RadCom

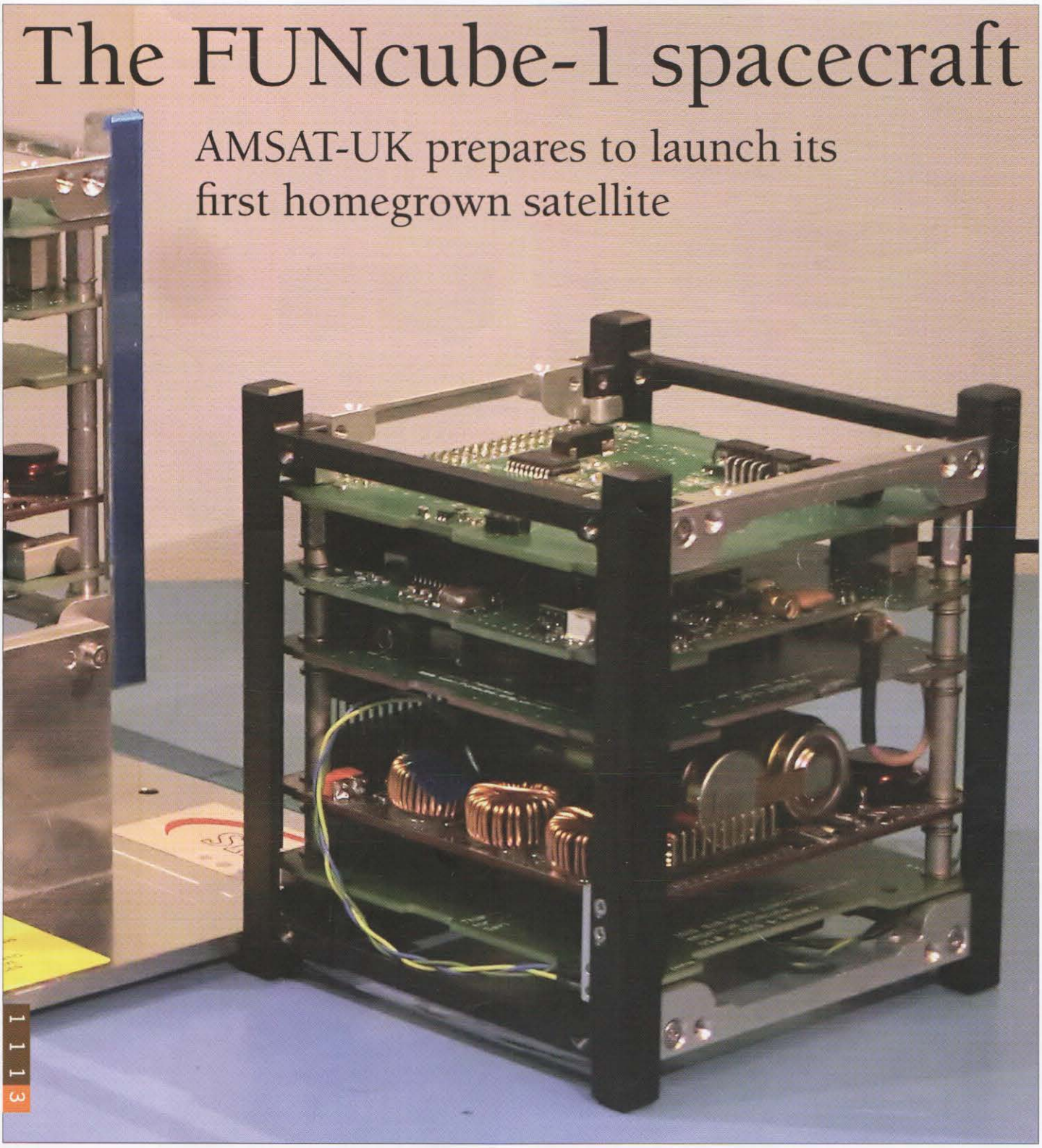
RADIO SOCIETY OF GREAT BRITAIN ◆ 100 YEARS WORKING FOR AMATEUR RADIO

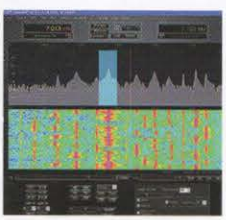
Radio Society of Great Britain
RSGB
100 YEARS 1913 - 2013

NOVEMBER 2013 ◆ VOLUME 89
NUMBER 11 ◆ £4.95

The FUNcube-1 spacecraft

AMSAT-UK prepares to launch its first homegrown satellite





Software Defined Radio

Learn the characteristic signatures of signals in the waterfall display

British medals in Poland

UK successes at the 19th IARU Region 1 ARDF Championships

Peter Hart Review

G3SJX gets his hands on the long-awaited Hilbering PT8000A HF-2m transceiver

WATERS & STANTON

Orderline 01702 206835 Online Catalogue www.wsplc.com

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Spa House, 22 Main Road,
Hockley, Essex, SS5 4QS.
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Email: sales@wsplc.com
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Fax: 01592 610451
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Sat 9am-4pm Tue-Fri 9.15am-5pm
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Check our BLOG
blog.wsplc.com

YAESU
Choice of the World's top DX'ers

The NEW FT-1200 Transceiver -- IN STOCK!

- 160 - 6m
- 5 - 100W
- Colour TFT Screen
- Auto ATU
- SpectrumScope
- 3 x Roofing Filters

£1399
FREE DELIVERY
24 Month Wtty.

YAESU ANNOUNCEMENT

Waters & Stanton support and source all their Yaesu products from Yaesu UK, appointed distributors by Yaesu Japan. We work very closely with them in order to bring you the best after sales service and knowledge base. It is relationships like these that we are proud of. And as the UK's largest distributor and importer of ham radio products, we are able to bring you some of the most exciting and advanced products. Certainly no Bull from us - just good old service and a reputation to be proud of.

HB-1B MK II QRP Transceiver

Enjoy the great outdoors with this fine little transceiver.

This little CW 80, 40, 30, and 20m transceiver runs 6 Watts from external . 12v or 4W from optional internal lithium cells. Has tunable filter 400Hz-3kHz, electronic keyer, programmable auto CQ, 30 memories, switched tuning speeds. Also receives SSB from 3.4 - 16MHz. It also has a nice clear LCD display. A great QRP transceiver at a great price.

IN STOCK £249.95 c

W&S Hi Tech. It's no coincidence that W&S have been chosen to represent Hi Tech Companies in the Ham Radio Industry. Companies such as Elecraft, Apache Labs and OM Power are recent additions. Companies have reputations that they cannot afford to have tarnished. They want integrity and skill backed up by reputation and established history. That's why they choose Waters & Stanton. We just get on with the job of bringing the latest in Ham radio to the enthusiast, whatever the interest or need. After forty years, we know a thing or two about the business. There is lots more to come.

FT-950 - SAVE £165!
HF & 6m 100W Transceiver

30kHz - 56MHz Rx, Auto ATU, triple conversion Rx with 3 roofing filters, 32 bit floating point DSP, Tx variable bandwidth and Mic EQ adjust, and much more! A really great transceiver for base station use. One of our most popular radios. **£1099.95c**

FT-450 HF & 6m 100W Transceiver

The FT-450D is a great base station that covers all HF bands anf goes right up to 50MHz. It also has a built in auto ATU. **£789.95d**

FTDX-3000HF & 6m Transceiver

NEW

Dual roofing filters, DSP IF filtering, large colour LCD screen, RTTY and PSK31 mode. Spectrun scope, bandscope and data. Super front end combined with down conversion to 9MHz . IF output and USB interface comes as standard. And of course you get a built-in automatic ATU. IN STOCK - **£2399d**

FT-DX5000 160 - 6m Transceiver

NEW DISCOUNT PRICE!

This radio is regarded by many as the current ultimate performer for serious HF base station use with its 3dB power advantage over the standard 100W radios. Available from

The current Yaesu "flagship" radio.

FT-DX5000 Standard	**£4199.95 D**
FT-DX5000D + SM-5000	**£4495.95 D**
FT-DX5000MP abobe + filters	**£4899.95 D**

FT-60E + FREE ACCESSORIES!

Choose either a QS-112Y4 Speaker Mic or WEP-501Y4 Earpiece/Boom Mic.
+ THESE GOODIES
1x WCN-3 Adaptor (worth £4.95)
1x LBMP-BK Log Book (worth £5.95)
1x WSC-3 Soft Case (worth £12.95)
1x Exclusive Yaesu Cap (worth £19.95)

£129.95b Plus £50 Worth of FREE Extras

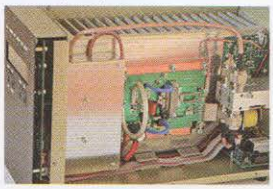
OM Power

144MHz 1KW Solid State Amplifier

We Are Appointed UK Stockist

These Amplifiers are built to an extremely high engineering standard at an amazingly low cost.

Designed for long term reliability and performance to an advanced technical specification. Another Hi-Tech product from the UK's leading Ham Radio Dealer, chosen on reputation and technical capability.



OM-2001

144MHz is the band of choice for many ham operators, whether it be for SSB DX, EME or MS. The OM2001 is capable of delivering 1kW output and has a gain of 17dB. Specified drive levels are 7 - 14W. It features an LCD panel for operational information and is well protected against VSWR and overload etc. Three top mounted cooling fans are included to maintain quiet but adequate air circulation. Case is 270mm x 190mm x 340mm (width x height x depth). Weigh is 12kg. **£2295**

1.8 - 52MHz 1.5kW Amplifier

OM-1500

There are lots of HF linear amplifiers to choose from, but few offer this level of performance and capability at anywhere near this price. The engineering and construction are quite simply superb, and anybody opening this amplifier up to look inside cannot fail but to be impressed. A single air cooled GS23B Ceramic tetrode provides 14dB of gain and delivers 1.5KW for SSB and CW (1KW data), reducing to 1kW on 50MHz. It typically requires around 60W drive for full power output. There is extensive protection including: SWR too high, Anode current too high, Screen current too high, Grid current too high, Mistuning of power amplifier, Temperature to high, and features Soft start for protecting your fuses. **£2895**

ICOM Exclusive Deals!

IC-7000

SAVE £100

HF-70cms up to 100W All Modes **£1099.95d**

PLUS £60 of FREE Accessories

Base or mobile, this is a great all-band and all-mode radio. Full colour screen, DSP selectivity and noise reduction and a great reputation.

ICOM Cap	worth £19.95
ICOM Mug	worth ££7.95
ICOM Document case	worth £19.95
A4 Log Book	worth £4.95
World Prefix Map	worth £4.95

IC-R6

This scanner covers 100kHz-1309MHz. Receives FM WFM & AM and comes with AC charge and NiMH batteries £179.95c

PLUS £50 of FREE Accssories

ICOM Cap	worth £19.95
ICOM Mug	worth ££7.95
WAT-999 Earpiece	worth £9.95
WSC-3 Belt case	worth £12.95

VX-8GE - SAVE £60!
2m/70cm 5W Handheld

The VX-8GE APRS/GPS provides an economical opportunity to obtain a handheld dedicated to APRS on 144 & 430 MHz. This model allows users to acquire a VX-8 series radio without having to pay for many of the VX-8DE features that may not be of value for their active APRS operation

Was £349.95 Now £289.95c

WATSON

Made for Watson by M0CVO Antennas NEW

1:1-BALUN-1.5 1.5kW 1.8-30MHz A 1:1 balun able to handle up to 1.5KW RF power. Used to feed a balanced antenna, or doublet with unbalanced feeder, reduces static on feeding. **£54.95 c**

4:1-BALUN-1.5 1.5kW 1.8-30MHz A 4:1 4:1 Extra High Power 1.5KW current balun for Windom, off centre fed or folded dipoles. Reduces 200 - 300 Ohms at feed point of antenna to 50 Ohms enabling the antenna to be fed with 50 Ohm coaxial cable. **£54.95 c**

W-LINE
1:1 Line Isolator
400W 1.8-30MHz
Removes RF from
Coax. **£32.95 c**

1:1, 4:1-UNLUN & 9:1-UNUN
400W
1.8-30MHz Can be used as centre feed point.
Each model **£32.95c**

MD-12HP	12m Mono for portable fixed station 400W CW 1:1 Balun 5.77m	£43.95 c
MD-17HP	17m Mono for portable fixed station 400W CW 1:1 Balun 7.95m	£43.95 c
LW-20	Multiband HF long wire 9:1 UNUN 80-6m inc WARC 20m long 400W	£43.95 c
LW-10	Multiband HF long wire 9:1 UNUN 40-6m inc WARC 10m long 400W	£43.95 c
HW-80HP	Multiband HF off-centre dipole 4:1 balun 80-10m 40m long 400W	£71.95 c

Carriage Charges: A=£4, B=£5, C=£8.50, D=£11

WIN A FREE RADIO

FT1DE 2m/70cms Handheld

We are offering this brand new transceiver as a prize for all Yaesu customers. Just buy any Yaesu radio from us and send the warranty card back to us. The offer applies to purchases from 1st October until 31st December.

WORTH £429 Don't Miss Out!

The FT1DE is a rugged dual band transceiver wirh two independent receivers built in. It has four power levels and can produce a maxinum of five watts RF output. It has both FM and the new Yesu digital mode. It has wide receive coverage and dual AF so you can monitor two stations at once.

ICOM IC-7100 HF - 70cms inc 4M!

Available NOW £1249.95c

- *HF, 6m, 2m, 70cm Multi-band, All-mode*
- *DSTAR DV Mode • Intuitive Touch Screen Display*
- *Easy-to-see, Easy-to-use Slant Top Controller*
- *Built-In SD Card Slot & USB • Built-In Speaker*
- *Dual DSP deliver great processing performance*
- *Built-in RTTY demodulator and decoder*
- *Voice recording and playback functions*
- *Optional RS-BA1 IP remote control software*

The Alex Loop

Buying A Loop Antenna?

Loops using 145WG wire have inferior performance. RF currents flow on the element surface and the Alex loop presents a surface area 600% larger! That means better efficiency. It also uses the conventional inductive loop coupling which is more efficient than a simple capacitor. All in all the `lex Loop is **JUST MORE EFFICIENT!**

40m - 10m up to 15W
Folds away in minutes!

The Alex Loop folds up into its compact carry case in minutes. Assembly is quick and positive and it can be hand held or mounted. The special sliding plate capacitor means low loss, extended frequency range and very accurate tuning.

£329.95c

Peter G3OJV: 'This is my favourite antenna for QRP work. Compact, efficient and rugged

KENWOOD TS-990S 160m - 6m Transceiver - In

RadCom: "Performance Second to None" - "performed impeccably on strong and

PART EXCHANGE WELCOME

PHONE OR EMAIL US FOR A REALLY GREEAT DEAL.

£5999.95d

The TS-990s 160-6m 200W transceiver is the product of many months of work carried our by the Kenwood engineers, and has resulted in a radio that is surely right at top of current radio technology. Its comprehensive colour display forms the centre of the design. The large heavy flywheel drive is a joy to use and underlines the mechanical superiority of the TS-990s.

Innov Antennas

"The World's Best Antennas for low noise work"
Peter Waters G3OJV

Yet Another W&S Exclusive!

***SAVE!* Quote this advert and we will charge a flat carriage rate of £6.00 for UK manland delivery on these antennas, Orders must be made befor 1st December 2013.**

144MHz LFA Yagi	Boom	Gain (dB	Prince inc VAT
3el short boom	0.67	8.67	**£59.95c**
4el short boom	1.17	9.49	**£74.95c**
5el short genrral	1.79	11.16	**£89.96**
6el short general	2.41	11.88	**£104.95c**
8el Medium DX	3.73	13.32	**£164.95c**
9el Medium Dx	4.40	14.06	**£194.95c**
12el Long DX	7.13	15.80	**£269.95c**

432MHz LFA Yagi	Boom	Gain (dB)	Price inc VAT
10el short boom	1.76	14.5	**£92.95c**
12el short boom	2.32	15.22	**£99.95c**
16el medium boom	3.46	15.92	**£139.95c**
18el long boom	4.27	18.1	**£174.95c**
22el long boom	5.51	19.06	**£215.95**

All antennas feature direct coax connection and mounting for masts up to 2" diameter. All feeds are DC grounded.

YAESU

NEW

Yaesu quality and performance at an amazing price. This is a radio that you can afford to buy to keep in the car or your briefcase. This is a very special price so order now and don't miss out.

FT-252E 2m Transceiver

Specification
144-146MHz (Rx 139-174MHz)
Loud 800mW Audio for mobile use
Tx 5W, 2W and 500mW
CTCSS & DCS Tx & Rx
9 DTMF Auto Dial Memories
200 Memories
5kHz & 2.5kHz deviation
1Ah Li-ion Battery & Charger

IN SYOCK

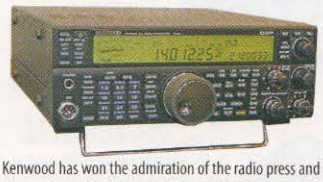
£79.95

NEW

ICOM ID-51E 2m/70cm DSTAR 5W

- *Dual Bander*
- *Rx. two simultaneously*
- *D-STAR DV*
- *Integrated PS*
- *AM/FM Broadcast Rx.*
- *Submersible Construction*
- *Voice Memory recorder*
- *MicroSD Card Slot*
- *1304 Memory Channels*
- *Rapid Charge DC Power Jack*

TS-590S 160m - 6m Transceiver



Kenwood has won the admiration of the radio press and hams all over the world. It is probably one of the best transceivers that Kenwood have ever produced. The best dynamic range in its class, digital IF, narrow roofing filters and auto ATU. Also FREE PC control program that can be downloaded. Exceptional value.

IN STOCK £PHONE FOR DEAL

Handheld Transceivers

ID-31E 70cm 5W D-Star Handheld with GPS

A sleek and lightweight radio, but don't let size fool you...inside the ID-31E is an integrated GPS receiver and fully functional D-Star radio.
* IPX7 submersible * Micro SD card slot * 1252 memories * 5W output
* Full Dot Matrix Display & Directional Keypad * Automatic Repeater List * Multiple Scan Functions *
CS-31 Cloning Software **£349.95d**

VX-3E 2m / 70cm Handheld Wide-band receive **£129.95d**

VX-6E ?m/70cms ıandy, Wide-ɔand Receive :179.95c

TH-K20E & TH-K40E

Two new handies from Kenwood. "K20E" offers 5.5W output and rx from 136-174MHz. "K40" offers 5W out and rx from 400 - 470MHz.
£119.95d each

VX-7R Waterproof triple band handy (silver/black) ***£299.95c***

VX-8DE Triple Band 6/2m/70cm Upgraded APRS **£369.95d**

IC-E80D 2m/70cm D-Star CTCSS & DTCS GPS Compat. **£329.95d**

C-E92D Dual band 2m/70cm waterproof fitted D-Star. Rugged radio. **£387.95d**

TH-F7E Dual band 2m/70cm + wideband receive inc. SSB **£236.95c**

TH-D72E Dual band 2m/70cm with GPS & TNC + SiRF **£426.95c**

TG-UV2 Dual band 2m/70cm with CTCSS DCS & LED torch! **£84.95d**

KG-UV6D Dual band 2m/ 70cm 5W/4W SMA **£94.95d**

1.8 - 23cns* All Modes - Ome Box!

KENWOOD TS-2000 160m - 23cn*

A base station that does every thing. All modes, 160-2m 100W, 70cms 50W and 23cm (option) 10W.
£1549.95c

ICOM IC-9100 160m - 23cn*

The latest all mode DC to light radio from ICOM. 160-2m 100W, 70cms 75W and 23cm (ption) 10W.
£2899.95c

ASK ABOUT OUR INTEREST FREE CREDIT!FF

ICOM IC-7600 HF Transceiver

HF - 6m 100W
Dual DSP and three roofing filters. 3 - 6 & 15kHz
Double conversion superhet - super image refection
Display 5.8" with ultra wide viewing angle.
Real time specrum scope - USB for flash card or leyboard
PSK and RTTY Operatioon with external keyboard.
104dB dynamic range for great receier performance
IN STOCK £3299.95 D

AR-8600MKII Base/Portable

This base or portable station receiver covers 530kHz - 3GHz. All modes AM FM FMW & SSB with standard rotary tuning. The ideal general coverage station receiver. Every Ham radio station needs a means of monitoring the signal that is being transmitted. Wethink that this is the one. **£699.95**

NEW

FG-01 MkII Antenna Analyser

The new FG-101 antenna analyser that covers up to 72MHz with larger screen and will include a matching AC charger and PSU. This highly portable unit features dual impedance and VSWR traces with colour screen. **£239 b**

HF on a BUDGET!

YAESU

FT-450D Has extra IF filter & an Auto ATU built in. 100W 160m - 6m with 3 IF filters 300Hz, 500Hz & 2.4kHz. **£789.95d**

IC-718 SSB CW 100W from 160m-10m. You won't find a mcre cost effective HF radio! **£594.95d**

ICOM

ICOM

IC-7200 this 100 Watt radio covers 160m-6m and includes digital IF filters. **£839.95d**

KENWOOD

TS-480SAT A very HF transceiver giving 100 Watts from 160 - 6m and includes auto ATU. I**£779.95d**

TEN-TEC

Jupiter-538CE 160m - 10m 100 Watts SSB CW AM FM with on-screen CW reader and socket for PC keyboard.
IN STOCK **£1649.95d**

Mobiles

TM-281E

Latest 2m FM 65W mobile. Superbly built**£169.95 D**

FT-8800E

Dualband Mobile 50W / 30W Great Value **£284.95 D**

FTM-350AE

2m/70cm Mobile Bluetooth GPS APRS **£399.95 D**

FT-2900E

75 Watt 2m 3W Audio, CTCSS, DTMF mic & "WIRES" internet. **£142.95 D**

FT-7900E

2m/70cms mobile 50/40W CTCSS, DTMF, internet, wide Rx **£219.95 D**

TM-V71E

2m/70cm Mobile with Echo Link ~~£299.95~~ **£259 D**

FT-8900R

Quad band 10/6/2m/70cm FM 50W (70cm 35W) **£329.95 D**

FTM-10E

Add A Quality Dash-Board Speaker!

SP-160 * 8 Ohms * Power rating 1.5W * 3m of lead with 3.5mm jack * Size 97 x 67 x 27mm * Weight **£9.95b**

SP-180A 6W Ampified Speaker 6W * Gain and on/off control * 12V DC cigar plug, bracket, audio lead with3.5mm plug. **£20.95b**

ID-E880

50 Watt Dual band 2m/70cm with D-Star and airband receive. **£439.95 D**

TM-D710E

50 Watts 2m/70cms with APRS **£445.95 D**

HF - UHF Compacts - One Box! GREAT PRICES

YAESU

FT-897D base or portable. This 1.8 - 440MHz transceiver is great value. 1.8 - 50MHz 100W 2m 50W 70cm 20W. **£749.95d**

FT-857D The great value mobile or base HF-6m 100W, 2m 50W 70cm 20W. **£679.95d**

WATSON **HF-VHF Mobile Whips**

MultiRanger 9 £49.95c

- 80 - 2m non WARC
- Impedance: 50 Ohms
- Power Capacity: 120 Watts
- Connector: (PL-259)
- Length: 1.9m Max

MultiRanger 2000 £69.95c

This antenna is the same as the MultiRanger 9 but adds the WARC bands of 30m, 17m and 12m, 200Watts

Carriage Charges: A-£4, B-£5, C-£8.50, D-£11

WATERS & STANTON

Orderline 01702 206835 | Online Catalogue www.wsplc.com

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Spa House, 22 Main Road,
Hockley, Essex, SS5 4QS.
Enquiries: 01702 204965
Fax: 01702 205843
Email: sales@wsplc.com
Mon-Sat 9am-5.30pm

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Fax: 01592 610451
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Closed Monday

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It's Official! - W&S The World's Largest MFJ Distributor

Why Buy From Us?

W&S are the world's largest MFJ dealer and the exclusive distributor for the UK. We offer a 12 month warranty and carry out all service work on MFJ we sell. Nobody has been selling MFJ longer than us, and only W&S are endorsed and supported by MFJ. That means you get the best deal now and for the life of your purchase.

MFJ

Just Great Ideas!

MFJ-225 Antenna Analyser with USB VNA!

It's the most comprehensive antenna analyser available for ham radio use and built to a very high standard.

NEW

Introductory Offer **£399.95b**

We are pleased to announce the introduction of the new antenna analyser from MFJ. This is a new step forward in design with built in VNA and can even be powered from the USB port of your PC.

FEATURES

- *VSWR with variable bandwidth sweeps 1-180MHz*
- *3" LCD panel for detailed data display.*
- *Impedance and reactance*
- *Return cable loss and phase angle*
- *Capacitance and Inductance measurements*
- *Coax length and loss - Coax break location*
- *VNA works with your PC - USB connection*
- *Power: Internal AA cells, Ext, 12v or USB*

Antenna Analysers To Make Antenna Adjustments EASY!

MFJ-266 HF/VHF/UHF Digital Ant Analyser

Covers HF, VHF, plus UHF amateur & commercial frequencies with digital precision. Also displays SWR, Complex Impedance, & Impedance magnitude simultaneously - all on the same easy-to-read LCD screen. Use it to measure Capacitance, Inductance, Field Strength, Frequency & generate test signals. Fine tune stubs, analyse coax, test baluns & RF transformers, and perform many other important RF-related tasks around the shack

£329.95 c SPECIAL!

MFJ-269PRO Professional Digital Analyser

Instantly check and tune any antenna from 1.8 to 170MHz and 430-520MHz with this antenna test lab! It measures SWR, return loss, reflection coefficient, match efficiency, RF resistance, reactance, impedance and phase angle of antennas and antenna resonance, and Q. Even determine coax cable loss, velocity factor, length and electrical degrees.

429.95c

MFJ-986 1.5kW 1.8-30MHz ATU

Differential-T Tuner uses a differential capacitor making tuning easier. Broadband coverage ends constant re-tuning. A rugged roller inductor atu that handles 1500 Watts PEP SSB power and covers 1.8 - 30 MHz continuously.

£359.95c

MFJ-269 HF/VHF/UHF Digital Analyser

* Freq Coverage 1.8-170, 415-450MHz
* Frequency Counter * LCD readout
* SWR & impedance or SWR Bargraph
* Coaxial loss meter * VSWR Meter
* Signal Generator * N-socket (Ant), Freq Counter) **£389.95c**

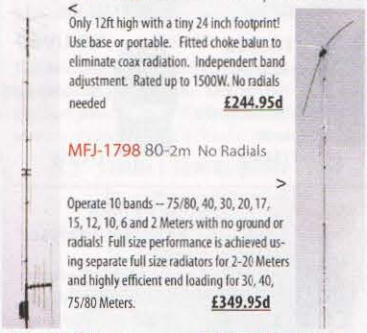
MFJ Vertical HF Antennas

MFJ-259B HF/VHF Digital Analyser

* Frequency Coverage 1.8-170MHz
* Frequency Counter * LCD readout
* SWR & impedance or SWR Bargraph
* VSWR Meter * Signal Generator
* Connectors: SO-239 (Ant), BNC

(Counter) **£289.95 £249.95c**

MFJ-1796 40m-2m No Traps No radials



Only 12ft high with a tiny 24 inch footprint! Use base or portable. Fitted choke balun to eliminate coax radiation. Independent band adjustment. Rated up to 1500W. No radials needed **£244.95d**

MFJ-1798 80-2m No Radials

Operate 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with no ground or radials! Full size performance is achieved using separate full size radiators for 2-20 Meters and highly efficient end loading for 30, 40, 75/80 Meters. **£349.95d**

MFJ-974B 3.5-30MHz Manual ATU 300W

A fully balanced line antenna tuner. Gives you superb current balance throughout a wide matching and frequency range. Handles 300 Watts SSB PEP and 150 Watts CW. ~~£194.95c~~

SPECIAL! **£175.95 c**

MFJ-974HB Same as MFJ-974B but covers 1.8-54MHz.

~~£199.95~~ £189.95 C

MFJ-9982 1.8-30MHz 2.5kW Manual ATU

Continuous Carrier atu handles 2500 Watts continuous carrier output on all modes and all HF bands into most unbalanced antennas -- even on 160 Meters where even the best atu's fail! 6-position antenna switch, 4-core balun, dummy load, true peak/average lighted SWR/ Wattmeter, 6:1 reduction drives with detailed logging scales, 3-digit turns counter

£684.95c

MFJ-263 300W Load DC-3GHz

NEW

DC-3GHz with N socket. Handles 125W continuous and 300W for10 secs.

MFJ-263 b £99.95 b

MFJ-251 Calibrator Load

NEW

This 300W load lets you switch 6.6, 25, 50, 100 or 150 Ohms to provide 1:1, 2:1 and 3:1 VSWRs (high and low impedance) **£TBA b**

MFJ-912

The fanous W9INN 4:1 1.5kW balun is for feeding ladder line via coax cable. Two large insulators for ladder line and SO-239 for coax. loss. **£76.95c**

MFJ-941EK ATU KIT!

NEW

Now you can build your own ATU, have fun and save money!

300W 1.8 - 30 MHz Coax , wire or balanced - includes case. **£145.95c**

MFJ-971 1.8 - 30MHz Portable ATU (QRP)

The MFJ-971 is ideal for portable work and as well as dual ranges of 30W and 300W, it is possible by changing an internal jumper to convert to QRP 6W or 30W FSD. Wire, coax or balanced.

£119.95c

MFJ-941E 1.8 - 30MHz 300W ATU

Here is amazing value. A cross needle meter, antenna selector switch, and the ability to match wire, coax and balanced feed. This makes a great base station gtuner capable of up to 300W and has internal 4:1 balun. 12v illumination **£119.95c**

MFJ-993B IntelliTuner Auto ATU 300 W 1.8-30MHz VALUE!

Lets you tune long wire, coax or balanced feed. Features analogue cross-needle meter & LCD display! MFJ's exclusive algorithm gives you ultra fast tuning with 20,000 memories! Beat that! Select 300 Watts for 6-1600Ω matching or 150 Watts for ultra wide 6-3200Ω. Versatile antenna selection and pre-used setups are found in milleseconds! **£279.95d**

MFJ-925 Ideal For IC-7000/FT-857D

This ATU sits nicely under the IC-7000 or FT-857D. A complete automated station that will match any antenna!

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MFJ-929 World's Fastest Compact Auto ATU

200W handling matches any antenna with near perfect VSWR. Get the best from your antenna!

£214.95c

MFJ-991B 300W Auto ATU

Handles 300W, cross needle meter. Wide range: coax, balanced or wire. 300 Watts matches 6-16000 hms, **£214.95c**

MFJ-998 1.5kW Auto ATU

Highest power model matches coax, balanced feed - fast tuning. Cross needle metering & LCD display.

£659.95d

1.5kW Handling Power!

MFJ-998RT 1.5kW Remote Auto ATU

MFJ's 1500 Watt remote automatic antenna tuner is built into a weather-tight ABS plastic cabinet top with a stainless steel bottom. Includes MFJ-4117 BiasTee Power Injector to send DC/RF down the coaxial line. When you key your transmitter, MFJ's InstantRecall checks to see if that requency has been used before. If so, tuning is instantaneous. Measures 13 3/4W x 6 3/4H x 17 1/2D inches. It's the true fit and forget Auto ATU for those using linear amplifiers. **£779.95d**

MFJ-994BRT 600W Remote Auto ATU

As you're ragchewing, contesting or DXing, your MFJ IntelliTuner is learning! to operate in milliseconds! We've made this tuner to suit the UK market, so that those with linear amplifiers can enjoy the benefit of auto ATU. Includes coax DC feed. **£449.95d**

MFJ-993BRT 300W Remote Auto ATU

The Remote IntelliTuner is mounted in a durable hard plastic case. Covers 1.8 to 30 MHz, has heavy duty 16 Amp / 1000 Volt relays and a highly efficient L-network. It also includes the MFJ-4117 BiasTee Power Injector to send DC/RF down your coax.

£329.95d

MFJ-926B 200W Remote Auto ATU

MFJ-926B Automatic Antenna Tuner covers the entire HF band and will match a random wire or coax-fed antenna 1.8 - 30 MHz at a full 200 Watts SSB/CW. Matches impedances 6-1600 Ohms (SWR up to 32:1). **£299.95d**

MFJ-927 200W Remote Auto ATU

Weather protected remote auto tuner for coax/wire ant., includes MFJ-4116 Power Injector. Most MFJ-929 features, no LCD/buttons. This is a low cost ATU that will get you on all HF bands using just a single wire. **£259.95d**

REMOTE CONTROL FOR YOUR TRANSCEIVER

NEW

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RBC-212 is an another exclusive product to come from W&S. It enables you to remotely control you radio via DTMF tones from phone. or PC Using the telephone you can fully control the radio, antenna switching and even rotator. And of course the audio goes both ways. Price and details shortly.

MFJ-945E 300W 1.8-50MHz Coax ATU

If you are looking for a wide range ATU that will handle quite high VSWRs, this is just the job. Just place between transceiver and your coax line to get a perfect match. It will handle up to 300W and it's cross needle power/VSWR metering has ranges of 60W and 300W. Can be used for base or mobile use **£134.95c**

MFJ-949E 300W 1.8-30MHz ATU with Load

SPECIAL!

More Hams use the MFJ-949E ATU than any other model. Match any antenna. Wires, coax, balanced, plus 8-way antenna switch Large 3" cross needle and internal dummy load. ~~£199.95~~ **£179.95c**

MFJ-260C 300W Dummy Load to 70cms

Every station should have a dummy load for testing and adjustment purposes. This one is our top seller and is available with SO-239 (C) or N (N) type sockets. It will handle up to 300W of power. **£45.95c**

MFJ-976 1500W Balanced Manual ATU

The MFJ-976 is a 1500 Watt balanced antenna tuner. You get superb balance, very wide matching ranges & continuous 1.8-30 MHz coverage including all WARC bands! It handles a full 1500 Watts SSB and CW.

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RadCom

THE RADIO SOCIETY OF GREAT BRITAIN'S MEMBERS' MAGAZINE

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Notices to readers concerning errors and omissions and advertisments can be found at www.rsgb.org/radcom/notices/

RadCom is published by the Radio Society of Great Britain as its official journal and is sent free and post paid to all Members of the Society. **The December edition of *RadCom* is expected to arrive with most Members by 22 November, although this can take up to a week longer in some cases; international deliveries can take longer still.**

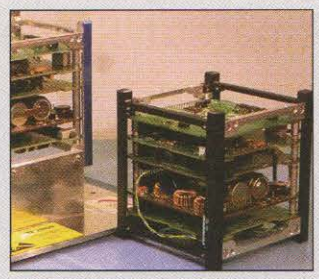
Layout and design by Kevin Williams. Original concept by Imotea Creative Mediadesign.

The online *RadCom* is at www.rsgb.org/news/radcom/

News and Reports

Reviews

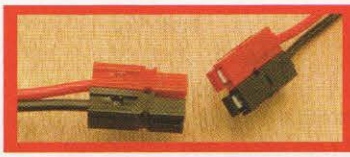
Technical Features



Cover image: The FUNsat satellite

Photo: AMSAT-UK.

Features



Heavy duty DC connections – P40

Regulars

Ofcom Amateur Radio Licence Review

Early views sought by Ofcom from the RSGB

Paul Jarvis of Ofcom addressed the National Hamfest on 27 September and explained the background to the Licence Review. He covered the reasons why the review was being undertaken and emphasised that it was not intended to be a radical change, but that the Licence Review was geared to be more explicit with regard to the wording of some of the existing clauses, on operational practice and to help extend the services available to amateur radio to encourage development of modern technologies. He explained that his workload and staffing meant that he would not be able to enter into general discussions on the likely topics prior to the consultation. He did, though, stress that Ofcom was working with the RSGB as part of the pre-consultation preparation and invited the RSGB to feed back general comments on the topics that he raised.

Ofcom announced areas where it was considering improving the clarity of the current licence and changes to improve both their management of amateur licensing as well as progression through the licence structure. To assist Ofcom prepare for its consultation the Society is to run several Litmus Tests over the next few months to provide feedback to Ofcom prior to their setting up of its consultation questions. The RSGB has just launched the first two Litmus Tests, one on Ofcom's interest of moving to a single licence per station and another on the subject of the Regional Secondary Locator in our callsigns.

As in previous Litmus Tests, a dedicated online forum has been created on our website. For each subject, a draft response to Ofcom has been prepared for people to modify and improve through online discussion. Opinions and views will no doubt vary, but the Litmus Test process may be able to identify a consensus on each of the subjects under discussion, and this will be captured by updating the discussion document. At the end of this process this final draft will be passed to Ofcom as a pre-consultation input from the RSGB to help Ofcom frame its consultation approach.

All Members are invited to participate in the Litmus Tests on these two subjects, which can be accessed at www.rsgb.org/licencereview/. For those without access to the internet, or who do not wish to participate in the Litmus Test but wish to make an input, written comments can be submitted to me directly: Graham Coomber, G0NBI, General Manager, RSGB, 3 Abbey Court, Priory Business Park, Fraser Road, Bedford MK44 3WH.

Graham Coomber, G0NBI
RSGB General Manager

GB2RS Manager Retires after 35 Years

After 35 years of unbroken service, Gordon Adams, G3LEQ is to retire from his position as GB2RS manager.

GB2RS has always been a much valued part of the RSGB news service and every week nearly 100 volunteer newsreaders give of their time to broadcast to all parts of the UK. The service will continue to play an important part within our information and publishing portfolio. The RSGB has special dispensation from Ofcom to broadcast the news within a defined remit and the role of the manager is to recruit volunteers, organise the volunteer rota and ensure that broadcasting standards are maintained.

Applicants can live in any part of the UK since the work is carried out by e-mail and telephone, but should be prepared to travel occasionally to RSGB events.

Applications should be sent by email to graham.coomber@rsgb.org.uk by 8 November 2013. As part of their application, candidates are invited to say how they see the service developing.

IET Meeting

The RSGB is running a joint meeting with the Institution of Engineering and Technology (IET) on Thursday 5 December. As the IET's Savoy Place venue is undergoing a major refurbishment the meeting will be held at Imperial College (Room 308, Huxley), between 6.30pm and 9pm. The meeting is open to all and attendance is free, including the tea and biscuits. To assist us in organising the event we ask that you indicate your intention to attend, online, by the end of November (http://rsgb.org/main/about-us/rsgb-centenary-2013/). The meeting is being run in conjunction with the IET's History of Technology Network. It is a part of our Centenary Events programme that reaches out to the professional science and engineering community, and is the concluding Centenary Event of the year. We hope, therefore, for a good turnout from our Membership as well as professional engineers, etc, interested to learn more about the amateur contribution past, present and perhaps in the near future, to radio communications.

The meeting will comprise two lectures. Peter Chadwick, G3RZP, will deliver the first on the subject of amateur radio technology and its application over the past 100 years. The second talk, being compiled from contributions by various experts within the amateur community, will look to the future and consider how amateur radio may develop in the first decade, or so, of our next 100 years. Further information on the meeting is available on our website.

Donation to RCF

John Side, 2E0ALH, an exam instructor from the Sandwich White Mill exam centre in Kent, recently visited RSGB HQ with colleagues Sam and Darren. They brought with them a donation for the Radio Communications Foundation (RCF). The RCF is a Registered Charity set up by, but independent from, the Radio Society of Great Britain. Its main aim is to create a fund that can be used to support initiatives to bring radio communications into the classroom, universities and any place where hands on public demonstrations can make a difference to the understanding of the magical world that is radio communications. The Foundation's strategy of bringing the benefits of radio to young people and encouraging the use of technology guides its work.

QSL Matters

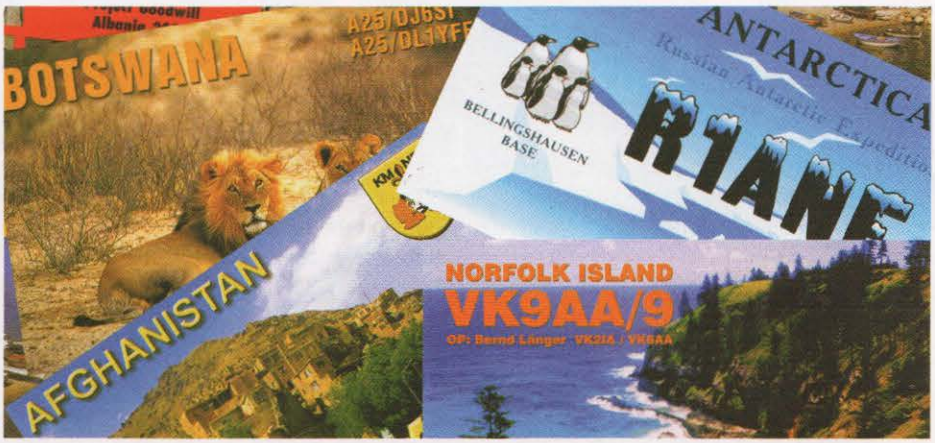
Newark Hamfest always makes for a very busy time for the bureau. It's a great chance to put faces to callsigns and answer queries and we collected some 20,000 cards from Members. Each year we like to set visitors a challenge, so we asked visitors two simple QSL questions from the *RSGB Yearbook*, each with 3 possible answers. Most pleasingly, 98% already knew the correct size for a single page QSL card (140 x 90mm) and that it should ideally weigh less than 4g (around 2-3g is good). But, sadly, almost 30% of incoming cards didn't reflect this.

Many were surprised to see our display of cards, some weighing up to 18g and, as one visitor rightly commented, "*sending cards like that costs everyone*".

Our theme this year was all about responsible QSLing. In particular, we wanted to encourage large card generators, such as GB stations and DXpedition groups, to consider following the example of G100RSGB and create their own Online QSL Request System (OQRS). Many Members have already requested their G100RSGB cards online without the need to send a card. OQRS can save any group or active amateur time, money and many wasted cards.

Here's our simple guide for more responsible QSLing:

- Ask new contacts, "If I send you a QSL card, do you collect and how?" every time.
- If you don't QSL, be polite but honest during your contact, "thanks but no thanks" is all it takes.
- Please don't say you QSL when you don't, or ignore the other guy's kind offer, otherwise cards will be sent.
- GB Stations, Special Events, DXpeditions or individuals, use *Club Log*. Create an OQRS that allows you to confirm a contact and respond quicker to those that really want your QSL, with a real card either via the bureau or direct. It saves time and money as well as cuts waste. See www.clublog.org.
- Please make your QRZ.com QSL details very clear, at the top of the page. Keep the details up to date.
- QSL Direct 'via' calls can be confusing. At QRZ.com print a via address. It reduces uncollected bureau cards from arriving.
- Please always collect your incoming cards even if you don't reply. It only costs a stamp, so please support our volunteers by being responsible for the cards your QSOs generate.



Co-option of new Director

The RSGB Board has invited Steve Hartley, G0FUW (Chairman of the Training and Education Committee) to be co-opted to the vacant, directly elected member vacancy. Steve will join the Board at the November meeting. As noted in last month's *RadCom*, applications for this vacant post – and that of President – will be invited in next months' *RadCom* for decision by the Membership at the AGM in 2014.

Nominations Committee

The Board have appointed Stewart Bryant, G3YSX to serve on the Nominations Committee. This committee is required to consider and submit to the Board names of candidates to be endorsed as Nominated Directors by the Membership in secret ballot at or prior to the AGM.

The other members of the committee are Rupert Thorogood, G3KKT (chairman), Graham Murchie, G4FSG (ex -officio as chairman of the Board), John McCullagh, GI4BWM and Mark Harper, MW1MDH.

Ofcom CB Consultation

Ofcom has published proposals to amend current arrangements for Citizens' Band (CB) radio in the UK, to allow the use of a wider range of transmission standards. Ofcom is proposing to allow the use of amplitude modulation (AM), double sideband (DSB) and single sideband (SSB) transmission standards on CB radio, which will bring the UK in line with other European countries. The consultation will close on 8 November 2013. Details are at http://stakeholders.ofcom.org.uk/consultations/citizens-band-radio/?utm_source=updates&utm_medium=email&utm_campaign=citizens-band-radio

CONGRATULATIONS

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

60 years

Mr E W G Allen	G3JHP

50 years

Mr P W F Darragh	G3MNV
Mr W H Hall	G3RMX
Mr J M Walch	G3RVI
Mr J J Bottom	G3SDG
Mr R S Hewes	G3TDR
Mr D T Legg	G3TFZ
Mr E Ross	G3TJC
Mr D G Mason	G3USD
Mr P D Hall	G4AQA
RAIBC - The charity working for RA with disabilities	G4IBC
Mr G R Smith	G8AOJ
Mr L L Williams	G8AVX
Mr H A Sinclair	GI4GOS
Mr S Hulme	GW3SRM
Mr S B Harrison	RS20102
Dr W G Kirchner	VK7ZK

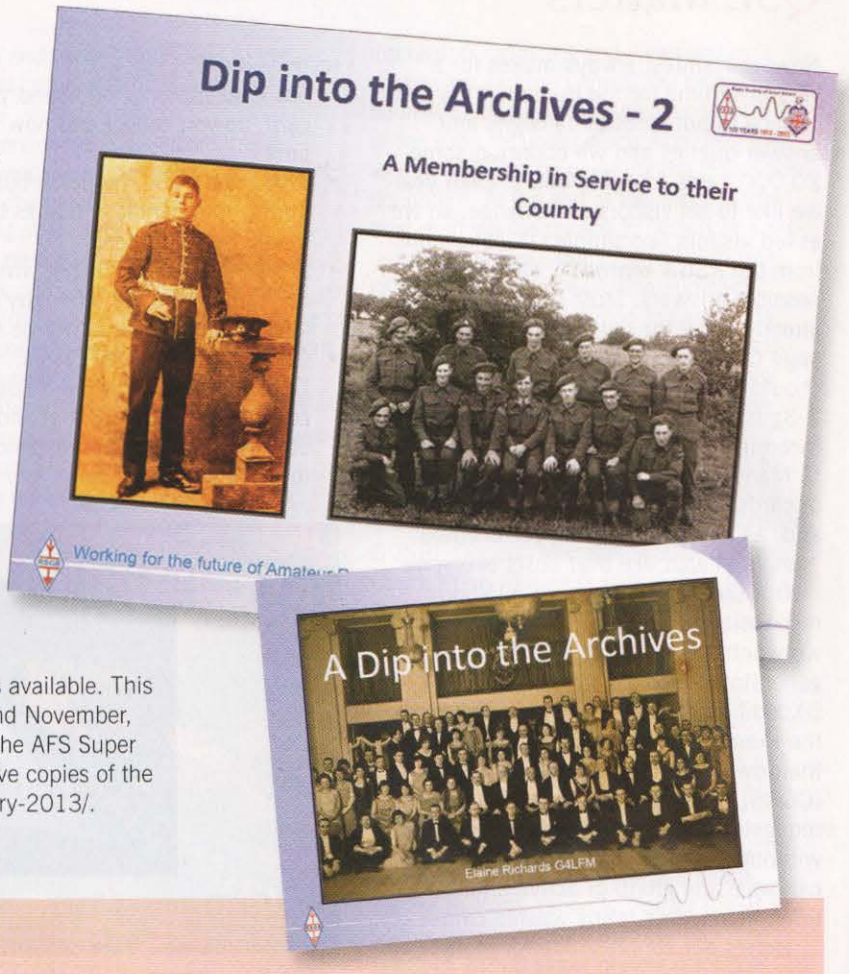
Instant Club Talks

The RSGB has four talks based on its archive collection available to radio clubs. Each talk is complete with a PowerPoint presentation and script that can be delivered by any club member. They were created for events such as the Centenary Day and Centenary Convention. The topics available are:

- Dip in to the archives 1: A look at some of the stories found in the archives.
- Dip in to the archives 2: The radio activities of RSGB Members in WWI and WWII.
- Dip in to the archives 3: 100 years of amateur aerials
- Dip in to the archives 4: The transatlantic tests of the 1920s.

The talks take about 30 – 40 minutes to complete.

If you are interested in downloading these presentations, please e-mail elaine.richards@rsgb.org.uk.



Contest Committee

The latest edition of the Contest Committee newsletter is available. This edition contains details on RSGB contests for October and November, other contests in October, recent results and reports on the AFS Super League and Club Calls Contest. You can register to receive copies of the newsletter at http://rsgb.org/main/about-us/rsgb-centenary-2013/.

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.

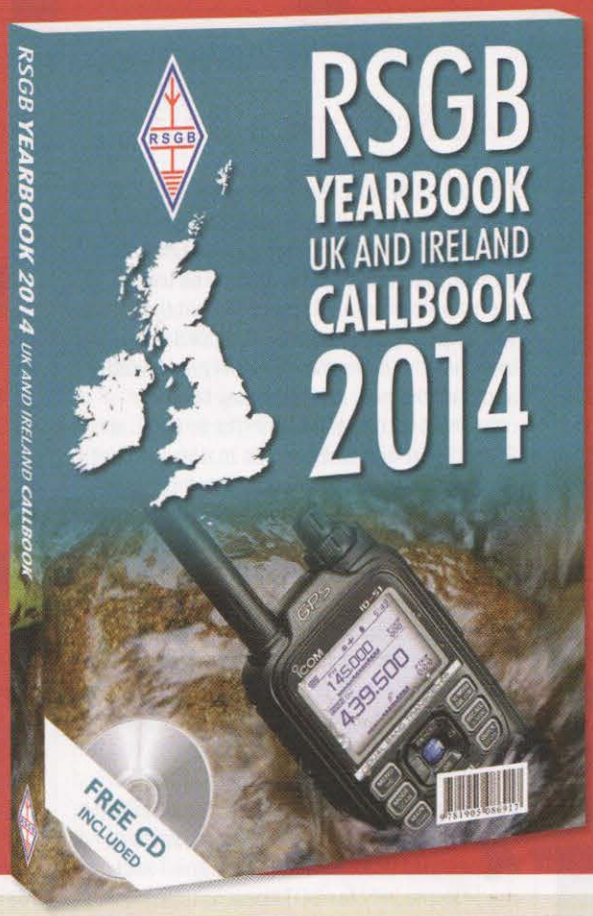
Mr R Crompton, 2E0BWF
Mr A Davies, 2E0CVF
Mr J Clark-McIntyre, 2E0JCM
Mr S Curtis, 2E1CJF
Mr D Wilson, 2EIGVY
Mr J Munro, 2M0FAD
Mr IR Jones, 2W0NNN
Mr J Mooney, G0ANM
Mr C De Lacy, G0TSQ
Mr C M Barry, G1DLS
Dr D Martin, G1YEV
Mr M Castle, G1ZUN
Mr D Fenton, G4MIH
Mr M D Taylor, G4OMT
Mr R Furniss, G7FBY
Mr G Jarrett, G8NDB
Mr W Dick, GM8MMW
Mr L Ward, GW1YBF
Mr O Mittigard, IB4CD
Mr T Tyson, KQ2I
Mr D Mills, M0HCN
Mrs L Lanson, M0SWG
Mr M Lorendwicz, M0WRO
Mr L Mason, M1AJA
Mr N Loughran, M3OYQ
Mr N Barnard, M6CPP
Mr J Richards, M6CTZ
Mr J Parsons, M6CUJ
Mr D Richards, M6CUL
Mr I Lonsdale, M6DFT
Mr A Arnold, M6DIH
Mr B Hodgson, M6DKF
Mr C Cowen, M6GLX
Mr J K Durey, M6JEK
Mr M Davies, M6JUZ
Miss C Meredith, M6MUP
Mr O De Payer, M6ODP
Mr R Cole, M6RDC
Mr S Priestley, M6STZ
P Bacon, MM0PRB
Mr D Hibberd, MM3ZRZ
Mr J Littlewood, MU6GCI
Mr F Ibsen, OZ1BCL
Mr P Tas, PA1TAS
Mr C Robson, RS207162
Mr A Williams, RS213072
Mr S Levsen, RS213851
Mr M Atkinson, RS214460
Mr M Cadman, RS214529
Mr Z Mead-Mason, RS214549
Mr D Pollock, RS214565
Mr S Dunning, RS214594
Mr R Prakash, RS214595
Mr J Smith, RS214611
Mr J Emery, RS214620
Mr C Phillips, RS214625
Mr J Bracegirdle, RS214628
Mr D Jones, RS214631
Mr I Duff, RS214633
Mr J J Johnson, RS214645
Mr E J Sharwood, RS214646
Mr O Jones, RS214663
Mr H Hodgkins, RS214668
Mr M O'Donovan, RS214670
Mr I Bevan, VK3FIAN
Mr L Wells, VK7WL

Apologies to both Peter Garratt, M0HJQ and Alan Lock, M0FBM whose names were missed from previous lists due to an admin error.

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

Mr B J Grice, 2E0BCD
Mr G A Cochran, 2E0BKS
Mr C Price, 2E0BMA
Mr N P Deery, 2E0NAP
Mr T Jones, 2E0TJX
Mr W P Curry, 2I0ETB
Mr D Bragg, G0AGW
Mr S C H Withnell, G0AIN
Dr A J Gilfillan, G0FVI
Mr P Halsall, G0HXD
Mr M R Frost BSc(Eng), G0IDH
Mr B B Smith, G0IER
Mr K C Blackburn, G0LUU
Mr G Bromfield, G0MIT
Mr H W Cox, G0OBH
Mr N D Swan, G1BLO
Mr A Wagstaff, G1KBJ
Mr S Gent, G1VQV
Mr A Hodkin, G1YLG
Mr B S Atkinson, G3GSI
Mr H Martin, G3JDO
Mr W H Bones, G4CFP
Capt R Towle, G4IWJ
Mr J Hall, G4LGX
Mr D J Womack, G4TNY
Mr P Croucher, G4YPC
Mr P J Randell, G6HKH
Mr D Hallifax, G6NRH
Mr M S V Biddulph, G7CGB
Mr F W Martin, G7GQP
Mr A Lord, G7HNG
Mr V Kingsley, G7LWN
Mr G R Strange, G8IWJ
Mr P G H Jackson, G8XLV
Mr D Hebenton, GH4API
Mr R C Rainey, GI0RBS
Mr M L Park, GM0MXP
Mr A Ward, GW0PZU
Mr I C Dudley, GW3YRP
Mr D Owen, GW6LHF
Mr S E Hamran, LA9MW
Mr P A Bradbeer, M0CVX
Mr I Uslu, M0DOQ
Mr R Powell, M0DSK
Mr P R Munson, M0KEF
Mr W J Welch, M0TDF
Mr P McDonough, M0TXR
Mr G J Griffiths, M1AIU
Mr J P Dooley, M3DOO
Mr M S Chancellor, MI0BDZ
Mr B Hansen, OZ2M
Mr G Liljegren, W4GAL

RSGB shop



P&P FROM FREE
see page 80 for full details

NEW

E&OE All prices shown plus p&p

RSGB Yearbook 2014

Edited by Mike Browne, G3DIH

The *RSGB Yearbook 2014* contains all of the usual features, from over 81,500 amateur radio licences on issue, to the pages of the very latest amateur radio information, making this book the indispensable guide for every amateur.

The *RSGB Yearbook 2014* is much more than the latest update of callsigns. You will find all manner of local information organised into regions so you can find local clubs, repeater and emergency groups, and examinations in the area alongside details of the RSGB Regional Manager Team. There are details of how the Society is organised, the services it offers, committees, who to contact for assistance, etc. There is a wide range of information included from Repeaters, Beacons, HF Propagation Predictions for 2013, Special Event stations, Features on National Affiliated Societies and much, much more.

As every year, the *RSGB Yearbook 2014* provides the very latest Ofcom callsign data, now sorted into those who release their personal details for amateur radio purposes and those who don't. The callsign data is then sorted further into postcode, surname formats. There are also listings of special contest callsigns, permanent special event callsigns and those in the Republic of Ireland.

FREE CD
Some buy this book for the CD alone, not only do you get all of the information section of the yearbook in a fully searchable format you also get, over 600MB of bonus material. There are samples of RSGB books, masses of amateur radio software, extra club information and more, all in an easily accessed formats.

210x297mm 528 pages
ISBN: 9781 9050 8691 7
Non Members' Price £19.99
RSGB Members' Price £16.99

Features:
- Over 81,500 UK callsigns
- Irish callsigns
- Callsigns sorted by name and postcode
- Licensing Information UK and International
- National and Featured Club Information
- Prefix Lists
- Latest Band Plans
- Award and Contest Information
- Technical Help
- And much more

MEMORY STICK - LIMITED EDITION ECO VERSION

For those who want the *RSGB Yearbook* in an easy to use format we are pleased to offer it on a USB memory stick. This new limited edition Eco version of the book is cased in bamboo and measures 60x20mm. It also saves the space and paper associated with the printed version. This isn't all though as the memory stick is based on the popular *RSGB Callseeker* so includes calls from all of Europe as well.
All the information pages are included along with a host of amateur radio software. There is even space spare to save extra items if you want to.

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Antenna healthcare

Often premature antenna failure is a result of feed point enclosures that are not vacuum sealed. RubbaSeal provides a water-tight protective barrier right up to and including your feedpoint. ConductaSeal is conductive grease loaded with aluminium particles for maximum conductivity and no dissimilar metal issues. It ensures maximum life and performance from any aluminium based, multi-section antenna with overlapping joins. This anti-oxidising formula prevents joint lock-up and repels water too!
Both these products are available from InnoVAntennas (www.InnovAntennas.com).

Inflatable antenna

MIT reports that researchers led by Alessandra Babuscia have developed a new design of antenna for small satellites known as CubeSats. She is part of the research group of radio amateur Professor Sara Seager, KB1WTW and that also includes graduate student Mary Knapp, KB1WUA.

The new inflatable antenna may significantly increase the communication range of these small satellites, enabling them to travel much farther in the solar system: the team has built and tested an inflatable antenna that can fold into a compact space and inflate when in orbit. It is claimed the distance that can be covered by a satellite with an inflatable antenna is seven times farther than that of existing CubeSat communications.

Students build a 3U CubeSat. Image courtesy NASA.

ML&S open day

The ML&S Hog Roast & Open day is on 30 November 2013. Doors open at 8am and there will be bacon butties for early morning arrivals, free flowing tea & coffee as well as a monster hog roast. Martin says that there will be plenty of special Christmas deals too. He tells us he and his team are excited about all the new products they have on offer, in particular the CommRadio CR-1 and Radio Sport headsets, which make excellent Christmas presents! The full range of Yaesu, Icom, Kenwood, Flex and other major products will be on hand with demonstrations by the distributors themselves. The day finishes at 4pm. See www.MLandS.co.uk.

Antenna cords

Portable radio specialist SOTAbeams has announced two new products. Stealth Cord is a thin woven nylon cord that consists of a green and brown weave. Designed and made especially for SOTAbeams it has been formulated to have low visual impact, making it hard to see. This makes it ideal for stealth antennas. At the other extreme, they have also introduced a 'hi viz' cord made that is designed for use on busy hilltops or in emergency situations where safety of the public is important. Both products are available in their web store at www.sotabeams.co.uk. SOTAbeams has also moved to new industrial premises in Paradise Mill, Macclesfield. The mill itself is a major tourist attraction in the area, housing an authentic weaving floor with 26 working Jacquard looms.

