RadCom

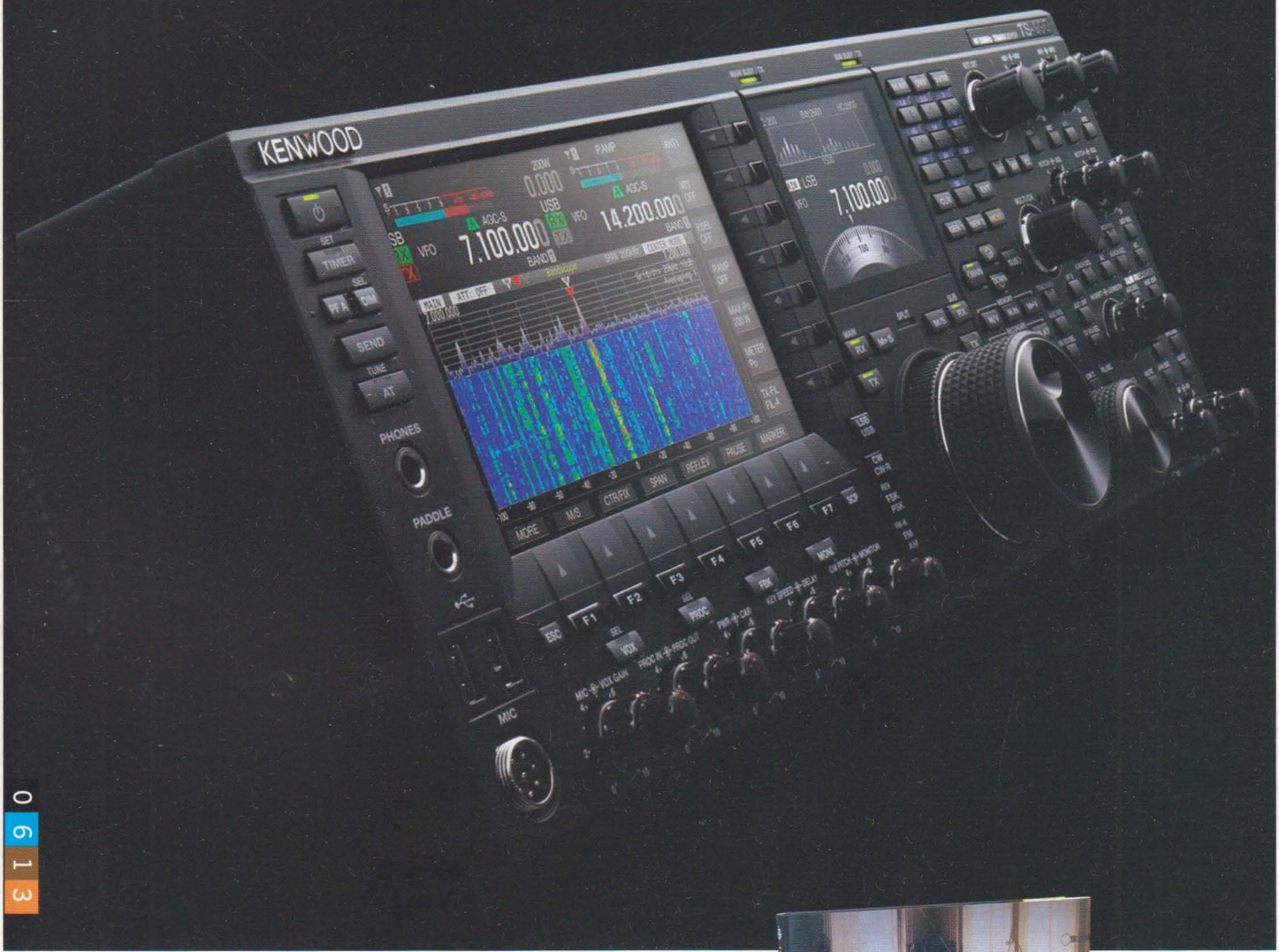
RADIO SOCIETY OF GREAT BRITAIN ◆ 100 YEARS WORKING FOR AMATEUR RADIO

Radio Society of Great Britain
100 YEARS 1913 - 2013

JUNE 2013 ◆ VOLUME 89
NUMBER 06 ◆ £4.95

Kenwood TS-990

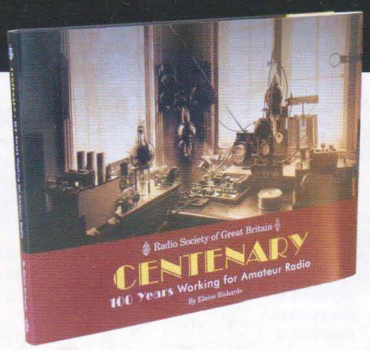
"An outstanding radio … second to none" says Peter Hart, G3SJX



0613

QRP
Tiny QRP transceiver that's a tinkerer's delight

Sport Radio
It's time for the UKSMG Summer Sporadic-E Contest



Centenary
Fascinating new book covering the hundred-year history of the RSGB

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Special Offers!

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!

Was £1264.95 Now £1099.95 D

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 operations.

Was £349.95 Now £289.95 D

FTM-350AE - SAVE £200!
2m/70cm Mobile Transceiver

The FTM-350AE 2m/70cm transceiver from Yaesu with Bluetooth GPS APRS 50/50W. * Advanced Dual Band/Dual Receive Mobile Radio * Two Separate Receivers * GPS / APRS® / Bluetooth® * 144/430 MHz 50 W FM Dual Band Transceiver * DTMF Microphone Included

Was £599.95 Now £399.95 D

FTM-350AE + FPGPS-1

FTM-350AE, as above, with FGPS-1 Internal GPS receiver unit, worth £59.95.

Was £659.90 Now £449.95D

WIN A BRAND NEW YAESU FT-897D!

HF-70cms - Up to 100Watt
Base - Portable - Mobile
Any Mode - Any Where!

To be in with a chance of winning a brand new FT-897D or 19 other prizes - simply return your Yaesu warranty card to us for any Yaesu purchase made through W&S between 18th March and 3pm Saturday 28th September 2013. Draw will be held at RSGB National Hamfest 2013. Many More Prizes!

Another W&S Exclusive!

AR-5001D
Fabulous Performer

- 40kHz - 3.15GHz
- All Mode Reception
- Digital Signal Processing
- Monitor 3 Channels At Once!
- SD Media Recorder
- AF 12kHz IQ Output

AOR

The AR5001D super wide range receiver has been developed to meet the monitoring needs of security professionals and government agencies. Up to three channels can be monitored simultaneously. 2000 memories, digital signal processing, direct digital sampling, a high performance analog RF front-end, DDS local oscillator, built-in spectrum display, 45.05 MHz IF output. £3749.95 d

NEW

FG-01 II
Antenna Analyser

We will shortly have 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.

ICOM IC-7410 HF-6m

This lovely new HF-6m all-mode 100W transceiver offers superb front end dynamic range. and has a 15kHz roofing filter. It also features a 36kHz DSP razor sharp filter, internal auto ATU, PC control via a USB port and speech synthesizer. IN STOCK £1695.95 D

IC-7600 HF Transceiver

The IC-7600 HF/50MHz transceiver is enhanced with some of the main features tried tested on the flagship IC-7700/7800 models. It is highly regarded by Amateur operators world-wide. Features inc a double conversion superheterodyne system, dual DSP units & 3kHz IF (roofing) filter. IN STOCK £3299.95 D

IC-9100 HF Transceiver

The Icom IC-9100 is ideal for the operator who is looking for a complete high performance radio that covers HF - UHF in one box. It offers 100 Watts output on all bands up to 2m, whilst on 70cms you get a healthy 75 Watts. An internal auto ATU is included which covers HF plus 50MHz. IN STOCK £2899.95 D

YAESU
Choice of the World's top DX'ers

FT-60E + FREE ACCESSORIES!
2m/70cm Dualband 5W Handie

Purchase the FT-60E at our usual discount price of £129.95 and get all these great accessories for FREE!

£129.95d

Choose either a QS-112Y4 Speaker Mic (worth £16.95) OR a WEP-501Y4 Earpiece/Boom Mic (worth £12.95)

£55+ Worth FREE

+ 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)

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. £699.95

WATSON
All models fitted with "NF" Noise Remove Function

Power Mite-NF

£79.95c

- Output Voltage Variable: 4.0V - 16V
- Output Current: 22A Continuous, 25A Peak
- Output Voltage Regulation: Less than 1%

Power Max-45 NF

£129.95c

- Output Voltage Variable: 4.0V - 16V
- Output Curvrent: 40A Continuous, 45A Peak
- Output Voltage Regulation: Less than 1%

Power Max-65 NF

£239.95d

- Output Voltage Variable: 4.0V - 16V
- Output Current: 60A Continuous, 65A Peak
- Output Voltage Regulation: Less than 1%

HF High Performance Transceivers

TS-590S 160m - 6m Transceiver

Kenwood has won the admiration of the radio press and hams all over the world. 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 **£1329.95d**

NEW FT-DX3000
HF & 6m Transceiver

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

FT-DX5000 160 - 6m Transceiver

NEW DISCOUNT PRICE!

- 160-6 metres
- Electronic Keyer
- Variable RF Filter (160-10M)
- Parametric Microphone Equalizer
- Dual Receive In Band Function
- Contest-ready Antenna Selection
- Manual and Automatic

HF/50 MHz 200 watt transceiver. Two fully independent receivers,112 dB dynamic range and an IP3 [3rd Order Intercept Point] of +40 dBm.

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 stock.

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**

HEIL

Pro-Set-6

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

Pro-Set-6
£149.95 C
AD-1 Rig adaptor leads £19.95 C

Pro-Set-Elite-6

Modelled on the ProSet-6 but adds phase reversal switch which offers a spatial awareness that moves signals around in your head to give perceived placement of signals between the two aco chambers.

Pro-Set-Elite-6£179.95 C **£189.95 C**
Pro-Set-Elite-IC **£19.95 C**
AD-1 Rig adaptor leads

microHAM

The perfect interface that sits between PC and radio. Voice keying, CW message and direct keyboard sending, digital modes for HF and VHF, all with perfect integration.

Exclusive UK Distributors.

microHam is the choice of many DXpeditions and contest enthusiasts. Finely engineered to integrate between PC and transceiver. We can supply ready made interface leads for any transceiver.

USB Micro Keyer II has it all.

The most powerful single radio interface switching that fully supports voice operation and microphone. It works with any USB Windows-based logging or control program for CW, voice, FSK and digital including (RTTY, PSK31, SSTV, OLIVIA, MFSK, WSJT, etc.) it also includes a radio control interface that supports all standards RS-232 protocols. You get memory CW keyer, Voice keyer with two channels of audio and auto microphone connection. **£329.95c**

USB Digi Keyer II for CW & Digimodes

A great interface for those who don't need the voice keyer, but simply want to operate CW and all the popu;ar digi modes. **£259c**

USB CW Keyer for CW operators

It gives you all that you need to operate an efficient CW station with the option of comprehensive message programming and direct keyboard CW as well as contest exchanges with rolling serial numbers. Coming soon.

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

IC-7100 It's Almost HERE! Phone for deal and PX.

With 4m Phone for Price and Reservation

The exciting news from Icom is the new IC-7100 transceiver that offers 100W from 1.8 -50MHz, 50W on 4m, & 2m & 35W on 70cms. A big leap forward is the introduction of a touch screen and a convenient built-in speaker in the remote head unit.

- 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 versatile digital processing performance
- Built-in RTTY demodulator and decoder
- Voice recording and playback functions
- Optional RS-BA1 IP control remote control software

KENWOOD

TS-990S 160m - 6m Transceiver - In Stock!

NEW

RadCom: "Performance Second to None" - "performed impeccably on strong and weak signals" - "transmit audio is excellent"

HEIL SOUND

The TS-990s 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.

When you get your new TS-990 transceiver you also get a high quality Heil microphone to give you the best audio in the business. The TS-990s is capable of some wonderful audio quality that can be achieved using a top grade microphone.

PART EXCHANGE MEGA DEALS just give us a call on: 01702 206835

- 160-6m
- 2 - 200 Watts
- Built-in AC PSU
- USB, Serial and Ethernet ports
- Large colour Dual TFT display
- Built-in Auto ATU
- 5 Roofing filters
- 270Hz-15kHz
- 0.1ppm TCXO
- Dual Receive inc, different band
- Dual sub receiver roofing fiters
- DSP with auto switch filters
- Advanced AGC
- Remote control from PC
- Sky Command System

2 Year Warranty! £6399.95d

AMERITRON AL-811XCE 600W Valve Amplifier

£949.95d

* 1.8 - 30MHz (All Ham bands) * Output: 600W PEP (500W CW) * Input: 50 Ohms 50W (typ) 100W (max) * Valves: 3 x 811A * Meters: Grid & Plate current Plate Voltage * Matching: Pi-network 50 Ohms * Voltage: 1,500V * Built-in 230V AC supply * Uses 3 low cost 811 valves * Widely used in the USA * Dual meters * Tuned inputs * By-pass switch * Shielded RF compartment * Matches Solid State Rigs * Switching: 12V Close for

The ideal linear to use in the UK. The excellent cooling fan runs quietly but efficiently and enables you to work contests or rag-chew. It matches the modern solid state rig and offers up to 9dB of power gain, that's nearly two S-points. In an instant you can switch it to standby and the amplifier will happily match into 3:1 VSWR.

Fantastic New Product From Icom!

NEW

ID-51E 2m/70cm DSTAR Handheld Transceiver 5W GPS SD

Evolving from Icom's popular ID-31E D-STAR portable, the ID-51E dualband D-STAR handportable possesses new features inc dualwatch, 500 extra memory channels (for a total of 1,752 channels), automatic position reply (DV), repeater search functions and AM/FM Receivers.

- Compact Dual Bander, receives two bands simultaneously.
- D-STAR DV Mode Operation • Integrated GPS
- Menu Driven User Interface• AM/FM Broadcast Receiver
- IPX7 Submersible Construction • Voice Memory (QSO/Voice recorder)
- MicroSD Card Slot • Total 1304 Memory Channels
- Rapid Charging from DC Power Jack

£479.95d

VHF UHF Mobiles

NEW

TM-281E 2m FM 65/25W Mobile £169.95 D

On or off the road, Kenwood's TM-281E is a mobile you can count on. This MIL-STD compliant transceiver delivers powerful performance, excellent audio clarity, and a host of advanced features.

FT-2900E 75 Watt 2m 3W Audio, CTCSS, DTMF mic & "WIRES" internet. £142.95 D

FT-7900E 2m/70cms mobile 50/40W CTCSS, DTMF, "WIRES" internet, wide Rx £239.95 D

FT-8800E Dualband Mobile 50W / 30W Great Value £343.95 D

FT-8900R Quad band 10/6/2m/70cm FM 50W (70cm 35W) £389.95 D

FTM-10E 2m/70cms Blue Tooth & built-in mic. £324.95 D

FTM-350AE 2m/70cm Mobile Bluetooth GPS APRS £399.95 D

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

TM-V71E 2m/70cm Mobile with Echo Link £299.95 D

FlexRadio Systems — New FLEX-6000 Signature Series

SmartSDR™ With the Flex-6000 Signature Series radios, FlexRadio brings a wealth of new capabilities to the amateur including direct digital sampling reception, transmission and networking. At the core of all these new capabilities is SmartSDR. SmartSDR organizes all of the signal processing power in the Flex-6000 series into an advanced reusable framework. Plug & Play The series was designed with Plug & Play installation as a requirement. There are no drivers or interface cards to install. Just plug the radio into an antenna, power supply and network, load the SmartSDR software on your existing PC and operate.

First Deliveries May 2013. Phone NOW!

FLEX-

160m-4m

FLEX-6500	£3449.95 D
FLEX-6700	£5799.95 D
FLEX-6700R	£4799.95 D

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 Wideband receive **£169.95d**

VX-6E 2m/70cms handy, 5W Wideband Receive **£249.95c**

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

IC-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**

HF - UHF in One Box!

FT-897D base or portable, this 1.8 - 440MHz transceiver is great value. 1.8 - 50MHz 100W 2m 50W 70cm 20W. IN STOCK **£819.95d**

FT-857D The great value mobile or base 1.8 - 440MHz. HF-6m 100W, 2m 50W 70cm 20W. IN STOCK **£714.95d**

KENWOOD The TS-2000E is a firm favourite for those wanting ultimate all-mode performamnce on all bands. 1.8-144MHz 100W 70cm 50W. It has the highest power on 2m & 70cms and the TS-2000X version adds 23 cms! Includes auto ATU, DX cluster facility & digital IF for superb weak signal performance. IN STOCK **£1549.95d**

ICOM IC-7000 The most compact, high spec. HF-UHF transceiver available. With its lovely display and digital IF filters, it can handle all your needs - SSB CW and data. HF-6m 100W, 2m 50W and 70cms 35W. All in one lovely box. IN STOCK **£1189.95d**

HF on a BUDGET!

FT-450D Comes with the extra IF filter & an Auto ATU built in. 100W 160m - 6m with 3 IF filters 300Hz, 500Hz & 2.4kHz. IN STOCK **£839.95d**

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

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

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

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

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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Why Buy From Us?

W&S are the world's largest MFJ dealer and the exclusive distributor for the UK. We offer a 24 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!

This Month's Specials

	Regular	Offer
MFJ-16010 1.8-30MHz random wire tuner 200 W	£71.95	£65.95B
MFJ-901B 1.8-30 MHz "versa tuner" 200 W	£111.95	£104.95 C
MFJ-971 1.8-30 MHz 200W portable ATU x needle	£122.95	£114.95 C
MFJ-904H 3.5-30MHz 150W Travel Tuner	£154.95	£144.95 C
MFJ-969 160-6m 300W ATU	£219.95	£199.95 D
MFJ-1786X Loop Antenna 10-30MHz inc remote	£439.95	£419.95 D
MFJ-1788X Loop Antennna 7--15m inc remote	£479.95	£449.95 D
MFJ-259B SWR analyser 1.8-170MHz + impedance	£269.95	£249.95 C
MFJ-269 SWR analyser 1.80450MHz + impedance	£389.95	£359.95 C

MFJ-914 Auto ATU Extender (for G5RV)

Having trouble in matching your G5RV using your rig's built in ATU? Then this could be the Answer. Just insert it between your antenna coax feed and the transceiver. Then select best position and fine tune with your rigs internal ATU. It's that easy. No more G5RV matching problems!

Antenna Analysers To Make Antenna Adjustments

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 SPECIAL! £329.95

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. £359.95 D

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. £429.95 C

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) £389.95 C

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) £269.95 £249.95

MFJ Vertical HF Antennas

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

Only 12ft high with a tiny 24 inch footprint! Use base or portable. End loading ensures entire length radiates ith full size on 2 & 6m. Fitted choke balun toeliminate coax radiation. Independent band adjustment. Low radiation angle for DX and rated up to 1500W. No radials needed, so easily attaches to a mast. £244.95 D

MFJ-1798 80-2m No Radials Vertical

Operate 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with no ground or radials! Full size performance gives high efficiency for more power radiated. Results? Stronger signals and more Q-5 QSOs. 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. £349.95 D

MFJ-974R 3.5-53MHz 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. SPECIAL! £194.95

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 £684.95 C

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. **£222.95c**

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 with external 12v. **£144.95c**

MFJ-385B NEW

£44.95c

24cms high, this dark charcoal, dual cone speaker offers enhanced audio

MFJ-393 Headsets NEW

£79.95c

Headphones with boom mic, these are available for Kenwood, Icom and Yaesu modular sockets.. MFJ-393i

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. An ATU to cope with coax VSWR is recommended but even 20:1 on 10ft of coax produces lessd than 2dB loss. **£76.95**

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! £279.95 D

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! £174.95 D

MFJ-929 World's Fastest Compact Auto ATU

200W handling matches any antenna with near perfect VSWR. Get the best from your antenna! £214.95 C

MFJ-991B 300W Auto ATU

Handles 300W, fitted cross needle meter. Wide range: coax, balanced or wire. 300 Watts level matches 6-1600Ohms, or 150 Watts with wider range of 6 - 3200 Ohms. £214.95 C

MFJ-998 1.5kW Auto ATU

Highest power model that matches coax, balanced and end fed, all with great efficiency and fast tuning. Cross needle metering & LCD display. £659.95 d

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. £779.95 D

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. £449.95 D

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. £329.95 D

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). £299.95 D

MFJ-927 200W Remote Auto ATU

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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**

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RadCom

THE RADIO SOCIETY OF GREAT BRITAIN'S MEMBERS' MAGAZINE

MANAGING EDITOR:
Elaine Richards, G4LFM
E-mail elaine.richards@rsgb.org.uk
TECHNICAL EDITOR:
Giles Read, G1MFG
E-mail giles.read@rsgb.org.uk

All contributions and correspondence concerning the content of *RadCom* should be posted to: The Editor, *RadCom*, 3 Abbey Court, Fraser Road, Priory Business Park, Bedford MK44 3WH
Telephone 01234 832 700
Facsimile 01234 831 496
E-mail radcom@rsgb.org.uk

Advertising. All display and classified advertising enquiries (except Members' Ads) should be sent to: Chris Danby, G0DWV, Danby Advertising, Fir Trees, Hall Rd, Hainford, Norwich, Norfolk NR10 3LX
Tel/Fax 01603 898 678
E-mail adsales@rsgb.org.uk

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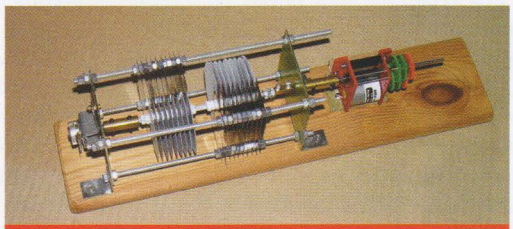
Layout and design by Kevin Williams. Original concept by Imotea Creative Mediadesign.

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

News and Reports



Recycling a biscuit tin into a variable capacitor – P70

Features

All set to go square bashing – P60

Cover image: The new Kenwood TS-990 reviewed by Peter Hart, G3SJX

Photo courtesy of Kenwood Electronics UK

Reviews

Technical Features

Regulars

Second time around

It was with great pleasure that I accepted your Board's offer to become the President of the RSGB again. Much has changed over the past 10 years in amateur radio. Radio spectrum has come to be seen again by governments as a valuable resource which they can sell to balance their books. Sounds familiar? Yes, it's just a rerun of the rush to repossess the short wave spectrum in the first half of the 20th century except that the numbers are much bigger and the wavelengths much shorter. Should we be concerned at the possible loss of some UHF spectrum? Certainly we should, because without spectrum much of amateur radio would be just hobby electronics. It's our freedom to experiment across the radio spectrum that sets amateur radio apart. So a strong national society like the RSGB is necessary for amateur radio to thrive. The RSGB enters its second 100 years in a good position, financially sound, a strong core membership and well informed about radio communication technology and radio spectrum usage. The RSGB is seen by IARU and national administrations as one of the leading organisations representing amateur radio enthusiasts in the world.

UPCOMING OFCOM CONSULTATIONS. At a meeting between the RSGB and Ofcom on 3 May, Ofcom outlined its plans for a series of public consultations on matters related to spectrum management. These will have implications for the spectrum available to the Amateur Service. These consultations will cover three topics:

a) The Public Service Spectrum Release – where spectrum will be released by government departments for other uses, which will have implications for some amateur UHF allocations
b) The release of spectrum in the low and high VHF bands, which might offer the opportunity for additional amateur spectrum
c) A more general review of the terms applicable to amateur licences in the UK.

Ofcom's intention is that changes to the amateur licence terms and schedule that result from these consultations will be enacted in the summer of 2014.

The Society plans to play an active part and we will make a considered input to each one. We want our input to be based on the views of all radio amateurs, our Members and non-members, and so we will be setting up processes to capture your views.

Ofcom consultations under (a) and (b) above will begin in June 2013 and the consultative documents will be available on the Ofcom website, probably from the end of May. The July edition of *RadCom* (available mid-June) and our website will carry further information on the consultations, allowing Members a few weeks to make input to the Society and, if they feel appropriate, directly to Ofcom. A statement from Ofcom summarising the process and some of the background can be found below.

In terms of (c) we will provide further information as soon as we have more details from Ofcom. It is our intention to create a structured process for comments to be sent to the Society, and this will be announced in the July *RadCom*. Please do not send comments to us just yet – it is important that members are aware of the scope of the consultation before making input, and we will be establishing this with Ofcom very soon.

Past President Dave Wilson, M0OBW hands over the RSGB Chain of Office to Bob Whelan, G3PJT at the 2013 AGM.

I do hope that Members (and indeed non-members) will see this as a chance to make input to the Society, and also, if they so wish, directly to Ofcom, so that any proposals properly reflect the interests of UK radio amateurs.

GETTING ABOUT. After the past 16 months working for the RSGB as your Board Chair some have said that I need to get out more. By the time you read this I will have been at the ARDF Championship and, in June, I plan to be at the Camb-Hams evening, to be on the air during National Field Day, attend the FOC Dinner in Harrogate and be on the RSGB stand at Friedrichshafen. Of course, on 5 July I will be at the Centenary Day. I hope to have the use of GB4RS and be around on 40m from time to time. I also expect to visit some club meetings as time permits.

Bob Whelan, G3PJT
RSGB President

Ofcom Consultation - A Statement from Ofcom

Ofcom is planning a number of policy initiatives in the next few months that will have a direct effect on amateur radio in the UK. If you want to keep up to date, you can sign up for updates on the Ofcom website at www.ofcom.org.uk/static/subscribe/select_list.htm.

Public Sector Spectrum Release is part of a commitment by government to release 500MHz of public sector spectrum by 2020. As part of these plans, the Ministry of Defence is looking at releasing 40MHz of spectrum between 2350 and 2390MHz and an additional 150MHz of spectrum above 3410MHz for new civil uses. These changes will have implications for amateurs (notably TV repeaters) in the release bands and may also have an impact on uses in the adjacent bands from 2310 to 2350MHz, 2390 to 2400MHz and 3400 to 3410MHz.

Earlier this year Ofcom invited a group of amateur TV repeater users to Baldock to participate in testing to determine what the impact might be in the adjacent bands. Ofcom plans to publish a consultation for amateurs about any potential changes within the next month. This will be followed later this year by a statement giving amateurs reasonable notice of any licence changes necessary. Ofcom then aims to issue a full consultation in due course.

Ofcom is also to consult on the release of three tranches of spectrum in Band 1, Low Band and Mid Band respectively. One proposal is that 1MHz of Mid-Band (146 to 147MHz, so adjacent to the existing allocation in the 2m band) could be allocated to amateur radio. The consultation will be published at the end of May 2013. It will be aimed at all mobile users, including business radio, maritime, PMSE as well as amateur.

Finally, Ofcom wants to review the terms and conditions of the amateur licence. The current form of the licence has been around for seven years now and Ofcom is keen to ensure that it continues to meet its regulatory needs as well as the needs of licensees. The licence needs to be updated anyway to reflect the changes in allocations agreed at WRC12. That process is at an early stage and the consultation will be published early next year.

All of these consultations will result in changes to the amateur licence. To minimise disruption to licensees, Ofcom intends to effect all of the changes at the same time, probably in summer 2014.

RSGB Patron to attend celebrations

2013 marks the Centenary of the Radio Society of Great Britain (RSGB) and we are pleased to announce that our Patron, HRH Prince Philip, Duke of Edinburgh, KG, KT will be joining us for Centenary Day at the National Radio Centre. He will visit the NRC on 5 July 2013 and meet with Members and invited guests before unveiling a plaque to commemorate the Centenary.

A cross-section of the Membership have been invited to meet the Patron and every Member is invited to Bletchley Park to take part in the celebrations on 5 July 2013. Full details will appear in the July issue of *RadCom*.

GV Callsigns to be available by NoV

Ofcom has confirmed to us that the commemorative special prefixes GV, MV and 2V will be available for use from 5 July until the end of the month. You will be able to apply for your Notice of Variation (NoV) on the RSGB website nearer the time.

QSL Matters

G4H SERIES. Cards and collection envelopes for this group of callsigns are being transferred to Ian Fugler, G4IIY, who already handles adjacent callsigns. The current holder, Steve Harwood, is reducing his commitment, but will continue to handle the G4O calls as usual. See the sub-managers web list for details.

MORE ROYAL MAIL CHANGES. No increase in letter charges this year, but Royal Mail has changed the way in which it charges for packets and parcels. The Post Office appears to be adopting the industry practice of charging by 'volumetric weight'. Cost is now determined not by weight alone, but by a computation of size and weight together. This means it's no longer just the weight of your cards that determines the cost but also the size and how you pack your cards that counts.

Royal Mail now has 3 standard parcel sizes, Small, Medium and Large. Attention to detail when packing can now save you money. Packets and small parcels of cards can be more cost effective than several separate letters, but stray over from one packet size to another and it could cost you £3-£4 more to send your cards. Current advice is to stay under 2kg weight and a package size of less than 45mm x 35mm x 8mm – more details in *Our Prices – April 2013*, from the Post Office or online.

OVERSEAS MAIL. Our outgoing, overseas despatch prices will also rise this year by around 4-5%. In fairness to other users, members are asked to consider what they send to us. It is very helpful if users with more than 2kg of cards for a single destination country should send them direct to the overseas bureau and not to us.

New Licensee

While GB3RS was on the air from the National Radio Centre, EI6KH answered the CQ call. The operator, Chris, had just obtained his licence. He had visited Bletchley Park last August and while there also visited the NRC where he talked to two of the operators who were on duty that day.

They in turn sparked his interest in amateur radio and, on his return home to Eire, he studied for and has taken the exam to get his licence. That's the 3rd new licensee that we know about.

Region 1 RM

Following Len Paget's appointment to the RSGB Board, Jason, GM7VSB will be acting as the Region 1 Regional Manager with immediate effect. All e-mails should go to rm1@rsgb.org.uk.

CONGRATULATIONS

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

60 years	
Mr S R Walker	G3IYT
50 years	
Dr H M Brash	GM3RVL
Mr D M Browning	G3UEY
Mr J Garrett	G3RHP
Mr A R B Gordon	GM6RXQ
Mr R C Marshall	G3SBA
Mid Warwickshire ARS	G3UDN
Mr I M G Miller	GM4JAE
Mr B B Nelson	GJ4KBM
Mr M L Sufit	M5AHF

IARU Region 1 Interim Meeting

IARU Region 1 held its Interim Meeting in Vienna over the weekend of 20 April. The event provides a key opportunity to develop plans ahead of the next full Conference. The RSGB presented a total of 11 papers – three on HF matters and eight on VHF/microwaves. One other RSGB paper on the 30m band plan was withdrawn prior to final approval being sought from the RSGB Board. Representing the RSGB were Microwaves Manager Murray Niman G6JYB, and HF Manager Ian Greenshields, G4FSU. In total, 19 societies from Region 1 were represented at the meeting.

HF topics included preparations for the WRC15, which includes the possibility of a world-wide amateur allocation at 5MHz. Other proposals included trying to align some of the HF band plans between Regions and the DXpedition Code of Conduct, which is intended to raise operating standards. A number of other papers covered contest matters, support for newcomers via JOTA, operation of unmanned stations, and discussions on a possible band plan for the new 472-479kHz amateur allocation.

For VHF/microwaves, a total of 34 papers covered technical, operating, band planning and contest matters. Areas of focus were improvements to IARU Contests, and accommodating digital voice, beacon and TV developments. Band plans at 4m, 2m and 70cm came under particular scrutiny. Pressure on spectrum, notably at 2.3GHz, was also discussed. Several topics are expected to be further developed in time for the next Region 1 Conference in the autumn of 2014.

The minutes and recommendations of the Interim Meeting will be published shortly, once approved by the Region 1 Executive Committee.

GB4FUN

Four members of Sheffield ARC collected the GB4FUN trailer from Bletchley Park recently. Since then, a small group of their committee has been working extremely hard to get the trailer out at an event in the very near future. They are presently in discussion with various amateur radio equipment dealers to sponsor them, either through permanent loan of transceivers, antennas, etc or to cover some of the operating costs. The club also has an excellent, very secure, parking facility for the demonstration trailer.

A major event for the trailer will be the Sheffield Show in June at which they expect 10,000 visitors. The trailer, sporting its new callsign of GX3RCM, will be the radio communications centre for the whole event.

RSGB 2013 AGM

The Society held its AGM on 20 April and the following were elected Directors of the Board.

Phillip Brooks, G4NZQ
Stewart Bryant, G3YSX
Stan Lee, G4XXI

These join the previously elected members John Rogers, MOJAV, Graham Murchie, G4FSG and Len Paget, GM0ONX who, together with the President Bob Whelan, G3PJT, form the new Board.

A number of annual prizes and awards were given out after the formal AGM.

The Norman Keith Adams prize, awarded for the most original article published in *RadCom* in 2012 went to Harry Weston, M0SOP for his article Skin Effect in April 2012.

The Courtenay-Price Trophy, awarded for the most outstanding published technical contribution to amateur radio in 2012 went to Chris Trask, N7ZWY for Transformer Feedback Amplifiers.

The Ostermeyer Trophy, awarded for the most meritorious description of a piece of home constructed or electronic equipment published in *RadCom* in 2012, went to Ken Ginn, G8NDL for his article Digital HF VSWR meter.

The Bennet Prize, awarded for any significant contribution or innovation that furthers the art of radio communications, went to Chris Saunders, G4ZCS for the best antenna article published in *RadCom*, Novel NVIS antenna for 5MHz.

The Wortley-Talbot Trophy, awarded for the most outstanding experimental work in amateur radio, went to Phil Harman, VK6APH & Andrew Martin, VK3OE for Chirp Modulation.

The Founders Trophy for services to the Society went to John Dunnington, G3LZQ for his outstanding contribution to the Society over many years.

The Harold Rose Plate, awarded for outstanding contribution to 50MHz went to Justin Johnson, G0KSC for 50MHz aerial design and support of home constructors, DXpeditions, etc.

The Don Cameron G4STT Award for an outstanding contribution to low power amateur radio communication went to Peter Barville, G3XJS for his encouragement and support of QRP activity in the UK and EU, though his roles within the G-QRP Club

The Louis Varney Cup for advances in space communication went to Howard Long, G6LVB for significant contributions to amateur radio space communications (ARISS, STELLA software, XO-53 and Fun Cube 1 satellite payloads, FUNcube dongle).

The Fraser Shepherd Award for research into microwave applications for radio communication was awarded to James Miller, G3RUH in recognition of his lifetime contribution to microwaves.

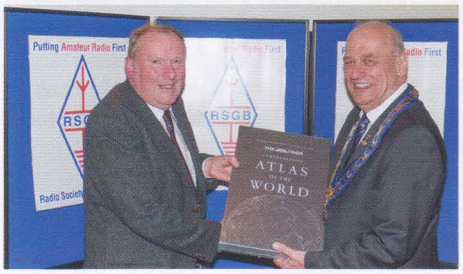
The 1962 Committee Cup awarded for outstanding amateur development at VHF/UHF went to Sam Jewell, G4DDK for preamp design at 70cm and above.

The Kenwood Trophy awarded for a significant contribution to training and development in amateur radio within the UK, went to Murray Ward, G3KZB for his work in developing and maintaining the *QADV* software that has been used by hundreds of Advanced students.

The Calcutta Key for outstanding service to international friendship was awarded to Bob Titterington, G3ORY for international friendship via ARDF.

NATIONAL CLUB OF THE YEAR. The prizes were awarded by Mark Francis from Walters and Stanton plc who were the main sponsors for the award again this year. 3rd place went to Warrington Amateur Radio Club in Region 3, 2nd place went to Newbury and District Amateur Radio Society in Region 9 and 1st place went to Lincoln Short Wave Club in Region 13.

The Ostermeyer Trophy awarded to Ken Ginn, G8NDL.



The Bennet Prize awarded to Chris Saunders, G4ZCS.

The Don Cameron G4STT Award went to Peter Barville, G3XJS.

The Louis Varney Cup went to Howard Long, G6LVB.

The 1962 Committee Cup awarded to Sam Jewell, G4DDK.

The Calcutta Key was awarded to Bob Titterington, G3ORY.

National Club of the Year 3rd place, Warrington Amateur Radio Club.

National Club of the Year 2nd place, Newbury and District Amateur Radio Society.

National Club of the Year 1st place, Lincoln Short Wave Club.

Thanks

"I would like to thank the RSGB team for the interesting and informative presentation on the RSGB centenary and the live demonstration of Earth Moon Earth communications to Ofcom staff.

"Jim Lee gave an excellent presentation that highlighted the amateur achievements over the first hundred years and how the regulatory scene has had to adapt to meet all the demands of radio use. The RSGB did a very good job representing what amateur radio is all about and how amateur radio has contributed to the evolution of communications and also come to the aid of communities in emergencies.

"The Earth Moon Earth demonstration by John Regnault showed how resolving minute signals can be achieved in quite hostile RF conditions.

"Thank you all very much and I hope that you will be prepared to come back another time and perhaps tell us more about the technological aspects of amateur radio."

Paul Jarvis
Head of Business Radio
Ofcom

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 Hillier, 2E0CRE
Mr N C Duke, 2E0FAS
Mr B Ramsdale, 2E0FYI
Mr G Russell, 2E0LER
Mr A Carney, 2E0YDT
Mr A J Bernard, 2M0AKV
Mr R G Dement, AA2QQ
Mr J Alderman, G0URK
East Lancs RC, G4ELR
Mr C S Williams, G4GKY
Mr P E Hemming, G7AHH
Mr R Thomson, G7RFO
Mr H R Goodwin, G8FXD
Mr C Gregory, G8GYY
Mr A Prescott, G8TLQ
Mr PJ Robinson, G8XXE
Mr J C Ramsay, GM3OQI
Mr M Walter-Oester, HB9HVG
Mr P Slugg, K4PHS
Mr R Baron, KB1YFH
Mr R Rigdon, KD8ADO
Mr S C Biczak, KE7JIP
Mr T Kirby Jr, KJ4FUU
Mr G A Hatt, M0HEJ
Mr J Young, M0JBY
Mr M Voyzey, M3VZY
Mr J Barker-Gunn, M6AIT
Mr D B Blackmore, M6BJL
Mr A Fisher, M6CCH
Mr T Molloy, M6CIH
Mr T Crew, M6CLH
Mr S A Collins, M6CQK
Mr R Flevill, M6CRR
Mr D Kirkden, M6DES
Mr D R Easden, M6DTA
Mr D Thurman-Newell, M6DTN
Mr K Sim, M6EYR
Mr D Smith, M6FWY
Mr M Penrose, M6GSI
Mr R J Olive, M6HQO
Mr I Hrynkiewicz, M6IAH
Mr I Habbs, M6ILH
Mr M A B Noblet, M6ILO
Mr J Rogers, M6JRG
Mr A K S Bond, M6KSB
Mr T Ashton, M6MFI
Mr S O'riordan, M6MPS
Miss N Punjabi, M6NPP
Mr C Edwards, M6RCP
Miss R Lowe, M6RCX
Mr D Willetts, M6SCU
Mr S Cotton, M6ZSC
Mr J G Morrison, MI6MKI
Miss S J McCormick, MI6YLT
Mr J Bryant, MJ6DEY
Mr C McGowan, MM0NDX
Mr I Colborn, MM6JDN
Bushvalley ARC, MN0GKL
Mr P Randall, MW0PDR
Mr R Murphy, MW3CEV
Mr C Osbourne, MW6CQO
Mr S K Rogers, MW6SKR
Mr T E McCabe, N2AXX
Mr G Riesenhuber, OE3SUW
Mr I Gurney, OH3FYN
Mr R Boute, ON4DBV
Mr A Pulman, RS213031
Mr R Allen, RS212284
Mr T I Peck, RS212574
Mr R T Uren, RS212675
Mr R Weightman, RS212684
Mr J Halpin, RS212852
Miss T Wilson, RS212897
Mr S Ram, RS212907
Mr S J Clarke, RS212917
WAARG, RS212930
Mr G Waldron, RS212952
Mr R N Mather, RS212967
Mr R Fisher, RS212987
Mr N R Mayes, RS213005
Mr M H Beecroft, RS213010
Mr E Beechill, RS213034
Mr W Buczkowski, RS213046
Master J S Clayton, RS213050
Mr T Evans, RS213057
Mr J Organ, RS213074
Mr S Wangefors, SM4YBA
Mr J Corriveau, VE2FDJ
Mr L Laquinto, VK3LI
Mr P Newman, VK4APN
Mr N Dennett, ZS6CVF
Mr J Wilhelm, ZS6NUL

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

Mr A C Brown, 2E0VPX
Mr B Lequeu, F1MPE
Mr W P Drea, G0CBU
Mr K W Porter, G0FEX
Mr M T Francis, G0GBY
Mr P Hunter, G0GSZ
Mr M S Johns, G0GZM
Mr R C Hurt, G0HDS
Mr C F W Martin, G0NJM
Mr J Voyzey, G0ROK
Mr G D Forde, G0VXY
Mr M A Clark, G1JBM
Mr G D Dancer, G1VLS
Dr W Redman-White, G3XSH
Mr G D Edy, G4AXD
Mr B W Macklin, G4BHE
Mr M D Dubery, G4EZR
Mr R M Heron, G4FBC
Mr M P Dixey, G4OSU
Mr T H Tallis, G4UUQ
Mr P Berwick, G6CKZ
Mr P Andrews, G6MNJ
Mr A S Ramsdale, G7GNM
Mr R Prew, G8EPQ
Mr A Lambert, G8HER
Mr M L Hayward G8KYT
Mr A V Fribbens, G8MLQ
Mr M Bilkey, G8MNC
Mr C Jarvis, G8YJT
Mr A M L Fegen, GM0LYT
Mr M Owens, GW4XMC
Mr D M Goonan, KV1Y
Mr C R Chadburn, M0BCH
Mr J Clarey, M0CGR
Mr M R Austin, M1NIZ
Mr M Daniels, M3ZZA
Mr M K Wootton, M5MKW
Mr K White, M6KMW
Mr T E McCabe, N2AXX
Mr J R Witmer, W3RW
Mr D G Ewing, WB9PHQ
Mr J L Scott, WK3N

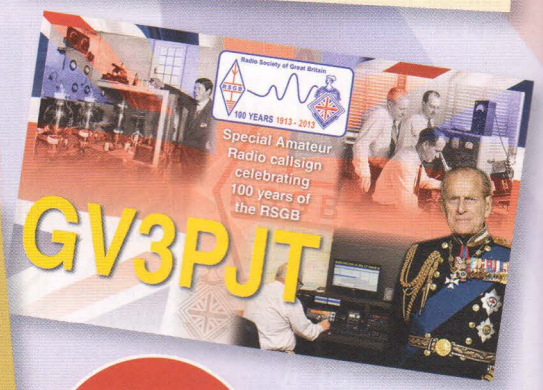
RSGB Centenary

RSGB Members Only Products

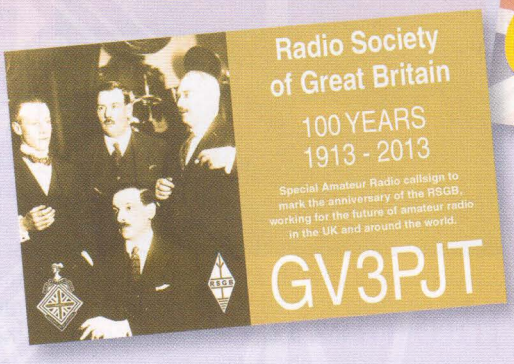
RSGB Centenary QSL Cards

The RSGB are pleased to offer special QSL cards celebrating the RSGB Centenary. The special V suffix will be in use from the Centenary day on the 5th July to the end of the month. There is a choice of three specially designed cards that are only available to RSGB members. If you are planning to use the 'V' callsign, this is an economic way to produce special cards to mark your support of the RSGB and our Centenary.

