. Some of the features of the ID-E880 are impressive, starting with the memories – it has a total 1052 memory channels, which is really only 1000 regular channels with 50 scan edges and 2 call channels. There are 300 memories set aside for D-Star and all these memories can be split into 26 memory banks and the scan function can check 50 channels per second. Talking of scan, the ID-880 can also scan tone and memory banks. If all these memories seem daunting to program then don't worry, Icom provide the CS-80/880 cloning software as a free download. I wish others would do the same!

RF PERFORMANCE. As expected with modern radios, the ID-E880 manages 50W output on both 2m and 70cm. Transmit covers the ham bands only, also as expected. The receiver covers 118MHz to 173.995MHz, 230MHz to 549.995MHz and 810MHz to 999.990MHz. Having lack of access to test equipment I'm unable to provide precise figures for the receiver but on-air testing while out mobile gave no issues that were apparent. I used an IC-2820 in the car as a comparison. The ID-E880 comes with a 0.5ppm high frequency stability with TCXO unit as standard. While this obviously gives great frequency performance, it also underlines Icom's commitment to performance. However, that said, the single antenna connector on the back is an SO-239 connector. Basically the RF of this radio is more than comparable to the IC-2820 that has been reviewed previously and is a very good dual band radio.

PERFORMANCE AUDIO. Something different on the ID-E880 is the ability to tailor the received audio with wide, middle and narrow noise filter that Icom claim reduces any high pitch noise on AM and FM reception. I could hear a difference in the tone when selecting these option and found middle best for me, but your mileage may vary. The audio level as mentioned can be very loud without distorting too much and in a car should be more than able to hear the other station. The microphone sensitivity has a 2 step adjustment that helps reduce background noise if required, I used the lower setting when out mobile as others said it sounded better for my car.

GENERAL IMPRESSION AND VERDICT. As a fan of my IC-2820, which is a dual band radio with independent left and right display and controls, I wasn't sure how I would get on with the ID-E880 being a dual band radio with only one display and set of controls. I soon found that actually worked for me and made me realise I usually have one side of the IC-2820 turned down effectively making it a single band radio. Using the menus was simple and in true ham radio fashion I was up and running on air with minimal use of the manual. The radios performance was better than average, which for its price range is a good thing. The large display and speaker make this radio easy to use in the car and the remote head helps with mounting solutions.

The price of the ID-E880 is a lot less than the IC-2820 at the moment so it makes a wise choice if you are deciding you want a radio to get into D-Star, which continues to move forward apace with new repeaters, simplex nodes and network features – but that's another article.

My thanks to Icom UK for the loan of the review model.

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p39 ⏩ prefer to use a headset or earpiece, or the speaker microphone. The volume level can be adjusted quickly with a pair of buttons just below the power button on the front of the transceiver. The IC-E80D is one of the loudest handhelds I have used in terms of volume level, however with strong signals, top volume level can suffer distortion.

To compare transmitted audio quality, I was fortunate to have assistance from Rob, M0VFC who took a few recordings. Subjective impressions of the transmitted audio is that voice quality is very good, but audio level is a bit lower than other similar handhelds produce and receiving stations may have trouble copying transmissions if they have local background noise, for example when mobile in a vehicle. No mic gain settings could be found to adjust transmitted audio levels.

A sturdy metal belt clip that screws to the metal back of the unit is supplied, as well as a lanyard for looping over your hand or wrist. The supplied rubber duck type aerial gives good results on transmit and receive, but is easily exchanged for a higher gain SMA fitting aerial from a 3rd party manufacturer, or an SMA adaptor to connect to an outdoor antenna.

A plethora of other accessories are available such as desktop chargers, leather cases, cigarette lighter power adaptors, headsets and more from most major Icom stockists.

OVERALL IMPRESSIONS. The Icom IC-E80D is aimed at the new Foundation licence holder, as well as those amateurs who would like to take their first steps into the world of D-Star. Experienced operators who want more features and flexibility may want to evaluate the next model up, the IC-E91D or the top of the range IC-E92D.

It is a shame that Icom use a segmented LCD display on the IC-E80D, rather than the more detailed dot-matrix displays on the higher end handhelds, as abbreviated menu options and scrolling callsigns are not the easiest to work with.

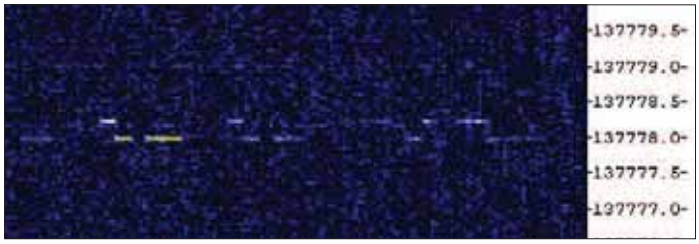
Overall build quality is a sturdy, well built radio that feels like it could survive being well used outdoors, a multi-function top dial with good ratchet click, and responsive, firm backlit buttons. The buttons are multi-function, and it will take a little bit of time to get used to whether a single push or a 1 second push or a push-and-turn-dial operation are needed to perform a task. The symbols and text on the buttons is easy to read with the backlight on, but is quite small and may challenge some users initially.

Free software to manage memory banks and an easy to build interface are a welcome change from the usual proprietary interfaces and optional paid-for software offerings from some vendors. Icom UK's excellent customer service and technical support also add a lot of value to products such as the IC-E80D and will help ensure that anyone purchasing one of these gets the best possible results.

My thanks to Icom UK for the loan of the review model.

LF

Spain 6, Netherlands 0.



JA7NI's 'NI' in DFCW120 as received by RN3AGC.

The consensus seems to be that 136.177kHz is the place to be, and several of the grabbers have been adjusted to this new slot.

SPAIN ARRIVES ON 500kHz. The Spanish authorities have granted six amateurs special permission to operate between 501 and 504kHz (as in the UK) with a bandwidth of less than 100Hz and a power of 5W ERP. First on the band was a beacon from EA3WX that was widely received around the UK and northern Europe despite Luis only using a 17W Tx. Next came a test from EA4BVZ in RTTY, which was beautifully copied by G4WGT. Since then several Spanish stations have been active including EA2HB who worked G3KEV on CW.

NETHERLANDS DEPARTS, TEMPORARILY. The 500kHz permits issued to PA stations expired on 31 December and will not be re-issued. All Dutch 500kHz activity is now suspended pending the inclusion of a 500-505kHz band in the National Frequency Plan on a secondary basis. This bureaucratic process may take a few months but will eventually allow more stations to participate.

JAPAN TO EUROPE. RN3AGC, 100km north of Moscow, has copied JA7NI on several occasions recently, a distance of 7172km, with very clear signals on peaks. JA7NI has already copied UA4WPF and RA3YO so Andrey is keen to try for a QSO.

NEW ON THE BANDS. A quick round up of new calls heard: on 136kHz, I1DDS was spotted by Markus, DF6NM in December, ES5AM has been worked by G3XDV and several others and G3KEV reports working SM6BGP on 500kHz CW at 589.

NEW EU DX FREQUENCY. Considerable discussion has taken place recently regarding the best frequency to use for trans-Atlantic tests from this side of the pond. Some stations have used the same slot as the Americans (around 137.7kHz) but this could lead to QRM for listeners in Europe who are trying to copy US stations. Others have used 136.3kHz but this was subject to interference in some parts of North America.

DREAMING OF ROS. A new version of the ROS software that is optimised for use on VLF has been released. This version generates multi-tone FSK at 8.95-8.975kHz within a bandwidth of only 25Hz, or it can be set to generate the tones at twice frequency (17.9kHz instead of 8.95kHz) allowing for the division by two inherent in some Class D/E transmitter designs.

BEACON BACK ON. LA1ASK/B is back on the air on 509kHz from a new site near Bergen, western Norway (JP20ok). It sends its call in MCW and has a Tx power of only 5W. More information is available at www.la1ask.no and reception reports are welcome.

NEW GRABBERS. With a little help and inspiration from Stefan, DK7FC, Chris Gomoiu, 4X1RF has set up a VLF/LF grabber at his QTH in Haifa, Israel. At present there is a window on 8.97kHz, a 1 to 24kHz span and two 136kHz band views. Find it at www.qsl.net/4x1rf/.

Also new to the grabber fraternity is Halldor, TF3HZ who has set up a similar facility (but without the 136kHz coverage) at his QTH in Reykjavik. Google TF3HZ grabber and you'll find it.

MYSTERY NOISE ON 500kHz. Listeners all over Europe have reported a wide-band noise extending from 498 to 502kHz with very sharp cut-off above and below. It shows up as a brighter band on spectrum display plots. It appears to be a French test of a proposed maritime data broadcast transmission using OFDM. The proposal specifies a maximum 10kHz channel width that wouldn't leave much room for a permanent amateur allocation in the 500kHz region. How this fits in with the existing NAVTEX system on 518kHz, no one is quite sure. Whilst on the subject of NAVTEX, John, GM4SLV has been using a program called YAND (Yet Another NAVTEX Decoder) that enabled him to identify a Chinese NAVTEX station one evening at 1811UTC.

AUSTRIA ON VLF. Two Austrian stations – OE5ODL and OE3GHB – have been experimenting on 8.97kHz recently and both have been received in Germany by DF6NM. Both were using their normal LF aerials and the distances achieved were 221 and 413km respectively.

MORE VLF TESTS. Stefan, DK7FC has been out portable again on VLF, first with a long-duration test using his 600m spaced 'earth antenna'. The long transmission allowed for high resolution reception techniques to be used to detect extremely weak signals. Unfortunately no DX reports were received despite a lot of effort from Stefan and the prospective receiving stations.

His next test was with the biggest kite aerial yet, supporting 300m of wire. Signals were received by OK2BVG on 5.17, 6.47 and 8.97kHz, by SQ5BPF on 5.17 and 8.97kHz and by many others in the UK France and Belgium. The most impressive result was a positive identification from 4X1RF in Haifa, setting a new distance record of 2873km for the 8.97kHz 'dreamers band'.

Also out with a kite on a different day, was Markus, DF6NM who flew 100m of wire and tried both 6.47 and 8.97kHz transmissions. The higher frequency test had to be cut short when the wind died down but both frequencies were visible on DK7FC's grabber so if they could both fly kites on the same day a QSO should be possible. Paul Nicholson in Todmorden managed to detect signals on both frequencies so it seems that even a modest kite system is capable of good results on this band.

Chris, G3XIZ is the first of the UK dreamers band permit holders to radiate a signal that could be detected at a reasonable distance. He augmented his usual long-wire with an extra vertical section supported by party balloons! His best reception so far is by Pete, G0FMT (10km) and by Jim, M0BMU, 37km away.

GENESIS LF KITS. Genesis Radio kits of Australia are launching SDR transceiver kits that will cover the 137kHz and 500kHz bands with 10W RF output. They will be known as the G137 and G500 respectively. Details are sketchy at present but I suggest keeping an eye on their website at www.genesisradio.com.au.

SAQ TESTS. SAQ was on air again over Christmas and the New Year with two special transmissions on 17.2kHz. The first was on Christmas Eve and it was well received around Europe and into the East coast of the USA. The next one was unusual in taking place later at night so that the USA would be in darkness at the time. Signals were much stronger to the USA but the increased level of noise meant that copy was still difficult. KL7UK in Alaska and many East coast stations reported good signals and more reports are still coming in.

HF

Latest News

The ZS8M QSL card was one of the most sought-after in 2010 (see year-end report).

DELAYED DXPEDITION. As I write this, the DX0DX Spratly DXpedition has been delayed and the team is waiting in the Philippines while various problems are resolved. Hopefully all will be well and by the time this appears you will have Spratly in the log on several bands. The VP8ORK South Orkney effort was still looking good for its original schedule.

YEAR END REPORT. Joe, W1JR has produced his usual excellent end-of-year review of the HF DX scene. His opening remarks will surprise no-one, in that he notes despite great expectations at the start of the year, HF propagation was not much better than the last two or three years. He reckons that some 285 DXCC entities were active in the course of the year, though only one 'Top Ten' entity by way of ZS8M. He notes that the following DXCC entities are believed to have been inactivate for at least six years: 7O, BV9P, CE0X, E3, FR/E, FR/T, FT/Z, HK0/M, KH1, KH3, KH5K, KP1, P5, VK0/H, VP8 (S. Sandwich) and ZL9. This shows, he says, that an avid DXer working hard at DXCC in the last 7-10 years could have been able to make the DXCC Honor Roll. Right now there is no evidence that any of them will be activated in 2011, either, but we can always hope that somewhere there is an individual or team with the ability and/or the contacts to make it happen.

As far as possible changes to the DXCC list are concerned, Joe suggests that Kosovo and/or South Sudan could be possible new ones, depending on various elections and the meeting of certain qualifying criteria, while a recent Russian treaty took back possession of Malyj Vysotskij Island (4J1FS etc) from Finland so this entity should soon be added to the deleted list. Joe's full report was made available, as usual, to readers of W3UR's excellent *Daily DX* publication (which, I gather, is now entering its 15th year of publication – how time flies). And if you want to hear some of what you missed, Tom, K8CX, has put up his annual 'Rare DX Sound Clips' for 2010. He has 131 of them this time around, posted on his website. Tom says, "This makes 13 full years of sound clips available." There are also some clips from the 1960s and 1970s linked from the home page. If you have old HF recordings, he would be very interested in hearing from you.

INACTIVATED ENTITIES. While on the subject of inactivated entities, the results of the 2010 Most Wanted Countries survey have been published in the January/February issue of The DX Magazine. There was very little change from last year to this year's top 20 countries. In fact, only FR/G - Glorioso moved out of the top 20. It should be no surprise that P5 - North Korea remains in the most wanted position. Here are the 2010 results for the 'Top Ten'.

2010 Rank	Prefix	Country	2009 Rank
1	P5	North Korea	1
2	KP1	Navassa	2
3	3Y/B	Bouvet	4
4	7O	Yemen	5
5	VK0/H	Heard Island	6
6	FT5Z	Amsterdam	9
7	ZS8	Marion Island	3
8	VP8/S	South Sandwich	10
9	FT5W	Crozet	7
10	BS7	Scarborough	11

The full results for 2010 will probably be posted in a month or two to the DX Publishing, Inc Website. The top 100 for 2009 can be found at www.dxpub.com/dx_news.html.

DXPEDITIONS OF THE MONTH. A large multinational team will operate from Cameroon, probably as TJ3C, from 10 to 20 February. They will be on 160-10m CW, SSB, RTTY and PSK with six stations, which will be one K3 and five TS-450SATs and six Acom 1010 amps. Their six laptops will be running the Wintest software. They will be on the air 24 hours a day for nine days. Antennas will be five Spiderbeams, a vertical for 160, 80, 40, 30 and 20m, one or two low-band Beverages for receive and a K9AY receiving loop. F6AML will be a pilot station. The goal is 80,000 QSOs, emphasising the lower bands, 160-30m, and digimodes. QSL via F5OGL.

Phil, G3SWH and Jim, G3RTE head for the Cocos (Keeling) Islands for their latest operation. The two plan to operate from the West Island as VK9C/G6AY on 80 through 10m on CW only from 22 February to 5 March. The Cocos (Keeling) Islands (OC-003) rank number 75 worldwide. "Propagation permitting, we plan to have two stations on the air for as many hours every day as is possible" says Phil. Their focus will be on Europe, North America and ROTW (rest of the world) and they have a goal of 15,000 QSOs. QSL VK9C/G6AY via G3SWH either direct with SAE and 'adequate return postage', via Phil's website for a bureau reply or via the bureau.

OTHER DX NEWS. The 8th Antarctic Activity Week is coming up, from 21 to 27 February. This one always causes confusion, because many of the special event stations are not in the Antarctic but are supporters of the Worldwide Antarctic Program, WAP. Some of the stations may operate outside those dates as well. The purpose of the event is to promote worldwide interest in Antarctica.

Laci, HA0NAR, is doing a swing through West Africa in January and February, starting with 6W Senegal and then J5 Guinea-Bissau 5 to 26 February. Look for 6W/HA0NAR and J5NAR. Also planned are side trips to AF-078 and AF-093, Senegal South Group and Guinea-Bissau Coastal Region Group, two Islands on the Air destinations. He plans to concentrate on 160, 80, 40 and 30m, with 160m from J5 the biggest priority of all. Peter, HA3AUI, is also in that region, as 6W2SC Senegal and J5UAP from 1 February to 31 March. He will do some of his operating from the beaches in Guinea-Bissau with his K3, Spiderbeam and verticals, 160-10m, mostly CW and digital. QSL to HA3AUI direct.

Bogdan, 3B8/SP2FUD and Slavo, SP2JMB/3B8SC, will be on Mauritius, AF-049, 8-17 February, then on Rodrigues (3B9), AF-017, 18-22 February. Between them, they are likely to be active on all bands and modes.

V5/DJ4SO in Namibia will be operational 22 February to 23 March. Klaus plans to operate CW, RTTY, PSK and SSB on 160-10. He will be at the same QTH as his last year's operation, "a farm home southeast of Windhoek". QSL via the bureau, or send an e-mail request to Klaus@dl4so.de, or direct or LoTW. No eQSLs.

A German team has announced plans to operate from Sao Tome and Principe as S9DX from 3 to 17 February. They will be on all bands, CW, SSB and RTTY. QSL via DL1RTL.

Mike, G4IUF will be in PJ6 from 27 January until 3 March. Operation will be holiday style from a rental villa with plenty of trees and room for antennas. Call probably PJ6/G4IUF. Mike will aim to operate 7kHz from the band edge on CW and around 3,797, 7,147, 14,157/247, 21,277 and 28,477kHz on SSB.

N7OU and W7YAQ, Bill and Bob, are teaming up for another expedition to the Pacific, this time to Tarawa, West Kiribati, T30 from 8 to 22 February. They plan on being on 160-10m, mostly CW with some RTTY and SSB, 100 watts to verticals. QSL to their home calls.

Gerd, DJ4KW and Gisela, DK9GG plan their next operation from Belize in February with two other German amateurs joining them for the WPX RTTY Contest. V31YN is Gerd and V31GW is Gisela. Gerd will operate the CQWW 160 CW Contest, and then go portable as V31YN/P to Blue Marlin Lodge on NA-180. Then back to the mainland for further contest and non-contest operation through to 27 February. Gerd likes CW and Gisela likes RTTY.

Dave, G3TBK, plans to be active from St Vincent as J88DR during the ARRL DX Contests (February 19/20 and March 5/6) and the RSGB Commonwealth Contest (March 12/13). Before his operations from J8 he is also planning stops in Antigua (V29TBK), Montserrat (VP2MDC) for about two weeks as well as St Lucia (J6/G3TBK).

The 'Caribbean Buddies' have announced another '100 watt or less low power radios and the Buddipole portable antenna systems' DXpedition to Dominica (J7) during the first nine days of February. After two very successful mini-DXpeditions to St Lucia in 2010, they look forward to demonstrating their capabilities for "ultralite DXpeditioning in magnificent vista locations, operating a field portable, battery-only radio with backpackable, lightweight antennas". The entire mini-DXpedition is limited to equipment that can fit in their airline suitcase. QSL via LoTW, eQSL, or mail to the operator's home callsign (SASE required). A web page is under development.

Bob, 5B4AGN (G3ZEM), plans to be in Palau, IOTA OC-009, from 2 to 8 February. He will operate CW only from the 'Palau Rental Shack', with the callsign T88ZM. Bob says he "may stray occasionally onto RTTY". Next, he will go to KH0/G3ZEM to operate 9 to 16 February, using 'The Saipan Rental Shack', "so antennas are as provided without opportunity for changes". He says if the low bands are productive he will spend time there at local sunrise and sunset. QSL via M0URX. Logs will be on LoTW as soon as Bob can arrange it.

P29CW in Papua New Guinea will start in February and run to the end of 2011. Operator Allan, VK2GR, will be in the Western Province. He plans to be on CW, RTTY and SSB with wire antennas and an FT897D. This is IOTA OC-034.

In addition to the above, bear in mind that there are a number of contests coming up that will generate activity, especially from the Caribbean where, these days, there are plenty of 'shacks for rent'. The ARRL International DX Contests (CW in mid-February and SSB in early March) are a focus for many such activities and although the DX operators will work only North American stations during the contest itself, there are likely to be plenty of free-for-all opportunities both before and after the contest weekends.

60m REPORT (from G4TRA). It has been good to hear one or two new G calls immersing themselves in 60m DXing for the first time this month, finding out how the band operates. G3SED, an accomplished low band DXer, has been one of those, putting a good signal out across the Pond. Of course we welcome all to try this interesting and demanding band for a little longer DXing.

From St Lucia, the Buddipole guys (J6/K4MK) came on for one day working a few UK stations amongst the many US contacts and also PZ5RA in Surinam, the only 60m station there, has been heard too. In many countries there may only be one station operating on the band and infrequently too, so it was good to hear from VP9GE in Bermuda and UR7GG in the Ukraine this month as well. VP2MSC operated by Carl, K9CS came on for a short spell from Montserrat too as did Hassan, CN8SG, the only African station currently active on 60m. KL7HBK is the only Alaskan station worked from the UK and he has been on this month too.

Finally, Wake Island. Colin, WA2YUN/KH9 reports that he'll check 60m between 0900 and 1100 most nights on CH5. If you want to work this rare one you might be better at a joint sunrise/sunset grey-line time, say later in spring time as opposed to full UK daylight.

YASME EXCELLENCE AWARDS. Many readers will be familiar with the YASME Foundation, which has done a lot of work to support DX activity over the years. From time to time it gives Excellence Awards to individuals who through their own service, creativity, effort and dedication have made a significant contribution to amateur radio. As such, it recently announced awards for several individuals who are, indeed, worthy of note. Firstly, Ramon, XE1KK, who has been active in many aspects of the hobby, both in the organisational side (within IARU and WRTC, for example) and operating (many DXpeditions including IOTA activations). Secondly, Mako, JE3HHT, who wrote *MMTTY* and *MMVARI*, popular digital mode programs, which have done much to popularise not just RTTY but other emerging digimodes. Then Bruce, WA7BNM, best known to contesters for his online contest calendar and for the 3830 score reporting site. Rick, KN6KB is recognised for his work on *WINMOR*, a sound-card software becoming increasingly popular with users of the Winlink 2000 system. Mikael, SM2O developed *Remote Radio Interface,* allowing remote control of HF stations, a popular facility for those who live in noisy urban environments, or locations where they are unable to erect antennas. Alex, VE3NEA is recognised for *DX Atlas, Morse Runner, HAM-CAP, CW Skimmer, Rocky* and other innovative software. And finally, just to show that it isn't all about computers and the Internet, Pepe, EA5KB receives the award for his extensive QSL manager duties on behalf of stations in countries where the postal service leaves much to be desired and/or where there is no local QSL bureau. Well done to all.

CORRESPONDENCE AND TABLES. Quite a lot of end-of-year correspondence, but it is still trickling in as I write this, so I am holding over a summary of what you have had to say until next month, when final 2010 scores should be in, too. A reminder that, for 2011, I propose a WARC bands table once again but, as a result of demand from several correspondents, I will also run a DXCC entities worked table, regardless of band or mode. You can participate in one or both. Now for some other correspondence, not directly year-end related.

Mike, W4MK writes, "I recently received several QSL cards from hams working a callsign of J6/W4MK in St Lucia. I wanted to let RSGB know that someone is using my call as a portable without my consent or knowledge. Anyone claiming to have this contact in your logs on or about 12/09/10 SSB 15m or 21m is getting false information from an illegal ham operator. I am currently off the HF bands and there is no way my call could be used for these contacts".

Dez, G3WW/G0DEZ comments that he aired the Short Contest Call M6W in the CQWW CW Contest and worked some 12 new band slots on 80m using low power and a 30ft homebrew loaded vertical. These were 9L, A7, C3, C5, FY, HI, HK, PJ4, PZ, TI, V4 and VP2E. He says, "There was plenty more DX worked but those were the all-time the new ones for that band. 80m genuinely seemed like 20m at times".

Brian, GW0GHF writes, "One or two comments for your column regarding 60m. I use 60m regularly and carry out QRP experiments with G4VLC and G4PNF. We all use the digital mode Olivia (500Hz bandwidth). We are all surprised by the lack of activity using digital modes, especially on 60m. For instance, when the band appears 'dead' and unusable to SSB, then communication is usually possible by Olivia. We can be found most evenings on 5366.5 on that mode. One thing that surprised us was that even when the signals are in the noise, copy is often 100%. In the winter evenings hardly any SSB can be heard, but give Olivia a try. In the early morning hours, G4VLC gets Olivia QSOs with US stations. A good pointer to conditions is the aeronautical station of Gander Radio (Newfoundland) on 6604kHz".

Maurice, G0AWA, near Newcastle upon Tyne, writes that he was keen to work ZL8X, as he has only nine to go for DXCC, but heard nothing. He was, though, only listening on 10, 15 and 20 and it is clear from reports that the lower bands proved more fruitful to the less well equipped. I don't think 10 or 12m were ever going to be possible from the UK with current levels of solar activity. But the trick was undoubtedly to watch the ZL8X website where you could see exactly which bands were generating contacts with the UK, and at what times, based on the actual expedition log.

Colin, MU0FAL reflects on the CQWW CW Contest, which gave him PZ5T for a new one on 40, and PJ4A on all six contest bands. Colin says he uses the IARU beacons on 24930kHz as a propagation indicator on that band, but frequently calls CQ for ages with no takers, despite beacons being heard.

SILENT KEY. Sheikh Ahmed Mohamed Zidan, HZ1HZ, has become a Silent Key. He was the first HZ contact for many over the last few decades. He was a member of the ARRL, RSGB and A-1 Operators Club. Dick, N7RO, sent out over 90,000 cards for him as QSL manager.

THANKS. Special thanks go to the authors of the following for information: *OPDX Bulletin* (KB8NW), *The Daily DX* (W3UR) and *425 DX News* (I1JQJ). Please send items for the April issue by 18 February.

WEBSEARCH

DJ4KW/V31YN: www.qslnet.de/dj4kw
K8CX sound clips: http://hamgallery.com/dx2010/
S9DX: http://s9dx.hkmann.de/
WAP: www.waponline.it/Default.aspx?tabid=113
VK9C/G6AY: www.g3swh.org.uk/vk9c-g6ay.html

VHF/UHF

Digital modes assist with VHF band activity

PHOTO 1: The 144MHz and 432MHz antenna system at the QTH of Bob Harrison, G8HGN.

PROPAGATION REPORTS. December was, predictably, yet another month devoid of any significant propagation events. Two auroral back-scatter openings, on 14 and 18 December, were reported by stations in Scotland but both were brief and uneventful. Jim Rabbitts, GM8LFB (Caithness, IO88) reported hearing the beacon stations GB3LER (Shetland Islands, 50.064MHz) and OY6BEC (Faroe Islands, 50.035MHz) around 1500UTC on the 28th. He also heard the CW station of LA3ANA (Norway, JP53) peaking 41A on 50.090MHz. The opening reached up to the 70MHz band with GM4YJB (Caithness, IO88) hearing the OY6BEC beacon on 70.035MHz. These 'Scottish' type auroras will continue until such time that geomagnetic activity really picks up. Then auroral back-scatter openings will be available to everyone in the UK and on bands as high as 432MHz. This is likely to occur in the period 2012-2013 but take note that at any time in the run up to solar maximum (and beyond) there will be some major events. So make sure your CW proficiency is up to scratch!

A tropospheric opening on both the 144 and 432MHz bands occurred on 10 and 11 December with stations as far north as the Isle of Man (GD) and Northern Ireland (GI) contacting SSB stations in southern France and Spain. Steve Passmore, M0BKL (Devon, IO80) has recently re-assembled his 144MHz station, a Kenwood TS-790E transceiver and a 12-element M-Squared Yagi and was pleased to hear the station of EA1UU (Spain IN83) calling CQ at 1935UTC on 11 December. Making a quick SSB contact he then went on to make further QSOs with the stations of EA1FBF (IN73), EA1MX (IN73), EA2AWD (IN93), F1MOZ (IN93), F1NMP (IN95), F5ICN (JN03), F6APE (IN97), F6GPT (IN94) and F8ALX (JN06). He also noticed that the HB9HB beacon (Switzerland, 144.448MHz) was very strong but although several calls were made in that direction, no further contacts could be made.

Bob Harrison, G8HGN (Essex, JO01) uses an FT-847 transceiver running 50W into a pair of 15-element Yagis. His 144MHz contacts on 11 December included the stations of EA2TO/1 (987km), EA1MX (968km) and F1MOZ. On the 432MHz band, running 50W into a pair of 21-element Yagis, he contacted the stations of F1MOZ (874km) and F5ICN at 931km distant. The antennas at G8HGN, the most vital part of any VHF/UHF station, are shown in **Photo 1**. Incidentally, some of the longest distance contacts achieved during the tropo opening on 11 December were possibly those made between the 144MHz station of David Ross, GI4SNA (IO64) and EA1UU at 1297km and the 432MHz station of Richard Baker, GD8EXI (IO74) to F5ICN over a 1260km path.

Even though there was little enhanced propagation during the period, there were still meteor scatter (MS) contacts to be made. December is quite a fruitful month for this mode of propagation with two major showers: the Geminids that encountered the Earth between 7 – 17 December with maximum activity on the 13/14th and the Ursids shower between 17 – 26 December, peaking on the 22nd.

Darrell Moody, G0HVQ (Gloucestershire, IO81) was active during the Geminids meteor shower running just 70W into a 9-element Vargarda Yagi. Using FSK441 he contacted the 144MHz stations of F6DFR (JN24), DJ2QV (JN58), YU7PAA (KN04) at 1811km, LY4U (KO24) at 1838km and US2YW/A (KN29) at 1851km distant. Darrell mentions hearing a number of Estonian, Latvian and Ukrainian stations during this shower and continues to be amazed just how effective the FSK441 mode can be with low power VHF signals.

Other 144MHz stations known to have made FSK441 contacts with UK operators during December included 9A3JH (Croatia), CT2GUR (Portugal), EM20WOC (Ukraine), DL2NP (Germany), F1MPQ (France), HA4XG (Hungary), I2SVA (Italy), LY2BUU (Lithuania), OH1MN (Finland), OK2PM (Czech Republic), OY4TN (Faroe Islands), RZ1AWT (Russia), S54AA (Slovenia), SP2MKO (Poland), YL2AO (Latvia), YO9MN (Romania) and YT1VP (Serbia).

There was a fair amount of MS activity on the 70MHz band, although due to fragmented band allocations much of this was pre-arranged via the ON4KST Chat Pages (see Websearch). Contacts, using FSK441 and JT6M, were made from the UK with the stations of 3A/OZ2M (Monaco), DL3YEE, DL6BF (Germany), OK1DFC, OK1KT, OK1TEH, (Czech Republic), LA4ANA, LA4YGA, LA8AV (Norway), OH5LID (Finland), OZ1JXY, OZ3ZW and OZ8ZS (Denmark).

Kev Piper, G0CHE (West Sussex, IO90) has provided details of the 2011 50MHz JT6M Challenge. The 'Challenge', which runs from 1 January to 31 December 2011, is held to promote the use of meteor scatter on the 50MHz band using JT6M mode. It is based on working as many unique (4 digit) locator squares – JO65, JN79, IO88 etc. To encourage the use of MS over other propagation modes, each new locator grid worked via meteors is awarded 3 points, all other propagation modes 1 point per locator. The winner will be the station with the most points and will receive an engraved trophy. See Websearch for further details.

In 2010, instead of a yearly challenge, Kev organised an event run throughout the Geminids meteor shower period, 10 – 16 December. The winner was Bojan Sojer, S57TW (Slovenia, JN75) with 80 locators worked and the runner up was Ken Osborne, G4IGO (Somerset, IO80) with 65 locators. Ken also achieved the longest distance during the event when he contacted the 50MHz station of OH6MIK (Finland, KP13) at 2099km distant.

MOONBOUNCE. Ken, G4IGO reports that he has been interested in 50MHz moonbounce operation ever since he first heard and worked

Lance Collister, W7GJ (USA) via the Moon in February 2005. At that time Ken was using a 5-element Yagi and a 4CX250B amplifier. Nowadays he uses a pair of 6-element NBS Yagis spaced horizontally on a wooden cross boom. To date he has made nearly 200 moonbounce contacts on the 50MHz band with 79 different stations in 37 countries. This is by no means an easy achievement as the 50MHz band is probably the most unsuitable for reliable Earth-Moon-Earth (EME) operation. It took, for example, 40 attempts over a two year period before Ken made a successful two-way contact with Rod Mackintosh, ZL3NW (New Zealand). During 2010 the station of G4IGO made successful JT65A contacts with 3D2LR (Fiji), EX6EME (Kyrgyzstan), HA8CE (Hungary), K6KLY (USA), W6JKV, K7CA, K7CW, KD7YZ, W7CE, KL7/KB7Q (Alaska), W7MEM (State No. 49 – only 1 to go!), PA3HP (Netherlands), SM7FJE (Sweden), VE5UF (Canada) and ZS6NK (South Africa).

It is the use of JT65A that has opened up the possibility of making 50MHz EME contacts. This is a relatively new digital mode of communication that utilises a computer to generate precisely encoded messages that are sent out through the transmitter as AFSK transmissions. Similarly, the sound card in the computer processes incoming audio signals from the station receiver and decodes the messages. This technique provides an enhancement of up to 16dB compared to a weak CW signal. So, where stations were just barely at the threshold of making EME contacts on 50MHz, the extra few dB provide a substantial margin for success. No longer are you constrained by the vagaries of the solar cycles, low solar flux or locations in high geomagnetic latitudes.

Russ Stewart, G4PBP (West Midlands) successfully uses JT65A to make EME contacts on the 144MHz band. Running a high power solid-state amplifier and a pair of 17-element Yagis he made QSOs during December with the stations of DH3YAK, DF5BN (Germany), EB5EEO (Spain), F6FHP (France), HA8CE (Hungary), IK4EZN (Italy), S52FO (Slovenia), JH0MHE, JR3REX, JS3CTQ (Japan), OZ1LPR (Denmark), UA4AQL (Russia), UX5UL (Ukraine) and VK3II (Australia).