DXpedition

The Swaziland 3DA0ET DXpedition is scheduled to run from 18 to 27 November. There is a multi-national team comprising British, Canadian, American, German and South African operators, who collectively bring a wealth of prior DXpedition experience to the table covering all operating modes. There will be 12 operators plus one pilot running 4 stations, covering all the HF bands (10 to 160m) and 6m as a secondary goal if there are any openings, using CW, SSB and RTTY. On the topic of RTTY, they hope to be a little different to many DXpeditions and have a solid focus on maximizing the RTTY QSO count by having a dedicated full-time RTTY station on the air from start to finish. The two main RTTY ops will both be from BARTG! Chris, G8OPB and John, GW4SKA have both been accepted as members of the team. So, if you need Swaziland on RTTY, be sure to look for 3DA0ET because they will be looking for the UK especially.

Scottish Microwave Round Table

The Scottish Microwave Round Table will take place on Saturday 2 November at the Museum of Communication, Burntisland, Fife KY3 9AA. The event will include talks of technical and operational microwave interest as well as a construction competition. Doors open at 9.30 for a 10.30am start. Admission is £10. Numbers are limited so registration is required at www.rayjames.biz/microwavert. A Dinner will take place in the evening. Full details are available on the website.

Successful open day

At the W&S Open Day, *PW* Editor Rob Mannion cut the ribbon (a length of balanced feeder!) shortly before his retirement. A good range of visitors both local and distant (Preston, Towcester, Malaysia...) had an enjoyable day in fine weather with lots of bargains. The event was supported by Icom, Kenwood, Yaesu, bhi, Innovantennas and RSGB (Mark Sanderson) plus Essex CW Club, CARS, etc.

NEWS IN BRIEF

After World War I, an amazing period of radio exploration took place. Amateurs all over the globe soon learnt that far from being useless, 'short' wavelengths seemed to allow communication over long distances. The first ZL to VK QSO in April 1923 and, the ultimate, Frank Bell Z4AA's QSO with Cecil Goyder, G2SZ in London on 18 October 1924.
To commemorate the 90th anniversary of the record breaking activities of these early pioneers of amateur radio, ZM90DX will be on the air between 1 October 2013 and 31 October 2014 on all bands from 1.8MHz to 1.2GHz and beyond, in all modes. In the spirit of those early pioneers the ZM90DX operators will also be calling CQ on bands and in directions one may not necessarily expect, with the intention of exploring the boundaries of radio propagation. See www.zm90dx.com/.

Centenary Matters

CENTENARY STATION. The North Wales operation went out with a flourish, with Stewart, GW0ETF's 3 day operation from Bangor at the beginning of September, making a total of 3,187 contacts. Just over a third were on 20m, with a large count on 15m and 40m, but also a good showing on 17m and 30m – and a few contacts on 2m, 80m and 160m. In planning his operation, Stewart looked closely at previous operations from the Region and decided to try and fill some of the gaps, such as CW and RTTY. Stewart commented, "There were some tremendous pile-ups at times and I was amazed at the numbers of JAs that were calling throughout the whole 48 hours". Stewart also fulfilled one of the objectives of the Centenary station, which was to try something new. Stewart commented to me that, "in the spirit of learning all the time I had fun with my first go at RTTY at the sharp end; worked really well with *Wintest/MMTTY* after a few minor problems with the PTT". Stewart used a K3/Acom 1000 amplifier with a 30m doublet for 30/40/80m, a quarter-wave vertical for 40m and a Cobweb for the HF bands.

Despite there being fewer clubs in the region, with the help of others from nearby doing portable operations in North Wales, the spirit of the Centenary station was maintained during the month. Mark, MW1MDH, RSGB Manager for North Wales, did a great job organising the region's activity and even had some fun of his own, as can be seen in his write-up on page 72.

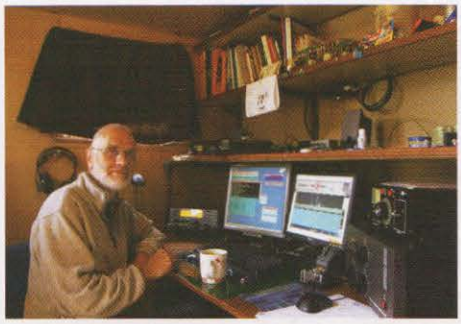
The QSO total for the Centenary station at the end of the North Wales operation stands at 94,480, with nearly two thirds of the contacts on SSB and about a third on CW. So far, South West England & the Channel Islands hold the lead for the highest number of contacts at 16,939. North West England and North Scotland and the Northern Isles were within 30 QSOs of each other at just under 12,000 contacts each, followed closely by North East England. Looking at the most popular modes South West England & the Channel Islands have so far made the most SSB and data contacts, North Scotland and the Northern Isles have the most CW contacts and North West England the most FM contacts. And there is still more than two months left of operation by the time you read this.

Anyone following the station will not be surprised that 40m has been the most active band, but the other HF bands have also been quite busy pulling in some of our many overseas Members, as well as thousands of others around the world wanting to contact the station. On 6m and above, activity has been more muted by comparison, but even there just over 4,600 contacts have been made with small numbers on the microwave bands that include moonbounce contacts.

At the time of writing, toward the end of September, Martin, G4ENZ leads the UK Leaderboard, closely followed by Peter, G3SJX and John, G3LZQ in terms of Region/Band contacts with the Centenary station. Apart from the competition at the top of the Leaderboard, it is pleasing to see that there are 200 listed who have achieved 13 Region/Bands or more.

JOINT MEETING WITH THE IET. As mentioned in last month's article we are running a joint meeting on Thursday 5 December with the Institution of Engineering and Technology (IET). As the IET's Savoy Place is undergoing a major refurbishment the meeting will be held at Imperial College (Room 308, Huxley), between 6.30pm and 9pm. The meeting is open to all and attendance is free, including the tea and biscuits. To assist us in organising the event we ask that online registration is made by end-November to indicate your intention to attend (see URL below). The meeting is being run in conjunction with the IET's History of Technology Network. It is a part of our Centenary Events programme that reaches out to the professional science and engineering community and is the concluding Centenary Event of the year. We hope therefore for a good turnout from our Membership as well as professional engineers, etc, interested to learn more about the amateur contribution past, present and perhaps in the near future, to radio communications.

The meeting will comprise two lectures. Peter Chadwick, G3RZP will deliver the first one on the subject of amateur radio technology and its application over the past 100 years. The second talk, compiled from contributions by various experts within the amateur community, will look to the future and consider how amateur radio may develop in the first decade, or so, of our next 100 years. Further information on the meeting is available on our website.



Stewart, GW0ETF operated GW100RSGB during a 3 day operation from Bangor.

CARRYING THE CENTENARY SPIRIT FORWARD. A number of people have commented to me during the year, obviously enthused by the various activities and events, as to how we are planning to follow our Centenary year. Indeed, I've been asked by the Board to come up with some suggestions! I can't claim credit for all of the activities and events as it has been very much a team approach to come up with ideas, and then develop and deliver all of the Centenary fun. Beyond doubt, the Centenary station has been hugely enjoyed by those both putting on the stations and by those chasing. Looking forward to 2014 and beyond I will be delighted to receive some thoughts as to how we can kick-start our next century. The Board meeting to consider this is mid-November, so I would be grateful for ideas via e-mail to the above address by early November. As my mailbox may get quite busy as a result, please understand that I may not enter into correspondence, apart from acknowledging receipt of all contributions.

DONATION. At the recent National Hamfest in Newark, the RSGB was given a donation towards the costs that G100RSGB QSLing. The Member concerned has really enjoyed contacting the various stations and felt this could be a token of his appreciation. Although we expect the costs involved in the QSLing of G100RSGB to be small, we appreciate both the donation and the sentiment behind it. It's good to know that Members have enjoyed the activity the G100RSGB has provided – and there's still almost 3 months to go.

WEBSEARCH

Joint IET/RSGB Centenary meeting: follow link on http://rsgb.org/main/about-us/rsgb-centenary-2013/

Leaderboard: Put your call sign into the "Am I in the Log" at http://rsgb.org/main/operating/centenary-station/centenary-station-spots-log-and-qsls/, and scroll down the resulting page to the Leaderboard

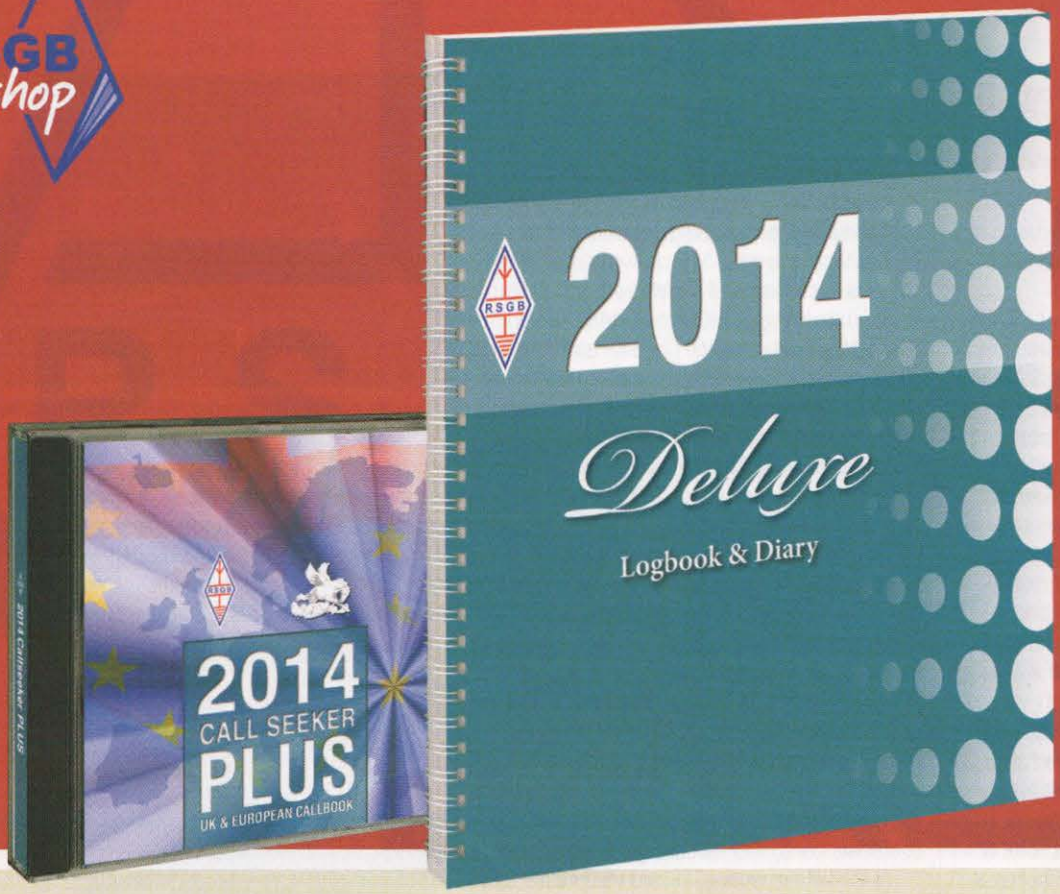
STATION CALENDAR FOR NOVEMBER

Region 5: West Midlands, G100RSGB	
31st Oct – 1st Nov	Wythall RC
2nd – 4th Nov	Cheltenham ARS
Region 1: Scotland South and Western Isles, GM100RSGB	
5th – 6th Nov	Falkirk ARC
7th – 8th Nov	CASHOTA
9th – 10th Nov	Stirling & DARS
11th – 13th Nov	West of Scotland ARS
14th – 15th Nov	Greenock and District Scouts & Guides ARC
16th – 17th Nov	Cockenzie and Port Seton ARC
18th – 20th Nov	Lothians RS
21st – 22nd Nov	Livingston & DARS
23rd – 24th Nov	Wigtownshire ARC
25th Nov	RSGB Region 1 Team
26th – 28th Nov	
29th – 30th Nov	Kilmarnock and Loudoun ARC

RSGB shop

P&P FROM FREE
see page 80 for full details

NEW



E&OE All prices shown plus p&p

Callseeker Plus 2014 CD -

The *RSGB Yearbook* is duplicated in the *Callseeker Plus 2014*. Just like the Yearbook it contains the most up-to-date listings of United Kingdom and Republic of Ireland amateurs' callsigns but you will also find comprehensive coverage of callsigns from across Europe.

You will find all the pages of the information section from the *RSGB Yearbook* are included in an easily searchable PDF. The CD also boasts a host of "extras" from across Europe, including hundreds of mega bytes of useful amateur radio software.

Callseeker Plus 2014 is user friendly and takes up no computer hard disc space as it runs straight from the CD. You can search by callsign, name or location and navigating through the search results is quick and easy. You can print the results in a variety of formats including straight to an address label. *Callseeker Plus 2014* is the ideal way to search for European QSLs from 9A, DL, EA, ES, F, HA, HB9, I, LX, LY, OE, OH, ON, OZ, SM, SP, SV and Z3.

Cheaper than a *RSGB Yearbook 2014* and with more callsigns – what a bargain!

Non Members' Price £16.99
RSGB Members' Price £14.44

RSGB Deluxe Log Book & Diary 2014

With the same design style as the *RSGB Yearbook 2014*, the new *Deluxe Log Book & Diary 2014* is a suitable companion. Not only are the very latest UK band plans included but you will find a useful DXCC prefix list, RSGB QSL Bureau information, RSGB Contest Calendar and information, a locator map, repeaters - pretty much everything you need to know. There is a dia lists of operating abbreviations & codes of activity and, of course, a generous amateur radio station log section for you to record a whole year of your activity.

The RSGB Deluxe Log Book & Diary 2014 includes:

- Current UK band plans
- European locator map
- Prefix guide
- Repeater listings
- QSL bureau information
- RSGB Contest Calendar
- Generous Log section
- 2014 Diary
- Handy lists of abbreviations & codes

Non Members' Price £4.99
RSGB Members' Price £4.24

CALLSEEKER 2014 MEMORY STICK

The Callseeker is now available in and easy to use USB memory stick. This new limited edition Eco version of the *Callseeker CD* is in a 60x20mm bamboo shell, which is a stylish alternative to the CD version. All that is included on the regular *RSGB Callseeker 2014* CD is included here to and there is even space spare to save extra items if you want.

Non Members' Price £16.99
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Radio Society of Great Britain **www.rsgbshop.org**
3 Abbey Court, Priory Business Park, Bedford, MK44 3WH. Tel: 01234 832 700 Fax: 01234 831 496

FUNcube-1

A new spacecraft from AMSAT

BACKGROUND. The first earth orbiting satellite was Sputnik, launched by the USSR in 1957. The first earth Orbiting Satellite Carrying Amateur Radio (OSCAR) was launched just four years later, in 1961. Since that time, more than 70 OSCAR spacecraft have achieved orbit, in addition to more than 30 Radio Sport (RS) satellites from the USSR/Russia [1]. Some ten years ago, a specification was developed for a new, very small, cost effective spacecraft. These are called CubeSats, have a mass of less than 1.3kg and overall dimensions of approximately 100 x 100 x 100mm (called 1U). The idea was to provide a standard to enable university development teams to be able to actually fly their spacecraft at a 'reasonable' cost.

A number of commercial companies around the world have now set up to supply some of the standard parts, subsystems and platforms needed for these missions [2].

These CubeSats can also be produced in double or triple formats; but even the 1U size is capable of providing a reasonable science return within the constraints of mass and volume described – and with less than 1.5 watts of DC power averaged over a typical sun synchronous orbit.

THE FUNCUBE-1 SPACECRAFT. AMSAT-UK has contributed to many of the OSCAR projects in past years, both technically and financially, but have not, up until now, been in a position to create a complete spacecraft themselves. With the advent of CubeSats, coupled with a significant bequest received via the Radio Communications Foundation, this has now become possible and FUNcube-1 is the result.

This 1U satellite has a 70cm to 2m (UHF/VHF) linear transponder and also has a telemetry data transmitter for educational outreach to schools and colleges. It has been designed to create an educational facility, which is intended to enthuse, excite and educate young people about radio, space, physics and electronics. It will also support other educational Science, Technology, Engineering, Maths (STEM) initiatives.

The target audience has been planned to be students at both primary and secondary levels and the project has included the development of a simple and cheap 'ground station' operating on VHF frequencies in the Amateur Satellite Service. This is the already famous FUNcube Dongle SDR receiver [3].

The satellite is intended to operate autonomously in 'educational' mode when it is in sunlight and in 'amateur' mode when it is in eclipse. Educational mode provides a 300mW 1200bps BPSK downlink with some 54 channels of telemetry from the housekeeping system, a Material Science Experiment and nine 'Fitter' messages. Each of these can be up to 200 characters and new messages can be uploaded after launch.

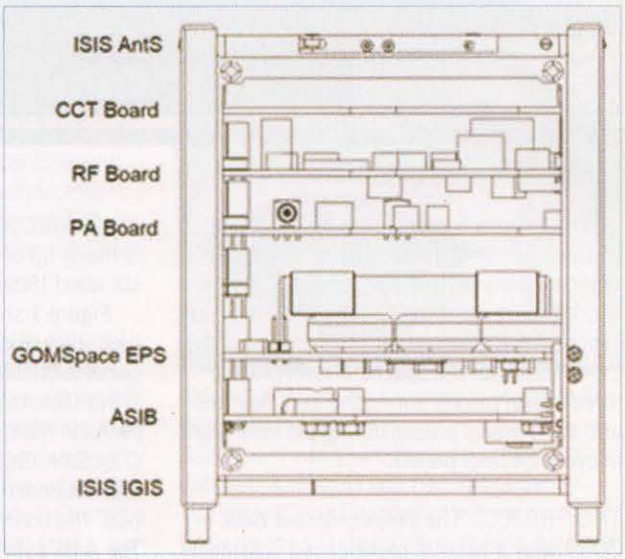

FIGURE 1: The satellite is made up of seven boards stacked into a standard ISIS 1U CubeSat structure.

The telemetry will provide information about

- On board temperatures – both internal and external, to show the effects of solar radiation.
- Voltages and currents flowing from the solar arrays and to/from the battery.
- Specific temperatures from external metal strips that have different finishes to provide an enhanced demonstration of the 'Leslie's Cube' experiment. (One of the traditional demonstrations of how objects emit heat).
- Whole Orbit Data for orbit illumination/ eclipse demonstrations.
- High Resolution data for attitude and spin rate determination.
- More advanced demonstrations relating to antenna radiation patterns and levels of solar radiation. Long term effects of radiation on microcircuits and other subjects would also be possible.
- Integration into the maths and physics curricula at primary and secondary levels.
- Demonstrations of radio communications and the 'Doppler effect' at schools.

When the satellite is in eclipse, ie during local night, when it is assumed that schools will no longer be open, the satellite will switch to provide a 20kHz wide linear UHF/VHF transponder for radio amateurs to use. As the power consumption in this mode is somewhat lower than when in educational mode, this will help the power budget and reduce the depth of discharge of the battery.

FIGURE 2: The first signals will be heard in southern Africa, then the first orbit passes over Antarctica and the Pacific.

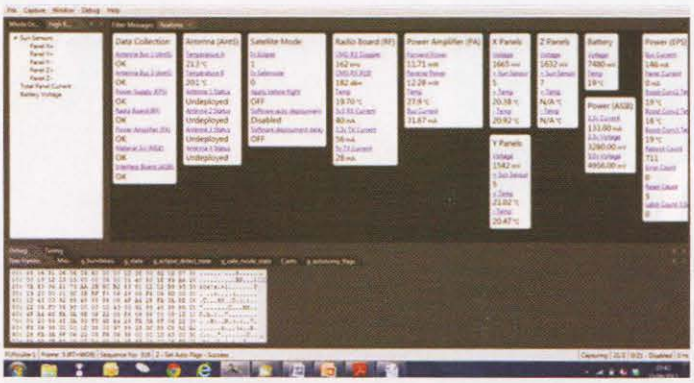

FIGURE 3: The Dashboard display.

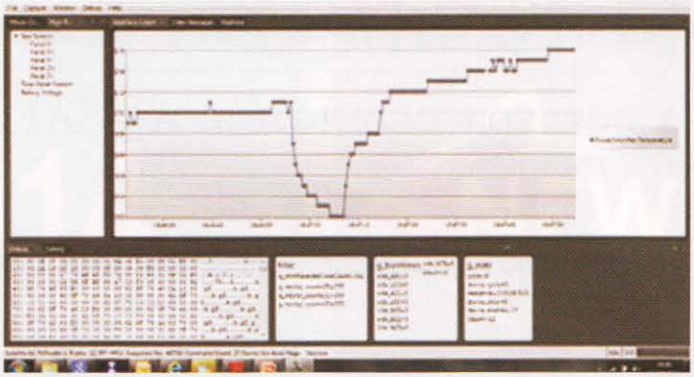

FIGURE 5: A Dashboard display showing a temperature graph

The satellite is expected to be in eclipse for approximately 35 minutes in an orbit of approximately 95 minutes in total. The type of orbit being planned is near a polar near sun synchronous type and, at any location on the Earth's surface, the spacecraft will provide three orbital passes during the local daytime and three orbital passes during the local night in every 24 hour period.

THE PROJECT. The project started back in 2009 with a team of experienced volunteers from AMSAT-UK working in collaboration with AMSAT-NL in the Netherlands. It was agreed that AMSAT would develop and build the specialist sub-systems required and would purchase a number of standard parts to enable a complete spacecraft to be produced as quickly as possible and with the least risk. A contract for the supply of these parts together with the provision of system integration and testing services was signed with ISIS-Innovative Solutions in Space BV who are based in Delft in the Netherlands.

During the project, the team, which comprises less than ten members, has met at 'face to face' technical meetings over weekends on numerous occasions and has held Skype conference calls every Sunday evening for three years. It has also exchanged many thousands of e-mails! In addition, individual team members have made many trips (without cost to AMSAT) to ISIS BV in Delft to make use of their test facilities and we are indebted to ISIS for their support and forbearance. We must additionally thank RAL Space at Harwell who kindly provided thermal vacuum and vibration test facilities to verify the performance of the FUNcube-1 Engineering Model.

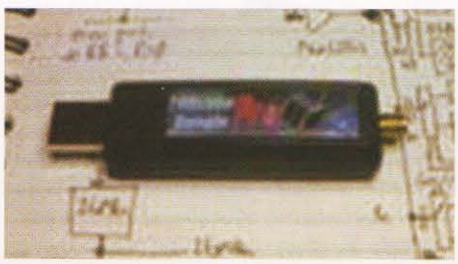

FIGURE 4: The FUNcube Dongle.

THE SATELLITE IN DETAIL. The satellite is made up of seven boards stacked into a standard ISIS 1U CubeSat structure.

Figure 1 shows a cutaway drawing of the final stack. Externally each face has a solar panel to ensure the maximum possible power is available for the spacecraft. The main physical interface between the boards is the CubeSatKitBus connector and commands and data are transferred using an I²C data bus. The boards have a PC/104 form factor.

The AntS subsystem: This is the 'top' board and contains the antennas, their deployment mechanism and matching harness. It is a commercial product from ISIS. There is a dipole for 435MHz reception and another one for 145MHz transmission. The board contains redundant systems for releasing the antennas autonomously soon after separation from the launch vehicle or, if necessary, by ground command.

Command, Control & Telemetry (CCT) Board: This is a bespoke board provided by AMSAT-UK and is an intentionally uncomplicated on-board controller using a low power Freescale microcontroller and a Xilinx programmable logic device (CPLD). This board decodes telecommands received from the ground and collects, stores and formats all the telemetry for transmission on the 145MHz downlink. It also applies the forward error correction coding that improves the robustness of the downlink signals. Additionally it provides an interface with the AntS board and the four thermistors used for the Material Science Experiment (MSE). The DC power consumption of the CCT board averages just 13mW.

RF Board: This bespoke board, provided by AMSAT-NL, contains the 435MHz receiver that is used for both commanding and the transponder uplink. The transponder section down converts the 20kHz passband to an IF of around 10.7MHz and this is then up converted to the final downlink frequency at 145MHz. The board includes a conventional AGC system that has over 40dB of gain control and a decay time of around two seconds. Additionally the board also provides six channels of telemetry.

PA Board: This board, from AMSAT-UK, provides the final 145MHz amplification using a Mitsubishi MOSFET. The design includes extensive harmonic filtering that prevents the third harmonic from the transmitter causing desense to the 435MHz receiver. This board also provides four channels of telemetry.

EPS Board. This is the on board power supply sub system (Electronic Power System) and is a commercial product from GOMspace in Denmark. It includes a lithium ion battery of two cells having a 2600mAh capacity, MPPT (Maximum Power Point Tracking) control of the six solar panels, battery charging and switched regulated outputs at 3.3V and 5V. It also provides abundant telemetry via an I²C data bus and includes various I²C and timer watchdogs to enable the power bus to be rebooted if needed. Thermal control within a 1U CubeSat is always challenging and the most important issue is to try to ensure that the battery never operates below 0°C. The only on board equipment that dissipates any significant heat is the PA, so it is for this reason that these two boards have been placed next to each other.

The ASIB Board: This AMSAT Special Interface Board incorporates the components of a standard ISIS passive magnetic attitude control sub-system – a magnet and two hysteresis rods – and it provides a power distribution interface and current/voltage monitoring sensors. Additionally, it includes ADCs to interface sun sensor and solar panel temperature sensors to the I²C bus and acts as a break-out board from the CubeSatKitBus to the IGIS below.

IGIS Board: This is the bottom board and is a standard product from ISIS. It provides a connector for battery charging before flight and enables the vital ABF (Apply Before Flight) plug to be inserted at the launch site. Without this plug being present the satellite will not function!

Solar Panels: Each of the 6 solar panels incorporates two 28% efficient triple junction solar cells that have special cover glass for enhanced radiation resistance. These are standard CubeSat Solar panels, again from ISIS. One of the panels has been modified to accept the inclusion of two projecting metal strips. These 70 x 4 x 3mm aluminium strips are mounted externally and incorporate a thermistor to measure temperature. One strip

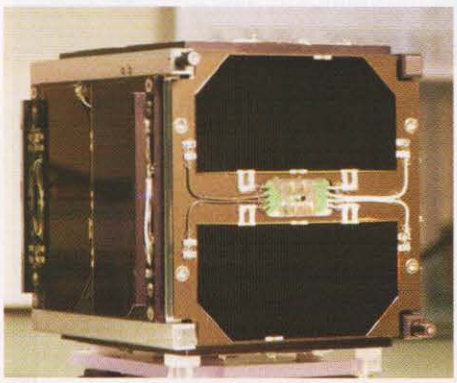

FIGURE 6: FUNcube-1 flight model in the lab.

is matt black whilst the other has a highly polished, reflective surface. As the satellite enters eclipse, heat energy will be lost by radiation at different rates. Temperature data, taken once a minute for the previous 104 minutes, can be displayed graphically to show the difference characteristics of the metal samples.

CubeSat Structure: The whole satellite is built around a 1U structure from ISIS. Again a modification has been made in that two sides are silver anodised and two sides are the usual black anodised. Thermistors have been fitted and they will also provide data for thermal demonstrations.

LAUNCH AND EARLY OPERATIONS (LEOPS). After many delays that have been outside the control of AMSAT, we finally managed to identify a launch opportunity early this year and AMSAT-NL signed a contract with ISL BV to broker the launch and provide the required coordination services. This has also been funded by voluntary donations received from many individuals and from a number of AMSAT groups from around the world.

At the time of writing (late September) it is expected that FUNcube-1 will be placed into orbit with more than twenty other objects on DNEPR launch vehicle from Yasny in Russia on 21 November. The satellite will be released from the POD on the launch adapter approximately 16 minutes after liftoff and deploy its antennas and activate the transmitter 10 minutes later. The satellite will initially be in Safe Mode and will transmit its 1200bps BPSK telemetry signal at approx 30mW. This is intended to be a very low power mode but should be easily heard and decodable by any station having a steerable Yagi with more than 9/10dBi gain. A circularly polarised array will provide the most reliable signals but linear antennas will also perform adequately.

It is anticipated that the first signals will be heard by stations in southern Africa; after that, the first orbit passes over Antarctica and the Pacific. It is likely that the next reception reports will not be available until the satellite is approaching Hawaii.

After a full checkout of the onboard systems that will, hopefully, only take a week or two, FUNcube-1 will be placed in its normal operation schedule – educational telemetry downlink when in daylight and amateur transponder operations at night. This schedule may be modified by ground command if required during holidays or for special events and, if the power budget is not satisfactory, it will be possible to command the satellite into 'receive only' mode for occasional eclipse periods to fully recharge the battery.

THE GROUND SEGMENT. It is planned that, when more precise information has been gained after launch, a follow-up article will be published that will give more detailed operational guidance for amateurs who wish to make use of the transponder or who wish to receive the telemetry and perhaps become involved in supporting the educational outreach opportunities. In the meantime, here are some guidelines.

To predict when the satellite will above your horizon, pre-launch Two Line Elements (TLEs) will be provided and these can loaded into any of the many tracking/prediction programs **[4]**.

The telemetry downlink uses 1200bps BPSK. Full details of the downlink format can be found on the FUNcube website **[5]**. When operating at full power, the satellite signals should be sufficiently strong that they can be received using an omnidirectional antenna such as a turnstile. This is one of the design requirements for the project to enable easy reception by schools.

To receive this telemetry, any SSB receiver that covers 2m, or an SDR receiver with suitable software will be suitable. Either type of FUNcube Dongle will work directly with the *Dashboard* telemetry decoding software described below.

The *Dashboard* software will be available before the launch date from the FUNcube website [5]. In addition to working directly with a FUNcube Dongle, this software will accept audio via a sound card. The *Dashboard* will display the real time telemetry, graphs of the Whole Orbit and High Resolution data, the Fitter messages and debug information. It can be configured to capture the incoming data in real time or from recorded audio or IQ files. When connected to the internet, the

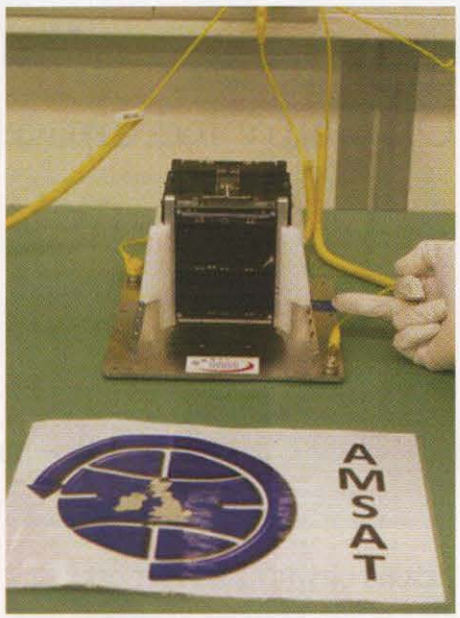

FIGURE 7: FUNcube-1 waiting to placed in its POD.

Dashboard will also upload your telemetry data to our central Data Warehouse server.

Presently the Dashboard software only works in the Windows environment, however the software source files are being made available to encourage other writers to 'roll their own'. Our only request is that you ensure that the software is able to correctly upload the received telemetry to the Data Warehouse.

When the transponder is active and the spacecraft is operating in amateur mode, it will require an uplink 435MHz SSB transmitter with approximately 10 watts of power to a steerable 10dBi Yagi. The transponder inverts the signal to reduce the effects of Doppler shift, so please transmit using LSB on 70cm and receive using USB on 2m. In any event, please do not transmit a signal that results in your downlink being any stronger than the telemetry downlink on 145.935MHz.

For all the latest, up-to-date information about FUNcube-1 you should consult the www.funcube.org.uk website and join the funcube yahoo group **[6]**.

THE FUTURE. As a follow-on to FUNcube-1, the AMSAT team has also been working on FUNcube-2. This is a sub-system on UKube-1, a 3U CubeSat that is sponsored by the UK Space Agency. Our sub-system, which has almost identical functionality to FUNcube-1, has been specially included to provide the main educational outreach for their mission. UKube-1 is now scheduled to launch in early 2014.

FUNcube-1 Frequencies

	Downlink	Uplink
Transponder:	145.950-145.970MHz (USB)	Transponder 435.150- 435.130MHz (LSB)
Telemetry:	145.935MHz	

WEBSEARCH

[1] http://en.wikipedia.org/wiki/OSCAR
[2] www.cubesatshop.com/
[3] www.funcubedongle.com/
[4] http://tinyurl.com/l6vpb5l
[5] http://funcube.org.uk/working-documents/
[6] http://uk.groups.yahoo.com/group/FUNcube/

Moving On

Off centre fed dipoles

WHAT'S IN A NAME?

This column began with the title "Start Here" under different authorship. It has since stared to cover a broad range of subjects and levels, making the original title less appropriate. So, last month, Start Here changed its name to Moving On. Whatever your level of experience, we're sure that you'll find something new and interesting here.

PICKING UP WHERE WE LEFT OFF. Last month we looked at the centre fed half wave dipole and how the voltage and current varies along its length. A similar situation also applies if the dipole is a multiple of half wavelengths long and it is fed at the centre of one of the half wavelengths as indicated in **Figure 1**. However in this case the radiation resistance is a little higher than 72Ω and it rises progressively as the number of half wavelengths in the dipole is increased.

A dipole, (or any other kind of aerial), may not necessarily be fed at its centre, but it can still be matched to its feeder. An 'off centre' fed half wave dipole is illustrated in **Figure 2**. (In this context feeding off centre does not include end-fed aerials such as a random length wire or an inverted L shaped Marconi aerial where the feeder is intentionally part of the radiating system). When feeding off centre, ie feeding at other than a current maximum, the feeder will always radiate unless special measures are taken to prevent it. This statement needs explanation, as follows.

EXPLANATION BY EXAMPLE. Consider a centre fed half wave dipole fed with RF power of 72W from a transmitter. The RMS voltage across the centre feed points will be 72V at a current of 1A. The voltages at the feed point will be 'balanced' with respect to earth, ie at an instant in time one wire of the feeder will be at +36V and the other at -36V, the average value at the two feed points being zero, ie at earth potential.

Now consider a feeder with a characteristic impedance of 288Ω connected to the half wave dipole at a point where the impedance is 288Ω, as in Figure 2. For the same 72W, the RMS voltage across the feed points will be 144V at a current of 0.5A. The feeder is again matched to the aerial and no power is reflected back down the feeder in a differential manner, ie with equal and opposite currents. However, in a resonant system that has been allowed time to stabilise, (ie in about 'Q' cycles from switch on), the average value of voltage at the two feed points is not zero, as it was for the centre fed dipole, but at some voltage, V_d say, appropriate to the sine wave distribution of voltage and current on a resonant dipole. The voltages on the wires of the feeder will therefore be V_d +72 and V_d -72 volts.

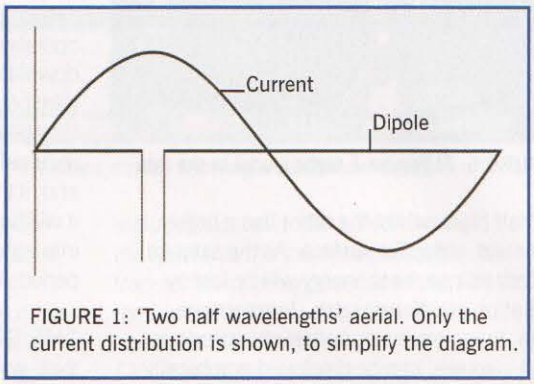

FIGURE 1: 'Two half wavelengths' aerial. Only the current distribution is shown, to simplify the diagram.

Although the feeder is matched to the aerial, this represents a common mode voltage on the feeder of V_d at the feed point. This voltage will force a common mode current to travel down both wires of the feeder in phase as though they were a single wire. This is a source of the 'voltage on the coax' you hear so much about.

Although it is possible for a wave to follow a single wire without radiating [1], the only way to prevent feeder radiation from an off centre fed half, or multiple half wave dipole, is to incorporate a 'choke' or 'current balun' of correct feeder impedance in the feeder close to the dipole feed point.

A common position on a dipole for off centre feeding is one third of a wavelength from one end, at the longest waveband which it is intended to use. This presents roughly the same impedance for all 'harmonically related' shorter wavebands as can be seen by an inspection of **Figure 3**. It can be seen that the vertical construction lines drawn at one third and two thirds of the aerial length intersect the sine waves at similar phase points. Aerials that make use of this one third of a wavelength effect are known as 'Windoms', of which there are several methods of feeding. The original Windom aerial of the 1930s used a single wire feeder connected one third of the way along the aerial, the combination being 'tuned against ground'.

This near constant impedance at the 'one third length points' is about 400Ω and is easily accommodated by twin parallel wire feeders. To prevent feeder radiation by the mechanism mentioned earlier, a current balun needs to be inserted in the feeder at the aerial feed point. However, constructing a satisfactory current balun for a high characteristic impedance balanced transmission line feeder presents some difficulties. This is because the twin wire feeder is unshielded, so the usual practice of coiling the feeder into a few turns to form a common mode choke still allows significant capacitive coupling between the input and output of the balun, effectively bypassing it.

Of course, in some cases, some feeder radiation may be welcomed as it may provide some 'null filling'. However, a radiating feeder usually implies RF in the shack, which bring its own set of disadvantages unless some measures are taken just outside the shack to prevent radiation inside it.

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WEBSEARCH

[1] See http://en.wikipedia.org/wiki/Goubau_line

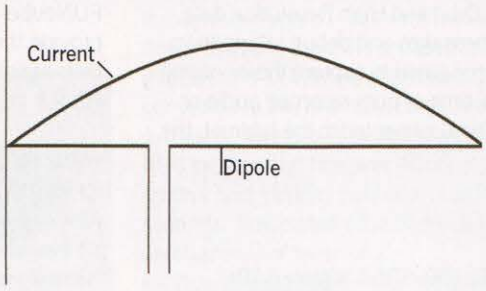


FIGURE 2: Off centre fed half wave dipole.

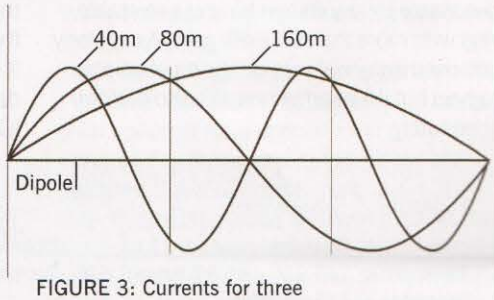


FIGURE 3: Currents for three harmonically related wavebands.

Homebrew

UHF receivers: a 432 to 28MHz receive converter

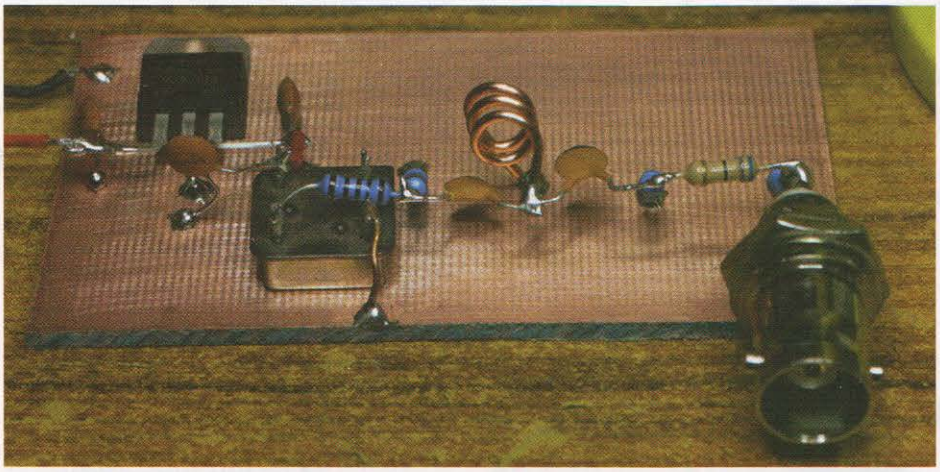


PHOTO 1: Prototype UHF weak signal source, which should be mounted on a screened case.

TECHNIQUES. Over the last few months we have been looking at design and construction techniques for UHF and microwave equipment. Many UHF circuits use very short lengths of transmission line (TL) as reactive circuit elements; longer lines are often used as resonators in filters and oscillators. In those UHF circuits that use conventional 'lumped' inductors and capacitors, the components often have extremely small values and their physical form may be quite different from the inductors and capacitors that we use at lower frequencies. For instance, a capacitor may just be a small gap between PCB traces or a pair of wires. We might tend to think of inductors as multi-turn spiral coils on a cylindrical or toroidal form. For very small values of inductance in the nanohenry (nH) range, the total number of turns required may be considerably less than one. In this case, our 'coil' may just be a bent wire or, for very small values, a straight length of wire. The textbook [1] formula for the low frequency inductance of a straight wire is shown in **Figure 1**. Skin effect will reduce inductance by a few percent at VHF and above. The basic uncorrected formula will be accurate enough for our purposes. Inductance of a straight wire is proportional to wire length and inversely proportional to wire diameter. A 25mm (1in) length of 1mm wire will have an inductance of

$0.0002 \times 25 \times (\ln(50 \div 0.5) - 0.75)$
$= 0.019\mu H$

or, if you prefer, 19nH. This is typical of the values used at UHF or in low impedance VHF circuits such as power transistor input matching networks.

In some circuits, it isn't easy to make a clear distinction between TL and lumped components. Our 25mm wire inductor doesn't exist in isolation. If it is placed above the ground foil of a PCB or near a metal enclosure, it becomes part of a transmission line. If other wires are placed nearby, it becomes a coupler. If any of these wires are terminated in a resistance, then you have a directional coupler and so on... Just as transmission lines are used in place of lumped components, it is also possible for lumped components to behave like transmission lines. This is particularly true at very short wavelengths where the component size and the length of its connecting leads may be a significant fraction of a wavelength.

Inductance of straight wire

$$L = 0.0002 \cdot b \cdot \left(\left(\ln \frac{2b}{a}\right) - 0.75\right)$$

L = inductance in μH
a = wire radius mm
b = wire length mm

FIGURE 1: The textbook formula for the inductance of a straight piece of wire.

PARASITIC VALUES. Ideal components don't exist in the real world. In practice, every component will have parasitic resistance and reactances. In most cases, these are unwanted and may cause unpredictable or unexpected behaviour in your circuit. The most commonly available types of carbon film and metal film resistors are formed from a spiral film on a ceramic insulator. As the resistors are physically small and there are very few turns in the spiral, the inductance is quite small, usually no more than a few tens of nH. This is insignificant at HF, but may affect the performance of a UHF circuit.

Inductors have parasitic capacitance and capacitors have parasitic inductance. This causes them to be self-resonant at some frequency where X=X_parasitic. Lead inductance of capacitors can limit their usefulness for VHF/UHF decoupling. The best way to get rid of lead inductance is to get rid of the leads. Surface mount chip capacitors and leadless disc capacitors are generally much better for RF decoupling than standard ceramic disc capacitors.

This month's construction project is a 432 to 28MHz receive converter that will be used as the receive section of the 70cm transverter. The design is similar to the UHF converter described in Homebrew for June 2008. As the previous project resulted in an exceptionally quiet and sensitive receiver, I won't be making too many changes to the original design. The ceramic trimmer capacitors in the UHF resonators have been replaced with high quality air-spaced piston trimmers. The ancient 3SK45 dual-gate MOSFET mixer has been replaced a more readily available BF981. Similar devices like the BF988 or BF966S in either the 'pill' type of plastic package or surface mount packages should perform equally well in this circuit. Before we proceed with the construction, there are a couple of other jobs to do first.

A UHF WEAK SIGNAL SOURCE. None of my DDS based signal generators cover UHF. As there is very little activity on the 70cm band in this part of the world, I have built a simple weak signal source based on a

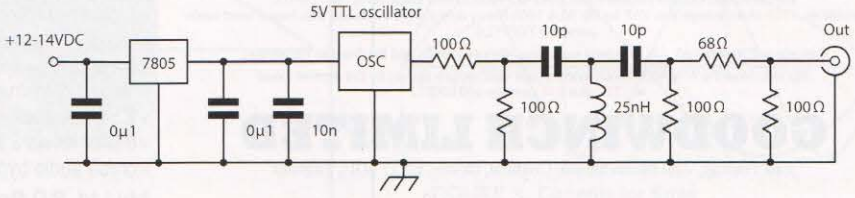


FIGURE 2: UHF weak signal source based on a TTL oscillator.

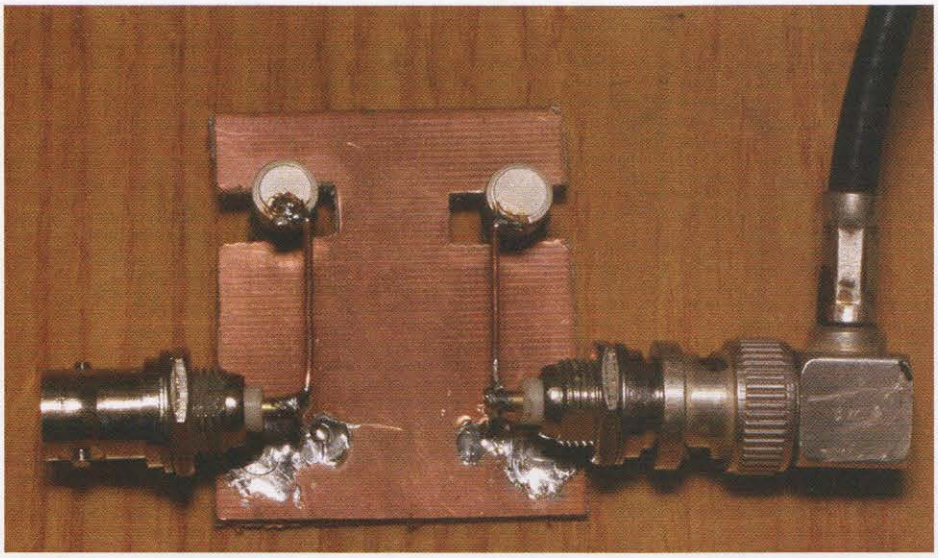


PHOTO 2: How the trimmer capacitors are arranged in a slot cut by a nibbling tool.

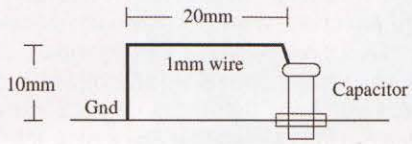


FIGURE 3: The type of resonator used in the Rx converter.

standard 5V TTL crystal oscillator module. This will be very useful when aligning the converter RF and IF tuning. I used a 27MHz tin can oscillator from the junk box. Any other sub-multiple of 432MHz like 24MHz or 48MHz should also be suitable. The schematic of my oscillator is shown in **Figure 2**. 5V is supplied by a 7805 regulator. A simple 3rd order high pass filter (HPF) reduces the 27MHz signal and the lower harmonics to a safe level. The HPF cutoff frequency is just over 300MHz. The 25nH inductor in the HPF is 3 turns of 1mm copper wound on a 4mm former. Turn spacing is slightly more than the wire diameter. There is a 10dB attenuator between the HPF and the output socket. To keep signal leakage to a minimum, the circuit should be built in a screened box with a feedthrough capacitor for the DC supply and a BNC or similar coax connector for the RF output. The circuit is suitable for 70cm, 23cm and probably on the some of the higher microwave bands. The finished unit is shown in **Photo 1**.

I use a switchable step attenuator between the output of the signal source and the RF input of the converter. At least 40-60dB of attenuation is required to produce a suitably weak 70cm signal for the final stages of alignment.

A TEST RIG FOR THE UHF L/C RESONATORS. I have evolved a fairly simple and reliable procedure for RF band pass filter (BPF) design. This has served me well for several previous projects, most recently in June 2013. Using procedures described b)y Zverev **[2]** and several excellent articles by Wes Hayward, W7ZOI, I can estimate the required filter complexity and calculate the filter component values, including the tricky inter-resonator coupling and I/O matching components. More often than not, the filter performs as expected with little or no modification required. Things are a little more complicated with side-coupled transmission lines or between loosely coupled copper wires. It is quite difficult to accurately predict the spacing required. In most of my previous attempts, I have tended to place the resonators too close together. This results in an overcoupled circuit with less than optimum performance. An over coupled 2nd order filter tends to have a double-hump response with unacceptably high passband ripple.

I have built a simple test rig for UHF LC resonators. The type of resonator used in the Rx converter is shown in **Figure 3**. The inductor is a 30mm length of 1mm bare copper wire. The centre core from some types of 75Ω TV coax is a good source of 1mm copper wire. A 30mm wire will have an inductance of around 24nH. As this wire has a 90° bend at one end, the inductance will be greater, probably around 30nH. This will require a capacitor value of 4.52pF to resonate at 432MHz. This is well within the range of the 10pF piston trimmer.

The capacitors for the two resonators are mounted in slots cut from PCB laminate. Johanson and similar types of piston trimmers are a perfect fit in a slot cut by a standard nibbling tool. **Photo 2** shows a close-up of the capacitors. This arrangement allows for easy adjustment of the resonator position. As you can see, the wires and connectors have been re-soldered several times as the wire inductors were moved to new positions.

I found that critical coupling was achieved with a rather wide spacing of 18-20mm. The 50Ω I/O coupling is tapped into the wires at the point where the wires are bent. The configuration in the photo has a -1dB bandwidth of just under 20MHz and a remarkably low insertion loss of just 0.5dB. These measurements will also be used in the Rx converter.

A GaAsFET RF AMPLIFIER FOR 432MHz. The GaAsFET RF amplifier and receive mixer will be described separately for the benefit of readers who only want to build the RF stage as a 70cm preamp.

The GaAsFET is a Mitsubishi MGF1302. These devices are available from specialist suppliers like G H Engineering or Barend Hendriksen. They are also often available from online auction sites like eBay. The MGF1302 is capable of excellent performance on 70cm. Noise figure at VHF / UHF is well below 1dB. The amplifier design is flexible enough to accommodate other GaAsFET devices from the junk box or pulled from retired satellite TV LNBs.

The schematic of the RF amp is shown in **Figure 4**. Details of L1, L2 and L3 are shown in **Figure 5**. Note the way that the bent section of L2 is cut short to allow room for the decoupling capacitors. See **Photo 3** for details. I would usually advocate the use of chip capacitors at UHF, but I have found that they are very prone to cracking in this particular application where they would be soldered directly to a very stiff wire. I used a parallel pair of 1nF disc capacitors with the leads cut as short as possible.

There are two possible configurations for the amplifier output. A high impedance output for direct connection to gate-1 of the MOSFET mixer and a 50Ω output so that the

PHOTO 3: How L3 is cut short to allow room for the decoupling capacitors.

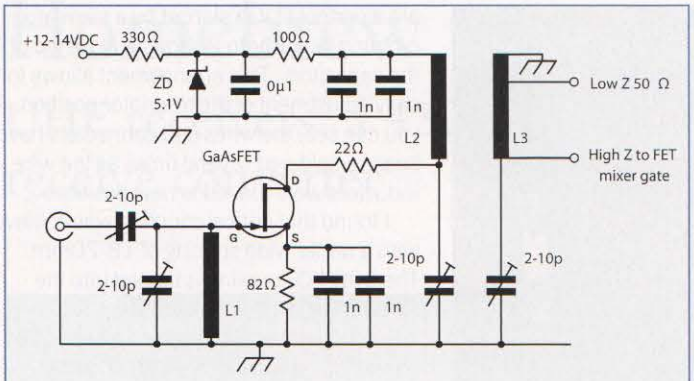


FIGURE 4: UHF RF amplifier based on a MGF1302 or similar GaAsFET.

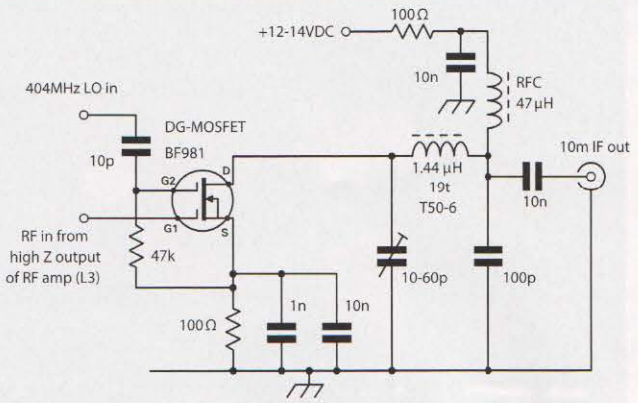


FIGURE 6: Dual-gate MOSFET mixer.

amplifier can be used for other applications like a masthead preamp. As with the earlier test circuit, the 50Ω tap is at the wire bend, 10mm from ground.

DUAL-GATE MOSFET MIXER. I had considered using another diode mixer module as the receive mixer, but I decided that the lower noise figure and conversion gain of the MOSFET would offer greater advantages on 70cm. The mixer schematic is shown in **Figure 6**. DC biasing arrangements have been slightly modified from the original design. The drain circuit of the FET is matched to 50Ω using a PI matching network. The design values are R1 = 2000Ω , R2 = 50Ω, QL = 8.5 and f = 28.2. The inductor in the PI network is 19 turns of 0.325mm enamelled copper on a T50-6 powdered iron toroid core. The measured inductance is exactly 1.44µH. I used a 60pF (yellow) trimmer capacitor. This was pre-set to about 30% meshed and needed little or no adjustment in final alignment. The completed converter is shown in **Photo 4** and **Photo 5**.

Measured gain of the RF amplifier section only is 16-22dB depending on the adjustment of the input coupling capacitor. This was initially set for a gain of 20dB. It will be fine tuned for best noise performance in final testing. The three tuning capacitors were peaked for maximum gain at 432.2MHz.

Unfortunately, 70cm activity was very low when I was testing the converter. The EI2HHR repeater on 430.900MHz provided the only reliable off-air signal. Initial tuning of the RF and IF circuits was done using the (not so) weak signal source described earlier. The 100kHz output from my GPS disciplined frequency standard (March 2008) was just about audible with a 10dB attenuator pad between the standard and the RF input of the converter. This allowed me to tune the 404MHz LO (August 2013) very accurately.

My thermionic diode noise source (July / August 2011) was used to evaluate the noise performance of the converter. Increased receiver noise was detectable with just over 1mA of diode current. 1.4mA increases receiver noise by 3dB, which indicates a total system NF of 1.46dB. This suggests that even at this early stage of fine-tuning, the 70cm RF section is doing better than 1dB NF.

Next month we'll tie up a few loose ends to finish the 70cm transverter and start on a new winter project.

REFERENCES

[1] *ARRL Handbook* 1993
[2] *Handbook of Filter Synthesis*, A Zverev

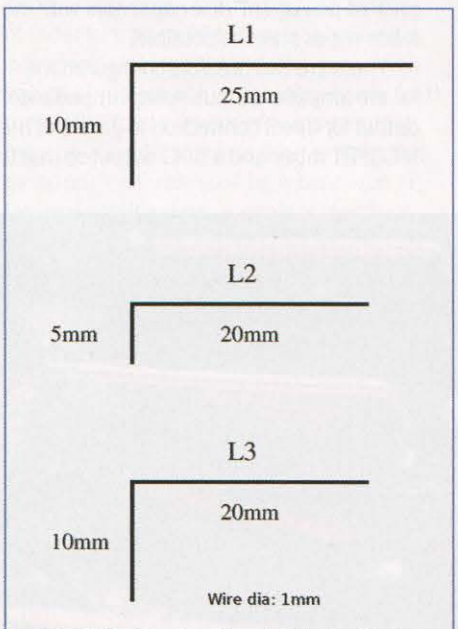


FIGURE 5: Wire bending details for L1, L2 and L3.

PHOTO 4: The UHF receive converter.

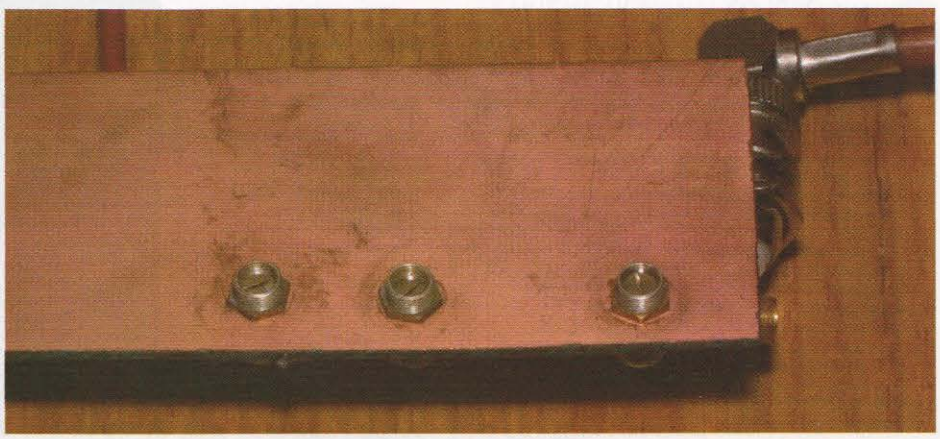
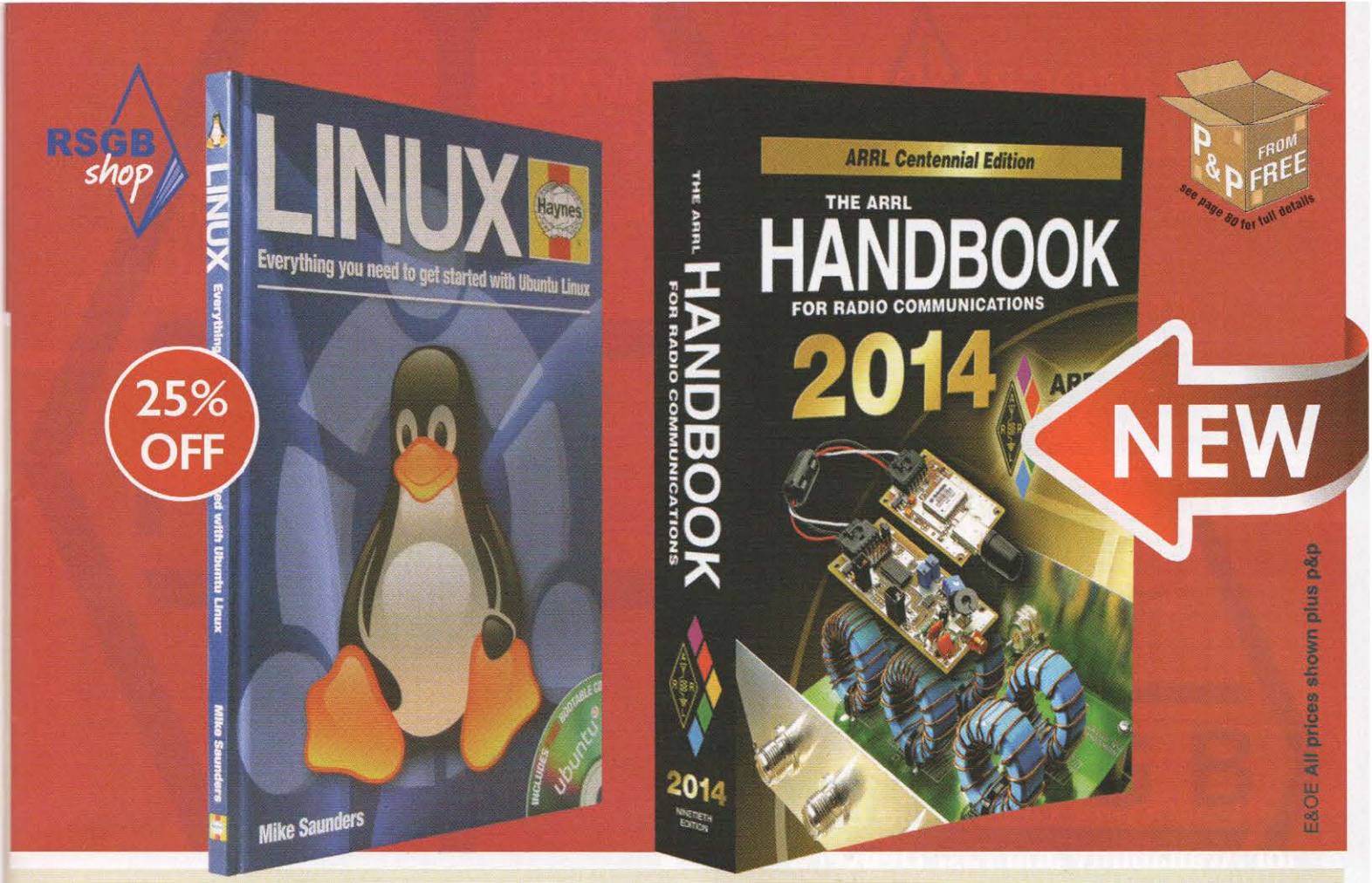


PHOTO 5: Back of the UHF receive converter showing the capacitor mounts and adjusting screws.