These standard size QSL cards are personalised with your special callsign and glossily printed in full colour on a high quality 250gsm card. The back of the card is also personalised with your special callsign, station address and IOTA reference (if required). This is black only print onto a matt white finish which is easy to write on or adhere labels to. These cards are only available via the RSGB and are produced by FDS Cards on our behalf.



This offer is also strictly limited to RSGB members, who may buy personalised cards for their own use, at only £10.99 for 100 cards plus £1.00 post & packing (larger also quantities available).



From £10.99 (plus P&P)

See our website www.rsgbshop.org for larger images and full details.

RSGB Centenary Ties

This new RSGB tie has been specially commissioned as part of the Centenary Celebrations. The tie is top quality and made from 100% pure silk. The design features both the 1920s RSGB logo and the current one in an attractive blue, gold and red pattern. As with all RSGB Centenary items we will be limiting production of this item so please order early to avoid disappointment

- 100% Pure Silk
- Fully lined
- Embroidered RSGB logos
- Unique Luxury Design
- Available to RSGB Members only

Price £12.99 each

RSGB shop

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

Centenary Construction Competition

THE AIMS. The Centenary Construction Competition is to encourage home construction, experimentation, design and innovation across the RSGB Membership. It aims to produce projects that show what radio amateurs can achieve and that could appear in *RadCom* to encourage further home construction. Judging will take place at the RSGB Convention in October and there are some excellent prizes available.

ENTRANTS. Entrants must be Members of the RSGB and all entrants must agree for their projects to appear in *RadCom*. Please note that assistance in preparing any articles will be given by *RadCom* editors so you don't have to worry about that when starting your project. Entrants need to register their intent to enter the competition before the end of August 2013 – see www.rsgb.org/constructorregister.

PROJECTS. Projects must have an amateur radio context and can be based on hardware, software or a combination thereof. So you could design a receiver, transmitter, transceiver, aerial, instrumentation, test equipment, etc. Projects should have been home-constructed, tested, complete and working; source code for any specially written software must be open and be freely available. Only readily available components should be used and sourcing information for any unusual components must be available should your project be published in *RadCom*. Projects should not have been commenced prior to the start of the Centenary year – ie not before 1 January 2013 – and original designs should not have been published elsewhere.

CATEGORIES. Three Categories of entry are available:

a) **Builders:** This is aimed at those getting started in home construction using relatively low cost projects. Kits may feature, either as a part or the whole of the project. An upper limit of £100 is placed upon the final build of the project. Credit for simplicity of design, where appropriate, will be given for projects that come in well below that spend limit. For kit builders, credit will also be given for personal additions, modifications or finishing touches.

b) **Designers:** This is where we will be looking for evidence of novel design, reproducibility and quality of construction. The size of the project will not necessarily determine the winner; a clever but simple project could well catch the eye of the judges. There is no spending limit within the rules.

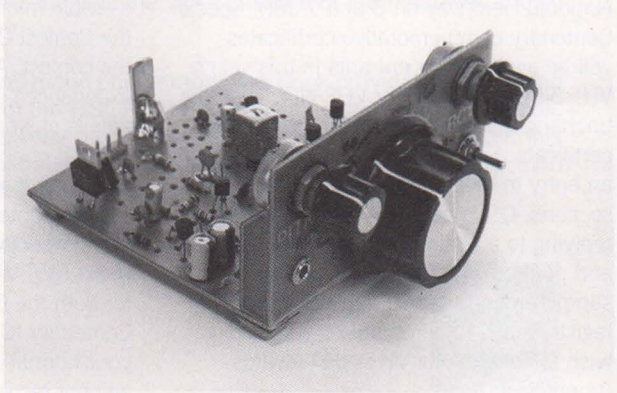
c) **Pi Users:** This category is reserved for a design where we expect to see originality and ingenuity to create something outstanding using the Raspberry Pi computer along with a significant hardware element.

This is a fitting way to mark our Centenary, where we might later use this part of the competition to show the professionals that radio amateurs are still able to use their 'freedom to innovate' with something as simple and cheap as the Raspberry Pi.

The judges reserve the right to ask for a demonstration. Members may enter more than one project, and all entries need to have stipulated into which category the entry is to be entered.

Entries must be displayed for judging (and be demonstrated, if required) at the RSGB Convention in October 2013. Attendance at the Convention is not essential but entries can be posted in (to arrive no later than the end of September 2013), or brought and demonstrated by a proxy.

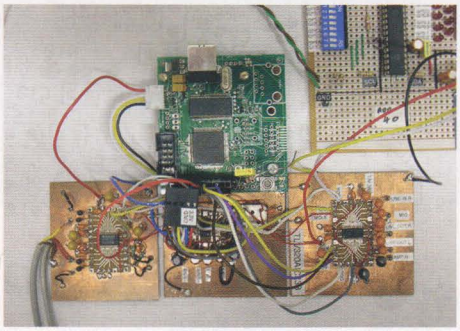
Members will be responsible for any loss of entries during transit; the RSGB will accept responsibility for entries whilst on display and during the judging at the Convention.



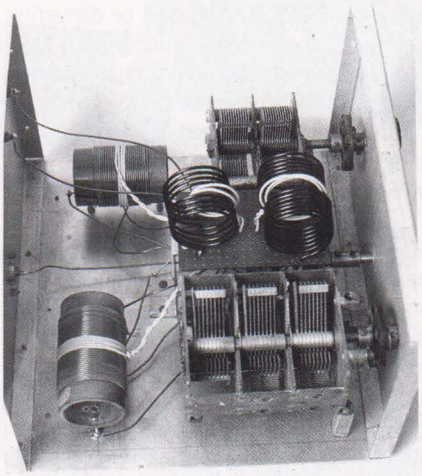
Using PCB material to make a project case could be a good finishing touch.

CRITERIA. For the Builders category, all the marks are gained by the quality of construction. In the Designers category, 30% of the marks will be for quality of construction, 20% for the reproducibility of the design, 10% for innovation and 40% for the application of the design. Finally, in the Raspberry Pi section, 30% of the marks are for quality of construction and software, 15% for the reproducibility of the design, 40% for innovation and 15% for the application.

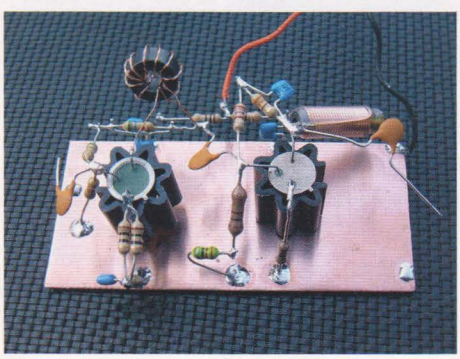
PRIZES. The winners in each category will receive plaques along with cash and other valuable prizes.



A project of your own design could be entered in the Designers category.



Radio amateurs have a long traditional of home made equipment.



Even a simple project is worth entering.

Centenary Celebrations

CENTENARY DAY 5 JULY. It is with great pleasure that we heard the Palace announcement, early in May, that HRH the Duke of Edinburgh, KG, KT, and Patron of our Society, will be attending the celebrations on Anniversary Day, 5 July, at Bletchley Park. The day's events will be in full swing when Prince Philip arrives in the afternoon. We plan for him to visit the NRC and other activities as well as meet a number of our Members and invited guests, before unveiling plaques to commemorate our Centenary as well as the work that the Voluntary Interceptors undertook during WWII.

VOLUNTARY INTERCEPTORS. The role of the 1,500 or so volunteer amateurs has not received much public recognition so it will be a fitting tribute for the day and Bletchley Park is finding an appropriate location for the plaque. As mentioned in last month's article Bob King, G3ASE, will be delivering a lecture in the Mansion during the morning on the work of the Voluntary Interceptors, giving us all a perspective on this vital wartime role that resulted from a request being made to the Society at the outbreak of the Second World War.

AERIAL CIRCUS. Some of you will have seen Terry Giles, G4CDY recreating the famous Aerial Circus of Dud Charman, G6CJ at the recent AGM. I think all who saw his modern approach to recreating the hardware will agree that he has done a first-rate job, and we can look forward to an interesting and thought provoking lecture on the Friday morning. For some, it will be a nostalgic event, as Dud travelled the country for many years with his 'circus' that was initially developed to help 'kick start' interest in amateur radio after the WWII.

BUILDATHON. As I reported last month, throughout the day there will be a Buildathon running. We are involving teenagers from nearby schools to participate in these events and plan some pre-learning and follow-up work within the two schools. Members and friends will be able to watch progress of the Buildathon, with a view of taking the ideas away for use in their local area. We will be taking the school children on the DF hunt in the morning.

AMATEUR RADIO DIRECTION FINDING. There will be an opportunity to try your hand at DF hunting in the grounds of Bletchley Park. Members and their friends are encouraged to come and have a go; no previous experience will be required! We will provide all the equipment needed and any help to get you going.

A DAY OUT. Bletchley Park opens at 9.30am and, even without our events, is a good day out. Next month there will be details of a special voucher that can be obtained from the RSGB website to allow free access to Bletchley Park (and car parking) for our Members. Family and companions of visiting Members will be able to visit the NRC for free, but will be required to pay the Bletchley Park admission fee if they wish to visit the rest of the site.

CENTENARY DINNER. We have been able to extend the booking deadline for the Centenary dinner to be held in the evening of 5 July at Horwood House. With around 100 guests booked, the remaining places are limited. To book any of the remaining places go to www.rsgbshop.org. Those who have already booked will be pleased to know that in addition to an after-dinner speech from Professor Peter Cochrane OBE, G3RVC we have engaged the services of Steve Dean to entertain guests during the early part of the evening with his close up magic. Regular visitors to the RSGB Convention will have seen Steve's brand of magic before as he is a popular part of the gala dinner. If you have already booked and would like to reserve a table for your group, please e-mail elaine.richards@rsgb.org.

LOOKING AHEAD. BBQ on the Air takes place around midday on Saturday 6 July and full details can be found on the RSGB website at www.rsgb.org/bbqontheair/. A reminder about the Centenary VHF National Field Day on 6 and 7 July. Special Centenary commemorative certificates will be available for entrants in this year's VHF NFD. The rules for VHF NFD itself are unchanged. To receive a commemorative certificate. Fixed stations should submit an entry to VHF NFD in the FSO or FSR sections. QSOs can only be established by replying to a station calling CQ (ie search and pounce). Portable stations should submit an entry to VHF NFD (no prior registration is required unless you also wish to compete for VHF NFD Awards (trophies etc)).

Stations may be worked once on each band. The total score is the sum of points on each band. To qualify for the Centenary Award a minimum of 100 points (post adjudication) must be gained, at least 50 of which must be for contacts with UK stations.

Each QSO will be scored as: 50MHz: 3 points; 70MHz: 3 points; 144MHz: 2 points; 432MHz: 4 points; 1296MHz: 5 points.

Logs should be scored as per normal RSGB rules: the adjudicators will calculate the award score for you.

There will be a Centenary Toast at the Hamradio show in Freidrichshafen, Germany, at 5pm on 28 June. All Members are welcome to join RSGB volunteers and staff on the RSGB stand in Hall A1 to celebrate the continued health of the RSGB.

Special Centenary commemorative certificates will also be available to all participants in July's RSGB IOTA contest on 27 and 28 July. To qualify, make 100 QSOs along with 20 multipliers (post adjudication). This is not too difficult for seasoned contesters, but the emphasis from the committee will be attracting newcomers and those who currently enjoy only the weekday 80m contests.

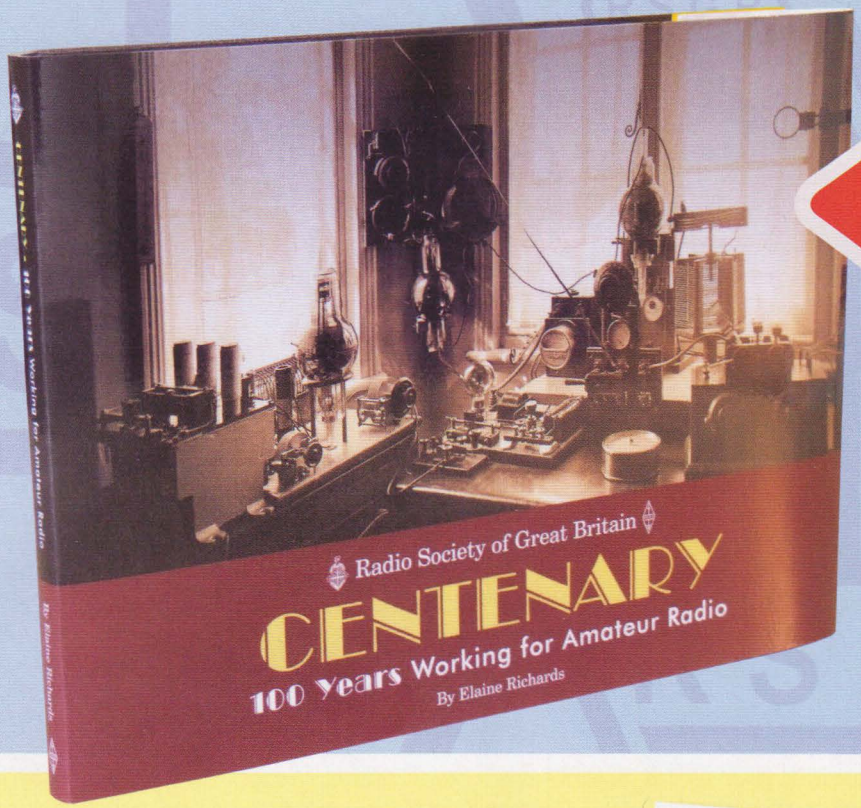
More information will be published on the Contest Committee website nearer the contest. A page of guidance for less-experienced entrants will also explain the details of what happens in this contest, and the sort of aerial that might be suitable for achieving the award.

The Contest Committee Chairman has mentioned that whilst the use of the special prefix (GV, MV and 2V) is within the rules, for both the Centenary VHF NFD and the Centenary IOTA contest, his advice is to use your normal callsign as many participants will not recognise the GV callsign and it could slow down some of the serious contest entries.

Terry Giles, G4CDY demonstrating the Aerial Circus.

RSGB shop

P&P FROM FREE
see page 76 for full details



NEW

E&OE All prices shown plus p&p

Centenary

100 Years *Working for Amateur Radio*

By Elaine Richards, G4LFM

As part of the Centenary celebrations the RSGB has commissioned and produced this special hardback book looking at 100 years of RSGB History. In its first century, the RSGB has represented the interests of members at national and international level and provided the framework within which the early pioneers and experimenters thrived. *Centenary* outlines the first century of activity of the RSGB and its members.

Centenary is a peek at the history of the RSGB, which is a rich tapestry indeed. The stories gathered together here provide a glimpse of the people behind the organisation and the way they have shaped the history of the Society. It would have been impossible for *all* the stories, famous names and events from the first 100 years have made it into print. Nevertheless, this collection of events gives a flavour of the RSGB history and the hobby it supports. From the first days and its initial membership of four, through two World Wars to a new Millennium, the RSGB's membership have taken part in propagation experiments, pushed the boundaries of radio and electronic knowledge and shown what international amateur radio relations is all about. Whether it's proving that VHF communications is more than line-of-sight, showing the world how far radio signals can travel or putting satellites into space, radio amateurs have been involved in it all. *Centenary* brings together some of the best achievements and tells the story of some of the most well known names in amateur radio history.

Packed with over 200 colour and mono photographs this book provides a fascinating insight into the life and times of the RSGB. Produced as a quality hardback book, with a glossy slip cover and glossy paper throughout, to bring out the detail, this book is exceptional. If you would like a part of the RSGB centenary celebration then *Centenary* will grace any bookshelf.

ISBN: 9781 9050 8689 4, Hardback
Size: 300x225mm (landscape), 144 pages

Non Members: £19.99
RSGB Members: £16.99

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

QRP

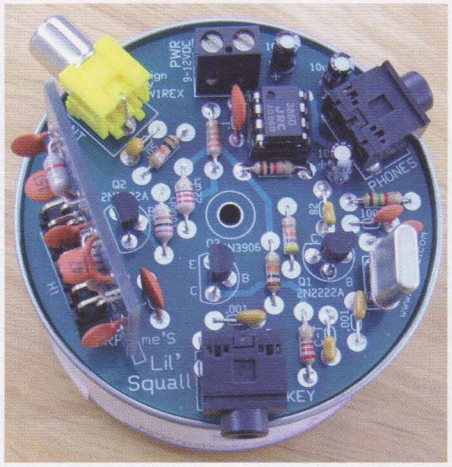
QRP kits and projects

THAT REMINDS ME... Recently I received an e-mail from Dave Joseph, W7AMX, about the Pixie-2 transceiver kits available in the USA. For some years Dave had been producing Pixie-2 kits to be sold by HSC Electronics, some 4,000 kits over the years. Dave has moved house and in future the kits will be made in-house by HSC Electronics (www.halted.com/). The complete kit, with 2 crystals, is available for $9.95. The Micro-80 Transceiver, the forerunner of the Pixie, is now 21 years old. So... what are the Pixie and Micro-80?

It is a long story but I will shorten it as best I can. In 1992, I received a letter from Russian QRP operator Oleg Borodin, RV3GM, enclosing a circuit idea for *SPRAT*. It was called the Micro-80; the simplest and smallest transceiver. The circuit was published in the summer issue and spawned a whole series of follow up ideas. The circuit was interesting in that the same bipolar transistor served as the power amplifier for the transmitter and the mixer for a direct conversion receiver. This was not entirely new as the same arrangement had been described by George Burt, GM3OXX. As far back as the summer of 1983, *SPRAT*, the journal of the G QRP Club, published a design by GM3OXX entitled 'The FOXX Mini-Transceiver – a complete transceiver on a 2" by 2" printed circuit board'. The FOXX also used the same bipolar transistor for the transmitter amplifier and the receiver mixer.

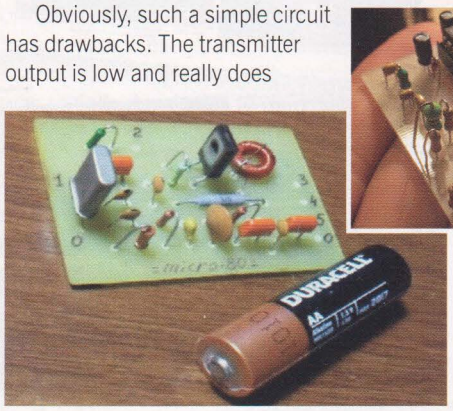
MICRO-80 CLONES. In describing the Micro-80 transceiver, RV3GM writes, "When the circuit of Micro-80 was published in *SPRAT* 72 (1992), it was probably the smallest workable transceiver in the world. Using only 19 components on a 55 x 35mm PCB it gives 200 – 300mW of RF output. The direct conversion receiver is sensitive enough for any station likely to be workable."

Obviously, such a simple circuit has drawbacks. The transmitter output is low and really does require extra harmonic filtering after the power amplifier tuned circuit. The receiver is very basic. All of the receiver gain comes from the audio amplifier and this is only enough to hear stronger signals, although these are probably the ones that would be contacted with such low power. The chief problem is the lack of selectivity; the ability to sort out the required signals in favour of the unwanted signals. The only frequency selective element is one tuned circuit and unwanted signals, especially strong broadcast signals, are likely to break through. But having said all that, it *is* a complete radio station. It is simple and easy to make and it can be fun to use. It certainly inspired other circuits.



Lil' Squall with plug-in modules for band changing.

The Pixie is the Californian version of the Micro-80 designed by Dave Joseph, WA6BOY, from RV3GM's idea. In the Pixie, a low-pass filter replaces the single tuned circuit and the audio amplifier becomes an LM386 audio amplifier chip. Both of these changes offer considerable improvement of the circuit. Very quickly the Pixie was updated to the Pixie-2 by Derrick Webber, G3LHJ, to give frequency offset between transmit and receive. Then that doyen of home construction, Doug DeMaw, W1FB, submitted his version of the circuit with offset and audio filtering. Versions of the Pixie-2 proliferate to this day. Six have been in *SPRAT*.



The Micro-80 transceiver is now 21 years old. Inset: The Pixie is the Californian version of the Micro-80.

Although still very basic, the Pixie-2 and its clones are better designs and more viable on the air. Sverre Holm, LA3ZA, who lives near Oslo, reported successful results with a Pixie-2 on 80 metres in his blog. He writes, "My first contact was made with LA3NCA. On the third attempt I was able to tune my frequency so that he could hear my response, resulting in a 569 report over a distance of 30km (!). I thought that was about as much as I could get out of a few hundred milliwatts. But I was lucky one weekend in the spring and stumbled upon a contest in the 80m band. To my astonishment I have now contacted many other countries with it: Sweden (SM5 and SM6), Denmark (OZ), Finland (OH1), several German stations (DL), Estonia (ES), Latvia (YL), Lithuania (LY), Kaliningrad Russia (RV2), Poland (3Z), Czech Republic (OK), Scotland (GM), England (G), Belgium (ON), the Netherlands (PA). My record is TM5Y on the Island of Yeu, south of Brittany in France – almost 1700km and with 0.3 watts; this is 3473 miles per watt".

THE LIL' SQUALL KIT. Rex Harper, W1REX, runs a company called QRPme that specialises in producing small QRP type kits mounted in tuna tins. This rather singular pursuit has produced some interesting and popular kits. See www.qrpme.com/. Not least of these is the Li' Squall; an update of the Pixie-2 with plug-in modules for band changing. Rex writes, "It is designed to be a tinkerer's delight. It fits in a small personal size tuna can, has a top quality silk-screened solder masked PCB with plated through holes. I studied a lot of online comments about why the Pixie works, why it doesn't, what to fix, etc and made a bunch of mods that will allow the builder to have a lot of play value. There is a socket for the final transistor for easy experimenting with output power. Likewise, the feedback capacitors in the oscillator circuit also have sockets making it easy to experiment with new bands. The crystal also has a socket for easily moving the operating frequency about a band. The low pass filter on the output is on a readily changeable band module so the Lil' Squall can be moved about the bands quite easily.

So twenty years after the original Micro-80 design by RV3GM, the circuit is still around in various forms and still being built. It is not too unfair to say that most versions are easier to build than to use, but many radio constructors have had a lot of fun over many years.

THE G QRP CLUB CONVENTION. The 2013 G QRP Club Convention (in conjunction with the Halifax Radio Society) will be held at the Rishworth School in Ripponden, West Yorkshire (HX6 4QA) on Saturday 20 October. It opens at 10am and has all the usual annual attractions. The trade stands specialising in electronic components, QRP kits and surplus equipment with a full programme of lectures on QRP related subjects form the backbone of the event. As in previous years, there will be a 'Constructor's Evening' on the evening before the convention. This will include homemade equipment 'show and tell' and a Buildathon where beginners can build a practical radio project under the guidance of more experienced radio constructors. Details can be found in *SPRAT*, other amateur radio magazines and at www.gqrp.com.

KENWOOD

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- Peter Hart

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TS-990S
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- Dual receivers for simultaneous reception on two different bands
- Newly developed mixer that helps to achieve +40 dBm IP3[1]
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- Dual TFT display configuration allowing an intuitive grasp of conditions

[1,2] Main RX only. [2] plus space for an optional filter

[Other functions] •Newly developed dividing PLL that divides high frequencies and achieves a high C/N ratio •Transceiver equipped with ±0.1 ppm TCXO, which has a high degree of stability yet still conserves energy •Advanced AGC combining digital and analogue technology •Functions for eliminating various types of interference and noise •Built-in automatic antenna tuner that enables high-speed operation •Twin cooling system that circulate sufficient airflow internally

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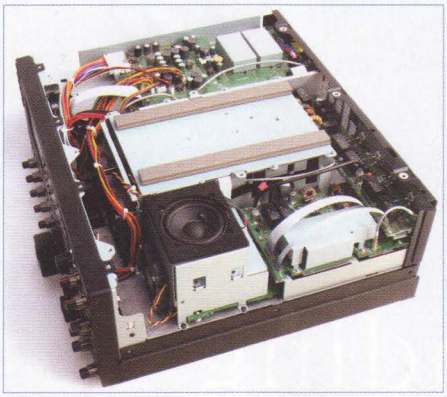
*Alterations may be made without notice to improve the ratings or the design of the transceiver.
*The photographic and printing processes may cause the coloration of the transceiver to appear different from that of the actual transceiver.

www.kenwood-electronics.co.uk

Kenwood TS-990S

New flagship HF & 50MHz transceiver

INTRODUCTION. During the latter months of 2010, Kenwood launched the TS-590S mid-range base station; this was their first new HF transceiver for over seven years. Building on the features of this radio now comes the TS-990S, Kenwood's new flagship top-end radio, offering the very highest in performance and a most impressive level of functions, user control and information display. As a large mains-powered base station delivering 200W output power with dual independent receivers it is targeted as a top-flight DX and contest radio.



Kenwood TS-990S with cover removed.

BASIC FUNCTIONS. The TS-990S is certainly large, measuring 460mm(w) x 182mm(h) x 449mm(d) and weighs about 25kg. The radio contains dual receivers, main and sub, both tuning 30kHz to 60MHz. They can operate independently over the whole tuning range although the performance is not specified over the full range. The transmitter is enabled on the amateur bands and delivers nominally 200W output power. In the UK, transmit operation on 5MHz is not standard out of the box but can be enabled by Kenwood dealers. A low level drive output is also provided giving about 1mW transmit signal on the 136kHz band as well as transverter drive from any of the HF bands. As with the TS-590S, the low level LF transmit range can be extended to cover 100 – 522kHz with a dealer modification, useful for the 475kHz allocation.

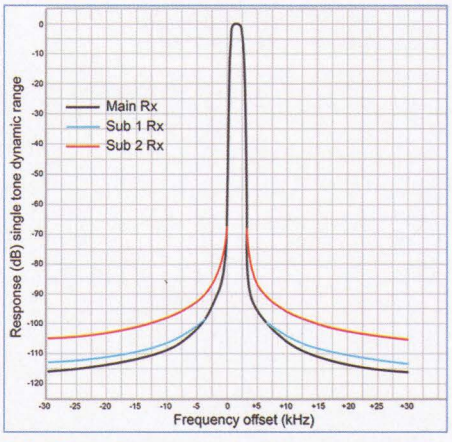


FIGURE 1: Composite selectivity curve on USB.

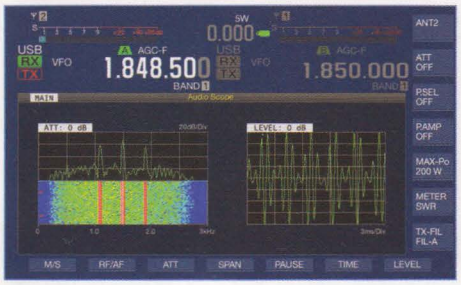
Individual buttons select the bands with a band memory where 1, 3 or 5 last used combinations of frequency, mode and other settings is returned for each press of the band key. Individual buttons also select the usual modes with both sidebands available on CW, FSK and PSK, and wide or narrow deviations on FM. A data button selects data mode on SSB and FM when interfacing to PC applications via the sound card and the various shifts and bandwidths are all settable. Modes can be selected automatically according to band plans by setting up a mode-frequency map, and CW transmission whilst on SSB can also be enabled.

The front panel is quite complex but well laid out, with most functions directly accessible from front panel controls in a logical way. The rear panel is fairly uncluttered. There are four antenna sockets and separate in/out sockets to connect a separate receive-only antenna, a separate receiver, transverter or extra front end filters. The antennas can be named on the panel display. Twin key jacks, one on the rear panel and one on the front, are each configurable for different keying arrangements. A 13-pin DIN connector provides audio and interfacing lines for the datamodes and other accessories, and a separate DIN connector is used for linear amp control. This provides control for both fast QSK linears and older style slower linears that need higher voltage or current control. Menu items allow separate switching characteristics for HF and 50MHz but there is only one linear control line. A dedicated connector interfaces to the AT-300 external ATU but there is no separate direct access to band data. Separate external speaker sockets provide output from the two receivers.

There are two USB-A connectors on the front panel to connect a USB keyboard or external memory and a USB-B connector on the rear, primarily for computer control and audio lines. The usual 9-pin D connector COM port is provided, a LAN Ethernet connection, optical audio input and output lines, a DVI connection for an external display and a socket to connect external analogue meters. The meter connection is identical to the Icom IC-7800 and allows external units such as the LDG DM-7800 to provide dual large S-meters and multiple simultaneous metering on transmit.

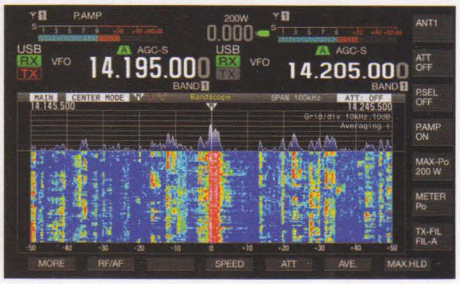
The menu system is extremely comprehensive, with over 200 items in the main and sub menus, with every conceivable parameter available for user selection and adjustment. The high resolution display makes access easy, straightforward and unambiguous. Many parameters are adjustable via bargraphs and other forms of graphical displays. Two entirely separate sets of parameters may be stored, configuration A and configuration B. This can be useful for optimising different operating environments such as contesting and local rag-chewing or for field day operation where two operators have different preferences for the way the radio is set up. Configurations and message stores can be saved to external USB memory. Quick access to commonly selected menu items or many other settings including some otherwise inaccessible functions can be assigned to any of the programmable keys. There are two programmable function keys on the front panel, one is rather obscurely placed, and a further two if keys are reassigned. A further eight keys may be accessed via a (home constructed) keypad connected via the rear panel. The up / down keys on the microphone can also be reassigned for this purpose and a further four with the MC-47 microphone. My preference is to allocate one function key to enable TUNE.

There is no microphone provided as standard with the radio but Kenwood have a range of compatible hand and desk



AF scope screen.

IF filter set-up screen.



Main display with bandscope and waterfall.

microphones. The SP-990 external speaker accessory is useful, particularly if the radio is set into a console or has other units on top. It only has a single speaker but includes additional audio tailoring. The instruction manual is huge and although written in a compact style, there are so many features and functions to describe that it runs to nearly 300 pages. Generally it is fairly clear and quite a triumph of writing in itself. At the time of this review, manual revisions were still on-going prior to release of the final version. There are no technical descriptions but circuit diagrams are provided and a separate PC Control Command reference manual is available downloadable from the Kenwood website. Here can also be found updated versions of the instruction manual, firmware upgrades and other relevant software. Another useful website for information is the G3NRW TS-990S Resources Page.

DISPLAYS. The radio uses two full-colour LCD panels that are particularly clear and bright with good viewing angles. The larger 7-inch main display indicates frequencies, S-meters and status messages for both main and sub receivers at all times. The main meter can emulate an analogue style or bargraph format and the sub meter uses a bargraph. The lower part of the display is used for a variety of purposes including a high resolution spectrum scan, message panels for the RTTY and PSK decoders and for menu access and setup, graphical displays used in the various setup screens and memory channel listing. The display is touch sensitive when displaying spectrum scans and will tune the radio to the touched area.

The smaller 3.5-inch sub display is located immediately above the main tuning drive and enables frequencies to be displayed and read with minimum eye movement. It also indicates the audio spectrum overlaid with full details of the channel bandwidth setting, including notch filter placement. On data modes it provides a useful tuning indicator, an X-Y scope on RTTY and a vector scope on PSK.

For retro addicts or those with fond memories of the tuning scales of the past, the smaller display can emulate the dial ring of an analogue mechanical drive and, in SWL mode, the main display can emulate the string driven ribbon scale of classic short wave receivers such as the Trio 9R-59.

Overall there is far more information presented in such a user-friendly way than by any other radio to date.

RADIO DESIGN AND ARCHITECTURE. The main receiver in the TS-990S follows current practice for high performance radios away from upconversion to a low IF and a suite of roofing filters. The first IF is 8.248MHz with roofing filters of 270Hz, 500Hz, 2.7kHz, 6kHz and 15kHz fitted as standard, selected either manually or automatically according to mode and channel bandwidth. There is provision for a sixth user-fitted filter. The second IF is 24kHz to feed the DSP for all subsequent processing.

The sub receiver adopts the same architecture and circuitry as the TS-590S. On certain amateur bands (160, 80, 40, 20 and 15m) and with bandwidths less than 2.7kHz, the receiver converts to an IF at 11.374MHz with 2.7kHz or 500Hz roofing filters and then to 24kHz for DSP processing. Over the remainder of the tuning range or wider bandwidths, the sub receiver upconverts first to a 73MHz IF with a 15kHz roofing filter, then via 10.7MHz with 15kHz, 6kHz or 2.7kHz filters and finally to 24kHz.

Separate 32 bit floating point DSPs for the main and sub receivers are used to provide IF channel filtering, demodulation, noise reduction, audio processing and AGC functions. On FM, separate FM ICs perform demodulation and pass audio to the DSPs. On this mode the DSP is used purely for audio filtering functions. A third DSP is used by the band scope.

The main receiver uses a switching first mixer and 15 input bandpass filters to cover the total frequency range, relay-switched on the five key bands and diode-switched on the remainder. A tuneable preselector may also be enabled to further reduce out of band signals. The sub receiver uses a quad arrangement of MOSFETs in both first mixer signal paths together with 13 diode-switched bandpass filters. Both receivers use switchable bipolar preamplifiers in the front end with nominally 12dB gain up to 21.5MHz and 20dB gain above and switchable attenuators for really strong signal situations. The local oscillator feed for the main receiver uses a PLL / DDS combination at VHF and a divider to achieve low phase noise. A 0.1ppm TCXO reference ensures high stability and accuracy and is available as a 10MHz reference via a rear panel connector to drive other equipment. Alternatively the radio can operate from an external reference. The transmit signal path uses the upconversion sub receiver frequency scheme in reverse.

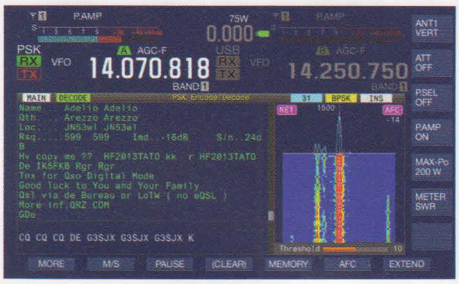
The radio is solidly constructed with shielded modular units around a substantial diecast frame, well packed there is a lot to this radio. The PA has a large finned heatsink and a total of five internal fans keep the radio cool. These are fairly quiet with variable speed and only operate when the temperature rises, which is rarely under normal use. A single 7.5cm speaker fits in the case top.

RECEIVE FEATURES. The radio is fitted with a 60mm diameter main tuning drive, weighted and smooth in operation. The sub tuning drive is 33mm diameter and also smooth. With 1000 steps per revolution and 10Hz steps, both combine precise tuning with fast frequency navigation. Fine-tuning at one tenth of these rates is selectable and lower steps per revolution if desired. Rapid tuning in a variety of mode dependant step sizes is performed by a small click-step rotary control, MULTI, also used to select menu items, memory channels and other functions. The frequency may be entered directly using the band keys as a numeric keypad and a history list of the last 10 frequencies entered this way is stored for rapid recall.

Selecting and swapping between main and sub receivers and split frequency operation are all simply performed. Both the main and sub receivers are equipped with similar functions with separate sets of controls for both receivers and these are logically grouped. With stereo headphones or external dual speakers, the receiver outputs can be kept separate or mixed to any degree (but not of course on the single internal speaker).

RIT and XIT are both provided and an auto-tune feature fine tunes the receiver on clear signals to give the correct CW pitch. There are 120 memory channels with ten for storing programmable scan limits. A host of very friendly memory access and related features are provided including name tagging and scrolling access via the display.

Main display with bandscope.



PSK decoder screen.

A separate quick access memory is included, with up to 10 channels stored. The usual comprehensive scanning is provided between frequency limits, across memory channels or groups. Three AGC speeds are selectable, each with a programmable decay time constant; AGC can also be switched off.

RECEIVER FILTERS. The TS-990S is well equipped with channel filtering functions. The IF channel bandwidth can be set over wide limits, down to 50Hz. On voice modes the upper and lower passband edges are set independently (HI/LOW) and on CW and data modes the centre frequency and width are set (SHIFT/WIDTH). SSB and SSB-DATA can use either method. In addition to these settings, the overall shape can be set to sharp, medium or soft. On AM and FM modes the quoted bandwidth is somewhat misleading. On FM it relates to the audio filtered bandwidth; the IF bandwidth is fixed. On AM it also relates to the audio bandwidth after demodulation but the IF bandwidth is filtered to about double this value. The sub display shows the actual set values as well as a graphical overlay on the audio spectrum.

The audio bandwidth can be set overall to narrow, medium or wide and, on CW, an audio peak filter can be enabled. This has three selectable bandwidths 80, 160 or 320Hz and is tuneable across the pitch frequency. In FSK mode, a dual peak audio filter may also be selected. Last, but not least, an audio equaliser is incorporated with six preset profiles or three custom profiles, where each of the 18 channels can be independently adjusted. This is easy to set and graphically portrayed as one of the setup screens.

Three separate sets of bandwidths for each mode may be stored and toggled from a front panel key. This includes IF, AF and roofing filter settings. Separate keys are used for the two receivers.

Four different notch circuits are provided. Implemented at IF is a manual notch with adjustable centre frequency and wide/narrow setting. An IF auto-notch is available on SSB for automatically locating and attenuating a single interfering tone. A separate IF notch, termed Band Elimination Filter, is a manual notch with adjustable depth and stopband. Implemented at audio is a beat cancellation filter for voice modes, often called auto-notch on other radios. This automatically locates and removes multiple tones with two speed settings, one setting is more effective on continuous beats and the other on intermittent tones.

Two separate DSP noise reduction functions are provided that use different algorithms and differ in their effectiveness depending on the prevailing situation. Finally in the armoury for combating interference are two noise blankers. NB1 is a conventional IF gated analogue system and NB2 performs blanking using DSP. Quite a selection to choose from. Again, all functions are duplicated between the receivers, with separate controls.

TRANSMIT FEATURES. The transmitter power output is variable on all modes down to about 1W. The maximum power output can be set separately for each band in 1W steps with different settings for data modes and tune power – very comprehensive. Metering indicates power output, SWR, ALC, compression level, temperature or PA voltage or current. The radio includes a built in auto ATU covering all bands from 1.8 to 50MHz and will tune antennas with up to 3:1 VSWR. The ATU can be set to be in circuit on receive as well as on transmit.

On voice modes VOX, speech processor and a transmission monitor are provided and the audio bandwidth may be tailored by adjusting the low cut and high cut response. In addition an audio equaliser may be enabled that has 18 selectable profiles similar to the receiver equaliser. On FM, receive and transmit tone decoders and encoders are provided for CTCSS operation and repeater access and these can use different frequencies.

On CW the rise and fall times of the keying envelope are settable from 1 to 6ms and there is the usual provision for full and semi break-in with the drop back delay adjustable from the front panel. An electronic keyer is built in and has various operating modes. It operates over the speed range 4 – 60wpm, with the speed in wpm indicated on the display. The weighting can be varied and made to increase or decrease with speed. Eight message stores are also provided storing up to 50 characters each and can be programmed from the paddle, the MULTI control or from a USB keyboard. Automatically incrementing serial numbers are allowed and messages can be set to repeat after a delay. The message stores are controlled from front panel keys.

DATAMODES. The TS-990S includes fully featured built-in encoders and decoders for RTTY and PSK operation. Unlike many radios where this feature is provided, but rather simplistically, the higher resolution display in the TS-990S together with an external keyboard connected makes real operation much more feasible and enjoyable. The main screen in extended mode allows for 12 lines of received data with 43 characters per line and 3 lines of transmit data, together with an FFT scope displaying audio spectrum and a waterfall. In addition, the sub display shows an X-Y scope or vector scope depending on mode. Together these tuning aids are really effective.

PSK operation allows both BPSK and QPSK modes with either PSK31 or PSK63. A host of configurable setups is provided, tone frequencies, shifts, UOS, AFC, tone reversal etc. The text buffer for transmission will store up to 4300 characters and there are eight 70-character message stores for each mode. Incoming messages can be saved to external USB memory.

BANDSCOPE. A versatile spectrum display or bandscope is incorporated into the TS-990S that provides a higher resolution than any other self-contained radio currently available. It also provides a waterfall display, which is often better for identifying weak or keyed signals. The displayed range is 80dB. In centre mode it displays the spectrum centred on the main or sub receiver frequency with spans from 5kHz to 500kHz. In fixed mode it provides scans within each band between presettable limits. Markers indicate the receiver and transmit frequencies and the display can be paused, averaged or maximum-held to assist in different situations. Touching the bandscope display will tune the radio to the touched area but this can be switched off to prevent accidental QSYs.

An audio scope function can also be enabled for the main display. This functions on both receive and transmit and shows the audio waveform, spectrum and a waterfall display of the spectrum. Frequency span, level and sweep time are adjustable.