To get in amongst the 'digital' action, just download the suite of WSJT programs (see Websearch) developed by Joe Taylor, K1JT. The software includes both the JT65 mode for EME communication and FSK441 and JT6M modes for 50, 70 and 144MHz meteor scatter.

THE 70MHZ BAND. Hardly a month seems to go by without news of yet another country gaining access to the 70MHz band. In the past many IARU Region 1 societies had difficulty in persuading their national authorities to grant permission as the 70MHz amateur band was not recognised in any official radio regulation documentation. However in March 1995 the European Conference of Postal and Telecommunications Administrations (CEPT) carried out a Detailed Spectrum Investigation (DSI) of the frequency range between 29.7 – 960MHz. The outcome of this was a recommendation that at least 100kHz be allocated to the Amateur Radio Service, centred around 70.200MHz. However it wasn't until October 2008 that a more important reference was made regarding the 70MHz amateur band. This was when the Frequency Management Working Group (WGFM) of CEPT approved a footnote within the European Common Allocation Table (ECA). The footnote (EU9) denoted against the bands 68.00-70.45MHz and 70.45–70.80MHz reads "In a growing number of CEPT countries, parts of the band 70.0–70.5MHz is also allocated to the Amateur Service on a secondary basis." Now, thanks to 'Footnote EU9', European societies can approach their authorities with much more confidence.

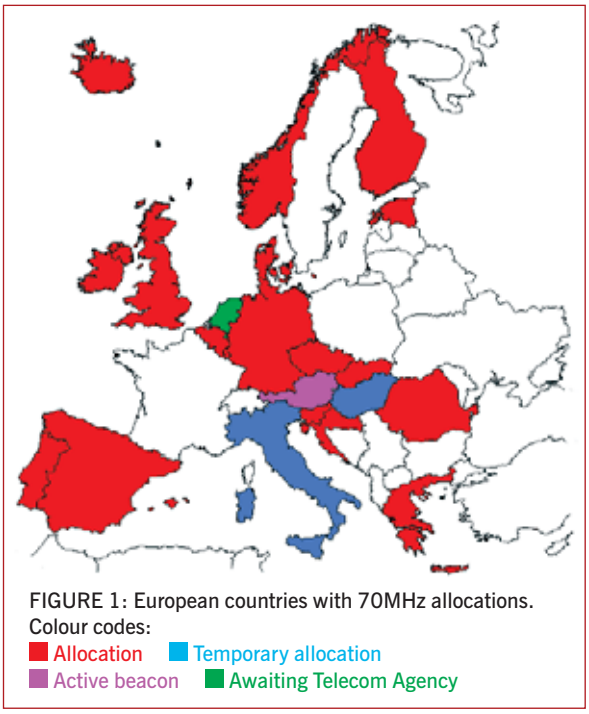


FIGURE 1: European countries with 70MHz allocations.
Colour codes:
Allocation Temporary allocation
Active beacon Awaiting Telecom Agency

There are now a number of countries within IARU Region 1 that have permanent access to the 70MHz band and I have shown most of them in **Figure 1**. However not all countries possess the 500kHz of bandwidth that we have in the UK and individual allocations and band plans can be exceedingly fragmented. For example, stations in Belgium and Germany can only operate on the spot frequency 69.950MHz, Greece has a 50kHz allocation above 70.200MHz and Norway has a total of five 50kHz slots dotted throughout the band.

As of January 2011 the permanent DXCC allocations included Aaland Island (OH0), Azores (CU), Bouvet Island (3Y), Cape Verde Islands (D4), Crete (SV9), Croatia (9A), Denmark (OZ), Dodecanese (SV5), Estonia (ES), Faeroe Islands (OY), Finland (OH), Gibraltar (ZB), Greece (SV), Greenland (OX), Iceland (TF), Ireland (EI), Jan Mayen (JX), Luxembourg (LX), Madeira (CT3), Market Reef (OJ0), Monaco (3A), Norway (LA), Peter I Island (3Y), Portugal (CT), Slovenia (S5), South Africa (ZS), Sovereign Bases-Cyprus (ZC), Svalbard (JW), United Arab Emirates (A6) and of course the United Kingdom.

The very latest news is the Dutch Telecom Agency have indicated that an allocation will soon be granted to radio amateurs in The Netherlands (PA), possibly in February 2011. Additionally there are a number of countries such as the Czech Republic (OK), Germany (DI), Hungary (HA), Italy (I, IT9), Slovakia (OM) and Spain (EA, EA6, EA8, EA9) that have or have had temporary time-limited access to the 70MHz band. These countries appear on the band as and when their permits allow.

Interestingly many countries with permanent and temporary 70MHz allocations are located at an ideal distance from the UK that suit propagation modes such as meteor scatter, Sporadic-E and aurora. Surprisingly, tropospheric propagation is the least favourable. Numerous stations are now active on the 70MHz band and in addition to CW and SSB many operators use FM and therefore can be worked on converted private mobile radio (PMR) sets when suitable propagation intervenes.

For some years stations in South Africa (ZS) have had a 70MHz allocation. The 9000km path between the UK and South Africa is particularly interesting as both ends lie at the extremity of the trans-equatorial zones. A contact over this TEP path is quite possible around sunspot maximum and should take place when conditions are particularly good on the 50MHz band. Possible openings between the UK and South Africa will probably occur during the month of October 2013.

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 *before the end of each month*. Alternatively you can send letters to Yew Tree Cottage, Lower Maescoed, Herefordshire, HR2 0HP.

WEBSEARCH.
50MHz JT6M Challenge: www.jt6m.org
ON4KST Chat Pages: www.on4kst.com
WSJT programs:
www.physics.princeton.edu/pulsar/K1JT/wsjt.html

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IC-E2820+D	Supplied with UT-123 D-Star board	**£653.51 (whilst stocks last)**
IC-910H	Multimode 2/70 Base Station	**£1296.96**
IC-910X	As above but with optional 23cm UX-910	**£1549.95**
UX-910	Optional 23cm board for the IC-910	**£259.95 (whilst stocks last)**

Icom PC Controlled Receivers

Icom IC-R1500 & IC-PCR2500
All Windows XP, Vista or Windows 7 Controlled via USB 10kHz-3300MHz All Mode with remote head **and** twin independent speakers **£648.95**

NEW Icom IC-9100 All-Rounder HF through to 23cms Base Transceiver

V/UHF Satellite + HF/50MHz bands + D-STAR DV mode

- HF/50MHz 144/430(440)MHz & 1200MHz coverage
- SSB, CW, RTTY, AM, FM & DV modes
- 100W on HF/50/144MHz, 75W on 430(440)MHz, 10W on 1200MHz
- 32-bit floating point DSP & 24-bit AD/DA converter
- Double superheterodyne with image rejection mixer
- Optional 3kHz/6kHz 1st IF (roofing) filters (for HF/50MHz bands)
- Satellite mode operation
- Optional D-STAR DV mode operation

Icom IC-7600

£3299.95

This new Mid-range HF base station from Icom has arguably the best screen for user interface in the business. Successor to the IC-756Pro3.

KENWOOD

AVAILABLE FROM STOCK
£1489.95

New TS-590S HF/6m Transceiver

FREE MC-60A DESK MIC worth £118!
Peter Hart says: "I found the radio friendly, intuitive & easy to use"
For further information see our website: www.hamradio.co.uk

TS-2000X

Flagship HF-23cm All Mode Base Station.
This really is a total shack in a box.

SPECIAL OFFER ONLY £1679.95

Kenwood HF Products

TS-480SAT	Remote head HF/6m 100W inc ATU Transceiver	**£779.95**
TS-480HX	200Watt version of above, no auto-ATU	**£879.95**
TS-2000E	100Watt all mode HF/2/6M with auto-ATU etc	**£1439.95**
TS-2000X	As above but fitted with 10Watts on 23cm (all mode)	**£1779.95**

Kenwood V/U Products

TH-F7E	The only 2/70 FM Handie with SSB/CW WB Receiver	**£235.95**
TM-V71E	First Class 2/70 FM Mobile with remote head	**£299.95**
TM-D710E	The only 2/70 FM Mobile/Base with APRS/TNC etc	**£445.95**

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

DV-AP-Dongle

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.**

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

New! MYDEL ML-5189 4m 25W FM Mobile.
Only £149.99

Two new Books from Nifty!

Nifty E-Z Guide to D-Star Operation
Using easy to understand explanations and illustrations, this book describes how the D-STAR system operates and provides guidance for setting up transceivers to be able to access D-STAR's many features and modes of operation. **Only £13.00**

Nifty E-Z Guide to PSK-31 Operation.
Using the very popular DigiPan software as a basis, a detailed step-by-step approach is used for configuring your interface hardware, software and computer system for PSK31 operation. Detailed step-by-step instructions and computer screen shots are provided for several Windows operating systems, including Vista. **Only £13.00**

Plus the full range of Nifty Equipment Manuals available from stock.
Equipment Manuals and Quick Reference Cards for Yaesu, Icom, Kenwood, Elecraft & Ten-Tec radios.

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

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New! GAP Antennas Available from stock

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

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

Isotron!

The most compact 1kW HF Antenna ever!

After 30 years of manufacture and Hot from the USA, these very clever compact antennas are available for all the HF bands. They are easy, quick and simple to install. Tunes & performs without radials or antenna tuners.

The full range can be viewed on our web-site and prices start from only £105 through to £265 for the "Combo's".

Mark, G8AWO showing off the assembled 10/15/20 & 40/80m Combo Isotron's before mounting on the roof at ML&S HQ.

HUSTLER

Base Station Range
Free standing, max 7.3m tall, 1kW

4-BTV	40/20/15/10m	£183.78
5-BTV	80/40/20/15/10m	£224.63
6-BTV	80/40/30/20/15/10m	£265.48

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.

The DX Engineering DXE-AOK-17M kit adds 17 meter coverage to the Hustler BTV series of vertical antennas without giving up any existing band coverage. This kit will operate across the entire 17m band with an SWR of 1.5:1 or less.

No disassembly of the existing antenna is required, simply bolt this kit over the 10m trap, make some minimal tuning adjustments and you're on the air with an additional band..... £71.44

HF Linear Amplifiers

Yaesu VL-1000 Quadra	£4099.95
Icom IC-PW1Euro	£4145.95
Ameritron ALH-811HXCE	£919.95
Linear Amp Ranger 811HXCE	£1295.95
Linear Amp Ranger 572B	£1395.95
Linear Amp Challenger Mk1V	£2449.95

FACTORY APPOINTED DEALER for FLEX

The entire FLEX Range is now on demonstration in the ML&S Super Store!

Flex 1500 SDR
Low cost SDR Transceiver, connect via USB & you have 5W 160-6m! £599.95

Flex 3000 with ATU
100 Watt SDR 160-6m with Auto ATU fitted. £1299.95

Flex 5000A
Flagship 100W SDR Base 160-6m £2495.95

Flex 5000A-ATU
Same as 5000A but built-in Auto ATU £2795.95

Flex 5000A-ATU+Twin RX
as above but with second receiver £3434.95

AirNav Systems

The Most Trusted Name In Flight Tracking

NEW AT ML&S

The New RadarBox is now available from ML&S!

Radar Box-3D £489.00
Radar Box-Pro £399.00

See web site for full specifications

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

Miracle Antenna

MMD-17 17M MIXED MODE DIPOLE + 5 BANDS WITH ATU £92.95
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 iLHF-70cm Mini ATU with BNC £109.95
Miracle DuckerHF-70cm with PL-259 ..... £109.95
Miracle AntennaHF-70cm fitted with telescopic £109.95

DX Engineering Products stocked at ML&S!

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).

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	£109.95

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	

DIAMOND

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
SX-27P	COMPACT 144/430, 60W Portable Meter	£45.93

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

NISSEI

One of the oldest names in Ham Radio

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

MyDEL POWER SUPPLIES

The neatest smartest looking desk top power supplies that money can buy. Ideal for powering any main rig or accessory requiring 13.8 Volts at up to 120 Amps.

New MyDel MP-30SW11

13.8V DC variable, metered, with rear facing terminals. Small, compact and very lightweight. **Only £84.95**

MP-925. £99.95
Linear PSU (Not Switch mode) 25-30Amps, 13.8V DC Variable, Metered with low current terminals for accessories. DC power supply.

MP-6A. £29.95
13.8V DC, 6A power supply.
Ideal for FT-817ND or most handhelds.

MP-8230 As used by CDXC. £69.95
13.8V DC, 25A power supply, switch mode.
Best Seller!

MP-9626. £299.95
"The Brick"
120A, 13.8V DC power supply, switch mode.

MP-9600. £179.95
60A switch mode power supply.
Ideal for TS-480HX or other 200W output radio.

Alinco DM-330MW PSU. £99.95
The Alinco DM-330MW is a 30 AMP switch mode power supply. It is ideal for mobile/portable with its light weight and low noise.

Yaesu FP-1030A Linear PSU. £169.95
25-30Amp 13.8V fixed DC PSU, Twin meters, near silent running. 2 year Warranty

LDG

LDG Auto Tuner Range

NEW! YT-450	Auto Tuner for the FT-450 & FT-950	£224.63
NEW! YT-847	Want a really good Auto ATU for your FT-847? Here it is!	£224.63
NEW AT-600pro	600W Auto ATU	£336.97
AT-100proII NEW	Desktop tuner covering all frequencies from 1.8-54 MHz	£204.20
AT-200pro	Designed for new generation of rigs	£219.52
AT-1000Pro	1kw 160m-6m (1.8-54MHz) High speed Auto ATU, tuning range 6-1000Ohms	£521.82
AT-897Plus	Bolt-on Alternative Auto Tuner for the FT-897. Wider tuning range and cheaper too!	£187.85
IT-100	New version of the AT-7000	£163.35
YT-100	NEW AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control	£177.65
Z-817	Ultimate autotuner for QRP radios, including the Yaesu FT-817D	£125.57
Z-100Plus	Ultimate autotuner for Yaesu FT-817D	£145.99
Z-11ProII NEW	Portable compact & tunes 100mW to 125W	£163.35
RCA-14	4-way DC Breakout Box	£52.12
KT-100	Dedicated tuner for Kenwood radios	£173.57
RBA-1:1	Probably the best 1:1balun out there	£35.69
RBA 4:1	Probably the best 4:1 balun out there	£35.69
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

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-550 Elevation rotator for satellite operation £299.95

G-5500 Heavy-Duty PC Controlled Vertical rotator for satellite and EME applications £589.95

G-650C Medium duty with higher brake torque than the G-450 ..... £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 to simplify installation. Total rotation range: 450°, with presets £859.95

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

Microbit RRC-1258mkIIS

A complete remote control system for Amateur radio.
Microbit1258mkIIS: £399.95. Leads included.
For more info see
www.hamradio.co.uk/rrc-1258.shtml

NEW VERSION OLD PRICE £399.95
A new version of the RRC-1258MkII which support Rigs with dual receivers is now available and will replace the existing RRC. Remote your rig anywhere in the world where you have an internet connection.

NEW

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.

MiniVNA original still available (without Bluetooth): £259.95

Tigertronics SL-USB

ALL sound card Digital and voice modes are supported by the SignaLinkTM USB. This includes traditional modes such as RTTY, SSTV and CW (to name a few), as well as today's hottest new modes like PSK31, MT-63 and EchoLink.

From only £99.95
Call to discuss your rig-to-cable requirements.

WiNRADiO WR-G31DDC EXCALIBUR

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

£599.95

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!

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 a high-speed 480 Mbit/s USB2.0 PC interface.

MFJ Products

MFJ-16010	Random Wire ATU 160-10M	£69.95
MFJ-949E	Manual ATU metered, Dummy Load, 1.8-30MHz, 300W	£179.95
MFJ-901B	Manual Mini ATU 1.8-30MHz, 200W	£109.95
MFJ-971	Manual ATU metered, 1.8-30MHz, 200W	£118.95
MFJ-904H	Manual ATU, metered, inc balanced, 1.8-30MHz 150W	£149.95
MFJ-969	Manual Roller ATU Metered 1.8-54MHz, 300W	£209.95
MFJ-993B	Auto ATU Metered 1.8-30MHz, 300W	£249.95
MFJ-1786X	Magnetic Loop 10-30MHz, 150W	£429.95
MFJ-1788X	Magnetic Loop 7-22MHz, 150W	£469.95
MFJ-259B	Antenna Analyser 1.8-170MHz	£259.95
MFJ-269B	Antenna Analyser 1.8-450MHz	£349.95
MFJ-260C	Dummy Load 300W SO-239	£44.95

Lots more MFJ stocked! See web for details

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

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New KV-UV920R

Low cost Dual Band, Cross-band Repeat High Performance 2/70 FM mobile Transceiver with wideband receive, remote head etc. **Due early 2011.**

wouxun

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: £92.99

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..... £59.99
KG-679E/U 70cm
(400-470MHz)..... £59.99
or with Voice Scrambler KG-689E/U ..£69.99

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 company's motto is 'Quality first, customer supreme'. To their customers this means they have the most advanced production facilities in the industry and do the most rigorous testing for product quality in order to meet the ISO9001 standard. Founded in 2000 and located in Quanzhou, China.

Wouxun KG-699E/4M 4m FM Handie

- ✓ 5W RF output
- ✓ English voice guide to under 5W RF
- ✓ 70-70.500MHz 4m Amatuer Band (66-88MHz capable)
- ✓ 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: £92.99

Supplied accessories:
1.3Ah Li-Ion Battery Pack (5W)
Intelligent Base Charger (110V-240V & 12V in input)
Belt-Clip
Dualband Antenna
Hand Strap
Handbook

www.wouxun.co.uk

Don't forget Wouxun have a complete range of Handies available for Commercial, Marine and Ham. Call for details.

WO/BLO-004 1700mAh Li-ion BatteryPack £19.99

WO/BAO-001 'AA' Battery Pack £9.99

WO/ELO-001 Eliminator £9.99

WO/CCO-001 Car charger £9.99

WO/SMO-001 Mic/Speaker £14.99

WO/PSO-110 Programming Software and USB Programming Cable £19.99

WO/CASE Leatherette case £9.99

WO/AAO-002 BNC Socket to SMA plug antenna adapter £4.99

WO/AAO-001 SO-239 socket to SMA plug antenna adapter £4.99

WO/CHO-004 110-234v AC & 13.8v DC spare charger (allows radio & spare battery to be charged at same time) £22.95

WO/CHO-006 Six-way charger £149.99

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

GHz Bands

Seeing things in a different light

PHOTO 1: Edixeon 'Truopto' high intensity LED. These are available from Rapid Electronics, Colchester. Similar LEDs are available from Farnell and RS Components. Even higher power LEDs have recently become available. When ordering your LED make sure it has 'Lambertian' radiation characteristics.

BAND ACTIVITY. From mid November through to at least mid December it was unseasonably cold across the whole of the UK with deep snow and cold winds dominating the weather. In spite of these conditions the microwave bands remained active with contests and the Monday evening microwave activity sessions. Overall, propagation was not particularly outstanding.

Whilst out for the day on Saturday 11 December I received several DX Sherlock **[1]** alerts on my iPhone indicating that EA1 was being worked on 432MHz from the UK.When I got home in the evening I logged onto the ON4KST chat system to find out what else had been happening. I immediately noted that the microwave bands had been open towards France for much of the day. www.beaconspot.eu **[2]** showed that the 1.3GHz beacons F5ZBT (IN94) and F1ZBC (JN06) had been heard by G4ALY (IO70) mid-morning as well as again around 1800UTC. Both G3XDY (JO02) and G4EAT (JO01) also reported hearing these beacons around 1800UTC. ON4KST chat showed a number of contacts on several of the microwave bands throughout the evening. As the evening wore on the lift seemed to favour stations in the western part of the UK. It would appear that conditions continued through 12 December as the following report shows.

Ralph, G4ALY, reports that he worked a number of French stations including F6FHP (IN94) at 701km on both 1.3 and 2.3GHz on 11 December and again on 1.3GHz on the 12th. His best DX was Guy, F2CT/P (IN93), on 10GHz at 810km on the 12th.

I was curious about the reason for the lift and wondered initially if it was due to the rise in temperatures over the previous two days causing warmed air to overlay the still-cold ground after more than two weeks of low temperatures. This could have created a surface duct. However, a look at the Hepburn Propagation Index for midday on 11 December indicated a possible high level duct stretching from Éire across western parts of the UK and down into western France. Looking at the University of Wyoming **[3]** radiosonde data confirmed the presence of a high level thermal inversion at several of the sounding places within this region including Brest (800m), Camborne (900m) and Bordeaux Merignacs (225m).

As air descends in the centre of a high pressure system it gets heated by compression and then spreads out, in this case overlaying the cold air above the very cold ground. This produces a domed effect with a high level duct that tends to be at its highest towards the centre of the high pressure and much lower towards the edges. This can be seen clearly in the thermal inversion height at Bordeaux compared with Brest, which was well within the high pressure system.

OPTICAL COMMUNICATIONS. There has been a noticeable upsurge in interest in free space optical systems in the UK over the last few years. This follows a quiet period since the UK distance record was set by G8LSD/P and G0MRF/P in 2003 **[4]** using semiconductor laser transmitters and photodiode receivers. Since then laser diode transmitters have tended to fall out of favour due to the bad press associated with the illegal use of laser pointers directed at aircraft.

The ease with which a semiconductor laser optical transmitter can be assembled has been a compelling reason to use lasers for moderate to long range optical communications. It has long been known that the very high coherence of laser based systems has also been a hindrance to good long range communications due to the self-interference effects, caused by scintillation on the received light signal. The scintillation is caused by turbulence in the atmosphere. A much wider, collimated, optical beam encounters as much turbulence but this tends to average out at the receiver such that the 'speckle' pattern due to the turbulence results in much less variation in light current in the receiver photodiode and, with that, much less noise. The beam expander that is required causes the light energy to be spread out over a much larger area, as shown in **Figure 1**. This reduces the light density, making the light signal much safer to the eyes of anyone who happens to accidentally look into the beam. At very long distance the size of the expanded beam is such that although the beam will appear very bright it will be eye safe.

Rather than using lasers, it is now becoming more common to use one of the new generation of high intensity LEDs such as the Luxeon III, Golden Dragon or Edixeon TruOpto with Lambertain radiation characteristics **[5]**. These are rated to as much as 3-5W DC input and have an optical output of several hundred milliwatts. Because of the way in which these LEDs are constructed it is much easier to collect the light output by the beam expander (collimator) than with laser diodes.

Lasers produce a highly coherent light spectrum which may be less than a nanometer wide and consist of just a few spectral lines. LEDs produce an incoherent spectrum that is much wider than a laser, yet still appears as a single colour wavelength (monochromatic). LED sources in lightwave communications systems are potentially capable of greater useful range than a laser source of just a few years ago. The current amateur distance record is a one-way contact 288km over a non line of sight path between Tasmania and Victoria, Australia, using an array of high power LEDs as the transmitter source **[6]**.

In the past the ARRL has allowed only coherent light sources as transmitters in contest entries. This was recently changed to allow monochromatic light sources such as LEDs. In turn, this has spurred a great

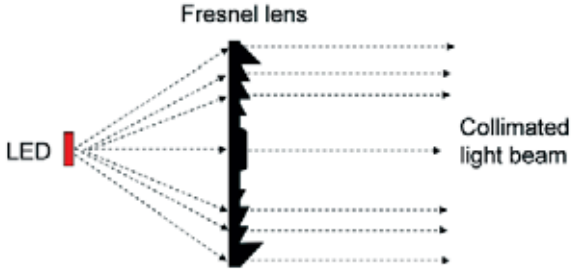

FIGURE 1: Using a Fresnel lens to produce a collimated beam.

deal of interest and increased lightwave contest entries. The use of LED sources, such as the Luxeon, reduces the chances of being accused of using laser pointers in inappropriate ways.

Single LED transmitters using low cost (less than £1) Fresnel lenses may have a beam width of around 2° compared with a small fraction of a degree with laser pointer based systems. This makes aiming the transmitter a great deal easier, quite important when located on a windy hilltop!

PHOTO 2: G3PHO's optical receiver with sighting telescope. The laser level can be used as a source for alignment at the far end of the path. Photo: G3PHO.

Most free space lightwave communications systems operate in the red wavelength range (around 470THz or 625nm). This is for several good reasons. Although the atmosphere has higher transmissivity at some longer optical wavelengths, red light can easily be seen, which aids in setting up. Cheap silicon photodiodes also have good sensitivity in this optical range.

Within the UK, the main interest groups seem to be based around NE England (Northern Lights Optical Communications Group) and South Yorkshire, with a growing interest in the Cambridge area. There are several other small pockets of interest across the country.

Interestingly, there seems to a small but significant split in interest between those using baseband modulated systems and those using subcarrier techniques. Theoretically the baseband modulated systems should give the greatest range (and indeed the world distance record has been set using this technique). However, baseband systems are very prone to interference from lighting systems such as street lights. Although the lights are usually powered from the mains at 50Hz, harmonics can often be generated well into the audio range used for communications. This can make operating in some locations extremely difficult due to strong interference. Modern developments such as DSP-implemented narrow notch filtering at 50Hz and above can reduce the interference to acceptable levels.

Subcarrier systems overcome much of the interference by the use of a modulated RF carrier located well above the likely interference range. Typically the subcarrier will be between 25 and 50kHz. The frequency response of typical medium area silicon photodiodes, such as the BPW34, falls rapidly with frequency such that at frequencies much above 25kHz the available carrier to noise ratio is often too low to be useable with very weak optical signals. The subcarrier can use FM, AM, SSB or CW modulation. In fact any of the common modulation modes can be used to 100% amplitude modulate the optical carrier (light). This technique has been known for many years and is the technique used in most modern hybrid fibre coax (HFC) TV networks. The restrictions on frequency are largely overcome in optical fibre systems because the photodiodes can have a much higher frequency response (over 1GHz - back to microwaves!).

Members of the NE England group have been using subcarrier-based systems to obtain ranges that are as great as many baseband systems. These systems are described as using optical transverters, where a small multimode radio, such as the FT817, has its RF output mixed down from (say) 3.6MHz to 25 kHz in a simple downconverter. On receive the modulated carrier detected by the optical receiver (optical head) is upconverted back to 3.6MHz for demodulation.

Operating optical systems has much in common with the kind of operating we did back in the 1970s with Gunn diode and klystron based 10GHz microwave systems. Most paths are line of site, usually from hilltop to hilltop, but the contact usually takes place after dark in order to ease alignment as the distant transmitter light can often be seen. Of course, the optical transmitter has to be accurately aligned on the receiver in the first place, so someone has to have a good compass. **Photo 2** shows the optical receiver belonging to G3PHO 'looking out' across a well-lit landscape towards the distant optical transmitter.

Tone modulation is commonly used to aid rapid signal peaking. Liaison between the sites uses 144MHz or 432MHz with handheld FM radios. Distances greater than a few tens of km will usually require the use of 144MHz SSB and an antenna that is larger than a rubber duck.

Because of the increasing popularity of lightwave systems I will include occasional reports on activity in the THz range in future columns. *(A major feature on lightwave communications is planned for RadCom - Ed.)*

FORTHCOMING MICROWAVE EVENTS 2011/2012

Martlesham Microwave Round Table meeting, 17 April 2011 – note change of date. Details: G3XDY, g3xdy@btinternet.com

Microwave Update, Enfield, Connecticut, USA, 13-16 October 2011. Details: Bruce Wood, N2LIV n2liv@arrl.net (conference Chairman)

15th International EME Conference, Cambridge, UK, 16-19 August 2012. Details: www.eme2012.com

INTERNATIONAL EME CONFERENCE 2012.

I am pleased to confirm that the 2012 EME Conference will be held on 17 and 18 August 2012 at Churchill College, Cambridge, England. As the Conference programme develops the organising committee will provide details on how to book your place at the Conference and for those planning to make Cambridge their base for a holiday, there will be information about the supporting partner's programme.

The Conference is aimed at both experienced EME enthusiasts and those who may be thinking about becoming involved in this exciting and challenging branch of our hobby. The programme will include talks, demonstrations, a chance to meet and chat with moon bouncers of all abilities from beginner to expert, and much more.

The Conference is sponsored by the UK Microwave Group in conjunction with the RSGB. The International EME Conference 2012 web page details are at **[7]**.

MARTLESHAM MICROWAVE ROUND TABLE 2011.

Please note the change of date for the 2011 Martlesham Microwave Round Table. It has been moved from its usual November slot to 17 April and, for 2011, it will be a one day only event.

WEBSEARCH

[1] DX Sherlock - www.vhfdx.info/spots
[2] Beacon spot - www.beaconspot.eu
[3] University of Wyoming - http://weather.uwyo.edu/upperair/sounding.html
[4] Lasercomms - www.lasercomms.org.uk/76km.htm
[5] Lambertian - http://en.wikipedia.org/wiki/Lambert%27s_cosine_law
[6] Australian record - http://tinyurl.com/RC0211-GHZ1 or http://reast.asn.au/optical/288_km_Cloudbouce_from_Tasmania_to_the_Australian_Mainland.pdf
[7] EME Conference - www.eme2012.com

Antennas

An alternative mode in HF mobile antennas

PHOTO 1: A Texas Bugcatcher antenna mounted on the tow bar on the rear a vehicle. It uses a single large inductance with tapping points and a wander lead to short out the unused sections of the coil.

SIMPLE MOBILE. The vertical whip antenna is the most popular antenna for mobile use. The easiest way to feed such an antenna is to make it a quarter wavelength long at the frequency in use, which allows it to be fed directly with 50Ω coax at the low impedance base. The resonant quarter wavelength is a function of frequency and is 1.48m (58.5in) on 50MHz, 2.5m (8ft 2in) on 28.4MHz and progressively shorter on the higher VHF bands. Quarter wave antennas on the 28MHz bands and higher are quite practical, but on the lower HF bands it is a different matter. Even on 21MHz, a quarter wavelength is 3.45m (11ft 2in) and on 14MHz is 4.99m (16ft 4in). It follows that a practical mobile antenna for the HF bands must be shorter than a quarter wave.

For a given antenna length, as the frequency of operation is lowered the feed point exhibits a decreasing resistance in series with an increasing capacitive reactance. In order to feed power to such an antenna it must be brought to resonance so that the feed point is resistive. This is achieved by adding some inductance and is known as inductive loading.

Each band requires a different value of inductance. This can be achieved using separate single band antennas with built in inductance or separate plug-in coils for each band. The most common method used now is by using one long coil and shorting out the unwanted inductance of the lower frequency bands not in use. The antenna on the rear of the vehicle shown in **Photo 1** is the commercial Texas Bugcatcher **[1]**. It uses a single large inductance with tapping points and a wander lead to short out the unused sections of the coil.

THE OUTBACKER. Another interesting method of the shorting out the unwanted inductance is used in the design of the Outbacker. These antennas come in several versions and the one I acquired recently is the Outbacker Outreach, which covers all bands from 160m to 10m. It is not possible to see how the inductors are formed but it is obvious they are wound continuously along the length of the antenna, in some ways rather like the Firestik CB antenna.

The Outbacker is made up of three sections: a lower section with the 160, 80 and 30m inductors; a centre section with the higher frequency HF band inductors and finally a whip (the 'stinger'). The centre section is shown in some detail in **Photo 2** because it is the basis of a discussion in this column. The inductances and physical lengths of the band inductances are also shown.

The inductors are selected using a wander lead terminated with 4mm diameter banana plugs, which fit very snugly into the 4mm inductor selector sockets. As you might expect, the higher frequency bands require progressively less inductance to resonate the antenna and the 15m band only requires 1.4μH plus the inductance of the wander lead, which is wrapped around the lower section of the antenna in a loose anticlockwise spiral (as recommended in the instructions).

However, you might have noticed that the 10m coil selection point is at the bottom of Photo 2. This indicates there is a total of 50μH of inductance in the antenna when 10m is selected. The 12m tapping point is located at the top end of the lower section (not shown in Photo 2) and includes an extra 14μH on top of the 50μH already mentioned.

The instruction book makes no mention of this oddity but the sales material **[2]** says "… 10, 12 and 15m are 5/8 wave". I think that only the 10 and 12m bands use the '5/8 wave' effect.

I had never seen any reference to 5/8 wave HF antennas. On VHF, a 5/8 wave antenna is quite common and comprises a full halfwave whip antenna matched to the feeder with a tapped inductance.

I constructed a computer model based on the data measured in Photo 2. The *EZNEC5* software allows effects of 'loads' (inductance, capacitance and resistance) to be modelled. Inductances are shown as small square icons in **Figure 1**.

The current distribution on the antenna shows a top section with a halfwave current distribution and a lower section with a near quarter wave current distribution. Note that there is current flow in the modelled vehicle body that shows that the vehicle also radiates during transmit and is part of the antenna system.

I made a further model using a full sized quarter wave antenna for comparison. The comparison elevation polar diagrams are shown **Figure 2**. I had to make a guess as to the resistive losses in the loading inductors so the diagrams in Figure 2 should not be taken as definitive. What is interesting is how similar they are. Note also that the total installation becomes quite directive when the vehicle is near to quarter of a wavelength long and the antenna is mounted at the end of the vehicle; with the lobe of maximum gain at the opposite end of the vehicle to where the antenna is mounted. This phenomenon has also been measured and documented in **[3]**. If the antenna is mounted in the centre of the vehicle then the system is omnidirectional.

It occurred to me that when the 10m or

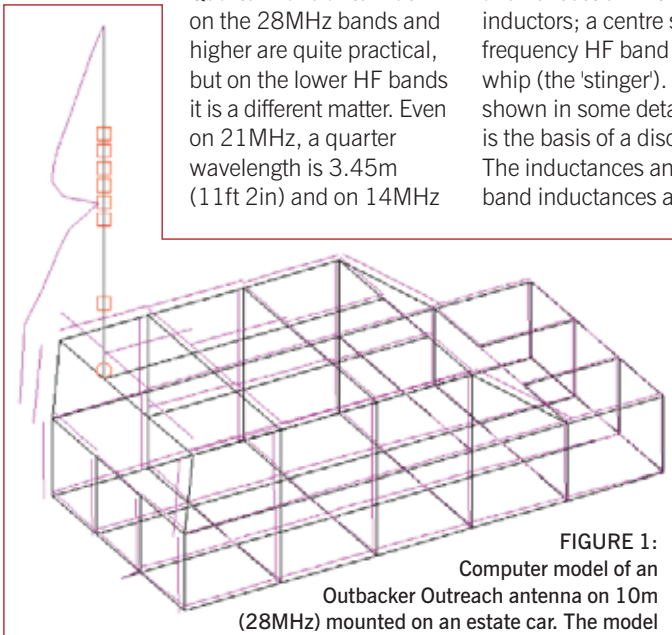

FIGURE 1: Computer model of an Outbacker Outreach antenna on 10m (28MHz) mounted on an estate car. The model is depicted with black lines and the current magnitude in magenta.