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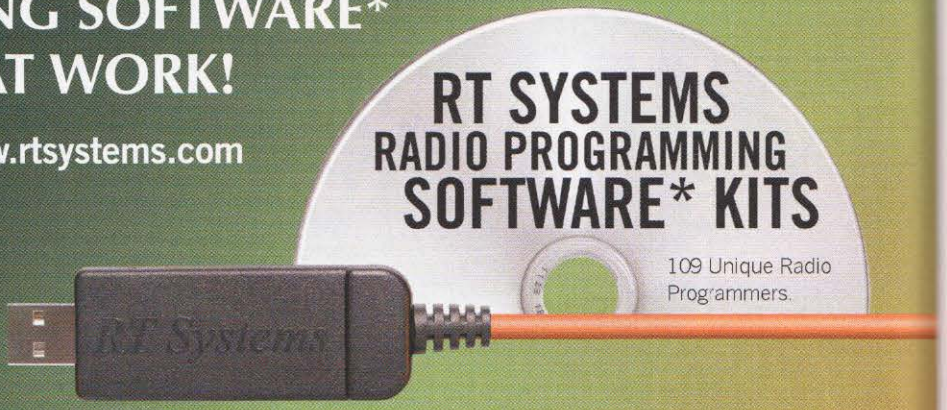

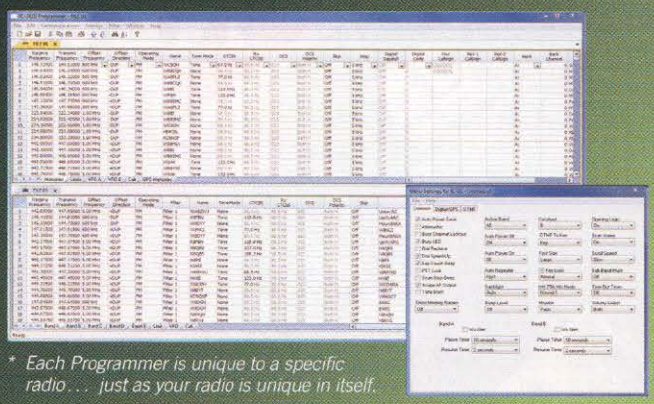

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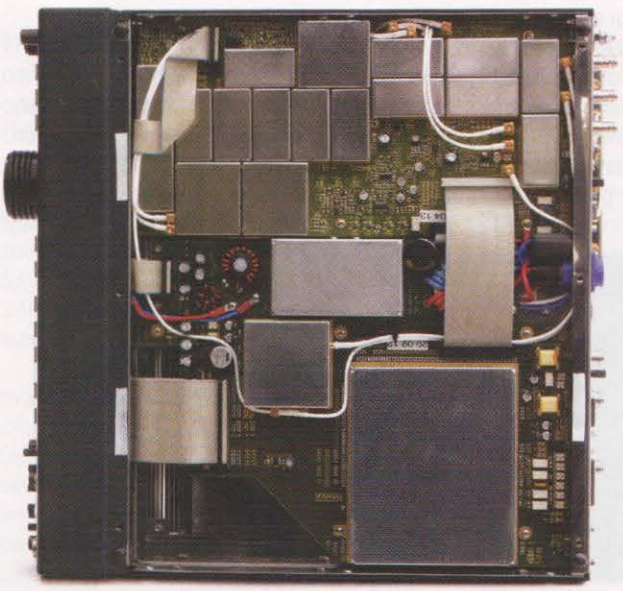
Hilberling PT-8000A

A new HF and VHF transceiver

The Hilberling HPT-8000A HF and VHF transceiver.

INTRODUCTION. Hilberling GmbH is a German company specialising in the design and production of professional communications equipment with a wide product range of power amplifiers, oscillators, microwave hardware and other units. Founded by Hans Hilberling, DK7LG, in 1988 the company has recently developed a transceiver covering the HF and VHF bands boasting the very highest RF performance for the professional and discerning amateur markets. First announced and launched at Dayton in 2007, production was delayed until recently to allow a significant degree of redesign to resolve some outstanding issues and further improve performance. Relaunched at Dayton and at Friedrichshafen this year, the radio is now in full production at a price that reflects its professional pedigree. As a high performance base station transceiver with dual independent receivers covering HF to 2m including 6m and 4m, I was very pleased to have the opportunity to put the radio through its paces.

BASIC FUNCTIONS. The PT-8000A is certainly a heavyweight radio, weighing in at 28kg and measuring 425mm(w) x 175mm(h) x 465mm(d). The matching HN-8000 mains operated power supply weighs a further 10kg. The radio contains dual identical receivers, main and sub, that can operate independently over the whole tuning range. HF/LF coverage is 9kHz to 30MHz, and on VHF several smaller segments cover 50 – 54MHz, 69.5 – 70.5MHz, 110 – 144MHz and 144 – 148MHz. The transmitter is enabled on the amateur bands, including 4m, according to the appropriate IARU region and delivers nominally 200W output power at HF and 100W on the VHF bands 6m, 4m and 2m. A low power mode provides 10W output when powered from a nominal 12V supply.



Under the bottom cover showing the many shielded modules.

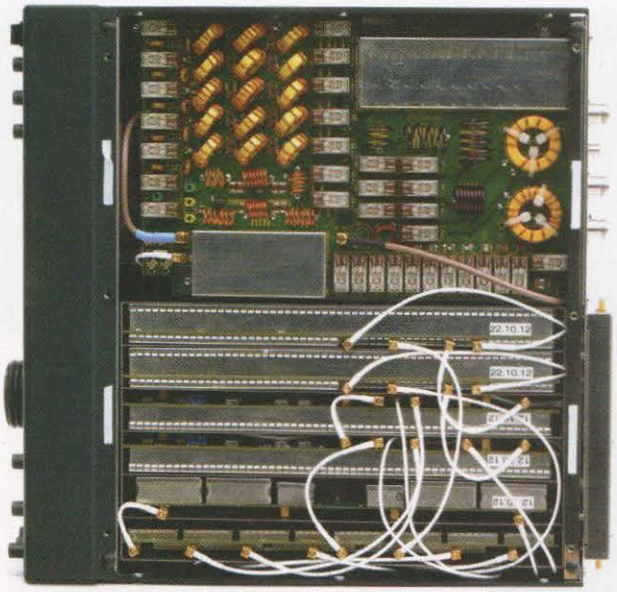
Individual buttons select the HF bands except 60m with a band memory storing the last two combinations of frequency, mode and bandwidth settings for each press of the band key. 60m channels are most conveniently allocated to and accessed from the memory stores. The VHF bands are accessed separately via the keys associated with the display, the soft keys.

The commonly used modes are selected directly by pushbuttons, with variations selected via the display soft keys such as opposite sidebands on CW and SSB, synchronous AM using upper or lower sideband, and repeater access and offsets on FM. A data button selects AFSK data input from PC sound cards on all voice modes and mutes the microphone. A recent addition not described in the current manual, RTTY, optimises the filter settings for high tone (2125/2295Hz) operation. Direct digital FSK input is not supported.

The front panel, available in five different colours, is well laid out and uncluttered with generously proportioned buttons and controls and easily readable control labelling. A bright and colourful TFT LCD display provides a very clear readout of all main operating parameters. It is recessed and slightly angled internally as is often adopted with car dashboards to improve visibility and reduce reflections. A large bargraph meter indicates signal strength and transmit power, with two smaller bargraphs for transmit SWR and ALC or compression. Signal strength can be displayed in S-units, dBm or dBμV. The A and B VFO frequencies are shown continuously and a slide rule linear scale shows the positioning of the principal VFO within its immediate band segment. The receiver IF filter bandwidth and shift are both shown continuously in graphical and numerical formats.

Six buttons down the side of the display operate in conjunction with the principal front panel pushbuttons to access most of the functions of the radio. The two receivers, main and sub, have identical features and functions and these are selected and tailored for whichever receiver is set to be in the foreground. The background receiver is always still fully operational and its frequency, mode and bandwidth are shown in a corner of the display. The transmit frequency is normally tied to the main receiver except for split frequency operation, which then uses the sub receiver frequency.

There are three type-N antenna sockets on the rear panel; two are freely assignable to any of the LF-HF bands but only one for all the VHF bands. This is unfortunate as separate antennas are normally used at VHF. The option to group 6m with the HF bands would also be helpful as many modern HF linear amplifiers also cover 6m. A separate receive-only BNC input is provided for LF-HF and an array of SMA connectors provides IF outputs for external units and allows the insertion of filters or amplifiers into the front end receive path of both main and sub receivers.



Under the top cover showing modular construction, auto ATU and TX output filters.

Other connectors include audio input/output lines for sound card and other uses, separate control for HF and VHF linear amplifiers, computer interfacing via USB but not via a serial port D connection, PS/2 keyboard connection for future use and input/output for an external 10MHz reference. Transmit drive at +20dBm is available, typically used for driving transverters. Control is provided for two separate transverters and using 28, 50 or 144MHz direct display readout of the final frequency to 10Hz resolution is shown for all preset UHF and microwave bands up to 75GHz.

Dual forward facing speakers are fitted into the front panel of the radio for the main receiver and into the front panel of the power supply for the sub receiver. The outputs can be kept separate or combined into both speakers. The speakers are muted individually by switches on the audio gain controls, not by plugging in headphones, so headphones and speakers can be used at the same time. Only the sub receiver loudspeaker output (or both combined) is available on the rear panel, not the main output on its own. Both receivers are active continuously, so it is necessary to turn down the gain control of the receiver not currently in use.

Hilberling include their T9 desktop microphone with the PT-8000A as part of the package deal. This is a high quality dynamic microphone, RFI proofed with a kidney shaped acoustic response. It uses the same 8-pin connector used almost universally on most radios, however the pinning is different. The manual, available in German and English languages on paper and in pdf, is generally well written and fully describes all aspects of installation and use.

RADIO DESIGN AND ARCHITECTURE. The receivers in the PT-8000A use a double conversion analogue architecture. The first IF is at 40.7MHz, where a 50kHz bandwidth 6-pole roofing filter is fitted. The second IF is at 10.7MHz, where signals pass first through a prefilter with a bandwidth of 15kHz, 3kHz or 500Hz (4-pole for the narrow filter, 6-pole for the others). After the noise blanker gate the main channel selectivity is applied at this IF. This comprises eight 16-pole filters of bandwidths 250Hz, 500Hz, 1.8kHz, 2.1kHz, 2.4kHz, 2.7kHz, 3.1kHz, or 6.0kHz. With two receivers this amounts to an amazing total of 300 crystals. DSP is used only at audio to provide all audio shaping functions, noise reduction and an auto-notch. It is also used to effectively sharpen the IF filter skirts.

The receivers each use a common first mixer for 1.8 to 144MHz with a separate mixer for the lower frequencies. Front end selectivity uses a tracking preselector for HF and separate bandpass filters for each of the VHF bands. Separate RF amplifiers are used for HF and each VHF band. Relays are used for switching signal paths and filter elements with physically large inductors where appropriate to ensure good signal handling and low distortion. An overload protector isolates the receiver front end if significant RF energy is present on the antenna.

The transmit chain uses the same frequency scheme as the receiver but in reverse. The final amplifier uses a pair of UHF FETs from a 50V supply with continuous coverage from 1.8 to 144MHz. In low power mode this amplifier is switched out and the driver used to provide 10W. Diplexer low pass filters are used on the PA output, seven to cover HF and two for VHF. The auto antenna tuner operates up to 30MHz and matches VSWRs up to only 2:1. The oscillators in the radio are derived from seven DDS sources driven at 640MHz from a SAW VCXO locked to the 10MHz low noise reference. This reference is oven controlled to an accuracy of 0.005ppm, which is 5Hz at 1GHz. A means of further calibrating to a higher accuracy is also provided if a suitable reference is available.

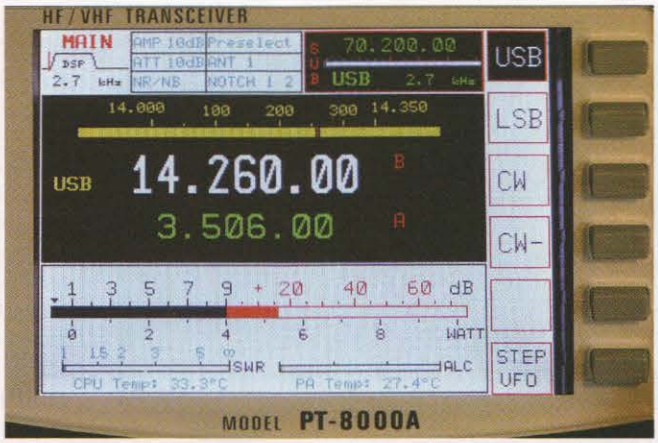
The radio is solidly constructed with fully shielded modular units and an internal heatsink. A single large internal tangential fan operates continuously but is fairly quiet in normal use, engaging a high speed only when the heatsink temperature rises. It is then quite noticeable. PA and CPU temperatures are shown on the display panel. Tilting bails on the front feet allow the radio and PSU to be angled for better viewing if required.

The power supply is very conservatively rated, capable of over 900W output. 50V and 13.8V supplies are provided for the radio and an auxiliary output of 13.8V 5A is available for other uses. It is a fully shielded switched mode design and also contains a fan operating continuously. A large meter on the front panel shows the DC power drawn by the PA in fractions of a kilowatt.

RECEIVE FEATURES. The radio is fitted with a 55mm diameter main tuning drive, weighted and very smooth in operation with 512 steps per revolution. The smaller sub VFO drive has 256 steps per revolution. Tuning is in steps of 1, 10, 100Hz or 1kHz with 2.5kHz on AM and FM, easily selectable and a good compromise between precise tuning and fast frequency navigation. For larger frequency changes the STEP VFO control provides steps of 10kHz, 100kHz

The PT-8000A with PSU and desktop microphone.

or 1MHz to move rapidly around the bands. Direct frequency entry is also possible. All the usual VFO functions are included, A and B VFOs for both receivers, transfer between receivers and VFOs, split frequency operations, RIT, XIT etc. 297 memory channels are available, organised into three banks of 99 channels each. Each channel stores frequency, mode and bandwidth settings but no labels. Scanning functions are described in the manual but are disabled in the current version of firmware.



The PT-8000A display and softkeys.

A receiver preamplifier with nominally 10dB gain is selectable for frequencies above 1.8MHz, not at LF, and there is a 10dB attenuator at HF for very strong signal situations. On the VHF bands, 12V DC at 1A may be fed through the antenna feeder to power remote amplifiers or relays. Five AGC speed settings covering 100ms to 3s nominal for decay are available to suit different operating conditions and modes. AGC may be turned off if desired to use just the manual RF gain control.

The eight 16-pole IF filters provide a good selection of bandwidths for each mode, 250Hz and 500Hz on CW, six bandwidths from 1.8kHz to 6kHz on SSB, 6kHz and 15kHz on AM. With DSP filtering enabled, additional audio filtering provides intermediate and narrower bandwidths down to 50Hz bandwidth on CW, 24 bandwidths on SSB and 14 each on AM and FM. IF shift is also provided (called BFO on CW for some reason) and pitch adjustment. The three 10.7MHz prefilters are selected automatically according to channel bandwidth or can be manually set. A manually adjusted IF notch and a DSP auto-notch help eliminate QRM and unwanted carriers and an adjustable IF noise blanker and DSP noise reduction system help in noisy situations.

TRANSMIT FEATURES. The transmitter power output can be switched between full output (200W HF / 100W VHF), low power (10W) with the PA switched out, and external with 100mW (+20dBm) available from a BNC socket on the rear panel. This connector is typically used for transverter drive. The output power is variable down from these levels and fully metered with meter scale maximums of 240W, 100W, 10W and 100mW selected automatically as appropriate.

A transmission monitor and VOX are available on all voice modes, and a speech processor on SSB. The transmit audio frequency response may be tailored in several ways to suit different microphones and operating styles. The audio bandwidth can be set between 2.2 and 3.4kHz and the passband shifted as appropriate. In addition, a three band audio equaliser allows the low, middle and high frequency characteristic to be adjusted to suit.

On FM, repeater offsets can be set over wide limits with different offsets on 50, 70 and 144MHz. However, on 28MHz and other HF bands, the offset is the same as on 50MHz, which does not follow actual practice. CTCSS tones are not provided, which limits the use on repeaters but a front panel pushbutton provides a 1750Hz tone (also 440Hz on other modes).

On CW, a keyer is provided operating over the speed range from 5 to 60 WPM. It allows iambic modes and reversed paddles but no memories or weighting adjustments. There is the usual provision for full and semi break-in with the drop back delay adjustable from the front panel. Full break-in is selected by setting the drop back delay to minimum. Adequate delays are incorporated to provide satisfactory sequencing for most modern linear amplifiers. For slower amplifiers, additional timing delays up to 50ms may be added and there is a hold-off or inhibit line for amplifiers or other external units suitably equipped.

ADDITIONAL FEATURES. A voice message store is provided recording short messages for repetitive calls such as CQ calls or recording the receiver audio. There are four tracks available, each storing 30 seconds of audio, and the source of the recording can be taken from either receiver, the microphone or the soundcard data input. Playback is through the receiver audio path or the transmit audio if on transmit.

Two software applications are provided on CDROM. The IF monitor program shows the spectrum up to 25kHz on either side of the receiver centre frequency. The receiver provides a 60kHz IF output via a socket on the rear panel and this is connected to the soundcard input of a PC running the FFT spectrum monitor software. This IF signal retains the full bandwidth of 50kHz from the first IF roofing filter. The software runs under Windows XP or later and needs a soundcard with 192kHz sampling frequency. Unfortunately, none of my PC soundcards sample this fast so I was unable to check out the program but it looks a good alternative to the normal spectrum scan found on most recent radios, offering a fast response and good resolution. Simultaneous spectrum displays of both receivers is shown or alternatively one receiver with its respective waterfall. The amplitude display range can be as high as 140dB and can be quite accurately calibrated. Another possibility is to use the first IF output (40.7MHz) from one of the SMA connectors on the rear panel in conjunction with an SDR receiver and readily available software to provide spectrum displays.

The second application allows the firmware in the radio to be updated via the USB port. The main CPU, receiver CPU and antenna tuner are all upgradeable and during the course of this review I upgraded the main CPU to version 1.35. I had some initial difficulty getting ports allocated correctly on my PC (Windows XP SP3) but eventually all worked well after I had cleared out redundant port assignments from earlier SDR receiver reviews. Make sure you have virtual COM port driver software installed. The latest software version improves power meter accuracy at low levels and some other changes.

MEASUREMENTS. The full set of measurements is given in the table. The receiver sensitivities reduce by 3dB to that shown in the table when both are allocated to the same antenna connector and the preselector adds a further loss of 1 to 4dB depending on the band. The sensitivity holds well at LF, remaining constant down to below 50kHz. CW sensitivities with 500Hz bandwidth were 7dB greater than the 2.4kHz bandwidth figures given in the table. The S-meter calibration showed 6dB per S-unit and was very accurate over the range S3 to S9+60dB and within 1dB on the dBm scale. S9 was about 60-70μV across all bands and broadly similar on all modes. The S-meter reading is compensated to be independent of the settings of the preamplifier, input attenuator and single or dual receivers on the same antenna.

The rejection of IFs and images was typically around 100dB, worst case about 80dB. There were a number of weak internal 'birdies' of S1–S5 across the tuning range of the receivers but none of particular significance for the amateur bands except a relatively weak unstable carrier on 160m. The AGC threshold was quite soft with AGC starting not far above the 10dB S/N measurement level and taking a further 25dB increase to fully clamp the audio level. This often gives a quieter background and preserves some of the differences in

Connectors on the rear panel.

signal levels, a characteristic preferred by some users. The AGC characteristic was very clean, a fast attack time with no 'hole' seen in many DSP implementations and a decay time close to the set figure. AF AGC is a current option on CW but the attack was delayed for 5-10ms, resulting in loud clicks with strong signals. This option will be removed in future software releases; it is not really needed with the narrow IF filters fitted.

The strong signal performance is top-class with intermodulation limited dynamic range well over 100dB in 500Hz bandwidth and holds well close-in towards the skirts of the 10.7MHz pre-filter. The 500Hz pre-filter is noticeably better than the 3kHz pre-filter in terms of intermodulation performance. The front end blocking performance is excellent, with no trace of desensitisation up to +15dBm, at which point the front end overload trip operates. This holds close-in towards the pre-filter skirts. The reciprocal mixing performance is also outstanding, unsurpassed by any other radio bar one (the Elecraft KX3). Inband intermodulation and audio distortion figures were fairly average. Second order and wideband third order products were well suppressed providing the preselector was in circuit. The excellent reciprocal mixing figures allowed measurement of the IF filters over 80dB down the skirts and these showed very good shape factors for crystal filters as a result of their 16-pole design. The table figures are with DSP filter off; with DSP on the skirts are further sharpened.

On transmit, the CW power output reached around 250W at maximum on the HF bands but on SSB ALC limits the output to 200W. The tuner loss was generally well less than 1dB. On 3.5, 18 and 21MHz the harmonic output fell slightly short of the specification limit of 50dB. Hilberling state this is not normal and suspect a fault in the filter unit of the review radio. The power meter display was generally accurate across the power range with the latest software release (1.35). Two-tone distortion products were low and even better at the 100W level. The processor was clean with negligible effect on wideband products. The audio was very clean with low distortion if kept within the green ALC zone but distortion rises rapidly on overdrive.

CW rise and fall shapes were nicely contoured with negligible distortion or character shortening at 40wpm even in full break-in mode. There was no overshoot or shortening of initial characters at all power levels and about 10ms delays to allow for linear amplifier switching. With extra delay added for slower amplifiers, characters are shortened by that amount, but only the initial character in semi-breakin mode. AM transmit showed correct carrier level but poor distortion. Similarly FM exhibited some distortion.

A fairly high level of wideband transmitter noise was observed at all frequencies below the cutoff of the output low pass filter. This level was -70 to -80dBm/Hz independent of transmit power even with zero RF output and observed across the HF bands even with the transmitter on 144MHz. This level is likely to be a problem with co-sited simultaneous multiband operations such as special events, DXpeditions and multi-transmitter contest stations unless extra filters are used. It was only at spacings less than 3kHz where phase noise predominated and this is power dependent.

ON-THE-AIR PERFORMANCE. As soon as I switched on the PT-8000A I was struck by the excellent quality of the audio and the brilliant display. The display is certainly a key feature of this radio, bright and colourful, most informative and easy to read. Similarly, the controls and pushbuttons are easy to use with very legible labelling, perhaps with the exception of the semi-presets needing less frequent access, the VOX, monitor and CW delay controls. Overall the ergonomics are good in most areas, once you have become fully acquainted with the controls and absorbed the manual. Some aspects of control access and the user interface are a little different from the radios from the Far East, relying heavily on the context allocated soft keys associated with the display. Changes of band, mode, receiver and transmit functions all bring different menu items that can be annoying if you wish to stay with one set, such as the voice recorder in contest calls.

The radio performed faultlessly on strong and weak signals and in crowded conditions. The filters were excellent and audio quality was outstanding for a transceiver with built-in speakers, in particular the bass response was particularly clean. Clean performance extended very well down to LF with the time-code transmissions and in the AM broadcast bands. Excellent performance extended to VHF and I was fortunate to catch a good tropo opening on 2m in late September and put some new countries in the log on that band (OK and OE). 6m and 4m also performed well. With the DSP filtering switched out there was a significant level of high frequency hiss but leaving the DSP filtering switched in eliminated this. There was a slight background noise in headphones at low listening levels. It is not possible to turn off the second receiver if not required, but just turn down the AF gain to zero.

On transmit, the audio quality was reported as being excellent using the T9 desktop microphone and the processor was clean and added extra punch. On CW the keying was clean but the sidetone sounded a little strange and the 1.35 software release has worsened matters in this respect. Full break-in functioned well and it was possible to listen between characters up to around 30 WPM. However, the monitor function is a problem. There is no mode dependent level or off button. On CW the level can be set for comfortable listening but then on voice modes the level must be turned down to zero to avoid audio feedback. This is most inconvenient.

Switching off the speakers when using headphones is also rather inconvenient and is reset to the on-state after power down. Remember this if you get up quietly during the night to chase some choice piece of DX and don't want to wake the family.

CONCLUSIONS. The Hilberling PT-8000A is a very interesting radio. Its performance is outstanding although the transmit noise may prove a problem. The mix of HF and VHF is a novel feature particularly with high performance on the VHF bands and the inclusion of 4m. It is a quality radio, professionally built and commands a related price so look away if you are looking for a radio in the economy price bracket. Available direct from Hilberling in Rendsburg, Germany it is priced at €13,690 plus delivery or 400 euros less without the 250Hz filters.

ACKNOWLEDGEMENTS. I would like to express my gratitude to Hilberling GmbH of Rendsburg, Germany for the loan of this radio.

Hilberling PT-8000A Measured Performance

Receiver measurements

	---Sensitivity SSB 10dBs+n:n---	
Frequency	Preamp Off	Preamp On
1.8MHz	0.63μV (-111dBm)	0.13μV (-125dBm)
3.5MHz	0.56μV (-112dBm)	0.13μV (-125dBm)
7MHz	0.63μV (-111dBm)	0.14μV (-124dBm)
10MHz	0.56μV (-112dBm)	0.13μV (-125dBm)
14MHz	0.5μV (-113dBm)	0.13μV (-125dBm)
18MHz	0.45μV (-114dBm)	0.11μV (-126dBm)
21MHz	0.56μV (-112dBm)	0.14μV (-124dBm)
24MHz	0.56μV (-112dBm)	0.14μV (-124dBm)
28MHz	0.56μV (-112dBm)	0.13μV (-125dBm)
50MHz	0.9μV (-108dBm)	0.10μV (-127dBm)
70MHz	1.3μV (-105dBm)	0.11μV (-126dBm)
144MHz	1.3μV (-105dBm)	0.10μV (-127dBm)

AM sensitivity (28MHz) preamp on: 1.0μV for 10dBs+n:n at 30% mod depth
FM sensitivity (28MHz) preamp on: 0.28μV for 12dB SINAD 3kHz pk deviation
Noise figure preamp on: 50MHz 6dB, 70MHz 7dB, 144MHz 7dB
AGC threshold: see text

AGC attack time: approx 1ms
AGC decay time: adjustable 100ms to 4s
Max audio at 1% distortion: 2.0W into 8Ω
Inband intermodulation products: -30 to -40dB

Bandwidth	----------IF Bandwidth----------		
Set To	-6dB	-60dB	-80dB
CW 250Hz	290Hz	680Hz	820Hz
CW 500Hz [1]	600Hz	1080Hz	1200Hz
CW 500Hz [2]	500Hz	820Hz	880Hz
USB 1800Hz	1650Hz	2760Hz	3100Hz
USB 2400Hz	2650Hz	3800Hz	4070Hz
USB 2700Hz	2950Hz	4230Hz	4520Hz
AM 6000Hz	6550Hz	9840Hz	10920Hz

[1] DSP filter off
[2] DSP filter on

Intermodulation (50kHz tone spacing) 2400Hz bandwidth USB

	------Preamp Off------		-------Preamp On-------	
Frequency	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
1.8MHz	+27dBm	99dB	+11dBm	97dB
3.5MHz	+30dBm	101dB	+14.5dBm	100dB
7MHz	+25dBm	97dB	+9.5dBm	96dB
14MHz	+36dBm	106dB	+17dBm	101dB
21MHz	+33.5dBm	104dB	+17dBm	101dB
28MHz	+33dBm	103dB	+15dBm	100dB
50MHz	+25.5dBm	96dB	+3.5dBm	94dB
70MHz	+31.5dBm	98dB	+6dBm	95dB
144MHz	+22dBm	91dB	+6.5dBm	96dB

Close-in intermodulation on 14MHz 500Hz bandwidth, CW, preamp off

Spacing	3rd order intercept	2 tone dynamic range
1kHz	+21dBm	101dB
2kHz	+26dBm	104dB
3kHz	+27dBm	105dB
5kHz	+27dBm	105dB
10kHz	+27dBm	105dB
15kHz	+29dBm	106dB
20kHz	+32dBm	108dB
25kHz	+35dBm	110dB
50kHz	+36dBm	110dB

Frequency Offset	Reciprocal Mixing RX Phase Noise 7MHz	Reciprocal Mixing RX Phase Noise 21MHz	Transmit Noise 7MHz 200W O/P
1kHz	-135dBC/Hz	not meas	-108dBC/Hz [3]
2kHz	-141dBC/Hz	-137dBC/Hz	-118dBC/Hz [3]
3kHz	-147dBC/Hz	-142dBC/Hz	-121dBC/Hz [4]
5kHz	-151dBC/Hz	-145dBC/Hz	-122dBC/Hz [4]
10kHz	-153dBC/Hz	-147dBC/Hz	-123dBC/Hz [4]
15kHz	-153dBC/Hz	-148dBC/Hz	-123dBC/Hz [4]
20kHz	-154dBC/Hz	-148dBC/Hz	-123dBC/Hz [4]
30kHz	-154dBC/Hz	-149dBC/Hz	-123dBC/Hz [4]
50kHz	-156dBC/Hz	-149dBC/Hz	-123dBC/Hz [4]
100kHz	-157dBC/Hz	-150dBC/Hz	-123dBC/Hz [4]
200kHz	-158dBC/Hz	-151dBC/Hz	-123dBC/Hz [4]

TX noise: [3] Phase noise limited [4] Wideband amplitude noise limited

Transmitter Measurements

		Intermodulation Products 100W		200W	
Frequency	Harmonics	3rd order	5th order	3rd order	5th order
1.8MHz	-56dB	-32dB	-41dB	-24dB	-37dB
3.5MHz	see text	-47dB	-59dB	-38dB	-48dB
7MHz	-68dB	-47dB	-56dB	-38dB	-51dB
10MHz	-65dB	-46dB	-56dB	-38dB	-50dB
14MHz	-65dB	-45dB	-52dB	-36dB	-46dB
18MHz	see text	-43dB	-48dB	-44dB	-46dB
21MHz	see text	-47dB	-48dB	-38dB	-46dB
24MHz	-51dB	-40dB	-49dB	-37dB	-46dB
28MHz	-50dB	-46dB	-46dB	-35dB	-46dB
50MHz	-68dB	-39dB	-46dB		
70MHz	-65dB	-45dB	-50dB		
144MHz	<-75dB	-36dB	-46dB		

Intermodulation product levels are quoted with respect to PEP.

Carrier suppression: -65dB
Sideband suppression: <-80dB at >800Hz, -30dB at 300Hz
Microphone input sensitivity: 2.5mV for full output
Transmitter AF distortion: 1%
FM deviation: about 2kHz
SSB Data T/R switch speed: mute-TX 20ms, TX-mute 12ms, mute-RX 20ms, RX-mute 10ms

NOTE:
All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on USB with receiver preamp switched out, 2.4kHz bandwidth. The two receivers were allocated to separate antenna connectors. Sensitivity related measurements were made with AGC off where appropriate.

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ZL7-70 70cm 7 Ele, Boom 70cm, Gain 11.5dBd..... **£39.95**
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SPX-300 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W, 3/8th fitting..... **£54.95**
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AMPRO-80 3.5MHz, Length 220cm, 38th fitting (slimline design)..... **£24.95**
AMPRO-160 1.8MHz, Length 220cm, 38th fitting (heavy duty design)..... **£59.95**
ATOM-20S 14MHz, Length 130cm, PL259 fitting (compact design)..... **£24.95**
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MR700 2/70cm, Gain 0/3.0dBd, Length 50cm, 3/8 fitting..... **£9.95**
MR777 2/70cm, Gain 2.8/4.8dBd, Length 150cm, 3/8 fitting..... **£19.95**
MRQ525 2/70cm, Gain 0.5/3.2dBd, Length 43cm, PL259 fitting (high quality)..... **£19.95**
MRQ500 2/70cm, Gain 3.2/5.8dBd, Length 95cm, PL259 fitting (high quality)..... **£26.95**
MRQ750 2/70cm, Gain 5.5/8.0dBd, Length 150cm, PL259 fitting (high quality)..... **£36.95**
MR2 POWER ROD 2/70cm, Gain 3.5/6.5dBd, Length 50cm, PL259 fitting (fibreglass colinear)..... **£26.95**
MR3 POWER ROD 2/70cm, Gain 2.0/3.5dBd, Length 50cm, PL259 fitting (fibreglass colinear)..... **£32.95**
MRQ800 6/2/70cm Gain 3.0dBi/5.0/7.5dBdBd, Length 150cm, PL259 fitting (high quality)..... **£39.95**
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MDHF-20 14MHz balun matched mono dipole, length 10m..... **£39.95**
OSHF-80 3.5-30MHz balun matched off set dipole, length 40m..... **£59.95**
OSHF-40 7.0-30MHz balun matched off set dipole, length 22m..... **£44.95**
OSHF-20 14-30MHz balun matched off set dipole, length 11m..... **£39.95**
LWHF-160 1.8-50MHz unun match end fed antenna, length 42m..... **£49.95**
LWHF-80 3.5-50MHz unun match end fed antenna, length 20m..... **£39.95**
LWHF-40 7.0-50MHz unun match end fed antenna, length 10m..... **£39.95**

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SQBM100N 2/70cm 3.00/6.00dBd, RX 25-2000MHz, Length 100cm N-Type..... **£54.95**
SQBM200P 2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, SO239..... **£54.95**
SQBM200N 2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, N-Type..... **£59.95**
SQBM500P 2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, SO239..... **£74.95**
SQBM500N 2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, N-Type..... **£79.95**
SQBM800N 2/70cm, Gain 8.5/12.5dBd, RX 25-2000MHz, Length 520cm, N-Type..... **£139.95**
SQBM1000P 6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, SO239..... **£84.95**
SQBM1000N 6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, N-Type..... **£89.95**
SQBM223N 2/70/23cm, Gain 4.5/7.5/12.5dBd, RX 25-2000MHz, Length 155cm, N-Type..... **£74.95**

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Amateur radio in 1926

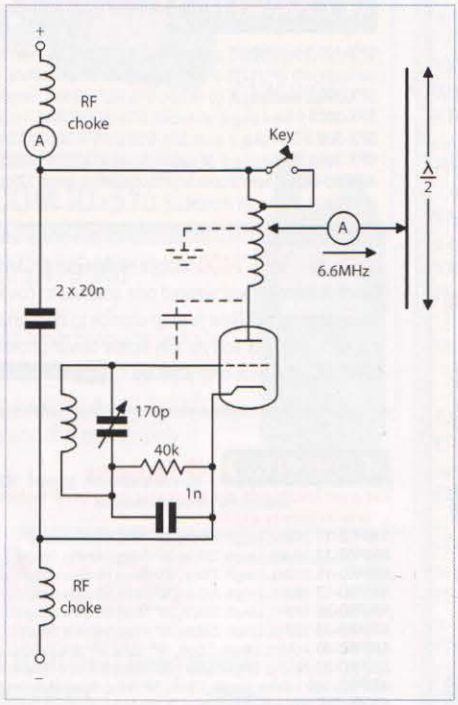
A look a yesteryear's technology for today's readers

I was fascinated by the reproduction in the Centenary edition of *RadCom* of G5KU's article from the March 1926 *T&R Bulletin* in which he describes his transmitter and antenna. The circuit arrangement for the transmitter and some of the terminology of that era, used in this and the other articles reproduced from the *Bulletin*, will probably need explanation for today's readers.

At that time, CW was the next evolutionary step after spark transmission and the popular method of producing it was to make a triode tube (valve) oscillate and to couple it directly to the antenna. Today this would be unacceptable because antenna current would include harmonics of the radiated signal. Power levels of several hundred watts could be produced at typical plate efficiencies of 70% [1] when the tube, or more often several parallel connected tubes, were operated in Class C. Difficulty was experienced in achieving a clean note, free from clicks, chirp and swishing. The first of these problems was due to arcing at the contacts of the Morse key, which had traditionally been required to either break the DC supply to the transmitter or to switch a negative DC potential used to cut off oscillation by driving the grid of the tube. Chirp was generally caused by the finite time taken for oscillation to stabilise, as it progressed through Class A to Class C, as the key was activated. Because the antenna formed part of the oscillatory circuit it could alter, or swish, the radiated frequency if its characteristics were influenced by wind movement or proximity of the operator to the feed wire. A short lived advance was a technique of coupling a low power stable oscillator that would lock the transmitter frequency to eliminate these problems but it was a common occurrence to lose lock and hence to lose communication. The simplest way of overcoming all of these problems was to use frequency shift keying and this was crudely achieved by shorting a small part of an antenna tuning inductor with key contacts. When phone operation was first introduced it was not unusual to also insert an appropriately cooled carbon microphone in the antenna feed line!

Antennas at that time as used by amateurs were generally of two basic types:

- The Marconi, essentially a quarter wave or a shorter wire loaded to look like a quarter wave, driven against ground or, more often, against a counterpoise.
- The Hertz or half wave wire that could be vertical, horizontal or anywhere between.



Feeders were single wire extensions of, and hence part of, the antenna.

It was essential to make the antenna resonant at the operating frequency to enable proper loading adjustment at the transmitter. A reactive antenna impedance would otherwise cause the frequency to be more dependent on coupling. Loading was critical because if excessive there would be insufficient plate potential to provide feedback to the grid to maintain oscillation. Light loading would cause the antenna/plate circuit to have the higher Q and take control of the radiated frequency.

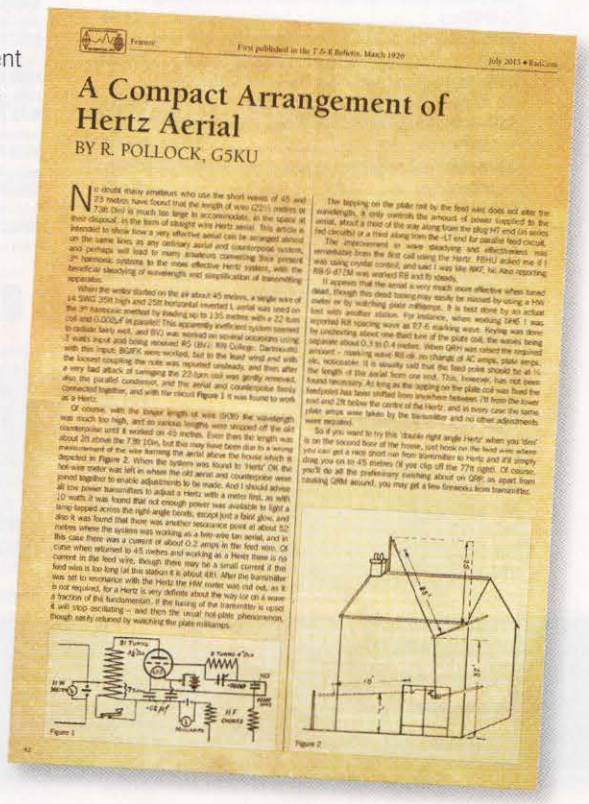
I have redrawn G5KU's circuit in a more conventional form (above), which hopefully will make it easier to understand.

Component count is minimal because the components often had to be constructed by the operator. The triode relies on internal feedback via the grid to plate capacitance and is known as a Tune Plate Tuned Grid (TPTG) oscillator. Oscillation frequency is determined by the grid tuned circuit which has much higher Q than the plate/antenna circuit. FSK is achieved by off-tuning the lower Q plate circuit. The 40kΩ grid resistor, bypassed to RF by a 1000pF capacitor, provides grid bias when the tube is oscillating and achieving grid current. If oscillation stops for any reason the tube has no bias and all of the input power is dissipated at the plate – hence the expression 'hot plating'.

It is interesting to see that no part of the transmitter is intentionally at ground potential. Both sides of the plate supply are derived via RF chokes decoupled by the pair of 0.02μF capacitors. In fact, there will be a point on the plate inductor that is at zero potential and it is against this that G5KU's 'Hertz' is apparently driven. The lack of a ground return would account for his observation that he could not see any antenna current. We can assume therefore that the antenna presented high impedance and was 'voltage fed'. The novelty of the antenna drive arrangement is that the bent half wave wire is driven via a single conductor to a point that is off centre. This arrangement was described by Wyndom five years earlier, incidentally. The Morse key is at high DC and RF potential and shows how health and safety considerations had yet to influence transmitting station design.

REFERENCES

[1] *Wireless*, L B Turner, Cambridge University Press, 1931

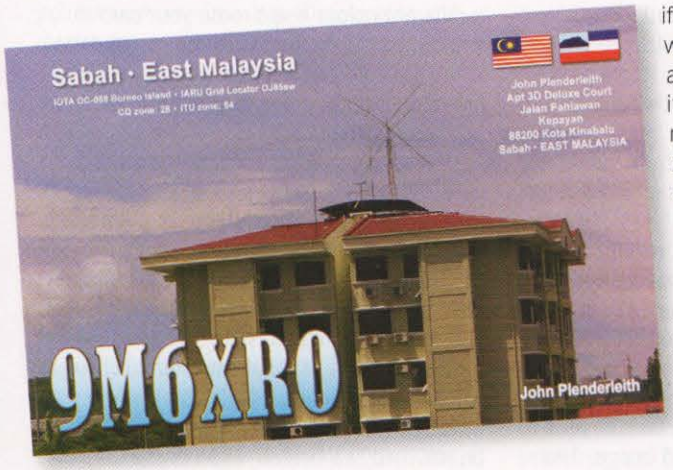

First published in the *T & R Bulletin*, March 1926 July 2013 ◆ RadCom

A Compact Arrangement of Hertz Aerial

BY R. POLLOCK, G5KU

Getting Started in QSLing

Responsible QSLing is the order of the day, but what does that mean?



QSL from the 2011 DXpedition to Sabah.

RESPONSIBLE QSLING. As an independent QSL manager for a hundred callsigns, DX, UK and special events, I send around 40,000+ QSL cards every year. In this article I want to explain the traditional ways of QSLing, how to get started and also how to take advantage of newer forms of electronic QSLing. My aim is to help you achieve the best QSL returns and how to QSL responsibly.

The basic reason for QSLing is to obtain confirmation that the contact(s) you make are genuine. You may need this confirmation to apply for certain awards or for your own satisfaction. Before the advent of the internet, the only way of doing this was by the exchange of cards by post and this method remains today. However, there are now cheaper and faster alternatives that are gaining popularity.

LOG KEEPING. This is where responsible QSLing starts. Today there is no excuse for not keeping a log that is up to date and with the necessary information to QSL responsibly. Many of us, but not all, use computer logging software, although some still prefer good old paper. Within almost all of the computer logs there is a box that has the option to tick 'Sent QSL / Received QSL'. This can be backed up with some form of note to yourself in the comments box regarding the date sent or received, bureau or posted direct and so on.

I strongly recommend using your QSL Rcvd/QSL Sent fields or columns at the time you request or receive a QSL card. I daily receive multiple QSL requests for the same QSOs as the sender can't remember if a card was sent and, if it was, by which method. To avoid the dilemma, I record it as follows. D 27/05/2013 means sent direct on 27 May 2013. B 27/05/2013 means sent via the bureau on 25 May 2013. OD 27/05/2013 means OQRS sent direct on 27 May 2013. OB 27/05/2013 means OQRS sent via the bureau on 27 May 2013. This makes tracking your QSLing much easier. If a follow up QSL is needed for any reason, the correct information is instantly available.

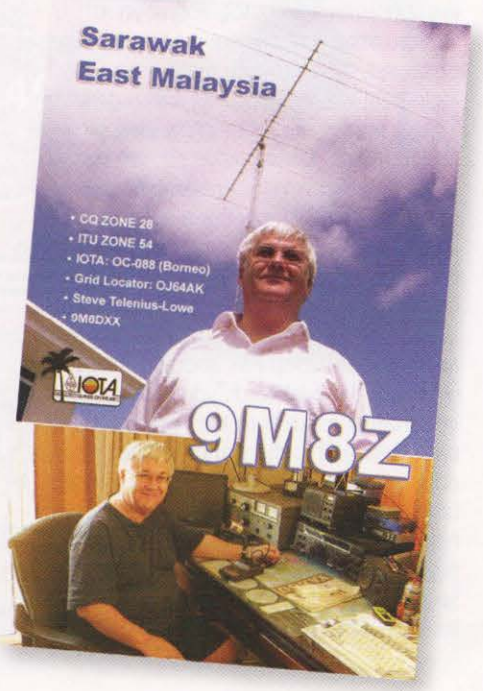
WWW.QRZ.COM. QRZ.com is a terrific resource. Always check it first before completing your QSL card. And note any special requirements, to avoid being disappointed. Some stations don't QSL or collect cards, others only respond to direct cards and some use a manager, sometimes in another country. You should always use only *one* route for your outgoing QSL, this is responsible QSLing. Sending multiple cards via several routes wastes time and money – yours and other people's – as someone has to process the multiple, duplicate, cards.

LOGBOOK OF THE WORLD. Logbook of the World (LoTW) is run by the ARRL. If you are collecting QSL cards for DXCC Awards then it is a good idea to register with LoTW. Even if you're not a QSLer, those that are can benefit hugely from LoTW if you regularly upload your logs. LoTW can save a huge amount of money for everyone and it's never been quicker to earn a DXCC Award. Registration is free and you only pay for the awards requested. As you receive more confirmations, LoTW costs do come down. Follow the link to LOTW from www.arrl.org to find out more.

ONLINE SYSTEMS. OQRS or Online QSL Request System & *Club Log* are online programs that can be used to request QSL cards. *Club Log* is a web-based application that analyses log files from radio amateurs all over the world. Using the logs, *Club Log* offers you a wide range of reports for your own benefit and identifies large scale trends from the sum of all activity in the database. It now offers a new option for QSL exchange – not to be confused with other forms of electronic QSLing. It offers a quick route to receiving a real, direct QSL card for a small online cost using PayPal. The receiver will pay about 42p in PayPal charges from a £2 payment. This is great value when you offset the postal cost.

You can register online and upload your logs at www.clublog.org. Once you have your account set up on *Club Log* you can find 'Log Search' in the left menu of the website, then search the log then proceed to request QSL. For Bureau option, OQRS should be your preferred option.

In truth, most DXpeditions, IOTA and special event stations don't actually need your card. The DX teams go to a rare location to give you an 'ATNO' (All Time New One). To get a card from them, all they need you to do is make an OQRS Bureau request to confirm that you want a card, then mark the request in your log book (eg OB 27/05/2013 = OQRS Sent Bureau). Please don't request a card via OQRS and then send a card through the bureau, it's just a waste of your time and money – and the time of those that will handle your QSL card along the line. I recently received 5,700 QSL cards from the RSGB bureau, mostly for DXpeditions for which I am the QSL manager. Around half of the cards had already been requested via the OQRS system: what a waste!



QSL cards from well-known DXer Steve Telenius-Lowe, 9M8Z.

2011 DXpedition to Hispaniola Island, Haiti.

OQRS improves your reply rates, reduces your costs and reduces the burden on the international bureau system and its willing volunteers. The whole QSL system is literally being clogged up with cards that could easily have been requested through OQRS.

TRADITIONAL QSLING. If you decide that traditional QSLing is for you, the good news is that professionally printed QSLs have never been cheaper. There are now many QSL designers and printers all around Europe. They provide quite exceptional design and high quality printing at very reasonable costs for special events, DXpeditions and personal use, even for small quantities. Homebrew, thin, small paper cards are difficult to handle or display; they tear, crumple or stick together. Photo paper cards are often false economy; they do not travel well and often arriving damaged by heat, humidity or damp. Good cards get replies!

How do you go about getting a QSL card designed? Your design is only limited by your imagination. Decide on a theme for your card that says something about you, your interests, your life or your special event. Perhaps a photograph of your station, antennas, a local landmark, sunrise or sunset, the Aurora Borealis or maybe inclement weather such as a thunderstorm? These, and others, offer interesting pictorial opportunities. Once you've chosen your subject, select several images and choose the best. Make sure you are not using copyright images from someone else without their permission – many images on the internet are not copyright free, be careful.

QSL printers advertise in *RadCom* and across the internet. Ask another amateur or checkout the best cards you receive. Most importantly make sure they use a single page card that is the standard international postcard size – 140mm x 90mm. No QSL bureau welcomes odd sized, multi-page or heavy cards; they are slow and costly to process, easily damaged and may not get sent out if it takes too long to turn each card inside out to find the destination callsign.

THE PEFECT IMAGE. Here are some tips to ensure the perfect image for QSL reproduction.

- Use the highest digital resolution that you can with your camera, 300dpi minimum (dots per inch). Small images become pixelated and blurred in print reproduction.
- Do not re-size photographs; let the designer do that if it is needed.
- Photographs require a 2mm clear 'bleed' border, to avoid damage during the cutting process.
- Club logos must be high resolution images. Don't rely on low resolution, website logos. Encourage your club to store high quality images in a download area for members use.

THE PERFECT WORDS. The text on your card is as important as a good image. The text should be clear and should include information such as

- CQ Zone number (UK = 14), ITU Zone number (UK = 27)
- Islands on the Air (IOTA) reference (UK mainland = EU-005)
- For IOTA, and other awards, it is vital that the Island name and reference is printed on the card.

Don't rely on the QSL designer to write the text for you: the designer will only work with what you provide. If you have a double-sided card, it needs your callsign, in large letters, on both the front and the back. Busy QSL managers handle thousands of cards, turning cards over repeatedly to find callsigns wastes large amounts of valuable time.

Think carefully about the QSO report area; simple, clear, clean and uncluttered is always best. If you are using a manually written QSO report panel, ask the designer for 5 QSO slots so you can show up to five contacts with the same station, perhaps on different bands, all on one card. Sending 5 cards for 5 QSOs isn't eco-friendly and costs many more man hours in the bureau system, slowing everything down. Logging software often has a label printing facility, but take the time to set this up to print in the best way possible. Many offer the multi QSO print out options of 5 or more contacts to a single station on one label. The most popular size label is 63.5mm x 38.1mm, with 21 labels per sheet, costing typically £6 per box of 100 sheets.

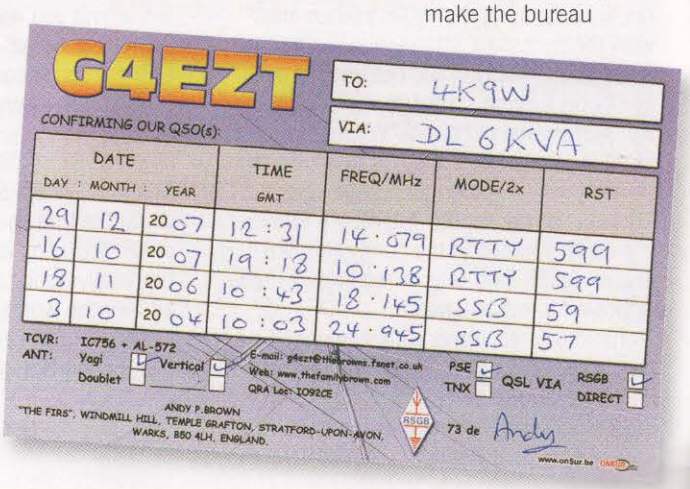
For quicker sorting at either your QSL Manager's end or in the bureau, the 'station worked' callsign really should be top right of your card or label. Use clear, **bold** print with a minimum size of 12 point to make for easy reading. Routing instructions such as an additional 'via another station' callsign should be printed directly underneath. Using a different colour helps route your card to the correct destination with minimum delay. If not, it could end up in the wrong country first time around or be returned if there is no bureau in that country.

DIRECT QSL. To send your QSL card direct, post the card plus a self addressed envelope and US$2 or 1 x International Reply Coupon (IRC) to the other station. IRCs are being phased out in the UK. If you need them, just ask a QSL manager to sell you some.

The US$2 is usually requested to cover all the costs for sending a QSL card back to you directly. Without a payment your QSL could be returned 'via bureau' and not the quicker, direct route. As most letters are sorted by machine all around the world, it is important that you put the destination country in capital letters – that's both on the envelope going out and the one addressed to you.

VIA BUREAU. Everything you need to know about the RSGB QSL Bureau is in the current Yearbook and on the RSGB website, http://rsgb.org/main/operating/qsl-bureau/sending-cards-to-the-bureau/. Please follow the rules carefully and you'll make everyone's lives much easier!

Once, almost all QSLing was done via the international bureau system and we all accepted the long exchange times, two years plus being the norm. Today, more people want their cards *now* and expect the bureau systems to react instantly. Sadly, this cannot happen for many reasons, mainly due to ever increasing volumes. Duplicate, unwanted, returned and unrequested cards have to be sorted and shipped, just to find the wanted ones. If we can do our bit to reduce the unwanted cards it will surely make the bureau



A good example of a report panel.

systems more effective again, speeding up genuine cards, both incoming and outgoing.

Many of the QSL bureaus around the world are run by volunteers with families, jobs and hobbies – like amateur radio. They want air-time too!

When using the bureau, make sure the callsign of the station worked is clearly visible (top right is preferred). It should also be legible and in a bold type if printed (12 point minimum size). It is surprising how long it can take to process a card when you can't easily find the destination call. Pre-sort your cards in the order given in the Yearbook and on the website, as those in random other order can take up to five times longer to process. A bureau can't send all cards everywhere, so always check before you send. There are only 178 potential destinations, with 22 currently closed. Find out what's possible from the IARU QSL Bureaus list from www.iaru.org/qsl-bureaus.html and check it regularly for changes too.

GOING ON HOLIDAY? If you are going on holiday, organising an event or DXpedition, please update QRZ.com with the correct QSL information, especially if travelling abroad. For example, the Canary Islands EA8 bureau cards will likely be destroyed or returned 'Not a Member/ Call Unknown'. It would be better to create a *Club Log* account or use the OQRS facility for your callsign and ensure your sub-manager knows and has adequate envelopes and stamps. If you visit any other UK prefix – find the sub manager details and send him envelopes, or you can always tell your contacts that you don't want cards?

QSL card from a Faroe Islands DXpedition.

LARGE INTERNATIONAL QSL MAILINGS. In fairness to others, the RSGB has a 2kg at a time limit for senders wishing to send multiple cards to a single destination. These should be sent direct to the overseas bureau concerned.

RESPONSIBLE QSLING. Before you write a QSL card, think about whether you need to send it or not. If you already have a card from G1VDP for a RTTY contact on 20m, do you want or need another card from him for that band / mode combination? He won't need your card for the contact and will happily send you his if you ask via e-mail or the OQRS system. Even if your logging software does not allow you to print numerous contacts on one label, stick on a list of the contacts to a card and send just one.

Thank you to Richard Constantine, G3UGF, Charles Willmott, M0OXO and Chris Colclough, G1VDP for their help in writing this article and for their help and support with the major postings.

Radio Fairs

West London Radio & Electronics Show Sunday 10th November 201 The UK's Premier Rally .....In The South

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- RSGB book stand
- Major UK distributors present showing the latest equipment from the Yaesu/Vertex, Kenwood, Icom, Alinco etc.
- Trade stands selling amateur radio equipment, antennas, components, batteries, computers disks, software, etc, etc.
- Larger area for club stands with local clubs represented.
- Bring and Buy stand (for selling of personal amateur radio items only; no hi-fi, computer stuff or boxes of components)
- Main UK Radio and Electronics Publishers present
- Catering of Costa Coffee and Best of British, including Fish & Chips

Opening Time 10am, Tickets 9.15am, Disabled Access 9.45am, Under 16's free Entry

For Trader table bookings please phone, fax or email your order - flea tables subject to availability

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Kempton Park Racecourse, Sunbury on Thames, Middlesex, TW16 5AQ

Antennas

Measuring coax electrical length

CORRECTION FROM OCTOBER. My thanks to G3VLF for pointing out that the formula for the size of a quad given last month was incorrect. It should have been L (ft) = 250/f (MHz).

ELECTRICAL LENGTH OF COAX. It is very useful to be able to measure the resonant length (electrical length) of a length of coaxial cable. Sometimes we wish to avoid resonant lengths of transmission line to reduce the effects of common mode currents on the line. On the other hand we need resonant lengths to make a coaxial balun or a phasing network for a directional array or for circular polarised Yagi. The need for identical electrical lengths of coax also arises whenever you need to feed two or more antennas in phased arrays.

Usually you need a precise number of electrical half-wavelengths or quarter-wavelengths. You may also want to measure the electrical length of a section of cable that is already part of an antenna installation or a roll of cable on a drum.

Quarter wave and half wavelength piece of transmission lines have special properties. A line quarter wave in length acts like an impedance transformer. A short circuit at one end will appear as an open at the other. Likewise an open at one end will appear as a short at the other. This will happen only at the frequency where the line is 1/4, 3/4, 5/4 (etc) waves in length and is known as the 'dual', see **Figure 1**.

However, you can't just cut a physical length of coax that is half or a quarter wavelength long as you can an antenna element – there is the velocity factor to consider.

VELOCITY FACTOR. The dielectric material that separates the outer conductor of coax cable from its centre conductor performs two functions: 1) it determines the intensity of the electrostatic field that can exist between the two conductors, thus establishing the cable's electrical characteristics and 2) it ensures the inner conductor is physically centred relative to the outer conductor (braid).

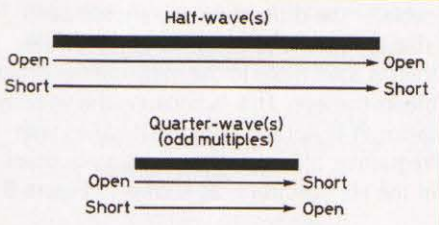


FIGURE 1: An electrical half-wave (or any multiple) shows the same impedance at its far end. An electrical quarter-wave (or any odd multiple) shows the 'dual' of impedance at its far end.

Common dielectric materials used in the manufacture of coax include polyethylene and polystyrene and many of the popular coax cables used in amateur radio use a solid polyethylene dielectric.

Electromagnetic waves travel at the speed of light in free space but are slowed down if they travel though a dielectric material. As already noted the two conductors of the transmission line are separated by a dielectric material. The RF energy is contained within these two conductors and is subjected to a delay caused by the dielectric constant of the insulating material. This delay is expressed in terms of the speed of light (either as a percentage or a decimal fraction) and is referred to as the velocity factor Vf.

Taking a length of RG-213 coax for example, from published data the dielectric type is polyethylene. This material has a velocity factor Vf of 0.66, which means the velocity of propagation within this coax is 0.66 x the velocity of light.