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 six channels available for short messages with a total recording time of 100 seconds. Messages can repeat automatically after a time interval. Up to 30 seconds of receiver audio can be recorded per file on internal memory or up to 9 hours if using external USB memory. The voice store can be set to record continuously but retain just the last 30 seconds.

Sub display showing IF bandwidth and notch.

The voice guide provides voice readout of the status of various radio settings depending on how it has been set up. This includes the frequency, meter readings and virtually any other settings and key presses, and can be a great help for those with impaired vision. If not needed, the voice guide access keys can be used as programmable function keys.

For use with transverters, the display can be set to indicate the transverted frequency up to a maximum of 4.2GHz, with any offset to a resolution of 100Hz. The transmit drive source for the transverter in most cases will use the low level 1mW drive output which disables the transmitter PA but there is a menu option to use the PA at its lowest power level (5W). Make sure you avoid transmitting into the transverter IF output when the transverter is disabled by using the receive-only input on the radio.

Other features include clock displays and timers and timed recording, power-on messages and screen saver. The radio is fully supported by Kenwood's suite of software, ARCP-990 and ARHP-990 for full remote operation from a PC or via the internet, and via radio with the Sky Command System II. This includes packet cluster tuning and crossband repeaters.

MEASUREMENTS. The full set of measurements is given in the table. The main receiver sensitivity reduced by 3dB with the sub receiver enabled and then both receivers gave similar results. The sensitivity holds well at LF, achieving -123dBm at 136kHz (preamp on) and only starts to reduce significantly below 100kHz. Sensitivity is reduced by about 18dB over the medium wave broadcast band. The S-meter calibration was similar for both receivers and showed about 3.5dB per S unit; all modes were the same except FM, which was highly compressed.

The rejection of IFs and images for the main and sub receiver downconversion path (SUB1) was typically 70dB to 90dB. For the sub receiver upconversion path (SUB2) these figures were somewhat better, typically around 100dB. Other spurious responses and birdies were very low, with none of significance. The AGC attack characteristic inserted a hole of up to 10ms in the signal, often seen in DSP implemented systems, which can impair signal copy in noisy situations. The default AGC decay times were quite closely spaced and the user may prefer to widen them. Using a wider roofing filter than necessary can result in close-in desensitisation, as the AGC responds to signals inside the roofing filter bandwidth.

The strong signal performance of the main receiver is top class, with front end IP3 approaching +40dBm on some bands and intermodulation limited dynamic range approaching 115dB in 500Hz bandwidth. The sub receiver is also excellent, with dynamic ranges in excess of 100dB. Close-in, these dynamic ranges hold well down towards the skirts of the roofing filters but reciprocal mixing noise starts to predominate and prevent measurement below about 5kHz. Measurements of blocking show that the front end can handle very strong signals. Blocking was in excess of +20dBm with the preamplifier out for both receivers down towards 5kHz spacing where reciprocal mixing prevented closer measurement. The tuneable preselector reduced sensitivity by around 6dB but had little effect on wideband second order intermodulation, which was already quite reasonable. Inband linearity was very good, but I have seen better.

The reciprocal mixing figures for the main and SUB1 receivers are best on the lower frequency bands; SUB2 sees little variation. The main and SUB1 profiles are somewhat different; the main receiver is best further out but SUB1 is best closer in. For comparison, the 3kHz spaced reciprocal mixing dynamic range figures in 2.5 kHz bandwidth on 7MHz are 93dB for main, 100dB for SUB1 and 87dB for SUB2. These are excellent figures, but have been bettered close-in by some other radios, and allowed measurement of the channel filter bandwidth about 80dB down the skirts. As with most DSP implementations, the filters exhibited a clean response and excellent shape factor. **Figure 1** shows the composite selectivity curve and the effect of reciprocal mixing in the different receiver paths.

On transmit, two-tone distortion products were low and the processor was clean with negligible effect on wideband products. The audio was very clean with low distortion and quite tolerant of high ALC levels and overdrive. The auto ATU reduced power by about 10 to 15%. CW rise and fall shapes were fine, with negligible distortion or character shortening at 40wpm even in full break-in mode. There was a 15ms delay on keying to allow for linear switching. Linear control by relay added a further 15 to 30ms on key-down for slow linears and this results in first character shortening. AM transmit was clean with low distortion.

ON-THE-AIR PERFORMANCE. A first encounter with the TS-990S (or indeed its manual) can seem quite daunting. However, I found that as you get to know the radio it is straightforward, a delight to use and I really appreciated the usefulness and clear information presented on the various display screens. The front panel is quite complex but the controls are well grouped, the tuning smooth and positive and functions easy to access. It takes 45 seconds for the radio to power up and during that time the display can show a start-up message.

The radio performed impeccably on strong and weak signals and in crowded conditions. The filters were excellent, the various notches and noise blankers all performed well. The audio quality using the internal speaker was excellent with good volume and no rattles. I also used the SP-990 external speaker and that gave even better quality. Clean performance extended down to LF with the time-code transmissions and in the AM broadcast bands. The two noise reduction modes were different in the way they transformed the signal. They could be very effective in certain circumstances and quite aggressive in operation but tended to produce a digital sound with strange artefacts if overdone.

On transmit, the audio quality was reported as being excellent using the MC-43S hand microphone although a little susceptible to acoustic handling noise. Better still was the quality from the MC-90 desktop unit. The processor was clean and added extra punch. On CW the keying and sidetone were clean and with full break-in it was possible to listen between characters up to around 30 wpm. The relay used for linear switching, if using this method, is rather noisy – particularly in full break-in mode.

I found that the touch screen tuning on the bandscope was not particularly accurate to set, but playing with the calibration routine helped. The frequency you tune from is lost and the ability to allocate an Undo function to one of the programmable keys would be very helpful.

CONCLUSIONS. The TS-990S is an outstanding radio. Its performance is second to none, right up there with the best, but what really sets this radio apart from all others is the level of built-in features, their ease of access and the degree of information presented to the operator. No other radio comes anywhere near the clear display of all operating parameters. However, this does come at a price; it is not a cheap radio and currently sells for around £6600 but I am sorely tempted.

ACKNOWLEDGEMENTS. I would like to express my gratitude to Kenwood Electronics UK for the loan of this radio and to Radioworld Ltd for the loan of the LDG DM-7800 accessory.

KENWOOD TS-990S MEASURED PERFORMANCE

Receiver measurements

All measurements relate to main receiver unless indicated otherwise SUB1 refers to the sub receiver downconversion path and SUB2 the upconversion path

	---Sensitivity SSB 10dBs+n:n---		----------Input for S9----------	
Frequency	Preamp Off	Preamp On	Preamp Off	Preamp On
1.8MHz	0.45μV (-114dBm)	0.11μV (-126dBm)	80μV	20μV
3.5MHz	0.45μV (-114dBm)	0.11μV (-126dBm)	80μV	20μV
7MHz	0.63μV (-111dBm)	0.16μV (-123dBm)	110μV	28μV
10MHz	0.63μV (-111dBm)	0.16μV (-123dBm)	100μV	28μV
14MHz	0.56μV (-112dBm)	0.14μV (-124dBm)	90μV	22μV
18MHz	0.63μV (-111dBm)	0.16μV (-123dBm)	100μV	25μV
21MHz	0.56μV (-112dBm)	0.16μV (-123dBm)	90μV	25μV
24MHz	0.63μV (-111dBm)	0.1μV (-127dBm)	100μV	10μV
28MHz	0.63μV (-111dBm)	0.1μV (-127dBm)	100μV	10μV
50MHz	0.5μV (-113dBm)	0.11μV (-126dBm)	80μV	10μV

AM sensitivity (28MHz), preamp on: 0.63μV for 10dBs+n:n at 30% mod depth
FM sensitivity (28MHz), preamp on: 0.18μV for 12dB SINAD at 3kHz pk deviation

AGC threshold, preamp on: 0.8μV
100dB above AGC threshold for 2dB audio output increase
AGC attack time: see text

AGC decay time: adjustable 80ms to 3s, see text
Max audio at 1% distortion: 1.9W into 8Ω
Inband intermodulation products: -45 to -55dB

S-reading (7MHz)	Input Level USB Preamp Off	Preamp On
S1	5μV	1.4μV
S3	11μV	2.8μV
S5	25μV	6.3μV
S7	50μV	14μV
S9	110μV	28μV
S9+20	1.1μV	280μV
S9+40	11mV	2.8mV
S9+60	110mV	28mV

Intermodulation (50kHz spacing) on USB: bandwidth 2.3kHz (Main and SUB1), 2.8kHz (SUB2)

	Main Preamp On		Main Preamp Off		SUB1 Preamp Off		SUB2 Preamp Off	
Frequency	3rd order intercept	2 tone dyn range	3rd order intercept	2 tone dyn range	3rd order intercept	2 tone dyn range	3rd order intercept	2 tone dyn range
1.8MHz	+25.5dBm	108dB	+31.5dBm	104dB	+28dBm	101dB	+27.5dBm	100dB
3.5MHz	+27dBm	109dB	+37dBm	107dB	+32dBm	103dB	+28.5dBm	100dB
7MHz	+32dBm	110dB	+38dBm	106dB	+31dBm	102dB	+30dBm	101dB
14MHz	+32dBm	111dB	+37dBm	106dB	+32.5dBm	104dB	+31.5dBm	102dB
21MHz	+31.5dBm	110dB	+39.5dBm	108dB	+32dBm	103dB	+31.5dBm	102dB
28MHz	+12.5dBm	100dB	+33dBm	103dB	-	-	+30.5dBm	102dB
50MHz	+14dBm	100dB	+35dBm	105dB	-	-	+29dBm	99dB

	Reciprocal Mixing Phase Noise 7MHz			Transmit Noise
Frequency Offset	Main	SUB1	SUB2	7MHz
1kHz	120dBC/Hz	126dBC/Hz	113dBC/Hz	-96dBC/Hz
2kHz	121dBC/Hz	131dBC/Hz	118dBC/Hz	-106dBC/Hz
3kHz	127dBC/Hz	134dBC/Hz	121dBC/Hz	-111dBC/Hz
4kHz	132dBC/Hz	137dBC/Hz	123dBC/Hz	-114dBC/Hz
5kHz	135dBC/Hz	140dBC/Hz	126dBC/Hz	-118dBC/Hz
10kHz	144dBC/Hz	145dBC/Hz	132dBC/Hz	-123dBC/Hz
15kHz	147dBC/Hz	147dBC/Hz	134dBC/Hz	-128dBC/Hz
20kHz	149dBC/Hz	149dBC/Hz	137dBC/Hz	-133dBC/Hz
30kHz	150dBC/Hz	151dBC/Hz	139dBC/Hz	-134dBC/Hz
50kHz	156dBC/Hz	154dBC/Hz	141dBC/Hz	-135dBC/Hz
100kHz	160dBC/Hz	156dBC/Hz	143dBC/Hz	-135dBC/Hz

Transmitter Measurements

	CW Power		Intermodulation Products	
Frequency	Output	Harmonics	3rd order	5th order
1.8MHz	200W	-70dB	-32dB	-45dB
3.5MHz	208W	-70dB	-40dB	-42dB
7MHz	207W	-72dB	-42dB	-46dB
10MHz	207W	-70dB	-50dB	-44dB
14MHz	207W	-68dB	-42dB	-46dB
18MHz	207W	-75dB	-46dB	-50dB
21MHz	207W	-68dB	-35dB	-45dB
24MHz	207W	-64dB	-31dB	-50dB
28MHz	206W	-66dB	-31dB	-47dB
50MHz	203W	-73dB	-33dB	-49dB

Intermodulation product levels are quoted with respect to PEP.

Carrier suppression: <-80dB
Sideband suppression: <-80dB
Microphone input sensitivity: 0.2mV for full output
Transmitter AF distortion: less than 0.1%
FM deviation: 1.9kHz narrow / 3.6kHz wide
SSB Data T/R switch speed: mute-Tx 20ms, Tx-mute 5ms, mute-Rx 35ms, Rx-mute 2ms

NOTE:
All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on USB with receiver preamp switched out, 2.3kHz bandwidth.

Homebrew

UHF and microwave design and construction techniques

HIGHER FREQUENCIES. Once again, the time has come for our annual spring/summer VHF/UHF project. In my 26 years as a radio amateur, I have never been active on the 70cm band. My two main excuses for this lack of activity were a absence of suitable transmitting equipment and a long-standing belief that it would be difficult (if not impossible) to work anyone on UHF because the nearest centres of activity are hundreds of kilometres away. When I built a simple 70cm to 10m receive converter (Homebrew, June 2008) and a 13 element Yagi (Homebrew, April 2008), I was pleasantly surprised to learn that I could regularly hear the Bristol 70cm beacon GB3BSL at a distance of more than 400km. Good tropo conditions in May of that year produced some very strong signals from G, GW, GM and GD. Many of these stations were using moderate power output and just a single Yagi aerial. Occasional reviews of the 432MHz band spots page on www.dxsummit.fi have shown that there is quite a lot of activity on UHF, even when band conditions are relatively flat. Perhaps there is a case for building some UHF equipment after all...

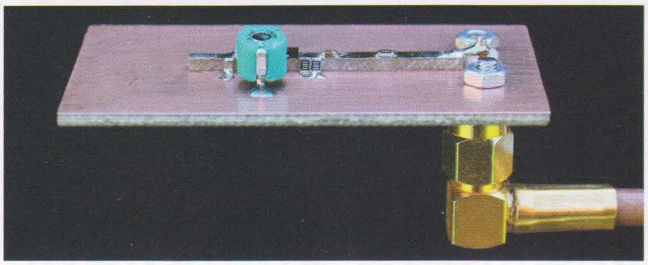


PHOTO 1: A simple noise generator circuit based on a superglued 50Ω line.

The main characteristic of radio frequency electronics is the very rapid rate at which signals change. LF, MF and HF circuits handle frequencies up to several million cycles per second. UHF and microwave circuits operate at frequencies up to several tens of billions of cycles per second. In the world of DC and low frequency electronics, a conductor is just a simple wire or PCB trace used for the sole purpose of carrying electric current. At UHF, a simple wire conductor may also be used as an inductor, capacitor, filter, power splitter/combiner, matching network or transmission line (TL). There are many examples of quite elaborate UHF and microwave circuits that are made entirely from copper PCB traces and/or lengths of coaxial cable. This has obvious advantages for mass production, cost/space saving and reliability.

The use of transmission line as resonators or in place of conventional lumped inductors or capacitors is usually limited to UHF and microwave frequencies. At HF and in the low VHF region, transmission line components tend to be unreasonably large. For most constructors, the crossover frequency where TL components become more practical than their lumped equivalents is somewhere around the 70cm (432MHz) band. Below this frequency, TL sections may be too long to fit in a reasonably small space, particularly in the case of PCB microstrip. It may be possible to overcome this limitation by bending the microstrip line into a U, a circle or some other convenient shape. This approach is often used in VHF mobile power amplifiers. There are also physical problems associated with using conventional LC components at UHF and above. Typical UHF and microwave circuits will often require L or C values that are so low as to be unrealisable. Sub-pF or nH values are difficult to achieve in practice.

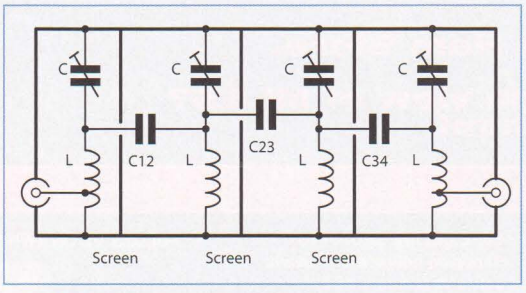


FIGURE 1: A typical configuration for a 4th order VHF/UHF BPF.

Even if such components were available, they would be difficult to use because they would tend to have a smaller value than stray circuit reactances. There are exceptions to these rules. It is possible to use rolled up lengths of coaxial cable so that electrically long TL sections can be squeezed into a small space. A short length of thick wire can be used as a small value inductor and a wire probe can be used as a very small capacitor by placing it close to another conductor. Transmission line resonators are often capacitively tuned by placing a metal adjusting screw into the open end of the centre conductor.

TRANSMITTER. My first objective is to build a transmitter for 70cm. As mentioned earlier, I already have a receive converter and a good aerial. This leaves me with a few options, including building a standalone transmitter or building a transmit converter that can be used with the existing receive converter. The final option is to build a complete new transverter. This might seem to be the more difficult option, but it will probably turn out to be easier than modifying the existing receive converter. I would also like to build some new equipment for the 23cm band. Unfortunately, my 23cm aerial has completely disintegrated, so I will have to build a new one before I can proceed with that project.

Many amateurs consider UHF and microwave construction as a 'black art' that is beyond the scope of the home constructor. In reality, UHF circuits tend to be physically quite simple. Circuits based on PCB microstrip and surface mount devices tend to be easy to assemble and they generally have a low component count. High power circuits often involve more plumbing than electronic engineering. For some of our previous projects, I have advised constructors to 'follow good VHF practice'. This is even more critical when dealing with UHF and above. A short length of wire may make a good ground connection at HF, but it could look more like a resonant stub at microwave frequencies.

Surface mount chip capacitors are a better choice than ceramic discs. Even when the leads are trimmed quite short, self-inductance may limit the usefulness of disc capacitors at UHF. Point-to-point wiring methods tend to work very well at UHF. Dead-bug and similar methods that are based on a continuous copper ground foil are ideal for UHF construction. Circuits that are based on TL sections glued to a copper foil are particularly well suited to UHF construction. Surface mount components can be soldered directly to the TL sections. This results in a neat looking circuit with a low profile and good mechanical stability. This method is also quite forgiving of errors and miscalculations. Lines can be lifted and replaced with very little risk of damaging other components. **Photo 1** shows a simple noise generator circuit based on a superglued 50Ω line.

It is very important to ensure that your VHF/UHF transmitter or transverter produces a clean signal. The IF and local oscillator frequencies should be carefully chosen to reduce the possibility of spurious signals. You should pay close attention to the design and construction of band-pass and low-pass filters. In the case of a linear transverter, make sure the drive level is correct. Overdriven

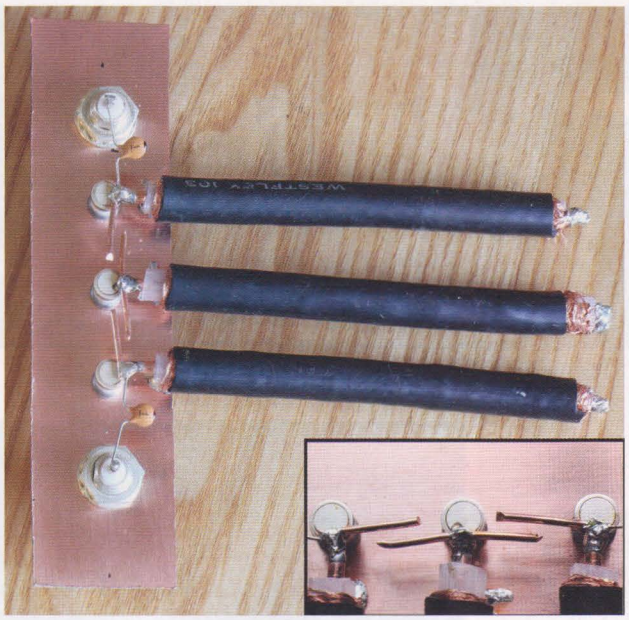


PHOTO 2: 3rd order 70cm BPF based on three TL resonators made from low-loss coaxial cable. The three white items are high quality trimmer capacitors, adjusted from the other side of the board.

$$\omega = 2\pi f$$

$$C_0 = \frac{1}{\omega^2 L}$$

$$C_K = C_0 \frac{k\,B}{f}$$

$$Q_E = \frac{q\,f\,Q_u}{B\,Q_u - q\,f}$$

$$C_E = \frac{1}{\omega} \frac{1}{\sqrt{R_0\,Q_E\,\omega L - R_0^2}}$$

$$Rp = \omega\,L\,Q_E$$

4th order Butterworth:

q = 0.7654
k12 = 0.8409
k23 = 0.5412
k34 = k12

FIGURE 2: The formulae used for designing the filters.

transverters are a common cause of splatter on the VHF/UHF bands. Here in Ireland, maximum spurious emission levels are specified in the licence conditions. Currently, the required levels of spurious suppression for newly installed equipment in EI are: "43+10log(P) or 50dB whichever is less stringent". Meeting the -50dB requirement shouldn't be too difficult. To comply with 'best practice', I will try to meet the more stringent 43+10log(P) dB requirement. In the case of a 50W rig, this would require all spurious outputs to be suppressed by at least 60dB relative to the wanted output. It is a relatively simple matter to filter out unwanted harmonics at multiples of 432MHz. Other spurious signals may be more difficult to remove. In the case of a 28MHz to 432MHz transverter, the local oscillator frequency will usually be at 404MHz. The most likely cause of out-of-band spurious signals will be breakthrough of the 404MHz LO signal. The other possible source of trouble is the IF image at 404 – 28 = 376MHz. The LO signal is offset from the wanted output by 28MHz. This may seem like quite a large difference, but you should keep in mind that it is a frequency difference of less than 7%. The use of a balanced mixer will tend to reduce the amount of LO leakage. We know from measurements of the balanced mixers in some of our previous HF projects that LO to RF port isolation can be greater than 50dB in many cases. It is not safe to assume that this will also be the case with a UHF mixer. Diode DBMs tend to have reduced port-to-port isolation when they are operating at frequencies close to their specified maximum frequency. We can probably expect no more than 25 – 35dB of LO to RF port isolation at UHF. This means that we will probably need to use an RF bandpass filter (BPF) that will attenuate 404MHz signals by 50 – 60dB before we can be sure of meeting our spurious emission requirements. This is certainly achievable, but it is not trivial by any means. The nomographs in the *Handbook of Filter Synthesis* [1] suggest that a 4th order filter would be close to optimum for this particular application.

FILTER COMPONENTS AND DESIGN.

If we were designing a BPF for a 2m, 4m or 6m transverter, conventional LC resonators would be the obvious choice for frequencies in this range. Similarly, a BPF for 23cm would almost certainly be based on TL resonators. At 432MHz, it could be argued that both types of resonator are equally suitable. Where small size is a priority, LC resonators will have an advantage. TL resonators may have a performance advantage, particularly if physically large components are used.

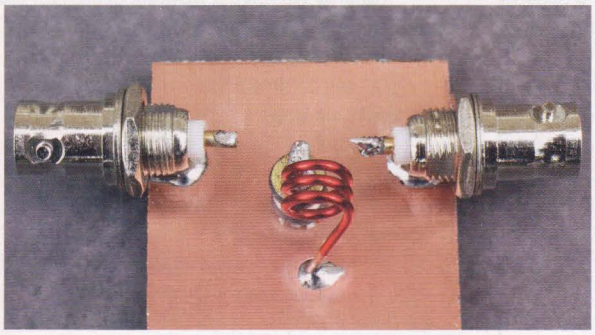


PHOTO 3: My test rig for measuring a UHF LC resonator.

Photo 2 shows a 3rd order 70cm BPF based on three TL resonators made from low-loss coaxial cable. The filter was described in the September 2010 Homebrew. Each coax resonator is cut shorter than an electrical quarter-wavelength and tuned to resonance using a high quality piston trimmer capacitor. A filter of this type could be expected to perform very well in our new transverter. For best results, I would add an additional resonator to make a 4th order filter.

Figure 1 shows a typical configuration for a 4th order VHF/UHF BPF. Each LC resonator is in a separate screened compartment. The inter-resonator coupling capacitors pass through a small hole in each screen. At UHF, these capacitors may be nothing more than a pair of stiff wires with an air gap of several mm between each wire (see Photo 2).

Qu (or unloaded Q) is a measure of the losses in a resonator. A typical PCB mounted LC resonator based on a capacitor and a slug-tuned inductor could be expected to have a Qu value in the range 50 – 150. Higher quality resonators like the ones used in our UHF filters will have a Q of several hundred. Even higher Q is possible in the case of highly specialised equipment such as the large, silver-plated cavity resonators used in repeater duplexers.

When designing a filter, it is useful to have a reasonably accurate measurement of the Qu value for each of the filter resonators. If you have a signal generator and a sensitive power meter, it is a simple matter to measure resonator Q. **Photo 3** shows my test rig for measuring a UHF LC resonator. **Photo 4** shows a similar arrangement for measuring a TL resonator. Input/output is via capacitive coupling. To keep loading by external circuits to an absolute minimum, the I/O coupling capacitors should have the smallest possible value. Note that in these two circuits, I/O coupling is via the very small capacitance between the top of the resonator and the centre pins of the BNC connectors. As the loss at resonance is 30 – 40dB, a very sensitive meter is required. I used a spectrum analyser and tracking generator for my tests. Qu is simply the resonant frequency divided by the -3dB bandwidth. The measured bandwidth of the LC resonator was exactly 1MHz, which indicates a Qu value of more than 400. The TL resonator also had a Qu close to 400. Interestingly, the LC resonator had a slightly higher Q than the coaxial line version. The TL resonators are made from 100mm lengths of Westflex 103 coaxial cable. This is a semi

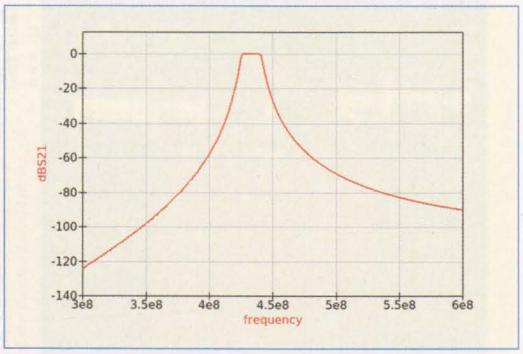


FIGURE 3: *QUCS* simulation of transmission loss through the filter.

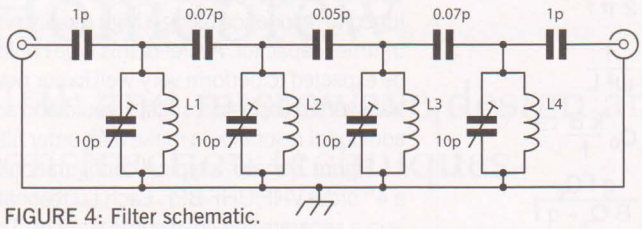


FIGURE 4: Filter schematic.

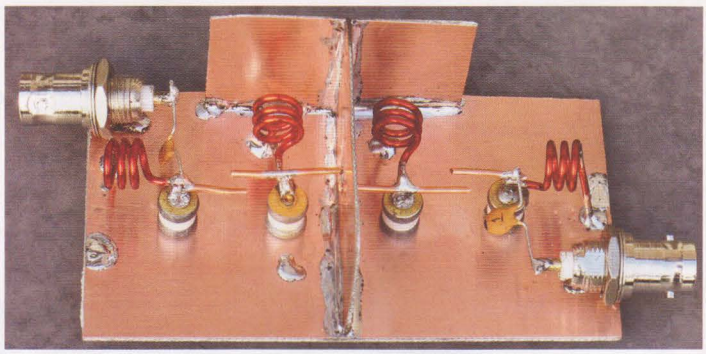


PHOTO 5: Assembled filter unit.

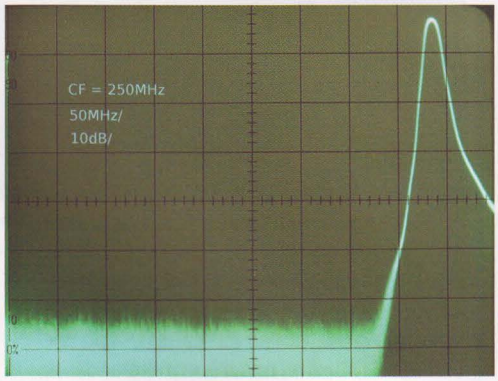


PHOTO 6: Filter response from LF to 500MHz.

air-spaced cable with a centre conductor diameter of 2.7mm. Each resonator is tuned to resonance at 432MHz using a high quality air-spaced 10pF brass/ceramic piston trimmer. This type of capacitor is available from RF and microwave specialists or internet auction sites like eBay. Unfortunately, they are quite expensive. Typical prices are several pounds per capacitor.

The inductors in the LC resonators are each three turns of 1.25mm enamelled copper (Maplin YN81C or similar). I used a 6mm drill as a former for winding the coils. The coil inductance should be about 37nH (or perhaps slightly more because of the relatively long tail at one end). Turn spacing is approximately the same as the wire diameter. The exact value of inductance can be adjusted by varying the turn spacing slightly.

The filters were designed using methods described by Wes Hayward, W7ZOI **[2]** and tables of coupling (k) and end-Q (q) values from Zverev. Assuming a value of precisely 0.037μH (37nH) for the inductors, each resonator will require a total capacitance of 3.668pF for resonance at 432MHz. This is well within the range of the 10pF trimmers. **Figure 2** shows the formula used for designing the filters. Values of k and q are shown for 4th order Butterworth filters.

For coupling capacitors k12 and k34, C0*((kB)/f) = 3.668*((0.8409×10000000) ÷432000000) = 0.0714pF. For k23, a different k value of 0.5412 is used. This results in a value of 0.0460pF for the centre coupling capacitor Ck12. The filter is designed for a bandwidth of 10MHz.

Before building the filter, I ran a *QUCS* simulation using the aforementioned component values. A plot of transmission loss through the filter is shown in **Figure 3**. The *QUCS* simulation is based on ideal lossless components. As Qu of the resonators used in the real filter are quite high, the simulation should give a good approximation of the performance we can expect to achieve. The response is close to ideal for our purposes. Attenuation at the LO frequency of 404MHz is in the 50-60dB range, as required. IF image rejection is excellent, at around 70-80dB. This type of filter has an asymmetrical response, with greater stopband attenuation at frequencies below the passband than above. As a result, the filter has extremely high rejection at the 28MHz IF and anywhere in the LF to VHF region.

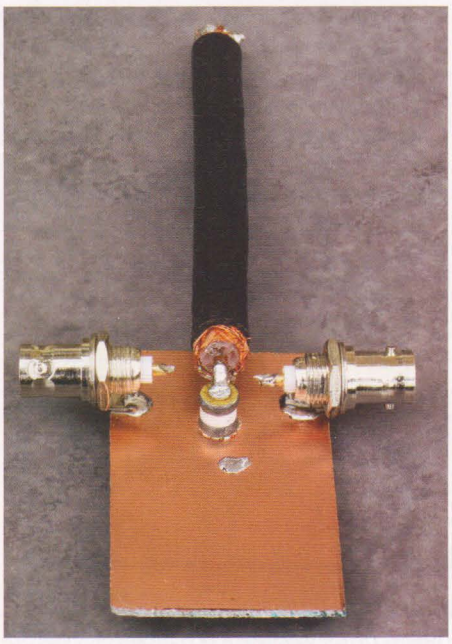


PHOTO 4: Test rig for measuring a TL resonator.

CONSTRUCTION. The prototype filter was built on a strip of single sided fibreglass PCB laminate. Four 6mm holes were drilled through the board, with a spacing of 20mm between each hole. These holes were used to mount the trimmer capacitors. The inductors are soldered directly to the solder tab on the back of each capacitor and to the PCB ground foil. For my first attempt at testing the filter, I used direct taps into L1 and L4 for input/output coupling. The tap points were placed at about 0.5 turns from the ground end of the inductors. This arrangement worked very well in the previous VHF filter project (September 2010). I had some difficulty getting the required passband shape and return loss values using this method. For the second attempt, I changed the I/O matching to a series capacitor, as used in the UHF 3rd order TL filter (Photo 2). This change completely resolved my matching issues and the filter now shows a nice flat response across the 70cm band and I/O return loss of around 20dB (SWR=1.2:1) as predicted by QUCS. The filter schematic is shown in **Figure 4**. The assembled filter unit is shown in **Photo 5**. Note the way that L1/L2 and L3/L4 are physically separated and mounted at a 90° angle to reduce mutual coupling. L2/L3 are separated by a screen made from thin double-sided PCB laminate. There is a 6mm hole in the screen to accommodate the ends of the wires used for Ck23. As with the earlier TL filter, the coupling capacitors are made from short lengths of 1mm bare copper wire.

TESTING. The measured performance of the filter is excellent. Bandwidth is around 10MHz and rejection at the LO frequency at 404MHz is around 50dB. Rejection of the IF image and all other spurious responses is at or below the analyser noise floor at -70dB. Insertion loss is 3dB. The filter was tested with source and load impedances of 50Ω. **Photo 6** shows a plot of the filter for frequencies from LF to 500MHz. No doubt, a fully screened and enclosed unit as suggested in Figure 1 would produce similar performance in a smaller space. However, as there is a reasonable amount of space available in the enclosure for the new transverter, I will have the option of using the prototype filter in the finished project.

It seems we have a working design for the first and one of the most important building blocks for the new 70cm transverter.

We will continue the UHF transverter project next time.

REFERENCES

[1] *Handbook of Filter Synthesis*, Zverev, chapter 5, Estimate of filter complexity

[2] *EMRFD*, Hayward, Campbell, Larkin, and *Designing High Order LC Bandpass Filters from EMRFD* (pdf), Hayward, 2007

[3] *QUCS* simulator: http://qucs.sourceforge.net/

HF F-Layer Propagation Predictions for June 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	55	74.....2688	87232..37888	467777777885	..677776786.	.....	.....	.....
*** Asia								
Yakutsk	.....	.....	3443	666665667777	...56555....	.....	.....	.....
Tokyo	.....	.....	.....	.....	.....43..	.....	.....	.....
Singapore	.....2.	.....488.	.....465.	.....55..	.....364..	.....4...	.....	.....
Hyderabad	.....	255	2566	5665	.....555.	.....4...	.....	.....
Tel Aviv	8.....799	98.....7999	76.....6887	...3...4676.	.....56..	.....	.....	.....
*** Oceania								
Wellington	.....	.....	.....	.....	.....	.....	.....	.....
Well (ZL) (LP)	.....	37.....6..	57.....352	45.....64	.....5.	.....	.....6.	.....
Perth	.....	.....3..	.....35.6	5	.....	.....	.....	.....
Sydney	.....	.....37..	.....67..	.....34..	.....	.....	.....	.....
Melbourne (LP)	.....	299.....	9998.....8	99985.....69	8887.....79	78	.....	.....
Honolulu	.....	.....	.....	.....	...443.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....	.....	.....	.....	.....
W. Samoa	.....	.....	.....	.....	...4544....	.....	.....	.....
*** Africa								
Mauritius	2.....22	6.....3887	4.....7887	.....3887.	.....5...	.....	.....	.....
Johanesburg	.....	353	6875	.....76..	.....6...	.....4...	.....	.....
Ibadan	1.....1	65.....556	77.....677	477.....7887	..76...5787.	..67....78..	...4....78..	.....
Nairobi	2.....23	8.....788	62.....666	.5.....5676	.....5666.	..5...3566..	.....5...	.....
Canary Isles	65.....66	886.....688	8873....6888	8887....8888	7.8988899999	..7988889987	...5....66..	.....4..
*** S. America								
Buenos Aires	.....	66.....2	887.....68	766.....88	4.....476	464	.....	.....
Rio de Janeiro	.....	66.....6	984.....89	77.....688	4.....777	665	.....5..	.....
Lima	.....	662.....2	888.....48	7665.....78	.....	.....	.....	.....
Caracas	.....	32.....3	8872.....68	88873....388	4.46653.5688	....5.4.3775	.....	.....
*** N. America								
Guatemala	.....	24.....	887.....7	7663.....7	45	.....	.....	.....
New Orleans	.....	64.....	775.....4	764.....46	.....	.....	.....	.....
Washington	2.....	65.....2	876.....6	873.4....577	.....56.	.....	.....	.....
Quebec	2.....	76.....6	764.....57	35566	.....	.....	.....	.....
Anchorage	.....	.....	3.....	766555556666	666546666777	.....	.....	.....
Vancouver	.....	.....	.....	.....	.....44.	.....	.....	.....
San Francisco	.....	.....	.....	.....	.....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.....	.....	.....	.....	.....

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 June, July & August are respectively (SIDC classical method – Waldmeier's standard) 47, 46 & 45 and (combined method) 78, 81 & 83. The provisional mean sunspot number for April was 72.4. The daily maximum / minimum numbers were 101 on 30 April and 53 on 1 April.

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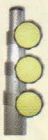
Telescopic Masts



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NTYPE-103 Compression type plug for westflex 103 ..... £6.00
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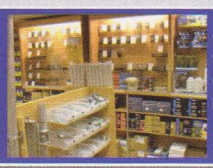

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International Marconi Day

Reports from around the country

INTRODUCTION. On the Saturday closest to Guglielmo Marconi's birthday, stations around the world are set up at sites with historical links to the inventor's work. This year these sites included Poldhu in England; Cape Cod Massachusetts, USA; Glace Bay, Nova Scotia; Villa Griffone, Bologna, Italy and many others.

GB0CMS. Radio amateurs at the Caister Lifeboat Visitor Centre in Norfolk managed to contact 201 other stations in 36 different countries on Saturday 20 April when they took part in the annual International Marconi Day to mark the inventor's birthday. Using the call GB0CMS and a mixture of Morse code and telephony, notable contacts included other stations in Israel, Asiatic Russia, Newfoundland, Canada and the USA. Some contacts were with other special Marconi stations in the UK, Italy and Iceland.

Norfolk Amateur Radio Club ran the all-day special event station at Caister Lifeboat to commemorate the village's original Marconi Wireless Station, which was established at Caister in 1900.

The station was in a house in the High Street known as Pretoria Villa and its original purpose was to communicate with ships in the North Sea and the Cross Sand lightship. The Caister station was connected by landline to Great Yarmouth Post Office and the Caister Coast Guard Station. The main aerial mast behind the house was 150 feet high, the aerial wire being suspended between this and a slightly shorter mast situated on land where Lacon Road was later built. The large front room of the house contained the main apparatus and was also used as the operating room. The engine for charging the accumulators was situated in a shed adjoining the house and the accumulators themselves were housed in a specially constructed annexe.

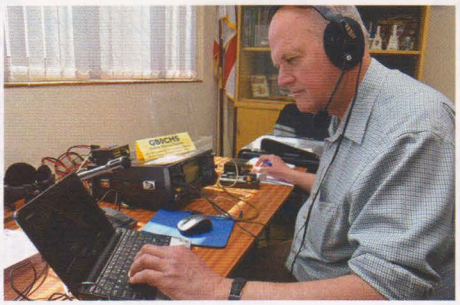
The remainder of the premises were used as a dwelling house for the officer-in-charge. The range of communication was 150 to 200 miles on the long wave (600m) and 100 miles on the short wave (300m).

In 1909 all the Marconi coastal stations were taken over by the Post Office. In 1911 the Caister station was used to train lightship men in the use of telegraphy equipment. In January 1915 the telegraph equipment on the Cross Sand lightship was transferred to the Parlour lightship and the Caister station was changed to 'general working', no longer being used for ship-to-shore work. Public use of the telegram facility provided at Caister was suspended for the duration of WW1.

In 1921 plans were made for the reinstallation of wireless on Trinity House lightships, but this time the new wireless telephony was to replace telegraphy (Morse). New technology made the Caister station out of date and it finally closed in 1929. The masts were taken down and a few years later the house became the village Police Station. (Historical details with thanks to local historian Colin Tooke.)

Steve Nichols, G0KYA said, "Conditions were not as good last year – we are heavily reliant on sunspots, which were not as numerous this year. But considering we set the whole station up on the Saturday morning, including erecting the two antennas, installing the radios and computers and had taken it all down again by the end of the day, we are very pleased with the result. Even the weather was perfect and our thanks go to Caister Lifeboat for letting us set up the station."

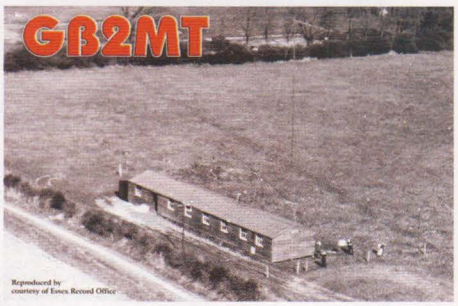
The equipment used was 100W from an Icom IC-756 Pro 3 (40m) and an Icom IC-7400 (20m). Antennas were a W5GI dipole on 40m and a G0KYA-designed end-fed half-wave vertical for 20m and 15m.



Peter Lock operating GB0CMS.

GB2MT. The morning of International Marconi Day, on 20 April, was more glorious than one might have hoped given what has seemed an eternal winter, reported David Barber, G8OQW. A crisp blanket of frost across the Essex countryside soon gave way to bright, beautiful sunshine and clear blue skies that lasted the day. As in previous years, with the kind permission of Writtle Agricultural College, GB2MT took to the air in support of International Marconi Day.

The original site, on the outskirts of the village of Writtle, had been used for the historic 2MT broadcast test transmissions between February 1922 and January 1923 and the Agricultural College itself hosted a



GB2MT QSL card.

demonstration to the Chelmsford Engineering Society in November 1922. Marconi continued its connection with Writtle until the 1980s when it was wiped from the map by a housing development; only a small commemorative information board remains.

The first CQ calls on 40m brought an immediate response, quickly developing into a pileup that continued virtually unabated throughout the day.

When the station was closed ten hours later there were 235 SSB contacts in the log and not a moment to explore the other bands. Conditions were good though changeable throughout the day but the level of activity was unprecedented, the best seen in over five years.

David said, "My thanks to all those who waited patiently and politely in the pileup and my apologies to those missed. My thanks also to the Cornish Radio Amateur Club for organising the event."

GB5LT. On the morning of Saturday 20 April, in glorious Spring sunshine, a small group of radio amateurs entered the tent that they had set up the previous day above Calshot shore on the Solent, in order to participate in the celebration of International Marconi Day. The tent and its contents were situated adjacent to Luttrell's Tower, where, from 1911 for a period of about five years, Guglielmo Marconi carried out many experiments on the top floor. His eldest daughter, Degma, later wrote that she and her younger brother were unhappy that he spent so much time there rather than with them in the nearby Eaglehurst house and grounds, where the family lived.

The three radio amateurs involved on this current occasion, Robin, G0OSG, Tony, G6MNL and Rod, G6LVJ, representing the Waterside New Forest Radio Club, had set up the G5RV aerial and tent on the previous day and it only remained to install and set up the generator and radio equipment. The latter was Tony's Yaesu FT-747 with

a transistorised linear amplifier producing between 200 and 300 watts. The G5RV aerial, running roughly north–south, was brand new and had been tested, watched with bated breath, for the first time only the previous afternoon! However, they need not have worried, for, after careful tuning in the tent, the aerial worked well on all HF bands.