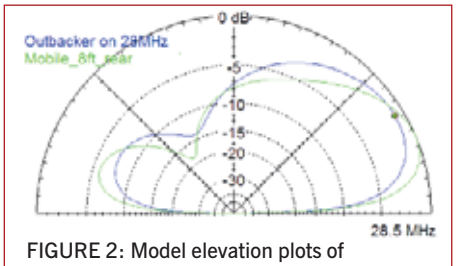

FIGURE 2: Model elevation plots of the Outbacker Outreach antenna (black) compared with a full size quarter wave antenna (green) on 28MHz.

12m taps are selected, with 60μH or more inductance above the tapping points, the antenna should also exhibit lower resonances. A frequency sweep of the antenna set at 12m showed that this was the case and a resonance occurred at 5.5MHz, as shown in **Figure 3**.

The impedance at the 12m resonance point was measured at over 100Ω, which resulted in an SWR of more than 2:1 – I initially though this might be due to the position on the vehicle where the antenna was mounted. On the other hand the conventional mode on 20m, see **Figure 4**, exhibited good matching characteristics.

THE TEXAS BUGCATCHER. This antenna has a good performance reputation, particularly on the lower HF bands. The reason for this is that it is a large antenna with a large coil wound on high quality, low-loss former. Some idea of its size can be seen in Photo 1. Its only drawback is that the SWR bandwidth is very small and the business of setting the wander lead taps can be tricky. Of course, the screwdriver type antennas overcome this problem but the construction of such an antenna is beyond the resources of my garden shed workshop.

It occurred to me that solutions suggested in an early edition of the ARRL *Radio Amateur's Handbook* (**Figure 5**) might make the adjustment less critical. **Figure 5A** is a simple sliding contact that shorts out the unused turns. (I am not sure how **Figure 5B** works: I would be interested in hearing from anyone who knows of this arrangement. There was no description in the text that came with these illustrations).

I modified the Bugcatcher coil to work much the same as Figure 5A. A movable contact arrangement was constructed as shown in **Photo 3**. It comprises a short length of 22mm copper tube drilled to fit the lower element of the Bugcatcher; the other end is drilled to take the 8mm copper tubing contact holder. The contact itself is made from a small piece of phosphor bronze draft excluder.

Regrettably, this arrangement was not an unqualified success because sometimes the sliding contact alighted on one turn and other times shorted out two turns. The result was an uneven inductance change with the slider position. Nevertheless, it allowed me to investigate other modes with the Bugcatcher antenna. One of the results shown in **Figure 6**.

WEBSEARCH

[1] GLA Systems, who manufactured the Texas Bugcatcher antennas, ceased production late 2009. An archived description of the Bugcatcher is at http://tinyurl.com/RC1102-bug
[2] www.adurcomms.co.uk/outbacker.htm
[3] Computer Modelling of the HF Mobile Antenna, Peter Dodd, G3LDO, *The ARRL Antenna Compendium, Vol 7*.

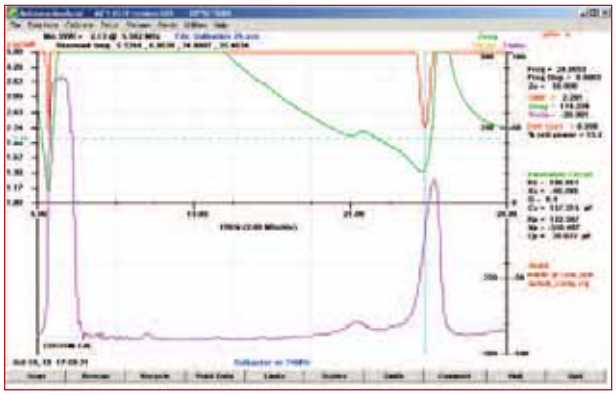

FIGURE 3: Frequency sweep of the Outbacker Outreach antenna on 12m using the AIM 4170. Note the lower resonance at 5.5MHz.

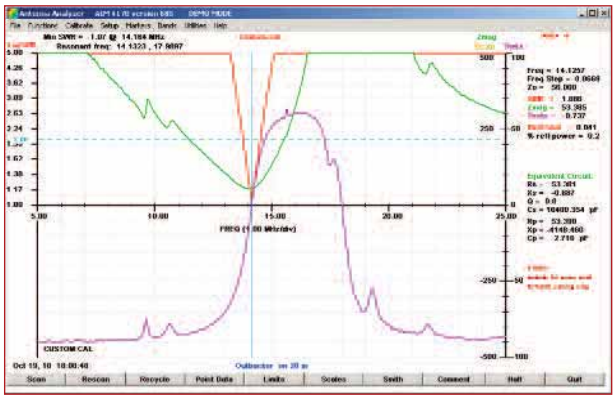

FIGURE 4: Frequency sweep of the Outbacker Outreach antenna on 20m using the AIM 4170. The off-resonance blips are due to strong out of band station interference.

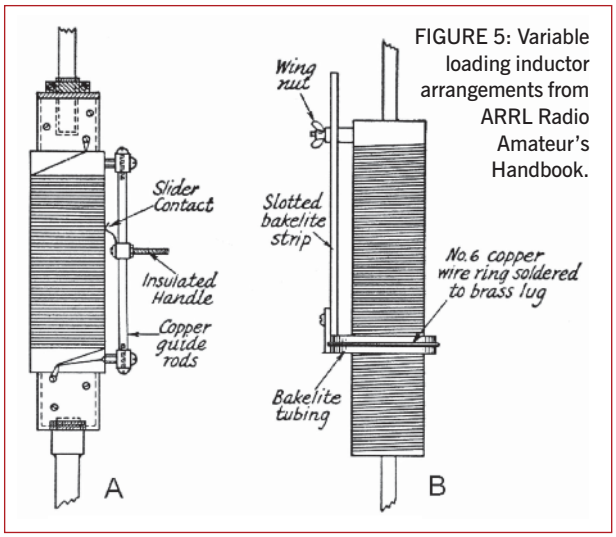

FIGURE 5: Variable loading inductor arrangements from ARRL Radio Amateur's Handbook.

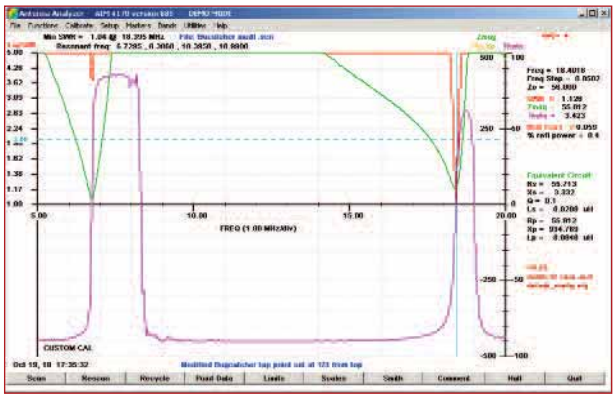

FIGURE 6: Frequency sweep of the Bugcatcher antenna on 17m using the AIM 4170. Note the lower resonance at 6.7MHz.

PHOTO 2: The centre section of an Outbacker Outreach antenna, with measured inductances for the bands 10, 15, 17 20 and 40m. The wander lead is shown with the 40m band selected.

PHOTO 3: Modified Bugcatcher coil with sliding contact.

NEW

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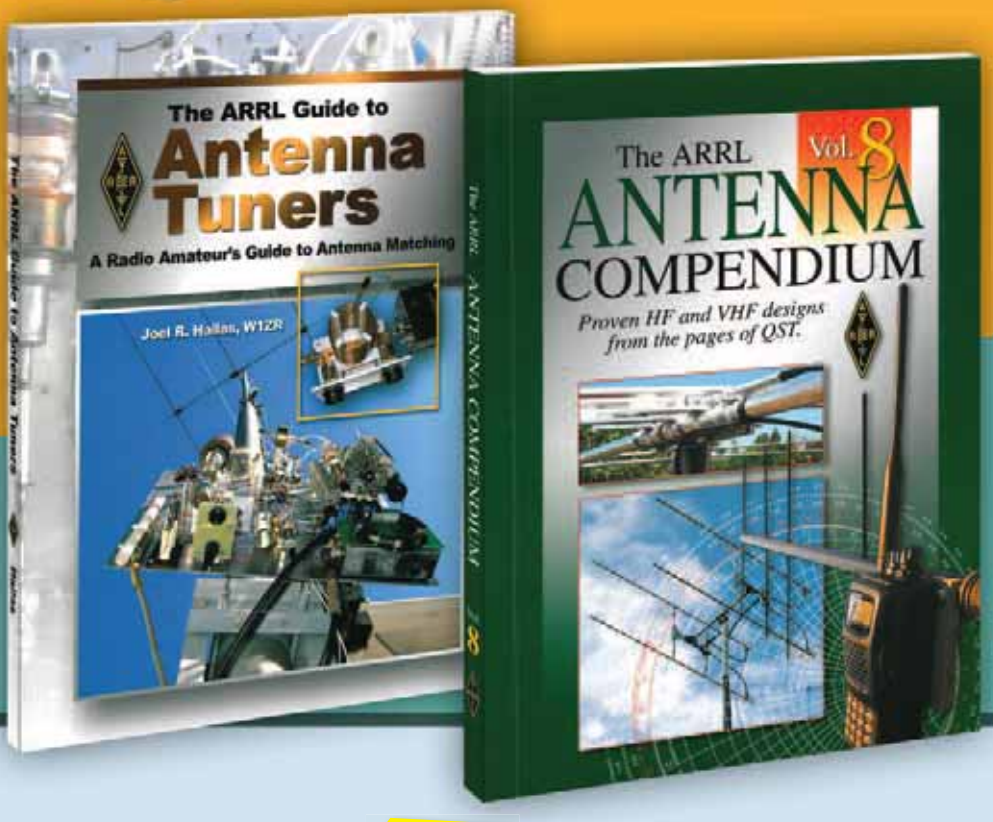

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CF706	For Icom IC706	39.95

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- Connectors: SO239

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MFJ 948	300W Tuner w/balun	£159.95
MFJ 969	300W Tuner	£209.95
MFJ 971	200W Portable Tuner	£118.95
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Four Way

Nevada CS-401	1kW HF (SO-239)	£34.95
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- Full duplex operation
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- DTMF Auto-dialer
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Alinco DJ-596
Dual Band Transceiver
- 2m / 70cm
- 100 memory channels
- CTCSS, DCS encode+decode
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DJ-V17
Waterproof Handheld
- TX/RX 144 - 145.995MHz (optional 137- 173.995MHz)
- 2 touch repeater access
- Submersible 1m/3feet for 30min) and rugged body
- 39 CTCSS tone squelch encode + decode settings
- 200 memories
- VFO, Memory, scan modes

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VHF 2 Metre Handheld
- TX: 144 - 148 MHz
- RX: 136 - 173.995 MHz
- New 2-touch repeater function
- 200 memory channels plus CALL channel
- CTCSS, DCS and DTMF
- 3 levels of output power
- Supplied c/w battery & charger

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TYT-UVF1
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- 145/433MHz
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- Supplied c/w re-chargeable battery pack, drop in charger and power supply, rubber duck antenna, belt clip, carry strap, DC charge cable for the car

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4 metre Handheld
- 66-88MHz '4m FM Band'
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- 128 memories
- 8 groups scrambler
- Channel name edit
- Power 5W or 1W
- VOX (Level adjustable)
- Wide/Narrow bandwith

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NEW

KENWOOD

TH-D72E
Dual Band Transceiver
A brand new FM Twinband VHF/UHF 145/433MHz Handheld Transceiver, with built in GPS and APRS features and lots more!

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- Twin meters for current and Voltage
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NEW

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Communications Receiver
- Frequency range 150 kHz to 35MHz
- Modes: AM / FM / CW / USB / LSB
- Selectivity: AM Narrow 2.4 kHz, AM/FM 6 kHz, SSB/CW 2.4 kHz
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- TX: SSB, CW, AM, FM
- Power: 100 Watts SSB/CW, 40 Watts FM
- QRP Mode: (0.1 to 2.0) Watt extra low power setting
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120W automatic long-wire antenna tuner

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30 Amp Switch Mode, high quality Supply
- Low noise
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DR-635
Advanced Dual Band Mobile transceiver
- Remote head facility & multi-colour display
- Bands 144 / 430 MHz with wideband RX
- (VHF to VHF) or (UHF to UHF) capability
- 50 Watts output power
- 200 Memory Channels

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DR-135 Mk III
50W VHF Voice/Data Mobile transceiver
- 100 memory channels
- CTCSS/DCS encode + decode
- 5/10/50 Watt output

£179.00

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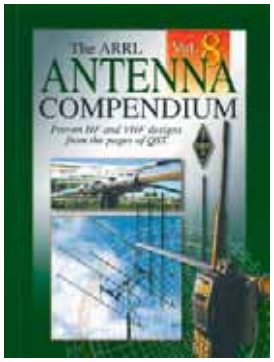
The ARRL Antenna Compendium vol. 8

Edited by Steven R Ford, WB8IMY



Like the RSGB, the ARRL publishes a number of antenna designs in the pages of its journal, *QST*. This book is a compilation of articles that appeared between 2005 and 2009.

The book is divided up into logical sections covering HF portable, HF directional, HF omnidirectional, VHF/UHF portable, VHF/UHF omnidirectional and VHF/UHF directional designs. There are some sixty antennas described in all, with a notable bias towards HF designs of various flavours. The antennas encompass a very wide range of bands and complexities. They range from a simple J-pole design for 2m that is made from 300Ω twin feeder through to complex multi-element HF affairs. Looking at this book brings home the huge breadth and depth that one little word, 'antenna' represents.

As I went through the *Compendium* I was struck by the realisation that, despite popular belief, not all Americans have enormous back yards (gardens) or huge towers. There are a refreshing number of HF designs that are suitable for fairly normal, British-size gardens and planning restrictions. One example of this is a Top Band vertical that's only (!) 30 feet high – 10m if you prefer – made from PVC pipe and, the author suggests, can be hidden within the canopy of a tree if painted a suitable shade of green or brown. Or, if that's too obtrusive, how about a 40m loop for the back of your pickup truck? A 2m antenna disguised as a fully-functional weather vane? There's a lot of ingenuity in the pages of this book.

I like the fact that the designs are reprints of full articles. They generally include full construction and, if appropriate, safety information that, in some books, may be relegated to a single chapter somewhere that you could miss if you're just dipping into it. The articles are from a wide range of authors, including several from the late and much missed L B Cebik, W4RNL. Not quite all of the writers have American callsigns, but be aware that all dimensions are in feet and inches and a few assume you've ready access to standard American materials such as 3/4" copper tube. A little mental arithmetic is normally adequate to convert to the nearest metric equivalent.

Overall, I think this is a worthy addition to anyone's bookshelf. It would obviously compliment a collection of the earlier volumes, but it also makes a good standalone book.

ISBN 978-0-87259-099-1
224 pages, 217 x 276mm
Published by ARRL
Non Members' price £17.99
Members' price £16.14

RadCom 2010 Bound Volume

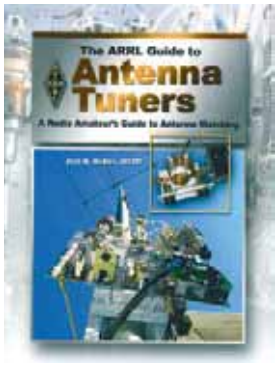
RSGB

If the idea of reading *RadCom* from a computer screen is not your idea of fun but equally you don't like loose magazines, the *RadCom* 2010 Bound Volume could be the perfect answer. Each of these carefully hand-made hardback books contains all twelve editions of *RadCom* in pristine condition, somewhat reminiscent of an encyclopædia. The covers are finished in black with a gold stamped year and RSGB logo. Bound volumes have been produced as a limited edition every year since 1925 and would grace any bookshelf. They are only available to RSGB Members and orders placed now will be despatched to arrive in April.

Published by RSGB
Members' price £49.99

The ARRL Guide to Antenna Tuners

By Joel R Hallas, W1ZR



Not all antenna tuning units are created equal. Sometimes you can get away without one – a point that is made at the very start of the book. But for all those other times, this book will tell you pretty much everything you'll need to know.

Presented in ARRL's familiar textbook style, the *Guide to Antenna Tuners* consists of 15 themed chapters that go into a fair level of detail about their subject. Each includes some thought-provoking 'review' questions at its end, for example "what are the benefits of an internal tuner?" or "what are the relative advantages of operating a balun at a balanced antenna feed-point versus having a long run of balanced line to a balun near the transmitter?" If you've read and understood the chapter, you'll find answering these questions pretty straightforward.

The chapters include why you might need an antenna tuner, a look at a typical configuration, what an antenna tuner actually is, whether a radio's internal ATU helps, transmission lines, line loss, baluns, ununs and chokes, the sort of antennas that work well with tuners and a survey of antenna tuners that are currently on the market. There are some minor errors in the book (such as inaccuracies in the contents list & index) but these are addressed on the ARRL's online errata page.

The nice thing about having a lot of chapters is that it makes it possible to read the book in manageable chunks that you can take to heart in one or two sessions. This is, I'm sure, deliberate, to make the book more accessible. But there is no compromise on the quantity or quality of the information it contains: there's an awful lot of excellent stuff in here that even the most seasoned operator will probably find beneficial. There is a lot of sound, practical advice on things like when a tuner is a good or bad idea, the different designs of tuner, views (inside and out) of various commercial tuners, current and past, plus a homebrew section in case you want to roll your own. This really is a comprehensive work that will teach you a lot about the theory and practice of antenna tuners, transmission lines and, actually, quite a lot more.

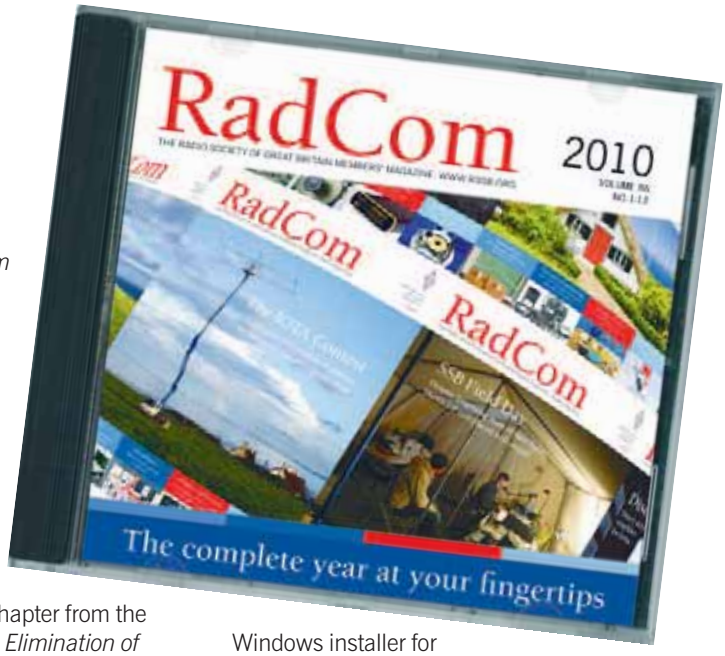
ISBN 978-0-87259-098-4
160 pages, 217 x 276mm
Published by ARRL
Non Members' price £17.99
Members' price £16.14

Book review

The best new publications of the month

2010 *RadCom* CD

RSGB



Around this time every year we all, consciously or unconsciously, seem to start a spring-cleaning exercise. Maybe it's to make room for all those still-shiny Christmas presents, or because we've just accumulated too much 'stuff' and something has to go. That pile of *RadComs*, for example – they take up a lot of space. Wouldn't it be more convenient if you could have them in electronic format and not have to give them so much valuable shelf space?

Enter the 2010 *RadCom* CD. Every word, every photo, every advert that appeared from January to December faithfully reproduced on your computer screen via the magic of binary digits. And thanks to the pdf format that we use, you can magnify the pages to 16 times or more – try doing that on the copies that land on your doormat! Don't like reading on the screen? Can't quite read that circuit diagram? Want to re-read an article in the bath but don't want to get your computer wet? Simply print out the pages you're interested in for instant device-independent portability!

But that's not all. Included on every *RadCom 2010* CD are samples from earlier decades. There are complete copies of the June 1943, July 1952 and January 1961 Bulletin, March 1974 and October 1984 *Radio Communication* and a *RadCom* from December 1998. There's also a complete chapter from the recent RSGB publication, *Elimination of Electrical Noise*, by Don Pinnock, G3HVA.

To make it easier to finds the article you're interested in, there is a copy of the 2010 index available from the home screen of the CD. Incidentally, no installation is normally necessary, because all of the files work with your web browser in conjunction with Acrobat Reader. In the unlikely event that you haven't already got Acrobat Reader on your system, a Windows installer for version 10 is included on the disc.

All in all the *RadCom* 2010 CD is an excellent way to enjoy the world's best amateur radio magazine in electronic format.

CD format
Published by RSGB
Non Members' price £19.99
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The Spies Who Lost The Battle of Britain

Released by Boffins TV

It's quite unusual for me to review a DVD – in fact, I think this is my first for *RadCom*. But what a way to start! *The Spies Who Lost The Battle of Britain* is a fascinating documentary about early radar and, in particular, Chain Home and Chain Home Low. It opens with the Graf Zeppelin, chock-full of radio spies, travelling up the East Coast looking for evidence of British radar capabilities. Did they spot it...?

The story is told using a very effective mixture of archive film, recent interviews and re-enactments. I thought the actor who played Watson-Watt was particularly convincing, as he bears quite a resemblance to the man he portrays. None of the interviews is lengthy, consisting mainly of pithy sound bites from distinguished people who were amongst the radar pioneers – I counted two professors, two doctors and two knights, including Sir Bernard Lovell.

Coverage is very comprehensive and includes the first theoretical calculation through the Daventry experiment, Orford Ness to Bawdsey Manor. It doesn't appear to pull any punches, either: I squirmed a little as I learned of the terrible embarrassment in front of London's top brass as the first demonstration of the Chain Home system was a resounding failure. Nevertheless, the system was soon made to work and it provided invaluable support to Fighter Command throughout the Battle of Britain and beyond.

But what of the spies in the title? Without wishing to reveal too much, I can say that two key figures happened to meet after the War and discovered – to one's delight and the other's dismay – that a relatively simple technical misinterpretation had resulted in a huge tactical loss to one side. Who made the mistake and what was it? You'll have to watch the documentary to find out.

I enjoyed it, and I think you will too.

DVD, 63 minutes, 16:9, PAL, Region 0
Non members' price £12.99
Members' price £9.99

If you haven't already tried the RSGB Bookshop online at www.rsgbshop.org then you may be missing out. The online book shop contains a vast array of publications on amateur radio and you'll sometimes find special offers that don't always appear in the printed version of *RadCom*. You'll discover full details of other special RSGB items such as callsign badges, clothing and members' offers.

RSGB Band Plan 2011

The following band plan is largely based on that agreed at the 2008 IARU Region 1 General Conference with some local differences on frequencies above 430MHz.

EFFECTIVE FROM 1ST JANUARY 2011 UNLESS OTHERWISE SHOWN.

136kHz	NECESSARY BANDWIDTH	UK USAGE
135.7-137.8kHz	200Hz	CW, QRSS and Narrow-Band Digital Modes

Licence Notes: 1W (0dBW) EIRP
R.R. 5.67B: The use of the band 135.7-137.8kHz in Algeria, Egypt, Iran (Islamic Republic of), Iraq, Lybian Arab Jamahirya, Lebanon, Syrian Arab Republic, Sudan and Tunisia is limited to fixed and maritime mobile services. The amateur service shall not be used in the above-mentioned countries in the band 135.7-137.8kHz and this should be taken into account by the countries authorising such use (WRC-07).

1.8MHz (160m)	NECESSARY BANDWIDTH	UK USAGE
1810-1838kHz	200Hz	Telegraphy
1838-1840	500Hz	Narrow Band Modes
1840-1843	2.7kHz	All Modes
1843-2000	2.7kHz	Telephony (Note 1), Telegraphy 1836kHz QRP (low power) Centre of Activity, 1960kHz DF Contest Beacons (14dBW)

Note 1: Lowest LSB carrier frequency (dial setting) should be 1843kHz. AX25 packet should not be used on the 1.8MHz band.
Licence Notes: 1810-1850kHz – Primary User. 1810-1830kHz on a non-interference basis to stations outside of the UK. 1850-2000kHz – Secondary User.
Notes to the Band Plan: As on page 63.

3.5MHz (80m)	NECESSARY BANDWIDTH	UK USAGE
3500-3510kHz	200Hz	Telegraphy - Priority for Inter-continental Operation
3510-3560	200Hz	Telegraphy - Contest Preferred. 3555kHz - QRS (slow telegraphy) Centre of Activity
3560-3580	200Hz	Telegraphy 3560kHz - QRP (low power) Centre of Activity
3580-3590	500Hz	Narrow Band Modes
3590-3600	500Hz	Narrow Band Modes - Automatically Controlled Data Stations (unattended)
3600-3620	2.7kHz	All Modes - Automatically Controlled Data Stations (unattended), (Note 1)
3600-3650	2.7kHz	All Modes - Phone Contest Preferred, (Note 1). 3630kHz - Digital Voice (DV) Centre of Activity
3650-3700	2.7kHz	All Modes - Telephony, Telegraphy 3663kHz may be used for UK Emergency Comms Traffic 3690kHz SSB - QRP (low power) Centre of Activity
3700-3800	2.7kHz	All Modes - Phone Contest Preferred 3735kHz - Image Mode Centre of Activity 3760kHz - IARU Region 1 Emergency Centre of Activity
3775-3800		Priority for Inter-Continental Telephony (SSB) Operation

Note 1: Lowest LSB carrier frequency (dial setting) should be 3603kHz.
Licence Notes: Primary User. Shared with other user services.
Notes to the Band Plan: As on page 63.

7MHz (40m)	NECESSARY BANDWIDTH	UK USAGE EFFECTIVE 29 MARCH 2009
7000-7025kHz	200Hz	Telegraphy, Contest Preferred Segment
7025-7040	200Hz	Telegraphy, 7030kHz – QRP (low power) Centre of Activity
7040-7047	500Hz	Narrow Band Modes
7047-7050	500Hz	Narrow Band Modes - Automatically Controlled Data Stations (unattended)
7050-7053	2.7kHz	All Modes - Automatically Controlled Data Stations (unattended), (Note 1)
7053-7060	2.7kHz	All Modes, Digimodes
7060-7100	2.7kHz	All modes, digital voice 7070kHz, SSB QRP Centre of Activity 7090kHz, SSB contest preferred
7100-7130	2.7kHz	All Modes, 7110kHz - Region 1 Emergency Centre of Activity
7130-7200	2.7kHz	All Modes, SSB Contest Preferred Segment, 7165kHz - Image Centre of Activity
7175-7200	2.7kHz	All Modes - Priority For Intercontinental Operation

Note 1: Lowest LSB carrier frequency (dial setting) should be 7053kHz.
Licence Notes: 7000-7100kHz Amateur and Amateur Satellite Service – Primary User. 7100-7200kHz Amateur Service – Primary User.
Notes to the Band Plan: As on page 63.

10MHz (30m)	NECESSARY BANDWIDTH	UK USAGE
10,100-10,140kHz	200Hz	Telegraphy (CW) 10,116kHz - QRP (low power) Centre of Activity
10,140-10,150	500Hz	Narrow Band Modes Automatically Controlled Data Stations (unattended) should avoid the use of the 10MHz band

Licence Notes: Amateur Service – Secondary User.
Notes to the Band Plan: As on page 63.
The 10MHz band is allocated to the Amateur Service only on a Secondary basis. The IARU has agreed that only CW and other narrow bandwidth modes are to be used on this band. Likewise, the band is not to be used for contests and bulletins. SSB may be used on the 10MHz band during emergencies involving the immediate safety of life and property, and only by stations actually involved with the handling of emergency traffic. The band segment 10,120-10,140kHz may only be used for SSB transmissions in the area of Africa south of the equator during local daylight hours.

14MHz (20m)	NECESSARY BANDWIDTH	UK USAGE
14,000-14,060kHz	200Hz	Telegraphy - Contest Preferred 14,055kHz - QRS (slow telegraphy) Centre of Activity
14,060-14,070	200Hz	Telegraphy 14,060kHz - QRP (low power) Centre of Activity
14,070-14,089	500Hz	Narrow Band Modes
14,089-14,099	500Hz	Narrow Band Modes - Automatically Controlled Data Stations (unattended)
14,099-14,101		IBP - Reserved Exclusively For Beacons
14,101-14,112	2.7kHz	All Modes - Automatically Controlled Data Stations (unattended)
14,112-14,125	2.7kHz	All Modes (excluding digimodes)
14,125-14,300	2.7kHz	All Modes - SSB Contest Preferred Segment 14,130kHz - Digital Voice (DV) Centre of Activity 14,195 ±5kHz Priority for DXpeditions 14,230kHz - Image Centre of Activity 14,285kHz - QRP (low power) Centre of Activity
14,300-14,350	2.7kHz	All Modes 14,300kHz - Global Emergency Centre of Activity

Licence Notes: Amateur Service – Primary User.
Notes to the Band Plan: As on page 63. 14,000-14,250kHz Amateur Satellite Service – Primary User.

18MHz (17m)	NECESSARY BANDWIDTH	UK USAGE
18,068-18,095kHz	200Hz	Telegraphy - 18,086kHz QRP (low power) Centre of Activity
18,095-18,105	500Hz	Narrow Band Modes
18,105-18,109	500Hz	Narrow Band Modes - Automatically Controlled Data Stations (unattended)
18,109-18,111		IBP - Reserved Exclusively For Beacons
18,111-18,120	2.7kHz	All Modes - Automatically Controlled Data Stations (unattended)
18,120-18,168	2.7kHz	All Modes, 18,130kHz SSB QRP (low power) Centre of Activity 18,150kHz - Digital Voice (DV) Centre of Activity 18,160kHz - Global Emergency Centre of Activity

Licence Notes: Amateur and Amateur Satellite Service – Primary User.
Notes to the Band Plan: As on page 63. The band is not to be used for contests or bulletins.

21MHz (15m)	NECESSARY BANDWIDTH	UK USAGE
21,000-21,070kHz	200Hz	Telegraphy 21,055kHz - QRS (slow telegraphy) Centre of Activity 21,060kHz - QRP (low power) Centre of Activity
21,070-21,090	500Hz	Narrow Band Modes
21,090-21,110	500Hz	Narrow Band Modes - Automatically Controlled Data Stations (unattended)
21,110-21,120	2.7kHz	All Modes (excluding SSB) - Automatically Controlled Data Stations (unattended)
21,120-21,149	500Hz	Narrow Band Modes
21,149-21,151		IBP - Reserved Exclusively For Beacons
21,151-21,450	2.7kHz	All Modes 21,180kHz - Digital Voice (DV) Centre of Activity 21,285kHz - QRP (low power) Centre of Activity 21,340kHz - Image Centre of Activity 21,360kHz - Global Emergency Centre of Activity

Licence Notes: Amateur and Amateur Satellite Service – Primary User.
Notes to the Band Plan: As on page 63.

24MHz (12m)	NECESSARY BANDWIDTH	UK USAGE
24,890-24,915kHz	200Hz	Telegraphy 24,906kHz - QRP (low power) Centre of Activity
24,915-24,925	500Hz	Narrow Band Modes
24,925-24,929	500Hz	Narrow Band Modes - Automatically Controlled Data Stations (unattended)
24.929-24.931		IBP - Reserved Exclusively For Beacons
24,931-24,940	2.7kHz	All Modes - Automatically Controlled Data Stations (unattended)
24,940-24,990	2.7kHz	All Modes, 24,950kHz SSB QRP (low power) Centre of Activity 24,960kHz - Digital Voice (DV) Centre of Activity

Licence Notes: Amateur and Amateur Satellite Service – Primary User.
Notes to the Band Plan: As on page 63. The band is not to be used for contests or bulletins.

28MHz (10m)	NECESSARY BANDWIDTH	UK USAGE
28,000-28,070kHz	200Hz	Telegraphy 28,055kHz QRS (slow telegraphy) Centre of Activity 28,060kHz QRP (low power) Centre of Activity
28,070-28,120	500Hz	Narrow Band Modes
28,120-28,150	500Hz	Narrow Band Modes - Automatically Controlled Data Stations (unattended)
28,150-28,190	500Hz	Narrow Band Modes

28,190-28,199		**IBP - Regional Time Shared Beacons**
28,199-28,201		**IBP - World Wide Time Shared Beacons**
28,201-28,225		**IBP - Continuous-Duty Beacons**
28,225-28,300	2.7kHz	All Modes - Beacons
28,300-28,320	2.7kHz	All Modes - Automatically Controlled Data Stations (unattended)
28,320-29,200	2.7kHz	28,330kHz - Digital Voice (DV) Centre of Activity 28,360kHz - QRP (low power) Centre of Activity 28,680kHz - Image Centre of Activity
29,200-29,300	6kHz	All Modes - Automatically Controlled Data Stations (unattended) 29,210kHz - UK Internet Voice Gateway (unattended) 29,290kHz - UK Internet Voice Gateway (unattended)
29,300-29,510	6kHz	Satellite Down-links
29,510-29,520		Guard Channel
29,520-29,550	6kHz	All Modes - FM Simplex - 10kHz Channels 29,530kHz - UK Internet Voice Gateway (unattended)
29,560-29,590	6kHz	All Modes - FM Repeater Inputs (RH1-RH4)
29,600	6kHz	All Modes - FM Calling Channel
29,610-29,650	6kHz	All Modes - FM Simplex - 10kHz Channels 29,630kHz - UK Internet Voice Gateway (unattended)
29,660-29,700	6kHz	All Modes - FM Repeater Outputs (RH1-RH4)

Licence Notes: Amateur and Amateur Satellite Service – Primary User. 26dBW permitted. Beacons may be established for DF competitions except within 50km of NGR SK985640 (Waddington).
Notes to the Band Plan: As on page 63.