Other coax such as RG-58xx uses polyethylene with low-loss nitrogen (accomplished by bubbling nitrogen gas through molten polyethylene during the manufacturing process). This material, known as foam dielectric, offers half the dielectric losses at a modest increase in cost and its velocity factor is 0.82.

It follows that a quarter or half-wave of an electrical length of coax required to perform the functions described earlier will need to be 0.66 and 0.82 respectively for RG-213 and RG-58xx. A more elegant method of determining and electrical length is to actually measure it electronically.

PHOTO 1: An MFJ-269 being used to measure the resonance of an open circuit length of coax. Originally an MFJ-259 was used, which can only measure the Rx component of impedance.

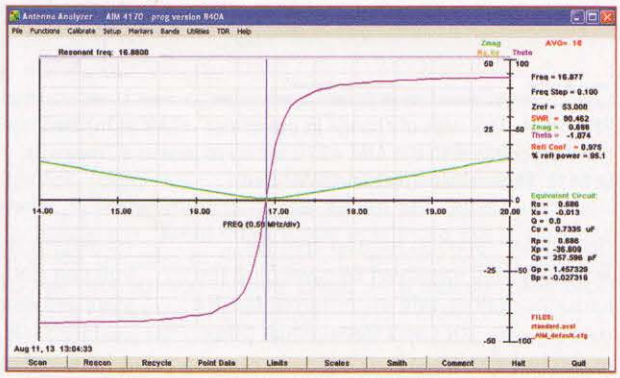


FIGURE 2: The impedances of a length of coax measured over a frequency range 14 to 20MHz plotted in polar coordinates. Note that the rate of change with frequency of theta (Xs) is much greater than Zmag (Rs).

The July edition of Antennas [1] partially addressed a question from Ron Bennett, G4DIY. He had a requirement for an electrical quarter wave of RG-213 for an antenna project and wanted to know how to measure it. I then described my efforts measuring the electrical quarter wavelength of a 9.25ft of open circuit Daiyu Denson SD-2V coax using an MFJ-269, as shown in **Photo 1**.

This method appeared to have accuracy issues. The problem arises when trying to determine the lowest value of Rx. As you can see from **Figure 2** (Zmag, the polar coordinate equivalent of Rx) varies slowly with changes of frequency. On the MFJ-259 the frequency could be swept over 400kHz (at 16MHz) with no

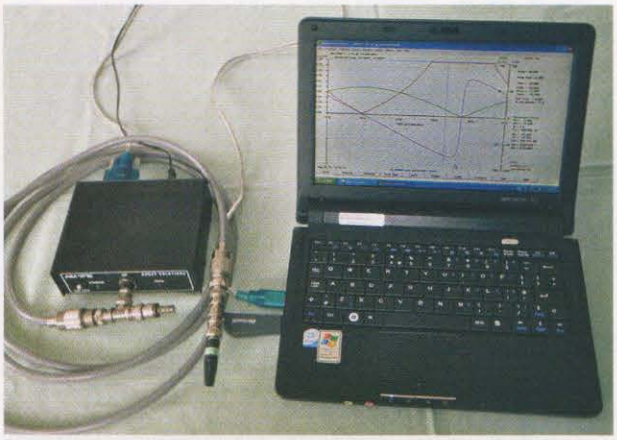


PHOTO 2: The AIM 4170 set up to measure SWR on a 'short' terminated line to see how it compares with Rx and Xs measurements.

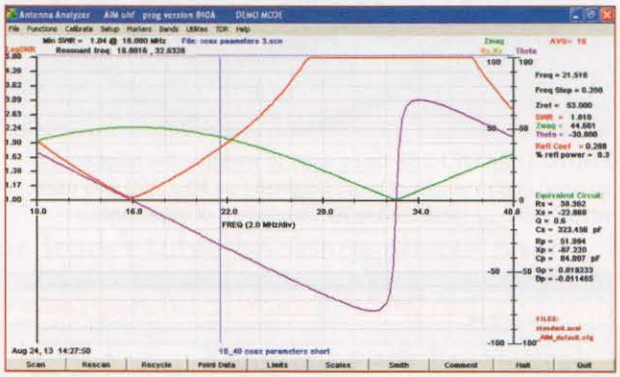


FIGURE 4: The rates of change in parameter values at the two resonant points with the AIM 4170 set up to measure Zmag=Rs (green), Theta=Xs(purple) and SWR (red).

perceptual variation around zero Rx. Accuracy was improved by sweeping the frequency either side of zero until the Rx reading was 10Ω and the average taken of the two readings.

On the other hand, from **Figure 2** you can see that the Xs rate of change with frequency is much greater than Rx so an instrument capable of measuring this parameter appears to be more suitable. The MFJ-269 displays Xs digitally. In practice the frequency could be varied from 16.26MHz to 17.04MHz before Xs moved from zero, which is an improvement compared with measuring Rx.

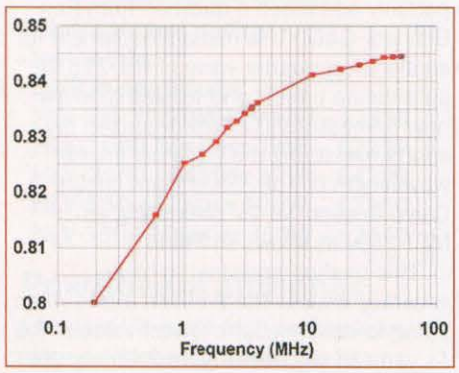


FIGURE 5: The variation in Vf with frequency of a high quality RG8 coaxial cable known as Commscope 3227. The published Vf for this cable is 0.84.

MEASURING COAX LENGTH USING SWR.

Stewart Rolfe, GW0ETF, e-mailed me to say "You talk about the accuracy problem of determining zero impedance with an analyser. I've always used the method of having a 50Ω load in parallel with the coax, which is in this case shorted at the far end. When the frequency is correct for an electrical 90° (quarter wavelength) the coax presents 'infinite' impedance to the instrument and you're left with 50Ω pure resistance, which the instrument will indicate accurately. You just need a SO239 'T' piece and a dummy load with a very short lead on one branch and the lead under test on the other [1]". See **Figure 3**.

I did describe this method in **[2]** but it was never actually tried and I had forgotten about it. The method has the advantage that an impedance measuring instrument is not required and you can perform the measurement with standard items found in a ham radio shack.

The SWR test assembly is energised by a transmitter (with the power considerably reduced so that the PA is not damaged by any wild load impedances). In many cases the measurements using this method will be confined to within the amateur bands because of transmitter frequency limitations.

Variations in the values of Zmag and Theta (polar equivalents of Rx and Xs) have already been described and shown Figure 2. I then set the AIM 4170, shown in **Photo 2**, to additionally measure SWR so that results could be compared with previous measurements. The measurements shown in Figure 4 were performed using the same length and type of coax (terminated with a short) as used in previous measurements but measured over a frequency range of 10 to 40MHz. This clearly shows the rates of change in parameter values at the two resonant points.

There is another factor to be considered when terminating a coax length. Although I was using the 'short' termination (black-tipped in Photo 2) provided with the AIM 4170 I didn't have a suitable coax adapter and had to improvise with three stages

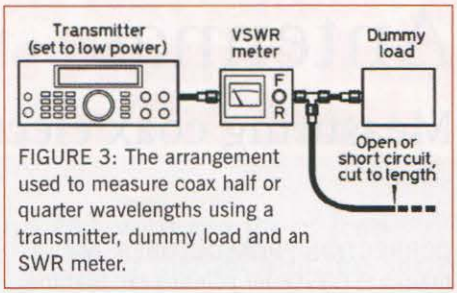


FIGURE 3: The arrangement used to measure coax half or quarter wavelengths using a transmitter, dummy load and an SWR meter.

of adaptors. This changed the resonant frequency down from 16.73MHz to 16.14MHz. When you use a termination with a connector or adapter consider that it may affect the length of the cable you are trying to measure.

CALCULATING VELOCITY FACTOR. If you have a length of coax with its pedigree stamped on the side then all you have to do is to look up the velocity factor in tables that can be found on the internet. Otherwise you can calculate velocity factor by comparing an electrically measured length with its physical length using the following formula:

Velocity factor Vf = physical length (ft) x frequency/246

For my 9.25ft length of SD-2V,

Vf = 9.25 x 16.49/246 = 0.62.

This wasn't the velocity factor figure I was expecting. It turned out that I had made an error in measuring the physical length of the coax. A new length measurement of 9.66ft resulting in a value of Vf = 0.6603

Vf = 9.66 x 16.82/246 = 0.6605 (measured 9ft 8in)

I can't say I like this length measurement in metric feet! It may have contributed to the physical measurement mistake; imperial rulers are not calibrated in decimal points. I now favour metric measurements and my length of cable was measured again giving a value of 2.94m. This requires a new formula for calculating Vf and I suggest the following:

Velocity factor Vf = Physical length (m) x frequency/74.88, so

2.94 x 16.82/74.88 = 0.6604

You can also measure the length of a large drum of coax to find its electrical length. If the coax type is printed of the cable or the drum then you should be able to find the physical length. However there's a bit more to the measurement than meets the eye. This is because the velocity factor Vf is not a constant – it varies with frequency, although this variation is small in the HF spectrum, as shown in **Figure 5**.

REFERENCES

[1] *Low Band DXing*, 4th edition, chapter 11 page 24, Phased Arrays, UN4UN

[2] *The Antenna Experimenter's Guide*, 2nd edition, P94, G3LDO

National Hamfest report

The best Newark event yet

The RSGB book stall was busy throughout the show.

EXCELLENT. In the lead-up to the National Hamfest we said it was going to be great and, now it's over, many would agree that 2013 saw the best National Hamfest yet. Organised by Lincoln Short Wave Club in association with the RSGB, the National Hamfest opened its doors on Friday 27 September to a long, expectant queue. And they were not disappointed! There was a wide range of exhibitors from the largest emporiums down to one-man bands plus a diverse range of clubs and a large number of RSGB representatives. As always, the Bring and Buy stand was kept busy all weekend too.

NEW PRODUCTS. Lots of new products were launched at the show – some of them so new that they hadn't quite reached production yet. In this class was the Peak Electronics Atlas LCR45 passive component impedance meter, which promises complex impedance analysis for enhanced component value measurement. It's expected to start shipping in December. Peak also displayed the rest of their range of handy-sized affordable test instruments in a hands-on demo that attracted many people.

The new bhi Desktop DSP noise reduction loudspeaker sold out very quickly said Graham Somerville, the man behind the company. The high quality 10W full range loudspeaker is proving very popular, particularly because it costs about the same as a transceiver-brand desktop speaker that doesn't come with a noise processor.

Software defined radio products abounded at the show. Waters and Stanton featured the brand new Apache Labs ANAN-100 series high performance Top Band to 6m SDR transceiver with a full working demo. W&S also hosted Eric Swartz, WA6HHQ – 'Mister Elecraft', who was making his first trip to the UK for 25 years. He was proudly showing off the new Elecraft linear amplifiers including the compact 100W KXPA 100, and the K3-size KPA500 solid state amplifier that delivers 500W from Top Band to 6m.

The new bhi Desktop DSP speaker sold out very quickly – but plenty more are on the way says bhi's Graham Somerville.

FlexRadio Systems' European representative Klaus Loweman, DK7XL gave a fascinating talk on SDR developments and then split his time between the Martin Lynch & Sons and W&S stands, where he was available to demonstrate and discuss the Flexradio range.

Another SDR sneak preview could be found on the Cross Country Wireless stand, where a prototype Sentry 25 was on display. This transceiver is expected to cover 160m-4m and is due out before Christmas. Meanwhile their compact HF antenna was "selling like hot cakes", apparently due to the polycarbonate box that's proof against just about anything the sun or weather can throw at it.

Marking their first appearance at the National Hamfest, Taylor Made RF Systems – worldwide dealer of Kinteic Avionics consumer products and UK dealer for Bonito Radio Products – showed off a prototype TMRF-TS990KP, a keypad to connect to the new Kenwood TS-990S radio and gives access to the 8 custom programmable functions the radio offers. Similar products will be available for Icom radios soon. Other products shown included the Unipatch patch lead kit, the Kinetic Avionics SBS-3, 1090 PUCK and SDR Puck along with a new intelligent HF converter, plus new products from Bonito including the 10cm-long Mini-Whip active shortwave antenna that operates from 10kHz to 30MHz.

Innovantennas had a very big stand this year, one that couldn't have been missed by any visitor. A wide variety of antennas wazs on display ranging from HF multibanders to the famous Loop Fed Arrays for VHF. Also on offer were OM-Power amplifiers at show special prices, SPID rotators and more.

G4TPH was showing his new ML40-HP remote-tuned compact magloop antenna that tunes 40m to 15m and handles up to 100W of SSB.

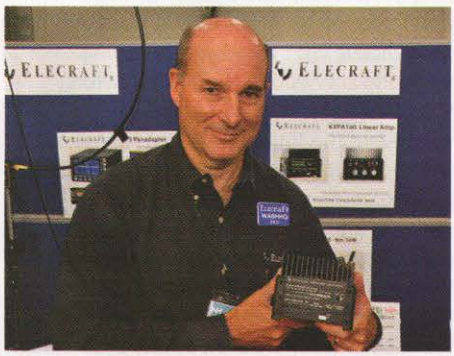
Telonic had a great show with their display of Rigol test equipment attracting much interest. Apparently they sold out of several lines on Friday so they arranged for a van to bring more stock from the warehouse for Saturday – and most of that sold out too! The free Noise Source kits that Telonic were giving out also proved very popular amongst visitors to the stand.

The brand-new Gemini series of solid state linear amplifiers had pride of place on the DX Shop stand. Featuring a solid 300W of output from 0.5-25W of drive, versions are available for6m, 4m and 2m now, with 70cm and 23cm versions coming in 2013. As far as possible they are made from British parts – the transformer, PCB and chassis are all UK-made – and if the prototype Gemini 4 on display is anything to go by, all are built to a very high standard. Apparently a whole month's worth of production was sold on the Friday!

CLUBS AND SOCIETIES. A wide range of clubs and societies exhibited over the weekend. The International Morse Preservation Society – FISTS – proudly showed off their 'silent running' touch keyer project that was originally designed to allow click-free QSOs at night.

RSGB President Bob Whelan, G3PJT (right) makes a presentation to *PW* editor Rob Mannion, G3XFD on his retirement. (Photo: G4EAN).

BIG NAMES. The Big Three amateur radio manufacturers all had large stands. Kenwood's new flagship TS-990HF/6m transceiver attracted a lot of attention and was the star of the stand. Over at Icom the new IC-7100 was on display and many amateurs were impressed by its touchscreen operation, 4m capability and optional D-Star. Yaesu's new FT DX 1200 provoked much interest, as did their new budget 2m handheld, the FT-252. Brief details were also available of Yaesu's new dual-mode analogue and C4FM digital DR-1 repeater plus FT1DR analogue/digital handheld and FTM-400E 2/70 analogue/digital mobile.

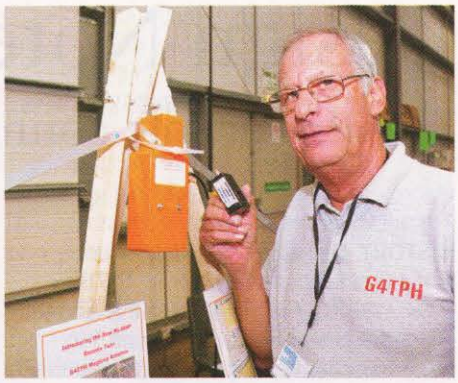


Eric Swartz, WA6HHQ was on the W&S stand with the full range of Elecraft equipment. Here he shows the new Elecraft KXPA 100 12V linear.

OVERSEAS TRADERS. As well as the UK traders, the National Hamfest attracts a number of international businesses. First-time visitors EAntennas had a wide range of aluminium masts and wire antennas on offer. Tecadi from Germany had their familiar composite mast sets, ropes and associated accessories and Jürgen, DH5AB said that he was having an excellent show.

OUTSIDE. The National Hamfest was blessed with good weather on both days, which meant that the outdoor activities went well. The car boot sale area was well attended with private traders and amateurs in search of a bargain. The former GB4FUN trailer, now GX3RCM, was on display by the Sheffield Amateur Radio Group who were streaming live video to the world and providing a welcoming face to visitors. Camb-Hams were busy all weekend operating G100RSGB from the club's well-equipped mobile shack, Flossie. The National Hamfest special event station, meanwhile, operated an impressive Elecraft K-line setup including a K3 transceiver and KPA500 amplifier. Other outside exhibitors included Total Mast Solutions who demonstrated a range of amateur and professional pump-up masts.

RSGB President Bob Whelan, G3PJT, presents a Prize Draw prize to Graham Parry, G7OGR. (Photo: Laura Roberts).



G4TPH shows off his remote tune magloop and wideband feed.

The Telonic crew had a great National Hamfest with much interest in their Rigol analysers and oscilloscopes.

NATIONAL HAMFEST PRIZE DRAW. Visitors were invited to fill in their details and enter their tickets into prize draws on both days. Valuable prizes were generously donated by bhi, Icom, Innovantennas, Kenwood, Moonraker, Peak Electronics, Waters & Stanton and Yaesu. The lucky winners were G4SSG, G0MGU, G1CPP, G7OSR, G7SOZ, G4WGE, G0WHO, G4ZFQ and G8IXX. Many thanks to our kind sponsors and congratulations to the lucky winners. Page 90 has more photos of some of the lucky winners receiving their prizes from our sponsors.

FAREWELL. One legend of hobby radio left the scene at Hamfest. Rob Mannion, G3XFD chose the Friday of Hamfest to retire from 35 years as the editor of *Practical Wireless*. At the conclusion of his morning talk on the trials and tribulations of his time in journalism, Rob was presented with a framed note of appreciation and serial number 1 (of just 250) of the RSGB Centenary First Day Cover by RSGB President Dr Bob Whelan, G3PJT. Describing himself later as "now officially retired", Rob also mentioned that he would still be a "consultant editor" to *PW*, so his experience will not be lost. Meanwhile, we offer our congratulations to his replacement, well-known DXer and former *RadCom* columnist Don Field, G3XTT.

NEXT YEAR. The 2014 National Hamfest is already booked for 26 & 27 September – see you there!

Design Notes

The PowerPole connector standard

HISTORY. Ever since I was introduced to the 6 pin Jones connector in 1978 by Dave, G8GKQ, I regularly used this ancient connector between equipment and 12V power supplies. One of these appears in the bottom left of **Photo 1**. They were robust, could easily carry 30A with the 3 + 3 pins connected in parallel for positive and negative supplies and, at least in those days, were readily available on surplus equipment. Several items of professional kit used them as the 12V input connector. Over the years supplies dried up and now they appear to be manufactured from Unobtanium **[1]**. A new connector standard was urgently needed chez 'JNT. 4mm plugs and sockets were pressed into service and I rapidly used up all that had been sitting in the junk box. 4mm connectors are not ideal: care and attention is always needed to avoid inadvertent polarity reversal, but they do work well. Going round the rally stands trying to stock up soon revealed just how pricey these things were. Then I remembered that several mentions had been made of the PowerPole connector for amateur radio usage, and I vaguely remembered it becoming a sort of standard. A Google search revealed all **[2]**.

An e-mail to Ian White, GM3SEK resulted in this response "Yes, this was covered in the November 2001 In Practice. Also covered was the popular Storno or 'RAYNET connector'."

So it looks (as usual) as if I am late finding out about this versatile connector. However, little has appeared in *RadCom* since then so it deserves a mention here. The 'amateur radio standard' PowerPole is actually just one type of a range of connectors produced by Anderson products. The type used is rated at 30A so is suitable for high power transceivers as well as low power equipment, is lightweight and easy to assemble using solder or crimping. The basic connector is genderless: both plug and socket are identical. One is mated with the other simply by turning it around (or upside down) and pushing the two together, as shown in **Photo 1**. There are several ways the individual connectors can be physically put together, but the 'standards specifies exactly how this should be done. Photo 1 shows the correct orientation. There is an enormous amount of documentation on the web about these connectors and **[3]** is a good starting point. eBay has several suppliers, usually selling connectors in packs of ten or twenty (5 or 10 each of black and red) and the price is typically half to a quarter of the cost for equivalent pairs of 4mm plugs. There are also several suppliers selling distribution panels, power supplies, chargers and other power products for 12V operation, all using this connector standard.

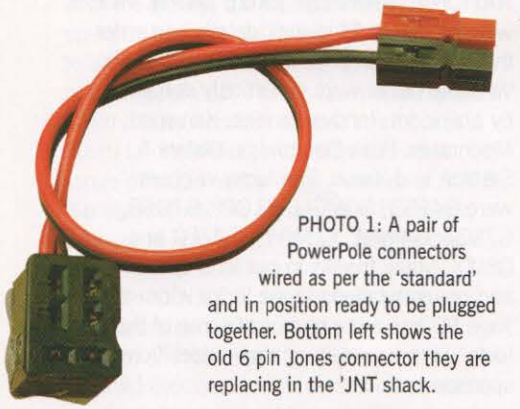


PHOTO 1: A pair of PowerPole connectors wired as per the 'standard' and in position ready to be plugged together. Bottom left shows the old 6 pin Jones connector they are replacing in the 'JNT shack.

Ian also stated, "There are also some non-Anderson Powerpole knock-offs around, not only on eBay but also from dealers including CPC. I have found these less tolerant of hand assembly than the original Anderson brand. It is very important to get the contacts EXACTLY parallel and in line so that they both click into place in the housing, especially when using heavy 20A cable that fights back. There are also many discussions about DIY crimping the contacts, as the Anderson ratchet tool is quite expensive and there don't seem to be any low-cost substitutes for the proper dies (a crimp that punches down in the middle but isn't allowed to spread out sideways). I usually end up graunching it together with two different ratchet tools to hand, and then soldering as well. I'd also be grateful if you could remind people that a lot of '*In Practice*' material – including several reprints and the complete Cumulative Index of more than 200 articles – is still online at **[4]**".

POLARITY REVERSAL AND TRANSCEIVERS. Having recently acquired an FT-817 transceiver, I needed to check how protected it was against damage from accidental power input reversal (see 4mm plugs above...). I remembered seeing someone connect an FT-790 the wrong way round across a lead acid battery. To my surprise at the time, it survived. Perusing the circuit diagram for the FT-817 suggested this too could survive a similar sort of mishap, and it appear to be designed to cope. **Figure 1** shows the essential part of the DC input circuitry after the 12V circular input connector that would 'see' the wrong input polarity. The DC input first goes though an RF filter before passing to the radio internals proper. Note how the negative connection goes to the chassis of the radio after this filter.

A series diode protects the input to the voltage regulators so they will never see the wrong polarity (the manufacturers even had the foresight to place the first set of polarised electrolytics only after this diode). A feed is taken from before the protection diode to the NiMH battery charging circuitry, represented by the PNP transistor shown. If the wrong polarity appears here, the base – emitter junction of the PNP device in the charge regulator blocks the negative voltage from travelling any further. This is not completely foolproof: bipolar B-E junctions can have a relatively low Zener breakdown voltage so a real test was needed. Using an

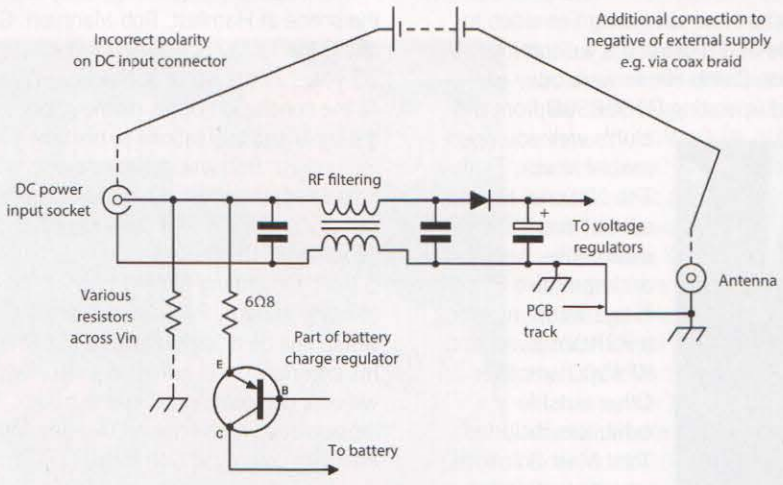


FIGURE 1: Circuitry following the FT-817 DC input connector, showing the areas where protection from reverse polarity input have been provided. Also note the short circuit route via ground connected PCB tracks that can have dire consequences in certain cases.

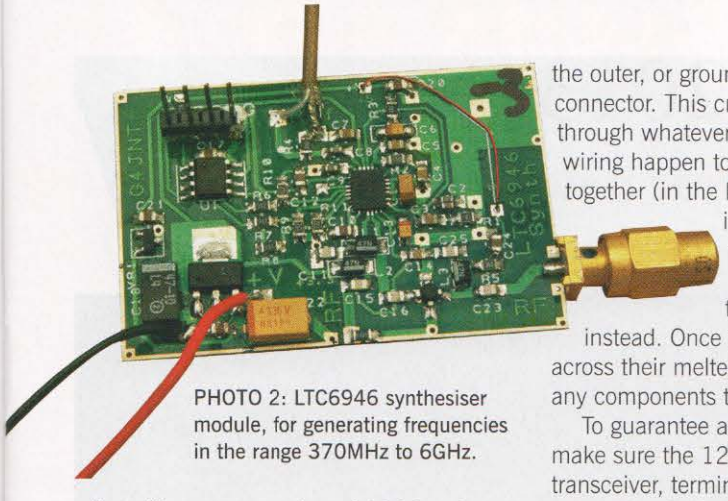


PHOTO 2: LTC6946 synthesiser module, for generating frequencies in the range 370MHz to 6GHz.

adjustable power supply and 100Ω resistor in series to limit the current, I connected the power input the wrong way round and wound up the supply volts. At (minus) 16V it was drawing just 4mA, which was due to various bias resistors across the supply (and clearly seen in the circuit diagram). It would be quite safe with the wrong input polarity on its own so no further reverse polarity protection was going to be needed.

But tales of seriously wrecked equipment do exist, including stories of fried PCBs and irreparably damaged rigs, so something else must have happened. There is a mechanism involving reverse connection that can still cause serious damage, however well the rig is protected internally. Assume another connection already exists from the chassis of the transceiver to the battery, or the PSU negative rail, such as via the braid of the coaxial antenna feed or any other auxiliary control lead. When the rig is incorrectly powered the positive supply now goes to the outer, or ground side of the DC input connector. This creates a short circuit through whatever PCB tracks or internal wiring happen to connect these points together (in the FT-817 this includes the input filter). If an external fuse is not provided, or is rated too high, these tracks probably will fuse instead. Once blown, the 12V appearing across their melted ends is transferred to any components that get in the way.

To guarantee against this possibility, make sure the 12V input lead to the transceiver, terminating in the small circular power plug is fused. A 2A to 5A fuse in low power transceivers should be OK; ground PCBs tracks really ought to be able to survive the overload current needed to blow that.

Incidentally, the DC input connector on the FT-817 is an odd size. Farnell part number 120-0128 is suitable.

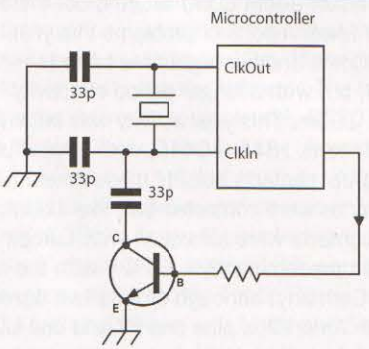


FIGURE 2: Mechanism to shift the processor clock whenever a harmonic of it is likely to cause a spurious response on the selected receiver frequency.

SHIFT THAT BIRDIE! While perusing the FT-817 circuit diagram, I noticed the 9.91MHz crystal on its processor chip has an additional 33pF capacitor on one of the pins, switched to ground by a transistor controlled via a dedicated line from the CPU as shown in **Figure 2**. Presumably this is so that whenever a listening frequency is selected where harmonics of the processor clock would give a spurious response, the frequency can be pulled to shift it out of the receiver passband. A rather neat touch I haven't seen before in amateur equipment – although apparently it is common practice in the mobile radio industry.

SELF CONTAINED SYNTHESISER CHIP. The LTC6946 is an integer-N synthesiser chip with internal voltage controlled oscillator and output divider. With addition of a reference frequency input and a small microcontroller to program the chip's registers, a self contained fixed or switchable frequency source with good low phase noise can be made. Depending on which of three chip variants are used, frequencies in the range 373 to 5790MHz are available. **Table 1** shows the frequency range covered by each variant as quoted in the manufacturer's data sheet, with the possible output divider settings from 1 to 6. In practice, the devices will function outside these recommended ranges and the -3 version will happily generate 6.2GHz. This upper limit makes the device a useful source for 24GHz local oscillators for transverters with subsequent X4 frequency multiplication. **Photo 2** shows a PCB containing a complete synthesiser assembly. This needs just a reference frequency input for a standalone signal source **[5]**.

SYNTHESIS OF LOWER FREQUENCIES. It is a pity that the output divider of the LTC6946b only goes up to a maximum value of 6, making the chip less useful at HF and VHF. The lowest frequency it can generate, 370MHz, is a bit too high for readily available, cheap, off the shelf divider chips. In contrast, the LMX2541 Fractional-N synthesiser, again with integral VCO and described in this column previously, has an output divider programmable up to 63, allowing it to directly generate down to 37MHz. This means any 74HC or 74AC family device can be used for further frequency division.

Modern frequency synthesisers often have a lower input range of several hundred MHz, so it is getting quite difficult to find a design using the latest devices if you want to run at HF or VHF. Direct digital synthesisers are one solution, but they tend to have a higher power consumption and, as a rule, generally have higher spurious levels than PLL type synthesisers. Some of the older obsolete PLL chips go down lower, for example the LMX2306 has a specified minimum of 25MHz, and the ADF4110 goes to 50MHz. But it is getting more difficult finding these older devices – and the new modern ones are just so cheap!

FEEDBACK. Graham, G8PHA, wrote in to say, "Thanks for a very interesting article on thermal power meters in the August issue of *RadCom*. One conclusion is that any such (thermistor + DC feedback) power head cannot be relied upon to present a matched RF load when the instrument is turned off, or before the bridge achieves balance. Since the latter is partly a thermal process, with thermal inertia, it cannot be instantaneous. This is not the case with passive RF loads such as the Marconi-Sanders 'TFT' power heads, which may be left in circuit at RF and disconnected from the instrument, yet still present a nominal 50Ω load at all times."

TABLE 1: Frequency output characteristics (in MHz) of the three LTC6946 variants.

Version	VCO divider	1	2	3	4	5	6
LTC6946-1	min	2240	1120	747	560	448	373
	max	3740	1870	1247	935	748	623
LTC6946-2	min	3080	1540	1027	770	616	513
	max	4910	2455	1637	1228	982	818
LTC6946-3	min	3840	1920	1280	960	768	640
	max	5790	2895	1930	1448	1158	965

WEBSEARCH

[1] The magic material, Unobtainium: http://en.wikipedia.org/wiki/Unobtainium
[2] Powerpole connectors: www.torberry.co.uk/powerpoles.php
[3] PowerPole reference: www.g0hwc.com/anderson-powerpole.html
[4] In Practice archive: www.ifwtech.co.uk/g3sek/
[5] LTC6946 synthesiser details: www.g4jnt.com/LTC6946_Synth_Module.pdf

National Field Day 2013

Last year there was flooding, this year it was sunshine

INTRODUCTION. Another year, another NFD. The French phrase *'Plus ça change, plus c'est la même chose'* is quite relevant: although the details differ from year to year, the 'big picture' stuff – preparation, assembling the station, operating, that odd feeling of unreality that goes with being overtired, packing up, getting home and collapsing – feels much the same every time. The details that probably change most from year to year, and which entrants certainly comment on most consistently, are the weather and band conditions. Almost all comments on this year's weather were favourable (although one station reported it cold and gloomy on the Saturday and others reported a very chilly night with rain) and this may account for the fact that several entrants commented that this was their best NFD for some years. Conditions deserve a more detailed analysis, and this is given later.

The number of entries this year, at 38, was exactly the same as last year. The Open Section was down from 13 to 9, and the Low Power Section was one up at 9. There was a corresponding rise from 17 to 20 in the Restricted Section, split exactly equally between the new Complex Antenna and Simple Antenna Categories. A few of those who had registered had to drop out: one of last year's trophy winners had an important wedding anniversary, another had their best CW operator hospitalised (hopefully he's fully recovered now) and yet another had to drop out for unspecified reasons, but put on an entry from home to give out some points – and also as an opportunity for a novice contester to cut his teeth.

The rules changes for 2013 received little adverse comment: nevertheless for 2014 the Contest Committee (CC) is considering making a few further minor changes suggested by entrants to provide a smoother progression of features as we move through Sections from Low Power through Restricted to Open. If so, entrants' views on the proposed changes will be sought.

RESULTS. The full results listings are shown on the CC website at www.rsgbcc.org/cgi-bin//hfresults.pl?Contest=NFD&year=2013. But to summarise the top end of the listings, in the Open Section, Stockport RS, G3LX/P was the Section (and also overall) leader, repeating its 2012 success. The well-travelled Three As Contest Group, back in Wales as GW0AAA/P, was second, up from 10th last year. The Restricted Section leader for the second year running was Orkney ARC, GM3POI/P, with Brimham CG, G6MC/P (a non-entrant in 2012) second. Both these stations were in the Complex Antenna Category: the leading Simple Antenna Category entrant, in fourth place, was Aberdeen ARS, GM3BSQ/P, up from sixth in 2012. And in the Low Power Section, Reading & DARC was leader for the 4th consecutive year, followed by Norfolk ARC, G8QR/P – a previous non-entrant but one of three stations entered by Norfolk ARC. Trophies are awarded as follows:

G3PDH operating G8QR/P.

National Field Day Trophy	Stockport RS, G3LX/P
Bristol Trophy	Orkney ARC, GM3POI/P
Reading QRP Trophy	Reading & DARC, G3ULT/P
Scottish NFD Trophy	Orkney ARC, GM3POI/P
Gravesend Trophy	Brimham CG, G6MC/P
G6ZR Memorial Trophy	Three As CG, GW0AAA/P
G3YF Trophy	Orkney ARC, GM3POI/P

CONDITIONS. Many entrants reported that conditions were poor on the Saturday as a result of a Coronal Mass Ejection the previous day, but that they improved substantially on the Sunday. CME or no CME, the total number of contacts, and average number of contacts per station, was up by 7% on 2012, although the amount of DX was limited – rather disappointing for what must be near the peak of the present sunspot cycle.

160m followed its usual pattern of a flurry of furious activity during the hours of darkness – this year between roughly 2015 and 0315 (all reported times are in UTC), peaking between 2200 & 2300 – and no contest traffic at all outside these times. 23 countries – all within Europe – were contacted by UK entrants, 70% of the contacts being with the UK or Germany. One of the perennial difficulties with 160m (and to a lesser extent 80m) is QRN, but there were fewer reports of problems this year.

80m is another night time band in NFD, but with a longer period of activity than 160m. This year activity was largely confined to 1845 – 0445, with a handful of 'mop-up' contacts outside these times. 31 countries were contacted but, like 160m, the contacts were almost all with Europe (again predominantly – 60% – with the UK and Germany) although around two dozen North Americans plus one PY and one UJ were also worked.

40m was the only band on which contacts were made throughout the entire 24 hours, and as often before seems to have been used as a default when activity was slow on the more time sensitive bands. Again, although 49 countries were contacted on the band by UK entrants, the bulk of contacts were with Europe, but around 100 contacts were made with Asia (mostly Asiatic Russians) and a similar number with North and South America (including all US call areas). A handful of African and Oceania stations were also contacted. DX worked – accepting that the definition of DX is very subjective – included OX, PY, SU, VK & VP5.

G4CZB operating at G3WRR/P.

Caravan and antennas at G4FNL/P.

20m provided the maximum number of contacts for UK entrants, about 1.5% more than 40m despite the fact that there was a gap of over 7 hours – between 2045 and 0400 – when almost no contacts were made. The band also offered the maximum number of countries worked, at 61. Again, most of the contacts were with Europe but this time the largest component was stations from the former Soviet Union. However, just over 9% of contacts were outside Europe, the majority being Asian (again predominantly Asiatic Russians), although just over 100 contacts were made with North and South America, Africa and Oceania – only Antarctica failing to appear in the logs. DX worked included 5N, 5Z, 7P, HS, JA, LU, OX, VK, VQ & VU.

In NFD, 15m is high enough in frequency for the state of the sun to have a major effect on propagation, but without the lure of the double points available on 10m. However, there was plenty of traffic this year. The band was active between approximately 0530 and 1745. Although the number of contacts was only just over half that made on 20m, the number of countries worked was only 2 less, at 59. As before the contacts were mostly European, but around 10% were with Asia – once again mostly Asiatic Russians – and a further 45 were with North and South America, Oceania and Africa, with a higher proportion of African contacts (in 9J, SU & ZS) than on 20m. DX worked included 9J, 9M2, 9M6, DU, HS, JA & ZS.

10m was its usual flukey NFD self, and performance depended quite strongly on location. In general, stations to the North and West did better than those to the South and East. Contacts were made between roughly 0645 and 1645, although the band was up and down over quite short periods (Sporadic-E is, after all, sporadic), and it was worth checking it regularly. All but 0.5% of the contacts were with European stations (Germany again being predominant) but of the non-European contacts the proportion of Asian stations was lower than on 20m & 15m. No North Americans appear in the logs, but a dozen or so African stations, a handful in Oceania and a single South American were worked. DX worked included 9J, 9M2, A6, HS, PY, VK, YB and ZS.

STATIONS. On the basis of information provided with the logs, over half the stations in the Open Section took advantage of the rule permitting multiple rigs to be used provided only a single signal is transmitted. In the Restricted Section only three stations – all in the Complex Antenna Category – did so. (In the Low Power Section only a single transceiver is permitted).

For the fourth year running, the Elecraft K2/3 series had a clear lead as the most popular rig, with 18 in use. In addition one of the new Elecraft KX3s was used. The next most frequently used was the Yaesu FT-1000 series, in several variants, with 8 in use. It is a tribute to this transceiver – whose design is now approaching 15 years old – that it continues to be used in quantity for a competitive event. Other rigs used by more than one station were the Orion, IC-756, FT-5000, TS-940 and FT-857. Six other different rig types from the Yaesu, Kenwood & Icom marques appear once.

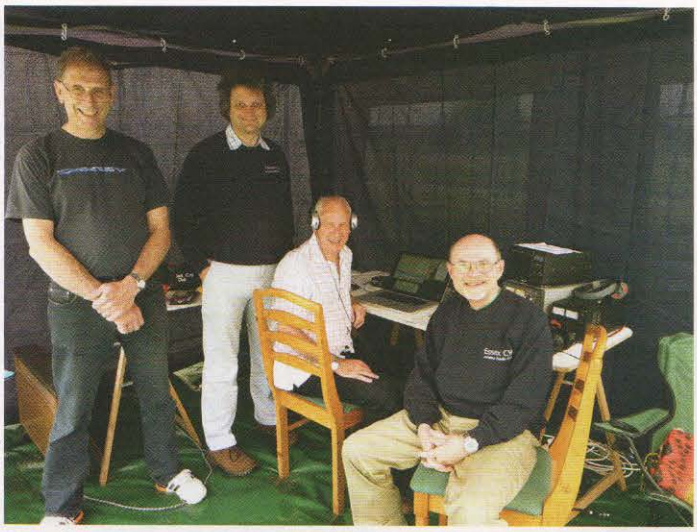
Setting up at G3WRR/P.

Moving on to antennas, in the Open Section most stations used a tribander, usually around 20m in height, backed up by dipoles or inverted Vs for the LF bands. A delta loop, sloper and, from one adventurous entrant, a 40m beam also appear. Most Restricted Section Simple Antenna Category (and also Low Power Section) entrants used a doublet of around 270ft in either dipole or inverted V configuration, although a Carolina Windom, double size G5RV and 80m trap dipole also appear. More variety was shown, as the CC had hoped, by stations in the Restricted Section Complex Antenna Category. Here multiple dipoles or inverted Vs, in a surprising variety of band combinations, were most common although verticals were also reported by several stations.

Fewer comments are received these days about accommodation and power arrangements. In the former case, it is probably because many stations now have access to caravans and tent design has moved forward a lot since our memories of Boy Scout (or Girl Guide) days making the whole exercise less hazard prone. However, mention should be made of GM0ADX/P who have operated from a 1940 ex-army tent for a number of years! And as for power, modern generators seem to be much more reliable than some of the horrors from a few decades ago.

Four full station inspections were made and a further 'drive by' inspection took place outside the 24 hour setup period. Everything was found to be in order and the inspectors were made welcome. The CC thanks the inspectors, particularly those who are not Committee members, for their efforts.

ADJUDICATION. As usual, logs were exchanged with other Region 1 Societies holding their CW Field Days over the same

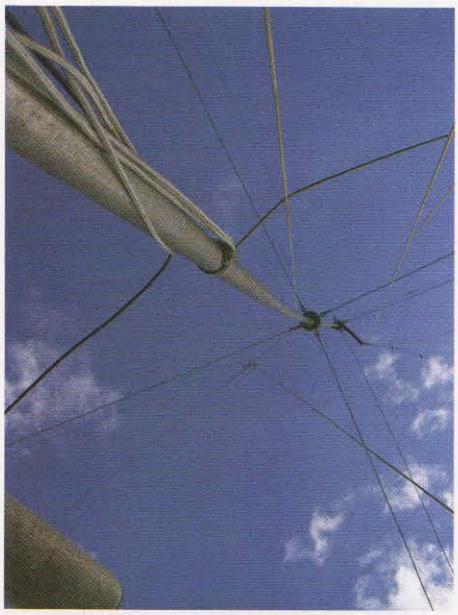


Team and station at G1FCW/P (I to r G4ZUL, G0DVJ, G0IBN & G4AJY).

Operators at GM3BSQ/P (I to r GM3WIJ, GM4ZUK & MM0ROV).

Setting up – G3WRR in single combat with operating tent.

Mastage at G3WRR/P – the business end.



View up a mast at G3WRR/P.

weekend as NFD. This year, a record 669 overseas logs were available (mostly from DL, HB9, I, ON, PA and Russia) to complement the UK logs, allowing a pleasingly high percentage of contacts to be cross checked. After around 2½ hours of computer time, around 36 hours of eyeball time was spent examining contacts identified as having potential errors by the *AdjSQL* software developed by the CC's Mike, G0GJV. The most common faults were incorrect calls, and serial and 'Not In Log' errors. One very useful feature of *AdjSQL* is the flagging of potential unique contacts. In practice, most of these apparent uniques are the result of misreading of calls, and this year it was possible to identify the correct call in 62% of cases. Error rates varied between 0.7% and 15.2%, with a median of 4%. Entrants may wish to look at their individual error reports (UBNs) – available from the CC website – to see where they may need to pay some attention (or alternatively to see where they are entitled to feel smug...).

PROBLEMS AND SOAPBOX COMMENTS.

Entrants' soapbox comments always include a few details that make amusing reading – for those not directly involved. Although, as stated before, generator problems are less frequent than in the past, nevertheless one station reported a 2 hour generator outage and another a shortage of volts. A couple of stations reported antenna problems, in one case causing S9 noise and in another, RFI difficulties that necessitated keeping the power down to below 35W. Another experienced catering delays that resulted in Saturday breakfast being served 15 minutes before the start of the contest (but well worth it when it arrived). But perhaps the most intriguing was the group who had acoustic QRM from aircraft operating from their airfield site – made worse by their inability to connect the headphones! The reverse side of the acoustic QRM coin is the group who had the pleasure of being accompanied by a cuckoo in a nearby tree.

Last year's problem in which the writer was partially immersed in a bog was averted by operating from a higher and drier field. This necessitated the use of the farm's quad bike and trailer to ferry gear from the road to the site in a number of runs. This was much less physically demanding than manual portage, but I managed to slam my hand in the trailer's tailgate: inevitably this was my keying hand – which may account for my poor CW during the contest. Guess I'll have to look for a new excuse next year...

BOOK NOW FOR 2014. NFD next year is on the weekend of 7-8 June 2014: please get the dates into your diary (and the club's) and remember it's never too early to start planning! Hopefully all this year's entrants, those who couldn't make it this time, and perhaps some new ones will take part: see you then.

Soapbox Comments

- A plague on people who use weird prefixes – G3GHN/P
- Difficult conditions on Saturday due to Aurora/CME beforehand – G1FCW/P
- Super ears from Russian / East Europeans and German stations – G3HEJ/P
- No DX except 9J2BO!! – G4ALE/P
- Excellent wx, food and cider! – G4WSM/P
- We all had a great time. Best NFD for a while – G5XV/P
- We had an extra operator this year – 3 ops makes it a lot easier to keep things going – GM0ADX/P
- Great weekend, also great weather (...for Wales!) – GW0AAA/P
- S9 noise from antenna fault and a paddle key that sent dashes only showed that it is always wise to check the gear out prior to the event!!! – GM4GTV/P
- A gentle workout of equipment and personnel prior to the main VHF Contests of the year – GW2OP/P

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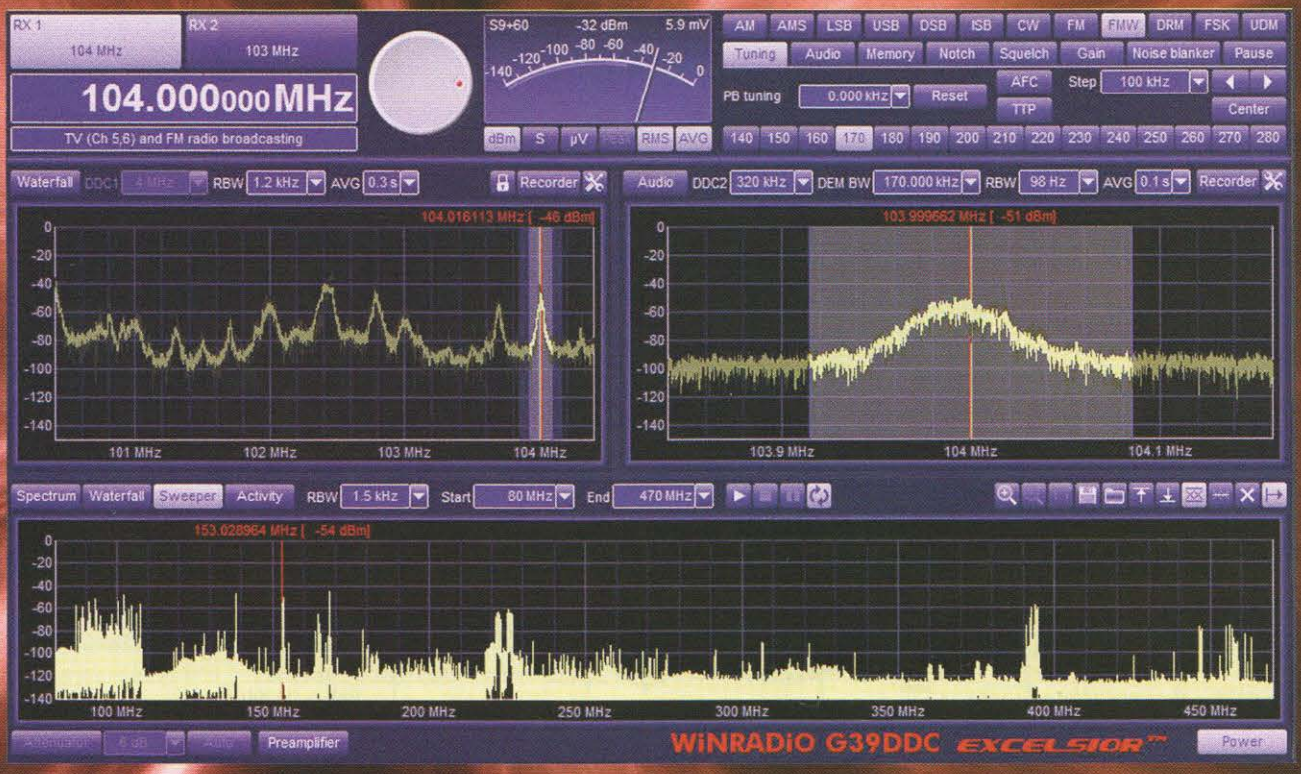

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How the tandem match works

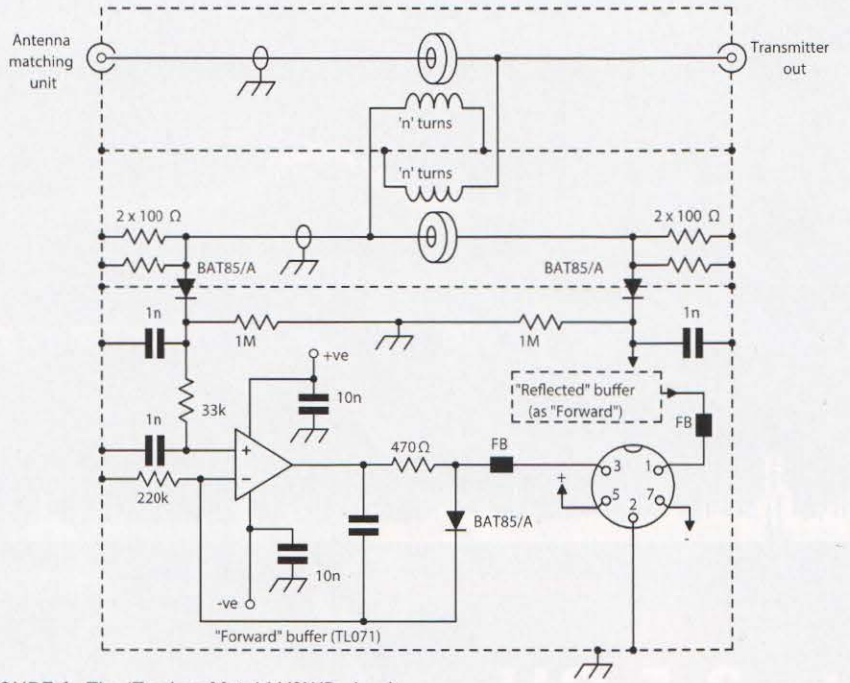


FIGURE 1: The 'Tandem Match' VSWR circuit.

INTRODUCTION. Since the publication of my original article in the May 2012 *RadCom* I have received a significant number of largely complementary comments, principally by e-mail. Very many of these were accompanied by a request for a similar explanation of the operation of an alternative circuit arrangement, using two identical toroids, known variously as the Stockton circuit, the tandem match or the four port hybrid transformer. The circuit of this arrangement, reproduced from Clive Smith's *Test Equipment for the Radio Amateur*, is shown in **Figure 1**.

CIRCUIT OPERATION. As may be expected, the heart of this system lies in the action of the two transformers and their associated 50Ω resistors (two 100Ω resistors in parallel in the diagram). To analyse this, the circuit has been simplified to include only those components relevant to its basic action, shown in **Figure 2**.

To recapitulate from the first article on this subject, the current on the main feeder passing through the upper toroid and constituting one effective turn is $I_F - I_R$, where I_F is the current associated with the forward wave, travelling from the transmitter to the load and I_R is the current associated with the reflected wave, travelling back from the load towards the transmitter. If the number of turns on the secondary of this toroid is 'n', then the current in the secondary is $(I_F - I_R)/n$.

The lower, identical toroid is essentially a voltage-reducing transformer, fed from the main feeder where the voltage is $V_F + V_R$, the sum of the voltages associated with the forward and reverse wave respectively. The voltage induced in the single turn, passing through the central hole, is therefore $(V_F + V_R)/n$. Using these thoughts, the circuit may be simplified to its skeleton form, shown in **Figure 3**.

To determine V_1 and V_2 the superposition theorem is used: first analyse the circuit with the current generator suppressed (ie replaced by an open circuit), then analyse again with the voltage generator suppressed (ie replaced with an short circuit). The actual voltages V_1 and V_2 are then the sum of the contributions of each generator. Suppressing the current generator yields the circuit shown in **Figure 4**. This gives

$$V_A = (V_F + V_R)/2n$$

and

$$V_B = -(V_F + V_R)/2n$$

Similarly, suppressing the voltage source to zero and replacing it with a short circuit reduces Figure 3 to the arrangement shown in **Figure 5**. This gives

$$V_C = V_D = R(I_F - I_R)/2n$$

and since

$$I_F = V_F/Z_0 \text{ and } I_R = V_R/Z_0$$

these become

$$V_C = V_D = R(V_F - V_R)/2nZ_0$$

Provided $R = Z_0$ this becomes

$$V_C = V_D = (V_F - V_R)/2n$$

Adding these voltages gives

$$V_1 = V_A + V_C = (V_F + V_R)/2n + (V_F - V_R)/2n$$
$$= V_F/n$$

and

$$V_2 = V_B + V_D = -(V_F + V_R)/2n + (V_F - V_R)/2n$$
$$= -V_R/n$$

Thus V_1 represents the voltage associated with the forward wave and V_2 the voltage associated with the reflected wave, each simply scaled down by the turns ratio n. It will be appreciated that these are alternating voltages which are usually rectified and smoothed to produce a DC voltage that corresponds to their peak values.

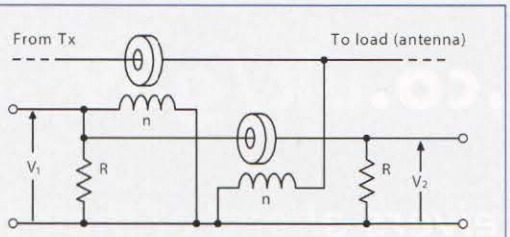


FIGURE 2: Skeleton circuit of the tandem match.

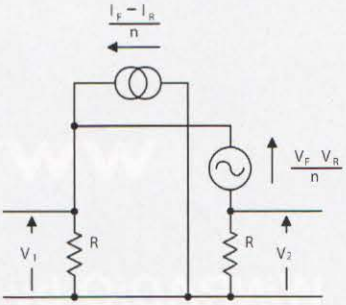
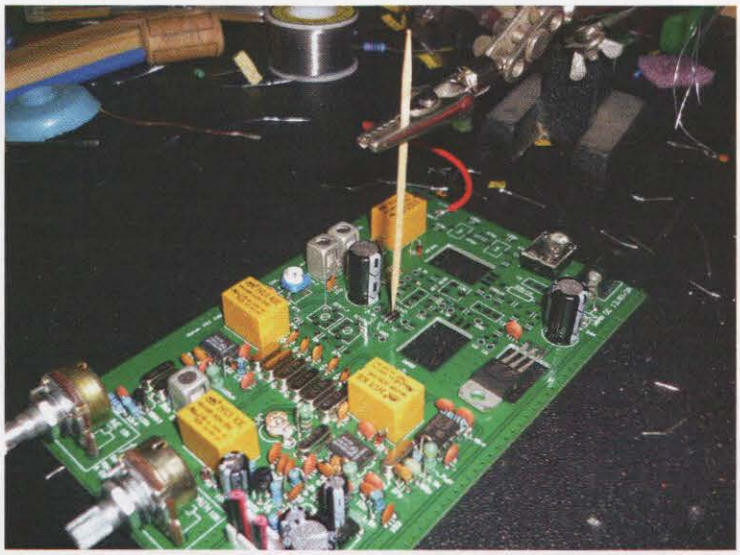


FIGURE 3: Simplified skeleton circuit for analysis.

Building the KN-Q7A 40m QRP SSB transceiver kit

The QRP page of *RadCom* October 2012 had a short review of QRP kits for SSB, including the KN-Q7A designed by Shi Ke, BA6BF. I ordered mine direct from China via http://crkits.com; it arrived a few days later in a thick padded bag, accompanied by a Post Office bill for VAT and handling. The kit includes a metal enclosure and the PCB was inside, with a bag containing all the components. I revisited the web site and downloaded the parts inventory, construction manual, etc plus information about the Yahoo user group. I checked off the parts against the list and was pleased to find everything present.



Part way through construction, holding down a surface mount device prior to soldering it.

Assuming that a kit is designed to be reliable and reproducible then there are three main areas where the construction can fail: poor soldering, wrong parts placement or wrong part values. I set about checking all the component values using my LRC tester from PEAK Electronic Design Ltd. Then I grouped the parts by value and type and placed them in small containers so that everything was pre-sorted and tested before starting the build. I used lids off plastic milk cartons. A little time put in here helps with parts identification, especially if you are not so familiar with the way components look. The construction manual was well laid out and divided the project into small manageable segments with tests at the end of each segment. This approached worked well and seemed like a very good idea as troubleshooting a completed board would be very difficult for a novice constructor like me.

After a few very enjoyable evenings with a hot soldering iron I had completed the receiver section and was gratified to hear plenty of signals on the 40m band. Receiver alignment was straightforward and worked OK without test gear. I suggest you do this during daylight hours as 40m can be very noisy at night, making it hard to find signals 'in the clear'.

Building the transmitter section was more daunting with less in the way of testing as you go other than voltage checks. Extreme care was taken in parts placement here and I only made one mistake, which I spotted immediately and quickly removed the part from the board with solder wick braid. The small bifilar toroids were tricky to make but plenty of wire was supplied. I suggest cutting the wire lengths needed and putting them to one side. Use the surplus for a few trial runs making the bifilar wire and then putting on the specified 5 turns. I found that after a couple of practice goes I was able to wind the three transformers quite easily.

Mechanical assembly was straightforward with the exception of the method used to insulate the fixing stud for the IRF640 device. I was unfamiliar with the method but I am sure this would not be a problem for anyone familiar with these devices. With the TX section completed and the mechanical assembly done I had reached the alignment stage.

There was a neat method to accurately align the BFO using a sound card and a simple audio spectrum analyser program found at www.qsl.net/z1lan/Software/Spectrum3.zip. After completing the alignment I hooked up my bhi DSP extension speaker, which gave very nice audio.

The bias setting for the final amplifier proved problematic. As I slowly advanced the bias trim pot the current suddenly increased alarmingly, indicating thermal runaway. The MOSFET was hot; I purchased a replacement from Rapid Electronics for 66p, installed it, and all was well.

As soon as I had confirmed that the Tx was OK and peaked up the Tx filter I was keen to try a contact or two. Brian, G0BFJ in Huddersfield gave me a report and kindly offered to put me in contact with others on a WAB net. I had a range of reports from around the UK, with the best being a 59 from the Lake District some 400+ kilometres from me in South Devon. This was with about 3.5W output on the speech peaks.

I had a lot of fun building the kit and would encourage anyone to blow the dust off the soldering station and have a go at homebrew.

As an example, taking a fairly typical value of 10 for n and assuming a transmitter supplying a forward power of 100W in a 50Ω line gives a peak line voltage of 100V. The rectified forward indication will therefore be 100/10 V = 10V – a reasonable voltage that is large enough to swamp any potentially serious inaccuracies due to rectifier drops etc.

Finally, it must be noted that the 50Ω resistors in this circuit must be chosen to be equal in value to the characteristic impedance of the line if correct readings are to be obtained – a constraint not present in the earlier, single transformer circuit. It is also recommended that these components are selected with care: carbon film types are now available with excellent HF characteristics – although they are rather expensive!

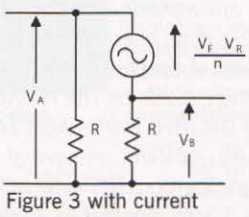


FIGURE 4: Figure 3 with current generator suppressed.