On the day the equipment worked excellently and they were kept very busy during the morning and afternoon, communicating with those wishing to accumulate enough contacts with International Marconi Day stations around the world to qualify for an award. The only disadvantage from the operators' point of view was that, though the sunshine was glorious, they were in the shade of some mature trees and a very gusty, bitingly cold south-east wind blew continuously through the morning, coming up off the Solent, finding every gap and crack in the tent's defences. Between spells on the radio and logging activity, Tony took to jumping up and down to keep warm! However, they were able to enjoy a warm spell inside the tower at lunchtime, eating their sandwiches and drinking hot beverages. During the afternoon, the wind dropped and things in the tent were more comfortable.

Their on-air activity was very busy indeed, with many pileups occurring during the day and the operators found that this was very demanding! They remained the whole time on the 40m band and had a total of 147 contacts, including Mike,

Robin, G0OSG and Tony, G6MNL operating GB5LT.

F8VOU (alias G4HXT, a founder member of the Luttrell's Tower IMD event); special event stations GB2SJ (Souter Lighthouse at Lizard Point); DF0MV (Marine Club at Bielefeld, Germany); GB4HPH (St George's Day Youth Festival, Halifax); GB0GPF (Grey Point Fort, WW1 Coastal Defence Battery, Northern Ireland); GB0YAM (Yorkshire Air Museum, York); PA6IMD (Gouda and District International Marconi Day Station, Netherlands).

At the end of the day, the team agreed that the exercise had been hard work, but well worth while.

SANDFORD MILL, Chelmsford's former waterworks, is primarily a museum collections store and science education resource, however it is open to the public for special events during the year.

The first public open day of 2013 was held in April to celebrate the birthday of Guglielmo Marconi. The event was very well attended, and as well as the usual family-friendly exhibits, saw talks by Peter Watkins, M0BHY on Marconi's steam yacht *Elettra*, a visit from the Mayor of Chelmsford, a display of military radio equipment and attendees from the Radio Officers Association. The museum has a series of five ship's radio room displays representing different decades including some very rare Marconi equipment from ships contemporary with the *Titanic*.

The Mayor of Chelmsford unveiled a beautiful model of Marconi's yacht *Elettra* that Peter Watkins, M0BHY spent over two years building.

Chelmsford Amateur Radio Society ran a HF SSB demonstration station located in the historic Marconi 2MT Writtle hut, which is now housed inside the museum, while the CW team ran another station from the first floor office.

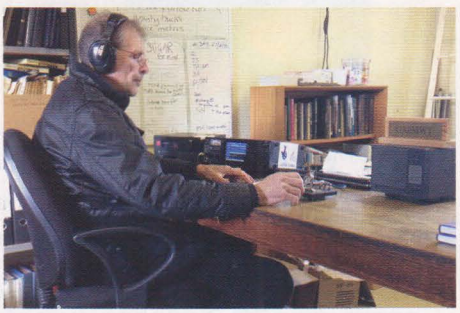
Luttrell's Tower undergoing restoration in April 2013.

Many CARS Members and visitors, including one from Germany, turned up to either try their hand on the air, to log, to tell the public about being a radio amateur or just chat with others over a cuppa. It was great to see so many familiar faces, as well as a few new ones. Many of the Radio Officers Association were familiar with the demonstration ship's radio rooms on display while some had a go on the Morse keys in the CW room.

Full marks to Colin Page, G0TRM and his team for the impressive mechanical Morse and Morse key display with the opportunity for the youngsters to try their hand at sending Morse. The ticker-tape sending and decoding practical always proves to be a big hit with potential junior CW operators. To complete the successful day the Military Vehicle Group brought along two vintage 3 ton army lorries and a tremendous selection of military wireless equipment. This brought back many memories to the visitors – great to see them there.

The open day provided a great opportunity to promote amateur radio to the general public and hopefully some of those attending will be signing up for the next CARS Foundation training course. Hopefully all who took the time to attend the get-together at a very busy Sandford Mill had an enjoyable day.

One of the visitors, 5 year-old Kathryn Sipple, trying out a crystal radio set at the exhibition. Kathryn is the daughter of radio amateurs Pete, M0PSX and Sarah, M6PSK. Photo: Pete Sipple, M0PSX.



Steve, G4ZUL working a station in Japan. Photo: Pete, M0PSX.

Antennas

Fixing HF mobile antennas to a vehicle

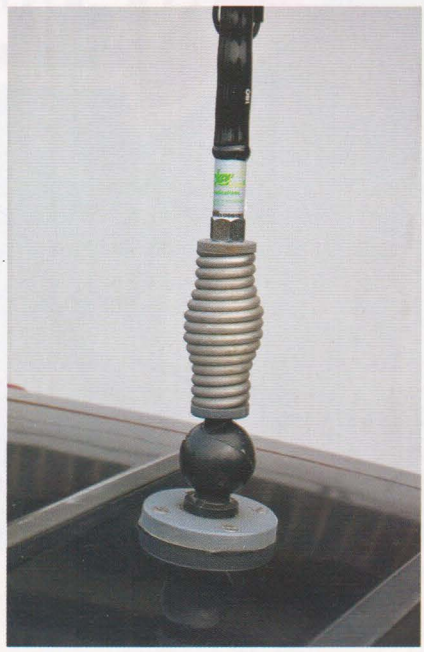


PHOTO 1: An antenna mount fixed through the roof of a Jeep Cherokee.

MOBILE OPERATING. It is summer time and time to get out and about and do some mobile operating. A few months ago I bought an old 1999 Jeep Cherokee Sport. We needed a vehicle that would pull the XYL's horsebox and provide me with a mobile shack. The diesel powered Jeep proved to be electrically quiet and, being an old vehicle, I had no qualms about drilling a hole in the roof for an antenna mount.

The antenna mount is shown in **Photo 1**. A spring has been added to the antenna mount to prevent damage to the antenna, the antenna mounting or the vehicle roof in the event of the inevitable collision with an overhanging tree branch.

I realise that most of you would not relish the thought of drilling a hole in the roof of your pride and joy just to install an antenna mount. This month, I'll look other possible solutions for mounting a mobile antenna to a vehicle.

MAG MOUNT. One solution might be to use a magmount but the type of magmount and the type of antenna used with it requires careful consideration.

Nick Plumb, G0PBV cautions. "Your most recent reflections on magmounts reminded me of the particular loss of an almost brand new Watson antenna for 6m-2m-70cm, which came to an untimely demise while I was trying to operate (with my wife driving) travelling along the A27 travelling west from Shoreham, having just passed under the high bridge to Truleigh Hill. A gust of wind unbalanced the magmount, which clattered briefly on the side of the car before becoming detached from the coax and falling into the road. We managed to carefully retrieve it in the following 10-15 minutes by which time successive vehicles had caused a fair amount of damage.

"The questions I have on this topic are: Has anyone done any studies with a variety of mobile antennas and magmounts to work out the maximum wind speed tolerated by any particular combination or in a more indirect way what moment about the magmount is required to begin to detach it from the roof surface? Should manufacturers produce a chart for each of their mobile antennas advising or recommending a certain size of magmount?"

There is no easy answer to this question. Magmount sales literature avoids the problem simply by not mentioning it. When magmounts are sometimes demonstrated they are stuck to a thick chunk of metal. Since the amount of sticking force is reliant on the thickness and composition of the material it is stuck to, the actual force may be may not be as great when located on the top of your vehicle. On the other hand a three-magnet type magmount appear to hold very tight and requires some leverage to remove it, see **Photo 2** but I still wouldn't trust it with a HF mobile antenna while travelling at any speed.

My view is that magmounts should not be used as a permanent solution to mounting a mobile antenna. Security is not the only issue. Magmounts can collect road debris such as metallic brake dust that gets between the magnet and the vehicle roof. You can, of course, regularly clean the surface(s) of the magnet(s) and the vehicle surface but these minute sized particles and are difficult to remove.

PHOTO 2: A three-magnet antenna mount being removed from the roof of a vehicle using a spanner as a lever.

THE W0IVJ MOBILE ANTENNA MOUNT. Tom Thompson, W0IVJ tried an alternative approach to the mobile antenna ground plane problem and by using a separate ground plane some 46in x 55in (1.17m x 1.4m) with the antenna mount fitted to the centre. The ground plane is fixed to the top of the vehicle using a roof rack as shown in **Photo 3**. This rack is removable and not grounded to the car body.

A computer model of this arrangement indicated that an antenna mounted this way would perform in a similar manner to one mounted directly on the roof.

W0IVJ then made measurements to check the modelling results. He says, "I used a tuned loop and a Boonton Model 92B RF millivoltmeter as a field strength meter, see **Photo 4**. This receiving antenna was mounted at a height of about 10 metres and a distance of about 75 metres from the car in order to intercept the radiation lobe at its predicted maximum. The loop was oriented for vertical polarisation. The transmitting power was 100 watts.

"Measurements were taken with the car oriented in four different directions. F, P D and R, which refer to the front, passenger side, driver side and rear respectively pointing toward the receiving antenna."

Tests were performed first with the ground plane connected to the vehicle at the four corners (grounded configuration). A second set of tests were performed with the ground plane isolated from the vehicle. The test results are shown below.

40 metres

	Grounded	Not Grounded
F	-9 dBm	-8.5 dBm
P	-9.3 dBm	-9.9 dBm
D	-9 dBm	-9.5 dBm
R	-9 dBm	-9.8 dBm

20 metres

	Grounded	Not Grounded
F	-1.6 dBm	-1.4 dBm
P	-1.6 dBm	-1.6 dBm
D	-1.6 dBm	-1.8 dBm
R	-2.3 dBm	-2.4 dBm

The resonant frequency of the antenna system differed when the ground plane was isolated or grounded to the vehicle

PHOTO 3: The W0IVJ mobile antenna with separate ground plane

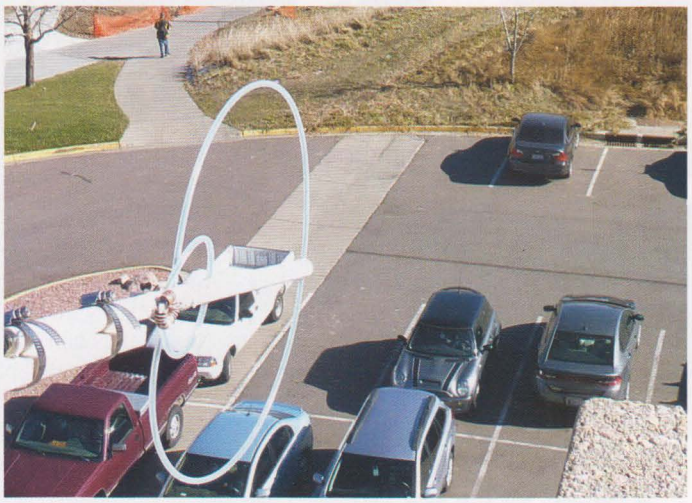


PHOTO 4: Tuned loop used with the field strength meter for mobile antenna testing

and separate resonating coils were used to maintain resonance in each configuration. The computer model indicated less than a dB difference between the grounded and isolated configurations. According to W0IVJ these tests appear to support modelled predictions.

ANOTHER ANTENNA MOUNT SOLUTION.

It would appear some vehicles have roof rack fixing arrangements that make it easy to install an antenna mount. Barry Keal, G4HDU found this out when he bought an adapted wheelchair accessible VW Caddy. He says "...I wanted to continue mobile operation with my FT-8900 but didn't want to drill holes in the vehicle. I also wanted to add the provision for HF mobile operation with my FT-897D and therefore required two antenna fixings.

"...I found that there were four threaded holes with screws in the roof for mounting roof bars and roof racks. Removing one of the screws revealed that secure fixing could be made using these mounting holes. (It would be interesting to know what other vehicles have this roof rack fixing arrangement.)

"I checked the internet for a suitable antenna mount and matching SO239 cable assembly. The mounting bracket I finished up required modification because the plates had ridges for mounting on roof bars. The fix was to straighten out one plate using a blowtorch and hammer. An extra hole to clear an M8 threaded machined screw was drilled in to the plate and a small piece of plastic cut out to go between the bracket and vehicle roof to protect the paintwork. The SO239 mount was mounted on the bracket along with a short length of braided wire to connect to ground under the mounting screw washers.

"The original screws provided by VW were not very long and made from a rather soft metal. I tracked down some hex socket set screws of the correct length and made from stainless steel from the Internet. The antenna mount is shown in **Photo 5** and now supports an ATAS 120A to go with the FT-897D".

SUCTION CUP ANTENNA MOUNT.

You may recall a suction cup antenna mount used by G4UDU and briefly described in March 2013 Antennas. A search of the internet revealed a whole range of these suction pad lifters and so I invested in a four-suction pad from Silverline, according to the instructions, capable of lifting a load of 120kg!

PHOTO 5: G4HDU Mobile antenna mount on the roof of a VW Caddy.

This turned out to be not a good idea for fixing an antenna mount to a vehicle. The reason being that these devices are used for lifting heavy sheets of glass and they work well providing that the surface is smooth and flat. If the surface is not flat then one or more of the suction cups is not in full contact with the surface and nearly all vehicles have curved surfaces. (This problem is not as bad when using a two-suction pad).

The idea was quietly forgotten until I received a request from John Glennon, G4ZQK on a method of fixing an 8m fibreglass pole to a motor home for portable use. Now I don't have a motor home, but the XYL does have a horsebox with flat sides. The Silverline suction pad has a hollow handle, which takes a 22mm copper pipe, which in turn allowed a telescopic roach pole to be fixed very firmly to the side of the horse box as shown in **Photo 6**.

PHOTO 6: A five-metre roach pole fixed to the side of a horsebox using a four-cup suction pad and a length of 22mm copper tube.

Looking ahead

RSGB events for your diary

This autumn, there are two RSGB events worth putting in your diary: the National Hamfest (27 & 28 September) and, two weeks later, the RSGB Centenary Convention (11 to 13 October).

RSGB CENTENARY CONVENTION. Horwood House is a conference centre set in 38 acres of landscaped grounds in the Buckinghamshire countryside just eleven miles from Milton Keynes. For many in the hobby the old HF Convention wasn't for them – well I'm pleased to say that the RSGB Convention has, by widening its appeal, successfully broken down those apparent barriers. Its aim is, in simple terms, to have something for everyone, be it HF, be it VHF, be it Microwave, be it analogue be it digital, be it operating, be it technical.

The programme will contain some very impressive talks and, taking onboard lessons learnt from last year, we'll be looking to give delegates more choice by repeating more lectures over the course of the weekend.

Being the Society's Centenary Year there will, of course, be a Centenary element to the programme combined with some forward looking technologies, along with the usual favourites IOTA, DXing, microwave, technical, contesting, something for the newcomers etc. Highlights currently include Joe Taylor, K1JT who'll be presenting a lecture entitled DXing with weak signals, Don Studny, VE7DS (a member of the Campbell Island DXpedition ZL9HR that activated Campbell in November 2012) and Michael Wells, G7VJR, presenting the recent DXpedition to Easter Island, XR0YG.

The RSGB Convention is as much a social event as a learning opportunity and the ML&S buffet on Friday evening and the gala dinner on Saturday evening both provide the ideal backdrop to catching up with old friends, making new ones, discussing how you did – or didn't – manage to work that elusive DXpedition, how successful or otherwise you were in your efforts working EME or microwaves or whatever. It's hoped that we'll be able to bring you some hands-on opportunities, be it either operating the latest equipment connected to the Convention's demonstration station or some hands on test gear we're hoping to make available, along with a lecture or two on how to use it!

As in previous years it will be possible to take the full suite of UK exams at the Convention, contact the RCE department at RSGB HQ on 01234 832 700 for more information – remember, candidates must book their exams prior to the event and have completed the required practical assessments before taking the exams. The US exams will also be available; candidates can turn up on the day but will need to have some form of ID, preferably photo ID, and a US postal address where the FCC can send your licence. More details nearer the event.

Hotel packages, dinner tickets, lunch tickets and day tickets can all be booked online via www.rsgbevents.org. A word of warning, based on last year's successful event, demand is likely to be high so why not take advantage of the early bird discount by booking early, ie before 18 August. The overall programme will appear shortly on the RSGB Convention web pages (www.rsgb.org/rsgbconvention) and is subject to change right through until the final programme appears in the October *RadCom*.

NATIONAL HAMFEST. Plans are also well underway for the National Hamfest 2013, organised by the Lincoln Shortwave Club in conjunction with the RSGB. Many radio manufacturers and traders have already rebooked for this year, following the increasing success of the event in recent years. International suppliers, as well as the usual smaller traders, clubs and special interest groups have also started booking their space. The organisers are looking to build on the success of the car boot area last year which was so popular with visitors. 2013 looks to be a bumper year for visitors wishing to grab a bargain.

Large and small traders will be at the National Hamfest in September.

There is much besides the trade element of the show. Visitors can look forward to a full lecture programme and more besides. Celebrating their Centenary you can guarantee that the RSGB will have a few surprises, as well as the usual 2014 Year Book Launch, massive book stand, committee and regional stands. There will the usual 'Bring & Buy' stall, so start sorting through your shack and see what you can sell to finance some of the latest equipment on sale, or a bargain from the car boot sale – because there will be lots of goodies to choose from. Morse assessments will also be available on demand throughout the show.

The RSGB Centenary station GB100RSGB will be operated onsite by the Camb-Hams vehicle 'Flossie' and the Hamfest special event station GB13NH will also be operating. Both will be allowing amateurs to operate from them so bring your licence along and play a little radio. Sheffield club are also planning to be on site with the refitted GB4FUN vehicle to air its new callsign.

Bookings for tickets are now open so you can already buy tickets at a discount, with new ticket options for this year. The Hamfest is still offering special discount packages of tickets so perhaps now is the time to arrange that club visit to the event. Not only are pre-booked tickets convenient and cheaper than day tickets, you also get that opportunity to avoid the queue and get in using the priority admission entrance – the perfect chance to beat the crowd and grab a bargain.

With less than 150 days to go, let's look forward to some warm dry weather for what is planned to be the Biggest and Best (Inter) National Hamfest so far. Look forward to seeing you there.

To book and for more details visit www.nationalhamfest.org.uk.

Radio Society of Great Britain
100 YEARS 1913 - 2013

Centenary Convention 2013

11 -13th OCTOBER 2013

- DXpedition Lectures
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- Contest University
- DXCC Card Checking
- UK and FCC exams
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- VHF Lecture
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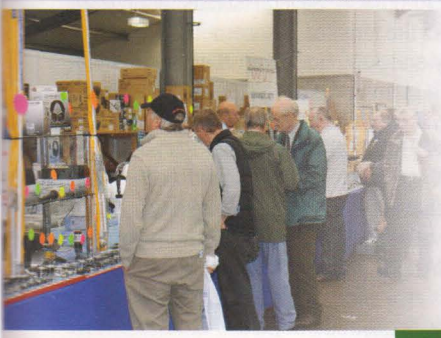
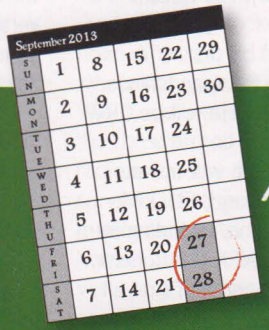


Friday 27th & Saturday 28th September 2013

INTER→ National Hamfest



Make a note on your calendars!

Show Highlights

- Centenary RSGB stand with RSGB committees and book stall
- Free raffle and parking
- Manufacturers stands
- International traders
- Club stands
- Special Interest Groups
- "Bring and Buy" stand
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IOTA 2013 Honour Roll

The latest news and updates from the IOTA community

HONOUR ROLL. The 2013 IOTA Honour Roll and Annual Listing has now been published on the RSGBIOTA website (www.rsgbiota.org/) under the 'IOTA Directory' tab. The top ten places are as shown in **Table 1**.

I1JQJ has regained first place and 9A2AA remains second. F9RM sadly passed away recently but, under IOTA rules, is listed in the year after his death. The first UK station is Les, GM3ITN, in 35th place, followed by G3NDC and myself in equal 48th position. One can assume, however, that Roger, G3KMA, would be up there near (or at) the top if he allowed his score to be published.

IOTA MARATHON. Having started in January 2012, the IOTA Marathon is now well into its second year. It's clear that there has been a huge number of IOTA groups active, with a lot more to come – as the information below confirms. The IOTA Contest comes up at the end of July and, given the ever-increasing activity scheduled then, the bands will be buzzing with IOTAs. The Marathon finishes on 31 December 2013 and we are looking forward to a bumper number of entries. Check your log and see how you are doing. It's not too late to start.

UK CHECKPOINT CHANGE. Tony, G4VMX stood down on 1 May as checkpoint for Scotland, Wales, Northern Ireland, Channel Islands, Isle of Man and all British SWLs. The IOTA community is grateful to Tony for his help and support and wishes him the very best on his retirement from checkpoint duties. In Tony's place we welcome Bob Barden, MDOCCE, who has agreed to take over responsibility for this checkpoint area. Bob's address is correct on QRZ.com.

NEW ONES. If all went, well the Egyptian Radio Amateur Society for Development will have activated Nelson's Island, AF-109, between 3 and 10 May for an all-time new one. The next unactivated group is timetabled to appear on 17 to 24 June when Stewart Island, OC-285, is expected (see later).

EUROPE. Keith, G3TTC, is planning a major operating saga during June and July. He will begin in Sweden with EU-137, 138, 177, 84, 176, 87, 15 and 139 then move to Norway in July for EU-141, 44, 46, 33, 76, 62 and, finally, (for the IOTA contest) EU-061. That collection of islands should certainly help his IOTA Marathon score! Check his QRZ.com entry for the exact dates nearer the time.

F4FET will be operating /P from EU-107 for a few days between 30 May and 5 June, and then from EU-157 on 27 to 28 July for the IOTA contest.

TM0AI will be located on Anneret Island, EU-039, from 18 to 20 May.

The Castres DX Gang will be QRV as TM5FI from Ratonneau Island, EU-095, on 15 to 22 May. QSL to F5XX.

French club station F6KUF/P will be QRV from Noirmoutier Island (EU-064) from 18 to 20 May. Activity will be on SSB, CW and RTTY on 80 through to the 2m band. QSL via F6KUF.

Rich, M5RIC, is heading to Zakynthos Island, EU-052, Greece, from 23 to 30 July including a single-op 24 hour entry in the IOTA Contest. He will now be using the call SW8CC, not SV8/M5RIC as previously announced. Activity will be on the 80 through to 10m bands on SSB and RTTY. QSL via M5RIC. http://m5ric.co.uk/iota2013/

DL1WA/P on Usedom Island, EU-129, will be in the IOTA Contest at the end of July. QSL via DL1WA. Ops will be DL4WA, DL1WA and DL3ARM.

DL1AXX will be QRV from Baltrum Island, EU-047, from 20 to 26 May. QSL to his home call and check www.mydarc.de/dl1axx.

DJ2II will activate Langeness Island, EU-042, from 21 to 29 May. His website is at www.dj2ii.de.

G7SQW has announced his first IOTA activity, which will be from the Aran Islands, EU-121, from 27 to 29 May. He will be QRV 40-6m as EJ/G7SQW.

HA0HW (ex J48HW), Laci, will operate as SW8WW from Thassos Island, EU-174, Greece from 23 May to 5 June, including an SOAB effort in the CQ WW WPX CW Contest. Activity will be on CW, SSB and RTTY on all bands, including 6m. QSL via HA0HW either direct or via the HA QSL bureau.

The Camb Hams will be active from Mull EU-008 as GS3PYE/P until late on 16 May.

OCEANIA. YB3MM will be QRV from Madura Island, OC-237, at some time during May but will be on Sebasi Island, OC-262, from 18 to 19 May. He also hopes to be active from OC-166, but the exact island and date are not yet known.

The IOTA activity by YB5NOF and YB5QZ from the Banggai Islands, OC-208, which was announced to start on 26 April, has been postponed. Hopefully a special callsign (possibly YE8P) will be issued in late April, and operations might take place around mid-May. Should the special callsign not be issued, John and Anton will be QRV as YB5NOF/8 and YB5QZ/8.

The upcoming H44IOTA DXpedition to four Solomon Islands in June of this year has posted the following schedule to their QRZ.com webpage: 1 to 4 June New Georgia (OC-149), 6 to 8 June Russell Islands (OC-168), 10 to 13 June Florida Islands (OC-158), 17 to 24 June Stewart Island (OC-285). This will be the first IOTA activation from OC-285. Operators include Ralph, H44RK; Dominik, SQ9KWW; Tom, WL7HP and Maggie, H44MK. More details at www.h44iota.com.

In July, the ops will also be going to three IOTA groups within Temotu Province (H40). The scheduled posted on WL7HP's QRZ.com web page is as follows: 1 to 7 July Nendo Island (OC-100), 9 to 12 July Vanikolo/Utupua (OC-163), 14 to 16 July Reef Islands (OC-065).

NORTH AMERICA. Several islands in Honduras are targeted for operations between late May and July. Honduran Navy permission, including permitted dates, is being requested. HQ8D will be Gracias, NA-223; HQ8S, Santanilla, NA-035; and HQ3W, Cochinos, NA-160.

Members of the NA-128 Contest Group will activate special callsign CF2I from Ile Verte, NA-128, from 24 to 28 July, including a multi-single effort in the 2013 IOTA Contest. See www.qrz.com/db/CF2I.

SOUTH AMERICA. PQ5M will be QRV from São Francisco do Sul Island (SA-027) from 26 to 28 July, with an emphasis on the IOTA Contest. Equipment will include an FT-450 running 100W into a tribander and vertical for activity on CW, SSB and RTTY on the 7 through to 28MHz bands. QSL via PP5BZ.

TABLE 1: 2013 IOTA Honour Roll and annual listing.

Position	Callsign	Score
1	I1JQJ	1098
2	9A2AA	1097
3	F9RM	1094
3	VE6VK	1094
5	WD8MGQ	1091
6	I8KNT	1090
6	ON6HE	1090
8	F2BS	1089
9	I1SNW	1088
10	I8XTX	1085
10	VE3XN	1085

Book Review

Celebrate the Centenary with a history of the RSGB

Centenary – 100 Years Working for Amateur Radio

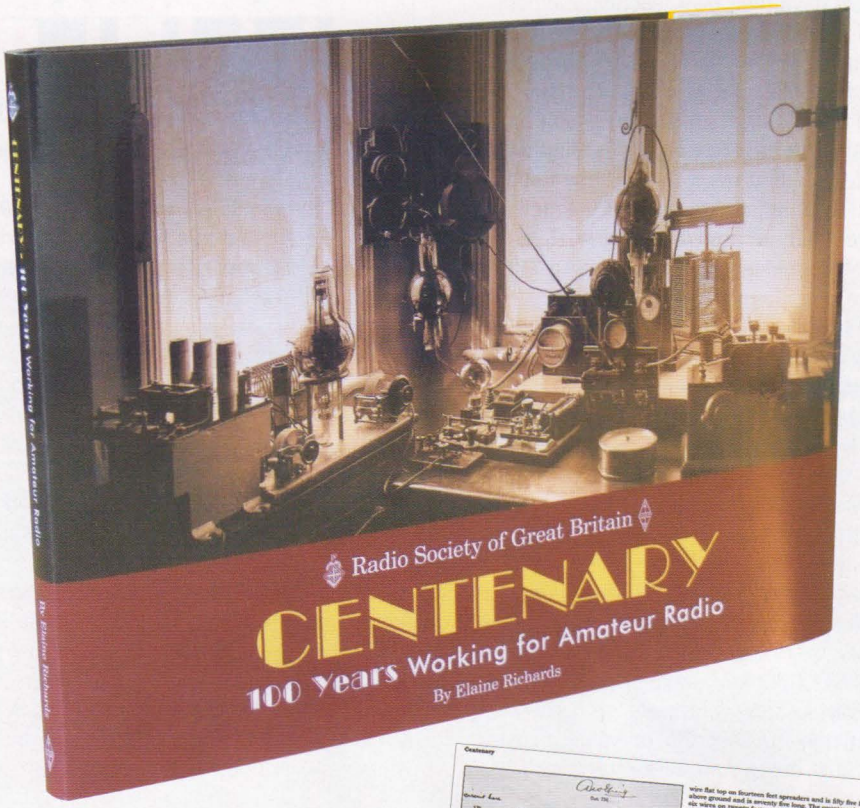
Elaine Richards, G4LFM

I have an inkling just how many hours of exhaustive research have gone into preparing this beautiful book. Elaine seems to have spent every spare minute for the last several years on historical research, including many, many very long days trawling through the RSGB archives and the library at the National Radio Centre. The result is a remarkable view of the people who have helped shape amateur radio and the Radio Society of Great Britain over its first century.

A lot has happened in the hundred years since four men got together on 5 July 1913 and founded the London Wireless Club. Radio has come an enormous way – and this book shows just how influential amateur radio enthusiasts have been in the refinement of the art and science. From the Transatlantic Tests of the early 1920s to the latest digital modes, this book covers it all. Its style is far more people-centric than its spiritual predecessor, *The World At Their Fingertips*, written in the 1960s by John Clarricoats, G6CL – and, of course, there's now a lot more history to cover!

One of the things I particularly like is the short biographies that pepper the pages, highlighting a person's contribution to amateur radio. The range is wide, including people such as Sir Oliver Lodge (President in 1925), Dud Charman, G6CJ with the remarkable photograph of his little-publicised work at Hanslope Park during the war, Pat Hawker, G6VA (detailing his wartime service) and Helen Sharman, the first British astronaut, who operated GB1MIR aboard MIR in 1991.

But the thing that comes over most clearly is the rich tapestry that is the history of the RSGB. For example, I learned how since its earliest days the Society has helped organise many scientific research projects, particularly into propagation. Then there are the international aspects – from representing the interests of British (and, originally, Empire) amateurs at intergovernmental level through to comfort parcels sent to Members who were POWs in the Second World War. As an aside, I was surprised to discover that during the war the ARRL sent parcels of tea, cocoa, marmalade and sugar to the RSGB in a gesture of fraternal support; I was even more amazed to discover that this continued through post-War rationing into the mid-1950s, with other Societies in Australia, Canada and South Africa showing their generosity too.



The service of the RSGB Members during both World Wars is something of which the Society can be justly proud. At the outbreak of WWI, the younger Members, ready trained, flocked to the wireless units of the Navy, Army and Air Force where they served with distinction. During WWII, radio amateurs were called up into the three armed services. Many of those radio amateurs not employed in the three services were recruited to become voluntary interceptors (VI). Operating from their own homes, in back bedrooms and sheds, these Voluntary Interceptors enthusiastically carried out their task. Their reports were posted to a mysterious Box 25, in Barnet, North London. After sorting, they were passed on to the Government School of Codes & Ciphers at Bletchley Park. Amongst the signals heard and reported were many coming from the German Secret Service.

Elaine's exclusive access to the RSGB archive has turned up much unexpected material and original documentation that helped her piece together fascinating stories that have otherwise existed in only fragmentary form, if at all.

Whilst it would be impossible to include all the stories and people who have contributed to our Society's first century, this book certainly paints a series of very vivid pictures that give a fine flavour of the events. Supported by a wealth of rare photographs and facsimile documents, it is a magnificent view of a hundred years of progress and achievement. Highly recommended.

ISBN 978-1-90508-689-4
144 pages, 300 x 225mm
Non Members' price £19.99
Members' price £16.99

Getting started in Morse

TUTORING AND THE GB2CW SCHEME.

Tutors have their own teaching methods and, no doubt, there will be those that disagree with mine. However, I have been teaching Morse now since 1957 and have had many successful students, so I am leaning on my experience. The first thing to do is to find out if there is any tuition at your local radio club. Here, in Norfolk, we have tuition at our club on club nights for one hour before the main meeting. We also have three tutors who provide an interactive one hour session one night per week each on two metres FM. We can cater for various speed levels in that way, teaching from the raw beginner to those aspiring to a 30 wpm level.

I am the RSGB GB2CW Co-ordinator, which is a national scheme for group tuition on the air using the GB2CW call. There are volunteers all over the UK, so it would be a good idea to see if there is participation in this scheme at your club. I would like to see every club in the UK have their own GB2CW volunteer tutors. We are always looking for new volunteers, so if you are a suitably qualified CW operator, please consider doing your bit for the hobby.

LEARNING THE CODE.

There are two methods of learning Morse. One is by using the Koch method. This entails learning and practising with a couple of characters to start with, say M and K. Then, when completely familiar with those, adding another one or two characters. This is fine if you are alone, but within a group of students, it does limit what can be done and also prolongs the course in my opinion. I have always advocated learning the whole code at one time. This includes the complete alphabet, numbers 0-9 and four punctuation characters, period, comma, slash and question mark. Once the whole lot has been committed to memory, then the practice begins.

How to commit them to memory is the first large step. Several ways can be adopted. First of all however, you must learn Morse as it will be heard. For example, you don't learn the letter A by saying to yourself it's a dot and a dash. The letter A sounds like "di-dah". The whole character set should be treated this way. One method is to have somebody (an understanding XYL perhaps?) ask you to convert the characters to Morse. You could also do the same in reverse, by having her ask you what "di-di-dah-dit" is.

You can make some cards that you carry around with you, with the character on one side and the Morse representation on the other. Take one out at a time and convert whichever way round the card is displayed to you. This learning of the complete code does take time, so join your local tutoring group after you have learned them. This part does seem like hard work at first, but it is the only way. There is no short cut method to learning I am afraid. I always use the analogy of learning the piano. The answer a concert pianist gave when somebody commented how lucky he was to be able to play like that, sums it up. He said, "Yes, and strangely enough the harder and longer I practice, the luckier I seem to get".

So, you will hear the word 'practice' repeated and repeated until you are sick of it! Remember that quitters never win, and winners never quit!

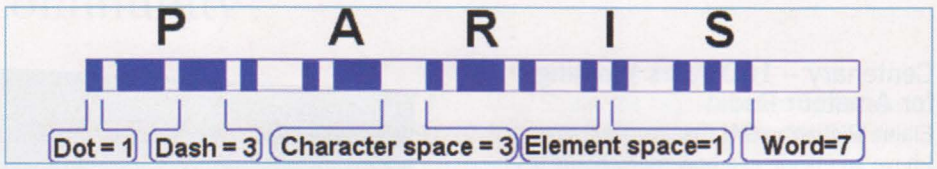


FIGURE 1: PARIS has a total length of 50 dot lengths, as does a typical English word.

THE CODE.

Timing and spacing are just as important as the character formation. Badly spaced characters and badly formed characters lead to bad Morse. Morse is an art form and beautifully sent Morse is a pleasure to listen to. As an example in this text, read the following:

Th emic rovol tsensitivi yofarec eiverisdependen tupont hebandwidth

Not easy to read, is it? his is assuming correct character formation too, just badly spaced. Now imagine some really bad character formation as well! You wouldn't want to have a QSO with the sender! This is why we don't recommend any student start sending until they are able to receive properly sent Morse at around 12 wpm.

Standard timing is as follows:

The period of a single dot is one unit, measured in seconds.

A dash is a period of three units.

A period of one unit separates each element (dot or dash) within a character.

A period of three units separates each character within a word. A period of seven units separates each word.

The basic element of Morse code is the dot and all other elements can be defined in terms of multiples of the dot length. The word PARIS, **Figure 1**, is used because this is the length of a typical word in English plain text. It has a total length of 50 dot lengths. If the word PARIS can be sent ten times in a minute using normal Morse code timing then the code speed is 10 WPM.

The character speed is related to dot length in seconds by the following formula:

Speed (WPM) = 2.4 / (dots per second)

Here are the ratios for the other code elements:

Dash length: dot length x 3

Pause between elements: dot length

Pause between characters: dot length x 3

Pause between words (see note): dot length x 7

Note: For learning the code, this ratio is often increased so that overall text speed is lower than in standard Morse code. This stretched code is called Farnsworth code. This entails sending the characters at around 25 wpm with a large spacing between characters to allow for thinking time. Eventually the target is to have *no* thinking time at all, just an instantaneous conversion of the Morse to plain text. This takes time and lots of practice!

Look at **Figure 2.** This shows just what you have to learn. Again it takes time but don't give up. Once you have learned all the characters you are then ready to join the study group. This will start at around 5 wpm and takes about one hour per week. You will be sent letters, numbers, and punctuation and so on and the speed

GB2CW

I am the RSGB GB2CW Co-ordinator, which is a national scheme for group tuition on the air using the GB2CW call. I would like to see every club in the UK have their own GB2CW volunteer tutors. We are always looking for new volunteers, so if you are a suitably qualified CW operator, please consider doing your bit for the hobby.

Take a look at the RSGB Morse pages and there you will find a listing of volunteers and assessors nationwide. The RSGB also provide an examination and certification for various different speed levels, so a nice piece of wall paper is available too. Studying in a group provides a friendly competition between students and also a rapport with the tutor that can be a lot of fun.

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will gradually increase over several weeks. A few comments about prosigns; these are procedural signals and consist of two characters without a space. In other words, SK will sound like di-di-di-dah-di-dah, with the S and the K rolled into one. These will be explained to you as you progress. There are quite a lot of these, but not that many are used on the amateur bands.

Practice are home is very important. The tutor doesn't really improve your Morse. He is really an adjudicator. The real hard work is down to *you*. You are the only one who can improve your ability. Remember my piano analogy? Well, the same applies here too. If you do no practice you will be left behind. The tutor can always tell whether you have done any practice too, so don't try any bluffing or excuses! You should be prepared to put in at least 30 minutes a night, preferably more, if you wish to become proficient in this mode.

It will also help on CW to know the Q-code as a number are used, and don't forget each Q code has two meanings, as in QTH and QTH? QTH means "The location is ...". QTH? means "What is your location?". A full list of Q-codes is on the *RadCom* section of the RSGB website.

PRACTICE IN GROUPS. You now have several months of hard work to do with your group and I do hope you manage to find a local GB2CW group with which to practice. It is so much more fun and more rewarding too. If you have to practice on your own, try listening to W1AW online. The code speeds are from 5 to 35 wpm and should be a great help. You can also download lots of Morse programs to help you. Try to pick one with a pleasant tone with it, as this always helps when receiving Morse. TEACH4 by ZL1AN is the one we use here for teaching and also for practice at home. You can import text files and all sorts of things into it. G4FON uses the Koch method and it is useful to vary your practice by using different means. If you require some callsign practice, try RUFZ. This sends a series of callsigns to you starting off really slow. If you copy correctly the program speeds up gradually until you make a mistake. Then it slows down again. This is great practice to obtain correct copy.

SENDING. After receiving at around 12 to 15 wpm and feeling comfortable at that speed, it is time to learn to use a key. Try to obtain a good straight key with a heavy base that won't move around on the desk. I am of the old school and that says you should learn to send on a straight key first. This will prove you know the correct formation of characters, correct spacing and well sent Morse with few mistakes. The technique of using a straight key should be shown to you by somebody who can use a straight key properly, as it does take some practice to get it correct. They can show you how to hold the key correctly and how to key from the wrist, using the arm as a lever with the wrist being the actual point at which you form the Morse characters. Holding the key will then make the key follow your wrist. It is not easy to explain, but must be carried out correctly, hence my emphasis on an instructor. Bad habits are extremely difficult to break and lead to bad Morse, which will inevitably lead to zero contacts!

PRACTICE. Now where have you heard that word before? Yes, this will require a lot of practice. If you can have one to one sessions with your tutor, you can now get into QSO format. Having learned all the abbreviations that appear on the *RadCom* section of the RSGB website, some mock QSOs can now be had and all the mistakes can be made before you go on the air. Oh yes, you will also have to learn the RST reporting system, on the *RadCom* section of the RSGB website. Again, this takes time and practice so please keep it up! This is the basic form of QSO to start with:

CQ CQ CQ, DE G5XX G5XX G5XX CQ CQ CQ, DE G5XX G5XX G5XX AR K

G5XX DE G9QB G9QB AR KN

G9QB DE G5XX GM OM ES TNX FER CALL UR RST 599 599 = NAME IS IAN IAN ES QTH STAINES STAINES = SO HW CPY? AR G9QB DE G5XX KN

G5XX DE G9QB FB OM ES TNX FER RPRT UR RST 599 599 = NAME IS MIKE MIKE ES QTH NR LONDON LONDON = SO HW? AR G5XX DE G9QB KN

G9QB DE G5XX FB MIKE ES TNX FER RPRT = TX RNG 30 WATTS ES ANT VERT = WX FB SUNNY ES ABT 23 C = SO HW CPY? AR G9QB DE G5XX

G5XX DE G9QB R R AGN IAN = RIG HR RNG 100 WATTS ES ANT DIPOLE UP 10 METRES = WX WET ES COLD ABT 5 C = G5XX DE G9QB KN

G9QB DE G5XX FB MIKE ES UR RIG DOING FB. QRU = QSL VIA BURO = 73 ES HPE CUAGN SN AR G9QB DE G5XX KN

G5XX DE G9QB R R QRU ALSO = QSL FB VIA BURO = SO TNX FER QSO 73 ES BCNU AR G5XX DE G9QB VA

G9QB DE G5XX FM 73 ES BCNU AR G9QB DE G5XX VA

Several of these can be found in TEACH4 and other programs, so try to become familiar with this format. Your tutor will be sending some to you anyway and asking for comments afterwards.

ON THE AIR. Having practiced this for some time, you should be ready to go on the air. Try to have a few QSOs with local friends who understand you being nervous for the first time on the air. Plan a QSO and, if necessary, write down what you wish to send. You will, however, have to copy what is sent to you!

Listen around the bands on the CW end as much as you can. It will be good experience to know what to find and where. You will find a lot of fairly slow Morse on 80 metres. Several of the students from the Norfolk Club can be found on that

FIGURE 2: WHAT NEEDS TO BE LEARNT.