50MHz (6m)	NECESSARY BANDWIDTH	UK USAGE
50.000-50.100MHz		Telegraphy
		50.000-50.080MHz Propagation Beacons only
	500Hz	50.090MHz Telegraphy - Centre of Activity
50.100-50.500	2.7kHz	All Narrow Band Modes 50.100-50.130MHz Intercontinental Telegraphy & SSB (Note 1) 50.110MHz - DX Calling (Note 2) 50.150MHz - SSB Centre of Activity 50.185MHz - Crossband Centre of Activity 50.200MHz - MS Centre of Activity 50-210-50.250MHz - JT6M 50.230MHz - JT6M Calling Frequency 50.250MHz - PSK31 Centre of Activity 50.400MHz - WSPR Beacons
50.500-52.000	12.5kHz	All Modes 50.510MHz - SSTV (AFSK) 50.520MHz - Internet Voice Gateway (10kHz channels), (IARU common channel) 50.530MHz - Internet Voice Gateway (10kHz channels), (IARU common channel) 50.540MHz - Internet Voice Gateway (10kHz channels), (IARU common channel) 50.550MHz - FAX Working Frequency 50.600MHz - RTTY (FSK) 50.620-50.750MHz - Digital Communications 50.630MHz - Digital Voice (DV) Calling 50.710-50.910MHz - FM/DV Repeater Outputs (10kHz channel spacing) 51.210MHz. Can be used by RAYNET 51.210-51.410MHz - FM/DV Repeater Inputs (10kHz channel spacing) (Note 4) 51.430-51.590MHz - FM/DV Simplex (Note 3) (Note 4) 51.510MHz FM Calling Frequency 51.530MHz - GB2RS News Broadcast and Slow Morse 51.910-51.950MHz - Internet Voice Gateways (10kHz channels) 51.950-51.990MHz. Can be used by RAYNET

Note 1: Only to be used between station in different continents.
Note 2: No QSOs on this frequency. Always QSY when working intercontinental DX.
Note 3: 20kHz channel spacing. Channel centre frequencies start at 51.430MHz.
Note 4: Embedded data traffic is allowed with digital voice (DV).
Licence Notes: Amateur Service 50.0-51.0MHz – Primary User. Amateur Service 51.0-52.0MHz – Secondary User. Available on the basis on non-interference to other services (inside or outside the UK).
Notes to the Band Plan: As on page 63.

70MHz (4m)	NECESSARY BANDWIDTH	UK USAGE
70.000-70.050MHz		**Propagation Beacons Only**
		70.030MHz - Personal Beacons & WSPR Beacons
70.050-70.250	2.7kHz	Narrow Band Modes 70.085MHz - PSK31 Centre of Activity 70.150MHz - MS Calling 70.185MHz - Cross-band Centre of Activity 70.200MHz - SSB/CW Calling
70.250-70.294	12kHz	All Modes 70.260MHz - AM/FM Calling
70.294-70.500	12kHz	All Modes Channelised Operations Using 12.5kHz Spacing 70.3000MHz - RTTY/FAX Calling/Working 70.3125MHz - Digital Modes 70.3250MHz - DX Cluster 70.3375MHz - Digital Modes 70.3500MHz - Internet Gateway. Can be used by RAYNET 70.3625MHz - Internet Voice Gateway 70.3750MHz - Can be used by RAYNET 70.3875MHz - Internet Voice Gateway 70.4000MHz - Can be used by RAYNET 70.4125MHz - Internet Voice Gateway 70.4250MHz - FM Simplex. Used by GB2RS News Broadcast 70.4375MHz - Digital Modes (special projects) 70.4500MHz - FM Calling 70.4625MHz - Digital Modes 70.4750MHz 70.4875MHz - Digital Modes

Licence Notes: Amateur Service 70.0-70.5MHz – Secondary User. 22dBW permitted. Available on the basis of non-interference to other services (inside or outside the UK).
Notes to the Band Plan: As on page 63.

144MHz (2m)	NECESSARY BANDWIDTH	UK USAGE
144.000-144.110MHz	500Hz	Telegraphy (including EME CW) 144.050MHz - Telegraphy Calling 144.100MHz - Random MS Telegraphy Calling (Note 1)
144.110-144.150	500Hz	Telegraphy and MGM 144.138MHz - PSK31 Centre Of Activity EME MGM Activity (Note 7)
144.150-144.180	2.7kHz	Telegraphy, MGM and SSB
144.180-144.360	2.7kHz	Telegraphy and SSB 144.175MHz - Microwave Talkback 144.195-144.205MHz - Random MS SSB 144.200MHz - Random MS SSB Calling Frequency 144.250MHz - GB2RS News Broadcast and Slow Morse 144.260MHz USB - Can be used by RAYNET 144.300MHz - SSB Calling
144.360-144.399	2.7kHz	Telegraphy, MGM, SSB 144.370MHz - MGM Calling Frequency
144.400-144.490		**Propagation Beacons Only**
144.490-144.500		**144.4905MHz ±500Hz - WSPR Beacons and Beacon Guard Band**
144.500-144.794	20kHz	All Modes 144.500MHz - SSTV Calling 144.525MHz - ATV SSB Talkback 144.600MHz - RTTY Calling 144.600MHz - RTTY Working (FSK) 144.6125MHz - UK Digital Voice (DV) Calling (Note 9) 144.625-144.675MHz - Can be used by RAYNET 144.700MHz - FAX Calling 144.750MHz - ATV Talkback 144.775-144.794MHz - Can be used by RAYNET
144.794-144.990	12kHz	MGM Packet Radio 144.800-144.9875MHz - Digital Modes (including unattended) 144.8000MHz - Unconnected Nets, APRS, UiView, etc 144.8250MHz - Internet Voice Gateway 144.8375MHz - Internet Voice Gateway 144.8500MHz - AX25 BBS User Access 144.8625MHz - Available for Nodes and BBSs on Application 144.8750MHz - TCP/IP User Access 144.8875MHz - AX25, Priority for DX Cluster Access 144.9000MHz - AX25 DX Cluster Access 144.9250MHz - TCP/IP User Access 144.9500MHz - AX25 BBS User Access 144.9750MHz - High Speed 25kHz Channel
144.990-145.1935	12kHz	FM/DV RV48 - RV63 Repeater Input Exclusive (Note 2) (Note 5)
145.200	12kHz	FM/DV Space Communications (eg ISS) - Earth-to-Space 145.2000MHz (Note 4) - Can be used by RAYNET
145.200-145.5935	12kHz	FM/DV V16-V48 FM/DV Simplex (Note 3) (Note 5) (Note 6) 145.2125MHz - Internet Voice Gateway 145.2250MHz - Can be used by RAYNET 145.2375MHz - FM Internet Voice Gateway (IARU common channel) 145.2500MHz - Used for Slow Morse Transmissions 145.2875MHz - FM Internet Voice Gateway (IARU common channel) 145.3000MHz - RTTY Local 145.3375MHz - FM Internet Voice Gateway (IARU common channel) 145.5000MHz - Mobile Calling 145.5250MHz - Used for GB2RS News Broadcast 145.5500MHz - Used for Rally/Exhibition Talk-in
145.5935-145.7935	12kHz	FM/DV RV48 - RV63 Repeater Output (Note 2)
145.800	12kHz	FM/DV Space Communications (eg ISS) - Space-Earth
145.806-146.000	12kHz	All Modes - Satellite Exclusive

Note 1: Meteor scatter operation can take place up to 26kHz higher than the reference frequency.
Note 2: 12.5kHz channels numbered RV48-RV63.RV48 input = 145.000MHz, output=145.600MHz.
Note 3: 12.5kHz Simplex channels numbered V16-V46. V16=145.200MHz.
Note 4: Emergency Communications Groups utilising this frequency should take steps to avoid interference to ISS operations in non-emergency situations.
Note 5: Embedded data traffic is allowed with digital voice (DV).
Note 6: Simplex use only - no DV gateways.
Note 7: EME activity using MGM is commonly practiced between 144.110-144.160MHz.
Note 8: The use of Amplitude Modulation (AM) is acceptable within the All Modes segment. AM usage may often be found on 144.550MHz although this frequency is not officially recognised within the 2m Band Plan. AM users are asked to consider adjacent channel activity when selecting operating frequencies.
Note 9: In other countries IARU Region 1 recommend 145.375MHz.
Licence Notes: Amateur Service and Amateur Satellite Service – Primary User. Beacons may be established for DF competitions except within 50km of TA 012869 (Scarborough).
Notes to the Band Plan: As on page 63.

430MHz (70cm) IARU RECOMMENDATION	NECESSARY BANDWIDTH	UK USAGE
430.0000 -431.9810MHz All Modes	20kHz	430.0125-430.0750MHz - Internet Voice Gateways (Notes 7, 8) (12.5kHz channels) 430.1625-430.1875MHz - Experimental MPT1327 Base TX Ch. 1-3 (12.5kHz channels)
430.4000-430.5750 430.6000-430.9250 Digital Repeaters		Digital Links 430.8000MHz - RAYNET 7.6MHz Talkthrough - Mobile TX 430.8250-430.9750MHz - RU66-RU78 7.6MHz Split Repeaters – Outputs **See licence exclusion note; 431-432MHz**
		430.9900-431.9000MHz - Digital Communications 431.0750-431.1750MHz - Internet Voice Gateway (6dBW max) (12.5kHz channels)
432.0000-432.1000 Telegraphy MGM	500Hz	432.0000-432.0250MHz - Moonbounce (EME) 432.0500MHz - Telegraphy Centre of Activity 432.0880MHz - PSK31 Centre of Activity
432.1000-432.4000 SSB, Telegraphy MGM	2700Hz	432.2000MHz - SSB Centre of Activity 432.3500MHz - Microwave Talkback Calling Frequency (Europe) 432.3700MHz - FSK441 Calling Frequency

432.4000-432.5000	500Hz	Propagation Beacons Only (Note 9)
Beacons Exclusive		
432.5000-432.9940	25kHz	432.5000MHz - Narrow Band SSTV Centre of Activity
All modes	(Note 11)	432.5000-432.6000MHz - IARU Region Linear Transponder Inputs
Non-channelised		432.6000MHz - RTTY (ASK/PSK) Centre of Activity
		432.6000-432.8000MHz - IARU Region 1 Linear Transponder Outputs
		432.6250-432.6750MHz - Digital Communications (25kHz channels)
		432.7000MHz - FAX Centre of Activity
		432.7750MHz - RAYNET 1.6MHz Talkthrough - Base TX
		432.8000-432.9900MHz - UK Beacons (Note 9)
432.9940-433.3810	25kHz	433.0000-433.3750MHz (RB0-RB15) RU240-RU270
FM repeater outputs	(Note 11)	FM/DV Repeater Outputs (25kHz channels) in UK Only
in UK only (Note 1)		
433.3940-433.5810	25kHz	433.4000MHz - U272; IARU Region 1 SSTV (FM/AFSK)
	(Note 11)	433.4250MHz - U274
FM/DV	(Notes 12, 13)	433.4500MHz - U276 (Note 5)
Simplex		433.4750MHz - U278
Channels		433.5000MHz - U280 FM Calling Channel
		433.5250MHz - U282
		433.5500MHz - U284 Used for Rally/Exhibition Talk-in
		433.5750MHz - U286
433.6000-434.0000	25kHz	433.6000MHz - U288 RTTY AFSK
All Modes	(Note 11)	433.6250-6750MHz - Digital Communications (25kHz channels)
433.800MHz for		433.7000MHz (Note 3) - Can be used by RAYNET
APRS where 144.800MHz		433.7250-433.7750MHz - Can be used by RAYNET
cannot be used.		433.8000-434.2500MHz - Digital Communications
434.000-434.5940	25kHz	433.9500-434.0500MHz - 25kHz Internet Voice Gateway Channels
	(Note 11)	434.0625-434.0875MHz - Experimental MPT1327 Mobile TX Ch 1-3 (12.5kHz channels)
		434.3750MHz - RAYNET 1.6MHz Talkthrough - Mobile TX
		434.4750-434.5250MHz - Internet Voice Gateway (25kHz channels)
434.5940-434.9810	25kHz	434.6000-434.9750MHz (RB0-RB15) RU240-RU270
FM repeater inputs in	(Note 11)	FM/DV repeater inputs (25kHz channels) in UK Only
UK only and ATV (Note 4)	(Note 12)	
435.0000-438.0000		Satellites and Fast Scan TV (Note 4)
438.0000-440.0000	25kHz	438.0250-438.1750MHz IARU Region 1 Digital Communications
All modes	(Note 11)	438.2000-439.4250MHz (Note 1)
		438.4000MHz - RAYNET 7.6MHz Talkthrough - Base TX
		438.4250-438.5750MHz - RU66-RU78 7.6MHz Split Repeaters – Inputs
		438.6125MHz - UK Digital Voice (DV) Calling (Note 12) (Note 13)
439.9875 POCSAG		439.6000-440.0000MHz - Digital Communications Centre

Note 1: In Switzerland, Germany and Austria, repeater inputs are 431.050-431.825MHz with 25kHz spacing and outputs.
438.650-439.425MHz. In Belgium, France and the Netherlands repeater outputs are 430.025-430.375MHz with 12.5kHz spacing and inputs at 431.625-431.975MHz. In other European countries repeater inputs are 433.000-433.375MHz with 25kHz spacing and outputs at 434.600-434.975MHz, ie the reverse of the UK allocation.
Note 3: IARU Region 1 FAX/AFSK.
Note 4: ATV carrier frequencies shall be chosen to avoid interference to other users, in particular the satellite service and repeater inputs.
Note 5: In other countries IARU Region 1 recommend 433.450MHz for DV calling.
Note 7: Users must accept interference from repeater output channels in France and the Netherlands at 430.025-430.575MHz.
Users with sites that allow propagation to other countries (notably France and the Netherlands) must survey the proposed frequency before use to ensure that they will not cause interference to users in those countries.
Note 8: Internet voice gateway channels: maximum deviation ±2.4kHz, maximum effective radiated power 10W (10dBW).
Note 9: The beacon band in the UK is scheduled to change to 432.400-432.500MHz when agreed by the Primary User.
Note 10: No longer used.
Note 11: IARU Region 1 recommended maximum bandwidths are 12.5 or 20kHz.
Note 12: Embedded data traffic is allowed with digital voice (DV).
Note 13: Simplex use only - no DV gateways.
Licence Notes: Amateur Service – Secondary User. Amateur Satellite Service 435-438MHz – Secondary User. Exclusion: 431-432MHz not available within 100km radius of Charing Cross, London.
Notes to the Band Plan: As on page 63.

1.3GHz (23cm) IARU RECOMMENDATION	NECESSARY BANDWIDTH	UK USAGE
1240.000-1243.250MHz	150kHz	Note 7 1240.00-1240.750MHz
All Modes		Note 8 - See below prior to ANY application or assignment in 1240-1325MHz
1240.000-1240.750		
Alternative Centre	(Note 3)	1240.150MHz - Packet Radio
1242.025-1242.250		1240.300MHz - Packet Radio
1242.275-1242.700		1240.450MHz - Packet Radio
Repeater outputs		1240.600MHz - Packet Radio
1242.725-1243.250		1240.750MHz - Packet Radio
Packet Radio		
1243.250-1260.000		1248.000MHz - ATV Repeater Input
ATV		1249.000MHz - ATV Repeater Input
1258.150-1259.350		
Repeater Outputs		
1260.000-1270.000		Amateur Satellite Service - Earth to Space only
Satellites		
1270.000-1272.000	20kHz	
All Modes		
1270.025-1270.700		
Repeater Inputs		
1270.725-1271.250		
Packet Radio		
1272.000-1290.994		
ATV/DATV		1280.000MHz - ATV Repeater Input
1290.994-1291.481	25kHz (Note 4)	FM/DV Repeater Inputs (Note 5) 1291.000-1291.375MHz (RM0-RM15) 25kHz spacing
1291.494-1296.000		All Modes
All Modes		
1293.150-1294.350		
Repeater Inputs		
1296.000-1296.150	500Hz	1296.000-1296.025MHz - Moonbounce
Telegraphy, MGM		1296.138MHz - PSK31 Centre of Activity
1296.150-1296.800	2.7kHz	1296.200MHz - Narrow Band Centre of Activity
Telegraphy, SSB and MGM		1296.370MHz - FSK441 MS calling
(Note 1)		1296.400-1296.600MHz - Linear Transponder Input
		1296.500MHz - Image Mode Centre of Activity (SSTV, FAX, etc)
		1296.600MHz - Narrowband Data Centre of Activity (MGM, RTTY, etc)
		1296.600-1296.700MHz - Linear Transponder Output
		1296.750-1296.800MHz Local Beacons, 10W ERP Max
1296.800-1296.994		1296.800-1296.990MHz Propagation Beacons Only
Beacons Exclusive		
1296.994-1297.481	25kHz (Note 4)	FM/DV Repeater Outputs (Note 5) 1297.000-1297.375MHz (RM0-RM15)
1297.494-1297.981	25kHz (Note 4)	FM/DV Simplex (Note 5) (Note 6) 25kHz spacing 1297.500-1297.750MHz (SM20-SM30)
FM/DV Simplex		1297.725MHz - Digital Voice (DV) Calling (IARU recommended)
(Notes 2, 5, 6)		1297.900-1297.975MHz - FM Internet Voice Gateways (IARU common channels, 25kHz)
1298.000-1300.000	20kHz	All modes. See Note 8
All Modes		Unattended Remote Control, Beacons and Digital Communications
1298.025-1298.500		
Repeater Outputs		
1298.500-1300.000	25kHz	1299.000MHz - Packet Radio
Digital Comms	150kHz	1299.425MHz - Packet Radio
1298.725-1299.000	150kHz	1299.575MHz - Packet Radio
Duplex Packet Radio	150kHz	1299.725MHz - Packet Radio
1300.000-1325.000		TV Repeater Outputs (UK only)
		1308.000MHz - ATV Repeater Output
		1310.000MHz - ATV Repeater Output
		1311.500MHz - ATV Repeater Output
		1312.000MHz - ATV Repeater Output
		1316.000MHz - ATV Repeater Output
		1318.500MHz - ATV Repeater Output

Note 1: Local traffic using narrow band modes should operate between 1296.500-1296.800MHz during contests and band openings.
Note 2: Stations in countries that do not have access to 1298-1300MHz may also use the FM Simplex segment for digital communications.
Note 3: IARU Region 1 recommended maximum bandwidth is 20kHz. See also Note 7.
Note 4: IARU recommended maximum bandwidth is 12kHz.
Note 5: Embedded data traffic is allowed with digital voice (DV).
Note 6: Simplex use only - no DV gateways.
Note 7: 1240.000-1240.750 is designated by IARU as an alternative centre for narrowband activity and beacons. Operations in this range should be on a flexible basis to enable activation of this alternate usage.
Note 8: The band 1240-1300MHz is subject to major replanning. Contact the Microwave Manager for further information.
Licence Notes: Amateur Service – Secondary User. Amateur Satellite Service 1260-1270MHz – Secondary User. *Earth to Space only.* In the sub-band 1298-1300MHz unattended operation is not allowed within 50km of SS206127 (Bude), SE202577 (Harrogate), or in Northern Ireland.
Notes to the Band Plan: As on page 63.

2.3GHz (13cm) IARU RECOMMENDATION	NECESSARY BANDWIDTH	UK USAGE
2310.000-2320.000MHz		2310.000-2310.500MHz - Repeater links
Sub-regional	200kHz	2310.100MHz - Packet Radio
(National Band Plans)	200kHz	2310.300MHz - Packet Radio
		2310.000-2310.500MHz - *Remote Control
		2311.000-2315.000MHz - High Speed Data
2320.000-2320.150		2320.000-2320.025MHz - Moonbounce
CW Exclusive		
2320.150-2320.800		2320.200MHz - SSB Centre of Activity
CW and SSB		
		2320.750-2320.800MHz Local Beacons, 10W ERP Max
2320.800-2321.000		2320.800-2320.990MHz Propagation Beacons Only
Beacons Exclusive		
2321.000-2322.000		
Simplex and Repeaters		
(Note 1)		
2322.000-2400.000		2322.000-2355.000MHz - ATV and ATV Repeaters
		2355.100-2364.000MHz - Repeater Links
	200kHz	2355.100MHz - Packet Radio
	200kHz	2355.300MHz - Packet Radio
		2356.000-2360.000MHz - *High Speed Data
	1000kHz	2364.000MHz - *Packet Radio
		2365.000-2370.000MHz - Repeaters
		2370.000-2390.000MHz - ATV and ATV Repeaters
		2390.000-2392.000MHz - Moonbounce
2400.000-2450.000		2435.000MHz - ATV Repeater Outputs
Satellites		2440.000MHz - ATV Repeater Outputs

Note 1: Stations in countries that do not have access to the all modes section 2322-2390MHz, use the Simplex and repeater segment 2320-2322MHz for data transmission.
Note 2: Stations in countries that do not have access to the narrow band segment 2320-2322MHz, use the alternative narrow band segment 2304-2306MHz and 2308-2310MHz.
Note 3: The segment 2433-2443MHz may be used for ATV if no satellite is using the segment.
Licence Notes: Amateur Service – Secondary User. *Users must accept interference from ISM users.* Amateur Satellite Service 2400-2450MHz – Secondary User. *Users must accept interference from ISM users.*
*In the sub-bands 2310.000-2310.4125; 2355-2365 and 2392-2450MHz unattended operation is not allowed within 50km of SS206127 (Bude) or SE202577 (Harrogate).
ISM = Industrial, scientific and medical.
Notes to the Band Plan: As on page 63.

3.4GHz (9cm) IARU RECOMMENDATION	UK USAGE
3400.000-3402.000MHz Narrow band CW/EME/SSB	3400.100MHz - Centre of Activity (Note 1) 3400.750-3400.800MHz Local Beacons, 10W ERP Max
3400.800-3400.995 Propagation Beacons	3400.800-3400.995MHz Propagation Beacons Only
3402.000-3410.000 All Modes (Notes 2, 3)	3401.000-3402.000MHz - Remote control
3410.000-3475.000 All Modes. See Note 4	3456.000MHz (Note 1)

Note 1: EME has migrated from 3456MHz to 3400MHz to promote harmonised usage and activity.
Note 2: Stations in many European countries have access to 3400-3410MHz as permitted by ECA Table Footnote EU17.
Note 3: Amateur Satellite down-links planned.
Note 4: Parts of this range are subject to regulatory change. Contact the Microwave Manager for further information
Licence Notes: Amateur Service – Secondary User.
Unattended operation is permitted for remote control, digital modes and beacons, except in the sub-bands 3,420-3,430MHz and 3,450-3,455MHz within 50km of SO916223 (Cheltenham), SS206127 (Bude) and SE202577 (Harrogate).
ISM = Industrial, scientific and medical.
Notes to the Band Plan: As on page 63.

5.7GHz (6cm) IARU RECOMMENDATION	UK USAGE
5650.000-5668.000MHz Satellite Up-links	Amateur Satellite Service - Earth to Space Only
5650.000-5670.000 Narrow Band CW/EME/SSB	5668.200MHz - Alternative Centre of Activity 5668.8MHz - Beacons
5670.000-5680.000 All Modes	
5755.000-5760.000 All Modes	
5760.000-5762.000 Narrow Band CW/EME/SSB	5760.100MHz - Current Centre of Activity 5760.750-5760.800MHz Local Beacons, 10W ERP Max
5760.800-5760.995 Propagation Beacons	5760.800-5760.995MHz Propagation Beacons Only
5762.000-5765.000 All Modes	
5820.000-5830.000 All Modes	
5830.000-5850.000 Satellite Down-links	Amateur Satellite Service - Space to Earth Only

Licence Notes: Amateur Service 5650-5680MHz – Secondary User. 5755-5765 and 5820-5850MHz – Secondary User. *Users must accept interference from ISM users.*
Amateur Satellite Service 5650-5670MHz and 5830-5850MHz – Secondary User. *Users must accept interference from ISM users.*
Unattended operation is permitted for remote control, digital modes and beacons, except in the sub-bands 5670-5680MHz within 50km of SS206127 (Bude) and SE202577 (Harrogate).
ISM = Industrial, scientific and medical.
Notes to the Band Plan: As on page 63.

10GHz (3cm) IARU RECOMMENDATION	UK USAGE
10,000.000-10,125.000MHz Digital Modes	10,002.5-10,027.5MHz - Wideband Transponders - 015 OUT 10,027.5-10,052.5MHz - Wideband Transponders - 040 OUT 10,052.5-10,077.5MHz - Wideband Transponders - 065 OUT 10,080-10,090MHz - Packet Links 10,090-10,110MHz - Wideband Beacons and Operating (Note 1) 10,110-10,120MHz - Voice Repeaters OUT
10,225.000-10,250.000 All Modes	10,227.5-10,252.5MHz - Wideband Transponders - 425 OUT 10,252.5-10,227.5MHz - Wideband Simplex
10,250.000-10,350.000 Digital Modes	10,277.5-10,302.5MHz - Wideband Transponders - 015 IN 10,302.5-10,327.5MHz - Wideband Transponders - 040 IN
10,350.000-10,368.000 All Modes	10,327.5-10,352.5MHz - Wideband Transponders - 065 IN 10,352.5-10,368MHz - Wideband Modes
10,368.000-10,370.000 Narrowband Telegraphy EME/SSB	10,368-10,370MHz - Narrowband Modes (Note 3) 10,368.1MHz - Centre of Activity 10,368.750-10,368.800MHz - Local Beacons, 10W ERP Max
10,368.800-10,368.995 Propagation Beacons	10,368.800-10,368.995MHz - Propagation Beacons Only
10,370.000-10,450.000 All Modes	10,370-10,390MHz - Wideband Modes (Note 2) 10,390-10,410MHz - Wideband Beacons and Operating (Note 1) 10,412.5-10,437.5MHz - Wideband Transponders - 425 IN 10,440-10,450MHz - Voice Repeaters RX
10,450.000-10,475.000	10,400-10,475MHz - Unattended Operation 10,450-10,452MHz - Alternative Narrowband CW/EME/SSB (Note 3)
10,475.000-10,500.000 All Modes and Satellites	Amateur Satellite Service ONLY

Note 1: 10,400MHz is the preferred frequency for wideband beacons but 10,100MHz is still used.
Note 2: Wideband FM is preferred between 10,350-10,400MHz to encourage compatibility between narrowband systems, however there is still activity between 10,050-10,125MHz.
Note 3: The current Narrow Band sub-band is at 10,368MHz; however, 10,450MHz is being considered as a possible future alternative.
Note 4: Simplex TV operations should take place on wideband transponder inputs that are not being used by local transponders.
Note 5: Wideband transponder pairs are designated by input/output frequencies. The pairings shown are recommended but occasionally variants may be needed to suit local circumstances.
Note 6: 10,475-10,500MHz is allocated ONLY to the Amateur Satellite Service and NOT to the Amateur Service.
Licence Notes: Amateur Service – Secondary User.
Amateur Satellite Service 10,450-10,500MHz – Secondary User.
Unattended operation is permitted for remote control, digital modes and beacons except in the sub-bands 10,000-10,125MHz within 50km of SO916223 (Cheltenham), SS206127 (Bude), SK985640 (Waddington) and SE202577 (Harrogate).
Notes to the Band Plan: As on page 63.

24GHz (12mm) IARU RECOMMENDATION	UK USAGE
24,000.000-24,050.000MHz Satellites	24,025MHz - Preferred Operating Frequency Wideband Equipment 24,048.2MHz - Narrow Band Centre of Activity 24,048.750-24,048.800MHz Local Beacons, 10W ERP Max
24,048.800-24,048.995 Propagation Beacons	24,048.800-24,048.995MHz Propagation Beacons Only
24,050.000-24,250.000 All Modes	

Licence Notes: Amateur Service 24,000-24,050MHz – Primary User. *Users must accept interference from ISM users.*
24,050-24,150MHz – Secondary User. *May only be used with the written permission of Ofcom. Users must accept interference from ISM users.* Secondary User: 24,150-24,250MHz. *Users must accept interference from ISM users.*
Amateur Satellite Service 24,000-24,050MHz – Primary User. *Users must accept interference from ISM users.*
Unattended operation is permitted for remote control, digital modes and beacons, except in the sub-bands 24,000-24,050MHz within 50km of SK985640 (Waddington) and SE202577 (Harrogate).
ISM = Industrial, scientific and medical.
Notes to the Band Plan: As on page 63.

47GHz (6mm) IARU RECOMMENDATION	UK USAGE
47,000.000-47,200.000MHz	47,088.2MHz - Narrowband Centre of Activity
47,088.000-47,090.000 Narrow Band Segment	47,088.8-47,089.0MHz Propagation Beacons Only

Licence Notes: Amateur Service and Amateur Satellite Service – Primary User.
Unattended operation is permitted for remote control, digital modes and beacons, except within 50km of SK985640 (Waddington) and SE202577 (Harrogate).
Notes to the Band Plan: As on page 63.

76GHz (4mm) IARU RECOMMENDATION	UK USAGE
75,500-76,000MHz All Modes (preferred)	75,976.200MHz - IARU Region 1 Preferred Centre of Activity
76,000.000-77,500.000 All Modes	
77,500-78,000 All Modes (preferred)	77,500.200MHz - Alternative IARU Recommended Narrowband Segment
78,000-81,000 All Modes	

Licence Notes:
75,500-75,875MHz Amateur Service and Amateur Satellite Service – Secondary User.
75,875-76,000MHz Amateur Service and Amateur Satellite Service – Primary User.
76,000-77,500MHz Amateur Service and Amateur Satellite Service – Secondary User.
77,500-78,000MHz Amateur Service and Amateur Satellite Service – Primary User.
78,000-81,000MHz Amateur Service and Amateur Satellite Service – Secondary User.
Unattended operation is permitted for remote control, digital modes and beacons, except within 50km of SK985640 (Waddington) and SE202577 (Harrogate).

THE FOLLOWING BANDS ARE ALSO ALLOCATED TO THE AMATEUR SERVICE AND THE AMATEUR SATELLITE SERVICE:

122,250-123,000MHz – Amateur Service only, Secondary User
134,000-136,000MHz – Primary User
136,000-141,000MHz – Secondary User
241,000-248,000MHz – Secondary User
248,000-250,000MHz – Primary User

NOTES TO THE BAND PLAN

ITU-R Recommendation SM.328 (extract)

Necessary bandwidth: For a given class of emission, the width of the frequency band that is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.
The use of Amplitude Modulation (AM) is acceptable in the all modes segments but users are asked to consider adjacent channel activity when selecting operating frequencies.

Foundation and Intermediate Licence holders are advised to check their licences for the permitted power limits and conditions applicable to their class of licence.

All Modes: CW, SSB and those modes listed as Centres of Activity, plus AM (consideration should be given to adjacent channel users).

Image Modes: Any analogue or digital image modes within the appropriate bandwidth, for example SSTV and FAX.

Narrow band modes: All modes using up to 500Hz bandwidth, including CW, RTTY, PSK, etc.

Digimodes: Any digital mode used within the appropriate bandwidth, for example RTTY, PSK, MT63, etc.
Sideband usage: Below 10MHz use lower sideband (LSB), above 10MHz use upper sideband (USB). Note the lowest dial settings for LSB Voice modes are 1843, 3603 and 7043kHz on 160, 80 and 40m.
Beacons: Propagation Beacon Sub-bands are highlighted - Please avoid transmitting in them!
Amplitude modulation (AM) may be used in the telephony sub-bands providing consideration is given to adjacent channel users (NRRL Davos 05)
CW QSOs are accepted across all bands, except within beacon segments (Recommendation DV05_C4_Rec_13).
Contest activity shall not take place on 10, 18 and 24MHz bands.
Non-contesting radio amateurs are recommended to use the contest-free HF bands (30, 17 and 12m) during the largest international contests (DV05_C4_Rev_07).
Users of Digital Voice (DV) should check that the channel is not in use by other modes (CT08_C5_Rec20).
The term "automatically controlled data stations" include Store and Forward stations.

TRANSMITTING FREQUENCIES

The announced frequencies in the Band Plan are understood as "transmitted frequencies" (not those of the suppressed carrier).

Unmanned transmitting stations

IARU member societies are requested to limit this activity on the HF bands. It is recommended that any unmanned transmitting stations on HF shall only be activated under operator control except for beacons agreed with the IARU Region 1 Beacon Coordinator, or specially licensed experimental stations.

1.8MHz

Radio Amateurs in countries that have a SSB allocation ONLY below 1840kHz, may continue to use it, but the National Societies in those countries are requested to take all necessary steps with their licence administrations to adjust phone allocations in accordance with the Region 1 Band Plan (UBA - Davos 2005).

3.5MHz

Intercontinental operations should be given priority in the segments 3500 - 3510kHz and 3775 - 3800kHz.
Where no DX traffic is involved, the contest segments should not include 3500 - 3510kHz or 3775 - 3800kHz.
Member societies will be permitted to set other (lower) limits for national contests (within these limits).
3510 - 3600kHz may be used for unmanned ARDF beacons (CW, A1A) (Recommendation DV05_C4_Rec_12).
Member societies should approach their national telecommunication authorities and ask them not to allocate frequencies other than amateur stations in the band segment that IARU has assigned to intercontinental long distance traffic.

7MHz

The band segment 7035 - 7043kHz may be used for automatic controlled data stations (unattended) traffic in the areas of Africa south from the equator during local daylight hours.
Where no DX traffic is involved, the contest segment should not include 7175 - 7200kHz.

10MHz

SSB may be used during emergencies involving the immediate safety of life and property and only by stations actually involved in the handling of emergency traffic.
The band segment 10,120kHz to 10,140kHz may be used for SSB transmissions in the area of Africa south of the equator during local daylight hours.
News bulletins on any mode should not be transmitted on the 10MHz band.