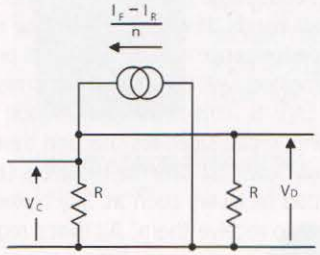


FIGURE 5: Figure 3 with voltage generator suppressed.

ATV

New ATV repeater licences

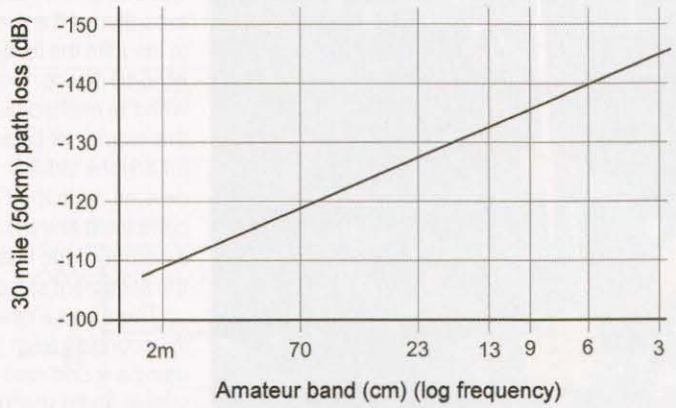


FIGURE 1: Loss for a 30 mile (50km) path on amateur bands from 2m to 3cm.

NEW AUTHOR. Roy, G8CKN has produced this column for the RSGB for several years. This, together with reading the RSGB News each Sunday in sound and vision is a remarkable achievement. I will try my best to continue writing in the same vein.

OFCOM. Ofcom has recently issued five new NoVs for ATV UK repeaters. This is very welcome news because, due to the wide bandwidth used, amateur television relies more on repeaters than do other forms of communication. The new repeaters are:

GB3SQ – Bournemouth, Dorset (23cm, new)
GB3BA – Basingstoke, Hants (9cm, new)
GB3BH – Bushey, NW London (adds 9cm Tx)
GB3KM – Spennymoor, Co Durham (adds 9cm Tx)
GB3FY – Fleetwood, Lancs (adds 3cm Tx).

These 9cm (3.4GHz) repeaters will be the first operating in this band. The 3.4GHz amateur allocation is relatively narrow so there is not room to receive ATV in the same band; these repeaters have inputs on other bands. It will be interesting to see what performance can be achieved on 9cm. The repeaters will use digital transmission mode DVB-S. This is the same mode as the commercial satellites use and therefore relatively low cost satellite receivers (but not dedicated receivers such as Sky boxes) can be used to receive them. All that's required is a downconverter and dish or horn antenna for the 9cm and 3cm bands and a good Yagi antenna and masthead preamp for the 23cm band.

MICROWAVES. The 9cm/3.4GHz band is easier to use than might be suggested by its high frequency. **Figure 1** shows the path loss in a direct line of sight for a 30 mile / 50km path length. The graph shows that the loss over this path on the 9cm band is just 12dB greater than the loss on the more popular 23cm band. On 23cm most people use Yagi antennas with a gain of about 16dBd; on 9cm it is normal to use a dish or horn antenna with typically 30dB gain. So the extra antenna gain on the 9cm band more than compensates for the extra path loss. The only bad thing about the 9cm band is that the signals are more easily obstructed by trees and buildings than they are on 23cm.

The 9cm band falls within the commercial C band. High quality down converters (LNBs) for this band can be obtained on the web for as little as £5. Search for 'C Band LNB'. These LNBs have a typical noise factor of about 0.5dB, which is as good as the best amateur converters. The diagram of a typical 9cm receive system is shown in **Figure 2**. I hope next time to be able to report on some results from this interesting new band.

WWW.DXSPOT.TV. Roy mentioned this new website last time. It is a site with a live map showing the DX that ATV stations are working. We have seen some interesting plots over the summer. I found two results of particular interest: PA3DEE in Drachten, north of The Netherlands received GB3BH, North West London, on 3cm at P5, 469km, on several occasions. M0IKB in Scarborough received the PI6ANH 13cm repeater in Arnhem at P5, 493km, also on several occasions. Without dxspot.tv we would never have realised that microwave televisions signals were travelling so far.

BALLOONS. As you may have read elsewhere, ballooning is getting very popular. New balloons containing amateur transmitters are being launched every week. Some also have cameras on board. A good way of following these balloons is on the BATC streaming video website, www.batc.tv. Click on Member's Streams and you will find several entries dedicated to ballooning. It is not uncommon to see hundreds of viewers logged on to these streams. The BATC server was never designed for such a high viewing audience but it seems to cope very well.

ACTIVITY. I have not received many reports over the summer; I hope for more now that the holiday season is over. Recently Arthur, G4CPE and Phil, G8XTW have refurbished the GB3TG 3cm repeater near Milton Keynes. By the time you read this it should be fully operational: have a look on 10.240GHz.

70cm digital ATV is becoming very popular, with many new stations on the band. Several repeaters now have 70cm digital TV inputs. I hope to write more about this band in the future.

Any reports and information would be appreciated – please e-mail them to the address at the top of the page.

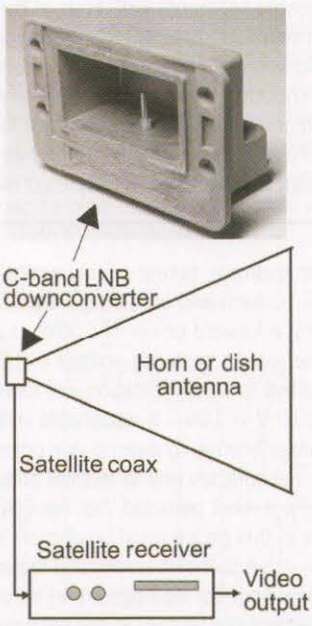


FIGURE 2: A typical 9cm receive system.

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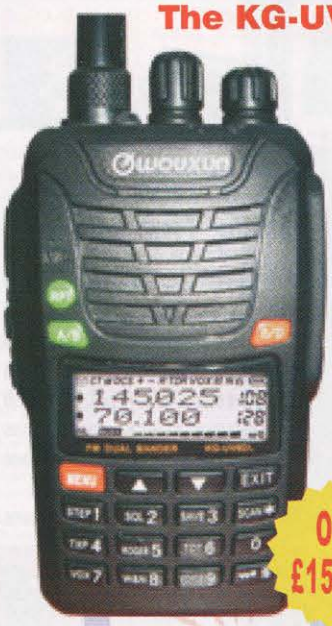

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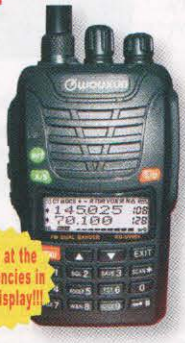

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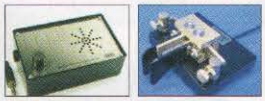

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RBA 4:1	Probably the best 4:1 balun out there	£37.95
FT-Meter	Neat Analogue back-lit Meter for FT-897/857. S-meter, TX Pwr, ALC Etc	£46.95
FTL- Meter	Jumbo version of the famous FT-Meter	£79.95

MFJ Products

Lots more MFJ stocked! See web for details

MFJ-266	V/U Portable Antenna Analyser 1.5-185MHz + 300-490MHz	£339.95
		Free UK carriage
MFJ-974HB	Manual ATU for balanced line antennas, 160-10m	£199.96
MFJ-974	as above but without 160m	Special! £179.95
MFJ-16010	Random Wire ATU 160-10M	£71.95
MFJ-949E	Manual ATU metered, Dummy Load, 1.8-30MHz, 300W	£199.95
MFJ-901B	Manual Mini ATU 1.8-30MHz, 200W	£111.95
MFJ-971	Manual ATU metered, 1.8-30MHz, 200W	£119.95
MFJ-904H	Manual ATU, metered, inc balanced, 1.8-30MHz 150W	£139.94
MFJ-969	Manual Roller ATU Metered 1.8-54MHz, 300W	£199.94
MFJ-993B	Auto ATU Metered 1.8-30MHz, 300W	£279.95
MFJ-1786X	Magnetic Loop 10-30MHz, 150W	£439.95
MFJ-1788X	Magnetic Loop 7-22MHz, 150W	£489.95
MFJ-259B	Antenna Analyser 1.8-170MHz	£289.95
MFJ-269B	Antenna Analyser 1.8-450MHz	£389.94
MFJ-260C	Dummy Load 300W SO-239	£45.95

BlueCAT Repeater Controller

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Palstar

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The AT-1500DT and the AT-1KP have been combined into a new 2kW Tuner. **£479.95**

"Hello from GA. I picked up an AT2KD last Thursday. Hooked it up on Thursday night and it's the best antenna tuner I have ever used. Bought an MFJ 986 about a year ago and had to send it back 3 times for service. Have owned others over the years as I've been a ham for 51 years. Wish I had bought a Palstar sooner!!! It works great. Thanks and 73, Louis Hernandez, N4MWR-Augusta, GA.

HF-Auto	1.5kW fully automatic ATU for QRO	£1399.95
AT-500	600W PEP Antenna Tuner	£409.95
AT-2K	2000W Antenna Tuner	£499.95
AT-4K	2.5kW Antenna Tuner	£789.95
AT-5K	3.5kW Antenna Tuner	£999.95
BT-1500A	Balanced Antenna Tuner	£639.95
PM-2000AM	Power/SWR Meter	£159.95
R-30A	Superb HF Communications Receiver. 100kHz - 30MHz AM, SSB, 20Hz/100Hz Tuning Steps	£699.95

Palstar Dummy Loads DL-1500 (1.5KW) £189.95 DL-2K (2kW) £339.95 DL-5K (5kW) £429.95

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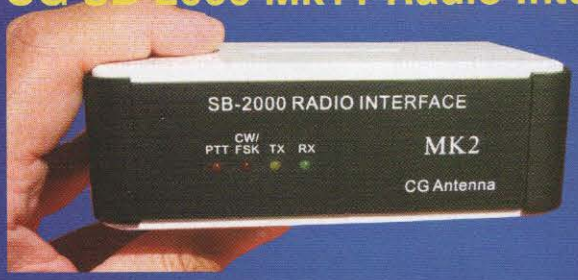
CG SB-2000 Mk11 Radio Interface



New from CG, the SB-2000Mk11 is an updated version of the original. The unit now supports 2 serial ports allowing you to have one reserved for CAT/CI-V rig control, the other for data operation. It also supports faster speed rate for CAT & CI-V, up to 19200bps.

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- Optical isolation used for digital signal.
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Tigertronics Grants Pass, Oregon

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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

New Model! FUNcube Dongle Pro+

£149.95

After the worldwide success of the FUNcube Dongle, many of you have noticed that we've been out of stock and waiting for new deliveries. Howard Long, the FUNcube inventor decided to take into account feedback by many FCD users with a redesign he is calling the FUNcube Dongle Pro+. Howard thinks that you will find that the results are very worthwhile (actually so do we!). There are many enhancements both in performance, extended range and features.

INTRODUCING THE EXTENDED RANGE VERSION, the FUNcube Dongle Pro+. Not only has it got a frequency range of **150kHz to 240MHz & 420MHz to1.9GHz** but this new design has on board filters for the lower frequencies.

- Coverage is from 150kHz (yes, that's kHz) to 1.9GHz.There is a gap between about 250MHz to 410MHz. There isn't a gap anywhere else.
- Eleven discrete front end filters, including some really, really serious SAW filters for 2m and 70cm
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- Much improved phase noise
- Better Dynamic Range by up to 7dB
- Tuner PLL Steps from memory
- All this plus more and still no drivers required!

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PERSEUS is a VLF-LF-HF receiver based on an outstanding direct sampling digital architecture Only **£699.95**

Perseus-FM+

High Performance FM 88-108MHz adapter for the Perseus SDR Receiver. Available now. **£299.95**

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The CR-1 SDR communications receiver is independent of a PC or MAC, using embedded digital signal processing technology providing a degree of portability and performance previously unavailable to the radio enthusiast. **Enter the CommRadio CR-1.**

Covering 500kHz-30MHz all mode, the CR-1 SDR is a small, low-power, ruggedly constructed radio receiver that is finding a niche in the world of short wave listeners and ham radio enthusiasts alike. Not only does it cover all the shortwave frequencies, but FM Broadcast*, AirBand* & VHF/UHF* too. It's even got a built-in Li-Ion battery pack allowing true portability for up to eight hours of use. (More using headphones). As one potential customer noted: "It's an SDR with knobs, keys, and a display!" **We think it's a modern day Lowe HF-150.**

* At reduced performance

The New CommRadio CR-1.

For full specifications, video's and further details see www.hamradio.co.uk/cr1

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

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AD-ATT3G50/HP	0MHz to 3GHz (2kW) surge protector. N-Female Connector. **£56.95**
AD-ATT3G50U	0MHz to 500MHz (200W) surge protector. SO-239 Connector **£49.95**
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Delta-DX-A	160m, 80m and 40m 1/4 twin slope trap antenna. This antenna combines the tremendous DX firepower of the 1/4-wave slope with the wide bandwidth of the 1/2-wave dipole. One leg is 67ft long and the other is 55ft long **£89.95**
Delta-DX-B	160m, 80m, 40m and 30m single slope trapped antenna. This antenna is designed for limited space installations, were room does not allow for large wire antennas; it only requires 60ft of space providing amazing DX performance at installation heights of 35ft **£89.95**
Delta-DX-CC	80m, 40m, 20m, 15m and 10m dipole. This antenna is parallel length dipole with no traps; overall length is 82ft **£139.95**
Delta-DX-DD	80m and 40m dipole. This antenna is parallel length dipole with no traps; overall length is 82ft **£119.95**
Delta-DX-EE	40m, 20m, 15m, 10m dipole, it can be used on 30m, 17m, 12m with an ATU. This antenna is not trapped, and has an overall length of 40ft **£129.95**
Delta-DX-LB	160m - 80m, and 40m Low Band dipole. This antenna performance and 2:1 VSWR bandwidth depends on the height and surrounding objects; overall length is 100ft. **£119.96**
DX-LB-PLUS	160m, 80m, 40m and 20m - 10m Low Band dipole. This antenna performance and 2:1 VSWR bandwidth depends on the height and surrounding objects; overall length is 100ft. **£169.95**
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Made of heavy duty black acrylic with a beautiful high gloss finish especially designed to fit the Elecraft KX3.

Only £29.95

New product from British manufacturer. WonderWand WonderLoop Antenna

ML&S PRICE ONLY £91.95

If you are an avid FT-817 or KX-3 operator and enjoy nothing more than heading for the hills on a weekend to active those rare WAB squares. Take a look at the all new WonderWand WonderLoop Antenna.

Incorporating their easy to use tuning circuit, which offers frequency coverage from 20m-6m and handling 10w of RF power, you can be on the air in seconds. The tuning unit is enclosed within a lightweight ABS case, no larger than a pack of cards. This means you will no longer need to carry around all those additional extras needed to string up a wire in the field. There is also no need to worry about running a counterpoise with this efficient loop design.

So how does it perform? As we had sunshine this afternoon, we popped out into the car park here at ML&S and attached the loop to our demo FT-817. Within minutes we had tuned to the 20m band worked into EA, I and 9A. Not bad for 5w and the 'shack' in our hand.

For full info & video see: www.hamradio.co.uk/wonderloop

New Super Antenna MP1 SuperStick

Covering a massive 80m right through to 450MHz*, this simple to erect compact vertical antenna weighs only 1kG, is only 2.1m tall when fully extended and collapses down to just 30.5cm (12")!

*With optional 80 & 60m coils

Product features:

- Ham bands: 40m-30m-20m-17m-15m-12m-10m-6m-4m-2m-70cm
- Frequency Range: HF 7MHz~30MHz continuous
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Only £159.95 including the 80m Coil FREE!

For the complete range of Super Antenna products see www.HamRadio.co.uk/Superantenna

Miracle Antenna

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VX-1000 6/2/70 2.15/6.2/8.4DB 1.42M Long ..... RRP £149.95 **SPECIAL £99.95**

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NR-770R 100W, 2/70, 3/5.5dB, .98m Long ..... RRP £34.95

NR-770RSP as NR-770 but spring loaded ..... RRP £39.95

NR-770RSP As above but spring loaded ..... RRP £37.95

NR-7900 2/70, 3.2/6.4dB, 1.46m Long ..... RRP £54.95

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MX-72N 1.6-150/400-460MHz Duplexer ..... RRP £44.95

MX-62M 1.6-56/140-470MHz Duplexer ..... RRP £69.95

MX-610 HF/6+2+70 (for FT-8900) ..... RRP £59.95

MX-2000 6/2/70 Triplexer ..... RRP £91.95

MX-3000N 2/70/23 Triplexer ..... RRP £86.95

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CX-210N 2-way, N-Type, Die Cast ..... RRP £82.95

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FREE Carriage UK Mainland

This design was originally manufactured for military use and thousands have been deployed around the world. Take the assembled antenna out of the package, snap in the included spreaders, string it up preferably no lower than 15' off the ground and you have an antenna system that needs NO ATU and offers continuous coverage from 1.8-30MHz.

The RRP is £309.95 ML&S: £199.99. See web!

MyDEL MyDEL CG-3000

Weather proof remote Auto-ATU. 160m-10m 200W PEP.
ONLY £229.95
Remote Control for CG-3000.
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HUSTLER

See web for full listing!

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Base Station Range

Free standing, max 7.3m tall, 1kW

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MyDEL Surmen Antenna

NEW at ML&S

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SU/K808 Ultra thin mag mount - 120mm base - 4m of rg188 ..... £29.95

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Signals viewed in the waterfall display of an SDR

Many signals have characteristic visual signatures

SOFTWARE DEFINED RADIO AND THE WATERFALL DISPLAY. Software defined radio (SDR) has been described as the First Big Thing to hit amateur radio since the adoption of SSB in the 50s and 60s [1]. Recently it has made astonishing strides. The waterfall display it produces represents many signals simultaneously, with clarity, in informative detail.

I would like to share my early experience of using the waterfall display with amateurs who are not yet familiar with it. Although I have been licensed since 1975, and had a burning interest in amateur radio long before that, I find the waterfall display clarifies my thinking about signals in a way that a single-signal, tuneable transceiver cannot.

HOW THE WATERFALL DISPLAY IS PLOTTED. Like a spectrum analysis, the waterfall display is a plot of frequency versus amplitude, with the difference that it grows as time elapses.

A horizontal line is plotted along the frequency axis, in which the intensity or colour of each point is varied in accordance with the signal amplitude. High intensity or 'hot' colours (eg white, red, purple) represent higher signal amplitudes. Darker (or 'cold') colours (green, blue, dark blue, black) indicate lower signal amplitudes. The display can be calibrated, such that each colour represents a definite, quantified range of amplitudes.

As each line is completed, it is shifted vertically and another line is plotted in its former position, hence the vertical axis represents elapsed time. The display grows line by line into the waterfall representation. The waterfall moves vertically up or down in real time, in accordance with the user's taste. Perversely, many of us prefer an upwardly-moving waterfall display!

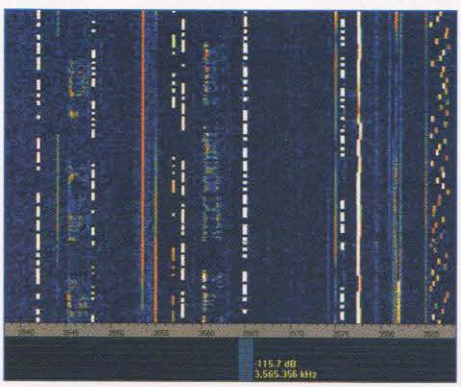

Figure 2: Waterfall display of Morse signals.

Such representation over time has significant benefits. Under quiet conditions, signals define clear vertical bands that contrast in colour with a uniform background. Even a weak signal leaves traces that the brain readily interprets (or joins together) as a band or line. A few blank or noisy horizontal lines cannot obscure the signal. Each vertical band is, in effect, a time-integrated representation of a signal.

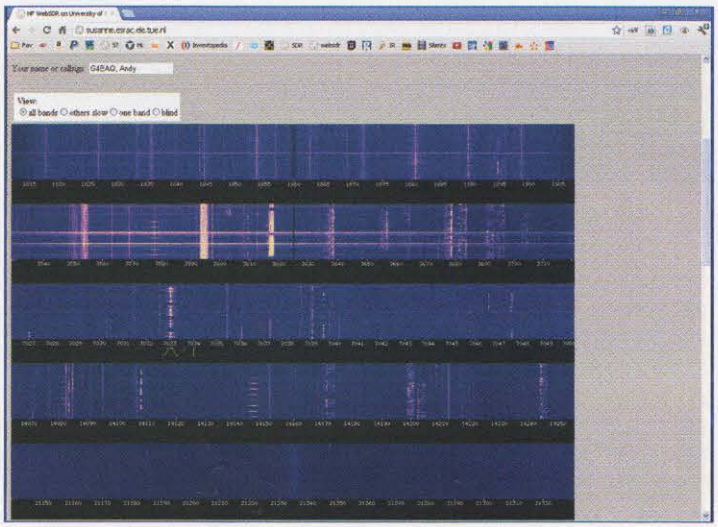

Figure 1: Multi-band software defined radio.

By contrast, in a conventional frequency-amplitude spectrum display (a panadapter type of display) weaker signals tend to disappear into the noise. Although integration over time is possible, there is a delay and the results are altogether less satisfactory than those of the waterfall display. Fortunately, modern software allows both types of display to be shown together, to satisfy the needs of all users.

MULTI-BAND WATERFALL DISPLAY. Many amateurs obtain their first experience of SDR receivers on the internet. **Figure 1** shows part of the live, 6-band display that anyone can access on the University of Eindhoven web page [2]. Just by mouse-clicking any signal in any of the bands shown, the corresponding audio output is heard. Not only does this SDR reception system allow rapid jumping between bands, but large numbers of users can access it simultaneously via the internet.

In this example, the display reveals that a Morse signal at 7033kHz has horizontal spread, an indication of undesirable frequency modulation in the form of key clicks. The waterfall display shows such signal anomalies very clearly. Further examples of undesirable emissions will be shown later.

The 21MHz amateur band appears dead in Figure 1. Previous experience suggests the 21MHz receiver is working, so it is likely that unfavourable conditions are responsible. The live multi-band display is a useful indicator showing where amateur radio activity can be found.

MONITORING YOUR SIGNAL ABROAD. It would be fascinating to monitor one's own signal in a remote part of the world. No problem. As an example, I have observed my own transmitted signals using this Dutch *websdr* receiver. Starting with 100W of RF power, I found my CW signals clearly readable in Holland at only 2W output, the lowest I could conveniently achieve. Freely-accessible *websdr* receivers are now scattered over a large part of the globe [3]. It is a simple matter for any radio amateur to assess the strength and quality of his signal in distant lands. Instant response should not be expected because of the computer processing delays. These will predominate over signal propagation delays.

WATERFALL DISPLAYS OF CW AND RTTY. A single continuous vertical line on a waterfall display indicates a carrier wave. **Figure 2** is a small excerpt from a Finningley SDR receiver display, showing Morse signals on 80m. Keying breaks up

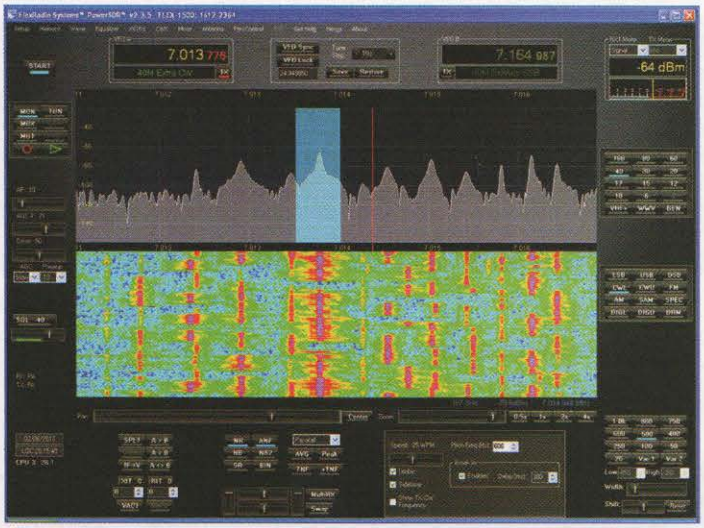

Figure 3: Morse key clicks on the Flex 1500 receiver.

the carrier lines, conveying useful information. The vertical speed of the display has been increased to show the dots, dashes and spacing of individual characters. The signals are seen to be relatively clean, with little evidence of key clicks. By contrast, **Figure 3** from a Flex Radio 1500 receiver, shows varying degrees of key click interference. In this example, 10dB of attenuation is applied to the receiver input.

Figure 4 shows the appearance of a teleprinter contest in a display provided by *WINRAD* software. In the lower part of the image, two signals in the light blue pass band of the receiver (set at around 3600kHz) are analysed into their two-tone constituents. Using the notch filtration capability of *HDSDR* software, it is possible to filter each of the RTTY tones individually (eg see ahead to the lower half of Figure 10, in which such filtration is fitted closely around teleprinter signal components).

SINGLE SIDEBAND SIGNALS. The waterfall display clarifies the frequency structure of SSB signals at a glance. Consider the dial frequency of an SSB signal. This is normally identical to the suppressed carrier frequency (marked by a red line in the screen displays). As an example, the nearest frequency of the transmitted sideband, corresponding with the lowest audio frequency of the voice, might be 300Hz away. The highest voice frequency transmitted might be 3kHz away. This range (300Hz – 3kHz) defines edges of the light blue band representing the range of transmitted voice frequencies (and the optimum receiver passband). It is immediately apparent that no part of the transmitted signal is actually at the dial frequency. This may seem paradoxical. In fact the dial frequency is only loosely related to the transmission frequencies because not even the range (300Hz – 3kHz) is fixed. It can and does vary from one signal to the next. In the waterfall display, the reception bandwidth can be tailored precisely to suit the received bandwidth, for best possible reception quality and optimum noise rejection. When operating an SDR transmitter the transmitted bandwidth and its relation to the dial frequency can be set by the user. An example is seen later in **Figure 13** where the transmitted bandwidth is defined by the two vertical yellow lines superimposed over the light blue reception band.

SPLATTERING. In **Figure 5**, an SSB contest is in progress on 80m and signals from all over Europe appear. Fairly regular, short signal bursts indicate CQ calls and the very brief QSOs of contest exchanges. Splattering is apparent on the strongest (lightest) signals. Definitions of splattering found on the internet include: "weak, spurious emissions 10-20kHz away from the operating frequency" and "high-order intermodulation distortion (IMD) caused by gross overloading on speech peaks". We are cautioned that any so-called linear amplifier will generate intermodulation distortion if driven too hard. Experience with the waterfall display reveals that splatter is now very common, most probably a result of poor adjustment of linear amplifiers, over-driving and/or lack of adequate filtering. It can be seen any day of the week, not just during contests. The transmitting amateur causing the splatter is likely to be completely oblivious of it.

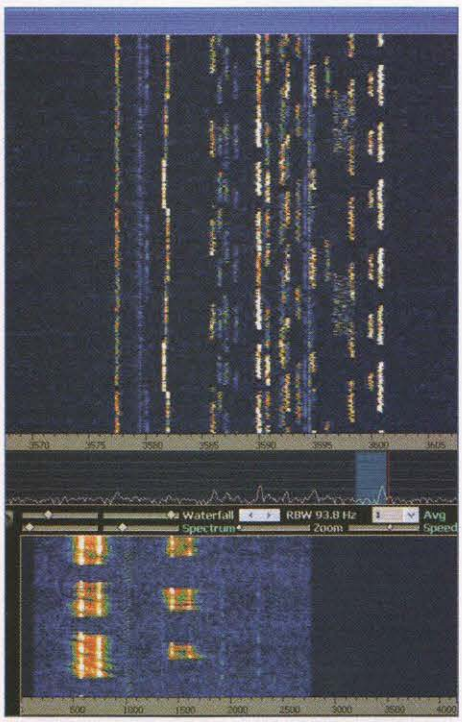

Figure 4: Group of teleprinter signals.

Remaining with the topic of splattering, **Figure 6** shows a QSO between two German stations at around 14.165MHz. The first over (extreme bottom right) is conducted by an amateur with a relatively clean signal, not much wider than 2.7kHz. The second over, ie the response from another station, splatters well beyond this and interferes very audibly with the weaker DX signal from the Australian station VK3OM at a dial frequency of 14.160MHz. This type of interference is all too typical and ruins the pleasures of DX listening and working.

AMPLITUDE MODULATED SIGNALS. An AM broadcast signal at 7.275MHz is depicted in **Figure 7**. Here the acceptance bandwidth of the receiver is shown as a light grey band above the waterfall display. The colourful effects of Spanish guitar music are shown. The broadcast bandwidth exceeds 10kHz and the reception bandwidth has been slightly trimmed to 9998kHz avoid a carrier (purple line) at 7.280MHz. Excellent filtration facilities typically provided by SDR software readily permit such fine improvements to increase listening pleasure. The results, if not exactly hi-fi, are generally an improvement beyond anything achievable before. The waterfall display also gives a feel for the large bandwidth (10kHz+) occupied by the ubiquitous but frankly primitive and hugely energy-wasteful AM broadcast transmitters.

UNUSUAL SIGNALS. It is often possible to see several different signal types at the same time. Each has its own interest. Just to the left of the splattering Dutch signal in **Figure 8** is the bright band of a DRM (Digital Radio Mondial) signal. DRM can fit more channels at higher quality than AM into a given amount of bandwidth, using various MPEG-4 codecs **[4]**. To the left of the DRM signal is the 'Russian Bleeper' centred on 3756kHz. This will be familiar to many who have listened on 80m in the evenings. In a conventional receiver, it may be mistaken for a single frequency, but the waterfall display clearly resolves it into its many constituent tones. Various theories have been advanced to explain this signal, see reference **[5]** for example. I would be interested to compare notes with anyone who believes they know its true purpose.

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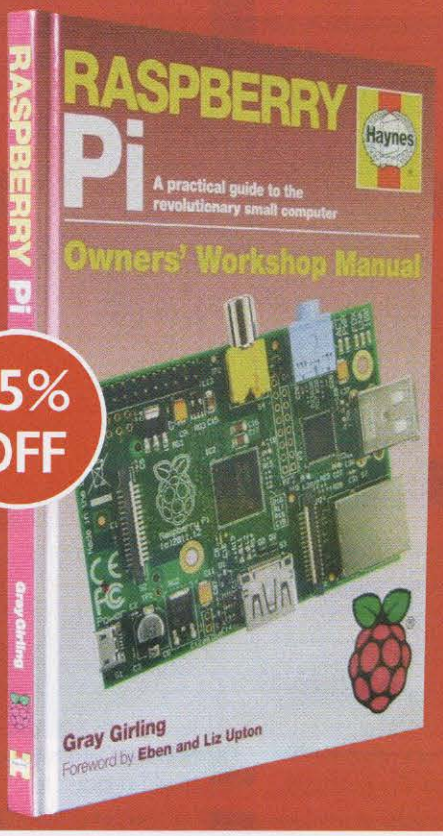

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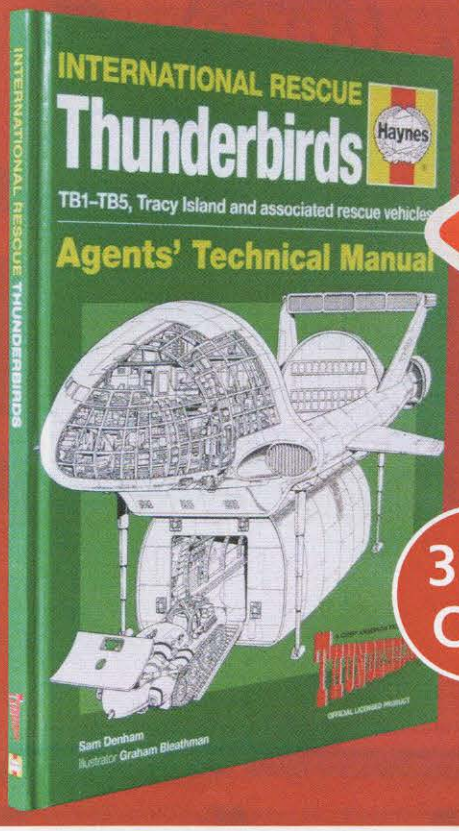

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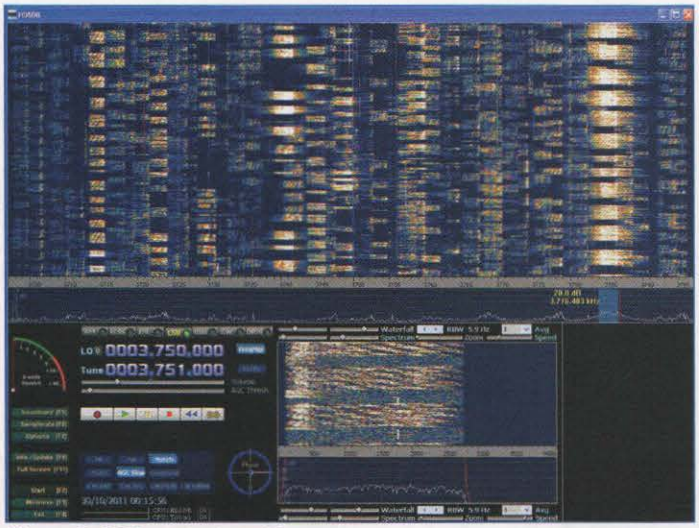

Figure 5: SSB contest on 80m.

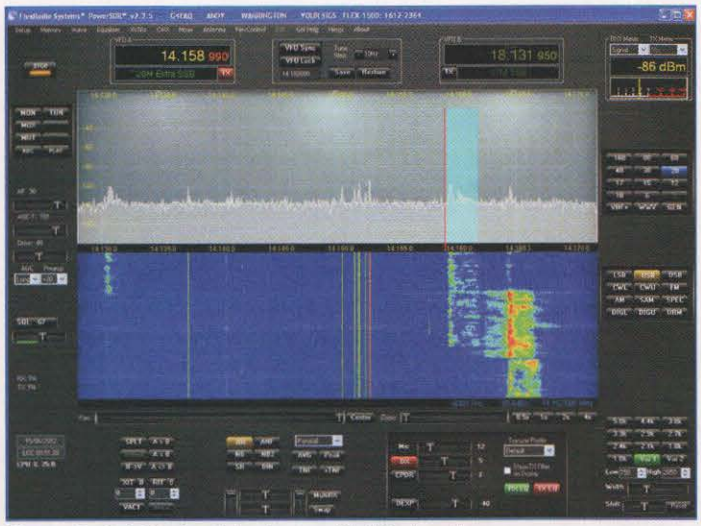

Figure 6: Splattering interferes with VK signals.

WANDERING SIGNALS. Wandering signals also appear! That seen in **Figure 9** appears to be the result of spinning the tuning dial manually at different rates whilst emitting a strong carrier wave. This type of behaviour occurs frequently and most of us will have heard the brief squeak made by a conventional receiver when this happens.

In **Figure 10**, I was observing a teleprinter signal when a carrier rolled very deliberately and in a controlled manner along the frequency scale. Its diagonal course results from vertical progression of the waterfall as time elapses. This has been tentatively identified as a legitimate, licensed ionosonde radar **[6]**. The ionosonde is important to radio amateurs, because it plots the height and optimum reflection frequencies of the various layers (D, E, F1, F2) of the ionosphere.

UNIDENTIFIED SIGNALS. **Figure 11** shows a slowly drifting 'mush' signal on 20m, which diagonally crosses the SSB signal of a Norwegian amateur. The origin of this drifting mush signal is not known.

Figure 12 shows a pair of very broad bandwidth signals in the upper part of the 80m band. There can be little doubt that they are related in terms of their structure and timing, but their purpose is unknown. Clearly they have the potential to cause interference. It is to be expected than many more unidentified and possibly fascinating signals will be revealed by the waterfall display in the future.

INTERFERENCE CAUSED BY LIGHTNING. **Figure 13** shows the effects of interference from lightning. Strong red horizontal lines correspond with static crashes from individual lightning strikes. Aside from nuclear electromagnetic pulses (EMP) they are possibly the ultimate in broadband, high power signals and, as seen, affect all frequencies to some extent. Here, reception of a single sideband signal at 3735kHz is made more difficult.

OBSERVATIONS OF SSB SIGNAL STRUCTURE. I was considerably surprised one day to discover that I could identify SSB signals on the wrong sideband in the waterfall display without actually listening to them. A moment's thought shows how this is possible. The power in many SSB signals tends to be concentrated close to the dial frequency, where reds and whites (higher amplitudes) generally predominate, irrespective of whether LSB or USB is used. It results from the lower tones of masculine voices, which still predominate on the bands. The situation is reversed if the wrong sideband is used, so the appearance of the signal is visibly changed relative to other, nearby signals. Where signal processing (especially in the form of equalisation) is applied, this can spread the signal energy more evenly over the transmission bandwidth and result in a clearer, more penetrating signal.

Whilst signals of wider overall bandwidth tend to be more intelligible, I have noticed that under noisy, weak signal conditions, SSB signal intelligibility can frequently be enhanced by pruning off some of the lower frequency components. Subjectively speaking, the signal changes from muddy to sharper and clearer. Such fine adjustment is facilitated by the very capable SDR software and the waterfall display it produces.

FUTURE ADAPTIVE INTELLIGIBILITY ENHANCEMENT. Various SDR computer programs have already brought us an astounding range of desirable facilities at little or no added cost. For example, these include 10-band graphic audio equalisers, which can be set individually for transmit and receive, and the ability to set numerous notch filters of almost infinitely-variable width in the reception bandwidth.

Could it be that in the future, SDR programs will detect and analyse signal structure, with automatic switching to the appropriate sideband followed by automatic optimisation to match the signal characteristics and ambient conditions? Will they also match the audio output spectrum to suit the hearing of the user? I look forward to the day when such Adaptive Intelligibility Enhancement (AIE) becomes commonly available to increase the operating pleasure of the radio amateur.

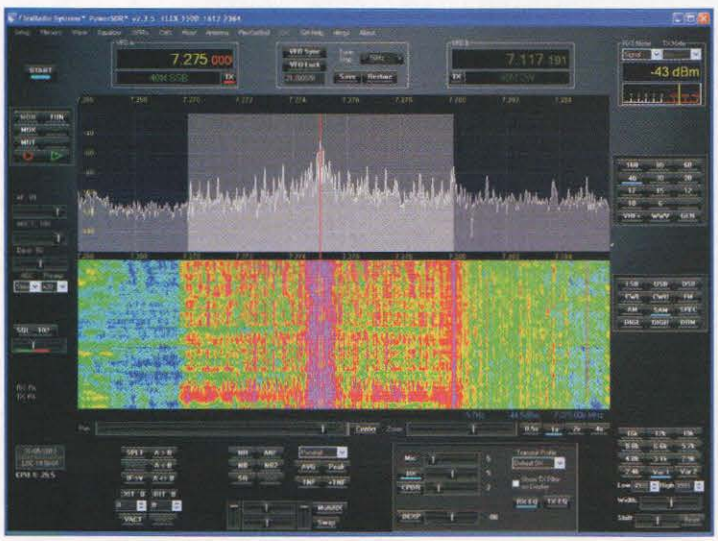

Figure 7: AM Signal – music with interfering carrier.

ACKNOWLEDGEMENTS. I am grateful to Martin Beekhuis, PA3DSC of Eindhoven University who kindly gave permission to publish the image of multi-band *websdr*. Thanks are due also to Tim Ellison, W4TME for permission to publish images obtained using the software *Power SDR* (version 2.3.5) used with the Flex Radio 1500 transceiver.

WEBSEARCH

[1] *RadCom*, July 2012, page 68: review article by G1MFG citing *The ABCs of Software Defined Radio* by Martin Ewing, AA6E.
[2] http://susanne.esrac.ele.tue.nl/
[3] www.websdr.org
[4] http://en.wikipedia.org/wiki/Digital_Radio_Mondiale
[5] www.brogers.dsl.pipex.com/page7.html
[6] http://en.wikipedia.org/wiki/Ionosonde

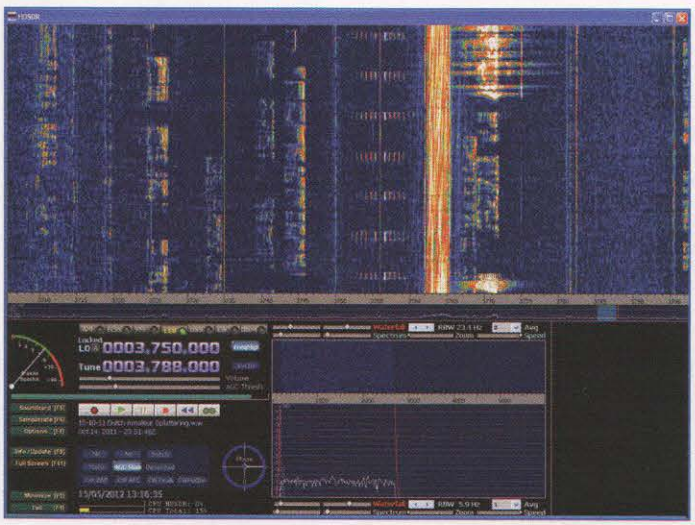

Figure 8: Various signal types (see text).

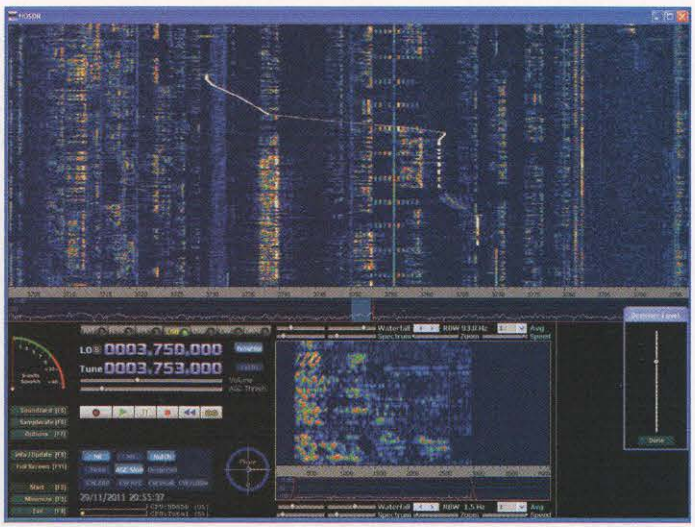

Figure 9: Wandering carrier.

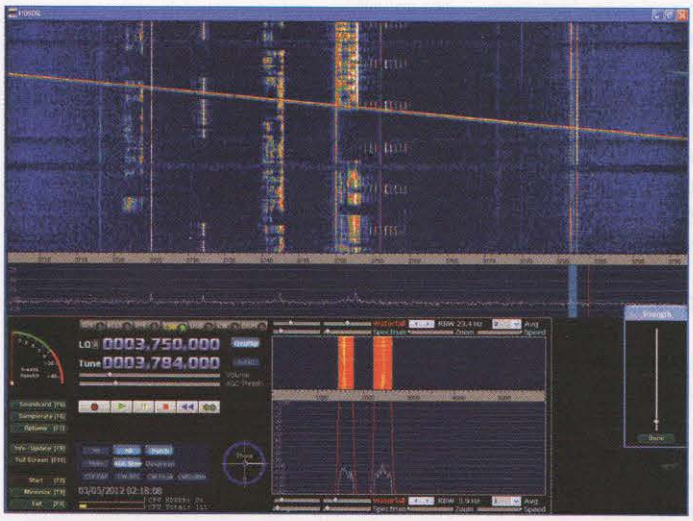

Figure 10: Wandering signal, likely to be an ionosonde radar signal.

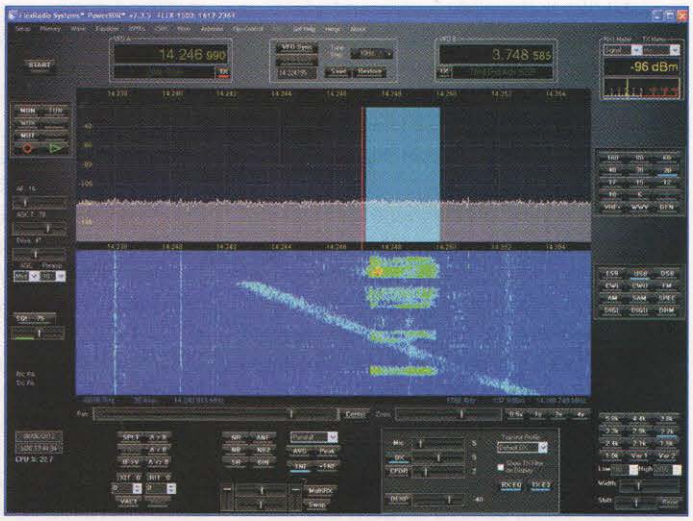

Figure 11: Drifting mush on 20m

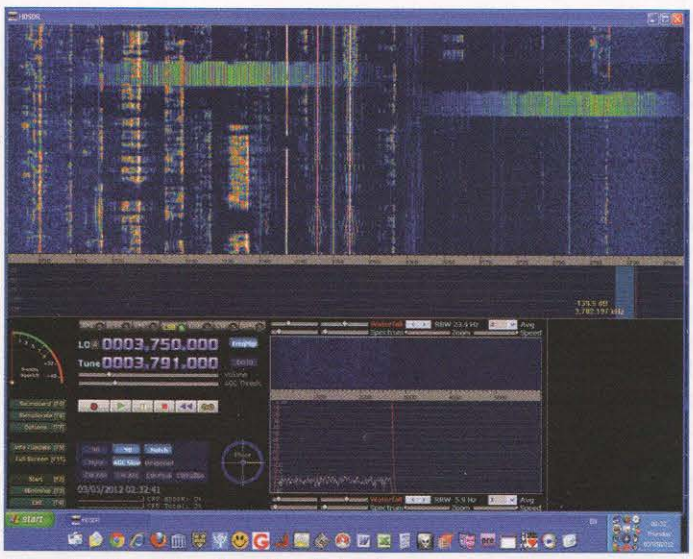

Figure 12: Unexplained broadband signals.

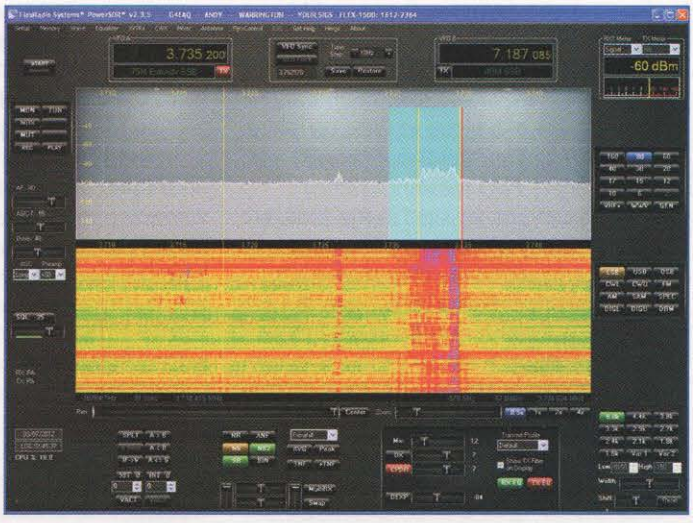

Figure 13: Strong lightning interference.

GB7TD - A digital repeater

West Yorkshire engages MotoTRBO technology

Michael, G1XCC and Mick, M0LEV with the new repeater. The cabinet also contains 23cm, 2m and 6m boxes.

A GOOD THING? Let's be honest. Repeaters are a bit like that well-known brand of yeast extract – you either love them or you avoid them. Repeaters get used, abused, forgotten, taken for granted but, above all, misunderstood. Sad but true. But it's undoubtedly also true that many established amateurs were tempted into taking the licence through monitoring repeater nets in their SWL days, myself included.

Designed primarily for mobile users, repeaters also provide vital social connections for many of those who have an impairment or limited mobility, allowing them to contribute more to the hobby. Repeaters also have the capability to connect amateurs all over the world using quite basic equipment.

So, can we agree that, on balance, repeaters are 'a good thing'?

LOOKING TO THE FUTURE. You could be forgiven then, for believing that with FM the accepted primary mode and a growing digital D-Star network, we've taken repeaters about as far as they need to go. But that wasn't the view of a group in West Yorkshire. The Five Towns Repeater Group already had three active FM repeaters covering 23cm, 2m and 6m, co-sited in the shadow of Arqiva's Emley Moor transmitter tower. But when an opportunity presented itself to return 70cm to the portfolio – and to take them in a brand new direction – they grabbed it with open arms.

At 11.20am on Monday 24 June 2013, GB7TD, the UK's first DMR (Digital Mobile Radio) repeater, was switched on and with coverage and quality reports already exceeding all expectations, the number of regular users is set to grow rapidly. It uses Motorola's MotoTRBO technology and is connected to the DMR-MARC system, a network that already has close to two hundred internet linked DMR repeaters around the world and gets bigger by the week.

HOW DMR WORKS. The DMR system and its network differ from D-Star in a number of ways. DMR is based on an open standard, which means that encode/decode software is available licence-free and this has resulted in equipment being produced across a number of manufacturers.

First used for commercial applications in 2005, the system was designed from the outset to comply with tight emissions specifications set by the European Telecommunication Standards Institute (ETSI) and Federal Communications Commission (FCC). Consequently, equipment is of commercial quality, but competition and sheer numbers make new and used gear available relatively inexpensively.

DMR employs Time Division Multiple Access (TDMA) that enables two discrete 'Time Slots' – effectively two separate voice channels within one 12.5kHz frequency allocation – so two QSOs are possible simultaneously. Additionally, these slots are software routed to various 'Talk Groups' that allows the user to make an area or group specific call. Talk groups are also stored within the preset memories so no re-programming is required in order to set up a QSO. Just select the appropriate preset, make the call and all repeaters on the same talk group will key up, worldwide.

In order to access the system, users first need to register online with DMR-MARC, who will provide a seven figure ID that should be programmed into the transceiver. The ID includes a country specific identifier, which is used by the system to route a contact to the desired talk-group, produce a 'Last Heard' log of on-air users and to compile system data.

THE GB7TD INSTALLATION. Pretty much standard equipment for all DMR repeater installations is the Motorola DR3000 – standardisation aimed at maintaining optimum network compatibility. GB7TD has Tx/Rx on 439.1625MHz and 430.1625MHz respectively, feeding a custom manufactured end-fed dipole 10 metres above ground level. With the site at approximately 220 metres above sea level, the combination gives excellent coverage to handhelds throughout West Yorkshire. Add a mobile antenna – even a basic quarter wave – and, as you would anticipate, range increases dramatically with reports received as far away as Hull and North Yorkshire.

GB7TD's network connectivity is achieved via a 3G router. A fixed broadband connection was considered, but the first few weeks using 3G have proved how frugal the system is in terms of data. Projections are that even with a significantly higher number of users, only around 1GB will be required per month.

The energy behind both the repeater group and the GB7TD project is repeater keeper Michael Lockwood, G1XCC. Michael has been licensed for some twenty five years and is a true higher frequency and repeater enthusiast. He was quickly convinced that, in addition to its other advantages, the DMR system addressed some of the limitations that D-Star can present, especially for mobile operation.

"We'd already looked at D-Star, which is great and connects thousands of amateurs around the world every day", he said, "but we decided that with a prerequisite for digital technology and a focus on safe mobile use, a superior system was available, hence our decision to go with DMR.

"Setting up anything more than a local QSO from scratch on D-Star in a mobile situation is not easy. In contrast, the permanently linked network and preset nature of DMR equipment makes mobile use very simple and, more importantly, as safe as possible.

"The configuration is also more user friendly for those who may be less technically minded and is especially suited,

GB7TD Motorola DR3000 repeater.

GB7TD custom end fed dipole.

2013-07-26 15:27:33	2624822	DK2ER	Andres	262460	DB0DBN	Oelberg/Bonn	262	TG262	0	2	GVR
2013-07-26 15:25:30	2624147	DG1ELO	Michel	262420	DB0NG	Marl	9	TG9	0	2	GVR
2013-07-26 15:24:22	2351033	G0SJB	John	235100	GB7TD	Wakefield	9	TG9	34	2	GVR
2013-07-26 15:16:29	2351018	G1FYS	Kevin	235100	GB7TD	Wakefield	9	TG9	34	2	GVR
2013-07-26 15:16:20	2351007	G1XCC	Michael	235100	GB7TD	Wakefield	9	TG9	34	2	GVR
2013-07-26 15:15:16	3136137	KB2NHH	Richard	313604	N2NSA	Bronx	2	TG2	19	2	GVR
2013-07-26 15:12:06	3117136	WV9M	Martin	311702	K9MOT	Schaumburg	2	TG2	12	2	GVR
2013-07-26 15:11:37	3117202	WA9EMY	Jim	311702	K9MOT	Schaumburg	2	TG2	12	2	GVR
2013-07-26 15:10:31	2624077	DL8YBQ	Hartmut	262440	DB0DDS	Dortmund	9	TG9	20	1	GV

DMR-MARC 'Last Heard' typical screen.

Motorola DM3600 mobile installation.

Typical handhelds; the DP4600, DP4400 and DP3600.

for example, to the visually impaired. Together with the commercial quality of the gear, the fantastic audio clarity and extended battery life on the HTs, we think we've found the perfect digital solution."

Of course, professional opinion counts for a lot and the choice of digital system was made easier thanks to invaluable input from another of the group's regulars. In common with many of those who set up and use the DMR network, Karl, G1YPQ, works with Motorola Solutions products and was able to share his knowledge and experience with the group. "I use all amateur modes, including D-Star and I work every day with Motorola equipment" he said, "given the brief for GB7TD, the MotoTRBO/DMR system was simply the best match – no question".

Additional funding was provided by Mick, MOLEV who says his investment is already paying dividends. "I frequently spend time with my family forty odd miles away in East Yorkshire and I can access the system from there with just four watts on a handheld. I'm amazed by the coverage and the quality we're getting. On top of that, battery life is brilliant – I recently went four days on one battery!"

MotoTRBO/DMR features:

- Two virtual channels / two simultaneous QSOs on one 12.5kHz repeater allocation
- Talk-groups/selective regional and area calls – local/UK/Europe/worldwide etc
- Extended range compared with FM and D-Star, including simplex
- Class leading audio
- Commercial quality equipment
- Simplicity of operation
- Reduced power consumption/extended battery life

Mike Swiatkowski, AA9VI, is an RF engineer based at Motorola HQ in Schaumburg, Illinois. He works on the design of MotoTRBO equipment and, as a major contributor to the development of the DMR-MARC network, Mike provided invaluable input to GB7TD.

"The best thing about our network is that it was designed by specialists from within the industry who have a personal stake in its professionalism and decorum. There is literally a treasure-chest of expertise on the network daily whose success is self-evident to all network users. Many of the early DMR-MARC trustees had no idea that it would grow to what it is today. When compared to other technologies that require a minimum 10kHz guard band between voice channels, DMR is far more spectrum efficient. Its main benefits over earlier amateur radio modes are immunity to inter-modulation products and multipath loss of sync between the mobile and repeater, with excellent adjacent channel selectivity.

"We're excited that after growing the network for a few years, the UK has joined the USA, Canada, Australia, New Zealand and South Africa on our English language talk group."

DMR EQUIPMENT.

In terms of transceiver choice, Motorola's MotoTRBO range is currently the most popular, mainly down to its availability both new and pre-used. A basic handheld such as the DP3400 can cost as little as £120 or so, with accessories such as chargers, batteries, etc available affordably from specialist online traders and auction sites.

Most models can be programmed to include both digital and FM simplex and repeater channels, with similar equipment also made by Hytera, Tait and Vertex Standard for example. Additionally, Chinese manufacturer Kirisun currently has handheld and mobile models on beta test. It's important to note however that because of the commercial origin of the equipment, transceivers have to be pre-programmed using, in Motorola's case, their Customer Programming Software. Michael recommends sticking to a standard preset configuration for each radio model and standard files can be supplied for that purpose. As well as making programming easier and quicker, this minimises the potential for system incompatibility issues.

DEVELOPING THE NETWORK IN THE UK.

The Five Towns Group is hoping that West Yorkshire's enthusiasm for DMR will spread and will demonstrate DMR at future rallies and events. If you see them at one, why not introduce yourself and give it a try? You might decide you like Marmite after all...

THANKS. The DMR community is always very willing to assist new projects, but G1XCC would particularly like to thank Mike Swiatkowski, AA9VI and Ralf Klingler, DR6RK who went out of their way to provide encouragement and technical advice throughout the GB7TD project.

WEBSEARCH

www.gb3yw.co.uk
www.dmr-marc.net
http://dmrassociation.org/the-dmr-standard/

GB100RXY activation

Celebrating 100 years of amateur radio in the Furness area

IT ALL STARTED 100 YEARS AGO. Furness ARS completed their activation of GB100RXY on 2 July as a celebration of 100 years of amateur radio in the Furness area. This celebration was prompted by Laurie, G4BZP re-reading of two RSGB books, *World At Their Fingertips* by John Clarricoats and *Bright Sparks of Wireless* by G R Jessop.

The first club to receive a transmitting licence in the UK was the Derby club followed by Liverpool, Birmingham, Northants and our own Barrow in Furness Wireless Club. The Dublin Wireless Club began a day earlier than the Barrow club but Eire is not now part of the UK, so we consider the Barrow club to be the fifth English club to be licensed. This licence – and the call letters RXY – were issued by the Post Office on 26 June 1913.

John Woodcock MP with Furness Amateur Radio Society members celebrating the club's 100 years.

A GB100 CALLSIGN. I spoke to the Derby club secretary at one of the Hamfests and pursued the issue of a GB100 call and NoV with Ofcom also at a Hamfest. Investigating matters locally led us to make enquiries of the Barrow & District Association of Engineers (BDAE) and they revealed they held minutes of a public lecture early in 1913 on the subject of Wireless Telegraphy. This makes interesting reading viewed from the perspective of 100 years on. These minutes tell of the help from Vickers, the shipbuilding company and described some tests done from their wireless site. Approaches were made to both BDAE and to Vickers successor company BAE Systems here in Barrow for letters of support for the special call. We also approached a variety of people within Barrow Borough Council and obtained a letter of support from them.

Our local MP John Woodcock was also very happy to provide a letter of support and, in fact, visited the station whilst it was operating from one of the venues. He was interested and amazed at the distances and countries we had worked and visibly happy to have his photograph taken sat at a loaned FT-5000.

PRACTICE. The club had the opportunity to operate G100RSGB in January of 1913 and consequently experienced some pileups during the three days we operated. We secured 2,540 contacts in these few days so we hoped for great things during our own centenary activity. Unfortunately, this was not to be since band conditions were absolutely awful for most of the period of our NoV.

An approach was made in May to Ofcom about progress on our NoV and special call and, after some difficulties, we were granted the special callsign GB100RXY, thus re-activating the 1913 call letters. One of our newer club members, Chris, 2E0CPG, volunteered to write a dedicated website for the centenary, www.gb100rxy.com.

OUR OWN CELEBRATIONS. We have a close friendship with our local RNLI station at Barrow and have raised significant sums for them including £1000 this year as part of SOS Radio week. We started our activation from the lifeboat station itself where we operated for several days with a lot of success. Members of the club then operated from the town square as part of a festival over the following weekend (8 & 9 June) and had the highest profile possible being in front of the Town Hall. This was also an excellent opportunity to meet and explain amateur radio to members of the public.