Letter	Morse
A	di-dah
B	dah-di-di-dit
C	dah-di-dah-dit
D	dah-di-dit
E	dit
F	di-di-dah-dit
G	dah-dah-dit
H	di-di-di-dit
I	di-dit
J	di-dah-dah-dah
K	dah-di-dah
L	di-dah-di-dit
M	dah-dah
N	dah-dit
O	dah-dah-dah
P	di-dah-dah-dit
Q	dah-dah-di-dah
R	di-dah-dit
S	di-di-dit
T	dah
U	di-di-dah
V	di-di-di-dah
W	di-dah-dah
X	dah-di-di-dah
Y	dah-di-dah-dah
Z	dah-dah-di-dit

Digit	Morse
0	dah-dah-dah-dah-dah
1	di-dah-dah-dah-dah
2	di-di-dah-dah-dah
3	di-di-di-dah-dah
4	di-di-di-di-dah
5	di-di-di-di-dit
6	dah-di-di-di-dit
7	dah-dah-di-di-dit
8	dah-dah-dah-di-dit
9	dah-dah-dah-dah-dit

Punctuation Mark	Morse
Full-stop (period)	di-dah-di-dah-di-dah
Comma	dah-dah-di-di-dah-dah
Question mark (query)	di-di-dah-dah-di-dit
Slash (/)	dah-di-di-dah-dit

Prosign	Morse
AR, End of message	di-dah-di-dah-dit
AS, Wait	di-dah-di-di-dit
BK, Break	dah-di-di-di-dah-di-dah
BT , New paragraph	dah-di-di-di-dah
CL, Going off the air (clear)	dah-di-dah-di-di-dah-di-dit
CT, Start copying	dah-di-dah-di-dah
KN, Invite a specific station to transmit	dah-di-dah-dah-dit
SK, End of transmission	di-di-di-dah-di-dah
VE, Understood (also used as pre-message)	di-di-di-dah-dit

band in the afternoons especially. The more contacts you make, the more you will wish to make and the more relaxed you will become. You will also notice your speed increase with increasing confidence. Now is a good time to find out what sort of paddle you are happy with too. Try several before committing to one in particular. I prefer a single lever paddle myself, but you may like an iambic twin lever. Don't buy the cheapest, get one with some quality to it and it will last years. Strangely enough, having bought a paddle, you have to do some practice in order to learn how to use it properly! Don't learn on the air!

MORSE BOOT CAMP. I was asked if I would be prepared to run a two week full time course. I am retired so I decided to open it up to anybody else who wished to attend. I was astounded when ten people from our Club replied! In the event we ended up with 8 and had to use all three tutors and three different classes. However, it did run for two weeks, 9am until 4pm for five days each week. All who attended benefitted and increased their speed and ability so we deemed it a success. I think it is the first time such a Boot Camp has been run in the UK. We had several tea-breaks and discussions too, so all enjoyed it. It was very tiring however. See **Figure 6**, L/R Paul, G3SEM, Malcolm, G3PDH tutor, Ray, G3XLG and Les, M0UMH in the advanced group. They ended up at around 26 wpm. This is real dedication.

FIGURE 6: Morse boot camp.

METAMORPHOSIS TO SLICK OPERATOR. You won't quite be there yet, you will probably need a lot more practice but more importantly a lot more experience. It will help to join groups like FISTS, joining in with their activities, chasing DX, getting into some of the pile-ups and also getting into a few contests. Start off with short ones such as the RSGB CC contests. There is a section for the slower operator, so build your confidence by using the mode at every opportunity. Download some useful programs such as Morserunner, N1MM contest program and start keeping a CW-only country score. You will find the more you use it, the more you will want to. You can also obtain the RSGB Morse Proficiency Certificate, a nice piece of wallpaper, of which you will be very proud.

You might even then consider becoming a GB2CW volunteer yourself, in order to help others to enjoy the wonderful world of Morse. We do need more volunteers to help in this regard. To paraphrase John Kennedy, "Think not what your club can do for you, rather what can you do for your club".

WEBSEARCH

Morserunner: www.dxatlas.com/morserunner/
Pileuprunner: www.dxatlas.com/PileupRunner/
Teach4: www.nsarc.ca/training/code/cw_teach.html
AA9PW:
http://aa9pw.com/morsecode/learning_the_code/
G4FON: www.g4fon.net/CW%20Trainer.htm
Learn CW online: http://lcwo.net/
N1MM contest program:
http://n1mm.hamdocs.com/tiki-index.php
W1AW Code Practice files:
http://www.arrl.org/code-practice-files

EMC

LED lights and solar PV systems continue to raise EMC issues

LED LIGHTING – VHF NOISE. The subject of VHF interference from LED lighting has come to the attention of the consumer organisation Which? One person reported that they replaced nine lights in the kitchen with 4.3W MR16 warm white LEDs but when the LED lights were turned on, the DAB radio in the adjoining dining room stopped working immediately. Others reported hiss on a portable FM radio and in one case digital TV reception was affected. Which? also published an item about interference from LED lamps in their magazine that said that they wanted to hear from anyone who knew why this was happening. The RSGB EMC Committee knows something about this so we responded and provided some input.

As mentioned in April 2013 *RadCom* EMC, we are aware of interference from some LED lighting products at LF/MF/HF and VHF including amateur radio bands, FM broadcast and DAB. Broadband interference sources that affect FM broadcasting at 88 – 108MHz or terrestrial DAB at approximately 210 – 230MHz are also likely to affect the 144 – 146MHz amateur band, which lies in between. By raising awareness of this issue in relation to FM and DAB, this should add weight to the case for better protection of amateur radio bands including 144 – 146MHz. The RSGB EMC Committee is represented on various standards committees that deal with, among other things, LED lighting and solar PV systems.

The matter of radio interference from LED lamps has already been investigated by, among others, the UK EMC test laboratory METECC (see Websearch). The presentation by METECC shows that some LED lamps on the market appear to be non-compliant with the relevant EMC standard, EN55015:2006 + A2:2009, which tests up to 300MHz.

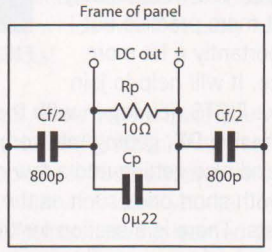

FIGURE 1: RF equivalent circuit of a single solar PV panel with typical values.

The 30 – 300MHz VHF range includes the DAB and FM radio broadcast bands and three amateur bands.

For mains-powered lamps, the standard includes conducted emissions in the range 9kHz – 30MHz but the standard does not cater fully for a recent development, 12V AC/DC LED spotlights that operate from a separate transformer (as the lamp itself is not mains powered). These devices are intended as low energy replacements for 12V halogen lamps. Any tungsten filament lamps are considered to be 'benign' and do not require EMC testing, but 12V LED lamps *do* require EMC testing. In the case of LED lamps, the actual LEDs are benign but they require some sort of control circuitry and this is generally a switching regulator, which isn't benign. The standard only requires radiated tests for such lamps but no conducted emission test below 30MHz is currently required on the 12V supply wiring of the LED lamp itself. The METECC tests showed that the conducted emissions from some 12V LED lamps into the supply wiring below 30MHz are up to 60dB higher than the limit that would apply to a lamp that operates directly from 240V AC mains. One consequence of this is that the 12V wiring may radiate, depending on the configuration.

Another issue with 12V powered LED lamps is that the levels of RF interference may vary greatly with supply voltage. For example, some 12V LED lamps produce little or no RFI at DC supply voltages of 11V or 12V but produce substantially more at 13V or above when the regulator starts switching. Other types are noisy at all operating supply voltages.

Apart from some products not complying with the existing standard, there are also a number of other issues with the standard itself. The VHF radiated limits in the standard are specified for a distance of 10 metres, whereas in practice the separation between the LED lamp(s) and the 'victim' radio receiver may be significantly less. Although the limits may still protect DAB reception at the edge of the service area with a separation of significantly less than 10m, this is still an issue that needs to be reviewed.

Another issue is that the standard only tests a single lamp but in practice multiple LED spotlights lamps are often used and 10 in the same room would not be unusual. For emissions of broad band noise at VHF, 10 LED lamps emit 10 times as much interference power as one lamp, so the limit needs to be reduced accordingly.

SOLAR PANEL OR ANTENNA? The matter of EMC standards for grid connected power conditioners (GCPC) for solar photovoltaic (PV) systems has been mentioned on several previous occasions. At the moment, generic EMC standards apply but a product-specific standard is being developed by adapting CISPR11. Solar panels are connected to a DC power port on the GCPC. The CISPR 11 conducted emission limits for DC power ports below 30MHz reference telecommunications port limits. While telecommunication cables such as twisted pairs are generally fairly well balanced, DC power cables from solar panels are not and they can therefore act as an unintentional radiating antenna.

The product standard will apply to emissions from GCPCs but it also needs to cover 'optimisers' that may be fitted on a one-per-panel basis with 8 or more panels (and sometimes over 20). These multiply the emission of a total installation well beyond that of the single GCPC and this effect has been seen in practice, both at HF and VHF. As with LED lamps mentioned earlier, this needs to be compensated for by stricter limits on the individual items.

Solar PV arrays are normally mounted in an elevated and exposed position on a roof, rather like an antenna. The frames of the panels are also normally connected to separately-routed protective ground conductors. This introduces unbalance and makes them much more effective

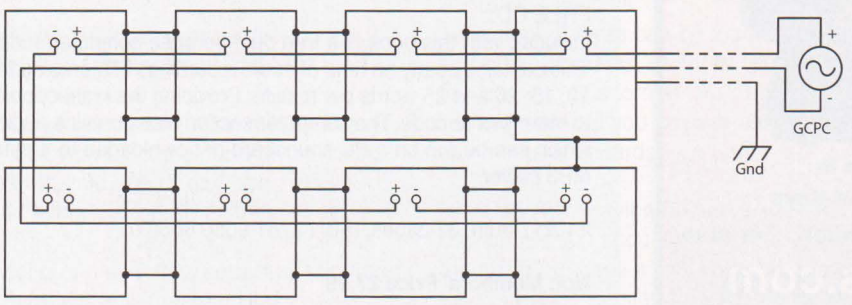

FIGURE 2: A single chain of 8 solar panels connected in series.

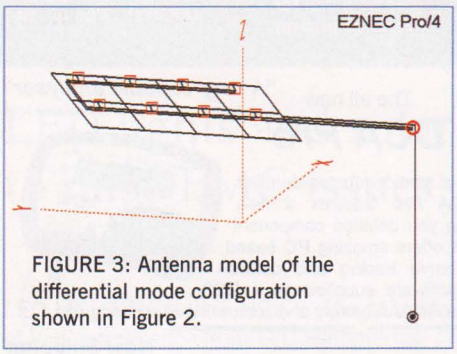

FIGURE 3: Antenna model of the differential mode configuration shown in Figure 2.

radiators of interference than a balanced telecommunication cable. The protective ground conductors can also complete a loop at RF that will radiate in its own right. These factors indicate that tighter limits should be applied. For GCPCs and optimisers intended for PV arrays, we conclude that both common mode and differential mode limits should be applied to DC power ports at a level 10dB more severe than the equivalent limits for AC power ports.

The limits for emissions from DC power ports below 30MHz use a conducted emission test, not radiated. In order to support the case for tighter limits, I have done some antenna modelling that shows how an array of solar PV panels and its associated wiring can act as an unintentional antenna on the HF bands.

First, we need to consider what a solar panel looks like for RF signals. A typical domestic solar PV installation may consist of eight or more 250W panels in a single series chain. A typical panel size is 1m x 1.6m and it contains typically 60 cells in series. The RF equivalent circuit shown in **Figure 1** was used for each panel. The DC output comes from a fairly low impedance Rp (10Ω or less) in parallel with a substantial capacitance Cp. This could be approximately 220nF for a 1m x 1.6m panel. As the reactance of a 220nF capacitor at 1MHz is only 0.72Ω, the impedance between the DC output terminals of the panel approximates to a short circuit at all HF radio frequencies.

There is also stray capacitance Cf between the panel and its frame and mounting rails. This is likely to be at least 1nF per square metre of panel and it may be much higher, depending on various factors including the type and proximity of the roof and whether there is a film of water on the panel.

Recommended installation practice for solar PV systems is to run the positive and negative DC power cables parallel and close together to minimise loop area. **Figure 2** shows a possible configuration with eight panels connected in series as a single chain. The frames of the panels are bonded together and are connected to a safety grounding conductor that is connected to mains earth somewhere.

Figure 3 shows an antenna model of the configuration shown in Figure 2. This uses *EZNEC Pro/4 v5.0* antenna modelling software by W7EL. In this model, the length of horizontal wire from the GCPC to the group of eight panels is 2.5m. The signal source shown as a red circle represents differential mode conducted emissions from the DC input port of the GCPC. These signals come from a balanced differential mode source, but nevertheless capacitive unbalance (mainly due to the PV arrays) results in unbalanced current flow that radiates effectively, as will be seen from the results below.

The red square symbols at each panel represent a load consisting of a 1600pF capacitor, which represents stray capacitance from panel to frame. This is connected between one DC power conductor and the frame of the panel. The GCPC is at a height of 8m above ground level and the protective bonding conductor is assumed to be connected to earth at ground level. A medium conductivity *MININEC* type real ground model was used.

The antenna model shows significant resonances at three different frequencies, as shown in **Figure 4**. Trial modelling shows that the impedance of the antenna at the feed point is greatly affected by the exact configuration of the DC power wires and the area of the loop that these form. Hence the antenna modelled here should be considered as an example of many possible situations that may occur in practice. However, the resonances are the result of basic physical characteristics of the installation. These will always be present; just the frequency and magnitude will vary. For example, in this case an extremely low feed point impedance of 2.4 - j3.7Ω is predicted at 12MHz. This occurs because at radio frequencies the DC circuit behaves as a short circuited transmission line and, at the frequency where the transmission line is a half wavelength long, the distant short circuit impedance will reappear at the feed point.

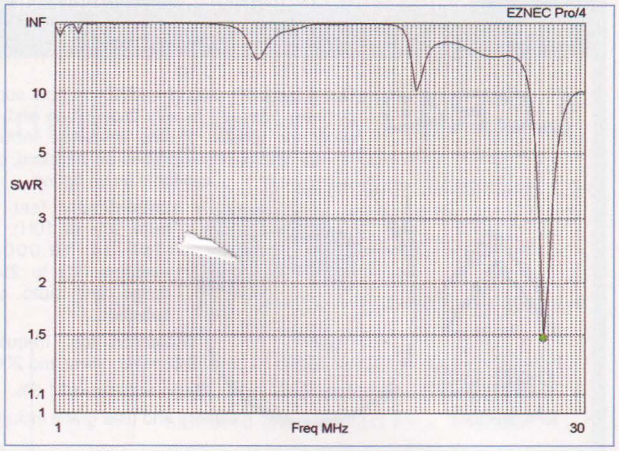

FIGURE 4: SWR plot of the differential mode antenna model (relative to 50Ω).

Figure 4 shows that at the 27.75MHz resonance, matching of the radiation resistance to the likely source impedance of the GCPC is particularly good, and so radiation will be particularly effective. **Figure 5** shows the far-field elevation plot. At a frequency of 27.75MHz, the antenna has a maximum gain of +2.59dBi for high angle radiation. If an azimuth plot (not shown) is done for an elevation angle of 10°, it shows that the antenna has a gain of +1.92dBi. The wiring was also modelled as an antenna for common mode signals from the GCPC but space does not permit its inclusion here.

What this antenna model shows is that at some frequency, the solar PV panels and associated wiring form an antenna that radiates rather like a half wavelength dipole. Exactly what this frequency is will depend to a large extent on actual wiring configurations; there will also be other significant variations due to the configuration of the mains earth wiring and also ground conductivity. Nevertheless, this model clearly shows that conducted emission limits for DC power ports on solar PV systems need to be much stricter than for telecommunication ports and also stricter than mains ports.

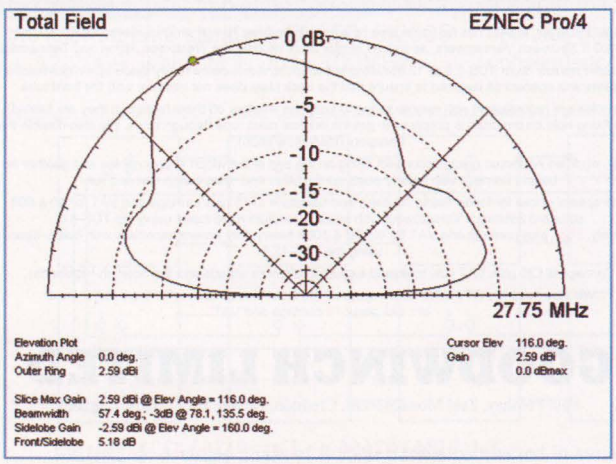

FIGURE 5: Elevation plot of the differential mode antenna.

WEBSEARCH

Which? Conversation – Your view: do LED light bulbs interfere with radios? – http://conversation.which.co.uk/energy-home/your-view-led-bulb-interference-dab-radios/

Which? The energy-saving LED bulb that switched off the radio – http://conversation.which.co.uk/energy-home/led-bulb-radio-interference-dab-test/

Presentation on LED Lamp Investigation by Peter & Sharon Metcalfe, METECC, www.metecc.eu. Available from the Electromagnetic Compatibility Industry Association web site, www.emcia.org/news.aspx?id=60

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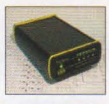

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NOW ONLY £229.95

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Input power: 10 - 200W PEP
SWR: <2:1
Power supply voltage: 12V +/- 10%
Current consumption: <0.8A
Auto tuning time: Approx. 2 seconds (first time tuning)
Less than 1 second (return to memory frequency)
Memory channels: 200
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2m/70cm V+U Mini-Mag with replaceable whip, 35cm with 4m cable terminated with reverse SMA female plug. Ideal for Wouxun range of handies..... £12.95

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

Design Notes

RF techniques and a case of mistaken identity

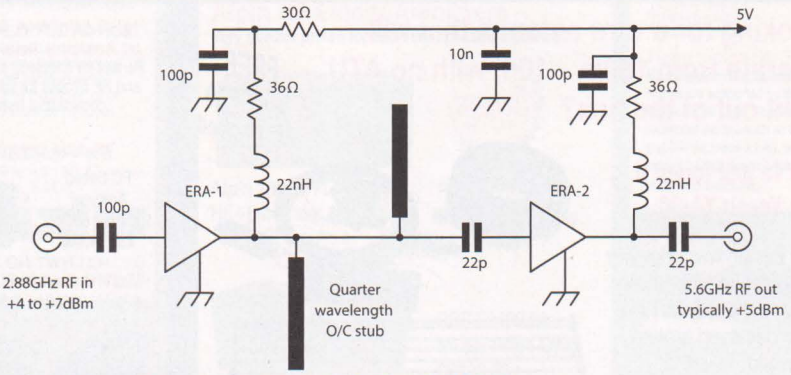

FIGURE 1: Modamp frequency doubler for 2.88 to 5.76GHz.

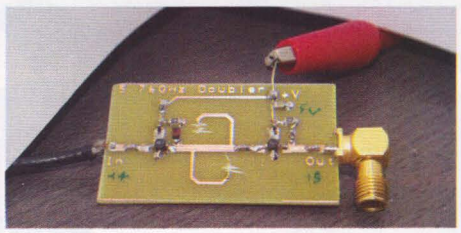

PHOTO 1: Test breadboard for the 5.76GHz modamp frequency doubler.

HARMONIC MIXING. December's Design Notes showed a frequency mixer that works with a local oscillator (LO) input at one half of the wanted frequency. That anti-parallel diode design is only suited to narrowband working as it uses tuned circuits to isolate the ports, but subharmonic mixing is also possible using standard packaged diode ring mixers such as the well know SRA-1 type. The full frequency range of these wideband diode rings can then be exploited.

Such mixers are usually driven with an LO input power of typically around +7dBm for the standard 'level 7' type. This signal hard switches the diodes in the ring, the relatively high drive level effectively switching the diodes on and off so they behave almost as if they were being controlled by a square wave. As we know, a square wave consists of the fundamental and all its odd harmonics, with a steadily decreasing amplitude. So, the mixer ought to work at all odd harmonics of the LO drive. It does, quite well indeed, for the first few terms.

To see just how well this technique works in practice, I measured a MiniCircuits ZLW-11 SMA connectorised mixer. This is electrically near-identical to their other mixers with –11 in the type number and is specified over the frequency range 5 to 2000MHz for the RF and LO ports; 0 – 1000MHz for the IF port. I used a fixed LO of 85MHz and varied the input power level from +4dBm to +13dBm to see how harmonic mixer loss was affected by LO drive. The RF input was fixed at –20dBm to stay within the linear operating region and avoid amplitude compression. The RF input frequency was adjusted to give a fixed IF output of 23MHz for each LO harmonic term.

The results can be seen in **Table 1**. For the first few harmonic terms, the additional mixer loss, over and above the insertion loss of 7dB at the fundamental LO frequency, is almost equal to the theoretical roll-off of harmonic level of 20.LOG(N), where the 3rd harmonic should be at around –9.5dB and the 5th at around –14dB. Above the fifth harmonic of the LO the overall loss becomes more dependent on drive level and there is appreciable advantage to be gained by increasing this to 10 – 13dBm.

Although the mixer loss is increased considerably at 7th order and higher, pure RF gain is a cheap commodity with drop-in packaged amplifiers like modamps, so the simplicity of not needing a high frequency local oscillator may occasionally make the technique worth trying.

MODAMP FREQUENCY DOUBLER. Staying on the subject of frequency multipliers. Low cost modamps make quite effective multiplier stages when they are overdriven, with fewer additional components than a discrete transistor design would otherwise need. **Figure 1** shows the circuit diagram of a frequency doubler stage for the 2.88GHz output direct from a synthesiser chip delivering an output at 5.76GHz.

The first ERA-1 stage is deliberately under run at about half its specified bias current. This means it saturates at a lower input level and delivers appreciable second harmonic energy at its output port. Two open-circuit transmission line stubs on the output are each a quarter wavelength long at the input frequency, so the open circuit at the far end appears as a short circuit to the signal, removing most of the fundamental frequency present at the multiplier output. They also present a low impedance at the third harmonic where they are 3/4 wavelength long, so removing the x3 term at 8.6GHz. Being a half wave at the second harmonic, no obstruction is offered to this, which passes to the second modamp, an ERA-2, for amplification.

With a modest +4dBm of drive to the first stage, an output of +5dBm can be obtained. The two stubs need to be tuned to properly suck out the unwanted components; the knife marks where this trimming was done can be clearly seen in **Photo 1**! The resulting attenuation of the 2.88GHz fundamental was such that it was 40dB down on the wanted signal. The third harmonic was more than 60dB below the 5.76GHz output. The fourth harmonic ought to have been detectable, as the stubs (now one wavelength long) will allow this to pass unattenuated. However, nothing was seen at 11.5GHz, meaning the amplitude was at least –70dBc. This is most likely due to the frequency response of the modamps rolling off and the extra attenuation of the glassfibre PCB material as well as the natural reduction in output from the multiplier of higher order multiplication terms.

LOW COST MEDIUM POWER AMPLIFIER. Coming down in frequency, a recent e-mail

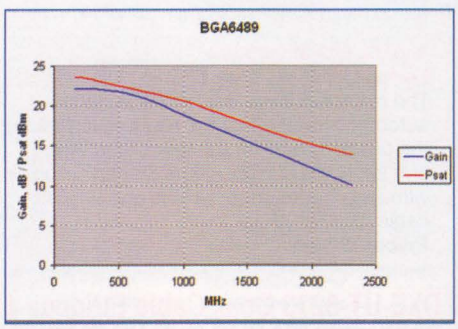

FIGURE 2: Frequency response of the low cost BGA6489 medium power modamp.

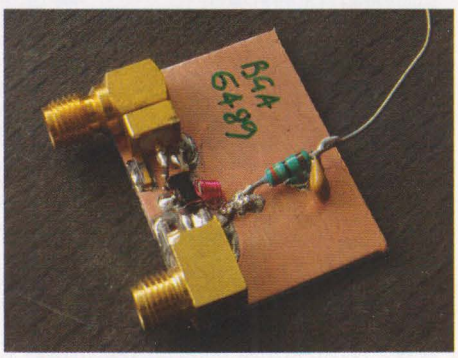

PHOTO 2: BGA6489 test rig.

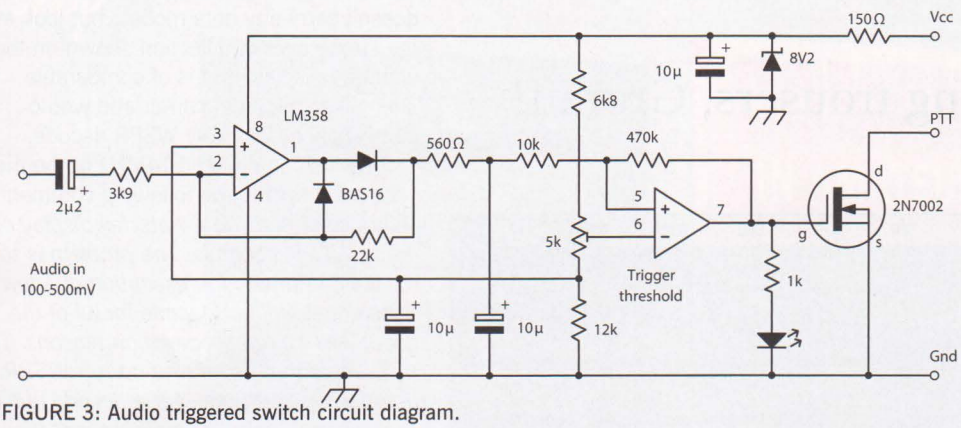

FIGURE 3: Audio triggered switch circuit diagram.

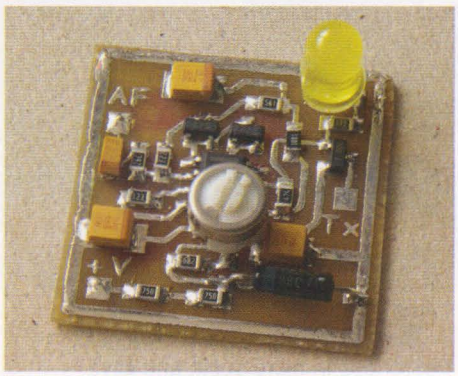

PHOTO 3: Audio triggered switch PCB.

exchange pointed me at the BGA6489 medium power modamp sold by RS Components [1] for the grand sum of 68p each plus VAT. These chips are specified for operation up to above 2GHz and can deliver in excess of 100mW at UHF or lower frequencies. There are many similar types of device around for these power levels, such as the SGA6289 that I have used quite a bit in the past up to 4GHz, but they are usually more expensive or difficult to get hold of. So, one of these just had to be put through its paces. It wasn't worth making a PCB, so the rats-nest construction shown in **Photo 2** served quite well enough just for testing. The frequency response showing small signal gain (tested with –5dBm input power) as well as saturated output level can be seen in **Figure 2**. Nearly 200mW of output and an associated gain in excess of 20dB can be seen up to 440MHz, making this device a useful driver stage or low power PA in its own right for HF through to UHF bands. At 1296MHz it still shows useful gain and Psat, but above 2GHz is a bit disappointing – far better devices exist for use up there. However, for the price and the ready availability from RS, this chip looks very useful indeed.

AUDIO TRIGGERED SWITCH. The circuit of **Figure 3** provides a reliable glitch free audio switch. It allows, for example, a transmitter to be keyed on when audio appears – from a modem, for example. As such, it works in the same way as VOX operation does for SSB voice. VOX control is not usually available on transceivers when the auxiliary line level audio input is used instead of the microphone input.

IC1 is configured as a precision rectifier with a voltage gain of about 6 times. The output of this rapidly charges the 10µF timing capacitor, which then discharges slowly through the feedback network of this stage. The result is a rapid rise followed by a slow fall-off of the voltage across the timing capacitor. IC2 works as a comparator, comparing the rectified and peak-held voltage to a threshold set by a preset potentiometer. When the threshold is exceeded, the output FET is switched on. Some hysteresis to reduce potential 'chatter' and switching glitches is provided by positive feedback around IC2. To allow single supply operation, the whole lot is biased close to mid rail, determined by the resistor chain shown in the middle of the circuit diagram. The Zener stabilised supply is not essential and the circuit will work directly from any supply voltage in the range 6 to 20V. But, as switching thresholds are determined by potential divider action from the power supply, in order to maintain consistent performance with regard to the triggering amplitude, some supply stabilisation is advisable.

The result is a reliable switch that activates within 20ms of audio appearing on the input terminals and holds for a couple of hundred milliseconds for momentary breaks in audio – such as those generated by slow narrowband modulation schemes like PSK31 and PSK08. Change any of the timing and thresholds or gain components to suit your own personalised requirements. **Photo 3** shows a 25mm square PCB carrying this complete audio triggered switch that is small enough to be squeezed in as an extra into most modern modem or transceiver cases. More details, including a complete 1:1 mirrored PCB artwork for homebrew PCB manufacture by UV/acetate or iron-on toner medium can be found on my website [2].

IC NUMBERING CLASHES. Recently while studying the circuit diagram of a mid 1980s vintage Rhode and Schwarz synthesiser that had failed I came across an MC4044 IC logic device as part of a frequency locking stage. (It was nothing to do with the fault, I was just curious about how the synth worked). Now, I naturally assumed this was a CMOS device of the old CD4000 family and looked up its connections. They clearly were not the same as the ones shown on the R&S diagram. The CD4044 was a quad RS latch in a 16 pin package whereas the MC4044 shown in the circuit diagram had a simpler function and was in a 14 pin package. After a bit of internet searching I found this chip – a now obsolete phase-frequency detector, superseded in modern equipment by faster, more capable, devices. This, as far as I know is the only clash of IC part numbers I have ever encountered. Recalling that old CMOS logic family, there certainly were ones that began MC, although they usually tended to have a 1 digit appended before the 4. So it would have been MC14044 or similar.

So beware when tracing out circuitry of older equipment. That familiar looking IC may not be quite what you think it is. This problem could become more prevalent as a lot of 1980s and 1990s vintage test equipment appears on the surplus markets and starts getting snapped up by amateurs.

In retrospect, I wish the MC4044 (phase frequency detector) had been widely available and in common usage a couple of decades ago. It would have been a nice solution to simple phase locked loops at low frequencies and might have changed substantially the way I did a lot of the frequency locking work over that period.

TABLE 1: Harmonic mixer loss at various local oscillator power levels.

Harmonic	F_{RF} MHz	13dBm P_{LO}	10dBm	7dBm	4dBm
1	108	-7	-7	-7	-8
3	278	-17	-17	-18	-22
5	448	-23	-25	-28	-31
7	618	-28	-33	-42	-39
9	788	-32	-35	-40	-38
11	958	-33	-34	-35	-36
13	1128	-34	-35	-40	-41
15	1298	-34	-37	-45	-43

ZLW-11: 5 – 2000MHz, level 7 mixer
LO = 85MHz, IFout = 23MHz, P_{RF} = -20dBm

REFERENCES

[1] BGA6489 from RS Components: http://uk.rs-online.com/web/ (search for the part number)
[2] Audio VOX PCB layout: www.g4jnt.com/AudioVOX.zip

Data

But they're the wrong trousers, Gromit!

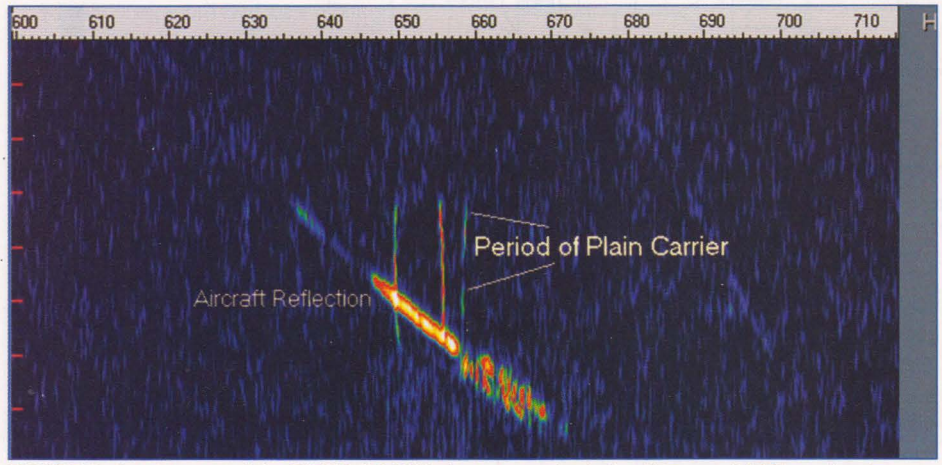

FIGURE 1: Spectrogram of the PI7CIS 144MHz beacon received at a distance of 408km, showing aircraft and other frequency shifted artefacts that would destroy any narrow band modulation type used.

MODES. Or in our case "But it's the wrong mode, OM!" The upsurge in new weak signal data modes and the speed and ease with which they can be downloaded, installed and used on the air within a few minutes of first being heard-about can lead to all sorts of anomalies. There is a tendency amongst many operators to try a new weak signal mode, perhaps on a popular band where everyone else is also using it. Confidence grows when it "works first time, without any fiddling about" so the temptation is to then try out this highly successful scheme on another band. Many fruitless calls later, despite that band being wide open all over the world but no response to CQ calls, the operator gives up disillusioned and goes back to the SSB or RTTY that does work.

This situation comes about because many weak signal modes are optimised to a particular type of propagation path and are entirely unsuited to other frequencies and propagation modes. They will fail abysmally, even if signals appear to be quite strong. That is not a fault of the data mode, it is the fault of trying to use a modulation type unsuited to ionospheric, tropospheric, or whatever, induced anomalies.

Consider WSPR. This highly successful personal beaconing and reporting mode has had a huge take-up around the world, allowing individuals to get a reliable map of HF propagation from their own and others' stations. WSPR is a four tone Multi Frequency Shift Keying (MFSK) scheme with a spacing between tones of just 1.5Hz. The symbol rate is the same as the shift so the overall spectral width of the signal is 6Hz. 'Normal' HF propagation involving reflection from the ionosphere may impart a few Hertz of Doppler shift of skywave signals on the higher bands, but this will often change more slowly than the two minutes of the WSPR message. On the lower HF bands, any ionospheric induced frequency shifts will be insignificant compared with the symbol rate – and this is why WSPR works so well at HF.

The success of WSPR has now lead many to want to try it on extreme weak signal paths on 50, 70 and 144MHz. This is where things can go very wrong. Several stations may be blindly sending WSPR beacon signals continuously and, when there are no decodes, will conclude the band isn't open. However, if the same amount of calling effort had been applied to, say SSB or a data mode designed for VHF like JT65B they would almost certainly have heard or decoded each other. At VHF, and 144MHz especially, it does not take much to generate several Hz of random Doppler shift on a signal. On the sort of long distance weak signal path that any user might be expecting WSPR to work over, there are probably tens or hundreds of aircraft in the air that could contribute to reflections. It only takes a differential velocity of a few tens of metres-per-second to impart a Doppler component several Hz wide that interferes with the direct path and corrupts the WSPR decoder. And this will be happening all the time.

Figure 1 shows my reception of the PI7CIS beacon on 144.416MHz at a distance of 408km. It is marginal, just about audible by ear. In normal situations, a signal this strong would be easily decodeable using WSPR. That beacon doesn't carry any data modes, but look at the strong aircraft reflection shown on the waterfall display, that is of comparable strength to the plain carrier and would completely destroy any WSPR decode.

One well equipped 144MHz op on the East coast sent in the following comment, *"I can see traces on a waterfall display of many WSPR hopefuls. The problem is that most signals, with the exception of a few Dutch ones will not decode for all of the good, well known propagation reasons. The problem is that those who do run WSPR leap for joy when they get a decode outside their normal crop, not realising that they are missing over 95% of those signals".*

Examples of other data modes that are shown to fail when used unwarily are: PSK31 on high latitude and Near Vertical Incidence paths; JT65B on Microwaves; and the new narrowband WSPR-15 and JT9 modes on any band above 1.8MHz. In the latter case, the instructions clearly state they are for LF and MF use only, but monitoring the various Internet groups, a lot of operators are reporting their failings trying to use them generally at HF

Back in the June 2009 Data column I described in more depth and gave examples of how various data modes are each suited to their ideal bands and propagation mechanisms.

PI4 BEACON MODE. Bo, OZ2M and several others have designed a modulation type, very similar to JT4, but with a shorter message structure and symbol rate lasting about 20 seconds. It is specifically designed for beacons operating a one minute repeat cycle. (The PI stands for Pharus Ignis – relating to an ancient lighthouse). More details can be found at [1]. Several of the OZ7IGY VHF beacons on 50 through 432MHz carry this modulation type. Unfortunately, although PI4 is very similar to JT4, it cannot be decoded using WSJT. A custom decoder must be downloaded from the website. This decoding software is still under development and at the moment is not as effective as WSJT is at decoding JT4, especially in the presence of multipath.

Until the decoder software reaches the same proven level of capability as the established WSJT suite, I can't help but feel PI4 will run a poor second to JT4 on beacons, in spite of its being designed specifically for use there.

REFERENCES

[1] PI4 Beacon Mode and decoding software: http://rudius.net/oz2m/ngnb/pi4.htm

Dave Robinson, G4FRE wrote to say that in the *Getting Started in Data Modes* article in April *RadCom*, the original source for JT65H, Reference [8] is at http://sourceforge.net/projects/jt65-hf/. It is written by W6CQZ.

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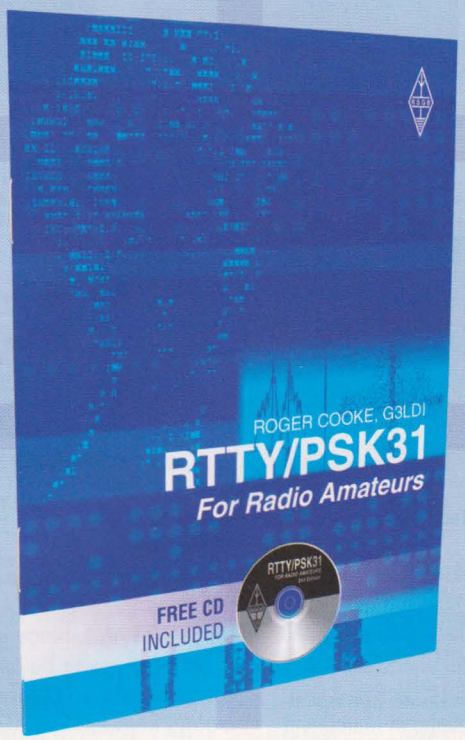

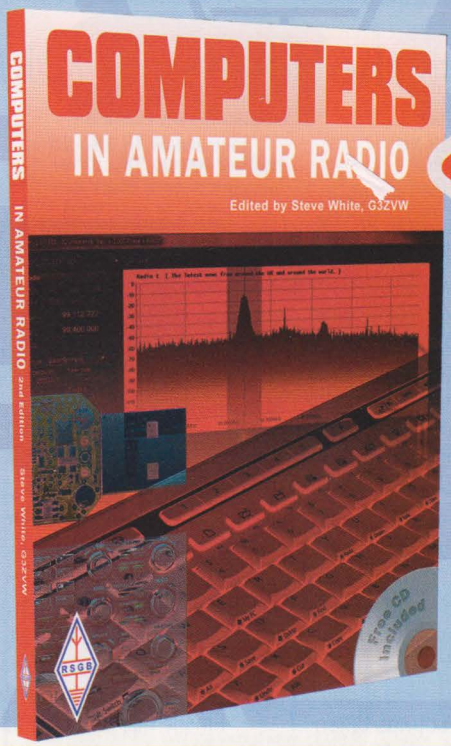

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LF

Can we cross the pond on 472kHz CW?

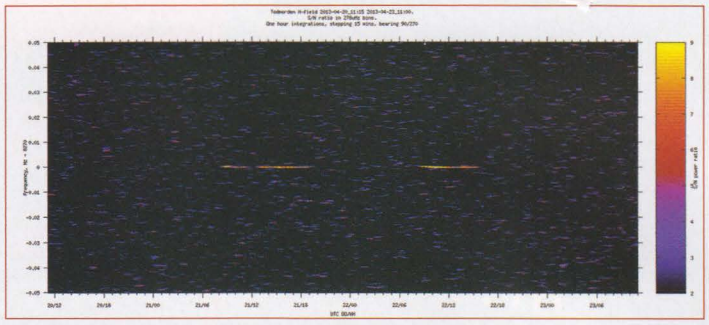
472kHz TRANSATLANTIC. WE2XGR/6 in New York State is operated by Bob, W2ZM and has been active on MF for several years. Over the last couple of months, Bob has been trying some WSPR on 475.7kHz with great success. On one occasion the software at G8FZK's station reported a signal level of -7dB, which is probably strong enough for CW or PSK31 reception. In the reverse direction, Vernon, VE1VDM has been receiving good signals from G8HUH and others using WSPR.

WSPR has become very popular on 472 as a quick scan of the wsprnet website reveals. DK7FC had reports from 57 stations during his recent few days of overnight operation and I counted more than 20 stations transmitting over a 24 hour period when I took a quick look the other day.

On CW, no 2-way contact has taken place since the new band came into being. Previously, EI0CF had worked VX9MRC on 501/504kHz and Finbar's 472kHz CW signal is regularly heard in Newfoundland but subject to the usual deep QSB we experience over longer paths. Recently, a group of European CW stations, including OK2BVG and DK7FC, have been attempting to cross the pond on CW but, so far, no QSO has been made.

A particular problem of the longer paths on MF is that slow and deep QSB. This may mean missing a few characters on QRS, but whole overs can be lost on CW as the signal may fade away for several minutes before reappearing out of the noise. If the operator is not patient in waiting for its return, a viable QSO could be lost. When exchanging reports the old adage "if at first you don't succeed, try try again" certainly holds good on MF!

472kHz ACTIVITY. GB4FPR was active on 472kHz on International Marconi Day, 20 April, looking for CW contacts on 472kHz or crossband to 80m. As usual from Fort Perch Rock (Wirral), the transmitted signals were good, reaching into Germany and France, but receive conditions were difficult. Then the transmitter died. Despite scant reward for all the effort, just two contacts, I'm sure they'll be back next year! I made mid-week trip to Scotland in March and with an improved aerial and a new transmitter I managed to work HB9ASB, PA3ABK, DK7FC, SM6BGP, PA0LCE, OK2BVG and G3XIZ on CW during the short stay. It was nice to find a decent amount of CW activity in the evenings.