28MHz

Member societies should advise operators not to transmit on frequencies between 29.3 and 29.51MHz to avoid interference to amateur satellite downlinks.
Experimentation with NBFM Packet Radio on 29MHz band: Preferred operating frequencies on each 10kHz from 29.210 to 29.290MHz inclusive should be used. A deviation of ±2.5kHz should be used with 2.5kHz as maximum modulation frequency.

1.3GHz

The band is subject to National and IARU-R1 replanning. It is also shared with air traffic radar.

There have been no changes to the Band Plan since the Yearbook 2011 Edition.

IOTA

A round-up of recent and upcoming IOTA Expeditions

Tim, NL8F operating on Ujelang. Photo courtesy Jan Kocian.

HOPING FOR PACIFIC IOTAS. 2011 started with a burst of new sunspots so Cycle 24 may finally be getting going. We can only hope that the days of easily working the Pacific IOTAs on 21MHz and above are about to return.

MARSHALL ISLANDS SUCCESS. The December return trip to the unactivated Ujelang Atoll by Yuri, N3QQ, accompanied by Tim, NL8F, was a success – though propagation from the UK was disappointing. They were workable on 10MHz and, occasionally, 7MHz during our afternoons but that was about it. 14MHz was a complete washout during the mornings though they were being worked around 0700-0900Z from southern and eastern Europe.

This was another IOTA trip that might have ended less well as, although a 165 foot government vessel was used for the main voyage, the final disembarkation was made in a small open boat that broke down while still 100m from land. Luckily the problem was fixed before it had drifted too far downwind from the island!

Ujelang was inhabited in the 1970s by people displaced from Enewetak by the US nuclear testing programme but has been abandoned now for 30 years. All the buildings, apart from the church, have disappeared so the guys operated under a tarpaulin. This provided some protection from the rain but less from the wild pigs roaming around – or the hermit crabs that tried to make off with the PTT footswitch. They had two stations running for part of the time with 100W to vertical antennas. Yuri and Tim made about 2800 QSOs in 2.5 nights of operating time – the bands were completely dead during daylight hours on the island. A full write-up is available at www.na-234.com/video/V73RRC-2010.pdf.

CAPE HORN DXPEDITION. News of a major DXpedition to South America only surfaced after the last column went to print and the operations will probably be wrapping up about now. Cezar, VE3LYC, and Johan, PA3EXX, were due to charter a 40ft yacht and set off for the Wollaston Islands (SA-031) and the Diego Ramirez Islands (SA-097) off the tip of South America. They will sign CE9/home call and hope to be QRV for four days from each location. Wollaston is the location of the famous Cape Horn and since 1992 has been home to a monument dedicated to sailors lost trying to pass around the Horn. The island has only been activated once before, by G3CWI, who was installing radio equipment at the Chilean naval base there. It is claimed by just 2% of the active participants in the IOTA database.

The Diego Ramirez islands are 50 miles or so further south in the Drake Passage and have never been activated – though they are also home to a Chilean naval base which is occupied every summer. The DXpedition was scheduled to run from about 7 to 22 January with landings and itinerary dependent entirely on the weather. Landing on Diego Ramirez will be particularly difficult as there is generally heavy surf, even on the leeward beaches.

I have been within half a mile of both locations on a large cruise ship and don't envy Cezar and Johan their journey on a small yacht in this windy part of the world. Check their website at www.ce9iota.weebly.com for more information.

ASIA & OCEANIA. Former *RadCom* editor Steve Telenius-Lowe, G4JVG, will be heading for the rarely activated Atauro Island (OC-232) off the coast of East Timor from about 16 to 26 September. He will be accompanied by VK8NSB, VK8FNCY, and 9M6XRO. They plan to operate up to three stations. Two, with linear amplifiers, will go to verticals on the beach. The third station will have just 100W and will be used only at peak times. Modes will be CW, SSB and RTTY on all bands 10-160m. East Timor is a rare DXCC entity so the team expect to be busy. QSL via M0URX.

DC0KK is now active as 4S7KKG from Sri Lanka until 13 March and will try to operate from the rare Barberyn Island (AS-171) while he is there. However, I suspect that security considerations will rule out that expedition unless he is well connected in 4S7 government circles.

ON4AFU left Belgium on 9 January for a 3 month stay in Thailand, with a side trip to Cambodia. His main QTH in Thailand is Pathui, where he will operate as HS0ZJF. From 20 January to 20 February he will be active as HS0ZJF/8 from two different islands (Samui and Tao) in AS-101, while on 22-28 February he expects to be QRV as HS0ZJF/9 from AS-126. He will also try to be active as XU7AFU from Koh Russei, AS-133, for a few days between 5 and 15 March. All dates are subject to change.

ANTARCTICA. VP8DMH was active as VP8DMH/P from the British Antarctic Survey Fossil Bluff station on Alexander Island (AN-018) from 13 to 22 December. This is a very rare IOTA that is occasionally activated by operators from Rothera Base on Adelaide Island. Fossil Bluff is used as a staging post for summer expeditions from Rothera and is not manned throughout the year. QSL via G0VGS.

AFRICA AND NORTH AMERICA. Last time I mentioned we were expecting activity from ZD9GI at the South African weather station on Gough Island. He has now appeared on the bands but on a very occasional basis when work permits. Check the DX cluster for recent operations and keep an eye out for his next appearance. He should be QRV until September 2011 when the supply ship returns.

IK2QPR will be active as 5R8PR during a vacation on Nosy Be (AF-057) from 17 to 25 January on 40-10 metres SSB, CW and RTTY. QSL via his home call. He may still be QRV when you receive this copy of *RadCom*. Linguists may like to note that 'Nosy' means 'Island' in the local language – so the IOTA website shows the island simply as Be.

Markus, DJ4EL (V31ME) and Joe, DJ1JB (V31ML) should be coming to the end of a major tour of three IOTA groups in Belize between 10 and 26 January. They were expected to operate SSB on 80-10 metres from Ambergris Caye (NA-073) on 10-11 January, from Caye Caulker (NA-073) on 11-14 January, Long Caye (NA-123) on 14-18 January and from Tobacco Caye (South Water Caye, NA-180) on 18-26 January. They were expecting to have two stations running 100 watts to homemade cubical quads, a wire antenna and a vertical. QSL via their home calls.

Finally, the Sable Island DXpedition (NA-063) has been rescheduled for a third time and the new dates are 7-15 March. The operators will be Randy, N0TG/CY0, Ron, AA4VK/CY0 and Murray, WA4DAN/CY0. Further information and updates are on their web page at www.cy0dxpedition.com.

Simple antenna for 13cm

Part 2 - double your signal strength by adding a capture hood

PHOTO 1: The completed antenna with the add-on hood that gives an extra 3dB of gain.

INTRODUCTION. Last month we built a simple tube antenna with wide bandwidth and about 9dBd of gain. By adding a simple cone to the antenna aperture we can increase its directivity by 3dB – doubling its effectiveness for a very modest outlay of time and materials. Adding the hood effectively collects signal from a larger area to provide the extra signal gain. Think of it as a funnel.

Recapping, we also learned last month that a common microwave transmission line can be made out of a simple copper plumbing pipe. Our copper pipe became waveguide allowing microwave energy to propagate through the cylinder. If one dimension of the (waveguide) is longer that a half wavelength it will pass microwave energy with extremely low loss [1]. Therefore, if the end of the (waveguide) pipe is simply left open, microwave energy will radiate out from the open end. This pipe waveguide then becomes the horn antenna you built.

In antenna terminology, gain is proportional to aperture size. In so many words the larger the antenna, the more ability that the given antenna has to capture signal. All literature reflects the premise that larger antennas have more gain than smaller antennas. In spite of the dubious claims by some antenna designers and manufactures, there is no such thing as a free lunch. All else being equal, the larger the antenna capture area, the more gain. But a large antenna with poor efficiency is a generic waste of metal. Horn antennas, depending on the propagation mode, must conform to specific dimensions in order for the waveguide to function as an antenna [2]. The previously calculated low cut off λc and high cut off λh basically determine the size, shape and the frequency range for your home made pipe waveguide. Making the pipe longer will not always provide more gain and may even introduce some serious propagation mode problems.

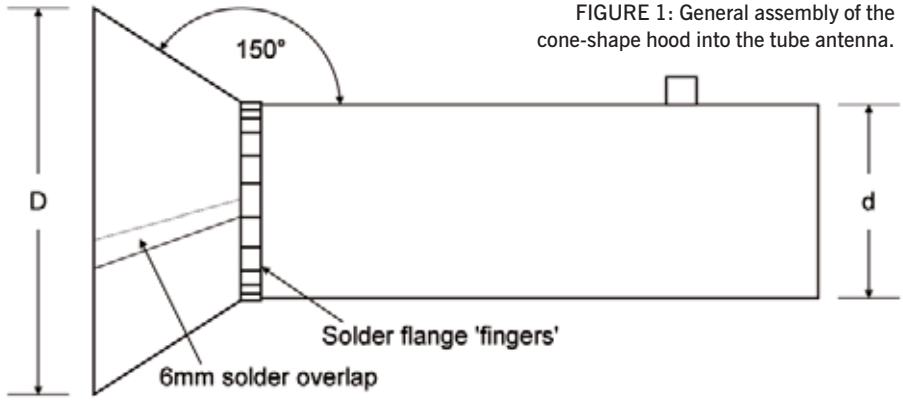


FIGURE 1: General assembly of the cone-shape hood into the tube antenna.

Knowing this information, to improve the horn antenna you built last month, the efficiency or capture area must be modified. For more gain, a larger aperture is desirable, but a larger waveguide is definitely not [3]. What we need to do is to make the waveguide think it's operating within the wave propagation mode inside the pipe but with an aperture actually bigger than the critical waveguide diameter. If the waveguide size is slowly tapered into a larger aperture opening, then more gain is achieved while keeping the undesirable propagation modes out of the pipe. This tapered aperture over the open end of your pipe gives the antenna its characteristic name, a cylindrical conical horn.

Maximum efficiency and gain for a given aperture diameter dictates that the taper must be long enough so that the phase of the microwave front is nearly constant across the aperture [4]. Therefore, the angle and the diameter of the aperture taper are critical to the frequency and waveguide dimensions. For most conical horns, this taper is around 30°, with the cone extension width derived from 1.5 times the free space wavelength dimension λ at the desired frequency. What we have done is to attach a specific type of funnel to the mouth of your waveguide cylinder to improve its overall performance. So the question is, how large does this funnel need to be and fit over the end of the cylinder? Back to the drawing board for a moment and some geometry to find the right size hood for this particular frequency and antenna. What needs to be done is to calculate the radius and diameter of a copper flange that will be soldered to the front of your antenna. The actual hood will end up as a curved copper strip soldered to the outside of the antenna's open end. **Photo 1** shows the general view of the completed antenna and **Figure 1** identifies the measurements necessary to derive the dimensions of the hood.

PHOTO 2: The copper sheet rolled into a cone, with strip cuts into the solder flange section.

PHOTO 3: Soldering the conical hood to the tube.

PHOTO 4: Prototype mounting strap made from aluminium strip.

CALCULATING THE HOOD SIZE. Step 1 is to determine D, the outer diameter of the hood. The outer diameter of the hood should be 1.5 times the free space wavelength λ, which we calculated at 122.44mm for 2.45GHz in Equation 3 last month.

D = 1.5 * λ
= 1.5 * 122.44mm
= 183.6mm

Step two is to calculate d, the inner diameter of the hood. It is simply the measured outside diameter of the cylinder (or the internal diameter plus twice the thickness of the pipe).

In our case,
d = 76 + 2 x 1mm
= 78mm

CONSTRUCTION. Step three is to carefully lay out the above radii over a sheet of thin copper, as shown in **Figure 2**. Remember, the diameters become the radius for d and D. Using a compass, measure from a reference line, 183.68mm and draw the outer arc on the copper sheet. Along the same reference line, measure 78mm and draw the inner arc. Move down below this inner arc 6mm and draw a small arc. This will allow about 6mm (1/4") tabs on the shorter radius for soldering to the outer cylinder end. On one side, extend the D and d lines down about 6mm (see Figure 2) to provide an overlap so you can later solder the shape into a cone. Use tin snips or aviation shears to cut out the outer and inner lines of the copper hood. Roll the strip into a cone shape and make small strip cuts into the 6mm (¼") flange (**Photo 2**) to aid in soldering the hood to the cylinder. Hold the flange together with G-clamps or mole grips and then solder the overlap.

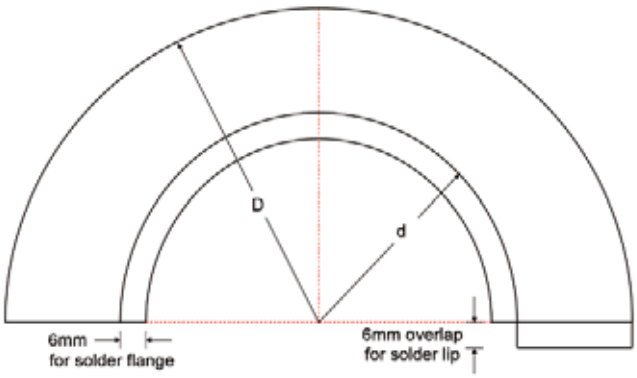


FIGURE 2: Marking out hood dimensions on the copper sheet.

FIGURE 3: SWR plot of the finished antenna.

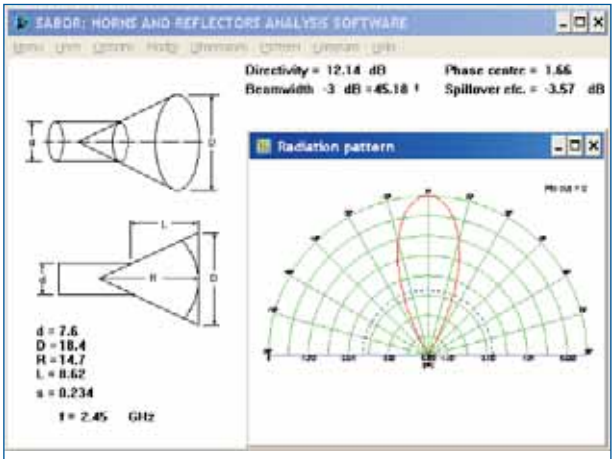


FIGURE 4: *SABOR* simulation of the antenna.

PHOTO 5: SWR plot of the finished antenna, 2.4-2.5GHz (10MHz/division).

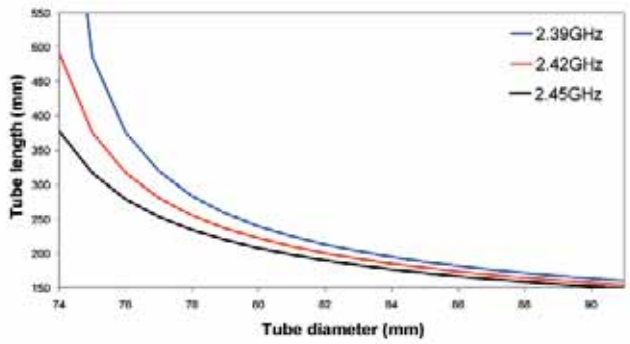


FIGURE 5: Altering the tube diameter and frequency affects the overall length.

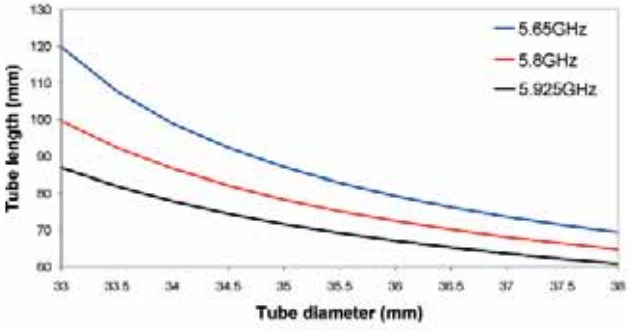


FIGURE 6: Typical tube diameters and lengths for various centre frequencies in the 9cm band.

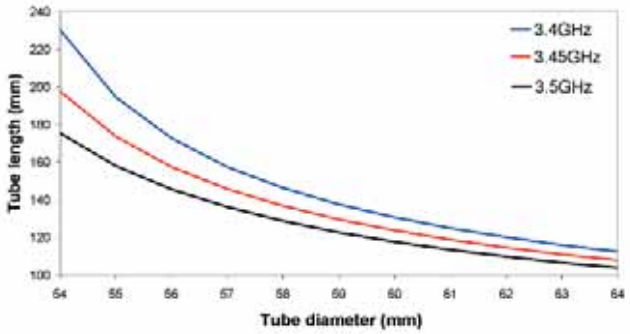


FIGURE 7: Typical tube diameters and lengths for various centre frequencies in the 6cm band.

When you are ready, mould the flange over the end of your cylinder and carefully solder the tabs onto the cylinder, as shown in **Photo 3**. It will probably take quite a lot of heat since copper conducts very well.

MOUNTING BRACKET AND CAP. To complete the project, some form of mount is required to attach your high gain horn antenna to a tower or building. After some consideration, bending a one inch width of aluminium stock worked out well. Bend the flat stock over the horn, then around a former the same size as the mast tube you want to attach it to. Drill appropriate holes for mounting hardware and wing nuts. You should now have a custom horn antenna mounting bracket like mine (**Photo 4**).

In order to prevent water and insect ingress, see if you can find a cover for the mouth of this antenna. Any plastic can be used that passes the 'microwave oven test' (put it in a microwave oven with a cup of cold water. After a minute of heating the plastic should still be cold – if it isn't, it has absorbed microwave energy and will attenuate signals in and out of your horn antenna). At a pinch, and certainly for test purposes, cling film can be used as a short-term fix.

TESTING AND MEASUREMENTS.

When I finished my prototype, I decided I would test it. I'm lucky enough to have access to an HP 8714 network analyser that had 3GHz capability. I stood the horn upright with the opening at least a metre away from metal surfaces I configured the analyser for return loss measurement. This provided a nice curve showing a very good match of 1.08 SWR at 2.45GHz (see **Photo 5** and **Figure 3**). The SWR bandwidth below 1.6:1 was 2.40GHz to 2.51GHz. Putting my hand over the front of your antenna hood caused the reading to change drastically – a crude indication that there is an energy field focused in front of the horn.

TESTING IN SIMULATION. In order to test the antenna's theoretical performance, I used a little-known program called *SABOR* **[5]**. This is by the University of Madrid's Engineering department and is available as freeware on the internet. The program was initially written to evaluate several types of waveguide horn antennas. It is perfect for calculating maximum gain, bandwidth, phase centre and generating a plotted pattern of your antenna for evaluating the power gain at different beamwidths.

The program opens up with a welcome page from Madrid, Spain. Hit OK at the bottom, then select Horn … Circular from the menu at the top. You will now see the screen change to a conical circular horn diagram similar to the one we've just built. Please note that the program uses centimetres as its measurement unit – just divide our mm measurements by 10.

Select Options … Frequency and enter the antenna centre frequency in GHz (ie 2.45), then click OK. Ignore (OK) any error message.

Select Dimensions. A window opens that asks for several parameters, several of which we have already calculated so that we could build the antenna. *SABOR* asks for Waveg, Horn radius and a radius value for R1. Knowing our example hood dimensions, d=76mm and D=183.6mm is all that is necessary to utilise *SABOR*.

Waveg is half the cylinder internal diameter, d. In our case, this is 76mm/2 = 38mm, or 3.8cm. Horn radius is half of the hood diameter, D: 183.68/2 = 91.84mm or 9.184 cm. R1 is calculated by dividing D by 1.25. For our antenna it's 83.68/1.25 = 147, or 14.7cm. s is calculated automatically. Enter the figures and click OK.

Now we can start seeing the polar pattern. Select Options … Automatic and Options … Polar. Finally, select Pattern, and the familiar radiation plot will appear (**Figure 4**). Using the dimensions and frequency data we've entered, the program has calculated a forward gain of 12.4dB and a 3dB beamwidth of a touch over 45°. Not bad for a bit of pipe!

DIFFERENT PIPES, DIFFERENT BANDS.

Part 1 of this article mentioned that a range of different pipe diameters were suitable for use at 13cm. However, the pipe diameter has a significant effect on the tube length (as does, to a lesser extent, the frequency). **Figure 5** shows the effect on the tube length of altering the diameter and frequency.

The same calculations from Part 1 can be used to determine the dimensions of tube antennas for any frequency, although the pipe diameters become impractical if you go much below the 1200MHz band. At 144MHz, for instance, you could easily drive a large car through the pipe… However, higher bands are eminently suitable. **Figures 6** and **7** show the tube length and diameters for various frequencies in the 9cm and 6cm bands.

Have fun experimenting! The maths in this article lends itself quite readily to what-if calculations in a spreadsheet and you can see what sort of results you'll get by using *SABOR*.

ACKNOWLEDGEMENTS. I would like to thank Dustin Larson who fabricated prototypes of this antenna during the development and testing phases and Jeremy Vogel, KC0OQR for his assistance with the graphing programs.

WEBSEARCH

[1] Andy Barter, Microwave Know How, RSGB, 2010, p5
[2] Henry Jasik, Antenna Engineering Handbook, MCGraw-Hill, 1961, p10-2
[3] John Kraus, Antennas, MCGraw-Hill, 1988, p653-654
[4] Stephen Adams, Microwave Theory and Applications, Prentice-Hall, 1969, p61-63
[5] SABOR can be downloaded for free personal use at www.gr.ssr.upm.es/sabor.htm. The University asks for a small donation if you use it a lot.

QRP

All the latest low power news

The JUMA TRX2 kit.

JUMA QRP RADIO KITS. JUMA Kits is a company now gaining popularity with QRP constructors. The company is Finnish, being founded and run by the kit designers Juha Niinikoski, OH2NLT, and Matti Hohtola, OH7SV. There are two basic kits, the JUMA-RX1, an 80 and 40 metre DDS controlled SSB/CW receiver that can be built without winding coils and the JUMA-TX1, a compact 5 watt DDS controlled CW transmitter. But perhaps the most interest has been shown in their two QRP transceiver designs: the TRX1 and TRX2.

The JUMA-TRX1 is a direct conversion HF transceiver based on the previous JUMA-RX1, JUMA-TX1, JUMA-KEYER projects. It is driven by a stable DDS VFO and has the following features: output power 5 watts, 3.5 and 7MHz bands, CW and DSB transmit modes, receiver filters 2.4kHz for SSB and 900Hz for CW, graphical S-meter, relative graphical output indicator and reverse power indicator, RIT, CW side tone, a built in keyer and no coils to wind.

The JUMA TRX2 is a high dynamic range transceiver for SSB and CW, using the quadrature sampling technique for demodulation and modulation with the low noise phasing method. The JUMA TRX2 includes a DDS controlled VFO for a good frequency stability and signal purity. An internal microprocessor controls all functions of the transceiver. It is available as a discrete kit with components and bare circuit boards. The enclosure is machined and screen printed. Only few coils need to be wound when constructing the JUMA TRX2. A completely assembled transceiver and other building help are also available with the help of the online 'JUMA community'. There are two models: the two band model TRX2 for the 80 and 40m bands and the all amateur band model TRX2A with a general coverage receiver. The two band model can be upgraded any time into the all band model by adding related modules. Several add on option modules are also available for both models.

The JUMA Kits have received very good online reviews. Earlier this year I had the chance to see some JUMA Kits at the Dayton Hamvention in Ohio. They are certainly attractive and well engineered. Further details about these interesting kits may be found at www.nikkemedia.fi/juma.

QRP CONVENTION 2010. At a time when some amateur radio events are diminishing, October's G QRP Club Annual Convention, run at Rishworth School, West Yorkshire, had a record attendance of over 350 people. The event is far more than a radio rally. There are plenty of sales stalls but these are limited to components and surplus equipment. One of the big attractions is a programme of lectures. In 2010 these included Ian Keyser, G3ROO, Clandestine Radio around World War Two, Roy Lewallen, W7EL, A QRP Field Day, David Starkie, G4AKC, HF Bicycle and Pedestrian Mobile and an open technical forum by David Stockton, GM4ZNX. The lectures were streamed live on the internet by the British Amateur Television Club (BATC).

In addition to the traders and the speakers, there were two rooms devoted to radio construction. One held an impressive display of homebuilt QRP equipment with the constructors on hand to show off and explain their work. Because of the G3ROO lecture on Clandestine Radio, several of the exhibits were restored clandestine radio equipment and reproductions of classic military radios like the Paraset. The other room was devoted to a Buildathon. Buildathons, where a group of novice constructors build a radio project under the guidance of more experienced radio constructors, have become popular in recent years. I have described them in previous editions of this column. The Rishworth Buildathon project was a basic QRP CW transmitter for 40 metres built 'Manhattan style' using pads mounted on a printed circuit board material ground-plane. My wife, Jo-Anna, G0OWH, took part and thoroughly enjoyed building her first ever radio transmitter. So far it has not been used as nature intended but it is proudly displayed above her desk.

BRING-A-BOOK-BUY-A-BOOK. Richard Constantine, G3UGF, who readers will know as the manager of the RSGB QSL Bureau, ran a novel fund raising event for Children in Need at the Rishworth QRP Convention; a bring and buy stall for amateur radio books.

In Richard's own words, "Wow! A big thank you to everyone who supported the third and biggest yet, Bring-a-Book-Buy-a-Book event at the GQRP Rishworth Convention, in aid of the BBC Children in Need. We had some amazing books to sell and they just kept coming all day! I was overwhelmed by the generosity of many people who carried cherished books in back packs, shopping bags and boxes to the convention, in aid of a good cause. The stand was so busy that I never got to see anything else or get much of a break all day, but it was absolutely great. At times the buyers were standing three deep. The range and quality of what was on offer was simply stunning. We must have sold a couple of hundred books – I really have no idea how many there were. The star attraction had to be an original first edition, mint, and autographed copy of a Ladybird basic electronics book by a certain GC Dobbs. The highest bidder donated a superb £20 to the cause and is now its proud owner. We were also able to donate some unsold RAE and educational type books to the radio students in India. The bottom line is that the total raised on the day was a staggering £335!" I suspect Richard will run the book stall again next year, so lay aside your unwanted radio books. I will announce the convention and Richard's stall in a future *RadCom* QRP column.

George, G3RJV, assists Jo-Anna, G0OWH, (Mrs G3RJV) at the Rishworth Buildathon.

Moonraker GP2500 Vertical

PHOTO 1: The Moonraker GP2500 mounted on a 10ft pole, suitably guyed.

MULTIPLE HF BANDS. With antenna space often at a premium in the UK, the demand for an 'all-band' HF solution has never been higher. There are various solutions to this problem, but the antennas can often be a compromise on one or more bands. Moonraker's GP2500 vertical antenna is the company's attempt to give the radio amateur with little space access to all bands 3.5 – 52MHz in one simple package.

In fact, the antenna is designed for transmission from 3.5-57MHz and reception from 2-90MHz. Just how it does this I'll explain later.

WHAT YOU GET. The antenna comes in a thick plastic bag, which is characteristic of Moonraker's products. Inside you'll find four thick-walled aluminium tubes that make up the vertical, plus the mounting hardware and the aluminium securing rings and bolts that hold each section together.

You have to slide each antenna section into the next and secure them with the bolts. The antenna is then secured to its mounting post with two U-bolts. The fit and finish of the hardware was very good, but the ends of the tubes could do with a little dressing after machining as I took a chunk out of my thumb during assembly!

Once assembled the antenna stands 7.13m high.

ASSEMBLY. The instructions consisted of a single A4 data sheet showing you how to assemble the antenna, a typical SWR chart and the main specifications. I think this is a mistake as it gives no clue as to whether the antenna should be ground or pole mounted and no hint as to whether or not the antenna requires radials. Perhaps Moonraker could add some hints and tips.

I decided to try the antenna ground mounted first, with and without radials, and then elevated with the base at about 10ft.

But the question you want to know is how can it give a good match across such a wide frequency range?

HOW IT WORKS. At the bottom of the antenna is a sealed matching unit with an SO239 socket for connection to the coax. There is no clue in the literature or on the Moonraker website as to how this works, but it appears to be a broadband unbalanced-unbalanced impedance transformer or 'UnUn'.

The antenna is designed not to be resonant on any one of the amateur bands – neither offering a particularly high or low impedance. The step down Un-Un then transforms the various impedances found as you move down the bands into something more closely matching 50Ω. By the time you then add a length of coax (which will lower the SWR even more due to losses) you are now in a position to either match the antenna directly to your transmitter's 50Ω output, or use its internal ATU to reduce the final residual SWR down to 1:1.

In fact, when fed with 20m of Mini8 coax, the highest SWR seen on any of the amateur bands was only 1.8:1 (at 5MHz). More typically the SWR was below 1.7:1 across the whole spectrum, often less than 1:1.4.

Now this 'miracle' approach to antenna design does have its drawbacks. Yes, you see a low SWR, but the antenna will probably not perform as well as a dedicated, resonant antenna on each band.

But for the record then, how did the Moonraker perform?

PERFORMANCE. Back to back comparisons are always tricky as you can get antenna interactions. For the purposes of this review the antennas under test were kept as far apart as possible and all other purely vertically-polarised antennas were taken down.

The first test was with the Moonraker GP2500 ground mounted with no radials. This was a 'worst case' scenario.

On 80m the first reaction was that the antenna was quieter than my existing 132ft off centre fed dipole (OCFD). Noise levels were about S1 compared with S4. A vertical is not the best antenna for working around the UK as its pattern is not conducive to good Near Vertical Incidence Skywave (NVIS) or high-angle radiation.

Nevertheless, UK and European stations could be heard, but they were down around 3-4 S-points compared with both the 132ft OCFD and my 65ft Inverted L. This is not surprising as the antenna is way too short for 80m and its efficiency must be very low.

On 40m the antenna started to perform slightly better, although it is still shorter than a quarter wave. Near EU and Scottish signals were down about 1-3 S-points compared with the reference antennas. A check in with GM2OT in Scotland on the RAOTA net on 7.163MHz confirmed this (nearer English signals were inaudible on the vertical and barely audible on the reference antennas as the critical frequency was about 5.7MHz).

The conclusion here is that if you are looking for an 80m/40m antenna for chats around the UK don't buy a vertical – this doesn't just apply to the Moonraker GP2500: it's the same for *all* vertical antennas.

On longer paths the Moonraker was about 2-3 S-points down on the reference antennas.

On 30m (10MHz) the Moonraker GP2500 really starts to perform. This is not surprising as a quarter wave antenna on 10MHz is about 7.42m high – close to the Moonraker's 7.13m.

PHOTO 2: At the bottom of the antenna is a sealed matching unit with an SO239 socket for connection to the coax.

With an SWR below 1:1.5 on 10.1MHz, I was surprised to see that sometimes signals were on a par with the reference antennas.

On 20m (14MHz) the antenna was useful, its signals being either equal to or no worse than 2-3 S-points down on the comparison antennas. Noise levels were better too. Contacts into Germany, Ukraine and Italy on SSB were possible, although QSB made some of these difficult on the Moonraker where they were still possible on the reference antennas.

It was a similar story on 17m (18MHz) and 15m (21MHz) where noise levels were down, but so were some signals. Other signals were equal on all antennas. The OJ0B Market Reef DXpedition was on 17m CW during the test and it was interesting to switch between antennas while listening to both them and the other stations calling them. In many cases they were all either equal signals or no worse than 2 S-points down. Oh, and I made it into the log on the second call while on the Moonraker with the obligatory 599.

12m (24MHz) and 10m (28MHz) were typically fairly flat during the test period and only a few signals were heard. The antenna offered similar performance to 15m.

I then added eight 10m long radials to the antenna, laying them on the ground. This had minimal effect on the SWR readings across the band. These appeared to have little effect on 3.5 and 7MHz, where the short length of the vertical is the limiting factor. On 20m (14MHz) they seemed to offer a slight improvement in received signal strength. While the difference was not phenomenal, some signals were now equal to the 65ft Inverted L but still down on a dedicated horizontal dipole at 30ft.

PHOTO 3: The various pieces of the Moonraker GP2500 antenna.

It was a similar story on 17m and 21m (18MHz and 15m) where the antenna often got close to the performance of the 65ft Inverted L, but didn't quite match a reference dipole.

I then mounted the antenna on a 10ft pole, suitably guyed. The SWR readings were virtually the same as when ground mounted, but the antenna seemed noisier when mounted off the ground.

The 80m results were broadly similar, but on 40m European (German and French, lower angle) signals became similar to those on the reference antennas. In fact, some were better by about 1 S-point. It was a similar story on 30m (10MHz).

The added height didn't seem to make much difference on 20m (14MHz). Conversely on 17m and 21MHz the elevated GP2500 vertical sometimes matched the reference antennas again. Justin at Moonraker told me that some customers have experimented with elevated radials, but the jury is out on whether they make a big difference on the HF bands.

The antenna also offers a 1:1.5 SWR on 6m. The test period was outside of the Sporadic-E season, but I still able to hear and access the GB3EF repeater, which is about 30 miles from me, so it could be a useful 6m antenna when conditions permit.

CONCLUSION. There is no doubt that a no-tune, broadband vertical can be a useful tool. Not only do you get all the amateur bands, but it makes a good antenna for short wave listening, offering a good match across the whole HF spectrum.

But such convenience comes at a cost and the antenna generally doesn't perform as well as a dedicated antenna on each of the amateur bands. Sometimes the difference is quite small. On loud signals this may not matter, but the antenna may lose out on weaker signals and DX.

The GP2500 is also too short to be effective on 80m and 40m, but it starts to work better on 30m (10MHz) and above.

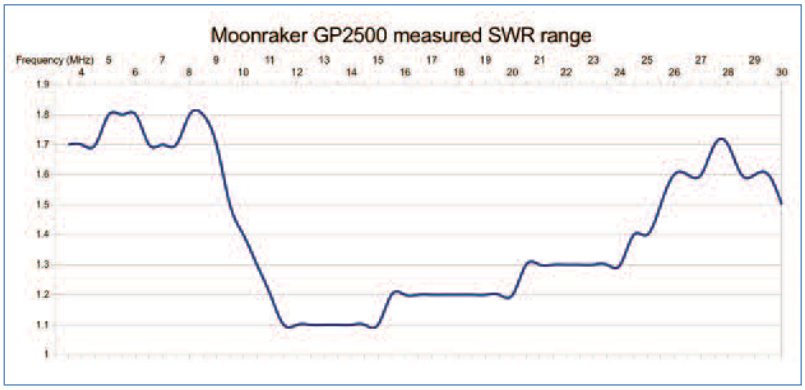
For optimum use I would recommend an extensive network of radials if mounting it on the ground. Or perhaps four elevated radials if mounting it in the air. These can't be resonant as the antenna covers too many bands, but anything will help. The elevated mount seemed to work better than ground mounting.