The following week we attempted to operate from our club HQ at Gleaston Watermill but were plagued with a lot of noise from equipment on the site. Apologies to anyone who called us and didn't work us but we were unable to hear any but the loudest stations. We operated over the next weekend from our local museum within yards of the Irish Sea. Having returned to the club HQ on 17 June, we moved our station to a field a short distance from the Mill and behind the residence of Mike, G8ALE who also owns the restored Mill. Here we had minimal noise, had mains power from Mike's workshop, operated from the club caravan and had plenty of room for masts for our doublet and a HF trap vertical. We operated from here for the rest of the NoV and, despite the poor conditions, had great fun. On the final evening, our two octogenarians, G3IZD and G4BZP, took it to the wire, working stations until 2359 on 2 July.

PUBLIC AWARENESS. As part of our celebration of this centenary, Furness ARS has been invited to submit items for a display at our local museum and 100 years after that first public lecture of our Association of Engineers, club member, Chris, M0TES will bring up to date the subject of Wireless when he gives a lecture in September as part of the Winter lecture topics of BDAE.

A little over 3,500 contacts were made despite the continuing dreadful band conditions. Several lessons were learned and it only remains to say, let's make a sked for the 200th anniversary.

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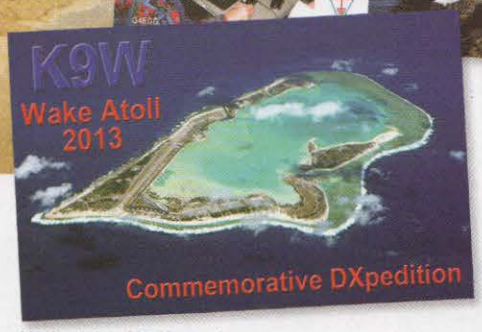
HF

Bands improving for Pacific DXpeditions

HPOINT QTH on San Blas Islands, tnx MM0NDX

GW3KHZ St Tudwals QSL card.



Wake Island QSL card.

NO SIGNIFICANT CHANGES. *"Plus ça change, plus c'est la même chose"* – a bit of a cliché perhaps but it represents my approach to taking over this column after G3XTT's long and immensely successful tenure. I don't plan any significant changes, so if you have been sending band reports or scores to Don please continue sending them to me via g3zay@btinternet.com. For 2014, let me know if you would like to see any changes in emphasis and what, if any, competitive table we should run. With sunspots starting to disappear again – if they ever really appeared – perhaps a 28MHz heard/worked table would be of interest before it's too late?

The sun continued to disappoint during September with the flux index dipping below 100 on many days. The lower HF bands delivered quite a bit of DX but 28MHz was dead for much of the time and contestants in SSB field day made very few QSOs on the band. Things were improving near the end of September and all is not lost even on 10m as the north-south paths require very little additional ultraviolet to function. There is also a reliable winter long path opening to KH6 on 10 and 12m around 0700-0900UTC. Check it out during the CQWW SSB contest and you should find a few KH6 contest stations beaming at Europe over the South Pacific and Indian Oceans.

TABLE 1: Main operations this month.

Delayed (see text)	Wake Island K9W (OC-053)
Until 20 October	Bhutan by JA ops
Until 24 October	Congo TN2MS
15-22 October	Mozambique C82DX
17-20 October	HQ4W (NA-060)
18-19 October	Akhziv Island (AS-100)
18-22 October	Anambas Island YE5R (OC-108)
20-27 October	Mapia Is YB9Y (OC-276)
24-29 October	Phu Quoc XV4MN (AS-128)
30 Oct-6 Nov	Raivavae TX5RV (OC-114)
1-7 November	Easter Island XR0YY (SA-001)
1-10 November	San Andres (NA-033)
5-18 November	Banaba T33A (OC-018)
8-20 November	Juan Fernandez (SA-005)

WAKE ISLAND (OC-053). The event of the month was due to be this DXpedition. Sadly, as we went to press we heard the news that, "due to the US Government shutdown, The Wake Island K9W Forgotten 98's Commemorative DXpedition is now on hold pending a revised schedule. We will announce new dates for the DXpedition as soon as possible. Thank you for your patience and understanding." This is a very rare DXCC entity (#13 in the European wanted list according to *Club Log*) and is quite a difficult path from the UK through the edge of the auroral zone. When it gets underway, I would expect some propagation peaking around breakfast and late afternoon on 20 metres and maybe some morning openings on 15 and 17m; but with sunspot counts as low as they are I would be surprised if there were many openings on 10 or 12m (unless that morning long path extends to Wake). There have been recent openings to FK8 on 10 and KH0 on 12m but those paths are largely clear of the auroral zone so may not be good indicators for Wake. On LF, those of you with good antennas will have been able to work the island on 30 or 40m from mid-afternoon to early evening. The 3D2 DXpedition to Rotuma at the end of September was audible on 40m CW as early as 1500UTC but was hard to work through the Eastern European wall. The team's website at www.wake2013.org should have the latest information about the activity.

BANABA ISLAND (OC-018). A major DXpedition expects to activate Banaba Island from 5-18 November as T33A. This is another rare DXCC entity and is #26 on the European wanted list. The last major DXpedition seems to have been in 2004, with a smaller operation in 2008. The bearing of approximately 11° is almost the same as Wake – though Banaba is much further south, so it will be interesting to compare the propagation. Formerly known as Ocean Island, Banaba was the setting for the book *A Pattern of Islands* written in the 1920s by Sir Arthur Grimble, a British colonial administrator. I remember reading this as a teenager in the 1960s and being most impressed by the tales of island life; what I did not know was that the island had effectively been destroyed by decades of phosphate mining and there would soon be a court case against the British government. A few hundred islanders still eke out an existence in their homeland and *RadCom* readers can search the internet for more information on this sorry story if they wish. Check T33A.com for the latest information about the expedition and check http://banaba2013.wordpress.com/ for the latest blog postings.

MYANMAR. It is about 10 years since any significant numbers of QSOs were made from Myanmar so perhaps it shouldn't be surprising that the country is #5 on the European most wanted list. Zorro Miyazawa, JH1AJT, was active again with a few friends as XZ1Z for a few days in September but will be returning in mid-November with a multi-national DXpedition team for about ten days. Plans are to have 3 or 4 stations operational around the clock on 10-160m CW, SSB and digital modes. This is linked to Zorro's work with the Foundation for Global Children (FGC), which is described on his QRZ.com webpage.

IOTA. The team for the YB9Y expedition to the unactivated Mapia Islands (OC-276) now numbers over 27 operators. They should be QRV from 20-27 October. QSL via YB1GJS, direct or bureau (OQRS on *Club Log*). Further information can be found at www.yb9y.com.

4X6HP, 4Z5IW and 4Z5LA plan to be active /P from Akhziv Island (AS-100) on 18-19 October if the weather permits a landing. They hope to have two stations on the air.

Mike, VY0BRR reported that his planned September activity from Broughton Island (NA-130) was being postponed into October. Check his website for more information, http://vy0brr.jimdo.com/.

Myanmar DXpeditioners: Ted, JJ1LIB, Zorro, JH1AJT & Champ, E21EIC.

Another Mike, NOODK, will be active as XV4MN from Phu Quoc Island (AS-128) on 24-29 October, including an entry in the CQ WW DX SSB Contest.

Don, VE7DS and Dave, K3EL are planning a mini-DXpedition to Raivavae, (OC-114) from 30 October to 6 November as TX5RV. The Austral Islands are currently quite high on the DXCC wanted list so pileups will be big.

Dan, HR2DMR plans to be QRV from Tigre Island (NA-060) as HQ4W from 17-20 October.

The YE5R activity from Anambas (OC-108), originally scheduled for September, has been postponed to 18-22 October.

The HPOINT team made over 32,000 QSOs from six Panamanian IOTA groups, generally being QRV on each island for 48 hours. No doubt a separate write-up will appear elsewhere but we have a photo of one of their sites courtesy of Col, MMONDX.

Derek, G3KHZ and Steve, G4EDG were lucky to be given permission to make a repeat trip to the private island of St Tudwal's (West). The previous visit was in 2006. In recent times no visitors have been given permission to go to the island. GW3KHZ/P was active from Friday evening of the 6th until Tuesday morning of 10 September when pending storms forced a rapid dismantling of the site and a return to the mainland.

Unfortunately Steve's radio blew a driver transistor after the first day and Derek's had to be shared. Over 5000 QSOs were made. 17m was an excellent band aided by the vertical dipole located on the highest point of the island.

OTHER DX. A major DXpedition will activate Juan Fernandez Island (SA-005) from 8-20 November using the callsign XROZR. More about this next time as the guys will still be on the air when you receive the December issue.

Alex, W1CDC will be active as 8R1A from Guyana from until the end of the month. This will be a holiday style operation with an emphasis on 80, 30, 17, 12 and 6m CW.

A very large multinational team will be QRV from Mozambique from 15 to 22 October and will emphasise the low bands. Their website at www.c82dx.com has all the latest details.

Eleven operators plan to be active as XROYY from Easter Island (SA-001) on 1-7 November. They intend to have three stations on the air on 6-160m metres CW, SSB and digital modes. Further information is available at http://easterisland2013.com.

JA3IVU (A52IVU), JH3AEF (A52AEF) and JH7EQW (A52EQW) will be active from Bhutan until 20 October while there as part of a medical volunteer team. Clearly this will be a spare time operation so you'll need to monitor cluster spots carefully.

The TN2MS DXpedition to the Republic of the Congo originally scheduled to finish on 11 October was delayed and should now be active until 24 October using three stations with amplifiers and several beam and vertical antennas. The team will raise funds for a Mercy Ships Charity Project. This is the 4th DXpedition in cooperation with Mercy Ships (www.mercyships.org) after Liberia 2007 (5L2MS), Benin 2009 (TY1MS) and Sierra Leone 2011 (9L5MS). See their website at www.TN2MS.nl for more information.

The DX Friends team comprising about 10 operators from Spain, France, Italy and Russia will be going to HKO, San Andres, for the first ten days in November. They will be on 160 to 6m CW, SSB and RTTY with four stations. See www.dxfriends.com/sanandres2013.

90 YEARS OF G-ZL QSOs. If you purchased the RSGB *Centenary* book you will know that the first G-ZL QSO was made at this end by a London school boy, Cecil Goyder, using the call G2SZ. He worked Frank Bell Z4AA. It happened in 1924 and some of the ZLs are celebrating that and a number of other pioneering QSOs by using a special callsign, ZM90DX, until the end of October 2014. Details can be found on their website at www.zm90dx.com.

At this end the special call GB2NZ will come on the air from Saturday, 5 October 2013, as part of the celebrations. The main objective is to make some G/ZL contacts on 80 metres, close to the 3MHz frequency used in 1924. Laurie Margolis, G3UML was scheduled to be first on with the special call on 5 and 6 October UK time but other operators, including G3BJ, G3SJJ and G3XRJ, will keep it going through most of October.

DXCC ENTITIES. Why do some places count separately for DXCC while others with a more obvious degree of 'separateness' don't? We probably need a special session on this at the RSGB Convention next year – but we'll have to hold off until the ARRL has finished its current revision of the rules as things may change. UA4WHX was active in September as T10VB from a place called Transnistria but although this area declared independence from Moldova in 1990, it is not recognised by any significant UN member states. Wikipedia will give you the details. I don't hold out much hope for it as a DXCC entity in the near future but a more promising candidate is Kosovo from the former Yugoslavia where a fairly small tweak to the international recognition test would bring it onto the list. Scott Wood, VE1QD, is organising a petition to the ARRL for just such a small tweak – e-mail him if you would like to sign.

CORRESPONDENCE. Peter Rivers, G4XEX wrote in to say that August turned out to be a better month than he expected, with QSO pride of place going to E44PM (Palestine) on 10m. He also worked Japan, Hong Kong and New Zealand on 15m SSB, and Japan, Hong Kong, India and Papua New Guinea on 17m SSB. 20m produced Bear Island (JW) and Australia on SSB and Japan on RTTY. He has been experimenting with a cobweb antenna which seems to be working well.

Peter Ball, G3HQT uses an FT-2000 with 100W to an MA5V vertical or a tuned inverted V. He bagged some interesting DX including on CW H70ORO in Nicaragua (30m), JW/DL5SE (17m), J28NC, V2BK and Z81R in South Sudan (15m) and YS1/NP3J (12m). On data he found OD5PY (15m PSK), 8N6MMTTY/3 in Okinawa (20m RTTY), and A45XR (17m RTTY).

Bill Harrison, MOBTZ QSYed LF from his usual VHF haunts and fired up his TS-940S into a 66ft inverted V doublet. His 40m haul included the USA, Morocco, Argentina, Brazil, Bear Island, Kuwait, Iceland and Algeria, but he couldn't break the huge pile-up for VK7AC in Tasmania. On 20m he seems to have got most US call areas plus Canada, Kuwait, Japan, Algeria, Trinidad and Lebanon. 17m produced the USA, Canada, Algeria and Bear Island, while 15m yielded the USA, Japan, Brazil, UAE, Curacao, Japan, Uruguay, India, Saudi Arabia, Oman and Qatar. Finally, 12m produced the Lebanon and the Azores.

Please keep your reports coming in. I'm not quite sure of the best way to summarise them and may try various formats over the next few months. We are heading in to the peak 80m DX season so I would be particularly interested in reports on what you are hearing or working on that band. The e-mail address is at the top of the column.

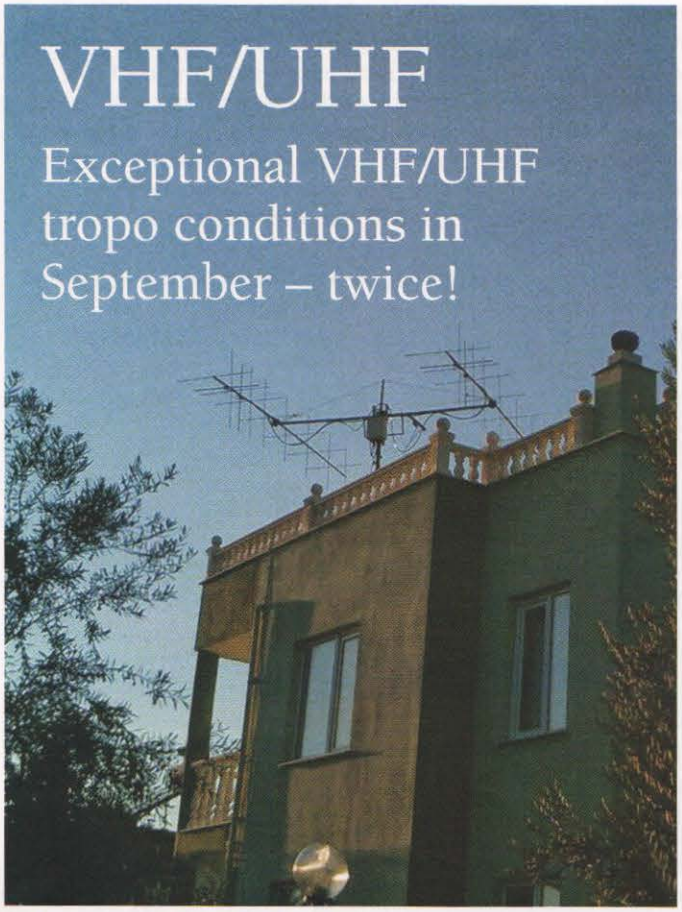
THANK YOU. Finally a thank you to various sources of DX information including Col, MMONDX and dx-world.net, Bernie, W3UR and The Daily DX, and Mauro, I1JQJ and the 425 DX Bulletin.

TABLE 2: Worked DXCC Entities.

Call	CW	SSB	Data	All
MOBKV	121	108	22	164
MOBVE	154	0	0	154
G4XEX	0	129	84	136
G3HQT	75	0	106	125
G4FVK	47	57	0	85

VHF/UHF

Exceptional VHF/UHF tropo conditions in September – twice!



TA/PE1L, showing the 2m EME antenna.

OVERVIEW. The beginning of the month saw excellent conditions for the west side of the UK and Southern Ireland with exceptional tropo paths to EA, CT and the Canaries (EA8). For most, sadly, the conditions didn't last until the 144MHz Trophy and IARU contest weekend, however this opening was welcome relief to many after a poor Sporadic-E (Es) season on 2m. The best was yet to come when high pressure dominated the UK and Europe during the 21/24 September period. Although 2m carried the bulk of the DX traffic during both openings, 70cm was busy with long DX and a possible new tropo record. 6m and 4m provided brief Es openings in the early days of September combined with the usual meteor scatter activity taking advantage of any sporadic meteors available, however tropo propagation was not so pronounced as on the higher bands later in the month.

70cm TROPO POTENTIAL NEW EUROPEAN DX RECORD. Richard, GD8EXI (IO74) who is well known on VHF/UHF sent in his 70cm report from the Isle of Man. On 3 September Richard heard EA8 stations on 70cm with the intention of trying to use the band to arrange skeds for 23cm but unfortunately no QSOs resulted. Richard was aware that the 3000km+ path on 23cm would be a new record but never imagined it would also be a record on 70cm and was only alerted to the possibility by a couple of French stations, who saw the QSOs on the DX cluster. He still wonders if a longer distance contact exists somewhere in Region 1 as the margins are so small. Having passed his information to DX record analyst Matej, OK1TEH, it was confirmed that the potential new DX record beats Ian, GOFYD's long standing QSO distance by 6.5km. This was also exceeded by David, GI4SNA who worked EA8TJ (IL18) at 3023.8km. So as it stands Richard is in pole position with his QSO with EA8CTK (IL18) at 3026.5km. Richard's 70cm station consists of a 38-ele M2 Yagi with a 9.25m boom, 13 meters above ground. The QTH is only 58 metres ASL, however is located on a hillside facing SSW. The prime mover is a TS-790A with preamp on receive and, on transmit, a pair of GS36-Bs (4CX400As) in a homebrew linear. This linear is a scaled up K2RIW design delivering 400 watts to the antenna. For more information on DX records on VHF/UHF and microwaves check out the OK2KKW website [1].

Peter, G3SMT (IO82) was also QRV during the earlier opening and on 3 September he worked EA8TJ (IL18), EA8AVI (IL28) and, best DX, EA8TX in IL18QI at 2944km. The station at G3SMT comprises an Elecraft K3, single LDMOS PA running 400W to a 12-ele LFA at 25m with superb takeoff from his 1000ft elevated location.

Mike, M5MUF (IO92) struggled to work much DX on 2/3 September as he simply couldn't hear it! The only DX worked was F5ICN (JN03) on 2m at 1051km, though signals were weak. During the 2m UKAC contest conditions seemed to favour the north, with still no trace of EA8s etc. Stations worked included GM4JR (IO85), MM1MHZ/P (IO75), GM4AFF (IO86), MM0GPZ/P (IO85) and G8PNN/P (IO95) plus a late night rag chew with M0CGL in JO03. The 144MHz Trophy Contest and Murphy dictated that all the tropo had completely gone. The band was flat with even GB3VHF down on normal signal levels. Add in some local noise, low power and a preamp that decided to go out in a blaze of self-oscillation, it was rather tough going! Still, Mike managed over 50 QSOs, including 8 DXCCs and 25 locators – with 3 x F, GD, 4 x PA, 3 x GM, ON and 2 x DL. ODX was DF0MU at 580km. On 3 September 6m Es QSOs netted EA1QT DF6HT, LY1R, OH1AF and CT1HZE (IM57). I6WJB was worked on JT6M though signals were via Es rather than MS however OE9ICI (JN47) was worked this time via real MS with bursts of up to 10 seconds. On 4m, Mike had successful contacts with EA7KB (IM67), OZ1JXY, LA6Q and LA4LN using random FSK441. During the major opening on 23 September, Mike worked these QSOs over 1000km: DG0VOG (JO60), OE2XRM (JN67), DF9RJ (JN68), OK2BY (JN69), OK1ES (JO60) and OK1KIR in JO70.

John, G4SWX (JO02) had a busy time fitting in a holiday in Southern France with two periods of tropo openings and EME operation as well. During the latter tropo opening John's best QSOs were HA1FV (JN87), S51ZO (JN86), OE3FVU (JN78), HA1VQ (JN87) and best DX YU1EV (KN04) at 1619km. On EME he made the first and maybe only G – 3B9 (Rodriguez Island) QSO. More EME QSOs included PY1EME (GG76), CX1AA (GF15), J45EME (KM46), GM6VXB/P (IO99) and OX3LX (Greenland) in HQ90. John also ran a test towards the end of the 'lift' on MS with TA/PE1L but only got bits of calls and didn't complete. At over 2440km this was a big ask however he thinks the duct was not good enough from JO02, maybe too close or overhead.

Bob, G8HGN (JO01) sent in his log from a busy tropo opening working the following stations on 2m: DK2RY (JN59), DL3YEE (JO50), DL1VPL (JO61), DG0JMB (JO60), DL8NP (JN58), HB9AXA (JN47), OK1CRM (JN69), OK1TEH (JO70), DJ6AG (JO51), DD7MH (JN68), DK1DB (JO30), OE5RBO (JN68), DL6KA (JO30), DL3NCR (JN48), DB5KN (JO31), F6DRO (JN03) and F1BKM (IN98). Bob also spent time on 70cm working DK2RY (JN59), OE5RBO,

The Dutch A Team (l-r) PE1LWT, PE1L and PA3FPQ.

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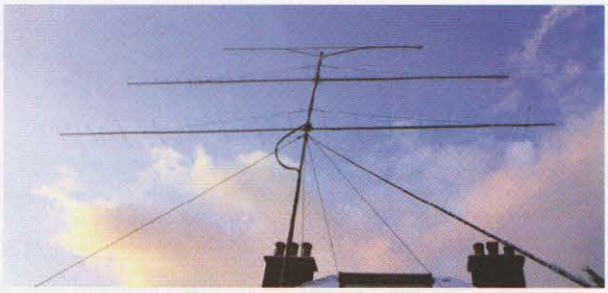

GD8EXI, showing the 2, 70 & 23cm antennas.

DC5XP & DJ7GK in JN68, OE3DSB (JN78), DH3NAN & DL3YEE in (JO50), DF1WS & DK5WO in (JO30), DL8DAU (JO40), F1BKM (IN98), plus two excellent contacts over 1000km with OE2CAL (JN67) at 1002km and OE3DSB (JN78) at 1078km.

Dave, G7RAU (IO90) sent in his incredible log covering 22 to 24 September with just short of 200 DX QSOs. OM2VL & HA1FV (JN87), 9A2AE & 9A1CAL (JN86) plus OE3REC & OE1SOW in JN88 were his best DX at approx 1400km. On 70cm, Dave worked OK1TEH (JO70), DL3YEE (JO50), DL8DAU (JO40) and DL5DWF in JO71.

Thanks to John, G3XDY (JO02) for his 70cm report where he says that he was only intermittently active on 432MHz (he was mainly on the microwave bands) but here are some highlights. On Sunday 22 September the French F9NL contest resulted in 6 QSOs over 400km, with best DX F6KSD in JN37 at 640km, who was up to S9 at times. This was a prelude to the opening to follow. Monday 23 September brought in DG0VOG (JO60), OE2XRM (JN67), OE5RBO (JN68), OK1TEH (JO70), DL6NAA & DJ5NQ (JO50) and DF3RU in JN59. OM3PV in JN88 was heard peaking 529, but sadly he was unable to copy John well enough for a QSO.

David, G4DHF (IO92) comments that this was certainly an excellent opening but adjectives such as superb and outstanding should be reserved for those stations in EI, GI and GW who were located some hundreds of kilometres further west of his QTH and were working the same stations from far greater distances. Stations from southern DL, OK and OE were extremely strong for hours on end but he only ever experienced the full extent of the good conditions between 1700 and 2100UTC on 23 September when the duct favoured his sea level inland location. David worked in total 7 x HB9, 17 x OK, 10 x OE plus S51ZO (JN86), 9A1CAL (JN86), HA1FV (JN87) and HA2ML (JN97) providing the highlights.

Alwyn, G8DOH (IO92) reported excellent tropo as well on the 24th. He worked 24 stations on J3E, with distances averaging 900km. His best QSOs over 1000km were OE3FVU (JN78), DL8NP & DL5RDP (JN58), OK1KIR (JO70), DG0VOG (JO60), DL3MBJ, (JN57) and OE2JOM/2 (JN67), who was very loud at -110dBm. Best direction was SE, but pretty good to S and E too. Working conditions were 400W to 2 x 8-ele at 34m AGL, site 239m ASL.

Lyndon, GW8JLY (IO81) reported in just before he was whisked off by his XYL on holiday. He worked these stations over 1000km: OE5VHL (JN68), OE9MON (JN47), DK1FG (JN59), DG0VOG (JN60), DG5CST (JO60) and DF1CF (JN57). He also worked some other HB9, DL, PA and F stations at good distances but at under 1000km.

In IO83, I worked DK5EW (JN48) with 1 watt on 144MHz and received a report of 52. However, he came out of QRP hibernation after that to try and crack the pileups as there were so many stations calling the DX. Best QSOs were DG5CST & DG0VOG (JO60), DF0HF (JO50), HB9SLU (JN36), OK1KIR (JO70), OK2BY & OK1DOL (JN69), F4AZF (JN39), F6GYH (JN27) and F6DCD in JN38. Unfortunately, HA1FV was heard whilst working G4SWX but too weak and not worked.

EME DXPEDITIONS. During September there were no fewer than three EME DXpeditions running from exotic locations. From 2-13 September, 3B9EME was QRV from Rodriguez Island in the Indian Ocean. They operated on 144MHz EME and reports received suggest that John, G4SWX was the only UK station to work them. The team battled with heavy rain, strong winds and, as if this wasn't bad enough, terrible interference from a local 70MHz TV station and the airport when beaming west. You can catch up on more information and logs on the Make More Miles on VHF website [2] and QRZ.com [3].

From 10 to 21 September, Herman, DL2NUD and Peter, DJ4TC were QRV from the island of Miquelon just off the southern coast of Newfoundland as FP/DL2NUD & FP/DJ4TC. They were QRV on 144, 432, 1296 and 2320MHz. The locator for the expedition was GN17TC and they successfully made QSOs on all bands from the rare square. UK stations worked included G4EZP, G4FUF, G4SWX, G4YTL, G6PHH on 144MHz and G4RGK on 432MHz. More details from the team's expedition can be found at [4].

The Dutch 'A Team' expedition to Turkey, TA/PE1L, had attracted considerable interest as TA is still on many stations wanted list of DXCCs. The locator for the expedition was KM39JA on the island of Mikylene in western Turkey. Rene, PE1L, Johan, PA3FPQ and Jurgen, PE1LWT are seasoned expeditioners and, after set up, the first moon pass netted 150 QSOs, which was way beyond the team's expectations. Effective placement of the antenna system proved tricky on the balcony with two 20m long coax cables running to the shack in the living room that was two floors down. They had no problems until they received a visit from a bunch of locals wanting to know what they were doing on the roof! It was very difficult to explain but with the help of the official papers from customs and police (good preparation) and a little help from Google Translate they shook hands and finished the conversation drinking Turkish coffee and tea underneath the antenna system! Highlights of the first moon pass were QSOs with 4X1DG, XE2AT, FM8DY and fellow expeditioners Peter, FP/DJ4TC and Hermann, FP/DL2NUD. Unfortunately they were subject to severe QRN so, armed with a set of handhelds and an HB9CV antenna, they walked through the small village. Triangulation of the interference pointed them to a barn not far away from the station; it turned out to be a still! The wiring to the still was not professionally done and the grounding was not connected. After rewiring the inverter the noise was much less, and they noticed the difference in the receiver immediately. During the second moon pass they made 91 QSOs. Success on 144MHz was then transferred over to 432 and 1296MHz with completed QSOs on both bands using single Yagis. Not only does this show technical excellence of the station installation by the team but good diplomatic local negotiations where language and culture is a barrier. The A Team's final results on EME were 144MHz 284 initials, 39 DXCCs, 432MHz 16 initials, 10 DXCCs and on 1296MHz 22 initials and 14 DXCCs. The equipment was 144MHz 2 x 8 X-pol Yagi and legal power by ItaLab. 432MHz 23-element DK7ZB Yagi made by Jurgen, DK3WG and 90W amplifier. 1296MHz 67-element Yagi and 80W amp with thanks to Dan, HB9Q.

NEW VHF/UHF YAHOO GROUP. Lawrence, GJ3RAX has established a new Yahoo group covering VHF/UHF operations. Although it doesn't specialise in any particular area it is a great place to post, advise and report on all matters VHF/UHF. Excellent idea Lawrence thank you [5].

SIGN OFF. Thanks to all contributors this month. Deadlines now for each edition are the 3rd weekend of the month. Please where possible keep reports for 70cm coming in.

WEBSEARCH

[1] www.ok2kkw.com/dxrecords.htm
[2] www.mmmonvhf.de/review.php
[3] www.qrz.com/
[4] www.emelogger.com/fp/index.html
[5] http://groups.yahoo.com/group/VHFandUHF/

GHz Bands

The 76GHz distance record is broken again and it's time to upgrade your systems

WINTER APPROACHES. I guess this means that portable activity will decline for a while, but there is plenty to do upgrading your equipment. Let's face it, we are into microwaves for system design and build not the QSO numbers and the new 76GHz distance record, reported later, highlights the importance of always improving systems. By the time we go to press, I'm hoping to have commissioned my 'new/surplus' 10GHz 14W solid state power amplifier (SSPA) and at the same time move the transverter into the loft, leaving just a masthead preamp on the dish and a short FSJ2-50 feed. It's a shame to throw away power, but the PA is just too heavy to put up a 2 inch pole. It should get me up from my current 1W to around 7-8W at the feed and give me a further 'edge' on 10GHz.

PHOTO 1: Hiding in the bushes! One end of the 76GHz record path. (Photo: Wessex Microwave Group).

NEW 76GHz RECORD. Wessex Microwave Enthusiasts have broken the UK distance record again! A new record of 102km was achieved on 76GHz on Saturday 14 September in a contact between Batcombe Hill, Dorset (IO80RT59) and Eglwysilan Mountain, Gwent (IO81IO36), see **Photo 1**. This is also believed to be the first 76GHz contact between Wales and England. Operating at Batcombe Hill on three millimetre bands (24, 47 and 76GHz) were Chris, G8BKE and John, G8ACE; on the same three bands at Eglwysilan was Ian, GW8KQW, who had valuable assistance from Keith, GW3TKH, who was also operational on 24GHz. All three bands were worked using NBFM with full duplex operation on 76GHz between GW8KQW and G8ACE and one way FM between G8BKE and G8KQW. Signals on 76GHz were exchanged for over two hours with a very gradual increase in average signal strength after some QSB initially. The G8ACE Tx and Rx were locked using RDDS PLLs [1], as was the GW8KQW Tx. This was the first time RDDS locking was used at both ends and meant the 76GHz signal was acquired within seconds due to the highly accurate frequency control, therefore no tuning was required. It has been very difficult to improve on the previous record distances primarily due to the earth being curved. So far if the path is not optical then it doesn't work: none of this K=1.332 stuff on 76GHz with the relatively low power levels used. This tremendous success is a result of continual innovation, systematic improvements and testing of the equipment built and used by the Wessex Microwave Enthusiasts with support from other microwave radio enthusiasts in UK and Germany. By calculating the link budget and path loss of this path it was possible to predict what environmental conditions would potentially give sufficient margin for success. The 7 day weather forecasts (specifically the dew-point temperature) were analysed for several weeks whilst waiting for the optimum conditions to materialise.

PHOTO 2: The GB3CAM antennas (24GHz on the left). (Photo: G4BAO)

ACTIVITY REPORTS. My deadline is usually just before the 'Microwave' UKAC contests so apologies for being a month behind but thanks for the reports. In the August 1.3GHz UKAC GM4CXM's log from IO75TW has some nice QSOs around the 500 – 600km mark including G3XDY (JO20OB) at 566km and G3TCU (IO91QE) at 584km; ODX again being OZ1FF (JO45BO) at 784km. The contest produced G0EHV's all time best session on 23cm from his IO94 portable site with 100W to a 55-ele Tonna. Conditions were up a bit but still suffered from sudden QSB at times. He had a total of 44 QSOs with 15 multipliers, ODX being G3TCU at 409km. Eddie reports many new 'initials' for him plus a new square from his /P site; G4DHF/P in JO03. On 2.3GHz GM4CXM's ODX were G8NVI (IO91JO) and G8CUL (IO91JO) at 525km and he reported Kjeld, OZ1FF and John, G4EAT as 'got aways'. Ray heard Kjeld briefly but the aircraft was always heading away from their midpoint. G0EHV/P found conditions below par with QSB being particularly harsh at times. Best of his 13 QSOs was John, G3XDY at 359km and he did hear PE9GHZ but no QSO resulted. On the higher bands the August 5.7/10 and 24GHz cumulative brought quite high activity on 10GHz and, despite a dire flat band, I had 9 QSOs: my ODX was Nick, G4KUX in IO94 at 298km. Despite my low QTH, I rarely fail with Nick as I have a perfect shot over the Fens and up the Vale of York to Bishop Auckland, between the 'islands' of Ely and Haddenham. Not one single station was worked or heard here on 24GHz despite at least 6 being active. G4SJH/P and G8CUB/P braved the horrid weather and were rewarded with 10GHz ODX QSOs with G4KUX and F6APE respectively, the latter QSO being 446km. John, GM8OTI was active in the 10GHz section while in transit between Edinburgh and Southampton; with a 40cm offset dish, 1W PA and LNB based Rx he went to a hilltop near Wigan. As well as the enormous signal from GB3XGH, which he could detect in most directions, much of the time was spent testing with Alan, GM0USI (IO76XA). At nearly 300km he was also behind much of the Lake District and lots of the Scottish southern uplands.

However, Alan's CW dashes turned out to be audible once the dishes were aligned and given a better site at the Wigan end would probably have achieved a QSO. He had a couple of easy contacts with Tony, G4CBW at 59km and Bob, G8DTF at 17km.

G3XDY was also active during the contest for a short period early on, then again later in the afternoon. He had 3 QSOs on 5.7GHz, ODX being G3ZME/P (IO82) and 9 QSOs on 10GHz with ODX F6DKW (JN18). John also entered the SHF NAC / UKAC on 27 August where he reported some tropo over the North Sea, but it did not extend much inland. Good activity on four bands made it a busy evening with, on 3.4GHz, 6 QSOs in 5 squares, 3 QSOs in 3 squares on 5.7GHz and, on 10GHz, 5 QSOs in 4 squares. Alan, GM0USI, has recently borrowed the UKuG's 5.76GHz transverter to try and increase activity on that band and Jim, GM3UAG (IO87XJ) reports QSOs with him. Alan went portable to IO86PB (North Berwick) and they hooked up first on 10GHz at S9 both ways; then on 5.7GHz, S9 again; then on 3.4GHz, S9 once more. So, within an hour, Jim enjoyed more contacts on more bands than he normally gets in a year! Nice to see Russ, G4PBP's 5.7GHz transverter doing the business. I'm sure Russ would have been delighted to see it put to such good use. I'm currently working on a 10GHz transverter for the UKuG to use as a similar 'loaner'. Group members should contact me if they want to book the equipment. No charge for the loan but approved carriage must be arranged!

EME ACTIVITY. Jac, PA3DZL sent me a report of his 3.4GHz activities using a 3.7m mesh dish, RA3AQ feed, 0.7dB NF and 150W at the feed. He worked G3LTF, SM6PGP (Hannes, who was using just a 1.8m dish), PA0BAT, PA3CQE for initial #25, SP6OPN, W5LUA (the strongest station of the day at 579) and K2UYH. Jac also manages a few terrestrial QSOs over the North Sea with his EME system, so look out for him when conditions are up. Here on the Fen Edge, with my small 1.9m dish I've now managed 2320/2304 CW QSOs with W5LUA and PY2BS. Both stations are in a fairly low elevation westerly direction.

PHOTO 3: The FA-Station Manager. (Photo: DH8BQA).

With my small system, I'm finding that I get the best results when the moon is at its closest (perigee), which for the next few years unfortunately coincides with low declination and hence low elevations and short moon windows. When the moon is furthest away (apogee), my self-echoes here are quite weak indeed. This is not helped by my local trees that screen me below 40 degrees elevation for easterly directions.

BEACON NEWS. Five years after initial installation, I've completely refurbished the GB3CAM 24GHz beacon in IO92WI53 [2] after a failure in August. Despite being heard at 150km, it seems that the beacon has been running only a few hundred microwatts for at least three of those years due to a failed doubler. It's now back up to 100mW to a 10dBi slotted waveguide and is around 20dB stronger here than it was, so take a listen for it. The 10GHz beacon also continues to perform well. **Photo 2** shows the two outdoor units on the rail of the water tower and the takeoff to the east.

SPECTRUM SHARING UPDATE. It seems that the 5760 / 5840MHz microwave bands used by narrowband and AMSAT downlinks are to become rather noisier in future. Ofcom has published another consultation document [3] about spectrum sharing. This includes proposals for expanding the range of frequencies at 5GHz for Wi-Fi and more 'white space' style spectrum sharing techniques. There seems to me to be a significant threat to continued use of 5.7GHz for weak signal work; it is likely to become an interference-limited free-for-all. John, G3XDY (JO02PA) has already noticed more wideband data signals around 5760MHz recently, almost certainly non-amateur, but there is no mention of amateur users in the document. It seems that Secondary users may now be below ISM services in the pecking order as viewed by Ofcom.

THE GHz BANDS IN PRINT. As well as many web resources, there are a few specialist microwave / VHF magazines out there and a number of books if you want to find out more about this aspect of our hobby. As well as the UKuG e-magazine *Scatterpoint* and its related free archive [4], there is *VHF Communications* [5] which, this quarter has, amongst other articles, designs for 122GHz components, some updated on information on microwave CAD and directional couplers. Then there is *Dubus* [6], which regularly runs microwave articles by the likes of Phillip Prinz, DL2AM as well as covering all VHF and up bands plus EME. The RSGB bookshop stocks a number of microwave books [7] edited by *VHF Communications* editor Andy Barter, G8ATD, and the ARRL UHF/Microwave projects CD [8] is still available.

A USEFUL STATION ACCESSORY. I just recently purchased a nice little kit from the online shop of German magazine *Funk Amateur* [9]. Designed by Ollie, DH8BQA the FA-Station Manager [10], in one small box is a voice-recording keyer, but it also contains the N0XAS 'Pico Keyer' [11], a memory Morse keyer and, most relevant to the GHz bands, a 3-output relay sequencer to allow you to sequence the keying of a rig, a transverter and PA to avoid destroyed preamps and the like. It also has a fully linkable pad for various microphones and an interface to the FT-817 band selection output, making it a very versatile piece of equipment in one box. The kit uses normal through board components, can be built in about two hours and includes a nice case, see **Photo 3**.

UPCOMING MICROWAVE EVENTS

Oct 26-27	BATC Convention, Finningley, www.g0ghk.co.uk
Oct 26-27	ARRL EME contest, 50-1296MHz
Oct 26-27	French 1296MHz And Above activity day
Nov 2	Scottish Microwave Round Table, www.rayjames.biz/microwavert
Nov 16-17	ARRL EME 50-1296MHz
Nov 19	1.3GHz UK Activity Contest
Nov 24	UKuG Low Band 1.3/2.3/3.4GHz
Dec 17	1.3GHz UK Activity Contest
Jan 18 2014	Heelweg Microwave Round Table, www.pamicrowaves.nl/

WEBSEARCH

[1] RDDS support page: http://myweb.tiscali.co.uk/g4nns/RevDDS.html
[2] GB3CAM: www.earf.co.uk/GB3CAM.htm
[3] 5.7GHz consultation document: http://tinyurl.com/rc-ghz-5g7 or http://stakeholders.ofcom.org.uk/binaries/consultations/spectrum-sharing/summary/Spectrum_Sharing.pdf
[4] *Scatterpoint* magazine: www.scatterpoint.org/
[5] *VHF Communications* magazine: www.vhfcomm.co.uk/
[6] *Dubus* magazine: www.dubus.org
[7] www.rsgbshop.org/acatalog/Online_Catalogue_Microwave_11.html
[8] www.arrl.org/shop/The-ARRL-UHF-Microwave-Projects-CD/
[9] Funk Amateur online shop: www.box73.de
[10] FA-SM Station Manager: www.dh8bqa.de/fa-sm/fa-sm-en.html
[11] Pico Keyer: www.hamgadgets.com

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6M5	6	5	4.6	10.7	169
6M4	6	4	1.92	10.3	139
6M3	6	3	2.6	8.7	99
6M Moxon	6	2	0.92	5.99	79
4M8DXX	4	8	8.3	13.56	229
4M7DX	4	7	6.6	13.09	179
4M6DX	4	6	5.23	12.5	149
4M5DX	4	5	3.35	10.7	129
4M4DX	4	4	2.56	10.4	99
4M3DXS	4	3	1.48	7.78	79
4M Moxon	4	2	0.62	6.0	75
2M9DXX	2	9+9 crossed	5.0	14.05	139
2M9DX	2	9	4.99	14.05	109
2M8DX	2	8	3.92	13.54	99
2M7DX	2	7	3.32	13.1	89
2M6DX	2	6	2.62	12.42	79

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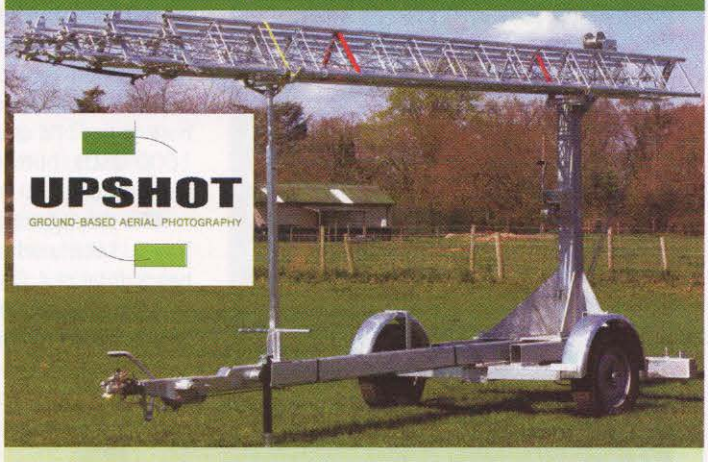

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Operating G(W)100RSGB

More stories from the clubs who have operated the RSGB's Centenary station

GW100RSGB. With an operation planned from my station I applied for the Sunday and Monday of the August Bank Holiday weekend. One of two things would happen, I'd either be running flat out for 2 days, or not. In the end, it was somewhere in between.

In the days before, the shack was tidied and all the unnecessary kit removed from the desk. Cables and interfaces were checked and double checked, my FT-100 was brought out of retirement as a backup Tx along with a backup laptop. Don't get me wrong, my Icom IC-7400 has performed faultlessly for 9 years, but what with the law of averages being what it is, if the 'magic smoke' was going to escape, this would be the weekend it would happen!

Sunday came; the CAT interface was fired up, then the logging software and the radio. I tuned up on 7.108MHz, put an announcement on the 'Alert' system and I was off. Ken, G0WKN, in South Lincs was the first QSO in the log at 0843UTC, followed by Vic, G3JNB, in Bedfordshire two minutes later. The morning was fairly steady; I moved up and down the bands as the propagation would allow. However, this weekend in particular, I was met by some deep fading, which meant that people could literally disappear mid-QSO to come back 20 over 15 seconds later.

I took time to talk to the people who had taken the time to work me, although I was aware of the number of people waiting simply by the wall of voices that met me every time I took my foot off the footswitch. I tried to ensure that everyone had the information they needed as there was a fair number of WABers and similar after me that day!

I carried on into the early evening, and had a break to grab something to eat. An hour later I was back, on 80m, this is where things got interesting. My log shows I hit 80m at 1903UTC, with G4SQA being first in the log. I can't remember when it happened, but the comment was made at some point, "You do know you're the first Centenary station in Region 6 on 80m?"... "No" came my reply. From there, the number of stations wanting to work me grew – and it grew exponentially. I wouldn't want to guess at the numbers, but suffice to say, you could literally feel the number of people growing each time I released the PTT. At one point, the only way was to go full-on contest-style and work as many stations as quickly as possible, whilst giving all the info every 10-15 minutes. It wasn't how I'd intended, but I wanted to give as many people as possible the opportunity to work me on 80m! I think the pileup could simply be described as 'epic'.

I finished with 253 QSOs for the first day, 90 of which were on 80m and in a 3 hour period. I'd envisioned it being around 1000 QSOs, but was still pretty pleased with myself.

The propagation issues were still there on Day 2. I ventured up to 6m and made the heady total of 4 QSOs – all local – with best DX being G4VSS in Warrington. The 'gods of propagation' were certainly not smiling on me that morning.

Again, over the course of the day, I moved up and down the bands as necessary. During the two days I had made ample use of the 'alert' system, which was commented on by a number of stations who worked me. Spots on the DX Cluster also created the much appreciated pileups.

Monday, being a bank holiday, moved at a slower pace, possibly because people were taking advantage of the warm sunny weather. Determined to make a total of 500 QSOs, I used the 'Alert' system as well as Twitter and Facebook, and encouraged people to spot me on the Cluster. However, despite the best efforts of everyone involved, I didn't make the 500. My afternoons on the quieter bands hadn't helped me and I turned off the IC-7400 at 2219UTC with 468 QSOs across 80m, 40m, 20m, 15m and 6m. Not a bad effort running 100W into a Hustler 5-BTV. I had a lot of fun, the propagation wasn't in my favour but that's all part of the experience!

I'd like to thank everyone who worked me or spotted me – it was an honour to be part of the G(W)100RSGB experience, and something that will certainly sit on the top of my 'amateur radio CV'.

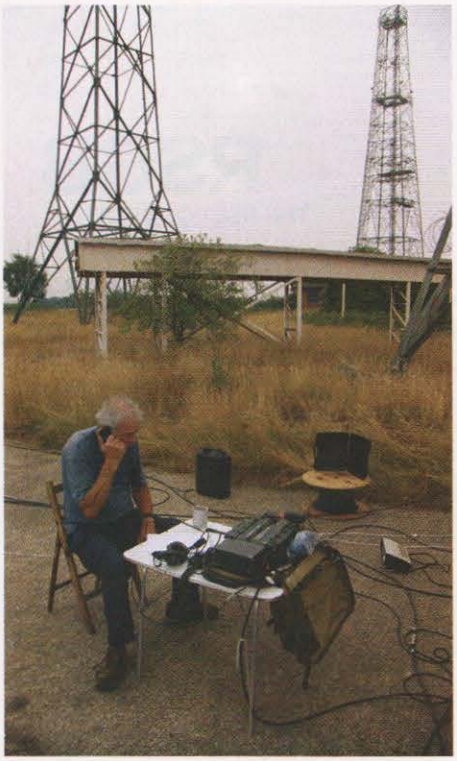
Mark Harper, MW1MDH

SOUTH ESSEX AMATEUR RADIO SOCIETY. On 7 and 8 August, South Essex Amateur Radio Society had the opportunity to operate the RSGB Centenary G100RSGB. We used our home location, The Island Yacht Club, as we have proved in the past it is great for operating radio with a good take off and low QRM. We were allocated a weekday spot and that did reduce the number of members that could operate down to four. In a good 15 hours of operating spread over two days on CW, PSK, SSB we managed to work over 300 stations in 44 countries.

Dave Speechley, G4UVJ

South Essex ARS operating G100RSGB.

South Essex ARS operating G100RSGB.



Outdoors operating the military equipment is Peter, G8BLS.

FELIXSTOWE & DISTRICT ARS. We were really lucky with the dates allocated to us for G100RSGB. It was a Friday and a Saturday, it overlapped the RSGB IOTA contest and it also coincided with a public event that we had already planned, with access to a great site and some fantastic towers. We planned to run G100RSGB for two days, then switch to GB2SAH on the Sunday, with as many club members as we could find plus friends and visitors.

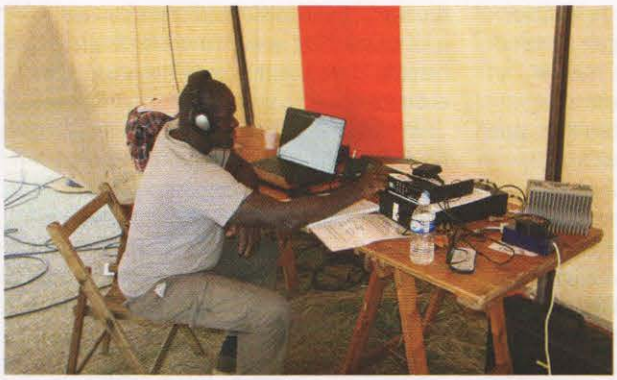
The site was a former US Defence Communications Station at Foxhall, just to the east of Ipswich, which used to provide communications for US and NATO forces in Europe. It's now the site of the Suffolk Aviation Heritage Display Centre. The outstanding features of the site are the communications towers, two at about 30m and one at about 60m.

We ran two HF stations and one VHF / UHF station, with a tri-band beam, multi-band vertical and a variety of dipoles for HF, plus beams for 6m, 2m and 70m. The radios were Elecraft K3, Yaesu FT-897 and FT-857 with a variety of other ad-hoc and creative combinations brought into service when we wanted to try something different – including Clansman ex-military radios. No on-site power was available, so everything had to be generator powered. All of the stations were housed in a single large marquee, which made it very sociable and also easy to demonstrate to visitors.

Some of the operating team camped on site, which meant that we could be active for almost all of the 48 hour period and make the most of the band conditions. Other members of the team joined us for the busy periods and the operating hours, which they found most interesting, so the stations were very rarely quiet. We enjoyed some very big pileups, most memorably during the IOTA contest when we managed a very respectable contact rate on both 40m and 80m simultaneously on the Saturday evening – we never thought EU-005 would be so popular!

We also suffered a fairly noisy thunderstorm on the Saturday evening and were suddenly very aware of our close proximity to the large towers. We decided to close down the station for about an hour while it passed, drank some tea and piled up the equipment in the centre of the marquee as the rain water leaked in and flowed across the floor. We did continue with the planned operation on 160m later that evening, but we were always fighting a losing battle against the static crashes from the storm.

It was great to have so many local amateurs visit, operate, help and support the stations over the weekend, including RSGB Chairman, Graham, G4FSG, who spent some time handling the G100RSGB pileup on 40m. We were also visited by many members of the public during the weekend because the site was open for a Military Heritage Weekend. A few visitors were licensed and have since joined the club, many were new to radio and were genuinely interested to see and hear what we were doing. I hope we managed to spark some interest.



Operating inside is Brian, 2E0BMC.

The weekend, and the planning and preparations leading up to it, was a really great event for the club and its members. Some were experienced contest and DXpedition operators, some were Foundation licensees who had never operated on the HF bands before – everyone enjoyed it. We made 1184 contacts as G100RSGB. We'd love to do it again.

Steve Thomas, M1ACB

Sport Radio

Set a record in CQWW CW, new logging software and how to complain

YOUR RSGB THE BEST CONTESTS

SET ANOTHER RECORD. Last month, in the item entitled Set a Record, Ron Stone, GW3YDX listed a number of easily beaten records and records just waiting to be set in the CQWW SSB contest. It should come as no surprise to learn that there are also some easily beaten records in CQWW CW, plus some records waiting to be set.

As regards England, the Multi-2 record currently held by M4A must be easy to beat, because it is lower than the Multi-single record held by G6PZ. In the Single-op Low Power category, the 40m, 80m and 160m records should be easily beatable; while in the Single-op QRP category the five single-band records for 15m to 160m should all be beatable. Incidentally, these five records are all held by Colin Smithers, G4CWH, who obviously went about setting records methodically. Well done to him! Moving on to the Single-op Assisted categories, nobody has ever submitted a single band Low Power entry for 80m or 160m, and nobody has submitted a single band QRP entry for any band at all. The situation will be different for other entities within the UK, so check the Records page at www.cqww.com/records.htm, pick your target category and record and go for it! Then please let me know how you did.

CLAIMED SCORES & COMPLAINTS. A while back it was noted on the Claimed Scores page of the Contest Committee website that personal remarks were being made by a few entrants to contests. This was an unwelcome development, so before long the following statement was added to the claimed scores submission page: "Comments posted on the Claimed Score Pages are not moderated. Derogatory comments naming another station must not be made under any circumstances. Failure to comply with this instruction may result in your entry being penalised".

There were never many 'offenders', but to prove that the CC monitor what comments are being made a claimed score was recently removed when someone used the facility to make a personal attack on someone else for apparently radiating a poor signal.

If you are taking part in a contest and find, for example, that someone's signal is wide, the way to deal with it is register a complaint via the Chairman of the Contest Committee. The CC take such complaints seriously, but always expects the complainant to have brought the situation to the attention of the station concerned *at the time*, to give the station concerned the opportunity to check their station. Before they will take action the CC normally expects others to have also brought the situation to the attention of the station concerned as well, because not everyone's receiver is capable of dealing with really strong signals – especially at VHF.

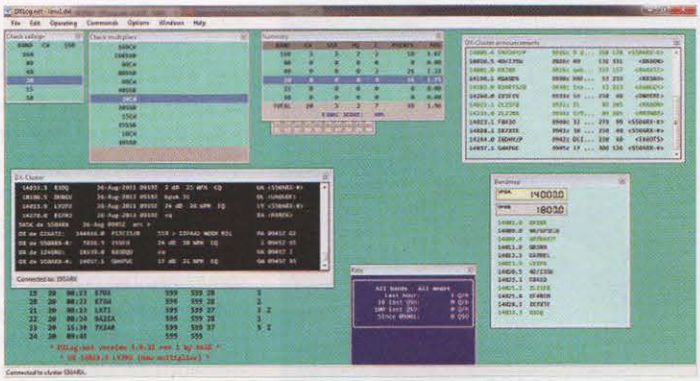


FIGURE 1: Screen layout of *DXlog*.

LOGGING SOFTWARE. It's not very often that a major new contest logging software package comes along, but a couple of years ago Kresimir Kovarik, 9A5K launched *DXLog*. I must admit that until recently I knew nothing at all about it, but with the release of Version 2 in September 2013 the package is becoming increasingly comprehensive in nature and attracting the attention of more contesters. Over 160 contests are supported and it is being developed rapidly, with frequent new releases.

DXLog (screen layout shown in **Figure 1**) is a Windows package that looks rather like *Wintest*, has a proper serial number server (unlike lots of other contest logging software) and is available as a free download from dxlog.net.

Neil Powell, EI3JE, one of the people responsible for putting together the Irish contest 'superstation' EI7M described it as "very easy to set up", "has much better support of digital modes than *Wintest*" and "one to watch".

Meanwhile, one of the most popular logging software packages is on the change. The *N1MM Logger* team has begun a major re-write, using Visual Basic .Net. *N1MM Logger* has used Visual Basic 6 since its initial release in 2001, but Microsoft has now stopped supporting VB6. The rewrite will also take advantage of the wide availability of multi-core computers, for improved performance. It is expected to run under Windows XP, 7 and 8 with .Net 4 Framework installed (a free download from Microsoft).

Due to the generosity of users during a recent fund-raising event the writers were able to buy the necessary software licences for the project and the rewriting process is already well underway. As the developers say; "We expect the rewrite will take six months to a year, and thousands of hours of work. If you are a developer currently using vb.net 2012 and you'd like to help, please get in touch. Everything will need to be thoroughly tested, and we can foresee a need for volunteer testers, so please let us know if you can help in that respect.

"As the rewriting process continues, we plan to keep the user community involved by publishing lists of features we propose adding, as well as those that may be dropped. We plan to be fairly conservative in both respects, to avoid slowing down the rewrite and increasing the complexity of testing.

"To free up the developers, we plan to limit changes to the existing version to critical functional issues and rule changes in individual contests. Releases will only occur if such changes need to be made available to the user community. User support will continue on the reflector (http://groups.yahoo.com/neo/groups/n1mmlogger/info), but the developers plan to step back as much as possible from their active role in this regard. VE3KI, K8UT and N4ZR will pick up some of the slack, but experienced users can help us a lot by pitching in even more on the reflector, helping to resolve the problems newer users encounter."

We often take logging software for granted, never thinking about the number of man hours or the personal commitment it has taken to provide us with something very useful, often at no cost to ourselves. I for one would like to acknowledge the efforts of those who do this work.

NEWS SNIPPETS. In some contests it is possible for a group to win more than one

RSGB HF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Nov 9	Club Calls §	2000-2300	SSB	1.8	RS + SN + Club code
Nov 13	80m Club Sprint	2000-2100	SSB	3.5	SN + name
Nov 16-17	2nd 1.8MHz *	2100-0100	CW	1.8	RST + SN + District code
Nov 28	80m Club Sprint	2000-2100	CW	3.5	SN + name

RSGB VHF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Nov 2-3	Marconi CW Δ	1400-1400	CW	144	RST + SN + Locator
Nov 5	144MHz UKAC	2000-2230	All	144	RS(T) + SN + Locator
Nov 12	432MHz UKAC	2000-2230	All	432	RS(T) + SN + Locator
Nov 19	1.3GHz UKAC	2000-2230	All	1.3G	RS(T) + SN + Locator
Nov 26	50MHz UKAC	2000-2230	All	50	RS(T) + SN + Locator
Nov 26	SHF UKAC	2000-2230	All	2.3-10G	RS(T) + SN + Locator

BEST OF THE REST EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange/info
Nov 9-10	WAE DX RTTY	0000-2359	RTTY	3.5-28	RST + SN
Nov 23-24	CQWW DX CW	0000-2359	CW	1.8-28	RST + CQ Zone (UK=14)
Nov 24	UKuG Low Band	1000-1400	All	1.3-3.4G	RS(T) + SN + Locator

* HF Championship event; + VHF Championship event; § Super League event; Δ VHF CW Championship event.
For the latest RSGB contest info and results, visit www.rsgbcc.org.

trophy. An example of this is that at times one group have won no fewer than three of the seven trophies awarded for CW NFD. The Contest Committee is looking at ways of spreading the trophies around a bit more, so in addition to a rule change to the Club Calls Contest this month (see This Month's Events), expect there to be some rule changes to a few events next year.

In VHF NFD the new Multi Single section attracted twelve entrants. A relatively small percentage of them moved across from previous years into the new section. Most were new. This year's glorious weather resulted in a 12% increase in the number of portable stations taking part over last year, when heavy rain caused flooding in many parts of Britain.

The IOTA contest goes from strength to strength. This year there was a new record number of entries – over 2600 (not including check logs). The number of entries has increased every year for at least the past five years.

It is well recognised that weekday contests with a club element (eg the UKACs and 80m CCs) are popular, so starting next year the Contest Committee have decided to add a club element to some weekend contests. On HF both RoPoCo contests, both 160m contests, the Low Power Contest and the 21/28MHz contest will have a club element added. At the time of submitting this column it had not been fully decided which VHF contests a club element would be added to.

For some time a few groups had been telling the Contest Committee that they were disadvantaged in 80m Club Championships, by virtue of the fact that their meeting place is either on the coast or that they have a member or two who live just outside the distance limit for local clubs. To alleviate this problem, from next year groups will be allowed to declare a virtual meeting place, rather than a club meeting place. For AFS contests the distance limit of 50 miles will be changed to the approximate metric equivalent of 80km. There will be no change to the 35km radius for local clubs for the 80m Club Championships.