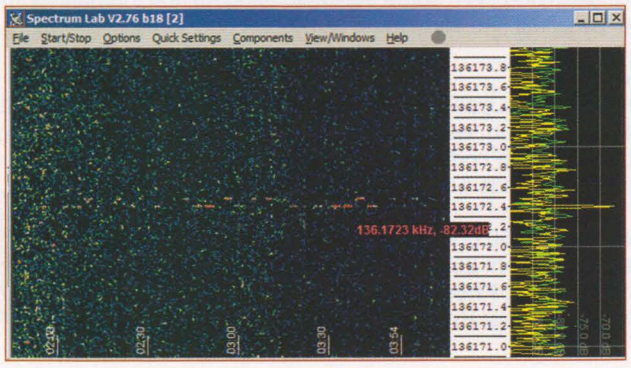


DJ8WX's carrier as seen in Todmorden on 8.27kHz. Each dash is about 6 hours long!

I used a Class D transmitter producing a maximum of about 200W from a standard 13.8V shack power supply, so I didn't have to carry a heavy transformer around. I hope to have a dual-band version (472 and 136kHz) up and running soon.

There doesn't seem to be any regular activity from GM on 472kHz so there's little chance of me working it from home at the moment. One chance may be when the Camb-Hams go to Mull in May for their regular springtime Scottish Island activation. This year they plan to be on 472kHz from a coastal location on the south east corner of the island.

136kHz NEWS. In the USA the long process of allocating an amateur band at 135.8-137.9kHz has passed another stage. The deadline for objections and comments has passed and all the submissions are in. The US power companies are against an amateur allocation on the grounds that transmissions may affect power line signalling systems, but don't seem to have offered any real justification for this assertion. Many of the special permit holders, who have been operating on 136kHz for many years without incident, have sent in submissions supporting the allocation. The FCC must now decide. Fingers crossed! Perseverance pays, as we all know, and DK7FC's was rewarded in early April with a nice copy of his 180 second period DFCW signal in Tasmania. Stefan had been transmitting every night for some weeks before VK SWL Edgar J Twining captured the signal. The distance is 16,806km.



DK7FC's DFCW signal as received in Tasmania.

Spiros, SV8CS has been the lone voice from Greece for some time now. Since increasing his transmitter power he has made a QRS-3 contact with DK7FC and has received QRSS reports from EW6BN (Belarus), RN3AGC north of Moscow and GW3UCJ in Swansea. No transatlantic reports have been received.

The Japanese have been busy on 136kHz with signals from JA1CGM being copied in Alaska by Laurence, KL1X, and Yuki, JA5FP has been regularly receiving UA0AET and UA0AGC on DFCW. Yuki and JA8SCD have been trying to spot a trace of DK7FC's signal, the best results being on 9 April when a fuzzy 'FC' was received, at a distance of 9,423km.

8.9kHz TOO HIGH? The Electronic Communications Committee of the CEPT has published its updated table of frequency allocations. The allocations now start at 8.3kHz, rather than 9kHz as before, apparently to protect lightning detection systems in the range 8.3 to 9kHz.

This change has prompted a spate of coil-winding activity from the VLF operators in order to QSY down to just below 8.3kHz. First to get on the air was Uwe, DJ8WX, who wound a new coil on a large plastic water butt, closely followed by Marcus, DF6NM whose 'seven bucket' VLF coil just needed a slight adjustment to bring it on to 8.27kHz. PA3CPM has now joined the party on the new, even lower, VLF channel and has managed to achieve 0.6A of aerial current. The receiving stations also had to make the change and OK2BVG, PA1SDB and Paul Nicholson in Todmorden were looking out for signals as soon as the transmitters were ready. In the event signals seemed about the same as before with good reception of both German stations in all locations. I wonder how low they can go? The biggest problem in going even further LF would be the increased loss in the larger loading coil required.

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HF

Fair to good conditions to report

VISALIA. For a number of reasons I wasn't too active on the bands during April but conditions seem to have been fair to good, with ZK3N, for example, having loud signals on several bands (although there was some negative comment about their wide frequency splits). Another one was South Sudan by OH0XX and OH2BH. What I did do during April was attend the Visalia (California) DX Convention for the first time in 11 years. It was good to see many old friends and attend some excellent DX presentations. There isn't room to report in detail here (I have written it up for the *CDXC Digest* so some of you will find it there) but I did want to mention a couple of items. First, N6PSE of the Intrepid DX Group formally announced that the team is actively working on getting North Korea on to the amateur bands, although I don't think anyone who heard the announcement is holding their breath, especially in the current political climate. The other was a great presentation by Bob Locher, W9KNI (author of *The Complete DXer)* during the DX Academy session about how to chase those countries that are not rare enough to warrant major expeditions but which only have a handful of active operators (who often tend to make a run for it when their operating attracts a pile-up). Bob's presentation was quite fascinating and he does have a point. Sometimes it's easier to work the really rare ones, especially on the low bands or RTTY, say, than the moderately rare ones who may turn up on 20m from time to time but are otherwise elusive. All the presentations from the DX and Contest Academies were made available on memory stick as part of the delegate pack (great idea) and will also, I believe, be uploaded to the web in due course. There was also quite a bit of discussion about DXpedition funding. The forthcoming FT5ZM expedition (see below), for example, will cost over $400k, much of which will have to be found ahead of time (for ship charter, etc). Quite a challenge.

DX NEWS. OJ0V, Market Reef, by ON8VP, Peter and ON6QO, ON4CCP, ON4LEM and ON5JT is being planned for 30 June to 5 July. The team will be on 30, 20, 17, 15, 12 and 10m, on CW, SSB and 'some digital experiments possible'. They will have several rigs including an FT-990, Icom IC-7600, FT-897D and some SPE amps, plus Ultrabeam verticals and an inverted V. QSL via ON4CCP. This will be the only DXpedition allowed on Market Reef this summer due to some restoration work being done there.

Harald, DF2WO, is planning to go back to the Cape Verde Islands between 3 and 20 June as D44TWO. He'll operate from Santiago Island (AF-005) on all bands, except 160 and 80, on CW and SSB. Harald will have a TS-50 and an all-band dipole. QSL via M0OXO.

Steve, 9M6DXX, Eva, 9M6EVA, Larry, XW0ZJZ (ex-XW1A), Bruce, XW4XR (ex-XW1B and now aka 3W3B), and (standing) Larry, AG6OU (ex-XW1X). Steve recently operated from Laos as XW8XZ.

While billed as an IOTA expedition, the H44IOTA DXpedition, due to be active between 1 June and 24 July (with gaps as they move island locations) should be a great opportunity to put the Solomons in the log even if you don't manage to catch them at every island group they visit. The best place to catch the latest news will be on the RSGB IOTA website or on the expedition's own website.

Further to the mention in my March column, it now seems that two more of the current team on Marion Island (ZS8) are planning to take their amateur exams and become active on the bands between now and April 2014. Arrangements have been made with the South African Radio League (SARL) for exams to be administered on the island, after their arrival. This will be a first for exams to be held on ZS8 and for the first ZS8 YL operator. ZS8C and ZS8Z were not expected to be active until the middle of May after the handover period and the previous team had headed back to Cape Town. ZS1HF will be the QSL manager for all. Fingers crossed for this rare one.

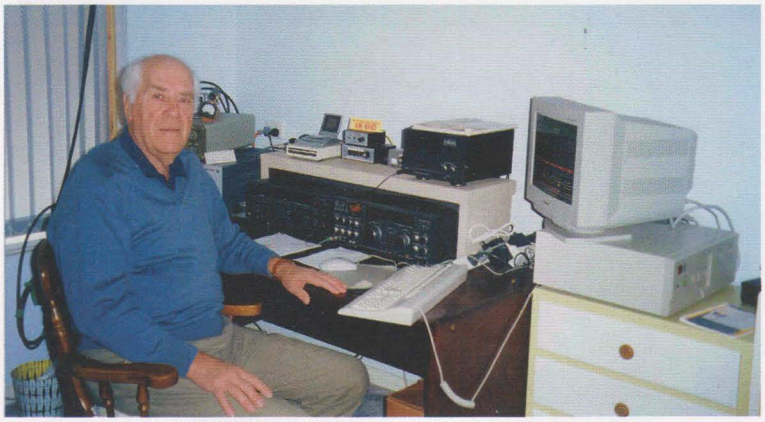
Take, JG8NQJ, will be heading back to Minami Torishima where he will sign JG8NQJ/JD1 starting in mid-June. Take typically stays for about 6 to 8 weeks, works at the weather station and is active in his spare time. QSL via JA8CJY.

Finally, Michael G7VJR, of *Club Log*, has an interesting look at "How many DXers are there in the world?" He did an analysis on *Club Log* to "try and tackle this ever-vexing question!" See the 19 April blog on his website.

PLANNING AHEAD. I don't normally mention upcoming DXpeditions several months in advance, but there are a couple of major efforts coming up in the autumn that you may want to mark in your diaries so as not to be away at the crucial times. First, Wake Island (KH9), which is pretty rare nowadays and will be activated in October. Then, in November, a very large effort from Banaba (T33). More details about both nearer the time. Also, although not until early 2014, but FT5ZM (Amsterdam Island) will be a big one and the expedition is already on Facebook and Twitter as well as having a website. This will be a big in the January/February period. Keep your diary clear!

LOTW AND EQSL. Following my remarks last month about Logbook of the World and eQSL, Dave, G3YMC has taken me to task. He assures me that eQSL users cannot see other logs or tamper with them in any way. I remain convinced that LoTW, with its public key encryption is a more secure system, but if any reader wishes to draft a brief explanation of eQSL and its benefits I am more than happy to set the record straight (I am not a user although I did upload my log a few years back in case the credits might be of use to any eQSL enthusiasts). As regards LoTW, I see that ARRL have set up a study group to draft recommendations for the ways in which it should be developed. Their report is due in July.

MORE RTTY? I had a fascinating e-mail recently from Ernie, VK3FM, attaching an article he had written for *Amateur Radio*, the journal of the Wireless Institute of Australia. To précis, his article argues that RTTY doesn't get a fair crack of the whip from



The late Mike Bazley, VK6HD.

most DXpeditions given how popular the mode is nowadays. He presents statistics from a number of major expeditions, showing the distribution by mode, where RTTY is usually down in the single digits, percentage-wise. He argues that the figure should be at least 15% of total contacts and probably more. It is an interesting debate. We have, for example, recently seen a few DXpeditions that were CW only, the choice of the operators concerned. But a case can be made that sponsored expeditions, at least, ought to give a more 'rounded' balance of contacts, by band, mode, continent, etc. In practice that is hard to achieve, particularly if the DXpedition team don't do a daily analysis of their totals. And RTTY can present additional technical challenges – for example, at T32C, because our container had gone astray, all connecting leads had to be made up on arrival at the island. It soon became clear that with lots of RF around from multiple operating positions, filtering of the audio leads (radio to PC) for RTTY was going to be a major issue and we ended up achieving it on just a couple of the stations (whereas our original plan had been to have every operating position datamode-capable). But it's certainly true that whereas a few years ago RTTY operators would have been content with a single contact for their RTTY DXCC, they now, as with other modes, want a contact per band and, ideally a repeat contact on other datamodes (particularly PSK) too. My only question might be 'where will it all end?' Will we see SSTV operators demanding the same treatment, along with 6m EME and every other band/mode combination one might care to name?

COUNTRIES WORKED, 2013
(starting 1/1/13, listed by CW total)

Call	CW	SSB	Data	All
M0BVE	111	0	0	111
M0VKY	79	83	0	115
G3HQT	42	0	0	42
G4FVK	40	55	0	80
G4XEX	0	81	70	115

DXFC. Following my mention last month of the DXFC table, Roger, G3SXW mailed me with the latest totals. From the UK G3TXF leads the 'visited' table with 165 DXCC entities, followed by G3SXW with 139, while on the 'countries activated' side the positions are reversed with G3SXW at 99 and G3TXF at 85. Great scores!

EXPEDITIONER SKILLS. I was reflecting recently on how the skill set needed by a DXpeditioner has changed over the years, although some of the requirements remain constant. In the early days of expeditions (I am largely talking the 50s and 60s) equipment was heavy (valves and big transformers!) and travel was often overland or by sea. Getting to site and setting everything up required considerable physical effort. But, once operational, the pile-ups were considerably smaller than they are now and most operators were happy with a single contact, for the 'new country'. A significant expedition might make fewer than 10,000 contacts – nowadays we expect this in the first day or two. Over the years a number of changes took place that affected the overall dynamics of expedition operating. The introduction of the CW and RTTY DXCC awards, 5-band DXCC and, eventually, single-band awards and the DXCC Challenge led to a demand for more contacts; one was no longer enough. No longer could a serious DXpedition get away with operating on, say, two bands. More equipment, more antennas and, perhaps, more operators were required. The good news, as time went on, was that equipment got smaller and lighter, and even antennas became more lightweight (with the ready availability of fibreglass poles and suchlike). But the demands on operators have, arguably, become much greater, especially since almost universal access to Packet Cluster and other facilities such as the Reverse Beacon Network. It only takes one CQ call nowadays to have the whole world calling. It is no wonder that expeditions often like to take experienced contest operators – DXers frequently cannot cope when at the sharp end of the pile-up – they are used to listening to just one station at a time!

CORRESPONDENCE. Damian, M0BKV is now back with a vengeance and sends in a very comprehensive list of DX worked. This includes VK7CW and VP2MRV on 30 CW, HR1/NP3J, WH7Z, TS8TI, E79D, V51WW, V85XD, YB0DJ, P29FR and E51JD on 20 SSB, A3EAQ, OD5PY, RI1FJ, ZK3N, T6MO, VP2V/AK4T, 5H3MB, OA1F, HR5/F2JD, FK8C and FG8NY on 20 CW, 5W0M, PJ4/SP9FIH, XW[illegible]Z and ZF2BI on 17 SSB, J6/N7QT on 17 CW, 4A8DM on 17 RTTY, YB5OUB, VP8LP, 8R1Z, TR8CA, D44BS, BX5AA, YC8GZP, PJ4/SQ9CNN and PJ4/SP6AXW on 15 SSB, 5N7M, 4A2L, J28AA and FG8NY on 15 CW, VP8LP on 12 SSB, 3B8MM on 12 CW, 5N7M on 12 RTTY, J28UC and ZD7FT on 10 SSB V44KAO, ZS2L and FM5WD on 10 CW, HI8CSS on 10 PSK31.

Dave, M0BVE mentions TI2KWN on 40, V44KAO on 20, 6Y3M on 15, A71CM on 12 plus JT5DX, OD5PY, FS/LY2IJ and UN7AB on 10, all CW.

Peter, G3HQT says, "I was surprised to find how well 10 watts can do. However, to give my ears a rest, for the past two weeks I have gone over to data/PSK. I've also gone QRO to 50W but my New Year's QRP resolution held for nearly four months!" His recent loggings include RI1FJ and 6V7S on 20 CW, T6T and FR4PG on 17 data, YB8BYL on 15 data, D2QR on 12 data, FS/UA4CC on 10 CW and HI8CSS plus FG8OJ on 10 data.

SILENT KEYS. I was particularly saddened this month to hear of the passing of Mike Bazley, VK6HD (G3HDA). Although active on all bands and modes, he is remembered by many as their first contact on 160m. That was true for me, too, back in the early 80s. He was the first station in Oceania to gain DXCC on 160m. Typical is a comment posted by Vic G4BYG, "Our first QSO on 160 was with me using just 10 watts from a Codar AT5 Tx into a loaded whip and a borrowed 75A4 Rx back in 1983. His ears were a special gift to many LF band enthusiasts. Many QSOs later I got him to try PSK31 data mode when in its infancy and we had the first VK-G PSK QSO in 2003. So he was always open to new challenges". I am grateful to Mike's brother John, VK4OQ (ex-G3HCT and a past RSGB President) for the photo of Mike.

Alan, VE1AL also passed away in April at the young age of 66. Al was part of the 1989 CY9DXX DXpedition to St Paul Island and a year later from CY0DXX on Sable Island. He was instrumental in helping subsequent operations from those islands including last year's CY9M trip. He also operated from Bermuda as VP9/VE1AL, as well as being involved in many other activities to support the hobby.

WEBSEARCH

FT5ZM: www.amsterdamdx.org/
G7VJR: g7vjr.org
H44IOTA: www.h44iota.com

VHF/UHF

Sam Jewell stands in for regular columnist Richard Staples

INTRODUCTION. Richard suffered a broken leg whilst working on his antenna system and has been hospitalised. As a result I was asked to stand in, at short notice, to produce the June column. I want to thank all the contributors who responded so promptly to my request for input. Thank you.

BAND NEWS: 50 AND 70MHz. Responding to my request for VHF reports, David Butler, G4ASR (IO81) reported the 6m band as having been poor and felt you needed lots of metalwork in the sky if you wanted to make regular tropo contacts. However, for Sporadic-E, it's a different matter as signals are often S9+ and you can get away with much smaller antennas, such as a dipole or a vertical ground plane. The 6m station at G4ASR consists of an FT-2000 and a 400W amplifier into a pair of 6-ele DL6WU Yagis.

During the 3-hour 6m contest on 14 April, David made a total of 85 SSB contacts, the longest distance tropo QSOs being to the stations of GM3SEK (322km), GI4SNA (349km), GM4NFC (390km), GM8OEG (505km), PA2J (534km) and GM8IEM (712km). The latter contact was actually accomplished via meteor scatter, with the contest exchange taking around 6 minutes to complete via random meteors.

Peter, G8BCG (IO70), sent the following 6m band report. He worked TX5K for his EME #218 (initial contact) on 2 March. Then, on 4 March, he worked XT2TT and 6W2SC, followed a few hours later by PY1RO. He noted on the 6th some weak TEP and F2 openings to south and west Africa with one weak opening to South America.

On 7 April he worked V51YJ peaking 579 and TJ3SN on SSB and a single Yagi. In the late afternoon of the 10th he worked 3B8CF, peaking 599, followed by FR4NT peaking 59. Later the same day C5YK was worked at 59, and then Z81D at 59+.

Although I don't have any reports from K5GW, **Photo 1** shows his impressive 4 x 8-ele Yagi array for 50MHz and an 8 x 18-ele Yagi array for 222MHz. This has full azimuth and elevation control with Gerald's own control software. The antenna system is on his ranch near Dallas, Texas.

Moving up to 4m, David, G4ASR says he hasn't been regularly active on 4m very much this year, with the exception of contests. However he says this will change during the Sporadic-E season when he reckons he will be active during every single opening.

Running a Yaesu FT-2000 transceiver, a Kuhne (DB6NT) high performance transverter into a re-tuned 6m TE System 160W amplifier and a pair of 7-element DK7ZB Yagis, he reports that his tropo range is around 500 – 600km, with contacts being made regularly into Belgium and The Netherlands during most contests.

David mentions that tropo propagation is generally quite poor at 70MHz (and at 50MHz for that matter) and that his best DX via that mode is only 1100km to the station of OZ3LD. Fading of signals is very prevalent on the 4m band and sometimes it can take many minutes before a distant station pops out of the noise.

During the 3-hour 4m contest on 7 April, David managed to make a total of 59 contacts, with best DX being the stations of GM4DIJ (441km), GM8OEG (505km), ON5VW (483km), PA5DD (524km) and PA0WMX (619km).

John, G4ZTR (JO01), passed on the following information. On 19 April, Janne, OH5LID, mounted a mini expedition (or LIDPEDITION as he calls it) to activate KP30 square on 4m. Most of the contacts were made using FSK441. Meteor reflections in the morning were very good. Janne made contact with 4 UK stations, G8HVY, G4FUF, G4ZTR and GM8OEG, plus stations in ON, PA, S5, DL, OK, SP, OZ, LA, OH and ES.

His expedition equipment is set up in the back of his van (**Photo 2**), together with sleeping arrangements. The rig runs 100W to a 10-element LFA and Janne plans to upgrade to a pair of these for the summer.

Apparently, there are many squares in OH that need activating on 4m, although a lot are out of reach for MS from the UK. To help Janne and others plan future expeditions, operators are encouraged to enter their 'most wanted squares' on this web page [1]. This is not limited to 4m.

Other recent 4m MS contacts by G4ZTR include IW4ARD (JN64), SP7BUZ (KO00) and LA6Q (JO58).

PHOTO 1: The 4 x 8 element Yagi array for 6m and 8 x 18 element Yagi array for 222MHz belonging to Gerald, K5GW. Photo: K5GW.

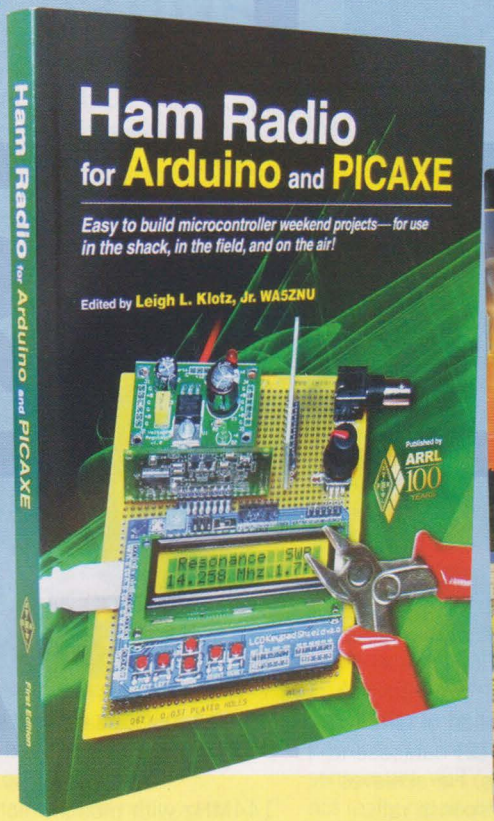
144MHz. Dave Edwards, G7RAU, reports he took a short Easter break down at the Lizard (IN79) taking 2m, 70cm and 23cm equipment with him. He was disappointed with the 2m UKAC activity as so few found him and he felt search and pounce did not work down there as nobody seems to beam towards IN79. He thought that maybe running 400W might have helped. Next time he goes (maybe next April) he will put the antennas up another 3m, as a line of trees towards the NE was getting in the way. Operation as ever was only SSB/CW.

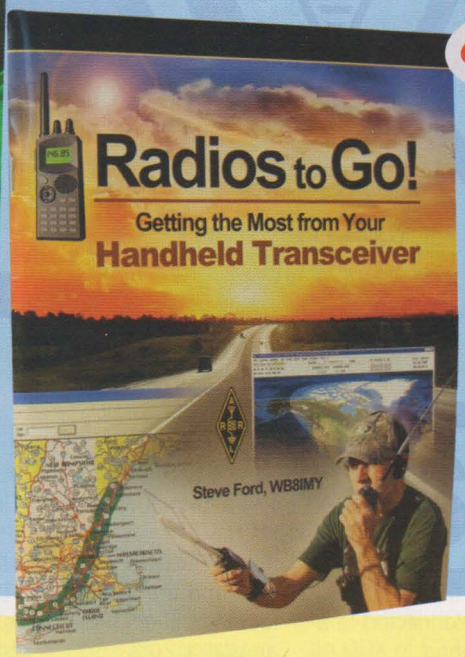
Dave's best DX from the Lizard was

RSGB shop

P&P FROM FREE

see page 76 for full details





NEW

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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, such as the popular open-source Arduino board, 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: £27.99
RSGB Members: £23.79

ARRL Radios to Go!

Getting the Most from Your Handheld Transceiver

by Steve Ford, WB8IMY

If you want to get the most out of your handheld 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 the features and use them day to day.

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If you own a handheld transceiver and want to get more out of it, or if you're trying to decide which transceiver to buy, *'Radios to Go!'* is the essential guide.

Size 155x228mm 112 pages
ISBN: 9780 8725 9307 7

Non Members £14.99
RSGB Members £12.74

PHOTO 2: View of the operating vehicle of OH5LID. Photo: OH5LID.

PHOTO 3: QSL card received by G4SWX from SP1JNY.

PA1TK (JO22) at 743km. 61 QSOs were made, all on 144MHz using (mainly) SSB at 100W from the TS-2000 connected to a 9-element Vargarda Yagi antenna.

Lyndon, GW8JLY, reports there was no tropo at all with him during April. The band was very flat, day after day. He noticed that lately activity on 144MHz SSB, which was already at a low level, seemed to be declining further – despite his best attempts to generate activity by calling CQ on 144.300 and by encouraging locals to come on (or back on) to SSB. This was very evident when, to test his portable kit in preparation for the next tropo opening, he made a trip to his usual high spot at 550m ASL in IO81LS. He was very surprised at how little he could hear and work from his super VHF spot.

He believes the RSGB should give some serious thought into how they could help generate some more activity on our VHF/UHF bands. Perhaps more activity nights such as the once a month activity nights we have now could be arranged? On the 144MHz UKAC night, on the 1st Tuesday of the month, many more stations are on the band and making QSOs. Most of these never seem to be on 144MHz apart from that night. Often on those Tuesdays, he will work someone who reports that this is the first time that they have worked GW or the first time that they have worked IO81 locator. He says they should come onto 144MHz SSB more often!

Again this is the only mode that enabled Lyn to work DX during April. He says he is constantly e-mailing stations, who may be QRV on MS in the locators he needs to work, asking if they are QRV and if they are available for a MS sked (he is still trying to build up his locator total). He uses a combination of QRZ.com and the MMMOVHF **[2]** database to identify potential operators. He achieves around a 20% success response rate. His most recent success came after he e-mailed SM3XGV (JP81). Anders replied immediately to his email, a sked was arranged to start in 5 minutes and his first QSO with JP81 was completed. SM3XGV used 600W to a 15-ele long Yagi and produced some amazing MS bursts. JP81 was the only new locator worked during the month and again YT3N in KN04LP at 1945km provided this month's MS ODX.

John, G4SWX, says one of the things that he always remembers is his first EME QSO, back in 1983, not long after he got his G4 call. What is nice now is to give somebody else that sense of achievement and to be somebody else's first EME QSO. In March he was the first EME contact for two stations: SP1JNY on 25 March (QSL card shown in **Photo 3**) and SV2JAO on 15 April. It was also very satisfying to be K4MSG's 3rd EME QSO on 25 April. For anybody who thinks that 144MHz EME is expensive or requires a lot of equipment, take a look at Paul's QRZ.com pages **[3]**.

John made the common observation that tropo was noticeable by its absence throughout the month. However despite poor conditions he managed a 2-way CW contact with SM7DTE (JO75) at 913km on 2 April, during the Nordic Activity Contest (NAC).

However, at this time of year, EME is John's main interest. Of particular note are the three EME contacts by remote operation from the Ofcom Headquarters during the RSGB Centennial presentation to Ofcom staff. It gave the Ofcom people a real glimpse of what is possible on 144MHz with modern techniques. I am sure the presentation will be viewed as a watershed event in our relationship with Ofcom.

John's most notable 144MHz QSO was undoubtedly that with 9G5EME (IJ95 – Ghana) on 11 April. The Dutch Atletico team have at the time of writing worked well over 200 stations including quite a number of other G stations. Further details of this DXpedition are given on their web page **[4]**.

432MHz. There were no reports of activity on 432MHz. This is probably not surprising. There has been little terrestrial weak signal DX activity on the band for some time (at least, none that has been reported) but there is still significant 432MHz band EME activity each month. Apart from this weak signal activity, FM repeaters and digital ATV seem to have been the main occupiers of the band. From the amount of 433MHz Short Range Device 'noise' that I hear, the band's other main user seems to be well represented.

SIGN OFF. Again, my grateful thanks to all those contributors who so promptly responded to my report request. Richard should be back next month, fully recovered. Please send your reports to him at the usual contact address.

WEB SEARCH

[1] Most wanted squares: http://rudius.net/mwd

[2] MMMOVHF: www.mmmonvhf.de/

[3] K4MSG: www.qrz.com/db/K4MSG

[4] 9G5EME: www.emelogger.com/ghana/log/log.asp

GHz Bands

What test gear does a microwaver *really* need?

END OF WINTER. As I write this (in late April) the weather is warming up so I hope by the time you read this you'll have been out on the hilltops making QSOs or at least outside improving your microwave antennas.

MICROWAVE TEST EQUIPMENT. I thought it would be useful to discuss what basic test equipment the microwaver needs in the workshop if he is going to do more than just buy a rig and antenna, put it up and operate. Some of the more exotic (ie expensive) pieces of equipment are beyond the reach of many, but such equipment is 'out there' – as is the expertise and help for microwavers. The UK Microwave Group runs a member's technical support team **[1]** of people who own such equipment and are prepared to help, but I believe we all need some basic kit of our own.

With modern narrowband microwave equipment, the microwave signal is often based on a VHF or lower oscillator. This can mean you never need a frequency counter that operates above a few hundred MHz, as you can measure your VHF reference and work out the multiple. What is far more important is a good reference to lock the counter and your system to. You can use a 10MHz OCXO, or a GPS standard such as the 'Thunderbolt' **[2]** or HP Z3801A **[3]**. These can be bought on eBay from the Far East. Alternatively you can build your own, such as the simple GPSDO circuit from G3RUH's site **[4]**. I've also seen cheap 10MHz rubidium standards on eBay for around the £50 mark, but I've never tested one here. My own rubidium source came from a surplus GSM base station timing card and seems more than adequate.

In my opinion, the most important thing is the ability to detect and measure RF power. A good microwave power meter and attenuators to allow higher power measurement are the essential items. Unlike meters for higher power, microwave power meters usually come as three units: a meter, a cable and a sensor head (although sometimes the cable is permanently attached to the sensor head). The sensor head is usually the most expensive part on the surplus market. There are a number of surplus options such as the HP/Agilent 435 and 432 series meters at around £150 for the meter alone (depending on condition) – plus their measurement heads. I have seen a much less expensive solution designed by Jason, G7OCD and sold via xeropage **[5]**. That sensor connects to a PC via USB and works up to around 9.5GHz (**Photo 1**). Power meter heads tend to measure low power; in the case of the HP 8484A sensor (usually the cheapest of the surplus options, at around £150) the range is only -20dBm (10 microwatts) maximum, down to -70dBm, so some decent attenuators are needed. For a 'professional' meter you are probably talking around £300 – £400 for a good working unit, cable, head and a couple of attenuators.

PHOTO 1: The G7OCD USB power sensor from Xeropage (photo: G4BAO).

A word of warning: great care needs to be taken with power meter heads as the sensors are VERY easy to destroy. They are not really repairable, though I did recently see a Swiss webpage **[6]** where an amateur had managed to make one useable again, albeit for indication only; he did not return it to full specification. I plan to investigate this with my own 'blown' HP head and will report in future issues.

There are many of these heads for sale on eBay marked 'untested, for spares or repair'. Take my word for it; they are dead and not repairable. Only buy one of these with a guarantee, or check it first. The 435 series meter comes with a built in 50MHz 0dBm power reference so you can test the head. Beware not to connect the -20dBm 8484 head to this output without at least a 20dB attenuator though, as you will destroy it!

With such a power meter and suitably rated attenuators, you can measure transmitter power. Add a signal source and you can measure losses and gains of circuits; add a directional coupler and you can measure VSWR/ return loss.

Table 1 shows what I call my '£250 starter test lab'. Look on eBay and places like rfshop.co.uk for these and similar items.

ACTIVITY NEWS. The April 1296MHz UKAC attracted comments about higher than usual activity and reasonable conditions. Leading station in the claimed scores was G8OHM with 51 QSOs and best DX (ODX) reported was the QSO between G3TCU (IO91qe) and GM4CXM (IO75tw) at 584km. Interesting to note that both G stations were running close to full legal power, showing the advantage of QRO on this band to get the extreme contacts during average conditions. That said, Dave, GW4FRE/P (IO81) managed 32 QSOs and an ODX of 527km with PA0EHG (JO22hb), giving him a very respectable 15th running just 10W to a single 23 element Yagi.

Eddie, G0EHV was out portable again on both 1.3GHz and 2.3GHz and notes that it's well worth the effort to get out for these contests, especially now the lighter nights are here. The contest coincided with the gales subsiding enough to allow a small window that suited the contest period exactly! He made 35 QSOs on 1.3GHz, ODX G3TCT (IO81qc) at 418km using 100W to a 35 element Yagi, while on 2.3GHz, running 60W and a 25-ele Yagi, he managed 14 QSOs, ODX G3XDY (JO02ob) at 359km. The UK Microwave Group Low Band Contest (1296, 2320, 3400MHz) on Sunday April 21 also brought out plenty of activity, with and much liaison on the ON4KST chat server **[7]**. Like it or loathe it, 'KST' does seem to be a good place to congregate to set up QSOs on some of the bands with lower activity.

MARTLESHAM MICROWAVE ROUND TABLE 2013. The Annual UK Microwave Group Round Table and AGM took place over the weekend of 27 and 28 April at BT Adastral Park in Suffolk. Visitors from all over the UK, plus France, the Netherlands and the USA were entertained and informed by a top notch lecture program with topics ranging from propagation and operating techniques through microwave hardware and satellites to EME and radio astronomy. The raffle this year had some very valuable donated prizes. The first prize winner was G8CUL, who took away a 4.2GHz USB signal generator.

PHOTO 2: James, G3RUH (left) receiving the Fraser Shepherd award from G4FSG (photo: Robin Gape).

The test equipment area, run by G3XDY and his team, was well stocked with measuring equipment and the Chip Bank was doing good 'trade'. Tea, coffee, sandwiches and cakes were again provided by the XYLs of the Martlesham Radio Club, with proceeds to the local Girl Guides. At the awards presentations it was good to see the RSGB's Fraser Shepherd Award (**Photo 2**) given to James Miller, G3RUH **[8]** for his lifetime contribution to microwaves via his work with AMSAT. As well as a long career as a professional consultant, James has worked on the control of the Big Dish at Bochum, **[9]**, patch and helix antennas, data modems and frequency references. The G3BNL trophy went to RSGB Microwave Manager Murray, G6JYB, for his tireless work on regulatory and licensing issues. While neither are really active microwave 'operators', I've always considered James and Murray to be two of the most valuable 'silent enablers' of our branch of the hobby. The G3EEZ trophy was awarded to GM0USI for his portable work. Unfortunately Alan couldn't attend but I was pleased that his record-breaking 10GHz QSO partner, Guy, F2CT was there to accept the trophy on his behalf.

SEIGY 2013. The French Microwave Convention took place on Saturday 6 April. An excellent meal with over a hundred attendees was held the night before. A number of G stations attended as well as prominent French microwavers including Guy, F2CT and Jean-Claude, F5BUU, who entered his mobile 10GHz station into the construction contest. It's an event well worth the visit from the UK, with reasonably priced hotel accommodation nearby.

SPECTRUM RELEASE TO FEATURE AT RAL ROUND TABLE. The next event in the UK Microwave social calendar will be the RAL Roundtable on Sunday 9 June near Didcot in Oxfordshire. Hosted by the Harwell Amateur Radio Society, doors open at 10am for the test and surplus session; talks will be after lunch. By the time RAL occurs, it is expected that the Ofcom consultation on 2.3 / 3.4GHz Spectrum Release will be in progress and be of concern to the entire microwave fraternity (narrowband, EME, ATV etc). This will be the topic of a talk by Microwave Manager Murray, G6JYB. RAL is thus an excellent and potentially unique opportunity to discuss the issues and consider the next steps. Given that the RAL Recreational Society Building is only small, please make sure you register in advance **[10]**.

BEACON NEWS. Welcome news on the beacon front is that the 2.3GHz beacon application at Telford, GB3ZME (IO82rp) on 2320.870MHz has just had its NoV released by Ofcom. Whilst we currently have uncertainty in the band, this is a most welcome development following a wait of several years for this (and a related application for GB3BSS at Stroud). Thanks must go to Ofcom, RSGB Microwave Manager Murray, G6JYB, G3UKV and the Telford group for the all the hard work put in over the years to make his happen. The 'reverse DDS' beacon driver was kindly built and donated by the UK Microwave Group. The beacon runs 10W to a 6.4dBi Alford Slot antenna at 10m AGL. Further details from G3UKV (QTHR).

Good news too on 10GHz north of the border. There is a new attended 10GHz beacon at the QTH of GM4CXM (IO75tw), built by GM0USI and GM7GDE. It operates on nominally 10368.922MHz but does move around a little with temperature. Alan tells me that GPS locking is coming in due course. I also hear that GB3CSB will soon be QRV from IO75xx and a GI beacon from the GB3NGI site (IO65vb), so plenty of beacons to the north at last! Reports on all these beacons to Beaconspot **[11]** please.

TABLE 1: My '£250 starter test lab'.

Equipment	Target cost	Possible source
USB power meter	£50	xeropage.co.uk
Coaxial attenuators:		
3, 6 and 20dB (3GHz SMA type)	£30	Various from eBay or rallies
VHF frequency counter	£50	Various from eBay or rallies
10MHz reference	£25	eBay, eg seller RF-Buy2008
20dB directional coupler	£25	Various eg RFS-0827-20 from rfshop.co.uk
Signal source	£70	QRP2000 synthesiser kit (to 1.4GHz; see http://bit.ly/ZYwaIP)

UPCOMING MICROWAVE EVENTS AND CONTESTS

There are plenty of French 1296MHz And Above activity days still to come in 2013. Times are Saturday 1700 to Sunday 1700.

May 25-26	1296MHz And Above (to coincide with UKμG contest), activity 'Big Blue'
May 26, 0600 – 1800	5.7GHz/10GHz/24GHz Contest
May 28, 1900 – 2130	2.3GHz+ Activity Contest
June 9, 0900 – 1600	RAL Microwave Round Table
June 22 – 23	1296MHz And Above (activity 'Big Blue')
June 28 – 30	Ham Radio, Friedrichshafen (www.hamradio-friedrichshafen.de)
July 13 – 14	Finningley Roundtable (www.g0ghk.co.uk)
July 14 (Sunday am)	F6BSJ memorial activity for QSOs by reflection via Mt Blanc
July 19 – 21	Amsat-UK Colloquium, Holiday Inn, Guildford, Surrey (www.uk.amsat.org/Colloquium)
July 27 – 28	1296MHz And Above (to coincide with UKuG contest)
August 24 – 25	1296MHz And Above (to coincide with UKuG contest)
September 28 – 29	1296MHz And Above (to coincide with UKuG contest)
October 26 – 27	1296MHz And Above

WEBSEARCH

[1] UKuG tech support: www.microwavers.org/tech-support.htm
[2] Thunderbolt GPS: www.ko4bb.com/Timing/FrequencyReference.php
[3] HP Z3801A GPS: www.realhamradio.com/GPS_Frequency_Standard.htm
[4] Simple GPSDO circuit: www.jrmiller.demon.co.uk/projects/ministd/frqstd0.htm
[5] SDR-kits QRP2000 synthesiser kit: http://bit.ly/ZYwaIP
[6] HP head repair by HB9AFO: http://bit.ly/14GqQly
[7] ON4KST Microwave Chat: www.on4kst.info
[8] James Miller, G3RUH: www.jrmiller.demon.co.uk
[9] Bochum Dish: www.amsat.org/amsat-new/articles/G3RUH/
[10] RAL Round table: www.ntay.com/hars/RAL2013.html
[11] Beaconspot: www beaconspot.eu

G100RSGB on the air

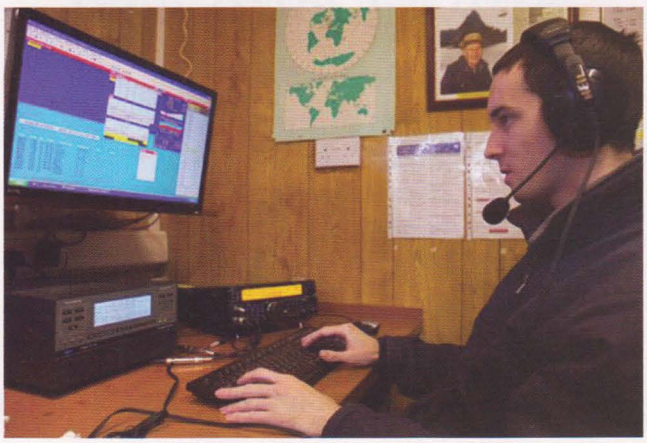
CENTENARY STATION. The Centenary station continues to attract much interest and indeed some debate as to the objectives. Clubs, groups and individuals have to decide how they plan to operate the station and I quite frequently get asked whether the focus should be on having more leisurely contacts within the UK or whether the effort should be directed at working DX, including our many overseas RSGB members. Some are quite engaged in collecting contacts with the Centenary station for the Centenary Award, or improving their position in terms of different Region/bands for the 'Leaderboard'. Others just enjoy a chat with those hosting the station as it travels around the country. In terms of an objective, this informal mix is what we had in mind for the station. Something different each day, letting the operators do what they enjoy doing as it's supposed to be a celebration, and giving those of us following the station a different style of operating every few days.

I've had some interesting e-mails from clubs and groups in South West England and the Channel Isles, where the station was hosted for much of April.

Keith, GOWYS wrote of the Poldhu ARC that putting on the Centenary station had been the most exciting event since the Marconi Centenary and has helped to give the club a greater profile. Reading Keith's account it would seem that the station caused the club to focus attention on sorting out some long-standing aerial maintenance issues, which had been delayed until after Easter on account of the weather. Like many other clubs they also needed to work on their computer logging. On the day, their preparation was worthwhile, with 1,312 contacts in 70 different countries including VK and ZL on the first calls on 20m under poor conditions! Keith was very appreciative of some operating support from nearby amateurs and concluded that several of their members will be encouraged by the event to participate in other special events and the regular operating days from Poldhu.

Of interest this month were reports from the Wessex Contest Group and a combined Jersey Contest Group & Jersey ARS. The Wessex Group ran four stations for 24 hours with a total of 1,280 contacts in all 6 continents. By comparison, the Jersey Group made 6,207 contacts over their 3 days of operating. Whilst the GJ prefix was an added reason for the demand, for both groups the key to success seems to be the detailed planning that took place. Dan, M0TGN, from the Wessex Group, wrote "With any event the key to success is planning, and this was no exception. Planning involved a full test run to position the antennas and lay the shack out. When it came to the day they actually started the build on Saturday 20th and took two days of calm construction."

Paul Ahier, MJ0PMA wrote, "The Jersey ARS clubhouse and home to GJ2A is a 3 storey concrete observation and command bunker, a relic of the German occupation of the island from 1940 to 1945, situated on a rocky headland on the island's southwest coast. The club is surrounded by water on three sides with a clear sea path to North and South America. A great place to play radio but a bad place to be an antenna! Having spent a few days on the roof of the club in temperatures below freezing fixing winches, halyards and various lengths of feeder, we had a full complement of working antennas for possibly the first time in the club's history. A CW station consisting of FT-990 and Acom 1010 was installed in the club's meeting room and the main HF shack held my own TS-590 and Expert 1k on SSB duty, with a bareback FT-1000 MkV as the 3rd rig. One tower holds a 6 element log periodic for 20-10m alongside dipoles for 30/40/80/160m at 60ft AGL, with the second tower holding a Force 12 C3 Tribander, wound down to 40ft due to high winds.