I was struck by how quiet the antenna was – often I could hear weak signals that were otherwise masked by noise on the reference antennas. This makes it an ideal SWL antenna.

Martin, G8JNJ (http://g8jnj.webs.com/) has done extensive work on how to make broadband HF verticals work well and if you are in the market for the GP2500 I recommend you read his comments. He agrees that pole mounting with a decent ground plane, radials or counterpoise is required for optimum performance. When mounting at height radials are recommended to stop the antenna using the coax as the counterpoise.

For use on HF, with the occasional trip down to 40m and 80m, the antenna may be a godsend for amateurs with little space for anything else. Moonraker also produce a glassfibre version of the antenna called the GP2500F. My thanks to Moonraker for the loan of the antenna, which costs £249.95.

Frequency range
TX: 3.5 - 57MHz
RX: 2 – 90MHz
Max power rating: 250W
Impedance: 50Ω
VSWR: less than 1.5:1
Connector: SO239
Length: 7.13m
Weight: 3kg
Rated wind velocity: 30m/sec
Mast diameter: 25-42mm



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132m (4.4mm) nylon guy (480Kg) £45.00

HANGING PULLEY

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

£24.99

BARGAIN WINCH

500kg brake winch. BARGAIN PRICE

£89.99 Del £10.00

(Now includes cable grip)
Winch wall bracket £22.99

BUTTERNUT VERTICALS

HF-2V (80/40m) £279.99
HF-6V (80/40/30/20/15/10m) £375.00
HF-9V (as HF-6V + 17/12 & 6m) £425.00

TONNA YAGIS

22089 9ele 2m £79.99
220811 11ele 2m £109.99
220817 17 ele 2m £139.95
220818 9ele 2m XD £129.95
220921 21ele 70cm £109.00
2209930 9ele 70cm XD £135.99

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
TM-3000 1.8-60MHz (3kW) incls mod meter ..... £69.95 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 £10.00

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

LOW LOSS PATCH LEADS

Connectors	Length	Price (P&P £4.50)
PL-259 - PL-259	0.6m	£11.99
PL-259 - PL-259	1m	£14.99
PL-259 - PL-259	4m	£19.99
PL-259 - PL-259	20m	£49.99
BNC - BNC	1m	£12.99

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 £48.99
Ground fixing spikes (3-off) £35.00
2 foot all ground fixing kit £99.99
(Can be hand operated or by compressor/foot pump)

10m MAST, ONLY **£1099.99**

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) + balun	£74.99

CUSHCRAFT BARGAINS

Delivery £15.00

MA5B	Mini beam 10, 12, 15, 17, 20m ..... WOW	£479.99
A4S	4 ele beam (10 - 20m)	£669.99
A3S	3 ele beam (10-20m) ..... WOW	£575.99
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

£219.99

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.

£179.99

NEW DIAMOND WD-330

Amazing performance. Twin folded dipole. 2-30MHz – and it really works. No ATU required (25mts long). Supplied with 30 mtr PL-259 feeder – ready to go. If you want great transmission, look no where else. Japanese quality made product

WOW **£209.99**

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 ..... £39.99 each P&P £4
Traps 80m or 40m or 20m or 15m ..... £39.99 pair P&P £5

DOUBLE THICK FERRITE RINGS

A superb quality 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

(POST £4.00)

CX-SW4N DC-1.5GHz (5xN) £59.99
CX-SW4PL DC-800MHz (5 x SO-239) £56.95
CX-SW3N DC-1.5GHz (4 x N) £49.95
CX-SW3PL DC-800MHz (4 x SO-239) £41.95
CX-SW2N DC-3GHz (3 x N) £32.95
CX-SW2PL DC-1GHz (3 x SO-239) £26.95

REPLACEMENT POWER LEADS

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) ..... £44.99 P&P £5
MH-4 4 pin fits older HF, etc. (4-pin round) ..... £39.99 P&P £5
MH-31A8J 8 pin modular ..... £39.99 P&P £5

COAX BARGAINS

True military spec real UK coax

RG-58 Military spec x 100m.
£49.99 or 2 for £90.00
Coax stripping tool (for RG-58) £4.99

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

AR300XL

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**

GS-050 stay bearing £34.99

DIAMOND YAGIS

No tuning required

2m/10 element	No tuning required SO-239 feed	£79.99
70cms/10 element	No tuning required SO-239 feed	£49.99
6m/2 element	No tuning required SO-239 feed	£84.99

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 £69.99
TSA-6011 144/430/1200MHz Triplexer £64.99
MX-72 144/430MHz £34.99
MX-72 "N" 144/430 ..... £35.99
MX-62M (1.8-56MHz + 76-470MHz) £64.99

MOBILE ANTENNAS

Del £10.00

DB-7900 2m/70cm (5.5/7.2dB) 1.8m (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

RH-9000 BNC

40cm flexible whip for the ultimate in gain. **£29.99** P&P £5.00
Tx:- 2m + 70cm (Rx:- 25MHz-2.5GHz).

RH-9090 SMA

40cm flexible whip that is ideal as replacement. Tx:- 2m + 70cm. Rx:- 25MHz-2.5GHz **£34.99** P&P £5.00

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

STATION A4 LOG BOOK OFFER

3 FOR £10.00
P&P £4.50

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
2.4m x 2" poles (4 off) £100.00
5 foot x 2" pole £17.99
6 foot 1.25" heavy duty pole £10.99

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
9" stand off brackets (no U-bolts) £10.99
12" T & K brackets (pair) £18.99
18" T & K brackets (pair) £22.99
24" T & K brackets (pair) £26.99
U-bolts (1.5" or 2") each £1.50
8mm screw bolt wall fixings £1.70
8-out 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 £15.00
Roll of self-amalgamating tape 25mm x 10mtr £8.99
Special offer:- Self-amalgamating 3 rolls £20.00

All bracket measurements are from wall to end of bracket

Data

News from the digital amateur radio world

PHOTO 1: PCM2900 stereo USB codec (28 pin device, right) with a 3-port USB hub chip (quad package, left).

ROS WITH IQ OUTPUTS. Jose, author of the ROS data communications package, has responded to requests and updated the MF / LF version. It now offers the option of I/Q stereo output mode for directly driving direct quadrature upconverters such as the one described in Design Notes last month. As soon as this was announced I immediately downloaded the latest version of the software from **[1]** and tested with a version of that upconverter that was already configured for direct I/Q inputs on 500kHz. The results were impressive, with 45 to 50dB of sideband rejection

SOUNDCARD RATES TX/RX DIFFERENCES. During a recent PSK31 QSO with G0API using the Digipan software when signals were a bit marginal, I noticed after every over I had to manually click onto John's carrier, which was about 8Hz lower each time. The signals weren't quite strong enough for the AFC to auto-correct, so the manual change was very noticeable. He reported that he was having to do the same, with the result that we were slowly drifting down the band at a rate of 8Hz every over. We both have high stability oscillators in IC-746 transceivers and it was definitely not due to frequency drift.

A few soundcard tests revealed all. In this column in December 2009 I reported on sampling rate errors and how a requested sampling rate isn't always what you actually get – leading to errors of a few Hz in the resulting audio tones. But it seems the situation can be even worse than this. I had only ever calibrated the internal soundcard in my Dell desktop on receive, using the crystal controlled calibrator shown in that issue. The same clock is used for Tx and Rx, isn't it, so surely they will be the same? But no, it seems you can't even assume this! On receive, calibration showed a sampling rate of 11100Hz; almost the norm with modern 48kHz derived soundcards. But when going onto transmit, the audio tone suggested the sampling rate actually was the requested 11025Hz. Very odd – and I'm sure I'd have noticed this before, so it is possible that at some point a driver has been changed. Fortunately, *Digipan* allows for separate Tx and Rx sampling rate calibration in its setup options so things can be corrected. Having entered the correct – different – calibration offsets, we could maintain a QSO on a single frequency.

So it seems we have to check soundcard frequency errors on both transmit and receive. Measuring the transmit tone frequency is more complex than for receive, but I am fortunate in having a frequency meter with a GPS locked reference that can measure audio frequencies to 0.1Hz resolution. An alternative would be to use a second PC (or even a second soundcard in the same machine) that has already been accurately calibrated with a spectrum analysis program to measure the tone frequency.

SDR TRANSMITTER. Possibly the first amateur direct generating SDR transmitter – a companion to the ever increasing range of direct sampling receivers – has just been announced by Alberto, I2PHD. He and Giuliano, I0CG, have developed a hardware project that takes audio input and generates RF in the range DC to 100MHz.

They presented a working prototype of the project at the Castelfeder (near Bozen, North-East Italy) meeting last October. A PDF of the presentation can be found at **[2]**. Alberto says, "Giuliano is the author of the hardware project, while I wrote the DSP software for the dsPIC. The audio signal coming from the microphone is digitised by the on-board ADC converter of a dsPIC chip at a sampling rate of 15501Hz, then upsampled to 248,016Hz and sent through an SPI interface to an AD-9957 device, which is dynamically programmed to provide an SSB output that can range continuously from about zero up to more than 100MHz (the final sampling frequency is 250MHz). It was tested on the air in SSB QSOs with the USA on the 20m band and received unsolicited comments about the very good quality of the modulation."

The AD9957 DDS chip used in this project is designed for I/Q conversion and has two integral mixers fed with 0° and 90° phase shifted RF signals. Unlike all other conventional I/Q upconverters the mixers are digital multipliers, not actual analogue ones. An outline block diagram of the device is shown in **Figure 1**. Instead of supplying the modulation as 0/90° phase shifted baseband signals, the user delivers these as a series of digital values. The concept is not dissimilar to that proposed by Alex, M0GJR in April's column last year but with the advantage of not having to convert to polar phase / magnitude coordinates. Running at the higher sampling rate of 248kHz, alias products will be considerably reduced.

SIMPLE USB CODEC. The PCM2900 Stereo Audio Codec with USB interface is a single chip 28 pin SSOP package audio input / output facility. With the addition of little more than a 12MHz crystal, a few coupling/decoupling capacitors and a 3.3V regulator, a high specification dual line input / line output is available as a second (or third) soundcard. Furthermore, as a single chip solution it can be built into audio interfaces or test equipment for a homebrew USB powered plug-and-play project. The PCM2900 is available at £6.90 each from Farnell **[3]**, order number 120-7086. **Photo 1** shows one of these chips mounted on a PCB along with a TUSB2036 three port USB hub chip. Not shown, on the underside of the board, is an FTDI FT232R chip providing a USB COM port. The PCB was made using the Press-n-peel **[4]** iron-on technique described in this magazine a few years ago.

WEBSEARCH

[1] ROS with I/Q outputs for direct upconversion - http://rosmodem.wordpress.com/2010/11/20/stereo-iq-outputs and http://rosmodem.wordpress.com/
[2] Direct generation SDR transmitter www.sdradio.eu/doc/Speech_I2PHD_English.rar and www.i0cg.com/ad9957_dds.htm
[3] Farnell - http://uk.farnell.com
[4] Press-n-peel PCB transfer - www.techniks.com

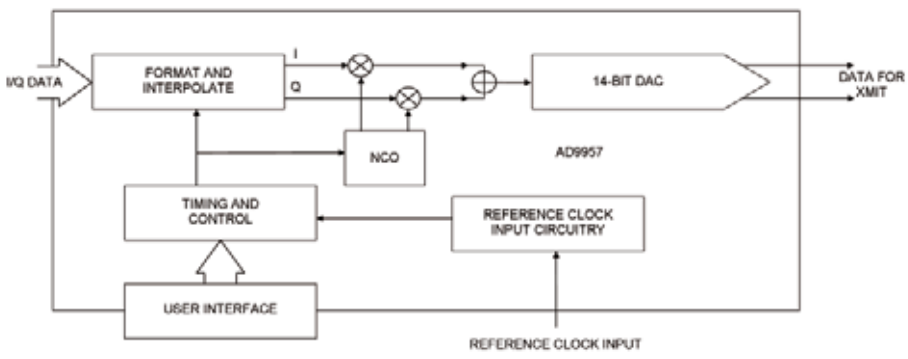

PHOTO 2: Block diagram of the AD9957 DDS with integral digital I/Q converter.

A Brief look at ARISSat-1

AMSAT North America's newest satellite, due to launch this month

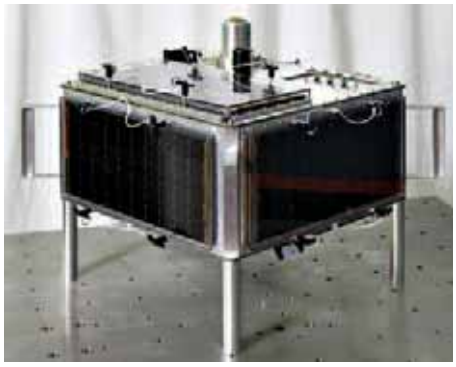

PHOTO 1: ARISsat-1.

HARD WORK. The Amateur Radio on the International Space Station programme (ARISS) is an international effort staffed by volunteers and intended to promote space education and inspire an interest in science, technology, engineering and mathematics (STEM) through amateur radio activity on the International Space Station (ISS). ARISSat-1 is the culmination of four years work by over 50 AMSAT volunteers. It is scheduled for deployment from the ISS in February 2011, from where it will be hand-launched by a space-suited astronaut. Extra vehicular activities (EVAs) such as this are often broadcast on NASA TV so it may be possible to see the ARISSat-1 deployment live.

ARRISat-1 is remarkably complex yet relatively small satellite. It contains cameras, radio gear and a science experiment. The satellite is intended as an education outreach project, and will be complemented by a very low-cost SDR receiver available to schools and colleges to receive the satellite's transmissions. A similar SDR receiver with enhanced frequency range, the FUNcube Dongle Pro, is available for general purchase.

Some of the satellite's key features are shown in **Figure 1**.

The six solar panels, donated by NASA, each measure 19" x 10.5" and produce 19W of power. The rechargeable battery, donated by RSC-Energia, is a type 825M3, Zinc/Silver battery – the same type used to power Russian Orlan spacesuits. There are four slow scan television (SSTV) cameras, the Kursk science experiment plus an internal housekeeping unit (IHU). Some measure of the spacecraft's complexity can be seen from the block diagram of the IHU, shown in **Figure 2**.

AMATEUR PAYLOAD. For amateur radio there is a software defined transponder (SDX) and whip antennas for 2m and 70cm. Uplink is on 70cm, the band edges being 435.740-455.760MHz and the downlink outputs are from 145.918 to 145.958MHz, with a linear transponder, CW beacons, BPSK data and the FM output on 145.950MHz. The 2m RF module will produce 500mW of downlink signal. On medium elevation passes I expect it will be easy copy with the typical omnidirectional 'white stick' collinear that many of us use for local 2m contacts. This will make the transponder, telemetry and SSTV accessible to a very large number of radio amateurs who don't currently have specialist satellite setups.

There are four SSTV cameras on board and we should get some very interesting images, including those of the switch on and deployment. These images will be stored and then transmitted after the 15 minute safety delay that is required before any of the RF systems power up. There will also be stored images that will be transmitted in colour using Robot 36 format and showing the callsign RS01S.

There are CW and BPSK telemetry beacons so satellite housekeeping and science data will be accessible to wide range of users. If you still have your 400BPSK hardware modem used for AO-13 and AO-40 then dust it off, otherwise soundcard and software modems should give good results.

There are pre recorded greetings messages in 15 different languages intended particularly for reception by schools.(Good for radio clubs too running special event stations or taking part in National Science and Engineering week).

The Kursk experiment, designed by students at the Kursk State University in Russia, will monitor and send back daily atmospheric density data that should prove especially interesting as the satellite decays out of orbit and into the upper atmosphere (which will happen after an estimated one year).

A LOT IN ONE BOX. ARSSat-1 shows what can be achieved in one satellite to provide an education outreach and an amateur radio transponder so, even if you are completely new to satellites, do give this one a try. You wont need a complicated 'satellite' station: try with what you have, as there will be plenty to enjoy.

For pass predictions for your QTH go to the AMSAT North America website after launch and click on the 'passes' option near the top of the home page.

ACKNOWLEDGMENTS. Thanks to Anthony Monteiro, AA2TX, Vice President, Engineering, AMSAT North America who supplied the images and whose article in the AMSAT Journal provided most of the technical information.

AMSAT-UK is an active supporter of the ARISS programme and is also building the UK FUNcube satellite, which will be in a higher orbit than ARISsat-1. It will also have an education outreach and an amateur radio transponder.

WEBSEARCH
NASA TV www.nasa.gov/multimedia/nasatv/index.html
AMSAT North America www.amsat.org
AMSAT-UK www.uk.amsat.org
FUNcube Dongle Pro www.funcubedongle.com

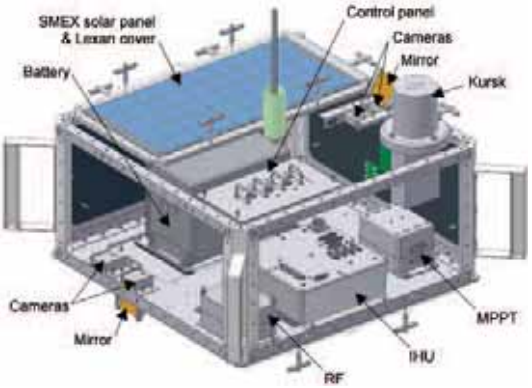

FIGURE 1: ARISsat-1 space frame cutaway showing major parts.

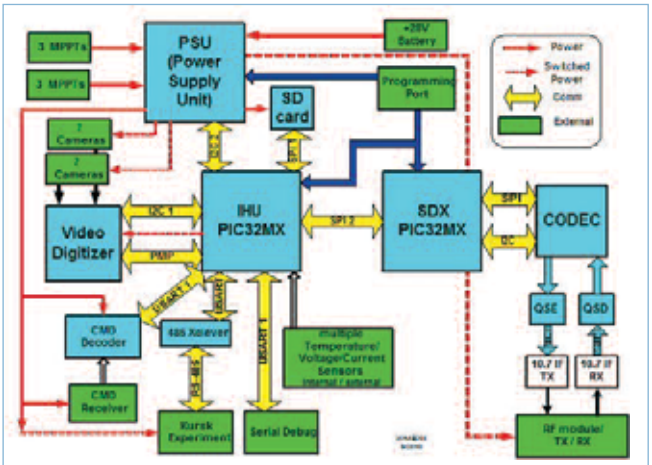

FIGURE 2: Internal Housekeeping Unit block diagram.

Sport Radio

More about how the Bolton club do so well in the UKACs, and contesting accuracy

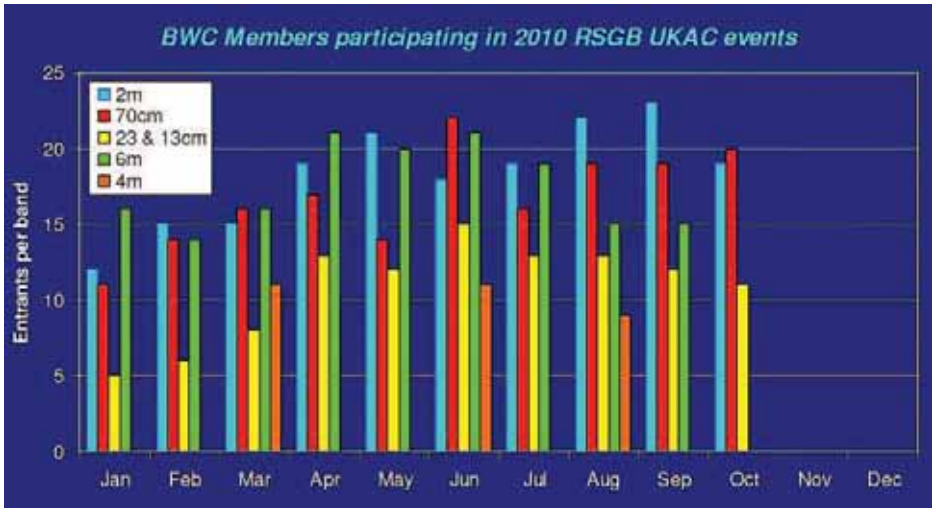

FIGURE 1: How Bolton keep constant track of participation by their members in the UKACs. They also produce a graph showing how they are doing compared to other teams.

RECIPE FOR SUCCESS, PART 2. Last month Ross Wilkinson, G6GVI began telling us how the Bolton Wireless Club had become so successful in the UKAC series of events. This month he continues the story and tells us why there's so much enthusiasm for portable operating at the Club.

"An example of our enthusiasm is several BWC members who regularly operate portable from the hilltops in all weathers, whilst others change around their home antennas every week, so as to have the right aerial on the mast for each session! Some of our team have even bought or built new equipment for 4m, 23cm and 13cm in order to get themselves going on these bands for the first time, and the ready availability of 'guaranteed' contacts on these (usually quiet) bands during the Tuesday night sessions spurs us on to improve our stations." As **Figure 1** shows, the club also keeps the members constantly informed about how many members are contributing to the total score.

"The enthusiasm for portable operation within our Club is partly due to the proximity of the Pennines (some of us can gain an extra 800ft altitude by travelling less than five miles from our home QTH!) and also the fact that some members are unable to put up effective antennas at home. Portable operation means that these people are still able to post good scores. The timing and duration of these contests certainly makes it worthwhile them going out for a couple of hours in the evening, and one member even travels 'over the border' into IO93 square for his operations.

"Teamwork is also an important ingredient, because with so many stations active within a small area we need to co-ordinate our portable activities, so that stations don't all arrive at the same hilltop at a quarter to eight! This liaison is done face-to-face at Club meetings, on the air and using the members' forum section of our website.

"We have a small amount of Club equipment for 23cm and 13cm that members can borrow, and some of our committee are kind enough to lend out their own gear for their colleagues to use on a Tuesday evening. And we've spent some time during our Club meetings throughout the year looking at DIY antennas for VHF, and improving our operating and logging techniques.

"One thing that can certainly be said is that there's a real *esprit de corps* amongst our members, who take pride in representing the Club in these events and pleasure in the success we're currently enjoying. In 2011 we'll be instigating a couple of Club awards, to be presented four times per year for outstanding efforts on the VHF/UHF and HF bands, so those who 'go the extra mile' for the Club will get due recognition."

Next month, in the final part, Ross will tell us tell us what he thinks of the UKAC series of events and more about teamwork.

THE DESIRED EFFECT. This column is being written before most of the new Super League events have taken place. The only one that has occurred so far is the 2m AFS. In 2009, 93 stations were listed in the results tables. In 2010 it will be 128, an increase of 37%, so it seems the Super League initiative has indeed had the effect of increasing participation.

A QUESTION OF BALANCE. Over the past months I have been exchanging e-mails with non-contester Godfrey Manning, G4GLM, on the subject of contest operating practice. In his latest e-mail Godfrey says "In Sport Radio July 2010 page 81 it suggests that, for expediency in a contest, a reply to a CQ need not state the callsign of the station that invited the response. Irrespective of the context, contest or not, this is bad advice because it offers no certainty that the intended station has in fact been worked. If there are three stations on frequency, conditions of propagation, power, beam heading, etc, can lead to an apparent standard contest exchange between two of them. However, the station worked is not the one that was expected. This results in wasted time and lost points. It's a real, not theoretical, possibility and in the *Practical Wireless* 144MHz QRP contest points were deducted for this reason (see the 'Not Worked' section on page 14 of the November 2010 *PW*). Contests require working as many stations as possible. They are also a test of the best operating skill. Paradoxically, some contests deliberately require a demonstration of the ability to exchange extended information reliably. Entrants to RoPoCo or Club Calls would not do well if a simple rubber-stamp QSO technique were adopted. It is obviously a basic part of communication to establish contact with the intended station by including its callsign, otherwise you are broadcasting and not communicating, which in turn could raise a question of non-compliance with licence conditions.

"As amateurs, we justify our spectrum allocation privileges partly in order to maintain a body of capable, self-trained licensees who contribute to the development of radio and if necessary, in an emergency, could accurately handle communications under adverse conditions if all else has failed. Contests are an opportunity to reaffirm our skills to the rest of the world. Sloppy practice has the opposite effect, as well as defeating the object of the exercise by loss of points. If I operated with such poor technique under either my aviation or marine radio licences, I would be regarded as incompetent. I'm

RSGB HF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Feb 7	80m Club Championships	2000-2130	SSB	3.5	RS + SN
Feb 12-13	1st 1.8MHz	2100-0100	CW, SSB	1.8	RST + SN + District
Feb 16	80m Club Championships	2000-2130	Data	3.5	RST + SN
Feb 24	80m Club Championships	2000-2130	CW	3.5	RST + SN

RSGB VHF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Feb 1	144MHz UKAC	2000-2230	All	144	RS(T) + SN + Locator
Feb 6	432MHz AFS	0900-1300	All	432	RS(T) + SN + Locator
Feb 8	432MHz UKAC	2000-2230	All	432	RS(T) + SN + Locator
Feb 15	1.3GHz UKAC	2000-2230	All	1.3	RS(T) + SN + Locator
Feb 22	50MHz UKAC	2000-2230	All	50	RS(T) + SN + Locator
Feb 22	SHF UKAC	2000-2230	All	2.3-10G	RS(T) + SN + Locator
Feb 27	70MHz Cumulative #1	1000-1200	All	70	RS(T) + SN + Locator

BEST OF THE REST EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange (info)
Feb 5-6	EPC WW DX	1200-1200	PSK63	3.5-28	RST + SN
Feb 12-13	CQ WW WPX RTTY	0000-2359	RTTY	3.5-28	RST + SN
Feb 12-13	PACC Contest	1200-1200	CW, SSB	1.8-28	RS(T) + SN (PAs send Province)
Feb 19-20	ARRL International DX	0000-2359	CW	1.8-28	RST + tx power (Ws send State, VEs Province)
Feb 25-27	CQ WW 160m DX	2200-2200	SSB	1.8	RS +CQ Zone (Ws send State, VEs Province)
Feb 26-27	REF Contest	0600-1800	SSB	3.5-28	RS + SN (Fs send Dept or overseas prefix)

For all the latest RSGB contest information and results, visit www.rsgbcc.org

also an amateur as far as flight and boating are concerned, but I would never consider this to exempt me from correct practice.

"My advice: give a good impression, practice and maintain correct communication skills at all times and, in the special case of contesting, avoid loss of points. Stick to accepted, commonsense radio procedure."

To clarify matters, what I suggested in my sample QSO is that once contact has been established there is no longer a need to give callsigns on every 'over', not that there is no need at all.

But returning to the plot, for serious contesters the objective is actually to be awarded the highest number of points, which doesn't always equate to the greatest number of contacts. To achieve the highest score it is possible to make a trade-off between repetition, giving everything phonetically, slowing down the process, claiming less points but possibly losing very few of them due to logging inaccuracies and/or lost QSOs, versus setting a fast pace and accepting the loss of some points as inevitable. Over the course of time this trade-off has found its own level, because if the top contesters were losing an excessive number of points they would operate differently. Equally though it could be unwise for less experienced ops to cut too many corners, because they would be likely to lose a greater percentage of their scores. Naturally, at times, it is appropriate to slow down and/or adopt procedures more akin to what Godfrey describes as 'correct practice'. For example, on SSB it is reasonable to give more phonetics when working someone who is a very weak signal or to repeat the exchange to someone who is obviously struggling. And on CW it is only polite to slow down if someone calls you at a substantially lower speed than you are working. What I certainly cannot agree with is the notion that contest operating is sloppy or inefficient.

THIS MONTH'S EVENTS. February is the second month of the 2011 80m Club Championship series. As is traditional, the mode sequence is rotated each month, so this month we have SSB on the 7th, followed by data on the 16th and CW on the 24th. Remember please that the power categories are 10 watts and 100 watts only. The First 1.8MHz Contest takes place for four hours on the evening of the 12th. This used to be a CW-only event, but it now contains CW, SSB and mixed mode sections. Exchange a signal report, serial number and District code (the first two letters of your postcode). Postcodes that begin with a single letter (eg S for Sheffield) are padded out to two letters. A full list of District codes can be found in the RSGB Yearbook or on the Contest Committee website.

VHF events kick off on the 1st with the 2m UKAC, the other UKACs being 70cm on the 8th, 23cm on the 15th, and 6m and SHF (13cm-3cm) on the 22nd. Tucked in and around the UKACs there are two other events, the first of them being the 70cm AFS contest on Sunday 6th. During the first decade of the 2000s it generally attracted about 30 entries per year, but in 2010 participation surged to 63. Now that it is the final 'match' in the new Super League series, it will be interesting to discover what effect that has on participation. Finally, there's the first (of five) of this year's 70MHz Cumulatives. It'll be your best three normalised scores that count towards the final table. 2009 was a record year for entries, but that record was promptly broken in 2010. With 4m activity continuing to increase, maybe the record will be broken again this year.

Moving to the international scene, there are several major events this month. The first is one I haven't mentioned before – the European PSK Club's WorldWide DX Contest on 5-6th. Contacts take place on BPSK63 only. Work everyone and exchange a signal report and serial number. There are too many entry categories to list here. Over the full 48 hours of the weekend of 12-13th the CQWW WPX RTTY contest will keep the data portions of the bands busy. Exchange a signal report and serial number. Multi-two and multi-multi entrants use separate serial number sequences per band, while all others use just the one. In parallel with it the CW and SSB portions of the bands will also be busy, because the PACC (VERON) contest takes place for 24 hours. Send a signal report and serial number, but expect to receive a report and a 2-letter Province code from Dutch stations. Over the full 48 hours of the following weekend the ARRL International DX CW Contest takes place. Work W/VE stations only, in as many of the 48 contiguous States and Provinces as possible. Send a signal report and your transmitter power, and expect to receive a signal report and 2-letter State or 3-letter Province code. On 25-27 February the CQ WW 160m SSB Contest takes place. The CW leg was held last month, so please refer to the January edition for further information. The final event of the month is the SSB leg of the REF Contest on 26-27 February. Work French stations only, send a report and serial number, and expect to receive a report and a Department code (or prefix from French overseas territories). There are no separate categories for different power levels and only a few entry categories. Single-op stations can enter single- or multi-band, while multi-op stations can make a single-transmitter all-band entry only.

EMC

RSGB EMC Committee members are busy working 'behind the scenes' on national and international EMC standards committees, helping to protect the RF spectrum from pollution

PLT STANDARDS. Various models of Power Line telecommunications (PLT) devices such as powerline Ethernet Adaptors (PLAs) are being sold with a CE mark, indicating that they comply with all applicable European Directives. These include the EMC Directive 2004/108/EC that supersedes 89/336/EEC. So how can PLT devices be CE marked if they emit conducted radio interference into the mains at levels higher than existing EMC standards?

EMC compliance can be demonstrated by completing an 'EMC Assessment'. This can be done by the correct application of all the relevant harmonised European standards. Alternatively, instead of applying harmonised standards, a manufacturer can perform an EMC Assessment by drawing up technical documentation to provide evidence of the conformity of the apparatus with the essential requirements (ERs) of the EMC Directive.

Most harmonised European EMC standards are derived from CISPR publications. CISPR is part of the International Electrotechnical Commission (IEC) and CISPR22 covers Information Technology Equipment (ITE). It is the basis of the harmonised European Standard EN55022. There is severe disagreement about whether EN55022 covers PLT devices or not but the RSGB EMC Committee is not aware of any PLT devices that comply with the CISPR22 conducted emission limits at the mains port. Those limits are based on long-agreed compromise figures for what the electromagnetic environment can tolerate. They take account of the statistical characteristics of the world's mains networks and the statistical requirements various radio services. PLT proponents have been trying to get these limits changed for the past 12 years but despite intensive work, they have not come anywhere near to justifying any change.

Nevertheless, CISPR committees have produced some Committee Drafts (CDs) such as CISPR/I/257/CD and CISPR/I/301/CD that have been available on the CISPR website for some years. These CDs were proposals for increasing emission limits and they have been cited by some PLT manufacturers in an EMC Assessment as evidence that a product meets the Essential Requirements of the EMC Regulations. These CDs were not voted on so they were not adopted as amendments to CISPR22 and hence not to EN55022. Nevertheless, until recently these CDs were still available on the CISPR website and they were still being cited in EMC Technical Files for CE marking PLT equipment. The RSGB EMC Committee has recently succeeded in getting these draft documents removed from the CISPR website.

FAILED CISPR DRAFT PLT STANDARDS REMOVED. The RSGB EMC Committee has members who work on various national and international EMC standards committees, representing the interests of RSGB members. They not only deal with PLT standards but all sorts of EMC standards such as emissions and immunity of radio, TV and Information Technology Equipment (ITE).

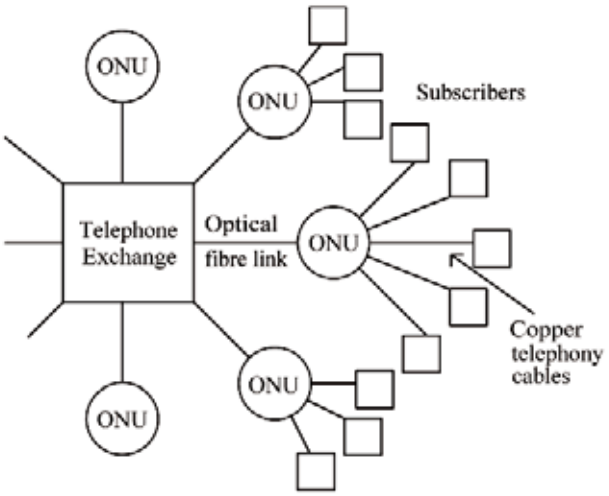

FIGURE 1: Architecture of a VDSL Network

As explained above, two CISPR Committee Draft documents were being used (some would say misused) in preparing EMC Technical Files for CE marking of PLT devices. RSGB EMC Committee members initiated a request via a British Standards Institution (BSI) committee to delete the CISPR/I/257/CD and CISPR/I/301/CD documents from the CISPR website. When this proposal reached CISPR, it was put to an international vote and the UK position was agreed. The draft documents have been removed from the CISPR website.