THIS MONTH'S EVENTS. The Super League series continues this month with Club Calls Contest (160m AFS) on the evening of Saturday 9th. In this 3-hour event, which has a reputation for being friendly and a bit relaxed, teams of up to four stations compete for the G4IQM Memorial trophy. A team can include a Club Station, but it doesn't have to. Club Stations are worth a sizeable bonus score, and it is also hoped to have Society station GB3RS on the air again this year, which will be worth an even bigger bonus score. Due to a rule change a few years ago, in recent times the winners of the two trophies have been the Club Station of the winning team in the overall club table (Ariel trophy) and the club itself (G4IQM trophy), ie the same club has won both trophies. This can mean that the highest scoring entrant in the table of individual stations is not always recognised. The Contest Committee considered that the purpose of these two trophies was no longer being met in the way that the original donors would have recognised, so a rule change was needed. This is not to detract from those who have won the trophy in recent years, but the committee decided that starting this year the Ariel Trophy will be awarded to the operator(s) of the leading individual station, as in the other Affiliated Society contests. We return to the 80m Club Sprints on Wednesday 13th, with the SSB leg of the event. This is the final month of the sprint series. The Second 1.8MHz Contest on the 16-17th is a CW-only event. It has sections for UK and non-UK stations and coincides with a number of other European contests, but please be aware that the European events don't all have the same exchange as the RSGB contest. Lastly, the CW leg of the 80m Club Sprints takes place on Thursday 28th.

On VHF, the Marconi CW Contest takes place on the first weekend of the month. There are 6-hour and 24-hour sections for Open and Single-operator Fixed entries. This is the final VHF CW Championship event of the year. The remainder of the month is the preserve of the UKACs, with 2m on the 5th, 70cm on the 12th, 23cm on the 19th, and 6m plus microwave on the 26th.

The last of this year's WAE DX contests – RTTY – takes place for 48 hours on 9-10th. Unlike the CW and SSB WAE contests (held in August and September), on RTTY everyone can work everyone. In WAE events QTCs (reports of a previously conducted contest QSOs) can add significantly to your total score, so before the event it's well worth reading the rules on the DARC web site to understand how they work. The CQWW DX CW contest takes place for the full 48 hours of the weekend of 23rd-24th and invariably keeps the CW portions of the HF bands really busy. In this contest there are always a number of DXpeditions to rarely activated countries, so even if you are not making a serious entry into the contest it's a good event to be active in if you are working towards DXCC. The final event of the month is the UK Microwave Group's Low Band Contest on Sunday 24th. Please note that this is the final session of the year and two hours shorter in duration than the previous ones.

ARDF

On the podium in Poland

YOUR RSGB
ARDF: DEDICATED TO DF HUNTING

The RSGB Team, from left: Bob, G3ORY, Team Captain Steve, Jillian, M0JIN, Svet, RS214021, David, G6HGE, John, RS205838, Robin, RS213497, Robert, G3ORI, David, M3WDD & Andrew, G4KWQ.

The national anthem of Great Britain rang out at the 19th IARU Region 1 ARDF Championships when one of the RSGB DF pioneers, Robert Vickers, G3ORI, triumphed in the M70 category of the Sprint races. Also on the podium that day was Bob Titterington, G3ORY in the bronze medal position.

The duo also 'medalled' with a silver in the team competition for the 2m Classic race. In a nail biting half hour at the finish, it seemed that the second place would slip away with the last runners from the strong teams of Sweden and the Ukraine, still out in the forest. Gradually it became clear that neither of them was going to post a qualifying time (minimum of one transmitter found in a time of less than 140 minutes) and the RSGB team held onto their second place.

The competition comprised four separate races. There were the two classic five transmitter competitions using the 2m and 80m bands. The Sprint format uses ten transmitters deployed close together and using transmissions only 12 seconds in duration. Finally, the FoxOring format, also using ten transmitters, is a blend of orienteering and direction finding.

The Championships were staged in south-west Poland, by the Polish national Society (PZK). Their organisation was superb and the whole event went very smoothly.

TERRAIN ISSUES. In the 2m Classic races some of the class results were 'carnage'. In particular the M50 and M70 categories saw over half the starters failing to post qualifying times. The other categories were not much better. Given that some of the best direction finders in the world were taking part, the finger was pointed at the steep slopes and heavily contoured terrain as the cause. These features cause the multi-path propagation to mushroom and this is very hard to deal with.

In Britain we rarely encounter this sort of area. In south west Poland the forest comprised thousands of acres covered in mature pine trees with very little undergrowth by way of nettles, brambles and bracken. The forests are allowed to grow for at least twice as long as a typical UK conifer plantation and generally the area is runnable in all directions.

The event was physically extremely tough at times. The M60 and M70 categories faced a 150m/500 foot climb out of one transmitter and all classes had this amount of climb straight out of the start on the second Classic day. This is really hard at the age of 60 or 70!

In this sort of terrain, the competitors can be set a whole new level of challenges that they never see in the UK. The Polish planner set some clever courses, which did demand a high level of physical ability and set some very cunning traps for the competitor.

OTHER TEAM MEMBERS. Newcomer to the international scene, Robin Bishop, RS213497, responded magnificently to the challenge. The established M40 RSGB team members Steve Chalk and Andrew, G4KWQ, were joined by Svet, RS214021 for the competition. This meant that M40s Robin and David, G6HGE had to run 'up' in the M21 category. This is seriously tough but on both 2m and 80m they both got round inside the time to put in a qualifying team performance. Robin excelled himself in the 2m race by outscoring all three members of our M40 team when he visited the same transmitters.

Elsewhere in the competition, David Williams, M3WDD, who has been in strong form in domestic competition for the whole year, put in a series of solid performances in the highly competitive M50 category, placing 8th in most of his four races.

The medal ceremony for the M70 Sprint race: centre: Robert Vickers, G3ORI; foreground, Bob Titterington, G3ORY.

MEDAL TABLE. Eastern European countries led by Russia, the Czech Republic and the Ukraine headed the medal table as usual. However, the western European nations did better than hitherto, led by Germany who were fourth. The RSGB team were an unprecedented 8th in the table, ahead of Sweden, the Netherlands and Norway. That said, **Table 1** shows just how far the top eastern European countries are ahead of the western ones.

Modern IT systems enabled the results to be posted on the internet the moment they were updated, as each competitor finished and downloaded the data from his electronic timing 'chip'. Plans to run a webcam showing competitors as they finished were frustrated by the slow speed of the local internet connection. In spite of this, RSGB Members with a close interest in ARDF were able to follow the fortunes of the team minute by minute.

Full results can be found either on the event website at www.ardf2013.pl or on the DARC website at http://ardf.darc.de/contest/13090813/13090813.htm.

The ten team members, who were all self funded, thoroughly enjoyed their week of radio sport in Poland and had a measure of success well in excess of anything previously achieved by an RSGB team.

TABLE 1: Medal table – top three places plus western European countries.

Place	Country	Total	G	S	B
1	Russia	36	21	11	4
2	Czech Republic	59	19	20	20
3	Ukraine	40	13	13	14
4	Germany	18	5	5	8
8	RSGB	3	1	1	1
9	Netherlands	2	1	0	1
10	Sweden	3	0	0	3
11	Norway	1	0	0	1

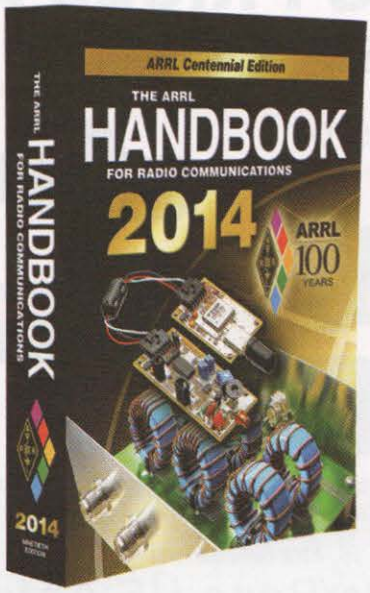
Future ARDF events:

Sun 20 Oct: Dymock Forest, M50 J3 144MHz
Sat 16 Nov: Cuffley, Herts
Sat 14 Dec: Mytchett, Farnborough
Further information on the RSGB website.

Book Review

Handbooks for amateur radio and Linux

ARRL Handbook 2014 Centennial Edition



2014 marks the centenary of our cousin, the American Radio Relay League. Like the RSGB, the ARRL has been at the forefront of promoting technical advances in amateur radio and there is no better consolidated proof of this than the *ARRL Handbook*. First published in 1926, it has been constantly revised and updated over the decades and is one of the top technical reference books in our hobby.

The *ARRL Handbook* is quite simply an amateur radio institution. It has helped generations of amateurs all over the world to understand, extend and enjoy their hobby more. It contains a mix of highly relevant theoretical and practical articles that address literally all aspects of amateur radio. Whatever aspects of our hobby you are interested in you'll find it in the *ARRL Handbook*, whether it is antennas, propagation, homebrew, LF, microwaves, SDR or any one of dozens more topics. And you won't find yourself looking at half-baked opinions that have been hastily downloaded from the web: all of the authors who contribute to the *ARRL Handbook* are recognised experts in their field, with a combined experience of many centuries worth of operating.

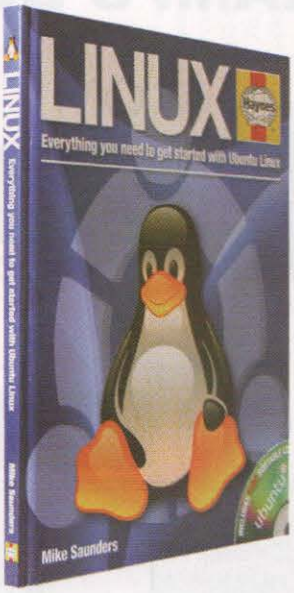
A mammoth tome such as this cannot of course be entirely re-written every year. Sections are re-visited on a rolling basis, being updated as the state of the art develops. New material this year, for example, includes a look at the new all-amateur-developed *Codec2* software that offers high performance at very low bitrates, a roundup of current battery technology, new material on microwave techniques, a look at telemetry and navigation data (including GPS) and much, much more. There are new projects too, ranging from a one- or two-valve linear amplifier for beginners through to VHF and UHF signal sources.

Accompanying the book is a CD that contains a fully searchable PDF copy of all the text and illustrations plus a considerable amount of expanded content such as software, support files, PCB layouts and so on. Whilst most of the software is Windows-oriented, the PDF works with PC, Mac, Linux, Android and all other operating systems for which a PDF reader is available.

Make no mistake; this 1300-plus page book contains an enormous amount of wisdom. Some of the material is likely to be familiar, some will be of no interest to you at the moment and some of it will likely stretch your intellect in ways you've never thought about before. Whether you're a beginner or advanced enthusiast, I guarantee there'll be something in here you've never seen before.

ISBN 978 0 62595 001 7
1320 pages, 208 x 276mm approx, plus free CD
Non members' price £37.99
RSGB Members' price £32.29

The Haynes Linux Manual by Mike Saunders



If you mention 'Linux' to many people their first response will probably be something to do with the Raspberry Pi. Whilst it's true that the Pi does run a variety of Linux-based operating systems, there is an awful lot more to it than that. Most of the internet – including Google – is built on Linux and, unlike virtually everything else in computing or even the wider world, Linux is completely free and, as is often said, that means free as in freedom, not just price.

Following an evangelistic introduction and explanation of the 'Free Software' ethos, Mike wades straight in to showing how to add Linux to your PC by installing it from the Ubuntu CD supplied with the book. Then it's on to a familiarisation session for the desktop environment, file manager and included software – much of which will probably feel familiar if you're a Windows user. After a lesson on the internet, downloading and installing software we learn about office work using programs such as *OpenOffice*, which combines a word processor, spreadsheet, database and presentation composer in one free (there's that word again!) package. Then, of course, there's multimedia, ranging from music, photos and video – all handled with aplomb from the desktop.

At this point you may be wondering why you ever bothered with more established operating systems. Some would say the next couple of chapters answer this: they deal with Linux administration. Unlike the relatively cuddly operating systems like (say) IOS, Android, Windows and so on, the pretty desktop environment is but a thin veneer over a powerful command-line-driven world in which many things are possible – including Messing Things Up Big Time. Fortunately, Mike is on hand you guide you through the things you actually *need* to know in order to administer your machine, for instance where to find the printer compatibility database to see if your hardware is supported in Linux.

The final chapter looks at arguably the *raison d'être* of Linux: programming. There's a look at *Python* (think *BASIC* brought up to date) and other programming languages, but there is only enough detail here to whet the appetite and point you in the direction of learning properly about programming, if that takes your fancy.

From the cuddly picture of Tux the well-fed penguin on the front cover to the CD attached inside the back of the book, *The Haynes Linux Manual* is a treasure-trove of useful information about Linux. If you have even a passing interest in computing beyond the borders of your current PC, you'll find this book fascinating.

ISBN 978 1 84425 970 0
168 pages, 213 x 276mm approx, plus free CD
Non members' price £19.99
RSGB Members' price £14.99 (25% off)

HF F-Layer Propagation Predictions for November 2013

Compiled by Gwyn Williams, G4FKH

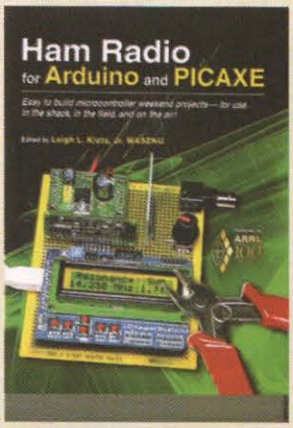
	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe								
Moscow	884....27778	8483..278778	..7666786...	...88888....	...99997....	...8999.....	....997.....	....78.....
*** Asia								
Yakutsk	4452	523...367677	3..66..363.5	...75.....	.....	.....	.....	.....
Tokyo	.......3322.	...55377756.	...3.....	.....	.....	.....	.....	.....
Singapore	.......1111.	687665	......66....	......63....	.....67.....	.....66.....	.....65.....	.....4.....
Hyderabad	.....	24333	.......54...	......55....	......64....	......5.....	......5.....	.....
Tel Aviv	996.....8889	979....89989	..32...77...	...75567....	...88886....	...6888.....	....888.....	.....
*** Oceania								
Wellington	.....	....66662...	....7776....	....6774....	....465.....	.....4.....	.....5.....	.....
Well (ZL) (LP)	.....	.....	.....	.....	.....	.....	.....	.....
Perth	.....	.......43...	......785...	......87....	......3.....	.....	.....	.....
Sydney	.....	.....58753..	....38872...	....7885....	....564.....	....35.....	.....	.....
Melbourne (LP)	.....	...96.....	.3.99.....	...993.....	...7964..4..	....9.....	....8.....	.....
Honolulu	.....	...3...4....	...55647....	.......4....	.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....	.....	.....	.....	.....
W. Samoa	.....	...57677....	...58888....	....7885....	....687.....	.....76.....	.....6.....	.....
*** Africa								
Mauritius	2........222	7......37767	5......77545	.......74...	.....	.....	.....	.....
Johanesburg	.....	52.......233	74......7766	.......56...	.......6....	......46....	......44....	.....
Ibadan	.1.....	676.....3456	777.....5777	3.45...277..	...754567...	...77667....	...87777....	...57776....
Nairobi	2........11	77......7777	5.......4445	..4....45...	......36....	...5.356....	...66675....	....667.....
Canary Isles	666.....1666	7776....6878	88684..58688	...8766768..	....9889....	....7777....	.....	.....
*** S. America								
Buenos Aires	.....	22.6.....	54.9......33	...8.....	...5.....	....4.....	.....	.....
Rio de Janeiro	.....	3327.....2	55.9.....554	...8.....3..	...64.....	....5.....	....4.....	.....
Lima	.....	22.3.....	34.62.....22	.....	.....	.....	.....	.....
Caracas	.....	3334.....3	75.86....275	....73..34..	....57666...	.....7774...	.....777....	.....876....
*** N. America								
Guatemala	.....	22.4.....	42.76......2	.....5.....	.....54.....	......54....	......5.....	.....
New Orleans	3231.....	66.62......6	5..7.....	.....5.....	.....	......4.....	......54....	.....
Washington	3453.....3	77473.....67	64.45....544	.....63354..	.....5445...	......55....	......66....	......4.....
Quebec	6663......45	77.7.....666	...66...66..	....66557...	.....545....	......55....	......66....	.....
Anchorage	.33.....	66.52...3..3	6...763674.3	.....5...	.....	.....	.....	.....
Vancouver	.....	33.3.....	.....	.....	.....	.....	.....	.....
San Francisco	.....	22.3.....	.....	.....	.....4....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.....	.....6....	.....6....	.....5....	.....

Key: Each number in the table represents the expected circuit reliability, eg '1' represents reliability between 1 and 19% of days, '2' between 20 and 30% of days, etc. No signal is expected when a '.' is shown. **Black** is shown when the signal strength is expected to be low to very low, **blue** when it is expected to be fair and **red** when it is expected to be strong. The RSGB Propagation Studies Committee provides propagation predictions on the internet at **www.rsgb.org.uk/propagation/index.php**. An input power of 100W and a dipole aerial has been used in the preparation of these predictions; therefore a better equipped station should expect better results. The predicted smoothed sunspot numbers for November, December 2013 and January 2014 are respectively (SIDC classical method – Waldmeier's standard) 57, 56 & 55 and (combined method) 76, 77 & 79. The provisional mean sunspot number for September was 36.9. The daily maximum / minimum numbers were 61 on 12 & 20 September and 9 on 9 & 15 September.

BEST US BOOKS

ARRL Ham Radio for Arduino and PICAXE

by Leigh L. Klotz, Jr. WA5ZNU



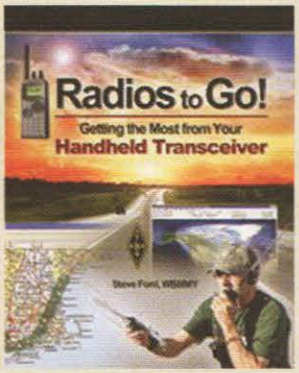
Microcontroller technology has exploded in popularity among ham radio operators. The new generation of single-board microcontrollers is easier than ever to use, bringing together hardware and software for project-building radio amateurs can easily dive into. With inexpensive microcontroller platforms, readily available parts, components and accessory boards, the possibilities are limitless.

Ham Radio for Arduino and PICAXE introduces you to the fun and rewards of experimenting with microcontrollers. Klotz and many other contributors have designed projects that will enhance your ham radio station and operating capabilities. Or, take it to the next step, using these projects as a launch pad for creating your own projects. Readers will find a wide range of unusual and differing projects including, beacon transmitters, keyers, antenna position control, RTTY and digital mode decoders, waterfall displays, and much more. *Ham Radio for Arduino and PICAXE* comprises mostly Arduino projects and readers should note that many of the projects require the purchase of additional Arduino shields and other boards to complete them.

Size: 208x274mm, 352 Pages, ISBN: 9780 8725 9324 4
Non Members' Price £27.99
RSGB Members' Price £23.79

Radios to Go!

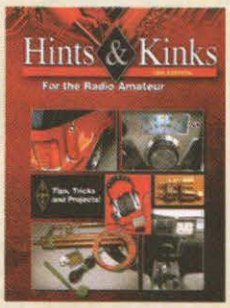
Getting the most from your Handheld Transceiver
by Steve Ford, WB8IMY



If you want to get the most out of your hand held transceiver *Radios to Go!* is the book for you. Modern technology has allowed manufacturers to pack a wealth of features into handheld transceivers. With so many features, however, it isn't always easy to get the full benefit from your investment. This book sets out to show you how to get at those features.

With even the user manuals telling the whole story of your radio transceiver *Radios to Go!* lets you unlock the 'hidden' capabilities that are often not even described. Most dual-band 2-meter/70 cm handheld transceivers can be used to communicate through amateur radio satellites, but you usually won't see this discussion in your average user manual but it is covered in *Radios to Go!*. Readers will find topics covered include: Why Are They Called HTs? (And Which One Should I Buy?), the Care and Feeding of Batteries, Memories, Scanning, Antennas, Software Management and Microphones & Headsets. There is even coverage of the Alphabet Soup: CTCSS, DTMF and DCS and even IRLP and EchoLink. For those looking for more the book also covers 'Expanding Your Horizons: APRS and Satellites'

Size 155x228mm, 112 pages ISBN: 9780 8725 9307 7
Non Members' Price £14.99
RSGB Members' Price £12.74



Hints & Kinks for the Radio Amateur

18th Edition

The QST monthly *Hints & Kinks* column is one of the most popular sections of the ARRL magazine - and it's easy to see why. This book takes the very best of the column from 2004 to 2011. If you're in the mood for an evening or weekend project, you'll find it in *Hints & Kinks*.

The chapters in the book are wide ranging and cover topics as diverse as Equipment Tips and Mods, Batteries and Other Power Sources, Restoration and Interference (RFI/EMI).

Size: 208x275mm, 192 pages
ISBN: 9780-8725-9520-0

Non Members' Price £18.99
RSGB Members' Price £16.14

Get on the Air with HF Digital

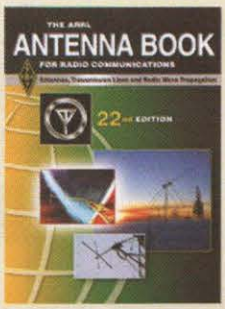
By Steve Ford, WB8IMY

Building on the success of the *ARRL HF Digital Handbook*, Steve Ford, WB8IMY brings you a beginner's guide to this fascinating area of amateur radio operation.

ARRL HF Digital Handbook will show you how to set up and operate your own HF digital station. The book includes instructions for configuring software programs for popular modes such as RTTY, PSK31 and JT65. You'll also learn about other digital communication modes such as MFSK, Olivia and PACTOR.

Size 229x190mm, 128 pages,
ISBN: 9780-8725-9601-6

Non Members' Price £21.99
RSGB Members' Price £18.69



ARRL Antenna Book

22nd Edition

The *ARRL Antenna Book* is the book by which all other antenna books are judged. Nearly a 1000 pages of getting the most from antennas and much more.

Devoted entirely to the pioneering spirit of antenna design, in this one book, you will find all of the information you need to design complete antenna systems.

This twenty-second edition includes a complete reorganisation.

Size 205x272 mm, 936 pages,
ISBN 9780-8725-9694-8

Non Member's Price £46.99
RSGB Members' Price £39.94

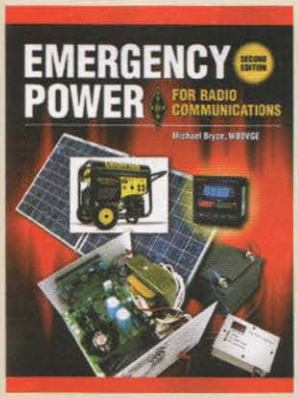
Order on the internet at **www.rsgbshop.org** or you can order by post making cheques and postal orders crossed and made payable to Radio Society of Great Britain or telephone your credit card order to **01234 832 700**. Open 8.30-4.30 (Mon-Fri). Send no cash. **Post & Packing:** Standard Delivery - 2nd Class Post (4-9 Days), For one item £1.95, For two or more items: £3.50, **For orders over £30.00 standard delivery is FREE.** Priority Delivery - 1st Class Post (2-4 Days), For one item £2.95, For two items: £4.95 , For three or more items: £5.95. **Overseas:** Worldwide Surface Delivery, For one item: £3.00, For two items: £5.00, Extra items: £1.00 per item. Worldwide Air Delivery: For one item: £9.00, For two items: £15.00, Extra items: £3.00 per item.

FROM ARRL

RSGB shop

Emergency Power for Radio Communications

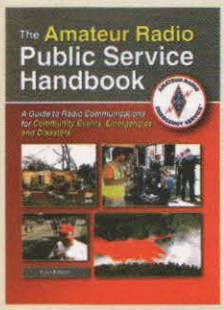
When all else fails...how will you communicate?
By Michael Bryce, WB8VGE



This new second edition of *Emergency Power for Radio Communications*, explores the various means of electric power generation from charging batteries, to keeping the lights on. Regardless of if you are facing a serious power outage or simply looking for power options on field day this book provides solutions.

Emergency Power for Radio Communications covers the foundation of any communications installation 'the power source', offering ways to stay on the air when weather or other reasons cause a short or long term power outage. There are also ingenious ideas for when you are beyond the commercial power grid. The book identifies methods of alternative power generation that will work best in your particular situation, perhaps taking advantage of possibilities already on hand. The contents are wide ranging and cover generators such as solar, gas, wind and water through to batteries. You will also find information on load sizing, inverters, safety, emergency practices and much more.

Size 276x207mm, 224 pages, ISBN: 9780 8725 96153
Non Members' Price £23.99
RSGB Members' Price £20.39



ARRL Amateur Radio Public Service Handbook

Prepare for the Unexpected!

The UK may not suffer too many tornados and earthquakes but we do see lots of fun runs and public events. For all these events when getting the message through is critical - amateur radio works! And has consistently been the most reliable means of communications when other systems have failed. This book provides a guide to how American radio amateurs work closely with disaster relief agency officials from FEMA, the American Red Cross, the Salvation Army, and other response organisations to offer wireless communications aid.

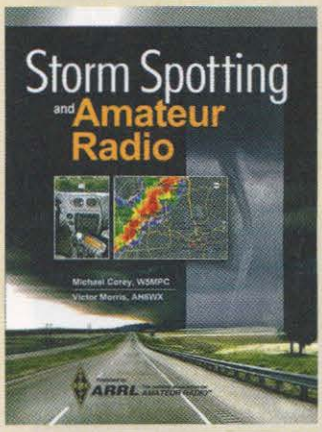
The Amateur Radio Public Service Handbook is for all amateurs who volunteer their time and skill to serve their communities. It provides knowledge needed for communicating quickly and effectively during disasters, emergencies, and community events.

Size: 208x275mm, 304 pages ISBN: 9780 8725 9484 5

Non Members' Price £28.99
RSGB Members' Price £24.64

Storm Spotting for Radio Amateurs

By Michael Corey, W5MPC and Victor Morris, AH6WX



This book is aimed directly at those who interested in tornados and other severe weather phenomenon. Using the assistance of thousands of volunteer storm spotters the American SkyWarn® program of the National Weather Service provides a first line of defence against severe weather. Many amateur radio operators are trained storm spotters and this book includes information on resources, training and equipment available to them.

The book starts with a straightforward introduction to the subject moving to practical safety information for this hazardous activity and details of what to expect. There are extensive guides to meteorology and hurricanes and storm spotter activation procedures. Readers will also find reportable weather criteria, how to develop a local storm spotter manual and the experiences of storm spotters from around the US. Thoroughly recommended reading for those interested in all severe weather, including hurricanes, tornadoes, hail, floods, damaging wind, and winter weather

208x274mm, 160pages, ISBN: 9780 8725 9090 8
Non Members' Price £19.99
RSGB Members' Price £16.99

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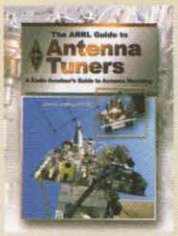
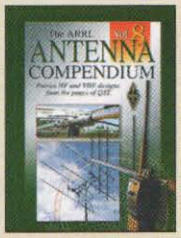
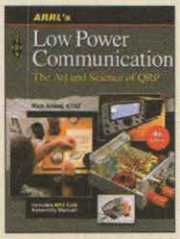
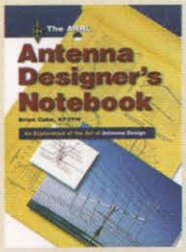
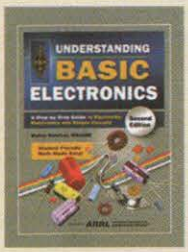
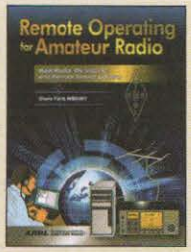












Radio Society of Great Britain **www.rsgbshop.org**
3 Abbey Court, Priory Business Park, Bedford, MK44 3WH. Tel: 01234 832 700 Fax: 01234 831 496

Please send news reports to radcom@rsgb.org.uk. To get future events listed here and put on GB2RS, 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. Please note that we don't normally print 'closed', 'TBA' or 'every Tuesday' type submissions. The deadline for the December 2013 *RadCom* is 25 October and for the January 2014 edition it's 21 November. For GB2RS, the deadline is 10am on the Thursday for the week of broadcast. If you need to amend your club details, please visit www.rsgb.org/clubupdates.

INTERNATIONAL

PAFOS RADIO CLUB, CYPRUS
Richard, 5B4AJG, 00357 97857891, 5B4AJG@cyprusliving.org

Whilst on holiday in Paphos, David, G4TMZ and Janette, G6YOR met up with members of **Paphos Radio Club** as a result of a QSO on the local repeater. A club meet at DT's Bar was arranged and the photo shows (l-r) standing Ian, Baz, 5B4AHO, Arthur, 5B4AGTN, 5B4AIX, G4TMZ and G6YOR, along with XYLs seated. A portable 'playday' was then arranged by Arthur for the following Tuesday at a site west of Paphos in 37 degree heat on the cliff tops overlooking the sea. Norman, 5B4AIF attended with his 20m vertical dipole along with other club members. David and Janette said, "we can only describe these great guys, they made us feel very welcome"

NATIONAL

Civil Service Amateur Radio Society
Weekly net every Tuesday, 8pm, 3.763MHz

REGION 1: SCOTLAND SOUTH & WESTERN ISLES

REGIONAL MANAGER: JASON, O'NEILL, GM7VSB, RM1@RSGB.ORG.UK

Ayr ARG
Ralph, GM4SQO,
01292 285 281,
aargsecretary@sky.com
13 Red Cross Emergency Response Comms, John, MM6AVE
27 Restricted Service Licence Stations, Marcus, GM4LVW

Cockenzie & Port Seton ARC
Bob, GM4UYZ,
01875 811 723,
www.cpsarc.com
1 Club night
15 Special events – whole story, Bob, GM4UYZ

Kilmarnock & Loudoun ARC
Graham, MM3GDC,
mm3gdc@btinternet.com
12, 26 Club night, 7.30pm

Livingston & DARS
Norman, GM1CNH,
07740 946 192,
5, 19 Club evening
12 Operating evening
21, 22 G100RSGB, 8am-10pm, visitors welcome
26 Morse code practice

Lothians RS
Alan, GM3PSP, 0131 623 4580,
alanjmasson@virginmedia.com
27 Home spun antennas, Malcolm, GM3TAL

Stirling District ARS
John McGowan,
gm0fsv@gm6nx.com
3, 10, 17, 24 Construction, training, projects and operating, 10.30am till late afternoon
7, 14, 21, 28 Club meeting

REGION 2: SCOTLAND NORTH & NORTHERN ISLES

REGIONAL MANAGER: DENNY MORRISON, GM1BAN, RM2@RSGB.ORG.UK

Aberdeen ARS
Fred, MM0ODL, 01975 651365
7 Junk sale
14 Construction evening
21 Quiz night
28 Morse and on the air

REGION 3: NORTH WEST

REGIONAL MANAGER: KATH WILSON, M1CNY, RM3@RSGB.ORG.UK

Bolton Wireless Club,
boltonwireless@gmail.com
4 Small antennas for 160m & 80m, Ross, G6GVI
18 Show & Tell – members' 5 min presentation

Chester & DRS
Bruce, M0CVP, 01244 343825,
www.chesterdars.org.uk
5 Aerials, David, G3UFO
12 Committee meeting
19 Homebrew QRP transceiver, Rob, G4GIY
26 SOTA aerials, Richard, G3CWI

Fleetwood Radio Enthusiasts Group, John, M0JFE,
07940 815 659,
GB0FRG@hotmail.com
5 Natter & discussion, M6TKU
12 Building test kit discussion
19 Building kit night
26 Fault finding & testing the kit

South Manchester R&CC
Ron, G3SVW, 0161 969 3999
7 Nuclear power, Dave G3WFH
14 Rig buyers guide
21 First impressions of the TS-990, Terry, G6CRF
25 Tech forum
28 Air traffic control, Steve Balfour

Stockport RS
Nigel Roscoe, 07973 312 699,
info@g8srs.co.uk
5 Opening evening
19 The SWR Mega, 2013 construction project
26 OTA from Walthew House

Thornton Cleveleys ARS
John, G4FRK, 01253 862 810
4 AGM
11 Table top surplus sale
18 Quiz night, Jan, G8YOK
25 Club night

Workington & DAR&IT Group
Barry, G0RZI, 01946 812 092,
barrydrm31@hotmail.co.uk
11 Club meet and OTA
25 Raspberry Pi, Mark, M0WCR

REGION 4: NORTH EAST

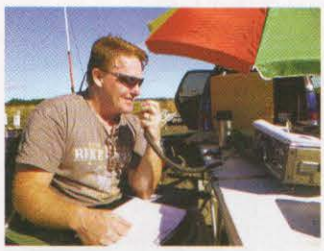
REGIONAL MANAGER: HAROLD SCRIVENS, GOUGE, RM4@RSGB.ORG.UK

Denby Dale RC
Richard, M0RBG,
07976 220126,
6 Club Night
13, 27 On the air
20 Nanowave comms, G8AGN

Sheffield ARC
Peter, G3PHO,
sarc@g3pho.org.uk
11 Interference – causes and cures, Peter, G3PHO
25 UK AC – briefing & planning

Barry, G0SCI and Dave, 2E1AII set up a stand at the Angel of the North Radio rally in support of the Tyne and Wear Repeater Group. They say they had a great day and enjoyed seeing faces new and old with the added bonus of collecting the grand sum of £116. They would like to thank Nancy Bone for arranging for them to attend the rally and say a big thank you to traders amateur who donated items and cash. Their local radio shop at Birtley donated a 2m radio.

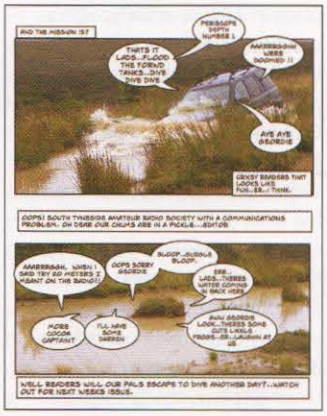
The weather was warm and sunny all weekend, perfect conditions for an outdoor radio station set up on a newly constructed railway platform for Railways on the Air. The event was organised by members of the **Northumbria Amateur Radio Club** to help publicise the Aln Valley Railway. Alnwick lost its branch line many years ago but an ambitious volunteer group has been formed to re-open the old line from Alnmouth to Alnwick, a distance of about 3 miles, hence the new platform! The modest radio station, with the callsign GB5AVR, consisted of an FT-857 running 100W and a delta loop aerial at 15m. Conditions on 40 and 17 metres were good and contacts were made into the UK, USA, Canada and Japan. The photograph shows Dave, M0DSS in QSO with Aki, JA3AOP.



August Bank Holiday Monday has a reputation for being dull and cold. But this year it dawned bright and sunny in Pontefract and you were guaranteed a warm welcome to a traditional amateur radio event put on by **Pontefract & District ARS**. The August Bank Holiday Junk Sales and Fair is definitely *not* a rally; the club has brought back the traditions of the jumble sale and junk sale. With three rooms at the community centre in use, including the spacious main hall, there was plenty of room for traders and individuals selling their own surplus equipment and, of course, the RSGB bookstall. In just a couple of hours PDARS welcomed almost 200 visitors. Tables to sell anything radio related were available on arrival and many of those taking tables kindly offered items for the raffle. Pontefract club members ran a Bring & Buy that was busy from the moment the main doors opened

Wakefield & District Radio Society will be running an Advanced licence course, tutored by Dr David Sadler-Lockwood, G4CLI, starting on Saturday 9 November at 1.30pm. More details and bookings for both courses can be made with the Chris Lashmar, M0KJP on 07908 740 627

South Tyneside Amateur Society operated a special event in Kielder Forest in September. It involved and element of off-road travelling and an amusing cartoon strip was created. It can be seen in full at www.starsradioclub.co.uk.



REGION 5: WEST MIDLANDS

REGIONAL MANAGER: VAUGHAN RAVENSCROFT, M0VRR, RM5@RSGB.ORG.UK

Aldridge & Barr Beacon ARC
Albert, G0KFS,
01922 614 169
4 Social evening
18 Programme for 2014

Bromsgrove & DARC
Chris, M0BQE, 01905 776 869,
g3vgg@hotmail.com
1 Data night
8 VHF night
15 Committee
22 HF night with the FT-1000 and FT-2000
29 Planning for next year

Central Radio Amateur Circle
Martin, G1TYV,
07906 905 071,
radio-circle@live.co.uk
7 Night on the air 8pm
21 Group meeting

Cheltenham ARA
Derek, G3NKS,
01242 241 099,
secretary@caranet.co.uk
2, 3, 4 G100RSGB operation
19 Lunch at Cross Hands
21 Bring & show something new

Coventry ARS
John, G8SEQ, 07958 777 363
1 Bangers & mash
4, 11, 18, 25 145.375MHz net
8 No meeting, 145.375MHz net
15 Committee & VHF activity
22 Skittles night
29 Radio workshop, bring your rig

Dudley and District ARS
Carl, M0ZCR,
m0zcr@live.co.uk
5 2m UKAC night on the air
6, 13, 20, 27 Advanced course
12, 26 On the air & natter night
19 SHF 23cm UKAC OTA

Hereford ARS
Tim, G0JWJ, 01432 279 435,
timbt@btconnect.com
13 QRP, George Dobbs

Midland ARS
Norman, G8BHE, QTHR,
07808 078 003
6 Open meeting, shack on the air and training classes
13 Committee meeting and training classes
20 Plans for Christmas social, training classes
27 Shack on the air, ragchew and training classes

Rugby ATS
Steve, G8LYB, 01788 578 940,
stephen@tompsett.net
2 RF connectors, Steve, G8LYB
5 UKAC 144MHz, radio operation and projects
9 Equipment test session, test equipment available
12 UKAC 432MHz, radio operation and projects
16 Committee meeting, and general radio and technical activities
19 UKAC 1296MHz, radio operation and projects
23 Vintage electronics and valves DVD, Mike, G8CTJ
26 UKAC 50MHz, radio operation and projects
30 Practical project session

South Birmingham RS
Mick, G7RRP,
07595 696 359,
g7rrp@btinternet.com
1, 8, 22, 29 Work in the shack
4 Open meeting and ragchew
5, 12, 19, 26 Coffee morning in the shack 11am to 1pm, all welcome
6 AGM 8pm prompt
7, 14, 21, 28 Training classes with Dave, G8OWL
8 Ragchew and planning Christmas party
11 Committee meeting

Stratford Upon Avon DRS
G0CHO, 01608 664 488,
cousbey@theiet.org
11 Victorian submarine telegraph cable system, John, G1AWJ
25 Practical evening – computer/rig interfacing

Sutton Coldfield ARS
Robert Bird,
spirit.guide@hotmail.co.uk
4, 18 Net on 145.250MHz from 7.30pm all welcome
11 AGM & OTA
12 Net on 70.475MHz from 7.30pm, all welcome
25 Club meeting & OTA

Telford & DARS
Mike, G3JKX, 01952 299 677,
mjstreetg3jkx@blueyonder.co.uk
6 Committee meeting & OTA
13 Table top sale
20 PSK et al using the Raspberry Pi, M0KZB
27 Hamfest video

Wythall Radio Club
Chris, G0EYO, 07710 412819
1 Operating G100RSGB & shack social
3, 10, 17, 24 Net on 145.225MHz, 8pm
4, 11, 18 Advanced licence course
5 Morse class 7.45pm, 144MHz UKAC Contest
8, 15, 22, 29 Shack social
9 RSGB Club Calls contest
12 Morse class 7.45pm, committee meeting
13 RSGB 80m Club Sprint contest
19 Morse class 7.45pm, the 'new' amateur band 472kHz, Dave, G3YXM
25 Curry night at the Monsoon 6.30pm, Advanced course
26 Morse class 7.45pm, video & internet night, Chris, G7DDN

Tamworth Amateur Radio Society is running a Foundation course that will take place over 3 Saturdays in November from 8.45am to 4pm. For additional information please contact Steve, M0TSD by e-mail to steve@spectrumservices.uk.net

The photo shows another success story for the **Gloucester Amateur Radio & Electronics Society** with three Foundation licence passes. Right to left are Sean, Callum, Barry, Les, G0ULH (tutor) and Anne, 2E1GKY (invigilator).

Students at **Birches Head High School** have created their own radio station with the help of local technology pioneers Bitjam. The Stoke-on-Trent school launched the station at a recent Brazilian themed open day, with the long term aim of broadcasting beyond the school to the wider local community. With 12 magazine style broadcasts already under its belt, Birches Head High School has now begun reaching out to other educational establishments in the community. Bitjam and Birches Head High School have also recently worked together to open a hack lab at the school to improve its student's computer skills and nurture their creativity. The lab aims to teach pupils how to use everyday technology, such as gaming equipment, and give the devices a new purpose. In one project, students used a Nintendo Wii remote to emulate an interactive electronic white board. A future project is based on the idea of integrating an iPad into a reception table, so its touch screen functionality can be used to flip through documents while in a waiting room.

The photo below shows two of the latest members of **Bromsgrove & District Amateur Radio Club** to pass their Foundation licence – Afonwen Coomber and Dave Carter. Both members attended the six week evening course at the club culminating in success in the Foundation examination. The Intermediate licence awaits!

REGION 6: NORTH WALES

REGIONAL MANAGER: MARK HARPER, MW1MDH, RM6@RSGB.ORG.UK

Dragon RC
Stewart, GW0ETF, 07833 620733
4 AGM
18 History of radar, GW8NZN

North Wales Radio Society
Liz Cabban, lizcabban@vodafoneemail.co.uk
7 General meeting
14 Technical topic
21 Microphones, Peter, GW6SIX
28 Natter night

Powys ARC, Dave, GW4NQJ, 07870 827 887
3 Junk sale 2pm
7 Magic lanterns part 2, Joanna & Rob, GW6EUS

Wrexham ARS
Frank Bailey, M1EYH, fcbailey20@btinternet.com
5 No meeting
19 Guest speaker

REGION 7: SOUTH WALES

REGIONAL MANAGER: JIMMY SNEDDON, MW0EQL, RM7@RSGB.ORG.UK

Llanelli ARS
Craig, MW0MXT, 01269 845 773, craig@mw0mxt.co.uk
4 GC0EZQ on the air
11 Raffle & social evening
18 DVD night
25 Junk sale and social evening

Marches ARS
marchesars@hotmail.co.uk, www.marchesradiosociety.org
14 Natter night, new club project & OTA
28 Digital modes and Echolink, Matt

REGION 8: NORTHERN IRELAND

REGIONAL MANAGER: PHILIP HOSEY, MI0MSO, RM8@RSGB.ORG.UK

Bangor & DARC, Peter, MI6NID, 07989 501 666
7 Surplus sale 8pm admission £2

The parishioners of Dungiven Parish Church held a Vintage Rally on 14 September. An interesting part of the rally was a special event station, GB2DPC, set up by Ian, GI0AZB and Esther, GI0AZA with help from Bronwin, MI1CCT. That date was also Churches & Chapels on the Air weekend and contacts were made with a few other churches throughout the UK and other radio amateurs around the world. The photo shows Esther, GI0AZA and Tamara, MI3CCT.

The annual Marconi Festival took place in August at Ballycastle's sea front. This is the 13th year that the event has been held and organised by the **Marconi Radio Group** and supported by the Moyle Council Community Festival Grants scheme. The event marks the work of Marconi, Kemp and Granville in 1898 when the world's first commercial signal was sent from Rathlin to Ballycastle across water. The Northern Ireland Fire & Rescue Service put on their usual displays, the Coastguard was promoting a safer sea journey and the PSNI displayed modern day policing equipment and the Community Rescue Service had their command unit on display to allow people to have a look around it and see exactly what they do. Childrens' entertainment and radio transmissions took take place all day from the seafront.

Bushvalley Radio Club held a Field Day from Slieve Gallion mountain on Sunday 18 August. Band conditions could have been better but a few contacts were made. Quite a few members of the public stopped with the club as Slieve Gallion is an area for hill walkers and mountain bike riders. The club had its usual barbecue on the day. The photo shows antennas being erected by MI0GGB and MI0WJC.

Marconi Radio Group has been hosted at Ballycastle Museum for the past thirteen years and is now on the move to a new site near the Giant's Causeway. The club will now operate from a Portacabin radio shack purposely designed at 101 Causeway Road, Giants Causeway, Bushmills. The club will meet on 7 November for normal business and on the 28th there's an OTA evening. Anyone who wants can come along on any evening. The Ballycastle Museum will continue to operate as an examination centre for the club or any other club who wishes to use it.

REGION 9: LONDON & THAMES VALLEY

REGIONAL MANAGER: LARRY SMITH, G4OXY, RM9@RSGB.ORG.UK

Burnham Beeches RC
Dave, G4XDU,
01628 625 720
2, 3 Foundation course
4 Construction project two
18 Broken equipment evening

Edgware & DRS
Mike, G4RNW,
020 8950 0658,
michael.stewart5@ntlworld.com
14 Where radio frequency spectroscopy meets drugs safety, Dr Jamie Barras
28 My portable QRP station, Steve, G0PQB

Harwell ARS
Malcolm, G8NRP,
01235 524 844,
info@g3pia.org.uk
12 High altitude ballooning, David, M6RP
26 Shack activity night

Newbury & DARS
Rob, G4LMW,
01635 862 737,
g4lmw@btconnect.com
27 WW2 code breaking, Ray, G4FON

Radio Society of Harrow
Linda, G7RJL,
0208 386 8586,
www.g3efx.org.uk
8 Using LT Spice, M0ITI
11 Pre-construction contest advice evening
22 Raspberry Pi on the air, G4LHT

Reading & DARC
Pete, G8FRC, 01189 695 697
14 Construction contest, Robin, G4IWS
28 If smoking is bad for you, why does it cure bacon? Simon, G6ZTZ

Shefford & DARS
John, 2E0OAK,
07860 804 793
7 No meeting
10 Visit to the Telephone Museum at Milton Keynes
14 Aerial Circus, John, G3WKL
21 Programming software based radio, Paul, G8IUG
28 Club quiz, Brian, G8GHR

Southgate ARC
Mr K Mendum, G8RPA,
g8rpa@arrl.net
13 Autumn Junk/surplus sale

The National Heritage Weekend saw **Dorking and District Radio Society** again at National Trust, Polesden Lacey near Leatherhead in Surrey. A special event station, GB0NT, was busy throughout Saturday on the HF bands as well as 2m. It is a quiet radio site located high on the North Downs with clear take off in all directions. Walter, G3JKV demonstrated his archery skills again to allow them to erect a G5RV at 8ft between nearby trees.

Skeds were kept with other participating stations including GB0HHT at Haywards Heath Town Day and GV4HVN at St Mary's church Llanfair Caereinion, Powys. Conditions on 15m were exceptionally good and members were able to try out the 15m for square antenna designed by Garth, G3NPC. Visitors were particularly impressed by our contacts with Kuwait, Brazil and the USA.

The weather was not kind and visitors were fairly sparse except when the fire alarm sounded at the house and visitors poured out and came over to see what we were up to: a good ruse! There were exhibitions of military man pack radio and of vintage Morse keys with a demonstration of high speed CW communication by Mary, G0BQV. It was an impressive collaborative event with the National Trust and Fetcham Scouts who supplied and erected the marquee.

REGION 10: SOUTH & SOUTH EAST

REGIONAL MANAGER: MICHAEL SENIOR, G4EFO, RM10@RSGB.ORG.UK

Brede Steam ARS
Steve, 01424 720 815,
M0NUC@aol.com
2. 5, 12, 19, 26 At the shack

Bromley & DARS
Andy, G4WGZ, 01689 878089
9, 23 Intermediate course
19 20/20 Build-a-thon

Coulsdon ATS
Steve, G3WZK,
secretary@catsradio.org
11 Acrobatic Flying, Julian Murfitt

Crawley ARC
John, G3VLH, 01342 714 402
7 Annual HARC/CARC constructional challenge

Cray Valley RS
Lawrie, G4FAA,
0208 300 1894 e/w,
7 Surplus sale, Guy, G0UKN
21 Maritime AIS system, G8ITB

Crystal Palace R&EC
Bob, G3OOU, 01737 552 170,
g3oou@aol.com
1 Maxwell's equations, Nick Stapley

Dorking & DRS
Garth, G3NPC,
01737 359 472,
garth@swansons.org.uk
26 AGM plus how valves work, David, M0SXD

Fareham & DARC
Derek, G4JLP, 01329 823 405
13 Inter club quiz
20 Grand junk sale, 8pm

Farnborough & DRS
Neville, G4SPD,
01252 404 816
1, 8, 15, 22 Net 144.675MHz 8pm, all welcome
4, 11, 18, 25 3.570kHz slow CW 1pm, 1.995MHz 8pm
6, 20 Slow CW 1.995MHz 8pm
13 6m beam, Mike, G0JML
27 AGM

Fort Purbrook ARC
Neil Hoare, M0NEH,
02392 378 559,
3, 10, 17, 24 40m net 9pm,
4, 11, 18, 25 144.350MHz net, 7pm
7, 14, 21, 28 145.550MHz net, 7pm
13, 20, 27 433.575MHz net, 8pm
29 Natter night

Hastings E&RC
Gordon, 01424 431 909,
gordon@gsweet.fsnet.co.uk
27 What's my thing – members' items of interest

Horndean & DARC
Stuart, G0FYX, 023 9247 2846,
www.hdarc.co.uk
7 Natter night/social evening
21 Canals, Terri Robinson

Horsham ARC
Alister, G3ZBU,
01932 242243,
www.harc.org.uk
7 HARC/CARC Challenge
14 Social, The Holmbush,
7 2m DF hunt
21 Curry night

Itchen Valley ARC
Quintin, M1ENU,
023 8078 7799
8 Club auction
22 Multi-club quiz. Quintin, M1ENU

Southdown ARS
John, G3DQY, 01424 424 319
4 Programme 2014 discussion
6 Operating at Hailsham shack
25 Christmas dinner at Toby Carvery

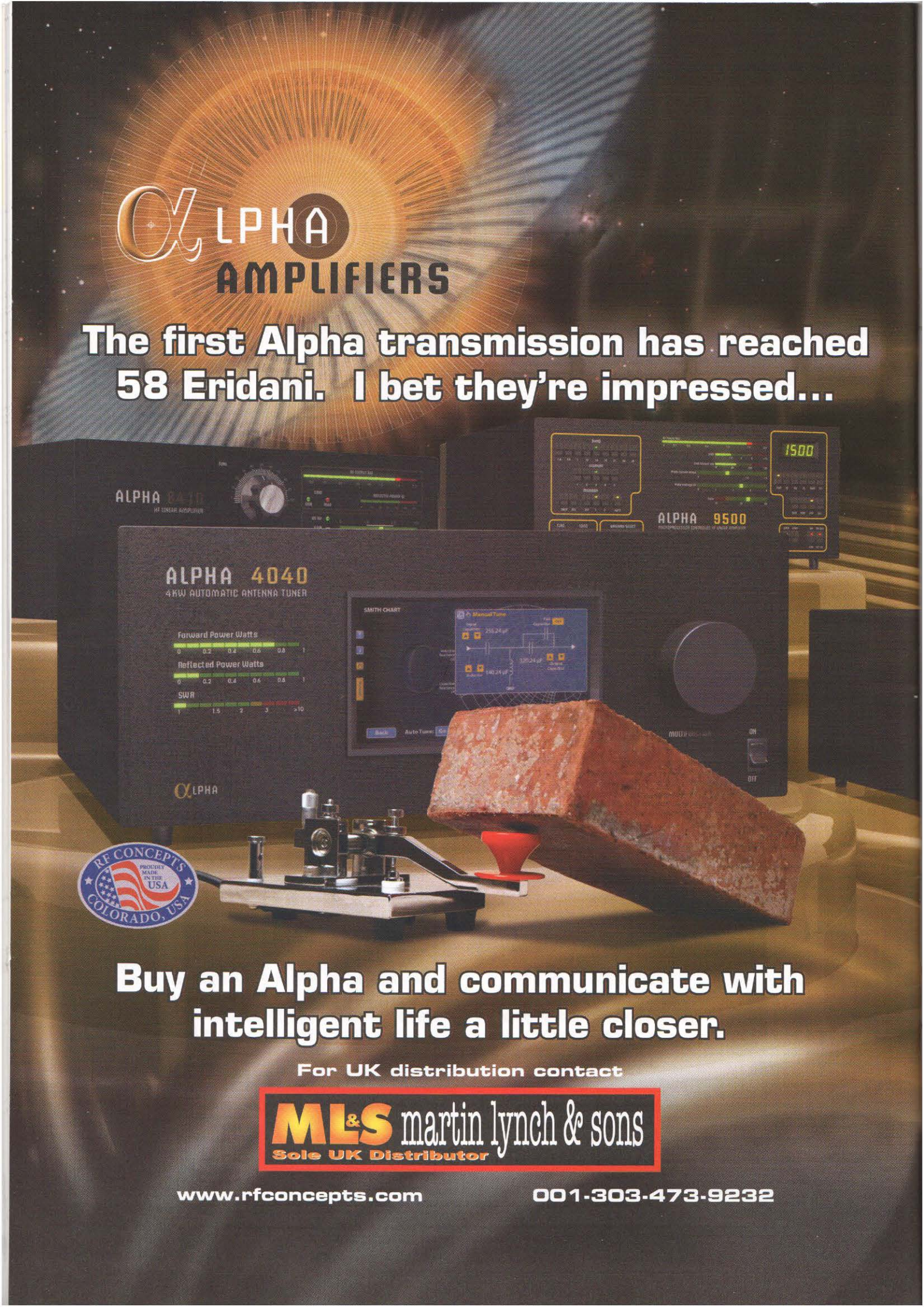
Sutton & Cheam RS
John, G0BWV, 020 8644 9945
21 HF aerials & ATUs, Bob G3OOU

Surrey Radio Contact Club
John, G3MCX, 020 8688 3322,
john.g3mcx@btinternet.com
4 Piggy axe project, Gareth, G4XAT
18 Informal chat, move-it-on, fix-it

Swindon & DARC
Kevin, G6FOP, www.sdarc.net
7 DXpedition Antennas, lesson Learned, Don, G3XTT
14, 28 Activity night
21 Development of the G4TPH magloop antennas, Tom, G4TPH

Wimbledon & DARS
Andrew, G4ADM,
020 8335 3434
8 Morse code on air
29 Surplus equipment sale

Worthing & DARC
John, G8FMJ, 01273 5932 32
3 Breakfast meeting at the Goring Café
6 Optimising antennas using antenna modelling programs, Phil, G4UDU
9 160m Club Calls contest
13 Discussion evening + 80m SSB Sprint
20 DVD evening
27 GX3WOR OTA
28 80m CW Sprint


ALPHA
AMPLIFIERS
The first Alpha transmission has reached 58 Eridani. I bet they're impressed...
ALPHA 4040
4KW AUTOMATIC ANTENNA TUNER
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Reflected Power Watts
SWR
SMITH CHART
ALPHA 9500
1500
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Buy an Alpha and communicate with intelligent life a little closer.
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www.rfconcepts.com
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REGION 11: SOUTH WEST & CHANNEL ISLANDS

REGIONAL MANAGER: PAM HELLIWELL, G7SME, RM11@RSGB.ORG.UK

Appledore & DARC
Brian Jewell, M0BRB, 01237 473 251
Zepp net on Monday, Tuesday and Thursday, 4pm, 145.450MHz.
Wed net via GB3DN, 4pm.
Friday net, 4pm, 7.185MHz ± QRM
18 Back to basics: the superhet by Terry, G4CHD

Bristol RSGB Group
Robin, G3TKF, 01225 420 442
25 UK spacecraft engineering in the late 1960s, Peter Cornall

Exeter ARS
Nick, M0NRJ, 01363 775 756, info@exeterars.co.uk
4, 18 Net on 3.675MHz 7.45pm
5, 12, 19, 26 145.575MHz net 7.45pm
11 How to run an Echolink node, Phil, 2E0PCJ
25 Crystal sets, valves and vintage night

Exmouth Amateur Radio Club
Mike, G1GZG, 01395 274 172
6 Auction
20 Digital & other modes

Flight Refuelling ARS
John, G4POF, g4pof@hotmail.com
17 Far Eastern adventures, Max, M0GHQ
23, 24 Foundation training course
24 Annual general meeting

Mid Somerset ARC
Nick, 2E0FGQ, 01749 346 320, nick.bennett@midsarc.org.uk
12 Club night
26 Social at The King's Arms, Shepton Mallet

Plymouth Radio Club
Robert Goodall, 01752 777 888, robert.2e0itn@gmail.com
12 Rally prep for Plymouth Radio Rally + natter night
24 Plymouth Radio Rally

Poole Radio Society
Bill, G4ERV, secretary@g4prs.org.uk
1 Activity night
6, 13, 20, 27 Net at 8pm on 2m FM
8 Early test equipment, Alan, G8BLW and Bill, G4ERV & Foundation training
15, 22, 29 Activity night & Foundation training

Riviera ARC
Alan, G2DXU, rivieraarc@gmail.com
1, 8, 15, 22, 29 2m net on 145.525 20.00
5, 12, 19, 26 MX0RIV OTA

Torbay ARS
Dave, G6FSP, g6fsp@tars.org.uk
1 RSGB Centenary by Elaine, G4LFM
8, 15, 22 Natter nights
29 Totnes Image Bank

Yeovil ARC
Rodney, M0RGE, 01935 825 791, rodney.edwards@uwclub.net
7 Basic inductors, G6LLP
14 Winter propagation, G3MYM
17 G-QRP Valve Day on Air 10am to 1pm
21 Morse practice with G3MYM
28 Station on air

The photo shows four members from the **Plymouth Radio Club** taking time out for a quick break after erecting an array of antennas ready for the Islands on the Air (IOTA) contest.

Guernsey Amateur Radio Society is once again operational. After many years without premises from which to operate, the club is now operating from a WWII German bunker. Although antenna installations are limited, the club is keen to operate on as many bands and modes as possible. Recent participation in the RSGB Field Day saw the club members log 90 QSOs using the club call GU3HFN. Further participation in forthcoming events is planned and looked forward to with enthusiasm by the members. The club meets every Friday from 1900-2100 at the bunker, Beau Sejour. Further information can be obtained by contacting Tom Burnett, 2U0TKB on 07781 405 083 or e-mail 2u0tkb@gmail.com.

Tiverton Radio Club recently took a break from VHF contests and helped four new members pass their Foundation exams and get themselves on the air. Shortly after passing his exam, Mike, M6CQA successfully demonstrated an HF station running PSK31 to the rest of the club members, many of whom were unfamiliar with datamodes on HF. This photo shows M6CQA and the other successful M6 licensees with the PSK31 station. During the Foundation course, a new tower was erected at the club site, involving the club members in some considerable manual labour.