Paul, MJ0PMA operating 15m SSB. Photo: Gregory Guida.

"First on the air was Mathieu for a couple of hours on 40m CW, kicking things off with 250 QSOs. Around 10am, Steve, GJ7DNI joined me at the shack to get started on VHF and he deserves a special mention. Steve sat up in a freezing cold VHF shack that is still being built and called CQ for hours on end on 6, 2 and 70 with very few takers, around 70 QSOs in total.

"We had originally planned to make 5000 QSOs over the 3 days, a pretty good total for 3 operators, but Mathieu got cold feet a few days before and moved the target to 4000. As it happened we did much better than expected with a total of 6207 HF QSOs.

"I'm sure I don't need to give a blow by blow account of our movements around the bands but a few things were noteworthy, primarily the incredible openings to JA on the Sunday and Monday in particular. We were hearing JA on both CW and SSB on the higher bands from 10am until nearly midnight local time. I regularly hear JA around 8 in the morning and 8-9 at night but an opening as long and reliable as this is unprecedented in my years on the air. It certainly made for an interesting time, trying to balance pileups from EU, NA and the UK, with Asia sitting on the side the whole time! We also worked a few slightly more rare Asian stations in China, Thailand and Indonesia to name a few.

"What I haven't mentioned so far are the visitors we had throughout the operation. Chris, 2J0CMB was obviously apprehensive at the pre-briefing, but took up a pair of headphones on the Saturday and did a great job assisting Steve and myself on the main SSB station by noting down callsigns in partner mode. It is quite surprising how a different set of ears will pick out a different callsign to the operator from the scrum of a pileup. The clubs newest members, James (SWL) and Gregory, 2J0GCU, came along to have a go, with Gregory's dog providing

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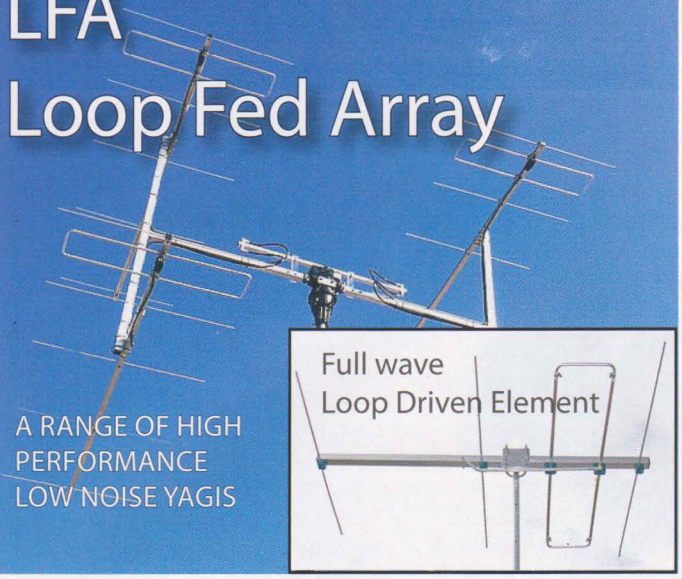

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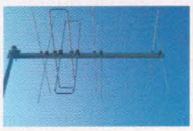

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The solid state amplifier OM1002 is designed for VHF amateur bands from 144 till 146 MHz and all modes. It is equipped with a with Freescale transistor. It can handle 900W key down and has 17dB gain. Drive levels are 7-14W and there is extensive protection against over drive and high VSWR. Dimensions: 27cm(W) x 19cm(H) x 34cm(D).

OM-1006 1kW 6m £2295

The solid state amplifier OM1006 is designed for 6 meter amateur band from 50 till 54 MHz and all modes . It is equipped with a Freescale transistor. Drive power is 3-25W selevtable with extensive protection against miss use. Dimensions: 27cm(W) x 19cm(H) x 34cm(D). weight 12kg.

SPID Elektronik

Each rotator comes with a USB ready controller

The World's most respected rotators. They use worm drives that makes them some of the most rugged rotators available and each controller has a USB connection making it easy to integrate into popular ham radio software

SPID-RAU Azimuth Rotator £449.95

- Angle of turn: 360 degrees + / -180 °
- Time of tour: 60 sec.
- Supply: 12V-18V DC
- Weight: 6.5 kg
- Input signal: pulses (one pulse per degree)
- Vertical pressure: 120 kg

A step up from mainstream rotators it provides direct mast mounting. Can be incorporated with an Elevation rotator.

SPID-RAK Azimuth Rotator £569.95

- Angle of turn: 360 + / -180 °
- Time of tour: 90 sec.
- Supply: 12V-18V DC
- Weight: 8 kg
- Input signal: pulses (0.66 ° or 1.00 ° per pulse)
- Vertical pressure: 120 kg
- Maximum net torque:

Spid's heavy duty AZ-rotor is a step up from the similar priced rotators but is tougher and retains the standard mast mounting. mounting. Ideal for bigger HF and VHF multi arrays. Fit and forget.

SPID-RAS Azimuth & Elevation Rotator

- Angle of turn azimuth: 360 + / - 180 degree
- Angle of turn elevation: 180 + / - 20 degree
- Azimuth: 120 sec. (12V), 60 sec. (18V)
- Elevation: 80 sec. (12V), 40 sec.

The RAS is an excellent option for medium sized EME arrays with good reliability and easy setup and interfacing to PC systems. Recommended for LFA and OWL arrays up to 14el x 4.

We can also supply the high resolution 0.1 degree version for accurate bearings. **£1,099.99d**

SPID-REAL Elevation Rotator £549.95

Like other models, the REAL takes a 13-20v supply and is controlled by the SPID Rot1 controller (supplied) which has a USB interface for easy integration with PC's.

The SPID RAEL is a high quality alternative to rotators such as the YAESU G-550 / G-5500 or CREATE ERC5A. However, the SPID is capable of handling more than 2.5 times the weight/load of these alternative products.

SPID-BIG RAK AZIMUTH £874.95

Rotating torque is in the 2,800 to over 4850 lb-inch range, with between 12 and 24 volts to the motor. The 24 volt measured torque is 3,240 lb-inches

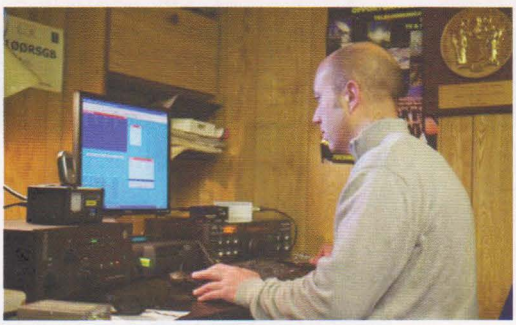
Medium to heavy duty antenna that can handle really big antenna arrays with a reliability and accuracy not achieved by many others. It has advanced digital features at an outstanding price. Mechanical complexity is reduced to a minimum by utilizing a simple double worm gear drive system. Engineered to perfection.

SPID-BIG RAS Azimuth and Elevation

- Tube slide for mounting: 45-65mm
- Max dia pipes for the pupil ring: 52mm
- Resolution: 0.5 degrees (rotary controller can be a degree)
- Weight: 22kg
- Double worm gear

The BIG RAS is as good as it gets for EME rotator systems. Built especially for large EME arrays or where high wind is a constant problem. The BIG RAS shows good reliability and easy setup

We can also supply the high resolution 0.1 degree version for accurate bearings. **£1,579.95d**



Mathieu, MJOASP calling CQ on the key. Photo: Gregory Guida.

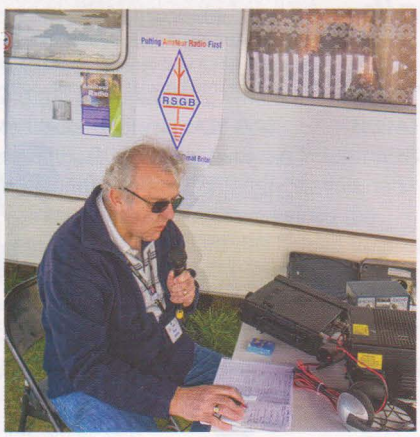
support but being obviously frustrated by the radios getting more attention! Dieter, MJ1CYD spent some time listening and is now keen to get back on the HF bands after many years absence. Further visits from Roy, MJ6ORG, Peter, GJ8PVL and other unlicensed friends rounded out the weekend.

"The event proved to be a lot of hard work, both with the preparation (which is key) and the length of time we spent at the shack, with having just 3 main HF operators. But above all it was an awful lot of fun and a fantastic opportunity to get some more practice on the air, give out thousands of QSOs and many new band slots, and introduce new and old members alike to operating a DX and special event station."

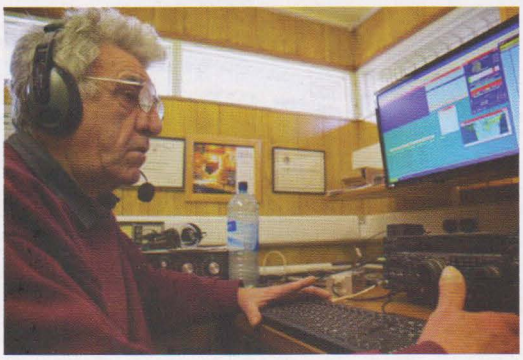
By comparison with the Jersey operation, the Guernsey ARS found conditions unusually quiet at the start of their two day operation. They even questioned whether it was an aerial problem. Propagation was normal in southern England, which added to their frustration. Such are the vagaries of the ionosphere, and one of the unique factors that makes amateur radio so absorbing. Despite the slow start the Guernsey club made over 1,200 contacts, many of which commented that the station was their first GU in their log, so it all seemed worthwhile.

It wasn't all focused DXing style of operating in April as a number of clubs and their contacts enjoyed a more relaxed and conversational style of operating. I was particularly taken by the account from the Exmouth ARC that their highlight was the full English breakfasts (plural) that to some extent made up for the poor operating conditions. I also had a nice e-mail from Dave, G6XUV of the Norman Lockyer Observatory group, which mentioned the thrill of the CW operator, Shelagh, G4UUH, when making her first 40m CW contact with JA. Dave commented that, "Unfortunately, our last night of operation was suddenly curtailed by a full mains failure (all three phases) to our site, so at 21:20 UTC we packed up and all went home, remembering two days that will be talked about for years to come... giving some great experience to operators new and old, thanks to the RSGB for the opportunity..."

More recently, activity has moved to South and South East England (Region 10). The Itchen Valley club commented on the enthusiasm from UK stations, even after 100 days of the callsign being operational, and the operation from Maplehurst, near Horsham, had a steady stream of contacts on 40m SSB for most of their day. The Horndean and District ARS, operating from Fort Widley, near Portsmouth reported a good day on a number of HF and VHF bands and commented that that as an added bonus they were able to use a part of the day to train a newly qualified Foundation Licence holder – "the smile on his face at the end of the day, after successfully tackling a pileup, showed just how much fun he had during the day". By way of contrast the First Class CW Operators day with the call sign, as one might expect, brought out many of our most experienced CW operators who followed the station across the various HF bands. The UK Microwave Group's operation on 19 May will be interesting as moonbounce contacts are the main focus. Outside these times terrestrial microwave contacts are promised!



Horndean & DARC operated VHF and 2m SSB from a gazebo to allow public access.



Steve, MJOULE working the pileup on 40m phone. Photo: Gregory Guida.

A member of the public shows interest as a newly qualified licence holder undergoes training when Horndean & DARC operated G100RSGB.

I note that some Regional Managers still have some slots available so if you have made a provisional enquiry or are still deciding whether to host the station when it is your Region's turn I suggest that you have a look at the "Putting on a station" page on our website and close off the allocation with your Regional Manager. Finally, in spotting the station on the Cluster, or writing about it, please try and avoid making the typo by using the GB prefix with the callsign!

WEB SEARCH & CONTACT INFORMATION
Centenary: www.rsgb.org/centenary/
Centenary news: www.rsgb.org/centenarynews/
Centenary station: www.rsgb.org/centenarystation/
Alerts and spots, "Am I in the Log" – follow links from the Centenary station above.
Putting on a station: www.rsgb.org/puttingoncentenarystation/

CENTENARY STATION CALENDAR SOUTH AND SE ENGLAND REGION 10 (G100RSGB)

South Wales – Region 7 (GW100RSGB)

1 - 3 June	Llanelli ARS
4 – 6 June	Rhondda ARS
7 – 9 June	Aberystwyth & D ARS
10 June	St Tybie ARS
11 – 12 June	Highfields ARC
13 June	Cwmbran DARS
14 June	Newport ARS
15 June	Cwmbran DARS
16 June	Cwmbran DARS
17 June	Hoover ARC

London and Thames Valley – Region 9 (G100RSGB)

18 June	Bromley & DARS
19 June	Verulam ARC
20 June	Radio Society of Harrow
21 June	Whitton ARG
22 June	Bedford & DARC
23 June	Bedford & DARC
24 June	Bracknell ARC
25 June	Echelford ARS
26 June	Verulam ARC
27 June	
28 June	Shefford & DARS
29 June	Shefford & DARS
30 June	Shefford & DARS

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YAESU

The radio

Biscuit tin tuning capacitor

DIY motor driven air spaced variable capacitor

INTRODUCTION. Having decided that the only place I could fit an antenna is in the loft, I needed to choose either a single- or multi-band design. I wanted a multi-band antenna so I thought a magnetic loop would be my best option. But I didn't want to buy one, leaving me the only option of building it. If I was going to do it, I was going to do it properly, making a multi-band loop similar to that made by Eric Sandys, GI2FHN [1]. That left the problem of where to get a suitable variable capacitor of 200 + 200pF.

I decided that I would have to make it myself. Like many amateurs I make electronic equipment, but I always buy the cases. This would be my first excursion into mechanical construction.

I read articles by C R Reynolds, GW3JPT [2] and then Thomas C Stephens, KD6ED [3]. Both required the purchase of sheet metal, threaded rod, nuts and insulating material. I decided to follow the example of GW3JPT and use his sizes and shapes (dimensioned drawings are in [2]), as cutting the rotor shape would be simpler. Wickes and Screwfix outlets are all over the UK so the M6 rods and nuts were easy to find and insulating material is not that difficult. The sheet metal was the only difficult part to find in small quantities.

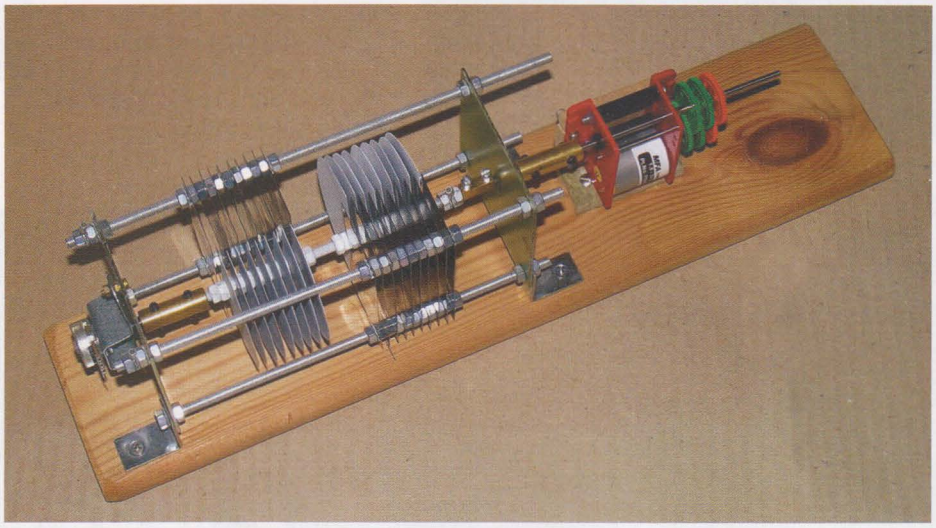

PHOTO 1: The prototype 200 + 200pF split-stator capacitor.

AN IDEA. I wondered for a while how I could find suitable metal cheaply. Then along came Christmas and there it was: a biscuit tin (**Photo 2**). I didn't know if it was big enough but decided to try it.

Having used the ubiquitous tobacco tin for many electronic units, I had found by trial and error that I can't drill tin easily. Drilling leaves burrs that have to be filed and/or tapped down. Fortunately I have a hole punch, old but still working, so I could make the holes – but not the shapes. For that I needed a sheet metal cutter, again a leftover from the past.

After some thought, I decided it would be best to have a pattern to get all the parts the same shape. For that I would need two pieces of thicker material.

PHOTO 2: A biscuit tin ideal for recycling into a variable capacitor.

TOOLMAKING. I found some thick metal sturdy enough to make marking-out and cutting-out templates. I made two plates, each 76mm square. I drilled the five holes needed, then cut one to make a pattern for the rotor and stator blades. **Photo 3** shows the stator and rotor patterns (left) and the marking out template (right).

CUTTING. I cut out the top of the biscuit tin and learnt my first lesson: WEAR GLOVES. Cutting tin isn't difficult but the edges are sharp and the sheets are very flexible. I then marked the sheet out into squares using my pattern, marking the holes as well. By punching out a hole and bolting the square plate to it, I could cut the sheet while keeping it reasonably flat. Some bends did occur – they may not seem much but they do make a difference.

Piece by piece I cut the top into squares. I had punched out the centre hole before cutting each piece but now had to punch two of the corner holes. By bolting my patterns to each plate in turn I cut one stator and then one rotor from each of six squares, see **Photo 4**. I'm lucky in that my sheet metal cutter is used from under the tin, which makes cutting curves easier. Other kinds of tin snips would also work.

I had some insulating board from a previous project that I cut and drilled to match the square as end plates.

TRIAL CONSTRUCTION. Using five rotor and six stator pieces I made up a capacitor, fixing the rotor pieces to the threaded rod with nuts and lock washers, then doing the same with two rods and the stator pieces. Second lesson learned: KEEP THE GLOVES ON. The edges are sharp and the corners even sharper. I slid the end insulators on with two more rods, held in place with nuts, to complete the frame. So far all as per GW3JPT's description and everything was going well.

This was when I found out just how bent the pieces were and that it wasn't always due to what I did before putting the pieces together. The thin metal pieces bend very easily and it's hellish trying to flatten them out in situ. It was during the fitting that I noticed the difference. The holes MUST be the right size for the rod. If they are too big then the piece moves out of place (leading to uneven rotors or stators) and if they are too small then burrs form, it's difficult to position the piece and the nuts don't fit properly.

Once I reached the 'that's about the best I can do' state, I tested the assembly. It worked! The capacitance was adjustable from 9pF to 125pF. Now I would need more of each piece to get the 200pF plus 200pF I needed.

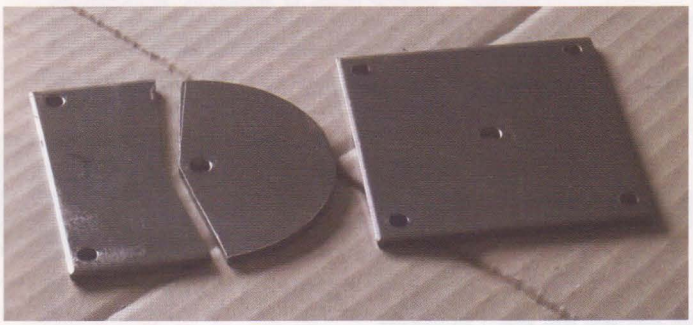

PHOTO 3: Stator and rotor patterns (left) and the marking out template (right).

PHOTO 4: Using a pattern to cut out a rotor vane.

FINAL CONSTRUCTION. I measured and marked and found out that I would need the side of the tin as well as the bottom. But the side would have to be cut directly into rotor or stator blades; it was too narrow for the square pattern. The tin had to be cut open to get to the bottom so I now had a long, very flexible strip to work with. If I could have made all the pieces as squares first it would have been easier to get them all the same size and shape.

I cut out the bottom, then marked and cut rotor and stator blades around the side section of the tin, again punching holes and bolting to the pattern. Another lesson: HAVE A CLAMP HANDY. While working on one end, the other swings about all over the place and I have the cuts to prove it.

When I had finished cutting I dismantled what I had already put together. I then re-read the articles and remembered I hadn't any insulated shaft, couplings, motor or control electrics.

A rummage through my box of bits found the variable resistor to go on one end (and I was lucky, as it had an insulated shaft that was quite long). I had thought of different ways to fit it, using gears or a coupling. My final solution was to fit the resistor to a plate, which I then bolted to the end insulator plate. This meant I could use the shaft as my insulated shaft, making it easy to centre (and also to change as and when needed). The shaft was far too long but the offcut would do for the other end. Couplings of the right size are available from the shops but I obtained two freebies – they were a bit big but they would do for my first attempt.

It took all day to put it together. I painted the rotor once it was complete so that I could see what I was doing more easily, leaving it to dry while I put the two stator sections together. The two halves of the stator have to be on opposite sides to keep construction simple (although it's not *that* simple). Working in gloves protects the hands but makes fiddly construction tasks harder.

The rotor and stator sections had to be interlinked before I could fit the end plates. This was when I realised that I should have made it up from one end, piece by piece. Another lesson learnt for the future! Getting all the rotor blades in a line requires holding them while tightening the nuts. As I tightened, so the blades bent or moved. It was fiddly but I finally had it finished. I mounted it on a board (**Photo 5**) to make it easier to work on.

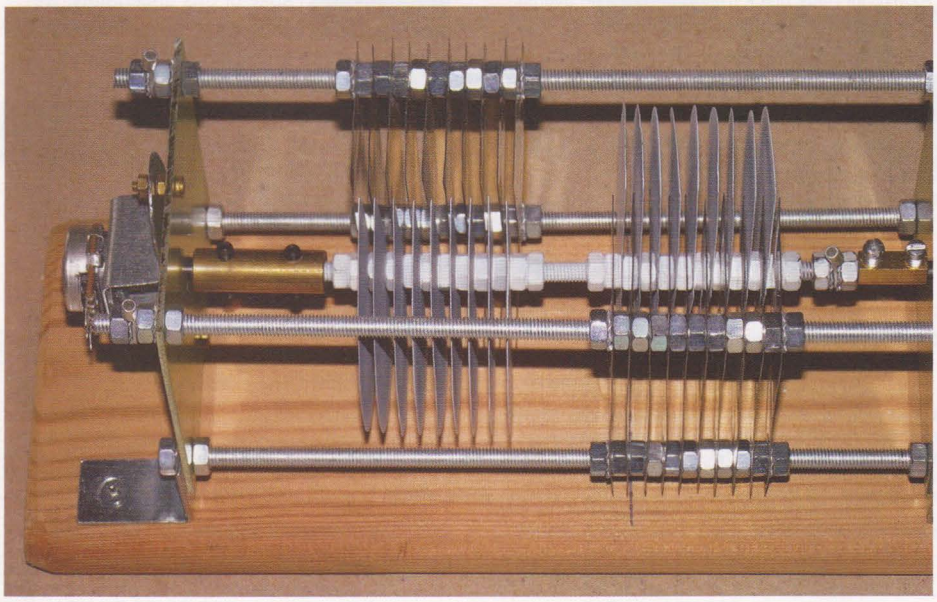

PHOTO 5: Close up of construction: the variable resistor is on a bracket on the left. Its spindle is coupled to the shaft via a brass coupling. The rotor and stator vanes are positioned and spaced using M6 nuts and lock washers.

I tested it as it was and measured 18pF to 197.5pF for one set and 16.5pF to 215pF for the other. I thought that wasn't a bad first attempt.

I purchased a motor/gearbox set, mounted that and connected it to the capacitor, making it easier to control the movement while adjusting the capacitor vanes. My next step was to try and flatten out any bends that I could see in the vanes. Fortunately having the two capacitors the same value was not absolutely necessary for the type of antenna I plan to build, but it would be better.

After a day of trying to adjust the blades, both rotor and stator, the best I could do without taking it apart was 27.5pF – 207pF and 28.6pF – 210pF. I've decided to leave it at that for now. I will make the loop antenna and the control circuit and see how it works in use. Then make a new capacitor, hopefully more accurately.

CONCLUSIONS AND COMMENTS. I now know it is possible to make the required capacitor from a biscuit tin. I learned the hard way that gloves must be worn while working on tin. All holes must be the right size without being too loose or too tight. Both the rotor and stator blades must be flat before construction. In future I will round the stator corners off to make it safer to work on‡.

Finally, it's no good rushing. Slow but steady is better.

‡ Sharp edges, corners and/or burrs can also significantly reduce the breakdown voltage of airspaced variable capacitors – Ed.

REFERENCES

[1] Roof-space dual band magnetic loop, Eric Sandys, GI2FHN, Technical Topics column, *RadCom* February 1993

[2] C R Reynolds, GW3JPT, *Building Successful HF Antennas*, p101/2

[3] A home-made high-power tuning capacitor, Thomas C Stephens, KD6ED, *QST* June 1983

Start Here

We wouldn't have electronics without electrons

INTRODUCTION. The hardware that makes radio communication possible is all about electronics. Electronics mainly concerns moving electrons (as opposed to static electrons, which is covered by 'electrostatics'). But what exactly is an electron and what are its properties? To answer this we first need to understand a bit of elementary physics.

ATOMIC THEORY. All matter consists of atoms. An atom is the smallest stable particle of matter that can exist happily on its own. In a solid material like iron or glass or wood, the atoms are packed closely together. You can imagine them as just touching, as shown in **Figure 1**. (You will have to use your imagination quite a lot when dealing with fundamental particles).

At any temperature above absolute zero atoms vibrate slightly, bump into one another and push themselves a little further apart. As the atoms get hotter the vibrations get bigger, which is why substances expand as they heat up. Further heating weakens the weak attraction between the atoms and they move almost independently, as a liquid. Further heating further increases their speed of vibration and they eventually move completely independently – the substance becomes a gas.

INSIDE THE ATOM. At the end of the nineteenth century, atoms were discovered to consist of negatively charged particles called electrons (originally called corpuscles) and positively charged particles called protons. All negative charges were found to repel each other strongly and similarly for all positive charges. However, dissimilar charges were found to attract each other equally strongly. Originally, atoms were thought to be just a mixture of the constituents; this was known as the 'Plum pudding model'. Each atom was assumed to contain an equal number of negative and positive charges and thus was electrically neutral. However, early in the twentieth century, Niels Bohr proposed that the electrons orbited the nucleus in fixed orbits, rather as the earth and other planets orbit the sun. The 'Bohr model' can be imagined as shown in **Figure 2**.

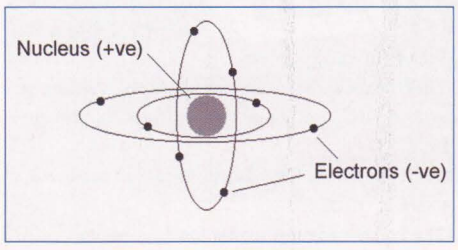

FIGURE 2: The Bohr model of the atom.

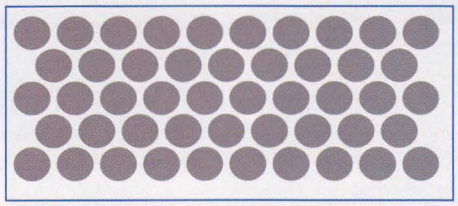

FIGURE 1: Representation in two dimensions of atoms in a solid.

This is probably the most popular (but not necessarily the most accurate) model that we have of the atom. It can certainly be used to explain all the spectral lines that are emitted when gaseous atoms are energised as in a flame or in a fluorescent lamp and it also explains many other phenomena. There are other models, but we will stick with this one. (It is something of a paradox in particle physics that one has to use different mental models to explain different phenomena).

In the Bohr model we imagine the nucleus (containing positive protons, conventionally coloured red in diagrams, and neutral neutrons, conventionally coloured white), as a compact mass in the centre of the atom. (For completeness, the diameter of individual protons and neutrons is about 10^{-15} metres and the diameter of the nuclei ranges between 1×10^{-15}m and 7×10^{-15}m, for hydrogen and uranium respectively. The mass of each proton or neutron is about 1.7×10^{-27}kg).

In this model, this nucleus is surrounded by tiny, probably spherical, negative electrons (conventionally black in diagrams). The overall size of each atom ranges from 1 to 3×10^{-10} metres for hydrogen to uranium respectively. So we see that most of any atom is empty space. The electric attraction between the electrons and the nucleus is balanced by the centrifugal force of the orbiting electrons.

In a solid or liquid, the outermost orbiting electrons (known as 'Valence electrons') often join the orbits of neighbouring atoms, performing a complicated and circuitous orbit embracing both or several nuclei. It is this sharing of orbits that binds each atom to its neighbour to form a solid or a liquid. In some substances, one or more electrons can escape from their orbit and wander off among the other atoms. These substances are called conductors and among them are all the metals. In other substances the electrons are tightly bound in their shared orbits and cannot easily escape and wander. These substances are called insulators.

CLASSIC EXPERIMENTS. At the end of the nineteenth century, in a classic experiment using an early form of cathode ray tube (CRT), the ratio of the charge (in Coulombs), to the mass (in kg) of the electron was determined by balancing the electric field against the magnetic field while centralising the deflection of the spot on the fluorescent screen of the CRT. In a second classic experiment, by observing the fall of tiny aerosol oil droplets in an electric field (using a microscope), the charge on the electron was determined. By combining the two results, the mass of the electron was then determined. For interest, the values are: mass of electron = 9.1×10^{-31}kg, charge on electron = 1.6×10^{-19} Coulombs.

ELECTRONS. Although I have quoted the masses and sizes of protons, neutrons, the nucleus and whole atoms, you don't see many estimates of the size of an electron. This is where the Bohr model comes unstuck. In other experiments, even where an electron is examined away from its parent atom, it behaves like a wave and shows diffraction phenomena just like light or X-rays. It is not at all like a tiny compact mass or 'corpuscle'. It still has a centre of mass and of charge whose position can be predicted with a certain probability, but it seems to be able to squeeze through two slits some distance apart *at the same time*. It is as if it were distributed in space, with its charge and mass having a 'sphere of influence' extending to infinity, with a calculable probability being ascribed to its being at any one place at any instant of time. In fact, even larger particles such as atoms can show a wave nature. The electron can also spin on its own axis, generating its own small magnetic field. What all this means is that we really don't understand matter at its deepest level. It now seems likely that the particles described here consist of even smaller particles, but there we must leave it for we are getting into the world of quantum dynamics. This is all rather disturbing for the deep-thinking young scientist or radio amateur.

BEHAVIOUR. In spite of this uncertainty, we can predict the behaviour of electrons quite well and we can build systems which use them, provided we use the appropriate 'mental model' that, in most cases in electronics, is the Bohr model. For example, we know that radiation is always produced by the acceleration of charge, so we can understand antennas. We know how to mix many substances so that electrons can build up internal electric fields in the substance to make diodes, transistors, photocells, etc. But before we get too smug, it is worth remembering that we don't really know exactly what an electron is and probably never will. It is even possible that this level of understanding of particle physics is actually beyond human ability to build a satisfactory mental model using everyday concepts such as spheres, masses, particles and waves.

THANKS. A version of this article was previously published in *Verulam News*; it is reproduced here with their kind permission.

Sport Radio

Contest Committee changes and the UKSMG's Summer Es Contest

YOUR RSGB THE BEST CONTESTS

CHANGING PLACES. Last year Ed Taylor, GW3SQX, the Contest Committee Chairman announced that he wished to stand down, but it has taken some time to find a replacement.

There have been quite a few changes in RSGB contests over the last three years. Many of them would have happened without Ed's presence and Chairmanship, but some wouldn't. As Ed says; "It was clear from the start that the committee's communication with contesters needed improving, but it was not obvious exactly how this could be done. A step in this direction was made at the beginning of this year, with the launch of a Contest Committee newsletter. This is e-mailed each month to subscribers and has been well received. It consists of information about recent contests and those to come, with news and views, together with commentary relating to ideas the committee is currently debating. It is proving to be a good vehicle for seeking contesters' views, where a short article from the committee will also include a series of points and questions asking for input. We can then see if there is a majority opinion, and act accordingly. This method has been used recently to shape the rules for CW Field Day and VHF NFD, as well as ask for opinions on trophy presentations at the RSGB Convention. In the opposite direction a new system in place for dealing with the many e-mails received from contesters.

"The merger of the HF and VHF contest committees some years ago reflected the fact that many radio amateurs do not see the 30MHz dividing line as relevant. Contesters are no exception to the trend and the committee has recognised this by creating the AFS Super League. This took the AFS contests on 80m CW and SSB, together with those on 2m and 70cm, creating consolidated results in a series that is now keenly fought over. The recent addition of 160m and 6m has made competition even more intense, particularly as there is now a new trophy.

"In a similar way we are aware that there is not a compulsory Morse test, but that our HF contest calendar has always been biased towards CW. One of the quirky 'rotating postcode' contests (RoPoCo), of which there are two each year, was changed from CW to SSB, attracting some new entrants. One of the two venerable RSGB 160m contests has been given an SSB section, in addition to the usual CW, with mixed results. A reinstatement of the 6m CW contest has attracted some contesters normally only worked on HF. A trophy is now awarded for the best performance in the VHF CW Championship, incorporating 6m, 4m and 2m.

A typical 6m portable station.

"Initiatives that were put in place before my arrival on the scene have led to a remarkable increase in the number of people taking part in weekday evening RSGB contests on both sides of 30MHz. The basis of this sort of contest is that Affiliated Societies compete against each other, with friendly rivalry being much in evidence. Scores from all participants contribute towards club totals, so even a newcomer making just a few QSOs helps. Clubs themselves have been mainly responsible for the increase. In fact, one or two have remarked that their moribund membership has been revitalised by working together to get members on the air. A case in point is that over 150 stations competed in April's 70cm UKAC, a record high, which nobody would have been rash enough to predict, even recently." It is a fact that when the monthly 70cm UKACs began in 2002 just 83 logs were received... for the whole year! Between four and thirteen people entered each session.

"The improvement in several software-related areas of the Contest Committee's activities has been evident over the last few years. The website has evolved and is now aligned with the new RSGB 'look and feel'. The log-entry robot and adjudication system are more user-friendly, enabling results to be produced faster and more accurately than ever, and UBN reports help contesters to understand where they are making mistakes and how they can do better."

Ed will be 'returning to the ranks' and basically switching roles with one of the existing CC members, Ian Pawson, GOFCT.

PEAK OF THE SEASON. The UK Six Metre Group (UKSMG) holds its annual Summer Es Contest on what is reckoned by some to be the weekend of the year on which there is most likely to be some Sporadic-E propagation on the band. Dave Toombs, G8FXM, the UKSMG Contest Manager, writes; "The UKSMG Summer Es Contest has long been the highlight of many VHF contesters' calendars and is held annually, usually on the first weekend of June. This year it will be on the weekend of 1 and 2 June. Contrary to popular opinion this contest is open to all, ie you don't have to be a UKSMG member to take part, although additional points are awarded if you work a member station and the membership number is recorded as part of the exchange. The contest takes advantage of the Sporadic-E season and as we are arguably at the peak of the current solar cycle this year there should be no better time to give this contest a go."

The following sections are available:

1. Single operator (fixed permanent station address)
2. Single operator (both portable and mobile)
3. Multi-operator (both fixed and portable)
4. 6 hour fixed
5. 6 hour portable
6. QRP 5 watts max (both Phone and CW)

David says, "As with all contests, there will be no better time to work DX than during this contest, conditions permitting of course, and you don't have to be a Big Gun station to do well". It's only right that I add the caveat that statistical likelihoods of 6m openings on the first weekend of June don't always hold true, because in 2012 entrants reported flat conditions.

When it comes to silverware, UKSMG is fortunate enough to be able to offer an excellent range of trophies. They commemorate some of the pioneers of VHF amateur radio. "There are a number of prestigious trophies awarded, ranging from the Richardson Cup, the Jersey Trophy, the Ellis Cup, the G8VR Shield, the G5KW Shield to a number of salvers for particular categories. The trophies may be viewed on the UKSMG website.

"Check logs are immensely useful to any contest manager, are always welcome and acknowledged, however you are encouraged to submit a contest log, even if you only make a handful of QSOs. You won't be by yourself and it's always interesting to compare how you did alongside others.

"Portable operation is always popular, with many stations putting in a good score for these categories.

"The contest is supported by a number of popular contest logging software programs,

RSGB HF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Jun 1-2	CW National Field Day	1500-1500	CW	1.8-28	RST + SN
Jun 3	80m Club Championships	1900-2030	Data	3.5	RST + SN
Jun 12	80m Club Championships	1900-2030	CW	3.5	RST + SN
Jun 20	80m Club Championships	1900-2030	SSB	3.5	RS + SN

RSGB VHF EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Jun 4	144MHz UKAC	1900-2130	All	144	RS(T) + SN + Locator
Jun 9	144MHz Backpackers #2	0900-1300	All	144	RS(T) + SN + Locator
Jun 11	432MHz UKAC	1900-2130	All	432	RS(T) + SN + Locator
Jun 15-16	50MHz Trophy +	1400-1400	All	50	RS(T) + SN + Locator
Jun 18	1.3GHz UKAC	1900-2130	All	1.3	RS(T) + SN + Locator
Jun 23	50MHz CW	0900-1200	CW	50	RST + SN + Locator
Jun 23	70MHz Cumulative #4	1400-1600	All	70	RS(T) + SN + Locator
Jun 25	50MHz UKAC	1900-2130	All	50	RS(T) + SN + Locator
Jun 25	SHF UKAC	1900-2130	All	2.3-10G	RS(T) + SN + Locator

BEST OF THE REST EVENTS

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange (info)
Jun 1-2	UKSMG Summer Es	1300-1300	All	50	RS(T) + SN + Locator + Member Number
Jun 2	UKuG Low Band	1000-1600	All	1.3/2.3/3.4G	RS(T) + SN + Locator
Jun 8-9	REF DDFM 6m	1600-1600	SSB, CW, FM	50	RS(T) + SN + Locator (first 4 digits only)
Jun 9	PW 2m Low Power	0900-1600	All	144	RS(T) + SN + Locator
Jun 16	WAB 6m Phone	0900-1500	Phone	50	RS + SN + WAB square
Jun 22-23	Marconi Memorial HF	1400-1400	CW	1.8-28	RST + SN
Jun 23	IRTS 80m Counties	1400-1700	SSB/CW	3.5	RS(T) + SN (EIs & GIs also give county)
Jun 30	WAB 2m Low Power Phone	1000-1400	Phone	144	RS + SN + WAB square
Jun 30	UKuG Cumulative	1000-1600	All	5.7/10/24G	RS(T) + SN + Locator

* HF Championship event; + VHF Championship event. For all the latest RSGB contest information and results, visit www.rsgbcc.org.

Alex, UR7EU with his 7-ele 6m Quad.

including *N1MM*, *GenLog*, *Lux-Log* and the *Contest Log Checker* by UU0JC.

"The UKSMG Summer Es Contest is a fun event whether you're a serious or casual contester, and I'll look forward to working you in the contest this year."

THIS MONTH'S EVENTS. The ever-popular CW NFD takes place on the weekend of the 1st-2nd. As per previous years there are three sections to be entered, but as I mentioned in this column in April the Restricted section now has sub sections for users of 'Complex Antenna' or 'Simple Antenna' systems. Entrants are advised to check the rules, which now have a helpful document linked to them detailing what the limits of the two antenna system types are. The rules also now state what additional technologies (Skimmer, RBN etc) are permitted in the various sections. June is the penultimate month of the 80m Club Championships, with datamodes on the 3rd, CW on the 12th and SSB on the 20th.

The 2m UKAC is the first VHF event of the month, on Tuesday 4th, followed by the second in the series of 2m Backpacker contests that takes place on the morning of Sunday 9th. The 70cm UKAC takes place on Tuesday 11th. This is followed by what is likely to be the biggest VHF event of the month – the 50MHz Trophy – that runs for 24 hours over the weekend of 15-16th. In addition to 24-hour sections there are also 6-hour sections for single-op fixed and portable stations. There is often some enhanced propagation at times in this event and the leading stations sometimes amass huge scores. Entrants in the 6-hour sections who choose their operating period(s) wisely (or who simply get lucky) are also likely to amass big scores. Then it's back to the UKACs, with 23cm on Tuesday 18th. The 6m CW Contest on the morning of Sunday 23rd may only be three hours in duration, but if propagation is favourable – which it is likely to be for some, at least – DX into the Continent can be expected. The fourth 4m Cumulative Contest takes place on the afternoon of the same day. The final RSGB events of the month are the 6m and Microwave UKACs on Tuesday 25th.

Non-RSGB events now; and as mentioned earlier the UKSMG Summer Es Contest takes place for 24 hours over the weekend of 1st-2nd. Another in the series of Low Band events organised by the UK Microwave Group takes place for six hours on Sunday 2nd. The REF (French) DDFM 6m Contest takes place for 24 hours on the following weekend, 8th-9th. In this one its pretty much the usual exchange of information, except that you only need to give the first four characters of your Locator (eg IO83). On Sunday 9th the *Practical Wireless* 2m Low Power Contest runs for seven hours. The maximum permitted power is 3 watts and Locator squares are multipliers. Moving on to the middle weekend of the month, the Worked All Britain 6m Phone Contest runs for six hours on Sunday 16th. The Marconi Memorial HF Contest on 22nd-23rd is organised by the Italian national society RAI. There are QRP/Low/High-power categories and DXCC entities count as multipliers. Wallpaper Alert! For the best chance of winning an award, I suggest entering the QRP category, because only one person from the whole of the UK did in 2011. Propagation will not be as favourable for UK stations who wish to enter the IRTS (Irish) 80m Counties Contest that takes place on Sunday 23rd as they are for this event's sister that took place in January. Nevertheless, with five categories to enter and awards for the leading non-EI station in each of them, you might not need to make many QSOs to win one, especially if you operate portable. Moving on to the final weekend of the month, the Worked All Britain 2m Low Power Phone Contest on Sunday 30th limits entrants to 10 watts output. Another in the series of UK Microwave Group Cumulatives also takes place the same day.