This is a significant step forward in the efforts of the RSGB and others to protect the radio frequency spectrum. The European Commission Enterprise and Industry has a 'Blue Guide' to the Implementation of Directives Based on New Approach and Global Approach (see Websearch). This Guide states, "… a Harmonised Standard does not necessarily cover all Essential Requirements. This would oblige the manufacturer to use other relevant technical specifications in order to meet all the essential requirements of the Directive."

The Blue Guide is not law, but it is supposed to be authoritative. PLT manufacturers may choose which technical specifications they use to show compliance but the Blue Guide does say that these have to be 'relevant'. So how can CISPR/I/257/CD and CISPR/I/301/CD be classed as 'relevant' now that they are discredited and withdrawn committee papers that effectively no longer exist? It appears that new EMC Assessments and Declarations of Conformity won't be able to cite these CDs and existing EMC Assessments should be easier to challenge.

That is not the end of the matter however as there is much more work to be done to oppose further proposals for relaxing EMC emission limits to accommodate PLT.

MEETINGS WITH BIS AND EUROPEAN COMMISSION. The European Commission has powers to mandate standards bodies such as CENELEC to produce European Standards. A CENELEC Working Group WG11 is working on this but the Society has serious concerns about the WG11 work and other issues. We have met with the UK Department of Business, Innovation and Skills (BIS) about PLT and have written a letter that can be found on the EMC Committee website (see Websearch).

At the time of writing, December, the Society is about to meet with European Commission Directorate General Enterprise staff responsible for the EMC Directive. The aim is to discuss PLT apparatus compliance and PLT/CENELEC standards work. Further details will be available after the meeting.

REPORTING TV INTERFERENCE. If your neighbour claims that your amateur transmissions are affecting his or her radio or TV reception, then the first thing to do is to remain calm, friendly and reasonable even if the neighbour's approach is unfriendly. Then it is worth looking at the RSGB EMC pages that include a link to 'I am causing breakthrough' (See Websearch). This page gives advice to members on how to tackle cases of 'breakthrough' caused by the fundamental of the transmitter getting into nearby electronic equipment. In some cases, the neighbour may wish to report the matter to the authorities and the way of doing this has changed recently.

Many members will remember the Post Office Radio Investigation Service (RIS) that used to investigate interference to radio and TV reception, including breakthrough from nearby amateur radio transmitters. Up until 1984, the RIS service was free to domestic radio listeners and TV viewers. Then it was transferred to the Department of Trade and Industry (DTI) and a fee of £21 was introduced for anyone wishing to report an interference problem. The service was subsequently operated by the Radiocommunications Agency (RA) of the DTI. The RA then became part of Ofcom, who operated the service until 2010.

The Ofcom website now has a page titled 'TV or radio interference or reception problems', which states, "The BBC are now responsible for investigating complaints of interference to domestic radio and television. Potential causes of interference inside the home can include central heating thermostats, fridge-freezers and some dimmer switches, for example on halogen lights. Under some circumstances, radio or other electrical equipment outside your home can also cause interference. Before reporting interference to the BBC, you should check your TV or radio installation to ensure it is operating correctly. In some cases, faults such as poor aerial connections can cause be the cause of the interference."

The BBC has a web page titled 'Help Receiving TV and Radio' that has a link to 'Diagnose Your Problem'. This asks users to enter their post code, then it asks a series of questions that give guidance and advice on interference problems. If that doesn't help, users are given the option to complete a web form to send an e-mail to BBC Reception Advice. The BBC states that it investigates all the e-mails sent to them and if they believe you are suffering from an interference problem, they may contact you for further information to help resolve the problem.

Investigation of interference to radio and TV reception has always been in the BBC Charter and is mentioned in the 2006 – 2016 BBC Agreement, which requires the BBC to make arrangements for the investigation of complaints of interference by electromagnetic energy affecting domestic television and radio reception within the UK.

Previously, the BBC made arrangements with Ofcom and its predecessors but now the BBC has taken the RIS service 'in house'. At the time of writing, the BBC web form does not cover interference from legitimate transmitters such as licensed radio amateurs.

The RSGB EMC Committee is currently looking at the handling of cases where individuals contact the BBC because they believe they are affected by transmissions from nearby radio amateurs. Further information will be published when available.

BT 'INFINITY' BROADBAND. EMC Committee member Robin, G3JWI has a BT 'Infinity' 40Mbit/s high speed broadband service and he has made some EMC measurements. The BT 'Infinity' service that G3JWI receives is a form of VDSL (Very High Speed Digital Subscriber Line) as opposed to ADSL (Asymmetric Digital Subscriber Line).

ADSL and VDSL both send radio frequency signals along existing copper telephony cables. These cables are unscreened so there is potential for such cables to radiate RF interference to some extent due to imperfect balance. They may also be susceptible to ingress of signals from nearby transmitters. ADSL uses frequencies up to 1.1MHz whereas ADSL2 and ADSL2+ use frequencies up to 2.2MHz, including the 1.81 – 2MHz amateur band. ADSL2 only uses its highest frequencies on relatively short lines such as 1km or less and even then they are used in the 'downstream' direction, from the telephone exchange to the customer. Due to line loss, the power of ADSL2 signals in the 1.81 – 2MHz amateur band should be relatively low, except for customers who live very near to a telephone exchange.

Whereas ADSL and ADSL2 signals go all the way from the telephone exchange to the customer on copper pairs, VDSL signals go from the telephone exchange to a street cabinet on optical fibre cables then from the street cabinet to the customer on existing copper pairs. VDSL is also known as a 'Fibre to the Cabinet' or FTTC service and the cabinets are also known as Optical Network Units or ONUs. The principle is shown in **Figure 1**.

VDSL can provide much higher upload and download speeds than ADSL2+ but VDSL uses frequencies up in to the HF band. The EMC Committee has been aware of VDSL since 1996 but it is only recently that it has been deployed commercially in the UK, for example as BT 'Infinity'.

Robin reports that his BT 'Infinity' service appears to be using the VDSL2 standard (ITU-T G.993.2) and it follows the general VDSL2 'band plan' with local modifications. VDSL2 can use frequencies up to 12MHz but Robin's measurements indicate that his service is not using anything above 7.025MHz.

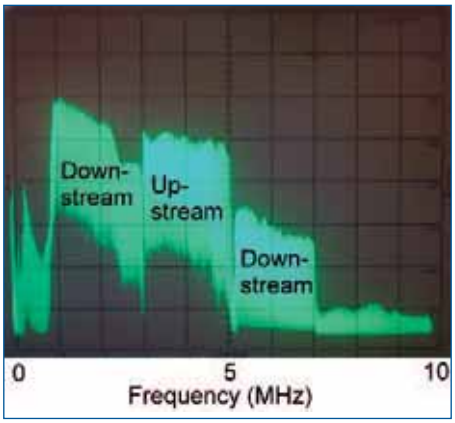

FIGURE 2: Spectrum plot of VDSL signals on a telephone line.

Robin's measurements were made by clipping a current transformer onto one wire of the twisted pair. The amplitude scale is 10dB per division and the measurement is made in 1kHz bandwidth. In principle, it should be possible to measure the power spectral density in dBm/Hz and compare it to the VDSL2 specification but to do this it is necessary to consider the impedance of the telephone pair at RF and the type of detector in the spectrum analyser, which is peak rather than true RMS.

Nevertheless, although **Figure 2** shows relative power density, it gives a useful indication of the overall shape of the spectrum. Three distinct bands can be seen and these are believed to be split between the 'upstream' and 'downstream' directions as indicated in the Figure. The power density drops away sharply above 7MHz and the narrow gaps between the bands at 3MHz and 5.1MHz are a characteristic that could be used to identify any RF radiated emissions from this type of VDSL2 network.

Robin reports that the balance on his VDSL line is good and he can't detect any radiated interference on his amateur receiver even with an antenna very close to the house. Nevertheless, VDSL has the potential to radiate RFI if line balance is poor so the EMC Committee would be interested to receive any reports of interference in amateur bands from ADSL2 or VDSL networks.

WEBSEARCH

RSGB EMC Pages: www.rsgb.org.uk/emc/

RSGB letter to BIS: www.rsgb.org/emc/docs/pdf/Simon%20Hicks%2015%20Oct%202010.pdf

Ofcom, TV or radio interference or reception problems: http://consumers.ofcom.org.uk/tell-us/tv-and-radio/tv-or-radio-interference-or-reception-problems/

BBC Help Receiving TV and Radio - Diagnose Your Problem: www.bbc.co.uk/reception/

European Commission Enterprise and Industry, 'Guide to the Implementation of Directives Based on New Approach and Global Approach' (known as the 'Blue Guide'): http://ec.europa.eu/enterprise/policies/single-market-goods/documents/blue-guide/

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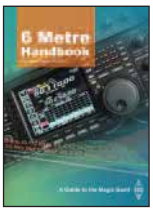

6 Metre Handbook

By Don Field, G3XTT

Not for nothing is 6 metres (50MHz) known to radio amateurs as the 'Magic Band'. One minute there may be no propagation at all, the next moment the band is full of big signals via Sporadic E. This book, written by well known DXer and 6m enthusiast Don Field, G3XTT, provides an ideal guide to this unique band. It is clear that the Magic Band can be both frustrating and highly rewarding and, more than on any other band, you need a good guide book to get the best out of 6m - the *6 Metre Handbook* is that book!

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By Peter Dodd, G3LDO

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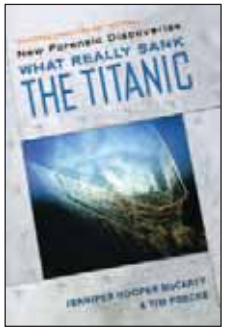

What Really Sank the Titanic?

By Jennifer Hooper McCarty and Tim Foecke

We are now all aware of the infamous night of the April 14, 1912, when the "unsinkable" RMS Titanic, plunged to a watery grave. But what really caused the Titanic to sink? Was it simply an unlucky accident with an iceberg in the North Atlantic or was it more?

For nearly a century, the shocking loss of the Titanic has haunted the world. Researchers Jennifer Hooper McCarty and Tim Foecke thoroughly investigate the accident applying modern techniques to the available evidence. There draw on their participation in expeditions to the ship's wreckage and experiments on recovered Titanic materials. Far from a conspiracy as some propose, the authors build a compelling new scenario for the reasons for the disaster. Grippingly written, *What Really Sank the Titanic* is illustrated with fascinating photographs and scientific evidence, a book not to be missed.

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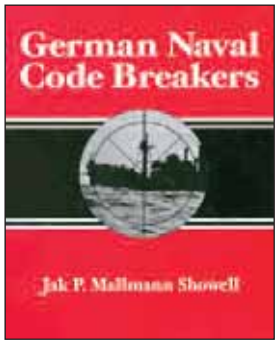

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By Jak P Mallmann Showell

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By Beryl Escott

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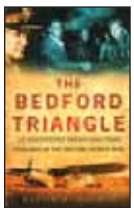

The Bedford Triangle

By Martin Bowman

During WWII there was a part of the English countryside that had a reputation for those posted there simply disappearing, including the famous band leader Glenn Miller. *The Bedford Triangle* tells the story of the activities carried out by the British Special Operations Executive, US Army Air Force and American Office of Strategic Services in Bedfordshire during WWII.

Drawing on revealing first-hand accounts, together with official documentary evidence, the author's extensive research has revealed that Allied Secret Service organisations participated in even more unorthodox activities, such as clandestine propaganda and political warfare.

During WWII Bedfordshire was a central part of the Allied clandestine activities against the Axis forces, *The Bedford Triangle* portrays this crucial role and is recommended reading for anyone interested in conspiracy theories and the Allied operations behind enemy lines in occupied Europe during WWII.

Size 124x199mm 240 pages, ISBN 9780-7524-5098-8

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HF F-Layer Propagation Predictions for February 2011

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.....37788	732...378888	..7556788...	...78898....	...99998....	...79997....	....888.....	.....7.....
*** Asia								
Yakutsk	........343.	4......57765	...4563685..	...77.......	....4.......	.....	.....	.....
Tokyo	........322.	......37755.	.....	.....	.....	.....	.....	.....
Singapore	........222.	388665	......363...	......55....	.....575....	.....45.....	.....4.....	.....
Hyderabad	.....	15333	.......553..	......464...	......55....	......54....	......4.....	.....
Tel Aviv	99......8999	977....89999	......2883..	...656784...	...78888....	...57776....	....77.....	.....
*** Oceania								
Wellington	.....	....2.365...	....55663...	....5653....	.....4.....	.....	.....	.....
Well (ZL) (LP)	.....	.....	.....	33.......53.	.....	.....	.....	.....
Perth	.....	.......6754.	......587...	......77....	.....	.....	.....	.....
Sydney	.....	......6763..	.....4884...	....3686....	......4.....	.....	.....	.....
Melbourne (LP)	.....	..39........	.4.99.......	...893......	....95...4..	....8.......	.....	.....
Honolulu	.....	...2........	...443.3....	.....	.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....	.....	.....	.....	.....
W. Samoa	.....	...33..4....	...37775....	....677.....	....477.....	.....65.....	.....	.....
*** Africa								
Mauritius	2........112	7.......6767	5......77655	.......76...	.......7....	.......6....	.....	.....
Johanesburg	.....	33.......244	77......8988	79754	.....	.....	.......5....	.....
Ibadan	22.......111	774.....6677	877.....7767	4..3...487..	...7545785..	...766778...	...577784...	....7777....
Nairobi	4........333	87......8888	6......36666	.......675..	......466...	...4.466....	...66677....	.....47.....
Canary Isles	777.....3667	7783....7878	8857...68888	...36667885.	....888978..	....6767....	.....	.....
*** S. America								
Buenos Aires	.....	33.5.......2	55.8......55	...7........	.....	.....	.....	.....
Rio de Janeiro	.....	33........23	66.7.....666	...5.....6..	.....	.....	.....	.....
Lima	.....	22.4........	34.7......43	.....	.....	.....	.....	.....
Caracas	.....	4432......24	76.7.....387	...46...37..	.....65574..	.....7677...	.....7774...	.....565....
*** N. America								
Guatemala	.....	22.2........	3..64.......	.....	.....	.....	.....	.....
New Orleans	333.........	76.5.......6	3..6......5.	.....3...5..	.....	.....	.....	.....
Washington	344........3	7737......77	43.3.....684	.....5.467..	......456...	......666...	......66....	.....
Quebec	566.......55	64.6.....776	........47..	....666683..	......666...	......665...	......56....	.....
Anchorage	.43.........	53.2.......3	........66..	.....	.....	.....	.....	.....
Vancouver	.....	33..........	.....	.....	........5...	.....	.....	.....
San Francisco	.....	.....	.....	.....	.....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.....	.......6....	.......5....	.......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 February, March and April are respectively (SIDC classical method – Waldmeier's standard) 31, 34 & 37 and (combined method) 56, 60 & 64. The provisional mean sunspot number for December 2010 was 14.5. The daily maximum / minimum numbers were 31 on 4 December 2010 and 0 on 18 to 21 December 2010.

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 March *RadCom* is 28 January and for the April edition it's 28 February. For GB2RS, the deadline is 10am on the Tuesday for the week of broadcast.

1 SCOTLAND SOUTH & WESTERN ISLES

REGIONAL REP: LEN PAGET, GM0ONX, RM1@RSGB.ORG.UK

AYR ARG
Tom Ferguson, GM1OST, 01292 532 088
9 Presentation: History of Scottish Railway
23 Presentation: WSPR

COCKENZIE & PORT SETON ARC
Bob, GM4UYZ, 01875 811 723
4 Normal club night
18 Radio check night by John, MM0JXI

KILMARNOCK & LOUDOUN ARC
Graham, MM3GDC, mm3gdc@btinternet.com
8 PLT - is it as bad as they say? - GM0ONX

LIVINGSTON & DARS
Norman, 07740 946192, uk.groups.yahoo/group/ms0liv
1, 15 Club evening
8 Operating evening
22 Morse code practice

LOTHIANS RS
Andy Sinclair, lrs_secretary@moosedata.com
9 RSGB Amateur Radio Centre, Bletchley Park, by Angus Annan, MM1CCR

WEST OF SCOTLAND (GLASGOW) ARS
Fred Coombes, 2M0BIN, 0141 571 5512, www.wosars.org.uk
2, 9, 16, 23 Solder Group homebrew projects & licence training
4, 11, 18, 25 Presentations, guest speakers, raffle & quiz

2 SCOTLAND NORTH & NORTHERN ISLES

REGIONAL REP: DENNY MORRISON, GM1BAN, RM2@RSGB.ORG.UK

No entries received this month. Please send any information to GB2RS@RSGB.org.uk

3 NORTH WEST

REGIONAL REP: KATH WILSON, M1CNY, RM3@RSGB.ORG.UK

BOLTON WIRELESS CLUB
boltonwireless@gmail.com
14 Amateur satellite operating by John, G1YYH
28 Members' show and tell evening

CHESTER & DARS
Barbara Green, 07957 870770, www.chesterdars.org.uk
1 Another new "The Other Man's Shack" video

PRESTON ARS
Richard, M0RDZ, 07855873566, secretary@prestonars.co.uk
24 UKFMGW repeater network by Dave and Kath Wilson

THORNTON CLEVELEYS ARS
Colin Hirst, G0EPY, colmay@sky.com
7 Natter night / OTA
21 Brains Trust

4 NORTH EAST

REGIONAL REP: HAROLD SCRIVENS, G0UGE, RM4@RSGB.ORG.UK

OTLEY ARS
Paul, 2E0PAK, 07768 996370, m6wat@pekae.co.uk
1 144MHz UKAC, G3XNO
8 DXpedition presentation
15 Open shack night / tech chat
22 50MHz UKAC, G3XNO + natter night

RIPON & DARS
Rob Hall, M0RBY, 0787 608 5631 or 01677 460449, www.ripon.org.uk
3 Club night, OTA
10 A talk on the Wensleydale Railway
17 Talk – QRP DXing? Myth or Reality?
24 Junkbox amateur radio – an altogether different kind of skip!

SHEFFIELD ARC
Peter Day, G3PHO, sarc@g3pho.org.uk
7 Social evening plus club contest night
14 Talk: electrical safety by David, G6DCT
21 Mini Fleamarket & Quiz night
28 Club open evening: visit by local Cubs & Brownies group

5 WEST MIDLANDS

REGIONAL REP: VAUGHAN RAVENSCROFT, M0VRR, RM5@RSGB.ORG.UK

CHELTENHAM ARA
Derek Thom, G3NKS, 01242 241099, chairman@caranet.co.uk
17 Sale of surplus equipment

COVENTRY ARS
John, G8SEQ, 07958 777363
4 EGM + construction competition
18 Project 2011
25 Radio workshop HF/VHF/UHF

GLOUCESTER AR&ES
Anne, 2E1GKY, 01452 548478, daytime, www.g4aym.org.uk
7 More thoughts about aerials by Tom, G3XMM
14 HF operating
21 Construction / workshop
28 Informal evening

MIDLAND ARS
Norman, G8BHE, QTHR, 01214 229 787
2 Open meeting, OTA & training classes
9 Committee meeting & training classes
16 Rally visit planning & training classes
23 Laptop computers, shack OTA & training classes

SOUTH BIRMINGHAM RS
Don, 0121 458 1603, www.radioclubs.net/southbirmingham
2 Lecture in main hall
3, 10, 27, 24 Training classes with Dave Murphy, G8OWL
4, 11, 18, 25 Construction evening
7 Equipment review for field days
14 Shack OTA, ragchew
21 Committee meeting
28 Repairs to trailer and horse box

STRATFORD UPON AVON DRS
G0CHO, 01608 664488, cousbey@theiet.org
14 Informal
28 Skittles & buffet evening

TELFORD & DARS
Mike, G3JKX, 01952 299 677, mjstreetg3jkx@blueyonder.co.uk
2 Committee meeting, VHF/HF OTA
9 Under £5 construction competition
16 Astronomy, G0CZD
23 Pacific Ocean DXpeditions talk by Derek Cox, G3KHZ

6 NORTH WALES

REGIONAL REP: MARK HARPER, MW1MDH, RM6@RSGB.ORG.UK

DRAGON ARC
Stewart Rolfe, GW0ETF, 07833 620733
7 The war after tomorrow by Clive Collins, GW3WEQ
21 Software Defined Radio by John, MW0XHO

7 SOUTH WALES

REGIONAL REP: JIMMY SNEDDON, MW0EQL, RM7@RSGB.ORG.UK

ABERYSTWYTH & DARS
Ray GW7AGG, 01970 611853, ray@clocktower.go-plus.net
10 Film night: The Silent Listener
24 Club night OTA with David, 2W0EDW on 145.500 then 145.550

8 NORTHERN IRELAND

REGIONAL REP: PETER LOWRIE, MI5JYK, RM8@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, RM9@RSGB.ORG.UK

BROMLEY & DARS
Andy, G4WGZ, 01689 878089
15 Programme planning

BURNHAM BEECHES RC
Dave, G4XDU, 01628 625 720
7 IC-7800 – Andy, M0YGB
21 The BBC – Tony, G0OVA

COULSDON ATS
Steve Beal, G3WZK, secretary@catsradio.org
14 Talk on motorcycle trip to the Himalayas by M0NAT

CRAY VALLEY RS
Bob, M0MCV, 020 8265 7735 after 8pm
3 History of the AVO by Guy, G0UKN
17 RAYNET - a community service, Phil, G6AQP

DORKING & DRS
Garth, G3NPC, 01737 359472, www.ddrs.org.uk
22 The Radio Amateurs' Emergency Network, Alan Stuart, G3ZHB

EDGWARE & DRS
Mike, G4RNW, 020 8950 0658, michael.stewart5@ntlworld.com
10 Video: The Secret Wireless War Part 1
24 Round table discussion on the ideal shack, Steve, G0PQB

NEWBURY & DARS
Rob, G3LMW, 01635 862737, g4lmw@btconnect.com
23 Talk on QRM by Tim, G3PJD

READING & DARC
Pete, G8FRC, 01189 695 697
3 Putting up a working antenna, wireless workshop evening
10 The Military Radio Show, WW2 radios on show and demo
24 Aerial tuning units, Peter Chadwick, G3RZP

SHEFFORD & DARS
David, G8UOD, 01234 742 757, www.sadars.co.uk
3 RAW format photography by Ken, G4YRF
10 Construction winner talk
17 Long Yagis by Paul, G1GSN

SOUTHGATE ARC
David Sharp, M0XDS,
david.sharp1@tesco.net
9 Graeme, G8DVJ brings his collection of RadCom magazine archive CDs

SURREY RADIO CONTACT CLUB
John, G3MCX, 020 8688 3322,
john.g3mcx@btinternet.com
7 Sid Morley Memorial

SUTTON & CHEAM RS
John, G0BWV,
020 8644 9945,
info@scrs.org.uk
17 Air traffic control by Ross MacDonald (ATC Watch Manager - Gatwick Airport)

WEY VALLEY ARG
www.weyvalleyarg.org.uk
4 Club night
18 Don Field, G3XTT

WIMBLEDON & DARS
Andrew Maish G4ADM,
020 8335 3434
11 OTA, SSB, Foundation training
25 Military radio for the amateur by Denis, MONDJ

10 SOUTH & SOUTH EAST

REGIONAL REP: GAVIN KEEGAN, G6DGK, RM10@RSGB.ORG.UK

ANDOVER RAC
Martin, M0MWS,
07776181646,
www.arac.co.uk
1 Club night
15 Club night, committee meeting

BREDE STEAM ARS
Steve, 01424 720815,
M0NUC@aol.com
5, 8, 15,22 At the shack

HARWELL ARS
Malcolm, G8NRP, 01235
524844, info@g3pia.org.uk
8 Construction contest
22 Shack activity night

HASTINGS E&RC
Gordon, 01424 431 909,
www.herc.uk.net
23 AGM

HORNDEAN & DARC
Stuart, G0FYX,
023 9247 2846,
www.hdarc.co.uk
1 Natter night/social evening
22 Hampshire and IOW Air Ambulance

HORSHAM ARC
www.harc.org.uk
3 The history of Mr Polly (Pt 5)
17 Social – The Selsey Arms, Coolham
27 Sunday morning fox hunt

SOUTHDOWN ARS
John, G3DQY,
01424 424 319
2 Operating at Hailsham shack
7 History of crystals in radio (Quartz Lab)

SWINDON & DARC
Den, M0ACM, 07810 317750,
www.sdarc.net
3, 17 Natter night
10 Members equipment sale
24 Mozambique DXpedition talk by Tony, G4LDL

TROWBRIDGE & DARC
Ian, G0GRI, 01225 864 698, E/W
2 Travelogs from G0BBL (voyage to Svalbard & QRSS operation) and G4YXS's Down Under trip
16 Natter night

WATERLOOVILLE ARC
Rich, G4IBW, 02392680852,
g4ibw1@ntlworld.com
25 CW training

11 SOUTH WEST & CHANNEL ISLANDS

REGIONAL REP: PAM HELLIWELL, G7SME, RM11@RSGB.ORG.UK

APPLEDORE & DARC
Brian Jewell, M0BRB,
01237 473251
21 Back to basics: modulation by Terry, G4CHD

BRISTOL RSGB GROUP
Robin, G3TKF, 01225 420442
28 Latest homebrew kits by Tim Walford, G3PCJ

EXETER ARS
Nick, 01363 775756,
info@exeterars.co.uk
14, 28 Club night

MID SOMERSET ARC
Nick, M6NJB, 01749 346320,
nick.bennett@midsarc.org.uk
8 Digital Modes part 2 by Jeff, M6GLH

SALTASH & DARC
Brian, M0BHG, 01752 844321
4 Photo and video evening, 25 years of club history by John Tozer

TAUNTON & DARC
William, G3WNI,
01823 666 234,
g3wni@btinternet.com
2 My French house by John Teague, G3GTJ
16 RSGB CC Contest (Data)

THORNBURY & SOUTH GLOUCESTERSHIRE ARC
Tony, G0WMB, 01454 417048,
tonytsgarc@btinternet.com
2 Local mines by David Hardwick
9, 23 OTA
16 Video night

TORBAY ARS
Dave, G6FSP, g6fsp@tars.org.uk
4, 11, 18 Natter night
25 AGM

WEST DEVON RC
Jules Cuddy, M1AGY,
01752 291588
1 Militaria evening with Tony Helm, G4BCX
15 QRP evening with M1AGY

12 EAST & EAST ANGLIA

REGIONAL REP: NEIL WHITESIDE, G4HUN, RM12@RSGB.ORG.UK

BITTERN DX GROUP
Linda, G0AJJ, 01692 404154,
secretary@bittern-dxers.org.uk
10 Informal club meeting
24 Informal club meeting, planning and briefing for the coming year

CAMBRIDGE & DARC
Ron Huntsman, 012233 501712
4 The club doublet antenna, theory and practice, Dave, G6KWA
11 Morse for all abilities
18 Bring and talk about your equipment 1: communication receivers
25 How to operate the club rig

CHELMSFORD ARS
Martyn, G1EFL, 01245 469 008,
www.g0mwt.org.uk
1 Expedition to Antarctica by Prof Les Barcley, G3HTF
6 Attending Canvey Island Rally (please bring surplus gear for the CARS table)

FELIXTOWE & DARS
Paul, G4YQC, pjw@btinternet.com
7 Homebrew Digital TV, Jason, G7OCD
21 Junk sale

HARWICH ARIG
Kevan, 2E0WMG 07766 543784
kevan2e0wmg@live.co.uk
9 Operating modes practical evening

HAVERING & DARC
John, M0UKD, 07817365354,
john@m0ukd.com
2 Informal club evening
9 RX building blocks by Ollie, G3TPJ
16 Informal club evening
23 Getting to know *RadCom* by Elaine Richards, G4LFM (Editor of *RadCom*)

LEISTON ARC
Dave, G4HUP, 0777 764 8448,
g4hup@btinternet.com
2 Measuring frequency with your oscilloscope, Dave, G4HUP

LOUGHTON & EPPING FOREST ARS
Marc Litchman, G0TOC,
020 8502 1645
11 Worked All Britain by Marc Litchman, G0TOC
25 OTA, VHF

SOUTH ESSEX ARS
Norman, M0FZW,
01268 692776,
secretary@southessex-ars.co.uk
6 Canvey Rally, Paddocks, Canvey Island
9 Humorous look at the internet by Vic, G6BHE

WEST KENT ARS
Les, G6UBM,
westkentars@googlemail.com
14 Keeping the big trucks moving, by Richard, G8CDD

13 EAST MIDLANDS

REGIONAL REP: JIM STEVENSON, G0EJQ, RM13@RSGB.ORG.UK

EAGLE RG
Terry, G0SWS,
01507 478590
8 Coastwatch by Pauline, G7UXI

FRISKNEY AND EAST LINCOLNSHIRE COMMS CLUB
Chris M0MFP,
01507 442240
1 EMC talk by Charles, G0CBM

HINCKLEY ARS
John, M0JAV,
m0jav@lowgables.co.uk,
07836 731544
2 Social evening
9 Workshop Magloop 2, John Rogers, M0JAV
16 80m Club Calls - data
23 Satellite getting started Brian Leathley-Andrew, G8GMU

LINCOLN SHORT-WAVE CLUB
Pam Rose, G4STO,
01427 788356,
pamelagrose@tiscali.co.uk
2 G5FZ OTA & Natter Night
5, 12, 19, 26 G5FZ OTA & work around the shack
9 The future of amateur radio by Dave Wilson, M0OBW
10 LSWCs 90th birthday
16 G6COL OTA, natter night & learn to play poker with G0PIO
23 RAYNET - Alan Clarke, M0LNR

LOUGHBOROUGH & DARC
Chris, G1ETZ,
01509 504 319
1 2m OTA from home
8 Bring along your unfinished project
15 Computer radio programs, a review by Art, G3KWY
22 Practical evening

NUNSFIELD HOUSE ARG
Ken Frankcom, G3OCA,
01332 720976
4 AGM
11 Erecting wire antenna
18 Northern lights
25 RSGB project

WELLAND VALLEY ARS
Peter D Rivers, G4XEX,
01858 432105,
g4xex@fsmail.net
20 TDOTA, GB0MHG
21 Construction night, 70cm HB9CV

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

ALL AS NEW and wired for Icom: W2IHY 8 band EQ + noise gate, £100. Heil HM4 + IC insert, £25. Heil Pro headset + IC insert, £50. All leads included. Robert Stratford, G6BDV, 01582 769078 (Harpenden).

DRAKE R4C noise blanker, 6kHz, 2.4kHz, 500Hz & 250Hz xtal filters, working. Matching Drake loudspeaker. T4XC with homebrew stabilised PSU, last used 2000. Manuals and boxes. Non-smoker owned from new. £300 ono. Collect or plus delivery. David, G3YYD, 01923 894346, g3yyd@btopenworld.com (St. Albans).

FINAL QRT. Yaesu FT-950 £1000. 30A PSU £75. Both items absolutely new boxed & unused. MFJ 949E deluxe, £100. Morse key new boxed £25. Data interface, as new, £45. All + carriage. Would prefer buyers to collect if possible. Ian Wilks, GW3FSW, 01745 570538, gw3fsw@hotmail.com (Clwyd).

FT-1000MP. Inrad 500Hz 8215 and 455 CW filters. Collins 500Hz in sub Rx. Inrad roofing filter. Hear recordings made with this rig at www.g3xrj.com. Some slight scratches on top cover but fully functional, boxed with original mic and manual. £695. G3XRJ, 01736 871285 (Lands End).

HF ANTENNAS. Optibeam 11-3 for 20/15/10m, £750. Optibeam 1-40 rotatable 40m dipole, £350. SteppIR BigIR plus 80m coil, new, unused, £800. More details at www.cdxc.org.uk/notices Sensible offers considered. Dave Gould, G3UEG, 01279 427788, dave@g3ueg.co.uk (Harlow).

HF9V BUTTERNUT antenna, brand new in box, £360 + £12 p&p. Yaesu FT-920 xcvr, vgc, £500, prefer buyer collects. Alan Booth, M0SMG, 01773 834801, albooth@dsl.pipex.com (Alfreton, Derbyshire).

HOLIDAY WITH YOUR AERIALS! Self-catering, smoke-free studio cottage near the middle of a long 3-acre garden. Sleeps 2 (twin beds). Peaceful, electrically quiet, rural area. Non-amateur owner happy for you to erect temporary (big!) aerials. Only £200 per week (Sat-Sat). Diana, 01308 485301 (W Dorset).

ICOM IC-290D mobile or base station VHF multimode. Boxed, complete with manual, in good condx, £150. Yaesu SP-6 filtered speaker in good condition, £99. Datong FL3 filter, £75. G0AIX, 01736 362536 (QTHR, Penzance).

KENWOOD TS-570DGE HF xcvr, all mode, internal auto-ATU, narrow CW filter, 100W, digital, £550.Vibroplex semi-auto bug key, £100. FRG-7700 HF Rx, all mode, digital, £120. Sony ICF-2001D HF, VHF, air band, all mode, scanning, digital Rx, £120. All plus P&P. Keith, G4OCH, 07946 730478 (Bewdley, Worcs).

PROCOM CXL2-3C/I professional 3dBd base station antenna (144-157MHz). Five unused antennas available at £75 each ono. Buyer collects. See http://moosey.orgfree.com/cxl/cxl.pdf for full spec. Peter, G4DJB, 01276 66432, peter1@moosey.org.uk (Frimley, Surrey).

SONY ICF-SW07, LF to VHF AM, FM, CW, SSB mini Rx including loop aerial with preamp and hbk. Good performance on HF. VGC and very useful, £120. Terry, G3RKF, 01625 535358, roeves@talktalk.net (Cheshire).

YAESU FT-709 70cm hand held, £20. Datong FL3, boxed, £30. Heathkit HP13, mobile PSU, £20. Heathkit Twoer, VHF base, 110VAC,.£30. HF amp valves, tested, 4-250 x2, £30. 4-400 x2, £40. Ade Mann, G0KSB, 07970 689321 (Telford).