REGION 12: EAST & EAST ANGLIA

REGIONAL MANAGER: MARK SANDERSON, M0IEO, RM12@RSGB.ORG.UK

Bitterne DX Group
Linda, G0AJJ, 01692 218 562, secretary@bittern-dxers.org.uk
28 Social, Roman Camp Inn, Aylmerton 8pm

Braintree & DARS
John, M5AJB, 01787 460 947
4 Fibre optics, Dave, G0DEC
18 Baluns and their construction, Melvin, G0EMK

Cambridge & DARC
David, M0ZEB, 01353 778 093
8 The Sun and other stars, Peter, M0DCV
22 Re-building the 1296MHz front end, Dave, G6KWA

Chelmsford ARS
Martyn, G1EFL, 01245 469 008, www.g0mwt.org.uk
5 Video editing using a PC, John, G1UZD
7, 14, 21, 28 Morse code class, The Bell & amateur training class
12, 19, 26 Net 7.30pm, see website for frequencies

Coalhouse Fort ARS
Tony Reynard G7HJT, 07976 553 345
24 GB1CHF on the air (11-5pm) for Remembrance Day

East Kent RS
Karl, M1DFM, 01227 710 120, karl.davies@talk21.com
10 Kempton Park Rally - TBC
18 Visit by Icom, Chris Ridley and John Turner

Felixstowe & DARS
Paul, G4YQC, pjw@btinternet.com
11 DXpedition to the Scottish Isles, Steve, M1ACB
25 Junk sale, Iain, G0OZS & Paul, G4YQC

Harwich ARIG
Kevan, 2E0WMG, 07766 543 784,
13 Big bangs & crashes, M5AEH

Havering & DARC
John, M0UKD, 07890 222 111, john@m0ukd.com
6 M3KNL quiz, Peter, G3JSR and informal
13 3Y0X DXpedition DVD
20 Informal
27 Top tips for working DX, Fred, G3SVK

Hilderstone R&EC
Chrissie Turner, hilderstoneclub@gmail.com
14 Natter night
28 AGM

Loughton & Epping Forest ARS
Marc, G0TOC, 020 8502 1645
1 Fish-n-chips night
15 Night on the air, VHF
29 Visit by Norman, M0FZW, RSGB DRM

Norfolk ARC
Chris, G0DWV, 01603 898 678, cmdanby@btinternet.com
6 *LOG4OM* the logging program for all OM, Terry, G4POP
13 Informal, workshop & beginners workshop
20 Retro-technology evening
27 Informal, bright sparks, operating, workshop

South Essex ARS
Dave, G4UVJ. 01268 697 978, g4uvj@btinternet.com
12 AGM, members only

West Kent ARS, Keith, G4JED, info@wkars.org.uk
11 Spectrum analysers, notches and filters, Richard, G8CDD

Congratulations to all 13 new Foundation licence holders (pictured above) who passed after their recent course run by members of the **Norfolk Amateur Radio Club**. Other club members are looking forward to talking to them on the air and hopefully seeing them at the club soon with their three month's free membership. Other club events over the past two months include Lighthouses on the Air, where they once again ran GB0HL at Happisburgh Lighthouse on the Norfolk Coast, and SSB Field Day, where they ran two stations. The club also operated the call G100RSGB for two days in August at the QTH of G0DWV. A total of 1,026 QSOs were made on 160-10m, including 118 stations in 22 countries in three hours on 6m (50MHz). On many occasions they were told they were the loudest station on the bands out of the whole of Europe.

Braintree & District ARS held an evening DF hunt in August. This annual event is always popular and is good fun. The fox (Howard, G6LXK) set off and a while later four teams started their tracking. Unfortunately, the weather was terrible with very heavy rain. As they were using 70cm the signals were being ruined and as a result Howard was not found.

The meeting on 10th was an aerial clinic and Dave, G0DEC brought his test equipment along. Various aerials were tested from homebrew beams to HF wire antennas and verticals. A little bit of tweaking and adjustment was needed to some of them, but all were pronounced OK after that.

The annual summer camp was held over the bank holiday weekend. As usual the hosts were John, M5AJB and Rosemary, his wife. They set up an array of club aerials and equipment, so that those members who are unable to operate on big aerials get a chance to have fun. Radios were being operated on all bands, and a lot of DX was worked. A Clansman 320 was set up with its own aerial and worked into Europe on just 5W on 20m. The Clansman kit created quite a bit of interest. Some members brought along their own aerials and rigs to test them out. It was, as always, a successful and enjoyable weekend.

For nearly two weeks in August, members of the **Kent Weald Radio Club** held their annual special event station, GB2KAA, as a sponsored event in recognition of the Kent Air Ambulance. Following the event, the club was pleased to present the air ambulance charity with a cheque for £1,248, with £620 having been raised from its sponsored radio activities and the remainder from collection boxes that had been distributed around the Headcorn aerodrome where the club is based. Members of the club had fun during this event to demonstrate amateur radio, while raising funds for the air ambulance charity. The club is grateful to the owner of the aerodrome, Jamie Freeman, for allowing them to operate the SES from within the grounds of the aerodrome and is looking forward to another successful year in 2014.

Chelmsford Amateur Radio Society has a new meeting night and venue. The club now meets on the first Tuesday in each month at the Oaklands Museum, Oaklands Park, Moulsham Street, Chelmsford, Essex CM2 9AQ. The Lecture Room is on the first floor. A lift is available for those unable to use the stairs and a hearing loop system is available in the meeting room. The doors open at 7pm and the meeting will get underway at 7.30pm. CARS are taking bookings for their next Foundation course; those interested should speak to Clive, G1EUC on 01245 224 577.

September was a busy month for **Braintree and District ARS**. The first meeting was the ever popular junk sale. This year they had a lot of homebrew projects in boxes donated by the widow of a local SK from which, combined with other donations and commission sales, the auction team managed to raise a large amount for club funds. The second meeting was to plan Railways on the Air and the Club's participation in the British Wireless for the Blind event. On the weekend of 21/22 September the club operated GB0CVR at the Colne Valley Railway in Essex. The radio station was set up in a 1960s motorail carriage beside platform 2 in the station. Most contacts were made on 40m with a few on VHF/UHF. They also ran the club callsign, GX3XG/A, tin tandem with ROTA to promote and raise funds for BWFTB, a very worthwhile charity. With steam and diesel trains operating on both days, they had a lot of visitors and a lot of fun, it's always a good weekend.

After months of planning, **Hilderstone R&E Club** hosted the G100RSGB callsign. It was a tremendous day, with everyone helping and working together as a team. They held the event at Monkton Nature Reserve using only batteries! The weather was kind to them and they were able to operate outside as well as inside the Monkton Observatory. Members of the club rallied round to operate and log or just offer moral support, whether they were foundation licensees or using HF for the first time. Despite the logistical problems they managed to operate PSK31, CW, SSB and FM, on the 80, 40, 20, 17, 15, 12, 10, 4 and 2m plus 70cm bands. They gave updates on Twitter and had some excellent contacts, including the Sahara desert where the temperature was rising to 50 degrees! The RSGB DRM Keith Bird, G4JED attended most of the day and he felt it was a great success for the club.
The following weekend saw the club taking part in the Lighthouses and Lightships weekend, using the callsign GB0NFL, as they were next to the North Foreland Lighthouse. Again it was a superb event, using simply a 'shack in a box' running on a battery and an inverted V antenna. The operators struggled with the pile ups but a fun time was had by all.

REGION 13: EAST MIDLANDS

REGIONAL MANAGER: STEVE BODEN, G4XCK, RM13@RSGB.ORG.UK

Derby & DARS
Richard Buckby, radio@dadars.org.uk
5 Junk sale
12 Committee meeting
19 Hawaii, Martin, G3SZJ
26 Night on the air

Leicester RS
Alex, G8FCQ, 07531 201 640, www.g3lrs.co.uk/
9 RSGB 160m Club Calls
18 Construction contest and

novel antenna presentation
Loughborough & DARC
Chris, G1ETZ, 01509 504 319
5 Open forum
12 Vintage night
19 Pulse power, Peter Senior
26 Practical evening

South Kesteven ARS
Nigel, M0CVO, 01476 402550
13, 27 Informal evening
Welland Valley ARS
Peter, G4XEX, 01858 432 105,
4 Net, 145.275MHz FM
18 Satellite working, Andy

On 14 September, Barry, G8AGN/P and Richard, G0RPH/P successfully passed SSTV pictures both ways over the 66km path between High Bradfield near Sheffield and Manton near Kirton in Lindsey, Lincs. Visibility along the path was very good and the received pictures were of P4/5 quality. Both stations used phlatlight transmitters and A4 size Fresnel lens antennas.

Members of the **Spalding & DARS** enjoyed a presentation by Derek, G3KHZ and his part in the DXpedition to Papua New Guinea, not only from the radio point of view but also the involvement in promoting amateur radio to the local schools and community. The club would like to thank Derek for sharing his experiences with them. The photo shows Graham, G8NWC and Derek, G3KHZ (photo by G0HGH).

This photo shows Polly, M3UNL operating the **Leicester Radio Society** centenary club station GB1OOL from LRS HQ. Over 700 contacts have been made so far and the special event callsign will be operational until January 2014.

Youth Hostel Association Day was held on 8 September with open days at 72 youth hostels around England and Wales. To mark YHA Day on amateur radio, **Phoenix Radio Group** (based in Nottingham and Derby) operated GB1YHA near to Eyam Youth Hostel in Derbyshire to join in the fun. At 10am on Sunday 8th, GB1YHA was on the air on 40m and 2m from a hilltop location sited at 1365ft (425m) ASL that gave a 360 degree vista of the Peak District and visibility of about 50 miles – a really good DX spot.

The HF team of G7HZZ and M0ANC worked on 40m amidst some very strong contest stations, but immediately started getting calls from all over the UK, with genuine 59/+20 reports from the North of Scotland to Land's End and Northern Ireland to Sussex. The original intention of rigging larger antennas was soon forgotten and they worked all day with a 20m wire with counterpoise through a SG231 Smart Coupler. The VHF team, 2E0CWE and M0FOS, were close by, and they rigged a 2m/70cm collinear vertical antenna on the highest point locally. Within minutes they were working stations across much of central and northern England, as far as the North York Moors and central Scotland. Following the GB1YHA event it has been suggested that a YH Radio Group might be formed to take portable ham radio operations to some of the more interesting Youth Hostels around the country in 2014. Anyone interested in participating can get more information from Alan Clayton, G7HZZ by e-mail to M0PHX@outlook.com.

For Sale

WANT A DATA INTERFACE ? You need an ISOTERM, Various models for your needs. PSK, WSJT, WSPR, CW, RTTY you name it WE can supply it ! See www.g3liv.co.uk

THINK ITS TIME TO TIDY up your Morse key connections? NEW GOLD PLATED UNIVERSAL CABLETIDYS for most BUG's and PADDLES, VIBROPLEX, JA7GHD,etc 40mm to 60mm spaced connections. See www.g3liv.co.uk email:johnny@melvin.com tel: 0191 2843028

FIBREGLASS TUBE High strength tube, square box, rod, and other sections all from stock in 6m lengths. Engineered Compositions, Chester. Tel: 01244 676000 e. barbara@engineered-composites.co.uk www.engineered-composites.co.uk

BAOFENG, TYT & VERO HANDHELDS at best prices from authorised UK importer. Full range of accessories available. www.sinotel.co.uk, 01926-460203, sales@sinotel.co.uk

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Aerials

M0CVO ANTENNAS for all your amateur radio antenna needs. Full details at: http://www.m0cvoantennas.com

VORTEX ANTENNA SYSTEMS UK Manufacturer and hardware supplier. Delta Loops, Yagis, Monoband and Multiband, OWA Arrays, Bespoke Designs. Antenna parts and mounting solutions. 6082-T6 Metric Tubing, Stainless U-Bolts and much more. www.vortexantennas.co.uk or 07943 871893

REMOTE TUNE G4TPH MAGLOOPS now available. Installations such as in the loft are now possible. There are 2 remote tune models, the ML40 covering 40m - 15m and the ML20 covering 20m -10m. Full details and online ordering at www.g4tph.com

SIGMA EURO-COMM LTD HF Vertical, Wire, G5RV & Mobile Antennas, VHF Base Station Antennas Mounting Poles, Magnetic Mounts Tel 0121 766 8146 stores.ebay.co.uk/sigmaeurocommltd

"WESTERN HF 10" 67ft wire dipole 160-6m, full details lookup m0bzi at: www.qrz.com buy direct: m0bzi@hotmail.co.uk or 07748331458 reviews at: http://g0kya.blogspot.com/2010_08_01_archive.html or http://www.eham.net/reviews/detail/9424

Equipment

REPAIRS to all amateur and vintage RX/TX cost effective service phone or call in for details. Kent Rigs, 52, Salisbury Road, CHATHAM, Kent, ME4 5NN, 07903 023437

RELIABLE REPAIRS for all amateur and vintage equipment. Professional service, reasonable rates. Call: 01807 580376 E: radiorepairs@btconnect.com

Miscellaneous

CALL IN ON THE UK 'GOOD NEWS' CHRISTIAN NETS! Every Sunday morning at 8am local on 3747kHz, 2pm on 3747 or 7147KHz (propagation) and 144.205 SSB at 3pm sharing Christian fellowship. Go to www.wacral.org for more information or contact G3XNX at 51 Alma Road, Brixham, South Devon, TQ5 8QR, Tel: 01803 854504 or derekg3xnx@talktalk.net

PAFOS, CYPRUS. Pafos, 2 bed villa. Simple HF station 300m ASL. www.domsvilla.co.uk

Computer Software

PROGRAMMING SOFTWARE FOR YAESU RADIOS Http://www.g4hfq.co.uk bob.freeth@g4hfq.co.uk (01425) 618092

Wanted

UNWANTED VALVE AMPLIFIERS, working or not. Known makes only (Kenwood, Yaesu, Drake, Linear Amp, etc), not home-brew. Also 3-500Z/ZG valves. Cash paid. Contact Peter G3ZRS on 01482 862323 or g3zrs@hotmail.co.uk

NEW PRODUCTS/INVENTIONS for Amateur radio or wider markets required. We arrange manufacture, branding, sales. Contact G4abt@yahoo.com

VINTAGE RADIO & VALVES WANTED - national cash settlement for silent key, shack clearouts 07552678725, vintageradio@btinternet.com

Classified advertisements 58p per word (VAT inc.) with a minimum of 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
Payment to: RSGB, 3 Abbey Court, Priory Business Park, Bedford, MK44 3WH

Business Cards

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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 90).

FOR SALE

14m STRUMECH MAST, complete with rotator cage and heavy duty base, £400. Needs a very small welding job to re-secure the mast securing latch. I broke it on dismantling. Dave, M1BTI, 07940 539 434, d.piggin@ntlworld.com (Cheshire).

CELLFLEX CONNECTORS. Three suit 7/8 cable N type plug code BN706721, one suits ¾ cable N type plug code BN870123, one suits ¾ cable N type socket code BN84502, one suits ½ cable N type code BN747517. £45 plus P&P. Gordon King, G3XTH, 01273 843 276, graking@talktalk.net (Hassocks, West Sussex).

CLASSIC KEYS. Vibroplex Original Deluxe s/n 70352 with polished chrome base and jewelled movements, purchased new 1993 and unused, with case, £199. Kent twin paddle key, used but in good condition and new lead, £50. Postage paid. E-mail for photos. Chris, G3YHF, 0121 449 5583, chris.bham51@gmail.com (Midlands).

HEAVY MAINS TRANSFORMERS, most for valve equipment. Best offers wanted. Collection only. Contact me for details and photos, only via e-mail. Steve, G3YOL, s.k.cole@btinternet.com (Weston-Super-Mare),

HRO-MX RECEIVER, not used for 40 years. Complete with instruction booklet and 9 band tuning units. PSU needs checking over. Offers please. Roger, G0CYC, 01707 324 958 (Welwyn Garden City).

HT TRANSFORMER. Secondaries 625-550-375-0-375(0.25A)-550-625(0.2A), 2 x 5V 3A. Marked ADM PATT W9370 1943, made by Parmeko, Leicester. Stored long time. Rather grubby. Tests OK. Weighs 24lb, prefer buyer collect, £10. G3NYX, 01273 832 910, jwh@elayer.org.uk (Hassocks, Sussex).

ICOM IC-7400 with wideband transmit. Shack in a box, great radio covering HF-6m and 100W on 2m. Boxed in mint condition from a non-smoking home. £795. Would be happy to demonstrate or can post at cost. Ian, M0IAA, 07929 505 683 (Wakefield).

ICOM IC-2 KL LINEAR, excellent condition, £725. Best if buyer collects as carriage extra. Icom IC-781 transceiver, excellent condition, £950. Best if buyer collects as carriage extra. Brian Atkinson, G3GSI 01435 883 248 (Heathfield, East Sussex).

ICOM IC-706 MKIIG with manual, Sharman power supply, mobile magnetic base car aerial, Moonraker SQBM 500 P dual 2/70cm collinear vertical aerial. All as new, little used, £450 ONO. Buyer collects or postage at cost. Brian, 2E0OBS, 0115 9251 377 (Nottingham).

ICOM IC-7600 HF xcvr, w/keyboard, original carton, mic, DC lead etc. One owner, a clean radio, £2,000 with free UK delivery. Brendan Rooney, EI7CS, 00353 71 91 62132, arenaria@live.ie (Sligo).

ICOM IC-7400, 100W on MF, HF and VHF, 40m extended and 60m added; excellent Tx audio. Full DSP. Decodes RTTY on screen. The HF driver board has been fully serviced by Icom. £700 ONO. I prefer buyer to collect. Andrew Lenton, G8UUG, 01252 416 363, a@lenton.org (Hampshire).

KENWOOD TS-570D with 20W power unit, G5RV antenna plus feeder and balun, Morse key and microphone. Buyer to collect and help with dismantling please, £300. Jim Orbell, G0WGR, 01953 788 173 (Bunwell, Norfolk).

KENWOOD TS-870S, VGC, mic, DR3 unit, boxed, £650. Icom IC-706 mk IIG, mic, EMC filter, OPC-581, MB-63, boxed, VGC, £450. Trio TM-201A 2m FM xcvr, good condx, mic, boxed, £90. Happy to demo any of these. Buyer collects, postage extra. Terry, G3MXH, 01664 454 949, G3mxh@btinternet.com (Nr Melton Mowbray).

LDG AT-100 PROII auto ATU. As new, boxed, hardly used, £140. David, G4ERW, 01233 860 266, david.lurcook@btinternet.com (Ashford, Kent).

LDG Z-100 plus ATU, £80. Trio 9130 25W 2m multimode, £90. Raycom 25W 2m linear, £25. Nevada TM1000 1kW+ roller coaster ATU, £50. HF linear, homebrew, 2x2CX250B, 4/500W output, internal 2kV power supply, needs modernising, £40. Tom, G8AMP, 01202 577 030 (Dorset).

MAGNETIC LOOP ANTENNA covering 20 through 10m complete with HV tuning capacitor and 12V drive motor gearbox, £60. Two 23cm 10dB whip antennas with SMA connectors, £10. Adrian, G4UVZ, 01823 421 751, adrianwhatmore248@btinternet.com (Taunton).

QUAD SPIDER 10 – 20m stainless steel. Custom built, no U bolts. Accepts fibreglass spreaders. Square boom to take radiators and reflectors assemblies removable for ease of construction. Half price, photo and full info available. P Pitts, G3GYE, ninapitts@talktalk.net (Penzance).

RACAL PRM-4090 VHF xcvr, used. Powers up but has faults, £300. MEL PRC-319 TURF unit. VGC, £80. MEL BA1201 vehicle power adapter for PRC2-000 radio, VGC, £200. All plus carriage. Warren, M0WLS, 07831 521 586 (Surrey).

REGAVOLT 715-40 open frame variable transformer. 250V 15A 50Hz. Mounted in steel case with mains filter and meter. Little used. Buyer collects, £120. Nick, G3VNC, g3vnc@uk6.net (Cheddar).

RT320 CLANSMAN XCVR. Fully synthesised 2-30MHz USB, AM, CW. Tested, GWO, no mods, all fins intact, £140 plus £15 p&p. Stuart, G3YPS, 07803 601 176, atko99@tiscali.co.uk (Lincs).

SILENT KEY SALE obo G8LYZ. Icom IC-202s UHF xcvr, Icom IC-729 HF/50MHz xcvr, Standard C558 144/430MHz & NiCad battery pack, Dartcom satellite Rx 136-138MHz, Eurosonic SWR meter XMTR SWR-2T, Altai SWR meter, MFJ-936B loop tuner with MFJ57B PVC cross loop antenna kit, DRAE 6A PSU, Hitachi U-1060 100MHz oscilloscope, Heathkit RF signal generator, Roadstar LCD 4003 TFT colour TV/monitor, Revco HG 144-148MHz antenna, mag mount, AKG 934 headphones with microphone. Contact Leon on 07927 329 454 (Fareham).

SILENT KEY SALE. Yaesu FT-450AT, £550. MyDEL MP-925 25-30A linear PSU, £50. G3LIV Isoterm Multicon interface, £20. High Mound Morse key, £10. HC 7040 digital multimeter, £10. *Radio Communication Handbook* 5th Edition, 1978. Prefer buyer collects and inspects or postage at cost. Dave, G0IIQ, 01472 590 460 david.pykett@ntlworld.com (Grimsby).

TGM MQ36SR mini beam in good working condition. Manual, spare spokes, balun. £200 ONO. Tennamast adapt-a-mast 7.66. Excellent condition. Includes rotator cage (not rotator), £350 ONO. Items will be dismantled ready for collection. John Farrar, G3UCQ, 01736 752 982, email@johnfarrar.plus.com (Hayle, Cornwall).

UHF PRM8020 radio 25W, 64ch, PSU, case, programed, c/w PYE remote controller PC1. C/W mic, wired for 12V phantom switching, service manuals for radio and controller, programing kit hardware and software, £50. Prefer collection only due to size and weight. Gordon, G3XTH, 01273 843 276, graking@talktalk.net (Hassocks).

VERSATOWER 60ft HD TOWER, electric winch, buyer collects and dismantles, no reasonable offer refused. ICOM IC-910H 2+70cm base station transceiver, £675. ICOM speaker SP-20, £75. Watson W-25 25A PSU, £50. All in GC, boxed with all accessories. Prefer buyer collects. Tony Lord, G8DQZ, 01359 242 900, tony@g8dqz.co.uk (Suffolk).

VHF/UHF COMPENDIUM parts 1+2 by DJ9HO, £5. *VHF/UHF DX Book*, first edition, DIR publishing, £5. Both as new. 2x Eimac SK610A 4CX250 valve bases, as new, boxed, £10. Trio TS700G 2m XCVR, VOX, mic, manual, working, near new, unmarked – offers? 0794 143 0950 (Notts) (name & callsign supplied).

VINTAGE/COLLECTOR SOMMERKAMP FL-200B Tx, condx unknown. Will need electrolytics reforming by gradually increasing volts. External condx fair. Stored for years in dry condx. Internal PSU. No mic. Heavy!! Will deliver 50/60 miles or meet traveller. Make offer or WHY exchange? Howard, G3NBY, 0161 637 8245, saxjazz99@gmail.com (Cheshire).

YAESU FT-1000MP, narrow CW and narrow SSB filters, INRAD roofing filter, high stability oscillator. C/w power lead, mic, handbook. Excellent condition, original box, £700. Yaesu FT-920 c/w power lead, mic, handbook. Excellent condition, original box, £500. Buyers inspect and collect. Niels, G8RWG, 01737 554 493 (Coulsdon, Surrey).

YAESU FT-736R with rare muTek front ends. 2m/70cm/50MHz. Internal PSU faulty but it works fine on external PSU. Built in CTCSS, DTMF, DCS. I have no box. Supplied with manual, mains power cable and MH-1 mic, £425 plus p&p. Mike, M0FCG, 07735 578 568, M1KEY@talktalk.net (Barnsley).

YAESU FT-857D, YF-122S Collins SSB filter fitted and FT meter. Non-smoker. Shack use only and in excellent condition, £450. Deliver within 50 miles or pay for postage. Dave, GW3DRK, 01443 683 912 (Mid Glamorgan).

YAESU FT-920 HF/6M tcvr c/w power lead, microphone, CW filter, £500 OVNO plus postage. Brian, GM0EGI, 01786 850 377, gm0egi@btinternet.com (Stirling).

YAESU FT-950 like new with mic, handbook and boxes. Had very little use. Has 5MHz conversion done professionally. Prefer buyer collects or will deliver 50 miles from Leeds. £800 ONO. Peter, G3MZF, 01977 682 888 (Leeds).

YOUKITS HB 1B MK2, QRP 4 band CW tcvr with 18650 li-ion internal battery pack. 5 months old, £180. MFJ-564 Deluxe iambic paddle £25. Moving so clearing shack. John, G3TLU, 07896 979 873, john.serlin@gmail.com (Edgware, London).

WANTED

ATV TELEVISION TEST CARD GENERATOR required. Robert, 2E0ITN, 07732 121 095, robert.2e0itn@gmail.com (Devon).

COMPUTER 3/4" MAGNETIC TAPE. Big reel and DECTape. For static display, clean looks but not working. Godfrey, G4GLM, 020 8958 5113, cgmm2@btinternet.com (Edgware).

CREATE 730 1A V DIPOLE, must be complete and in good working condition. Patrick, M0VFG, 07527 571 737, m0vfg@talktalk.net (Ivybridge, Devon).

DEAD ICOM AT-180 tuning unit. It's the case that's required, so the actual electronics can be fried! Richard Perzyna, G8ITB, 01689 602 948 (Bromley, Kent).

DISABLED FAN OF OLD DAYS seeks old DX QSLs. *Short Wave* magazines 1955/1958 inclusive. Also, Codar RQ-10X Q multiplier and PR-30X pre-selector. Mike, 8 Windsor Road, Reydon, Suffolk, IP186PQ.

HANSEN FS-500H peak reading power meter 1.8-60MHz in good working order. Alan, M1JAK, 0793 103 213, m1jak@talktalk.net (Warwickshire).

RACAL RA1218 WANTED to complete my Racal collection. Steve, M6WAA, 07552 678 725, vintageradio@btinternet.com (Warrington).

REMOTE OPERATING QTH – seeking the use of a rural site to install and operate a remote station. Prefer south east England. Must have electricity available. Happy to pay a modest rent and pay costs. John, G4IRN, 07767 421 333, qrz@dxdx.co.uk (Kingston upon Thames).

YAESU FT-480R, very good condition. Parcel delivery only. Gordon Edge, G4PDV, 01732 457 820 (Kent).

YAESU FV200 (BLACK CASE) VFO for FT-200 transceiver sought by Old Timer to complete 1960s FT-200 station. Also grey & silver FT-200, FV-200 & FP-200. Preferably in working order. Must be complete & unmodified. Can collect from South Yorkshire. Alan, G3WXI, 07759 819 558 g3wxi@qsl.net, (Sheffield).

RALLIES & EVENTS

3 NOVEMBER - FOYLE & DISTRICT ARC RALLY – White Horse Hotel, 68 Clooney Road, Londonderry BT47 3PA. OT 11.30, TS, SIG, B&B, WIN, LIC, C. Tables available £5. Nigel, GI7FJY, 07514 101 141, gi7fjy@hotmail.com.

3 NOVEMBER - HOLSWORTHY AMATEUR RADIO RALLY – Holsworthy Community College, Victoria Hill, Holsworthy EX22 6JD. Don, g0rql@hotmail.com, QTHR.

This list shows all rallies and events we are aware of as of press deadline. 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. We also recommend you check the details are correct in *RadCom* and tell us if not.

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.

SILENT KEYS

We regret to record the passing of the following Members:

Name	Date
Mr E Melton, AK9N	5/5/2013
Mr N D Whitehead, G4HL	5/9/2013
Mr D H Allerston, G5PQ	11/8/2013
Mr P C Shepperd, G0CAN	
Mr T Unsworth, G0ECP	9/9/2013
Mr E B Cachart, G0FDR	9/9/2013
Mr S P Hodgson, G0LII	31/8/2013
Mr D K Austin, G0VGX	4/8/2013
Mr D Coffey, G1SFU	2/9/2013
Mr F E Lines, G1YHX	26/7/2013
Mr B Insull, G3ESW	19/8/2013
Mr J W Roberts, G3OKX	22/2/2013
Mr P S Nicholson, G3VJF	11/9/2013
Mr F Erskine, G3WTE	19/9/2013
Mr P J Scanlon, G3ZKL	1/9/2013
Mr W Bryan, G4BMV	
Mr F C Bowen Lock, G4HLS	4/8/2013
Mr G E Curran, GI4JJD	2/6/2013
Mr G F M Engel, G4MVF	25/7/2013
Mr D F Campbell, GI4NKD	25/8/2013
Mr G Reid, G4YRU	
Mr P R Hudson, G8BHD	9/9/2013
Mr A J Gilchrist, G8BVJ	17/9/2013
Mr T J Lawson, G8JID	2013
Mr J D Lewis, M0FHA	4/9/2013
Mr R H Scholey, M0HDR	24/8/2013

OBITUARIES

As part of the improvements to the RSGB website, an obituaries section is being opened at www.rsgb.org/sk and we welcome obituaries from clubs or individuals when someone sadly passes away. Please send submissions by e-mail (only) to sk@rsgb.org.uk. All submissions will be moderated.

SILENT KEY ENTRIES

The Silent Keys column is separate from the obituaries section. To notify the RSGB that a Member has passed away (and their subscription should end and they should be listed in Silent Keys), please e-mail sales@rsgb.org.uk or telephone 01234 832 700 and then select option 1. We will need to know the deceased's name, callsign or RS number and, if possible, date of death.

7 NOVEMBER - BANGOR & DARS SURPLUS SALE – Boathouse, Groomsport. OT 8pm, £2. Peter, 07989 501 666.

10 NOVEMBER NEW DATE - WEST LONDON RADIO & ELECTRONICS SHOW (Kempton Rally) – Kempton Park Racecourse, Staines Road East, Sunbury on Thames, TW16 5AQ. TI, free CP, OT 9.50/10am. TS, FM, B&B, SIG, C, DF, WIN, LEC. Paul, M0CJX, 08451 650 351, info@radiofairs.co.uk. [www.radiofairs.co.uk].

16 NOVEMBER - HALTON & DISTRICT RADIO AMATEURS RALLY – The Heath Business & Technical Park, Runcorn, Cheshire WA7 4QX. OT 10am, £1. TS, B&B, C, DF, SIG, cash machine, prize draw. All proceeds after costs to charity. George Low, G0RLF, 07919 935 725 (daytime), g0rlf@talktalk.net. [www.haltonradiorally.webs.com].

24 NOVEMBER - CATS RADIO & ELECTRONICS BAZAAR – 1st Coulsdon Scout HQ, r/o Council Car Park, Lion Green Road, Coulsdon, Surrey. OT 10am, £1, B&B, C, DIS, free CP. Glenn, G4FVL, chairman@catsradio.org.

SPECIAL EVENTS STATIONS

These callsigns are valid for use from the date given, but the period of operation may vary from 1 - 28 days before or after the event date. Operating details are provided in an abbreviated form as follows: T = 160m; L = 80 or 40m; H = HF bands (30 - 10m); V = 6 and/or 4m; 2 = 2m; 7 = 70cm; S = satellite and P = packet. Details published here are kindly provided by Ofcom.

Date	Callsign	Phonetics	Location	Bands	Keeper
01/11/2013	GB4A	Golf Bravo Four Alpha	Black Lion Hill	TLHV27	M0DOL
14/11/2013	GB4RN	Royal Navy	Waterlooville	TLHV27	G3LIK

24 NOVEMBER - PLYMOUTH RADIO CLUB RALLY – Harewood House, The Ridgeway, Plympton, Plymouth PL7 2AS. CP, TI, OT 10.00, £2, TS, C. Contact pippa117@hotmail.co.uk.

30 NOVEMBER - 18th ROCHDALE & DISTRICT ARS TRADITIONAL RADIO RALLY – St Vincent's Church Hall, Cutgate, Rochdale OL12 7QL. OT 10.15, £2.50 (concessions U12 & Seniors), B&B, C. Pitches £7.50. Dave, G0PUD, 0161 285 1600, info@vintage-radio-repair.co.uk. [www.radars.me.uk].

1 DECEMBER - BISHOP AUCKLAND RADIO AMATEURS CLUB RALLY – Spennymoor Leisure Centre, Co Durham DL16 6DB. CP, TI S22 (V44), OT 10.15 /10.30, £2 (U14 free). TS, B&B, C, LB, DF, FAM. Mark, G0GFG, 01388 747 497.

7 DECEMBER - SOUTH LANCS WINTER RALLY – Bickershaw Labour Club, Bickershaw Lane, Bickershaw, Wigan WN2 5TE. OT 10am, traders 8am. Tables £9 pre-booked, entry £2.00, TI, B&B, C, DIS, CP, SIG, DF, TS, LB. Jason 01942 735 828, rally@slarc.co.uk.

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12 JANUARY - RED ROSE WINTER RALLY - The George H Carnall Leisure Centre, Kingsway Park, M41 7FJ (opposite the Trafford Centre). OT 11am. CP (free), TS, B&B, SIG, C, DF, DIS, RSGB Bookstall. John, 07840 389 427. [www.wmrc.org.uk]

26 JANUARY - HORNCASTLE WINTER RALLY – Horncastle Youth Centre, Lincolnshire LN9 6DZ. OT 10.00/10.30, £1.50, DF, C, free CP. Tables £5, free power. Tony, G3ZPU, 01507 527 835, tony.nightingale@yahoo.co.uk.

2 FEBRUARY - 29th CANVEY RADIO & ELECTRONICS RALLY – 'The Paddocks', Long Road, Canvey Island, Essex SS8 0JA (southern end of A130). Free CP, OT 10.30. C, DF, TS. Vic Rogers, G6BHE, 01702 308 562, nvr@blueyonder.co.uk. [www.southessex-ars.co.uk].

16 FEBRUARY - RADIO-ACTIVE RALLY – Civic Hall, Nantwich, Cheshire CW5 5DG. OT 10.30. TS, B&B, C, WIN. Tim, 01948. 519 249, tm0sin@yahoo.com. [www.midcars.org].

23 FEBRUARY - BRATS RAINHAM RADIO RALLY – Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent ME8 0BX. TI, OT 10.00/9.30, TS, SIG, C Darley, 0798 2244 788, charlesdarley@hotmail.co.uk.

1 MARCH - LAGEN VALLEY ARS ANNUAL RALLY – the Village Centre, Ballynahinch Street, Hillsborough. OT 11.30am, CP, C, B&B, SIG, TS. Jim, GI0DVU, 02892 662 270.

9 MARCH - WYTHALL RC ANNUAL RALLY – Woodrush Sports Centre, Shawhurst Lane, Hollywood, B47 5JW. TI S22 (V44), CP, OT 10am, £3. TS, C. Chris, G0EYO, 07710 412 819, g0eyo@blueyonder.co.uk. [www.wrcrally.co.uk].

6 APRIL - 51st NORTHERN AMATEUR RADIO SOCIETIES ASSOCIATION EXHIBITION (Blackpool rally) – Norbreck Castle Exhibition Centre, Blackpool FY2 9AA. TI, CP, OT 10.15/10.30. TS, B&B, SIG, MT, LB, C, DF, RSGB bookstall. Dave, M0OBW, 01270 761 608, dwilson@btinternet.com. [www.narsa.org.uk].

13 APRIL - SOUTH GLOUCESTERSHIRE AMATEUR RADIO RALLY – Scout Activity Centre, Woodhouse Park, Almondsbury, Bristol BS32 4LX. OT 10am, B&B, CP, C, CBS, TI S22 (V44). Mike, M1DPB, southglosradiorallycoordinator@gmail.com, 07806 310 095. [southglosradiorally.org.uk].

8 JUNE - 13th JUNCTION 28 QRP RALLY – South Normanton Alfreton and District Amateur Radio Club in association with the G QRP Club. Alfreton Leisure Centre, Church Street, Alfreton, Derbyshire DE55 7BD. 10 mins from M1 J28 and the A38. TI S21, OT 10.00. TS, SIG, C, LB. Anya Lawrence, 2E0BQS, 0115 930 7322, adylawri@btinternet.com. [www.snadarc.com].

29 JUNE - WEST OF ENGLAND RADIO RALLY – Cheese & Grain, Bridge Street, Frome, BA11 1BE. CP, OT 10am, £2.50. TS, RSGB bookstall, C, DIS. Shaun, G8VPG, 01225 873 098, rallymanager@westrally.org.uk. [www.westrally.org.uk].

31 AUGUST - TELFORD HAMFEST – Enginuity Technology Centre, Coalbrookdale, Telford TF8 7DU. Martyn, G3UKV, 01952 255 416. [www.telfordhamfest.co.uk].

RSGB MEMBERS' ADVERTISEMENTS

RSGB Members wishing to place an advertisement may do so free of charge by e-mail.

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. Ads may still be submitted by post but must be accompanied by a payment of £5 to cover administration costs.

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 maybe 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 anyway. 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.

Some of the National Hamfest Prize Draw winners receiving their prizes from our generous sponsors – see p38. (Photos: Laura Roberts).

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded in 1913 incorporated 1926. RSGB is a trading name of Radio Society of Great Britain, a limited company registered in England and Wales with company number 00216431. 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.

RSGB MEMBERSHIP

Annual rates from 1 January 2011

Full membership (by Direct Debit). £47.00
(individual & club)
Family membership (by Direct Debit). £56.00

Paying other than by Direct Debit attracts a £4 premium.

Student (21-25). . . . . Free
Ham Club (under 21). . . . . Free

Subscriptions include VAT where applicable.
Special arrangements exist for visually impaired persons. Details and membership application forms are available from RSGB HQ or see www.rsgb.org/join.

YOUR RSGB

This page provides names and contact details for Board Members, Regional Managers, Committee Chairmen and Honorary Officers. Members seeking advice and guidance on any aspect of Amateur Radio or the Society's work are free to contact the relevant person below. Before doing so, please do check the comprehensive FAQs on the RSGB website, www.rsgb.org/faq/ to see if your question is answered there.

For HQ staff below, both e-mail addresses and telephone details are provided, including the option to select when dialling through the RSGB switchboard (01234 832 700).

Chairmen and Honorary Officers:
These are all volunteers and give their time freely to support the Society. Members should respect the fact that many also have full time day jobs, and so e-mail is the appropriate method of communication.

General Manager:
Graham Coomber, G0NBI,
e-mail: graham.coomber@rsgb.org.uk

Honorary Treasurer (Acting):
Richard Horton, G4AOJ, e-mail: g4aoj@rsgb.org.uk

Company Secretary:
Rupert R Thorogood, G3KKT, e-mail: g3kkt@rsgb.org.uk

THE RSGB BOARD

Dr Bob Whelan, G3PJT (President), e-mail: g3pjt@rsgb.org.uk

Graham Murchie, G4FSG, (Board Chairman)
e-mail: g4fsg@rsgb.org.uk
Phillip Brooks, G4NZQ, e-mail: g4nzq @rsgb.org.uk
Stewart Bryant, G3YSX, e-mail@ g3ysx@rsgb.org.uk
Stan Lee, G4XXI, e-mail: g4xxi@rsgb.org.uk
Len Paget, GM0ONX, e-mail: gm0onx@rsgb.org.uk
Dr John Rogers, M0JAV, e-mail: m0jav@rsgb.org.uk

Note: The General Manager, Company Secretary and Acting Honorary Treasurer are not Directors, but are in attendance at Board Meetings.

REGIONAL MANAGERS

Region 1 – J O'Neill, GM7VSB, e-mail: rm1@rsgb.org.uk
Region 2 – D Morrison, GM1BAN, e-mail: rm2@rsgb.org.uk
Region 3 – K A Wilson, M1CNY, e-mail: rm3@rsgb.org.uk
Region 4 – H Scrivens, G0UGE, e-mail: rm4@rsgb.org.uk
Region 5 – V Ravenscroft, M0VRR, e-mail: rm5@rsgb.org.uk
Region 6 – M Harper, MW1MDH, e-mail: rm6@rsgb.org.uk
Region 7 – J Sneddon, MW0EQL, e-mail: rm7@rsgb.org.uk
Region 8 – P Hosey, MI0MSO,
e-mail: rm8@rsgb.org.uk
Region 9 – L Smith, G4OXY, e-mail:rm9@rsgb.org.uk
Region 10 – M Senior, G4EFO, e-mail: rm10@rsgb.org.uk
Region 11 – P Helliwell, G7SME, e-mail: rm11@rsgb.org.uk
Region 12 – M Sanderson, MOIEO, e-mail: rm12@rsgb.org.uk
Region 13 – S Boden, G4XCK, e-mail: rm13@rsgb.org.uk

SPECIALIST AREAS – CHAIRMEN & HONORARY OFFICERS

Abuse and poor operating
Amateur Radio Observation Service (AROS), Keith Bassett, G7NBU, AROS coordinator, e-mail: aros@rsgb.org.uk, www.rsgb.org/aros/

Amateur Radio Direction Finding
Bob Titterington, G3ORY, Chairman, ARDF Committee, e-mail: ardf.chairman@rsgb.org.uk, www.rsgb.org/ardf/

Contests
Ian Pawson, GOFCT, Chairman, Contests Committee, e-mail: cc.chair@rsgb.org.uk, www.rsgb.org/radiosport/

EMC
John Rogers, M0JAV, Chairman, EMC Committee, e-mail: emc.chairman@rsgb.org.uk, www.rsgb.org/emc/

General Technical Matters
Andy Talbot, G4JNT, Chairman, Technical Forum, e-mail: tech.chair@rsgb.org.uk, www.rsgb.org/technicalmatters/

General Spectrum & Regulatory Matters
John Gould, G3WKL, Chairman, Spectrum Forum, e-mail: spectrum.chairman@rsgb.org.uk www.rsgb.org/committees/spectrumforum/

GB2RS News Service Management
Gordon Adams, G3LEQ, GB2RS Manager, e-mail: gb2rs@ntlworld.com
(GB2RS news items should be sent to gb2rs@rsgb.org.uk)

HF Matters
Ian Greenshields, G4FSU, HF Manager, e-mail: hf.manager@rsgb.org.uk

Intruders to the Amateur Bands
Chris Cummings, G4BOH, e-mail: iw@rsgb.org.uk www.rsgb.org/intruders/

IOTA Activity Programme
Roger Balister, G3KMA, IOTA Manager, e-mail: iota.manager@rsgb.org.uk, www.rsgbiota.org/

Microwave Matters
Murray Niman, G6JYB, Microwave Manager, e-mail: mw.manager@rsgb.org.uk

Planning Advice
Stephen Purser, G4SHF, Chairman, Planning Advisory Committee, e-mail: pac.chairman@rsgb.org.uk, www.rsgb.org/planning/

Propagation Studies
Steve Nichols, G0KYA, Chairman, Propagation Studies Committee, e-mail: psc.chairman@rsgb.org.uk, www.rsgb.org/psc/

Repeater and Data Communications
John McCullagh, GI4BWM, Chairman, ETCC, e-mail: etcc.chairman@rsgb.org.uk, www.ukrepeater.net

RSGB Awards
John Dunnington, G3LZQ, Awards Manager (Contact HQ in the first instance on 01234 832 715), e-mail: hf.awards@rsgb.org.uk, www.rsgb.org/operating/awards/

Training & Education
Steve Hartley, G0FUW, Chairman, Training & Education Committee, e-mail: tec.chair@rsgb.org.uk, www.rsgb.org/clubsandtraining/

VHF Matters
John Regnault, G4SWX, VHF Manager
E-mail: vhf.manager@rsgb.org.uk

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

HEADQUARTERS STAFF

General Amateur Radio Issues
E-mail: AR.dept@rsgb.org.uk
Telephone: 01234 832 700, Option 5
Amateur Radio Examinations
E-mail: exams@rsgb.org.uk
Telephone: 01234 832 700, Option 4
***RadCom* (news items, feature submissions, etc)**
Elaine Richards, G4LFM or Giles Read, G1MFG
E-mail: radcom@rsgb.org.uk
Telephone: 01234 832 700, Option 3
GB2RS and Club News
E-mail: GB2RS@rsgb.org.uk
Telephone: 01234 832 700, Option 3

Sales department
(membership, books and other products)
E-mail: sales@rsgb.org.uk
Telephone: 01234 832 700, Option 1

Subscription renewals
Telephone: 01234 832 700, Option 2

IOTA
E-mail: IOTA_HQ@rsgb.org.uk
Telephone: 01234 832 700, Option 5

General Manager
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Telephone: 01234 832 702

HEADQUARTERS AND REGISTERED OFFICE

3 Abbey Court, Fraser Road,
Priory Business Park, Bedford MK44 3WH,
Telephone: 01234 832 700
Fax: 01234 831 496

QSL BUREAU ADDRESS

PO Box 5, Halifax HX1 9JR, England
Telephone: 01422 359 362
E-mail: qsl@rsgb.org.uk, www.rsgb.org/qsl

PLAY YOUR PART IN YOUR RSGB

Have Your Say
Let us know how we're doing! Through "Have Your Say" you can let us know your views and you will receive a reply from the General Manager or a Board Member.
Write to haveyoursay@rsgb.org.uk or go to www.rsgb.org/haveyoursay/

Consultations
From time to time you will find we are consulting the Membership on aspects of Society policy. You can find current consultations at www.rsgb.org/consultations/

National Radio Centre
Don't forget to tell your friends about the National Radio Centre at Bletchley Park. Full details can be found at www.nationalradiocentre.com

Licensing & Special Event Stations
Licensing and Notices of Variation (NoVs) for special event stations are handled by Ofcom, 0207 981 3131, www.ofcom.org.uk

FAQs
The RSGB has compiled the questions most frequently asked by Members at www.rsgb.org/faq/

Band plan
The latest version of the band plan is always available on the website at www.rsgb.org/committees/spectrumforum/band-plans.php

Good Operating Practice
The RSGB fully supports the code of conduct and encourages all amateurs to read the advice. www.rsgb.org/tutors/pdf/good_operating_practices.pdf & www.rsgb.org/operating/ethics/docs/ethics_and_operating.pdf

RSGB Tech
The purpose of this service is to be the first port of call for technical queries on amateur radio matters. It is open to all radio amateurs. http://groups.yahoo.com/group/rsgbtech/

RSGB Shop
All RSGB goods - books, filters, clothing - can be purchased online at www.rsgbshop.org/

Club Finder
Use the website to find your nearest radio club and check out the facilities they have to offer.
www.rsgb.org/clubsandtraining/

WEBSITE

Main website: www.rsgb.org
Members Pages
Log in using your callsign in lower case as the user name and your Membership number, without the leading zeros (see your *RadCom* address label) as the password.
If you need to update your Membership details, please visit www.rsgb.org/myaccount/.

ANTENNA LAUNCH CAUTION

Stewart,G3YSX

From time to time US radio amateurs publish interesting designs based on common plastic plumbing pipe, such as antenna masts or the tennis ball launcher discussed in last month's *RadCom*. Readers should be aware that the normal US plastic water pipe has a much thicker wall and a much higher pressure rating. For example US 1.25" Schedule 40 PVC waste pipe has a wall thickness of approximately 4mm whereas a similar UK plastic waste pipe has a wall thickness of approximately 2mm. This in turn means that common UK plastic pipe is not as mechanically strong as the US equivalent, being only half as stiff as US pipe of the same diameter with a much lower pressure rating. Any reader wishing to copy a US design needs take these reductions in mechanical strength into account.

Terry Roeves, G3RKF

Bob's experience of USA operation reminds me of my W2/G3RKF aerial erection challenges in rural New Jersey (NJ).

I am sticking with my US-purchased sling shot (aka a catapult). A ½ inch nut attached to 10lb breaking strain fishing line gets me over tree branches on the edge of my son's garden, up as high as 90ft. Thicker line doesn't fly as far and 6lb line, for example, snaps if the nut snags up.

I confess to some misfires, so it's best to have some spare nuts. Taking care that the fishing reel bale arm is open and no coils of line are caught up will prevent the line snapping. Two of you will make a better job of it.

It's easier and safer to get the aerial supports up when there are no leaves on the branches and the undergrowth has died back. My encounters with a poisonous snake, a poisonous spider, a hornet and numerous deer ticks tell me that you need to be very well covered and wearing gloves. So, no shorts and sandals. Deer ticks cause a very nasty disease that is hard to diagnose, whilst venomous bites are extremely painful – I speak from experience. Also the poison ivy, poison vine, poison sumac are other opportunities to suffer pain.

This summer, I avoided the worst of Mother Nature, spotting the deer ticks and a very large Wolf Spider in time. (Heard the Timber Rattlesnake, but several feet away). No wonder the family in NJ think I'm crazy! My son, concerned for my welfare, cut the undergrowth back, but that still left the deer ticks to drop down from the foliage above, so wear a hat. Perhaps this is why a tower and a Yagi are so popular over there. If hurricane Sandy hadn't wrecked the last aerial, none of this would have been necessary. NJ may not be tropical sub Saharan Africa, but it too has its challenges for visitors. So spare a thought for the intrepid operators on the next DXpedition that you work.

Robert Dancy, G3JRD

The interesting letter in the October *RadCom* about antenna launching reminds me of the 1950s when there was an 80 foot oak tree about thirty yards from my house, with a yew of around 25 feet high a convenient distance from the oak. It was in open countryside six miles east of Tunbridge Wells, giving plenty of room to manoeuvre. A quite stable box kite was flown up twenty or thirty feet, another line tied to the existing one, then two of us let the kite up probably three hundred feet, walking away from each other to form an inverted 'V'. Moving sideways, it was easy to position the lines right over the top of the oak. Pulling down the line on the leeward side to recover the kite, we now had a draw-line for pulling galvanised fencing wire over the tree with a pulley fixed to the top end.

The pulley was previously fitted with some insulating line supporting copper wire, and stringing one end across to the yew, a 260 feet end-fed long wire was available, much of it sixty feet high. It was used with good results on frequencies from Top Band to 20 metres for the remaining four years in the house.

It would probably be even easier to wait for a calm day and use a hydrogen-filled balloon, or a bunch of them, to take a line over a tree. No Health and Safety problems with that, though men with white coats might arrive if a neighbour gets worried about the strange antics!

Glenn Loake, G0GBI

What's the world coming to when amateurs start using these devices? The next thing will be rocket launchers or guided missiles! Why make the art of portable antenna erection, so high tech. A day out in the field should be as simple as possible. Safety is also top of the priorities. At the end of the day an antenna erected by run of the mill equipment is at least half the enjoyment of the day out.

If you refer to the Portable Fishing Rod Antenna article on page 76 of the the July 2010 *RadCom* you will see a very easy and practical way to erect antennas as long as there is a tree about, or even a building. I wrote this article, because people were struggling with catapults, bows and arrows. Some body was going to get injured, sooner or later. A cast with a beach casting rod can be very accurate, in the right hands.

I have made one change to the set up since submitting the article. The reel now pivots round on the winch bracket to face forward for casting, making it unnecessary to flake out the line on the ground first. The reel is then pivoted back to normal for winding in at the end of the day.

CABLES DOWN A HOSEPIPE

Roger Mew

Some years ago I ran my own business and ran cables down and under roads. Now many people do not realise that you cannot run non proofed cables down hose pipes etc as cables are naturally hygroscopic. I used to get my cables covered in waterproof plastic (polyethylene) although another company didn't because it was cheaper. Some 2 years later both cables were still ok, but some 10 years down the road and the other cables have failed. So just placing them in hosepipe will not do. You must cover the cables with some kind of plastic that is designed for that purpose. I can't remember who used to cover our cables but I'm sure one of the cable suppliers can help as I used Webro in those days.

Even better than a hosepipe is to place the cable in French drain, the yellow stuff with holes in, placed in gravel.

Robert Dancy, G3JRD

For threading cables down a pipe, it is possible to pull a line through a small pipe without uncoiling it using a friendly dairy farmer's vacuum system for milking his cows. I did that very successfully about 40 years ago for pipes up to two hundred metres long, when a vacuum cleaner did not have sufficient power.

Richard Edmondson, 2E1RED

With reference to the letter on putting cables down hosepipes as a protective measure. I have also installed all coax and rotator cables from my radios up into the roof space above using 25mm diameter electrical conduit, until reaching the exit point in the outside wall of the building. This has involved three 90 degree bends in the various conduit and a total run of some 25 metres. This means that in my old age I will no longer have to venture up in that roof space in order to remove, or install new coax cables.

I already had a ball of polypropylene string and, taking a small piece of cloth, some 25mm x 100mm, which I fastened onto the end of the string, I then stuffed said string into the open end of the conduit, ensured that the string would unravel from the inside of the ball of string and, using my small air compressor, simply blew the cloth and string through the entire length until it reached the other end. My compressor is the type that can be bought from the likes of Machine Mart; it is fitted with small wheels with which to manoeuvre it, has a coil air-line that stretches to over 6 metres and a simple air blow gun.

A total time of about one minute flat to feed a string through each conduit, obviously one at a time. Problem solved.

RE: START HERE – THE DIPOLE

John Welsh, G0NVZ

Last month there was some correspondence from Peter Martinez, G3PLX regarding my article on the dipole. Firstly I must say that I am not attempting to propound a new theory of radiation from a wire. The articles were an attempt to explain, in very simple terms and to non scientists, how bits of 'radio science' work. They were originally written under the heading 'AB INITIO' implying not only "from first

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principles", but also "for beginners". Please remember that these articles were originally written, starting a long time ago, for the very restricted readership of the Verulam Amateur Radio Club of which I am a member.

I am not competent to challenge a renowned expert in the field such as G3PLX, but in mitigation of my effort, I offer the following comments taken roughly in order.

The first two paragraphs of my original article were omitted through lack of space. These paragraphs defined the meaning of the word 'dipole' both in general, and specifically in 'radio science'.

I agree that the concept of "stored energy" might be difficult for some people, particularly as it is much greater than that radiated, and it would have been better if I had used the term "referred to later" rather than "explained later".

The reason I brought electrons into the discussion, with their strong mutual repulsion, was to create in the mind of the reader "why they wanted to get away from each other", causing a pressure, rather like the high pressure gas in a gas bottle. Not a very good analogy you may think, but it may help some people.

I agree that stored energy has nothing to do with launching the wave, but it is relevant to a dipole and it explains why a dipole is more efficient for its size than, for example, a Beverage or a Rhombic, ie the stored energy is available for recycling.

I agree I did not explain why a half wave dipole is self resonant, but I used the analogy of a pendulum. Electrons, in reality their influence), surging, (at the speed of light), from the end where they were compressed to the other end and back again, a total distance of one wavelength, restores the original condition and therefore establishes the wavelength. The points in your final paragraph concerning Maxwell's Curl equations and the 'Short Dipole' are accepted but I was trying to keep the article simple.

The original article was too long for the one page available in *RadCom* so it was truncated, omitting the first two and last four paragraphs. The final paragraphs were included in the following month's article, which picked up where this one left off.

100 YEARS OF EMC

Brian Austin, G0GSF

G0SNO suggests in his interesting review in October's *RadCom* of a centenary of radio communications that EMC may well have first become an issue (though not a catchy acronym) around about 1913. This could well be true. However, one needs to go back quite a bit further to the very early days of wireless experimentation – to the time of Sir Oliver Lodge, in fact – to find what may actually be the first mention of radio interference, soon to be called RFI and then, much later, EMC.

In 1894, at a lecture in Oxford, Lodge's assistant, E E Robinson, operated a Morse key connected to an induction coil and a spark gap to transmit a series of dots and dashes to Lodge's coherer receiver, some 60m away where Lodge was demonstrating his apparatus to a distinguished audience. Lodge described the process as "a very infantile form of radio telegraphy" though, at the time, he saw no practical applications for it. This demonstration is now recognised by most historians of science as the first use of wireless to transmit intelligence and, hence, it was the beginning of wireless communications.

But it also coincided with the possible beginning of the bane of wireless, electrical noise. Lodge was well aware of this and it was that which drove him to invent tuning or syntony, as he called it, to allow numerous transmitters to operate at the same time but on different frequencies. In developing his ideas in his laboratory at Liverpool University, Lodge even attempted to receive radio emissions from the Sun – the first experiment in radio astronomy – by placing his coherer at the focus of a parabolic reflector. Lack of sensitivity in that most primitive receiver, almost two decades before the introduction of the triode amplifier, meant that all he received was noise from Liverpool's electric trams. Here was undoubtedly RFI/EMC in action!

Intriguingly, too, it was around about this time that he reported picking up "communication from ordinary telephone lines", presumably by induction, with such oddities as hearing "people ordering potatoes for dinner". Breakthrough?

So, maybe we should push back the beginnings of EMC to the very earliest days of wireless communications?

CAMPAIGN FOR REAL ENGLISH

Rob Macfie, G4FAX

As I listen to the bands, I am constantly amazed by the things some people say. How often has the following been heard in one form or another: "The operator handle at this end is xxxx there"? This, and other inanities, are constantly in use and I can only assume that they derive from CB-speak. I would like to be able to say that this is only heard from newly licensed operators but this is not the case by any means. If these people heard a recording of themselves would they feel embarrassed? I would hope so. May I ask the guilty ones to consider this; if you were at a party and were introducing yourself to someone for the first time would you say "The attendee handle at this end is..."? No, of course not, you would use "My name is..." So why not the same on the air?

In view of the above may I make the following suggestions?:

Instructors of amateur classes should impress upon their students that there is no 'special' language on the air. Teach them to speak normal plain English and give them examples of what *not* to say.

If, while speaking to a newly licensed operator, or any other operator for that matter, you hear examples of gobbledegook, gently remind that person it is not necessary. The new operators particularly should not take offence at this as it is the job of all more experienced amateurs to teach and guide the novices. If anyone does take offence why not play back a recording?

Let's drop the Morse code abbreviations like references to the WX or ending an over with QSL and return to plain English.

Remember, not everything that comes across the Atlantic is a benefit to this country and there are still some things that we invented first, like the English language.

CALLSIGN ALLOCATIONS

Glenn, 2MODES

I am at a loss to make sense of the callsign allocations in the UK. Enter GM, GW, GJ etc into any logging programme and you are told they are callsigns registered to operators in Scotland, Wales, Jersey. Enter G and it says England. Now M, W, J are regional locators of other component members of the UK. So why is England not GE?

I can already hear your hurried reply, but wait – why is an Intermediate licence holder in England 2E? Are you now finding the ground getting boggy?

Here is another anomaly. What callsign would a Full licence holder from England use when operating in say France – F/G3xyz? QSL details would be found under G3xyz. Now, this station holidays in Scotland for a day trip. He now operates as GM3xyz. What would a logging program show – station in Scotland. Wouldn't it make more sense to operate as GM/G3xyz so that the details are more easily uncovered? A Scottish station operating recently in Germany should have used the call G0xyz but, instead, gave DL/GM0xyz and was greeted with, 'oh, you're Scottish station', which he was because his licence gives his call as GM0xyz.

Club callsigns can be even more complicated when operating away from home. No wonder some of our amateur friends around the world find it difficult to follow.

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ELECRAFT FIRST UK VISIT

WA6HHQ, Eric Swartz, and G3OJV, Peter Waters, at the RSGB National Hamfest 2013. We celebrated our second year as exclusive UK appointed distributor where once again record sales have been achieved. Eric and Peter are long term friends who work closely together in the building and marketing of Elecraft products. Both are very active hams and the excellent relationship between the two companies is very special.

The KPA-500 HF-6M 500W Solid State Linear
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It's the perfet match for the K3 with totaly silent T?R and perfecta QSK for CW operators. No warm up time and auto power reduction to the K3 when active on an adjustable band to band basis plus ng all achieved using the optional connecting lead. But you son't need to be a K3 owner to eny this amplifier. Just connect RF input and and PTT to the amp -nn ALC needed with moderne rigs, and you still get auto band changing via the RF frequency sensor. Typical drive for 500W is about 25-30W. Built-in PSU. Same size as K3.

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KXPA100K £699 KXPA100F £749 KXAT100K £299 KXAT100F £349

100 W output on 160-6 m with 5 W input typical
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TIME TO PLACE YOUR ORDER

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