YAESU FT-736R, 6m/2m/70cm, boxed, £675. Tokyo Hi-Power HL-166V 6m 160W linear, boxed, £120, Diamond GZV2500 25A PSU, boxed, £90. KW-107 ATU £120. All VGC & with manuals, all plus carriage. Graham, G3OHC, 01483 808419 (Guildford, not QTHR).

YAESU FT-7800e mint, boxed, £120 . Yaesu VX-6, mint, boxed, £110. LDG AT 100PRO, mint, boxed, £130, DX394 com rec, mint, boxed, £100. Kenwood TS-50 good clean wkg order, £250. Kenwood TR-9130 2m multimode, good wkg order, £90. All plus p&p. Ted, 2E0BPF, 01833 631729 (Barnard Castle).

WANTED

10m POST MOUNTED Strumech Veratower or similar wind up tilt-over mast, preferably with the post out of the ground (disabled member). M Butler, GW0MNP, 01656 741679, mikegw0mnp@yahoo.com (QTHR, Bridgend).

ACCESSORIES FOR KENWOOD R5000. VC-20 VHF Converter and YK-88CN CW Filter. Richard Tremelling, G3FWG, 01326 373758, (Falmouth).

COLLINS KWM2-A, PM2, 516F-2 PSU and other S line accessories. Condition, serial number and prices please to Bob Preston, G1EGL, 01953 604019, bobg1egl@talktalk.net (Wymondham).

DISABLED FAN OF OLD DAYS seeks pre-1975 QSLs, magazines, etc. Mike, 8 Windsor Road, Reydon, Southwold, Suffolk, IP18 6PQ.

MAST PARTS. Telescopic lattice mast parts or whole mast for upgrading my existing two masts. WHY? John Farrer, G3XHZ, 07843 79336, farrerj@yahoo.com (Saffron Walden).

POWER SUPPLY No 4, any variant, for a Wireless Set No 22, working or not. Anything considered. Stewart, G8YQN, 07940 271308, psgebbie@sky.com (Filey, N Yorks).

QUALITY HI-FI EQUIPMENT. Preferably British manufacture. Peter Munson, 2E0PET, 01332 544606, p.munson@ntlworld.com (Derby).

TUNING UNIT TU-5-B in good physical/operational condition. Will collect reasonable distance. Mike, G3NKR, 01962 861575, g3nkr@ivarc.org.uk (Winchester).

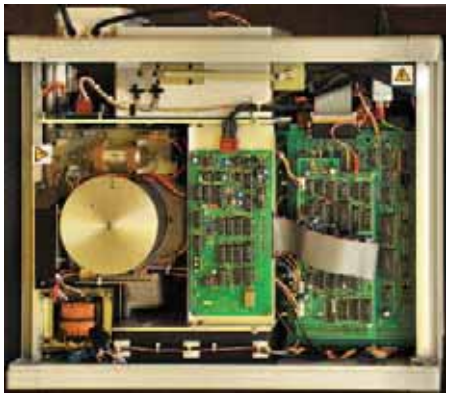
HELPLINES

Respondents are advised not to send original documents, but to copy them and send the copies.

LAYOUT DRAWING / DIAGRAM for a Tokyo Hy-Power HL-82V all mode 2m linear amp. Please note, NOT the circuit diagram, which I already have, but a component location drawing showing where each component is on the PCB. Andy, G0JLX, 07768 282880, g0jlx@mail.com (QTHR, Winchester).

MANUAL OR PHOTOCOPY of KW Atlanta Manual, for restoration project. For money of course! I have the original 8 page User Handout and the circuit diagram. Roger A Smith, G4BZG, rogerazsmith@tiscali.co.uk (Yorkshire).

MONOLIGHT-6601 PC CARD. Has anyone any info about this optical spectrum analyser or others of the same series? I want to resurrect one. I've the main unit, driver software, connecting lead, manual and accessories but no PC interface card! WHY? Giles Read, G1MFG, 01234 832714 (office hrs), giles.read@rsgb.org.uk (Bedford).



Yaesu FT-950 Transceiver

Direct lineage from the legendary FT DX 9000 and FT-2000

HF/50 MHz 100 W Transceiver
FT-950

- Triple-conversion super-heterodyne receiver architecture, using 69.450 MHz 1st IF
- Eight narrow, band-pass filters in the RF stage eliminate out of band interference and protect the powerful 1st IF
- 1st IF 3 kHz Roofing filter included
- High-speed Direct Digital Synthesizer (DDS) and high-spec Digital PLL for outstanding Local Oscillator performance
- Original YAESU IF DSP advanced design, provides comfortable and effective reception. IF SHIFT / IF WIDTH / CONTOUR / NOTCH / DNR
- DSP enhancement of Transmit SSB/AM signal quality with Parametric Microphone Equalizer and Speech Processor
- Built-in high stability TCXO (0.5 ppm at room temperature)
- Built-in automatic antenna tuner ATU, with 100 memories
- Powerful CW operating capabilities for CW enthusiasts including CW Zero-in and CW Spot features
- Five Voice Message memories, with the optional DVS-6 unit
- Large Multi-colour VFD (Vacuum Fluorescent Display)
- Optional Data Management Unit (DMU-2000) permits display of various operating conditions, transceiver status and station logging.
- Optional RF μ-Tune Ultra Sharp Preselector System for 160 m, 80/40 m and 30/20 m Bands

Optional, YAESU Exclusive, Fully-Automatic -Tuning Preselector System!

Fully automatic, Ultra-sharp, External μ-Tuning Preselector (optional) features a 1.1" (28 mm) Coil for High Q

On the lower Amateur bands, strong signal voltages can impinge on a receiver and create noise and intermod that can cover up the weak signals you're trying to pull through. YAESU engineers developed the μ (Mu) Tuning system for the FT DX 9000/FT-2000, which is now available as an option for the FT-950. There are three modules available, the MTU-160, MTU-80/40, and MTU-30/20); these may be connected externally, using the optional base kit, with no internal modification required.

When the μ-Tuning module is engaged, the VRF system is bypassed, but the fixed Bandpass Filters are still in the received signal path.

Optional External Data Management Unit (DMU-2000) Provides Many Display Capabilities

Enjoy the ultimate in operating ease by adding the DMU-2000!

Enjoy the same displays that are available with the FT DX 9000 and FT-2000: Band Scope, Audio Scope, X-Y Oscilloscope, World Clock, Rotator Control, Extensive Transceiver Status Displays, and Station Logging Capability. These extensive functions are displayed on your user-supplied computer monitor.

Shown with after-market keyer paddle, keyboard, and monitor (not supplied).

DMU-2000
Data Management Unit (option)

For the latest Yaesu news, visit us on the Internet:
http://www.yaesu.co.uk

Specifications subject to change without notice. Some accessories and/or options may be standard in some areas. Frequency coverage may differ in some countries. Check with your local Yaesu dealer for specific details.

YAESU
Choice of the World's top DX'ers

RALLIES & EVENTS

Members of the RSGB Regional Team will be present with a bookstall at the rallies this month marked with an RSGB diamond.

6 FEBRUARY – 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].

6 FEBRUARY – RADIO-ACTIVE RALLY – Civic Hall, Nantwich, Cheshire CW5 5DG. CP, OT 10.30, TS, B&B, C. Simon Chettle G8ATB, 01270 841506, e-G3at@aol.com. [www.midcars.org].

13 FEBRUARY – HARWELL RADIO AND ELECTRONICS RALLY – Didcot Leisure Centre, Mereland Road, Didcot OX11 8AY. TI S22 (V44), free CP, £2.50 (u12 free), OT 10.15/10.30. TS, FM, SIG, LB, C, DF. Details from Ann, G8NVI on 01235 816379, e-mail rally@g3pia.org.uk [www.g3pia.org.uk].

13 FEBRUARY – NORTHERN CROSS RALLY – Thornes Park Athletic Stadium, Horbury Road, Wakefield WF2 8TY. OT 10.30 (10.15), £3, C. free CP, TS. Ken, 2E0SSQ on 07900 563117 before 8pm please or e-mail kquinn27@o2.co.uk. [www.northerncrossrally.org].

27 FEBRUARY – RAINHAM RADIO RALLY – Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent ME8 0BX. 10.00, Trevor, G6YLW, 0771 7678 795, e-mail trev@wig1.co.uk.

27 FEBRUARY – SWANSEA ARS RALLY – Court Herbert Sports Centre, Neath Abbey, Neath SA10 7BE. OT 10.30, £2/50p, free CP, TS, B&B, SIG, LB, C. Details Roger, GW4HSH, 01792 404422 [www.radioclubs.net/swanseaars].

6 MARCH – BOURNEMOUTH RADIO SOCIETY 23rd ANNUAL SALE – Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth BH10 7LH. CP, OT 09.30-14.30, admission £1.50, TS, SIG, C, DF. Contact John, G0HAT, 07719 700771 [www.brswebsite.org.uk].

6 MARCH – EXETER RADIO & ELECTRONICS RALLY – America Hall, De la Rue Way, Pinhoe, Exeter, EX4 8PW. OT 10.30 (10.15), £2, TS, B&B, C, TI. All profits from the event are shared between GB3SW, GB3EW and GB3EX, the local 2m and 70cm repeaters. Contact Pete, G3ZVI, 07714 198374, e-mail g3zvi@yahoo.co.uk.

12 MARCH – DUTCH NATIONAL RADIO FLEA MARKET – "Autotron", Rosmalen's-Hertogenbosch, just off A59 motorway]. OT 0900 to 1530. TS, FM, €6. TI PI4SHB, 145.250MHz. Details +31 6 1356 1325, e-mail info@radiovlooienmarkt.nl [www.radiovlooienmarkt.nl].

13 MARCH – CAMBRIDGE & DISTRICT AMATEUR RADIO CLUB RALLY – Wood Green Animal Shelter, King's Bush Farm, A1198 London Road, Godmanchester, Cambs PE29 2NH. OT 10:00 (09:45), £3, TI, TS, B&B, LB, C, DF, FAM, Contact John, G0GKP, 01954 200072, e-mail j.bonner@ntlworld.com. [www.cdarc.co.uk].

13 MARCH – 26th WYTHALL RC RADIO AND COMPUTER RALLY – Woodrush Sports Centre, Shawhurst Lane, Hollywood, nr Birmingham B47 5JW on the A435, 2mi from J3 M42. TS, C, £2, B&B, CP, TI S22 (V44). Contact Chris, G0EYO, 07710 412 819, e-mail g0eyo@blueyonder.co.uk [www.wrcrally.co.uk].

19 MARCH – 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 – CALLINGTON AMATEUR RADIO SOCIETY RALLY – Due to circumstances beyond the organisers' control, this rally has been cancelled. A new date will be announced soon.

20 MARCH – 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.

27 MARCH – SPRING MILITARIA & ELECTRONICS & RADIO AMATEUR HANGAR SALE – Hack Green secret Nuclear Bunker, Nantwich, Cheshire, CW5 8AP. 10am, £2.50, civil, military and vintage radio equipment plus vehicle spares and more. Contact Rod Siebert, 01270 623353 or e-mail coldwatr@hackgreen.co.uk [www.hackgreen.co.uk].

3 APRIL – SOUTH GLOUCESTERSHIRE AMATEUR RADIO RALLY – Avon Scouts Activity Centre, Fernhill, Almondsbury BS32 4LX (junction of M4 & M5). OT 10.00, CP, DF, C. CBS, TI S22 (V44). Stan Goodwin, G0RYM, 07833 517370, gentryone@googlemail.com [www.avonscouts.org.uk/woodhousepark].

10 APRIL – CAMBRIDGESHIRE REPEATER GROUP ANNUAL RALLY – Foxton Village Hall, Hardman Road, Foxton, Cambridge CB22 6RN. TI S22, TS, B&B, C, DF, OT 10.00, £2. Contact Lawrence, M0LCM, 01223 654880, e-mail rally2011@cambridgerepeaters.net [www.cambridgerepeaters.net].

10 APRIL – NORTHERN AMATEUR RADIO SOCIETIES ASSOCIATION EXHIBITION (Blackpool rally) – Norbreck Castle Exhibition Centre, Blackpool FY2 9AA. 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.narsa.org.uk].

SILENT KEYS

We regret to record the passing of the following members:

Mr G Meanley MBE, G0GRM	23/7/2010
Mr F J Fairman, G0NLV	13/4/2010
Mr H N Stuart-Turner, G1EYS	23/9/2010
Mr D G W Austin, G1XUW	22/12/2010
Mr J Heaton, G1YYH	24/12/2010
Mr N Brierley, GW2DNJ	20/12/2010
Mr D Johnson, G3GAH	
Mr C F Cole, GW3GEN	
Mr J M Smith, G3OHW	29/10/2010
Mr G Grundy, G3XEC	29/12/2010
Mr J Dooley, G4MYG	24/11/2010
Mr R A Denyer, G6ZIS	
Mr R A Cannon, G8OTG	28/10/2010
Mr E P Dudley, M0DUD	22/11/2010
Mr H W Fensom, RS12109	
Mr S Gartside, RS202887	20/11/2010
Mr G Adams, RS93886	

17 APRIL – ANDOVER RADIO AMATEUR CLUB BOOT SALE – Wildhern Village Hall and Playing Field, SP11 0JE, north of Andover just off the A343. TI S22, CP, £1.50, C, DF. Vendors £6 per boot/table, £8 inside the hall. Details Martin, M0MWS, 01980 612070 [www.arac.org.uk].

17 APRIL – WEST LONDON RADIO & ELECTRONICS SHOW (Kempton Rally) – Kempton Park Racecourse, Staines Road East, Sunbury on Thames, Middlesex TW16 5AQ. TI, free CP, OT 9.50/10.00. TS, FM, B&B, SIG, C, DF, WIN, LEC. Details Paul, M0CJX, 0845 165 0351, info@radiofairs.co.uk [www.radiofairs.co.uk].

17 APRIL – LOUGH ERNE AMATEUR RADIO CLUB 30th ANNUAL RALLY – The Share Holiday Village, Lisnaskea, Co. Fermanagh BT92 0EQ N. Ireland. Access from Erne/Shannon Waterway. OT 11.30, CP, B&B, TS, LB, C, DF. Details Iain 028 66326693, e-mail iain@learc.eu. [www.loughernerradioclub.co.uk].

1 MAY – DAMBUSTERS HAMFEST – Thorpe Camp Visitor Centre, Coningsby, Lincs LN4 4PE. TI S22, GB4FR & GB3FJ, £3 under 12 free (incl traders and their companions), free parking, Pitches free but size is limited if not pre-booked. RAF heritage centre on site. Overnight camping. C, OT 10.00, RSGB bookstall. David, david@g1zqc.demon.co.uk.

2 MAY (Bank Holiday Monday) – DARTMOOR RADIO RALLY – Tavistock College, Crowndale Rd, Tavistock, Devon, PL19 8DD. OT 1015/1030. TS, B&B, TI S22 (V44), CP, DF, C, FAM. Peter, M1AYI, 01822 860277.

22 MAY – MID ULSTER AMATEUR RADIO CLUB RALLY AND BOOT SALE – Drumgor Youth Centre, Drumgor Heights, Craigavon, BT65 4AP. OT 11am, CP, TI, B&B. [www.muarc.com].

This list shows all rallies and events we are aware of as at 6 January 2011. 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 FEBRUARY 2011

Due to unforeseen circumstances, Ofcom has not been able to provide us with a listing of special event stations this month. We apologise for any inconvenience this may cause. If you are running a special event station in February and would like it included in GB2RS, please send details by e-mail to gb2rs@rsgb.org.uk.

5 JUNE – SPALDING & DARS ANNUAL RALLY – The Sir John Gleed Technology School, Halmer Gardens, Spalding, Lincs, PE11 2EF. TI S22 (V44), free CP. OT 10.00, TS, C, CBS. John, G4NBR, 0794 630 2815, Graham, G8NWC, 0794 776 4481, e-mail rally-secretary@sdars.org.uk [www.sdars.org.uk].

12 JUNE – 10th JUNCTION 28 QRP RALLY – South Normanton Alfreton and District Amateur Radio Club (SNADARC) in association with the G-QRP Club. Alfreton Leisure Centre, Church Street, Alfreton, Derbyshire DE55 7BD. Just 10 minutes from M1 J28 and the A38. OT 10, TS, B&B, SIG, C. Russell Bradley, G0OKD on 01773-783658, e-mail russell.bradleyG0OKD@ntlworld.com [www.snadarc.com].

19 JUNE – NEWBURY RADIO RALLY AND BOOT SALE – Newbury Showground, next to M4 J13. Big display area of amateur radio stations, exhibitions, special groups, clubs and societies. TI S22 (V44), free CP, OT 9.00, £2, TS, C, DF, FM, SIG. Sellers have access from 8am and pitches cost £10. Details from rally@nadars.org.uk [www.nadars.org.uk].

26 JUNE – 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].

10 JULY – CORNISH RAC 48th MOBILE RALLY – Penair School, Truro, Cornwall, TR1 1TN. TS, B&B, C, TI, CP. OT 10.30, £2. Details Steve, 01209844939 e-mail g7voh@btinternet.com. [www.cornishamateurradioclub.org.uk].

17 JULY – MCMICHAEL RALLY AND BOOT SALE – Reading Rugby Club, just off the A4 east of Reading, £2, TI, free CP, LB, C, SIG, WIN, TS, CBS. OT 9.30. Details Pete, G8FRC, 01189 695697, e-mail g8frc@radarc.org [www.McMichaelRally.org.uk].

17 JULY – 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].

31 JULY – HORNCASTLE SUMMER RALLY – Horncastle Youth Centre, Willow Road, Horncastle, Lincolnshire LN9 6DZ. 10.30, £1.50, DF, C. Tony, G3ZPU, 01507 527835.

12 AUGUST – COCKENZIE & PORT SETON ARC 18th ANNUAL MINI-RALLY NIGHT – Community Centre, Main Hall, Port Seton. Bring along your own 'junk' and sell it yourself. Tables on first come first served basis. £2 for everyone. OT 18.30 to 21.30.

14 AUGUST – FLIGHT REFUELLING ARS HAMFEST – Mike, M0MJS, 01202 883 479, e-mail hamfest@frars.org.uk [www.frars.org.uk].

14 AUGUST – FRISKNEY & EAST LINCOLNSHIRE COMMUNICATIONS CLUB RALLY – The Friskney Village Hall, Church Road, Friskney, Lincs. 6.5 miles south of Skegness. OT 10.00 to 14.30, £1.50, CP, C, WIN, TI S22, DIS. Details Bren, 2E0BDS, 01754 820 204, e-mail felcc@btinternet.com [www.felcc.webs.com].

4 SEPTEMBER – TELFORD HAMFEST – Enginuity Technology Centre, Coalbrookdale, Telford TF8 7DU. OT 10.30. TI S22 & GB3TF 433.200MHz. TS, SIG, discounted admission to Enginuity Centre. Details from Martyn, G3UKV, 01952 255 416 [www.telfordhamfest.co.uk].

18 SEPTEMBER – 21st GREAT NORTHERN HAMFEST – Metrodome Leisure Complex, Barnsley S71 1AN. OT 11.00, DF, TS, SIG, LB, C, FAM. Details Ernie, G4LUE, 01226 716 339 [www.greatnorthernhamfest.co.uk].

30 SEPTEMBER & 1 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].

9 OCTOBER – AUTUMN MILITARIA & ELECTRONICS & RADIO AMATEUR HANGAR SALE – Hack Green secret Nuclear Bunker, Nantwich, Cheshire, CW5 8AL. OT 10.00, £2.50, civil, military and vintage radio equipment plus vehicle spares and more. Contact Rod Siebert, 01270 623 353 or e-mail coldwatr@hackgreen.co.uk [www.hackgreen.co.uk].

16 OCTOBER – 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].

6 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].

4 DECEMBER – 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.

RSGB MEMBERS' ADVERTISEMENTS

RSGB members wishing to place an advertisement may do so free of charge by e-mail, or by post provided the advertisement is accompanied by a payment of £5.00 to cover administration costs.

The following terms and conditions apply to all Members' Advertisements.

1) In order to qualify for free insertion, Members Ads must be submitted by e-mail to memads@rsgb.org.uk. Please ensure you include .uk on the end of the email address.
2) **Your advert must clearly show whether it is For Sale or Wanted and must include your name, callsign or membership number, telephone number and postal town, in that order.**
3) The Ad may not contain more than 40 words, excluding the information in (2), and may be edited for readability at our sole discretion. Longer ads may be accepted if there is a good reason, eg a shack clearance on behalf of a SK member; e-mail us and ask.
4) Not more than one ad per month will be accepted from any member. 'Recurring' ads will not be accepted, but members may re-submit the same advert each month if they wish.
5) E-mailed adverts may optionally include one photograph of the item(s) being offered. Images must be attached as a jpg file, at least 800 pixels wide and of good quality. By submitting any image you warrant that you own the copyright and that you permit the RSGB to use it in any way. We will endeavour to publish photographs with ads as space permits but cannot guarantee to publish any particular photograph.
6) Adverts will be published at the first available opportunity but no guarantee can be given as to when a particular ad will appear.
7) The RSGB believes that it is inappropriate for members trading in radio equipment in any way to place members' ads. We therefore regret we are unable to accept such ads, although we do welcome these in the 'Classified' advertising section of *RadCom*.
8) The RSGB accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange.
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.

WARNING

Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement.

The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the money paid.

Members' Ads also appear on the Members-Only website at www.rsgb.org/membersonly/membersads.

CLASSIFIED ADS

Classified advertisements 58p per word (VAT inc.) minimum 14 words £8.12. All classified advertisements must be prepaid. Please write clearly. No responsibility accepted for errors. Latest date for acceptance is 1st of the month prior to publication.

Copy to: Chris Danby G0DWV, Danby Advertising, Fir Trees, Hall Road, Hainford, Norwich, Norfolk, NR10 3LX Tel: 0870 904 7377 Fax: 0870 904 7378 E-mail: adsales@rsgb.org.uk

Payment to: RSGB, 3 Abbey Court, Priory Business Park, Bedford, MK44 3WH

FOR SALE

YOUR FAVORITE DATA TERMINALS are still available PSK31-RTTY-WSJT-WSPR Etc
Do you own a VIBROPLEX MORSE key.
Its time it was fitted with my CABLETIDY.
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GREAT DAY OUT

Peter Norris, G4VUN

I thought I really must put pen to paper regarding the Bishop Auckland Rally on 28 November 2010.

I took along a complete newcomer to amateur radio. The rally went ahead despite the quite bad weather – a real credit to all involved.

The new chap was made most welcome and any questions were answered. At the rally he joined the RSGB – quite a good deal. Also credit must go to Harold Scrivens, Regional Manager for Region 4 for his help and common sense.

We came away with some more 'stuff', had a laugh and enjoyed the day.

RNARS

AJR Pegler, G3ENI

I would like to compliment Wally, G4DIU for the amount of detail contained in the 50 year brief history of the RNARS in the December *RadCom*.

Before the issue of the first news sheet in 1964, the late Bob Sharpe, G3AWY, used to type a few sheets of news with a small circulation from the offices of the Naval Aircraft and Marine Examination Board at RNAS Lee on Solent. He also acted as a 4m talk in station on Portsdown Hill for the rally held at the air station.

FLYING THE FLAG

David, G4ZMP

Having served in the Communication branch of the Royal Navy for 25 years I can vouch that there is only way the Union flag can be flown (or displayed) correctly is when the broad band of the white cross next to the Hoist (ie on the left hand side)is uppermost.

The Union flag on the front of November 2010 issue (Sport Radio) is shown correctly if the Hoist is on the right hand side of those who are holding it up to the camera.

Flags are generally depicted with the Hoist (the side the halyard is attached) to the left hand side.

If the Union Flag, shown in this position, is turned horizontally, the broad white band will now be uppermost with the Hoist on the right hand side, which is still correct.

I feel that I must comment on this as it can be quite offensive to many people.

Sidney Harbour, G3PQB

In the reply published in the January 2011 copy of the *RadCom* regarding the Union Flag being upside down. The reply states that, '*When a Flag has attachments down one of its short edges to allow it to be fastened to a halyard on a flagpole. There are only two ways it can be flown. In the case of the Union Flag, these are either correctly or upside down.*' This says it all.

The Union Flag held up by the RSGB team at the ARDF World Championships is upside down. It is obvious from even a casual glance that the hoist which in the photograph is on the right-hand side, making the Chief Canton (also known as the 'upper hoist quarter') in the lower canton. The Chief Canton of the Union Flag should be at the top adjacent to the Staff. This is not the case in the photograph, thus making it upside down. Simply turning the flag bottom to top makes the white lines above the diagonals wider, which is correct and places the Chief Canton in its correct position. To sum up the Union Flag is not flown by the Fly shown on the left hand side of the photograph but by the hoist which is quite plainly seen on the right hand side of the photograph.

Phil Cragg, G3UGK

Talk about a lesson in making a simple task ultra-complicated. It's simple:

Broad side up nearest the flagpole.

If there's no flagpole then assume it's on the left as you look at the flag.

Graham Bartram FFI
Chief Vexillologist, The Flag Institute

Physically the flag was upside down, but symbolically it was the correct way up. To have been physically the right way up the broad white diagonal would have had to be uppermost next to the hoist, but by having the broad white diagonal uppermost on the left hand side, as seen by the viewer they had the flag symbolically correct. Basically when a flag is being held or is flat against a surface and is not on a pole then the concept of hoist becomes vague. This applies to when athletes hold up flags after winning an event, or drape it over their shoulders like a cloak - what is the 'front', the view from behind the athlete, where most of the flag can be seen, or from in front of the athlete when they inevitably obscure much of the flag?

Roy German, G3OZT

With reference to the Union flag discussion in *RadCom*. I always rely on my Cub (then Wolf Cub) training of some 70 years ago.

Bob, G3ORY, is clearly holding the flagpole-end of the flag in his left hand and the wind is thus blowing from right to left across the page. Thus the flag is clearly upside-down because the broad white stripe of the diagonal at the flagpole end is underneath and should be uppermost.

If I am proved to be wrong, I will take it up with Akela, if and when I see her again.

CAN YOU HELP

Bri, M6LZX

This picture of an antenna is baffling me. Has anyone seen one or knows about this sort of antenna? I've been told it's called a long wave coned copper antenna (circa 1953). This one is about 12in so. I was wondering if someone might recognise it.

AMATEUR RADIO SCAM

Tony Wadsworth, G3NPF

I too have been the subject a similar scam to that described by G3LDI. I have put a warning on both my own website and QRZ.com and the scammer appears to have stopped using my name and postal address. In my case, I do not think anybody has actually parted with money to this scammer as the appalling English grammar/spelling and requests to send money to individuals with West African names at extremely dubious addresses has alerted potential victims. Several people have contacted me asking the question "is this really you?" and I have been able to warn them off before any money changed hands.

SHORT WAVE LISTENER QSL CARDS

Ian Wilks, GW3FSW

I read with interest letters from G4ICC & G3RKH and agree with their sentiments. We are clearly of the same vintage. I too started in the mid 40s with simple valve receivers, large HT batteries and lead acid 2A accumulators plus membership of the ISWL (1584) who produced pads of comprehensive report forms.

National Service took me into the Royal Navy and a period at Portishead Radio, Burnham on Sea where I met G8PG on the Post Office staff. He encouraged me to take up amateur radio and suggested on demob I build a TRF to G5UM's design; contact with Mark Denny, G6DN followed, he becoming my mentor. Amateur radio (like everything else) was in a different world in those days but has provided me with an interest and hobby for some 50+ years.

Yes, I feel SWLs do deserve encouragement.

HOSPITAL RADIO WITH A DIFFERENCE

Bruce Carter, GW8AAG

I read Paul Carter's letter in the December 2010 *RadCom* and realised the great comfort the Warrington ARC members' actions had been to the hospital-bound Dave, M0TUB. However, I feel there was more to the arrangements than written about. For instance, many hospitals prohibit the use of non-hospital electrical equipment (unless it has been inspected and tested by their technical staff). In multi-occupancy wards there may be objections to the continual intrusion of radio transmissions and someone's participation in the club AGM might be a step too far; even if copies of the agenda had been distributed around the ward previously. I am sure the impact must have been carefully arranged to be minimal.

MORE 5kHz DEVIATION

Derek, G1ZJQ

Thank you to Gordon, G8WWD, he understood what I was getting at so must be on my wavelength! I was not bashing

D-Star and digital modes, just pointing out a weakness.

John McCullagh misinterpreted my letter and jumped to the defence of the new technology, stating that it would soon become apparent that something was amiss if a once operating link failed. My point was that this is too late. By the time the error correction has given up, months or years of growing interference could have passed unnoticed and the source become established. However, if the equipment also gave an indication of the level of error correction necessary, then this would help – there is always a way!

As to the ±5kHz deviation, John seems to assume that 2m FM is mainly for repeaters. I do have a couple of repeater frequencies stored in the FT-60 and they are set at ±2.5kHz. Unfortunately, calls have gone unanswered, as Gordon has experienced. Another of the local repeaters I can access from the hills has reasonable traffic; there is little evidence of clipping and I am certain that some still use ±5kHz deviation on the input. On FM simplex, I have heard folk with new equipment being told to switch to ±5kHz because they are so much quieter than everyone else.

Last year, an operator answered my CQ on 2m & requested 'down one'. He appeared on 145.4875MHz but I persuaded him to move down 'another one' so as not to interfere with the calling channel. There is a wide variety of equipment being used and misused out there who is to say whether a soft voice on an unmodified 2.5W FT-290 will cause more problems than a loud voice with high mic gain on a 50W TS-2000 set to narrow FM?

After searching the net for a deviation meter, I have just been informed that my local club has a good one. My older sets need checking and adjusting…maybe ±3.5kHz would be a good compromise? (Specifications all state ±5kHz MAX deviation, so they may be set lower anyway.)

My most recent equipment (FT-60 and FT-817) has the option of wide or narrow FM deviation, however, the receive bandwidth is limited to the wider setting. I note that the latest Chinese handhelds also claim narrow receive filtering and cost much less than a used FT-208 did in 1987!

The October tropo conditions stirred up brief interest and some 12.5kHz channels were in use but this is rare up in NE England. In Hertfordshire, 1987, I remember all 25kHz simplex channels being busy – is this still the case?

WHERE ARE YOU ?

Derek Bemister, G3OBX

I see in the January 2011 Last Word that Ray Hills, G3HRH is asking why so many radio amateurs are now only putting "Particulars withheld by request" in the RSGB *Callbook*, and suggests that it would be much more useful to have their approximate location printed. I agree with his findings.

It may be of interest to Ray and other members irritated by the inserted words that sometime in early 1989 an article, I cannot say for sure where it was published, asking all RSGB members who did not wish to have their name and address inserted in the next RSGB *Callbook* (May 1990) to contact "The *Callbook* Editor at RSGB Potters Bar" and they will insert, within reason, what you wanted. I contacted a Mr Brett Ryder at RSGB headquarters and asked for **G3OBX Station Located in Romford Essex** to be inserted. There was a small fee of £2 for this.

The next couple of RSGB *Callbooks* were compiled as such, as were many other amateur callsign entries. But then all stopped and after which they all went back to "Withheld etc". It would seem that when the *Callbook* was edited by the RSGB staff all was OK, but now they get their information direct from Ofcom. I for one would like to see a locator for the station being worked, if only to get an idea of the distance.

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.

REMOTE INTERNET COMMUNICATIONS

Carl Bowen, M1BSI

Although I can fully understand the concerns of Sam, G4UQB and remote internet connections, I cannot get from my mind the wonderful fact that today, through a laptop, we are able to keep in contact with our great community almost anywhere… even on our deathbeds!

John Gould, G3WKL
Board member - Spectrum

I was pleased to read the letter from Sam, G4UQB in last month's *RadCom* as it backed up a policy that I am trying to get approved by IARU Region 1 on this type of remote operation. At last year's Region 1 Interim Meeting I presented an RSGB proposal in this general area. However, as there was one country opposing and one abstaining we will need to re-present the proposal to the Region 1 General Conference this coming August.

What the RSGB is proposing is that the callsign used with a remote station should indicate the country from which the transmission is emanating. During discussion at the Interim Meeting it was also proposed that where a remote receiver was being used that is in a different country to that of the transmitter/aerial that this should also be indicated during the contact.

In part our proposal failed on a technicality pertaining to the CEPT TR61-01 arrangement, whereby CEPT countries and some other countries may use their amateur licenses in a foreign country. The technicality is that TR61-01 only applies to the licence holder visiting the country. So in Sam's example, where the operator was not visiting Austria it would be incorrect to use OE3/KC9xyz/P. Probably the only correct call sign in this case would be OE3xyz, and explain in the contacts that the operator is KC9xyz operating remotely from the USA.

MORSE CODE

Mike Marlow, G3IAF

Although certain that others more qualified than myself will comment on the article In *RadCom* regarding Morse, I cannot let it pass unchallenged.

Ignoring the efforts of Wheatstone and others who trod different code paths I have no argument that the analysis demonstrates the efficiency of 'International Code'. Morse/Vail code is very different and little credit is due in this direction. It was, of course, designed for paper tape and even contains variable spacing and element length to produce some characters. The actuating relay or sound(er) mostly replacing tape provides a prime example of serendipity.

This code, becoming known as American or Railway Code persisted long into the 20th century primarily because, curiously, it requires less key movements than 'International' and thus suited the profit interests of the telegraph operators, falling into disuse only through the advent of teleprinters and the like.

International was adopted by the US military and others around 1900.

Your contributor fails to mention International Code should be credited to one Friedrich Gerke who, in Germany, in 1848, changed around half of the Morse/Vail code, this being adopted in Europe as 'Standardised' or 'International' at the International Telegraphy Congress, Paris, 1865.

I well remember hearing Stateside amateurs using Railway Code in the 50s and being totally unable to decipher a single word!

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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).

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**** 5 Watts Of Clean RF Power***
**** USB Connection***
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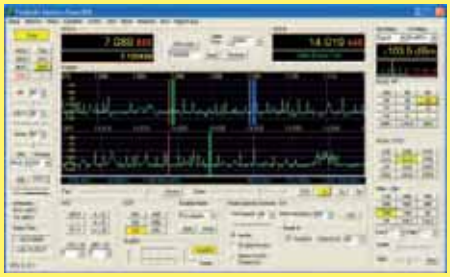

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