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INTERNATIONAL

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Cockenzie & Port Seton ARC
Bob, GM4UYZ, 01875 811 723, www.cpsarc.com
7 Normal club night
9 *Practical Wireless* 144MHz QRP Contest
15-16 Museums on the Air, GB2MOF at Museum of Flight, East Fortune
19 CPSARC HF activity night 7pm to 10pm
28 Normal club night (note change of night)

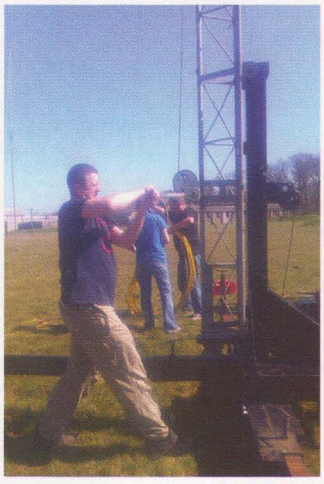
Kilmarnock & Loudoun ARC
Graham, MM3GDC, mm3gdc@btinternet.com
11, 25 Club night, 7.30pm

Lothians Radio Society
Alan, GM3PSP, 0131 623 4580, alanjmasson@virginmedia.com
12 AGM
26 Summer barbecue

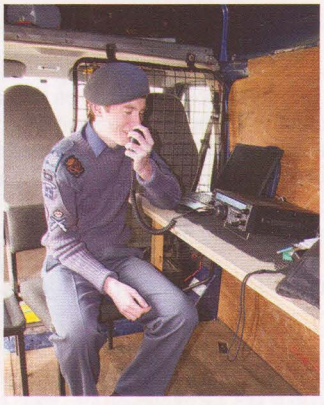
Stirling & District ARS
John McGowan, gm0fsv@gm6nx.com
2, 9, 16, 23, 30 Construction, RCE training, projects and operating, 10.30am till late afternoon
6, 13, 20, 27 Weekly meeting

West of Scotland ARS
info@wosars.org.uk, www.wosars.org.uk
5, 12, 19, 26 Construction night & licence preparation
7, 14, 21, 28 Club night with talks, quiz & raffle

GB2VEF was operated by **Cockenzie & Port Seton ARC** on behalf of the Vulcan to the Sky Club and Trust to promote the Vulcan Bomber XH558 in her 2013 flying season. The sun came out at last and new licensee, Al, MM6LRK can be seen winding up the 60ft tower.



Assisted by **Stirling & District ARS** the 470 Squadron (Falkirk ATC) operated from the site of the former RAF Grangemouth Airfield to celebrate the 75th Anniversary of the Royal Air Force Amateur Radio Society using the special call GB2ATC. Although a very modest portable setup was used on the day consisting of a FT-847 and a 4 band rotary dipole, there were many contacts established between other RAF stations including HQ as well as many other contacts with amateur operators. Robert Tripney, MM0RDT, a civilian instructor with Falkirk ATC, operated the special call for the event along with some of the cadets from 470 SQ Falkirk. GB2ATC would like to thank the many stations calling in on the day and especially the other RAF stations contacted during the event.



REGION 2: SCOTLAND NORTH & NORTHERN ISLES

REGIONAL MANAGER: DENNY MORRISON, GM1BAN, RM2@RSGB.ORG.UK

Aberdeen ARS
Fred Gordon, MM0ODL, 01975 651 365
6 Junk sale
15 Museums on the Air at Bennachie Centre
27 Morse & on the air

Glenrothes & DRC
Tam, 0775 3526 498
1 NFD at Union Farm
5 Plan for IMOTA
12 Search on Sound, Tam
15-26 IMOTA at Scotland's Secret Bunker
19 Operating evening
22-23 IMOTA at Scotlands Secret Bunker
26 Radio interest film

Glenrothes and DARC has a new website. The new URL is www.gdarc.webs.com. They are encouraging all radio amateurs to drop in and find out more about the club.

Aberdeen ARS is very saddened to report the passing of Stanley Sutherland, GM4BKV, aged 90, who was a great stalwart of the society and is much missed. Stanley joined the Royal Navy prior to WW2 as a boy seaman and served throughout the war, rising to the rank of Petty Officer. He escaped twice from ships that had been torpedoed, on the first occasion in *HMS Calypso*, a C class cruiser torpedoed by an Italian submarine. After War service, Stanley briefly worked ashore before going back to sea as a Merchant Navy officer and held a Master Mariners certificate. He served in the Ben Line that traded mainly to the Far East.
Stan then decided on a career change going to university to qualify as a physics teacher, he then spent the rest of his career as a teacher in Aberdeen schools. In his long association with Aberdeen ARS, Stanley served in various committee posts. For many years he was the lead teacher in the amateur radio syllabus and many amateurs were to pass the exams and became licensed with Stan's excellent tuition. He also was the QSL manager for the Society and administered the Society's WAGM (Worked all GM) award.

He was a very keen Royal Navy Amateur Radio Society member and ran RNARS nets, in addition to being active on HF and VHF he was a great supporter of Aberdeen's various field events and special event stations always being keen to get on the air and encourage beginners to have a go.

REGION 3: NORTH WEST

REGIONAL MANAGER: KATH WILSON, M1CNY, RM3@RSGB.ORG.UK

Bolton Wireless Club
boltonwireless@gmail.com
3 An evening with Rev George Dobbs, G3RJV
17 APRS developments, Chris, G4HYG

Chester & DRS
Bruce Sutherland, M0CVP, 01244 343 825
4 Surplus sale
11 Committee meeting
18 SDR, Chris, G0PJX

25 Operating club station at CMBC

Mid-Cheshire ARS
Peter Paul Fox, G8HAV, 01606 553 401
5 Antenna and preamps removal
12 HF station on the air
19 Committee meeting
26 Boxing up equipment for VHF NFD

South Lancashire ARC
Allan Green, 2E0RAG, 07533 970 841
12 The dark and until now untold history of GB3PZ by G4ZPZ
22 Summer rally

South Manchester R&CC
Ron, G3SVW, 01619 693 999
6 Programmable logic for the amateur, Dave, G4UGM
13 2m fox hunt
16 Special event station at Sale Festival
20 Summer solstice BBQ
23 Car boot sale (9.30 for cars, foot traffic 10.30)
24 Technical forum
27 Royal Engineers Motor Cycle Display Team – Mike Brough
30 472kHz activity day

Stockport RS
Nigel Roscoe, 07973 312 699, info@g8srs.co.uk
1-2 National Field Day
4 Repeaters and Voice over Internet protocol, Gareth, M6IGJ
18 The G5O Story, Ed, 2E0CFM

Thornton Cleveleys ARS
John E Rodway, G4FRK, 01253 862 810
3 Natter night
10 Technical talk, G4EZM
17 Nautical days (sparks at sea), G3OSR
24 VHF Field Day discussion

Workington & D AR&IT Group
Barry Easdon, G0RZI, 01946 812 092, barrydrm31@hotmail.co.uk
10 Club website, Alex, G7KSE
24 Club meeting and OTA

The **Workington Radio Club** had their presentation on 21 April at the Workington Lifeboat Station. They presented a cheque for £1,024 to be divided between the three lifeboat stations in the north of Cumbria. GB1LBC at Silloth, GB2LBC at Workington and GB4LBC at St Bees were all manned by club members and joined by Paul, GM0KMJ. This was a great adventure for both Workington & Furness clubs and they would like to thank all the operators who took part at the various stations during the event, particularly Bill, G4USW the QSL manager.

On 26 June 1913, Barrow Wireless Association in NW England received a transmitting licence from the Post Office, the fifth English club to do so. **Furness Amateur Radio Society**, as a successor to that association, is celebrating this centenary with a series of events and on-air activities. Ofcom have been approached for a special callsign and as this will be announced as soon as it is confirmed. Amateurs in the UK and beyond are invited to work the station. Activity will be from early June for around 28 days.

REGION 4: NORTH EAST

REGIONAL MANAGER: HAROLD SCRIVENS, GOUGE, RM4@RSGB.ORG.UK

Angel of the North ARC
Nancy Bone, G7UUR, 01914 770 036, nancybone2001@yahoo.co.uk
3, 17, 24 On the air
10 Talk, 7.30pm, all welcome

Denby Dale RC
Richard, M0RBG, 07976 220 126, m0rbg@talktalk.net
5 Planning for open day & Honley Show, GB2HS
8 GB2HS at Honley Show
9 Clayton West Gala
12, 26 Night on the air, 145.575MHz
16 WAB contest from Cartworth Moor
19 Club night
22-23 Museums on the Air
23 LAM Communications rally at Elsecar Heritage Centre
29 Open day at Pie Hall, Denby Dale, HD8 8RX
30 WAB contest from Cartworth Moor

Sheffield ARC
Peter Day, G3PHO, sarc@g3pho.org.uk
1 RSGB National Field Day (CW): G2AS/P
3 Social night & RSGB 80m Club Contest as G3RCM
10 Portable evening and club activity contest
17 VHF Field Day planning meeting

For International Museums Weekend, **Wakefield & DRS** will be active from The Hepworth, Wakefield on 15 and 16 June using the callsign GB1HW. The Hepworth is one of the galleries in the Tate Plus group and it is dedicated (though not exclusive) to the works of Wakefield's internationally famous local artist, Barbara Hepworth.

The club intends to run one HF station from within the gallery grounds. Activity will begin at about 8.30am each day and close at around 5pm. Active bands are expected to be 14MHz to 50MHz, with a bias to the higher frequencies, depending on the availability of propagation. See QRZ.com GB1HW for updates during the event. QSLs will be electronic, via EQSL.cc, only and features a rather nice photo of the gallery. Visiting amateurs are welcome during the activation.

REGION 5: WEST MIDLANDS

REGIONAL MANAGER: VAUGHAN RAVENSCROFT, M0VRR, RM5@RSGB.ORG.UK

Aldridge & Barr Beacon ARC
Albert, G0KFS, 01922 614 169
3 CW tuition
17 Fault finding

Bromsgrove & DARC
Chris, M0BQE, 01905 776 869, g3vgg@hotmail.com
7 Antenna workshop
14 Training on the FT-1000 operation
21 VHF night
28 HF night

Central Radio Amateur Circle
Martin Hallard, G1TYV, 07906 905 071, radio-circle@live.co.uk
6, 20 On the air
15 Plug & play day, Barr Beacon, 10.30am

Coventry ARS
John, G8SEQ, 07958 777 363
3, 11, 17, 24 Club net on 145.375MHz
7 Nuneaton Wildlife Centre, Geoff Grewcock
14 Castles on the Air, Astley Castle
21 2nd Round G4ZMC Trophy, Hatton Locks
22-23 Museums on the Air, The Herbert, Coventry
28 SSTV radio workshop
30 30th Signals Bramcote open day, GB4BLC

Gloucester AR&ES
Anne, 2E1GKY, 01242 699 595, daytime, www.g4aym.org.uk
3 DF hunt
10 VHF operation/construction and Intermediate exam
17 Outdoor operating with picnic and longest day draw (or talk on Severnside operating by Brian, G4CIB and Malcolm, G6UGW if wet)
24 Informal evening

Midland ARS
Norman, G8BHE, 07808 078 003
5 Open meeting, shack on the air and training classes
9 QRP Rally at Alfreton Leisure Centre
12 Committee meeting and training classes
19 Social planning evening, shack on the air and training classes
26 General meeting, rallies and outside events and training classes

Salop ARS
www.salop-ars.org.uk
6 Natter night and committee meeting

13 Fox hunt with Ken, G8DIR as the fox
20 SARS / PARC BBQ at The Sun
27 Natter night

South Birmingham RS
Mick Cleary, G7RRP, 07595 696 359, g7rrp@btinternet.com
3 Shack on the air, open meeting
4, 11, 18, 25 Coffee morning 11am till 1pm, all welcome
5 Lecture in main hall
6, 13, 20, 27 Training classes with Dave, G8OWL
9 QRP Rally with NADARS at Alfreton Centre
10 Field day review
14 Shack and aerial work
24 Sorting out surplus gear for sale

Sutton Coldfield ARS
Robert Bird, spirit.guide@hotmail.co.uk
3, 17 Open net 145.250MHz from 7.30pm
10 DXCC, Bob, G3PLP, plus OTA
11 Open net 70.475MHz from 7.30pm
15 British Inland Waterways on the Air at Fazeley Mill Marina
24 Finalising details for VHF/UHF weekend plus OTA

Telford & DARS
Mike, G3JKX, 01952 299 677, mjstreetg3jkx@blueyonder.co.uk
5 Committee meeting & GX3ZME OTA
12 VHF NFD planning
19 Portable in the field
26 Boat trip

Worcester RAA
Rich Moles, M0UVA, secretary@m0zoo.co.uk
2, 23, 30 Club net on 145.225MHz, 20:00
3 80m Club Championships DATA Contest; Foundation course
4 Morse class; Free 'n' Easy/144 MHz UKAC Contest
7, 14, 21 Shack social
9 Club Trip to J28 QRP Rally, Alfreton; club net on 145.225MHz
10, 15 Foundation course
11 Morse class; committee meeting
12 80m Club Championships CW Contest
16 Trip to Newbury Rally, club net on 145.225MHz
17 Mock Foundation exam
18 Morse class; Worked All Britain Awards Scheme by Judith, G4IAQ & Dave, G4IAR
20 80m Club Championships SSB Contest
24 Curry Night at the Monsoon; Foundation exam
25 Practical evening with Ed, Morse class; DFing for Dummies, Chris, G0EYO
28 Summer fox hunt

Gloucestershire RAYNET recently participated in a large scale multi agency exercise involving helicopters, hovercraft, UAVs and sniffer dogs. More than 400 emergency workers descended on Cotswold Water Park, near Cirencester, to simulate the response that would be needed in the event of an aircraft collision in mid-air.

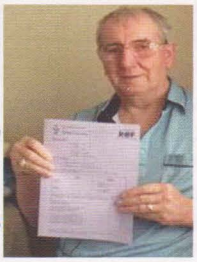
With only the scenario known, the ten members were initially requested to rendezvous at the Fire Strategic Holding Area located on a nearby army barracks, before being tasked to provide radio links back to the fire control room at the Tri-Service headquarters outside Gloucester, and also deploy into the incident zone. Less than an hour later, point to point contact was made between the two locations via talk through units for messages to be passed, in case of an Airwave failure. Ironically, this did happen, and the only air to ground VHF liaison with the RAF Sea King deployed from Chivenor was via marine licenced RAYNET personnel on site, sparing a few red faces!

Due to the exercise ending early, members were denied the opportunity to deploy with police search teams and the experience of having to kit up in full forensic white suits. The experience provided an excellent opportunity to demonstrate the group's capabilities and impress those conducting the exercise – including national observers – as well as re-establish good contacts with blue light and fellow volunteer agencies.

Photo courtesy Max White, M0VNG

GB2BCN will operate at the Pelsall Canal Festival on Pelsall Common from 14 to 17 June. The purpose of this Festival is to celebrate 200+ years of inland waterway transport and recreation with a rally of traditional and modern replica narrowboats on this picturesque section of the UK's central canals. Over 100 narrowboats are expected to attend the rally while the adjoining and spacious Pelsall Common will host a variety of stalls and attractions for visitors including a marquee of real ales from the nearby Black Country, and fun-fair entertainment for children. Admission is free and visitor car parking is available at the end of Wood Lane, Pelsall, Walsall, WS3 5DY.

Boating visitors (especially BiWota members) are also very welcome to attend and are invited to submit the boat-entry form available on the BCN Society website, www.bcnsociety.co.uk. Further details with 'live' updates are also being posted on www.qrz.com/db/gb2bcn.



Central RAC would like to say well done to Roy on passing his Foundation exam. He hopes to go on and study for the Intermediate licence next. Congratulations also go to Ian, M6YRU, Mark, M6MPE, Paul, M6CKL and Mark, M6CKJ with their instructor Martin, G1TYV (pictured) and also Damian, M6DHM. Since this picture (below) was taken, Mark, M6CKJ has passed his Intermediate exam and is now 2E0MGX and he is studying for the advance exam in May

Midland ARS recently had three members pass the Intermediate examination. Paul-Michael and Steven are shown here with tutor and chief examiner Ron, M0WSN.

REGION 6: NORTH WALES

REGIONAL MANAGER: MARK HARPER, MW1MDH, RM6@RSGB.ORG.UK

Powys ARC
Dave, GW4NQJ, 07870 827 887, www.parc.care4free.net
6 Nanowaves (modulated light) by Dave, G8VZT
20 BBQ with Salop ARS at Sun Inn, Marton

REGION 7: SOUTH WALES

REGIONAL MANAGER: JIMMY SNEDDON, MW0EQL, RM7@RSGB.ORG.UK

Aberystwyth & DARS
Ray, GW7AGG, 01970 611 853, ray@clocktower.go-plus.net
9 Public demonstrations at Aberystwyth Cliff Railway open day and RSGB Centenary station GB100RSGB on the air
27 Night on the air on 145.500MHz then 145.550MHz

Carmarthen ARS
Lloyd, 2W0LLT, 01239 711 297, 2W0LLT@talktalk.net
4 Rig clinic
18 Open night

Llanelli ARS Craig, MW0MXT, 01269 845 773, craig@mw0mxt.co.uk
1-3 GW100RSGB on the air
10 GC0EZQ on the air and club raffle
17 On the air
24 DVD and club raffle

REGION 8: NORTHERN IRELAND

REGIONAL MANAGER: PHILIP HOSEY, MI0MSO, RM8@RSGB.ORG.UK

West Tyrone Amateur Radio Club recently held their AGM. The following were elected to the club's committee: Chairman, Eddie, GI7FHZ; Vice-Chairman, Frank, 2I0FPK; Secretary, Paul, 2I0LDC; Treasurer, Sean, GI0EJT; PRO, John, 2I0OMA; Committee Members, Eric, GI4SXV & James, GI3YBZ.

Lough Erne Amateur Radio Club would like to thank all who took part in the 32nd Lough Erne Rally. The Club was particularly pleased to welcome the entire Regional Team at the RSGB stand – Phillip, MI0MSO, Melvin, MI0MSR, Bobby, MI0RYL and Trevor, MI5TCC. Despite disruptive weather all the expected traders expected attended. Only one exhibitor was missing and all tables were full iin the big SHARE Arena. Numbers were noticeably lower, due to a mix of very bad weather, travel costs and financial recession.

REGION 9: LONDON & THAMES VALLEY

REGIONAL MANAGER: LARRY SMITH, G4OXY, RM9@RSGB.ORG.UK

Bromley & DARS
Andy, G4WGZ, 01689 878 089
1 Bromley Pageant of Motoring
18 G100RSGB on the air from lunchtime to 10pm
Burnham Beeches RC
Dave, G4XDU, 01628 625 720
3 Club contest
17 Raspberry Pi, Paul, G6TSF
Chesham & DARS
Terry, G0VFW, 01442 831 491, cdars.club@ntlworld.com
1-2 Weekend event: RSGB HF CW Field Day
5 General meeting & night on the air
12 QSL Cards, Chris, M0GVT
19 Members' forum – bring along your radio equipment
26 Pedestrian DF contest, 2m FM
Coulsdon ATS
Steve Beal G3WZK, secretary@catsradio.org
10 DF hunt on Coulsdon Common
Cray Valley RS
Malcolm Bryan, G8MCA, 07906 433 965
6 Bletchley Park codebreaking presentation by Martin, G3ZAY
20 Annual DF hunt, 8pm
Crystal Palace R&EC
Bob, G3OOU, 01737 552 170, g3oou@aol.com
7 DSP noise cancellation, Graham, M3ZGS
Dorking & DRS
Garth, G3NPC, 01737 359 472, www.ddrs.org.uk
25 Presentation by RSGB General Manager Graham Coomber, G0NBI
Edgware & DRS
Mike, G4RNW, 02089 500 658, michael.stewart5@ntlworld.com
13 Table top sale
Newbury & DARS
Rob, G4LMW, 01635 862 737, g4lmw@btconnect.com
1 NFD, team leaders G4LMW & G0ORH
3 80m Club Championships DATA
12 80m Club Championships SSB
16 Newbury Radio Rally
Reading & DARC
Pete, G8FRC, 01189 695 697
23 Transistors & valves, Des, G8FIF and Dave, M0PMZ
23 DF techniques at the London Olympics 2012, Chris, G3VEH
Southgate ARC
Mr K Mendum, G8RPA, g8rpa@arrl.net
12 Building your own 70cm aerial for DFing
23 DF hunt using the previously built aerial
Surrey Radio Contact Club
John, G3MCX, 020 8688 3322, john.g3mcx@btinternet.com
3 Construction contest
17 Fix it and natter night
Sutton & Cheam RS
John, G0BWV, 020 8644 9945, info@scrs.org.uk
20 Practical antenna design, Mike, G0JMI, from Alton Antenna Arrays
Verulam ARC
Ralph, G1BSZ, 01923 265 572, g1bsz@aol.com
13 Social with GB3VH repeater group, 7.30pm, Rose and Crown Pub
23 All day Sunday operating at field cabin site with BBQ from 12.30pm
Wimbledon & DARS
Andrew Maish G4ADM, 02083 353 434
14 A DVD from the RSGB Audio Visual Library
28 On the air

Reading & DARC had nine candidates pass the Spring 2013 Foundation exam with flying colours. The highest mark was 100% and nothing less than 97% for all the other candidates. From left to right in the picture are Andy, Carl, Robert, Roddy, Andrew, Dorian, John, Richard and Peter. Some of these will be sitting the Intermediate exam soon. The next Foundation course will be in October, please check www.radarc.org/ for further details.

In April, a group from **Dorking & DRS**, with friends from Guildford and Echelford societies, was privileged to visit Surrey Satellite Technology Ltd (SSTL) at Guildford. SSTL designs, makes and operates small satellites for civil and military use. The company was founded by Sir Martin Sweeting, G3YJO. It has grown from an offshoot company from research at the University of Surrey to be part of the Astrium aerospace group. It now has 600 employees at three locations in the UK as well as in Colorado. Their hosts were Dr Stuart Eves (SSTL) and Dr Chris Bridges (UoS) who made presentations about the company and the capability of its satellites, as well as describing a student team project which studied the effect of the space environment on a mobile phone.

The group was able to see the company's manufacturing and commissioning activity housed within a very large clean room. They also saw its satellite control room used to monitor and receive telemetry as well as controlling the satellites' orbital positions. Interestingly the control room had no one in it, it was completely automated. All were astonished by SSTL's achievements and left with renewed faith in UK technology and enterprise.

REGION 10: SOUTH & SOUTH EAST

REGIONAL MANAGER: MICHAEL SENIOR, G4EFO, RM10@RSGB.ORG.UK

Basingstoke ARC
Tim, G3PJD, 07754 132 859
17 SDR radio
Brede Steam ARS
Steve, 01424 720 815, M0NUC@aol.com
1 AGM
4, 11, 18, 25 At the shack
Fareham & DARC
Derek, G4JLP, 01329 823 405
5 SDR dongles: why every ham should have one, Andrew, G4XZL
12 Club quiz, other clubs most welcome
19 Portable on Portsdown Hill
Farnborough & DRS
Neville, G4SPD, 01252 404 816
3, 10, 17, 24 80m slow Morse net, 3.570MHz, 1pm; Top Band G2DX club net, 1.995MHz, 8pm
5, 19 Slow Morse club net, 1.995MHz, 8pm
7, 14, 21, 28 2m club net, 144.675MHz, 8pm
Fort Purbrook ARC
Neil Hoare, M0NEH, 02392 378 559, 07740 056 451
28 Natter night, 7pm
Harwell ARS
Malcolm, G8NRP, 01235 524 844, info@g3pia.org.uk
11 Software defined radio, Mike, M0CUL

25 Shack activity night

Horndean & DARC
Stuart, G0FYX,
02392 472 846,
www.hdarc.co.uk
6 Natter night/social evening
15-16 GB0RMM from the Royal Marines Museum
20 The Rowans Hospice, Martin M0JTN

Horsham ARC
Alister, G3ZBU,
01932 242 243,
www.harc.org.uk
6 RF leakage from cable networks, G4LRP
13 Social at The Plough

Mid-Sussex ARS
Mike Mundy, G1TDL,
01444 246 899
7 Foxhunt
14 Club 47th anniversary at the Windmills
21 Morse refresher, Mike, G3VAK
28 Workshop

Southdown ARS
John, G3DQY, 01424 424 319
3 Talk on APRS, Bob Clinton, G0BUX

Swindon & DARC Den,
M0ACM, 07810 317 750,
www.sdarc.net
6, 13, 20, 27 Activity Night

Worthing & DARC meets every Wednesday evening at 8pm in the Lancing Parish Hall, Lancing, West Sussex. Contact John, G8FMJ on 01273 593 232.

Horndean & DARC held an Advanced level exam for three candidates in March. Two out of three candidates passed. They would like to thank the club's Advanced level tutor Rob, M0RZF. Also in March, the club ran their tenth Foundation exam and eleventh Intermediate exam. Training was supported with equipment bought with the club's Awards-for-All Lottery grant. All six Foundation and all five Intermediate candidates passed. Congratulations to all the successful candidates and thanks the club's Foundation tutor John, M0HEX, and posthumously thanks to the Intermediate tutor Ronald, G3UKU. The club was shocked to learn that Ronald suddenly passed away 16 days before the exam, and his students have asked that a special mention be made of the help he gave them during the training for the Intermediate exam. The club will greatly miss Ronald and the valuable contribution he made. Some additional training for the Intermediate course was subsequently given by training manager Ken, G0JWL and also by the training associate Simon, G0IEY.

(L to R): Tutor John, M0HEX, John Taylor, Paul Phillips, Martin, M6FEL, Maurice Phillips, Roger, M6KWN. Seated is Simon Worger.

(L to R): Simon Bradley, Grahame Webster, David Rudling, Michael, 2E0ZAZ, tutor Ken, G0JWL holding the pass certificate for Gordon, 2E0CSN. Gordon had to leave immediately after the exam.

REGION 11: SOUTH WEST & CHANNEL ISLANDS

REGIONAL MANAGER: PAM HELLIWELL, G7SME, RM11@RSGB.ORG.UK

Bristol RSGB Group
Robin, G3TKF, 01225 420 442
24 G3SJI: Summer "Christmas" Party

Cornish Radio Amateur Club
Steve, G7VOH, 01209 844 939,
G7VOH@btinternet.com
6 Main meeting
15 Radio demonstration at Redruth Murdoch Day
20 Workshop evening

Exeter ARS
Nick, 2E0NRJ, 01363 775 756,
info@exeterars.co.uk
3, 17 HF net on 3.675MHz 7.45pm
4, 11, 18, 25 2m net on 145.575MHz 7.45pm
10 Digital modes evening using *Fldigi*, 7pm; HF net 3.675MHz 7.45pm
24 Repeaters and how they work by John G8XQQ at 7pm; HF net 3.675MHz 7.45pm

Flight Refuelling ARS
John, G4POF,
g4pof@hotmail.com
16 Shutter telegraphy by John, M0XIG

Mid Somerset ARC
Nick, 2E0FGQ, 01749 346 320,
nick.bennett@midsarc.org.uk
11 Club night with themed evening or guest speaker 7.30pm
25 Social gathering at The King's Arms (AKA Dust Hole)

Plymouth RC
Robert Goodhall,
01752 777 888,
robert.2e0itn@gmail.com
11 Technical talk by Kurt Langfeld, M0KPL

Poldhu ARC
Keith Matthew, G0WYS,
g0wys@yahoo.co.uk
11 Pre 706T, John Farrar, G3UCQ

Poole Radio Society
Bill Coombes, G4ERV,
secretary@g4prs.org.uk
3, 12, 19, 26 Club 2m net, 2m FM
7 Activity night & Advanced course
9 *PW* 2m QRP Contest
14 Construction contest
21 Activity night & Advanced mock exam
23 Day at Hamworthy Park
28 Activity night & Advanced revision

Riviera ARC
Alan Wyatt, G2DXU,
rivieraarc@gmail.com
4, 11, 18, 25 Club meeting, MX0RIV on the air
5, 12, 19, 26 2m net on 145.425MHz, 20:00

Saltash & DARC
Brian, M0BHG, 01752 844 321,
m0bhg@yahoo.co.uk
6 Programme review and natter night

South Bristol ARC
Andrew Jenner, G7KNA,
07838 695 471
6 VHF NFD demonstration
13 Summer BBQ
20 Summer table top sale
27 Open house and on the air night

Thornbury & South Gloucestershire ARC
Tony, G0WMB, 01454 417 048,
tonytsgarc@btinternet.com
5 Mobile fox hunt, Peter, G4OST
7, 14, 21, 28 2m net at 8pm
12, 26 On the air
19 Visit to model flying club with G6RAZ

Yeovil ARC
Rodney Edwards, M0RGE,
01935 825 791,
rodney.edwards@uwclub.net
6, 13 Field Day at Sexeys Playing Fields, Bruton
20 2m fox hunt
27 On the air

Four members of the **Poldhu ARC** obtained their Intermediate licences recently. From left to right are Robin, 2E0RER, Frankie, 2E0CTD, Jim, 2E0JYA and Barry, 2E0LLO. Their tutor was Keith, G0WYS.

REGION 12: EAST & EAST ANGLIA

REGIONAL MANAGER: MARK SANDERSON, M0IEO, RM12@RSGB.ORG.UK

Bittern DX Group
Linda, G0AJJ, 01692 218 562,
secretary@bittern-dxers.org.uk
27 Club meeting at The Roman Camp Inn

Braintree & DARS
John, M5AJB, 01787 460 947
3 Speaker from Essex Air Ambulance plus table top purchases
17 Construction contest

Bredhurst Receiving and Transmitting Society
Charles G4VSZ, 07982 244 788,
secretary@brats-qth.org
15 5MHz Day – building aerials and operating from the shack
29 GB4BVF at Bredhurst Village Fete

Cambridge & DARC
David, M0ZEB, 01353 778 093
14 Astronomy for your holidays, Peter, M0DCV
28 Constructors' evening - bring and show something you've made
Chelmsford ARS
Martyn, G1EFL, 01245 469 008, www.g0mwt.org.uk
14 Used Royal Navy Equipment for Radio Amateurs, Charles Riley
Coalhouse Fort ARS
Tony Reynard G7HJT, 07976 553 345
30 GB1CHF on the air (11-5pm) for open day
Colchester Radio Amateurs
Jeff, G7TAT, 0789 9894 435, g7tat@live.co.uk
20 HF antennas for a postage-stamp garden, Bill, 2E0BMG
Darenth Valley Radio Society
Bob, M0RAW, 01322 663 804, to m0raw-bob@talktalk.net
12 Aerial erection for fault finding
26 VHF Field Day preparation
Dover RC
Pete, M0PKH, peter.halloway@sky.com
5 Low power fox hunt, Alkham Valley
12 Operating in South Africa, Roger, G3SXW
19 Natter night
26 Having fun on APRS on 2m and HF, Matt, M1CMN
East Kent RS
Karl Davies, M1DFM, 01227 710 120, karl.davies@talk21.com
3 A Yorkshire childhood, Doris Hatch
17 Bob MacDonald
23 Stelling Minnis meeting and picnic
Felixstowe & DARS
Paul, G4YQC, pjw@btinternet.com
10 Preparing for ESWR rally
23 ESWR rally
24 Field activity evening, Felixstowe beach, with Peter, G8BLS and Steve, M1ACB
Harwich ARIG
Kevan, 2E0WMG, 07766 543 784 kevan2e0wmg@live.co.uk
12 Remote control, Joe, G0JJG
Hilderstone R&EC
Chrissie Turner, hilderstoneclub@gmail.com
13 Natter night
27 The story of Thomas Russell Crampton, Peter Shaw
Loughton & Epping Forest ARS
Marc Litchman, G0TOC, 02085 021 645
20 Science and Technology education days
Lowestoft & District PYE ARC
Tim Ward, 2E0TJW, 07810 481 182, tim@2E0TJW.co.uk
6, 13, 20, 27 Club night at the shack
Norfolk ARC
Chris Danby, G0DWV, 01603 898 678, cmdanby@btinternet.com
1-2 NFD and Radio Active weekend at Ellingham Ranch
5 Sun by day, aurora by night Paul Money FRAS FBIS
12 Informal in the main room, workshop in the side room
19 SSB contesting: how it should be done, Paul, G3SEM
26 Fox hunt prep / planning
South Essex ARS
Dave, G4UVJ, 01268 697 978, g4uvj@btinternet.com
11 On the air
22 Dave, G4AJY's 70th birthday evening (invitation only)
23 Bay Museum for Museums on the Air
29 Armed Forces Day at The Paddocks, Canvey Island
Thames ARG
Pete Sipple, M0PSX, 07940 579 116
7 My SOTA experiences, Peter, G1FOA
West Kent ARS
Keith G4JED, info@wkars.org.uk
10 SDR introduction and demo of Flexradio 1500 by Wilfrid, M0GYE

The radio community recently gave **Dover ARC** fantastic support by donating some raffles prizes said Pete, M0PKH, DARC Chairman. Thanks go to Martyn Lynch & Sons, Icom UK, Fox Delta, LAMCO, Stuart Electronics, Yaesu UK and the RSGB. These raffle prizes along with other donations and activities raised over £400 for the Kent Repeater Group. This will go towards the re-siting and installation of GB3KS. The picture shows some of the lucky prize winners at the AGM.

Hilderstone ARC took part in Crampton Tower Hobbies Weekend in April. The club set up a radio station consisting of a Yaesu FT-897d, Icom IC-703 and a Comet 250B antenna system, demonstrating datamodes and CW throughout the weekend. Peter, G0KOK brought various types of Morse keys including his specially produced key number 50 of 250 in celebration of the RSGB's centenary. At the club meeting Dr Ken Smith gave a fascinating talk on the early telegraph system, the first 'internet'.

Six members of **Hilderstone RC** enjoyed four very successful days at the GEEK show in Margate – John, G7OHO, Patrick, M0ZPK, Ian, M0CAG, Denis, M6DES and Danny, M6ZDD – not playing on the retro games but explaining the capabilities of the Raspberry Pi and the Arduino to visitors. They were joined on the Sunday by 6 year old Oliver Barclay from Callis Grange nursery and infant school who demonstrated squishy circuits with conducting dough. This too was a great hit, especially with radio amateur Daniel, M0EBK and his family. Oliver is in the centre of the photograph. At the club meeting Peter, G0KOK gave an interesting talk on his operating adventures in Barbados under his special call sign, 8P9CC. He showed the impressive antennas at the Barbados Radio Society and the antenna he set up himself on the hotel roof!

The club had a very successful evening with all four candidates passing their Foundation exam – Denis Kirkden, Danny Day, Paul Russell and Nick Parker.

Fifteen excited Brentwood School students were eager to broadcast after a whole day of hands-on experimental radio, where they made contact with other stations as far afield as Moscow and were even given a chance to construct their own medium frequency (MF) receiver. The stations reached were patient and happy to respond to the students, who were able to contact both mobile and static stations throughout the day. They conducted professional conversations about location, weather conditions and equipment setup with other radio technicians around the globe. Information Technology teacher and RSGB Member Stanley Anders provided the equipment and was able to help students by sharing his amateur radio expertise.

Students were also given an opportunity to construct their own MF radios in the School's Design and Technology department. The design was not complex by modern standards but proved to be challenging to make in just a few hours. Although some students did not succeed in making the device, they all found the experience an interesting tie-in with the rest of the day's activities.

In April, **Braintree & DARS** hosted Mark Sanderson M0IEO, the RSGB Regional Manager. Mark was accompanied by Norman, M0EZW, the Essex rep. Mark brought the club up to date with what was happening with the Centenary celebrations and G100RSGB. Mark and Norman said they would take any concerns back to the RSGB. It is most helpful to have the RSGB reps available and the club enjoyed their company.

Back in March, the **Braintree & DARS** was visited by members of the Essex CW club. Jonathon, G0DBJ, assisted by Steven, G4ZUL and Andrew, G0IBN, gave them a fascinating talk starting with the history of the Essex CW club, which was formed by a few CW fans in 2009. Their idea was to promote the continued use of the oldest form of data communication by helping the new licence holders to learn Morse, and reminding the older hands that their hidden Morse key should once again see the light of day.

REGION 13: EAST MIDLANDS

REGIONAL MANAGER: STEVE BODEN, G4XCK, RM13@RSGB.ORG.UK

Derby & DARS
Richard Buckby, radio@dadars.org.uk
4 Junk sale
11 Committee meeting
18 The work of the Royal National Lifeboat Institution by Richard Dobson
25 On the air

Hucknall Rolls Royce ARC
Dave Wilde, G1YAI, treasurer@hrrarc.com
7, 14, 21, 28 Club meeting followed by members' forum
22-23, 29-30 Foundation training weekend

Lincoln Short-Wave Club
Pam Rose, G4STO, 01427 788 356, pamelagrose@tiscali.co.uk
1, 8, 29 Surgery and mentoring 09:00; Intermediate course
2 Spalding Rally 10am; Intermediate course
4 144MHz UK AC
5 Shack activities + natter night, BSA Club
6 Repeater net, 145.725MHz, 20:00
9 Junction 28 QRP Rally + *PW* 144MHz Low Power Contest; Intermediate course
11 432MHz UK AC
12 Sausage & burger night,
13, 20, 27 Simplex net, 145.375MHz, 20:00
15, 22 Surgery and mentoring, 09:00; Museums on the Air CW at East Kirkby; Intermediate course
16, 23 Museums on the Air CW at East Kirkby; Intermediate course
17 Committee meeting, 19:30
18 1.3GHz UK AC
19 Formal meeting, BSA Club,
25 50MHz UK AC
26 Talk on the work of the RAIBC

Loughborough & DARC
Chris, G1ETZ, 01509 504 319
4 Model/ Kite flying - Subject to WX
11 Radio Ramble Mick, M0GDW
18 'Fish & Chip Supper'
25 Practical evening

Northampton Radio Club
John, G4CZB, g4czb@hotmail.com
3, 10, 17, 24 2m net, 145.4625MHz
6, 20 Club evening, 20:00
8-9 100th Anniversary BBQ and weekend event at Ravensthorpe, (everyone welcome)

South Kesteven Amateur Radio Society Nigel, M0CVO, 01476 402 550
12, 26 Informal evening

Spalding & DARS Graham Boor G8NWC, 07947 764 481, www.sdars.org.uk
2 SDARS rally
21 DXpedition to ZD9UW, Tristan da Cunha, Rob, M0VFC

Welland Valley ARS
Peter D Rivers, G4XEX, 01858 432 105, g4xex@fsmail.net
3 80m Club Championship DATA 19:00-20:30
8 Special event station at Market Harborough Carnival
10 Club net, 145.275MHz FM (moved from 3rd due to 80m contest)
15-16 Special event station GB0BON at Rupert's View
17 Wi-Fi DX experiment with Kettering Club
20 80m Club Championship SSB 19:00-20:30

Nunsfield House ARG has been very active the past few months; since Christmas they have run several Foundation and Intermediate courses. The photograph shows the latest Intermediate passes with their invigilators Dave, G8GBU and Tony, G6MWS. The club will be running further courses later this year.

Maurice W A Pyle, G2BLA 1921-2012

Maurice became interested in radio in 1935 when his father constructed a radio with 2V valves, accumulator, 120V HT battery and a horned speaker. A Peto Scott commercial receiver with short wave was purchased a couple of years later and this was the first time Maurice heard amateur radio. This spurred on his interest and he also became very proficient at CW. In February 1939 he obtained his AA licence with the callsign 2BLA, held in his mother name with him as her agent, but he was not allowed to transmit over the air.

At the outbreak of war the transmitter parts he had collected were confiscated but he continued to listen on his Howard receiver and he enrolled in the National Wireless Register. In 1939/40 he became a member of the Y service as a voluntary interceptor. He volunteered for the RAF in 1941 and was taken on as a Wireless Operator/Mechanic. After initial training Maurice was employed at RAF Hendon on the maintenance of aircraft radios. In 1943 he was promoted to Flying Officer and was posted to Cheadle and then to Dunstable.

After the war, Maurice restarted his interest in amateur radio as he still had his Howard receiver and got back his equipment. Fortunately there was plenty of surplus radio equipment available so he built a Top Band transmitter and made his first real QSO in 1947. Different surplus receivers were obtained and various transmitters were built during the ensuing years until he purchased his first transceiver, a KW200E, and then a linear amplifier. This was followed by various other transceivers, the last being an IC 7400 in 2009.

He was always interested in DX and during his lifetime worked over 250 countries using an 80m loop aerial. He also used to enter the BERU contest regularly. Later in life when he was not able to erect large aerials he became a great fan of the 6m band and spent many a happy hour chasing DX on that band.

Maurice was an RSGB member for 70 years and also a member of the Radio Fraternity Lodge since 1967, becoming Master in 1978 and he remained an enthusiastic member of both organisations throughout the remainder of his life.

He will be greatly missed by his daughter and grand children as well as his radio and Masonic friends.

For Sale

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

MODERN MILITARY SURPLUS. Unused antenna kit designed to survive the North Atlantic. Fernpatch Engineering Ltd. www.yachtradio.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

YAESU FT450 + YAESU FC707 ATU... mint and boxed...£400 R.L.Gay 07564621763 Chester Chesire.

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 email: radiorepairs@btconnect.com

Cards & Design

QSLERS SPECIAL OFFER till end of April, 1000 full colour qsl cards £47inc postage. 07720 580968 www.QSLers.co.uk

LOW COST AND HIGH QUALITY QSL cards by LZ1JZ QSL PRINT http://www.LZ1JZ.com

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Wanted

UNWANTED VALVE AMPLIFIERS, working or not. Known makes only (Kenwood, Yaesu, Drake, Linear Amp, etc), not homebrew. Also 3-500Z/ZG valves. Cash paid. Contact Peter G3ZRS on 01482 862323 or g3zrs@hotmail.co.uk

Aerials

HF PORTABLE CAN BE GREAT FUN! Search: I-Pro Traveller G0KYA "Amazing" review! www.proantennas.co.uk

THE NEW 9 BAND ROTARY DUAL BEAM PRO 1000 Watts, slim profile, neighbour friendly! www.proantennas.co.uk

THE NEW 9 BAND I-PRO HOME VERTICAL 1000 Watts, efficiency without the hassle of radials! www.proantennas.co.uk Carl: 01489 789960

M0CVO ANTENNAS for all your amateur radio antenna needs. Full details at: http://www.m0cvoantennas.com

10M AND 7M TELESCOPIC ANTENNA POLES from £22.50 inc p&p. Voucher code "SOTApoles" gives you 10% off! Valid until end of month. www.sotabeams.co.uk

"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

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

G4TPH PORTABLE MAGLOOPS. ML40HP mk11 tunes 40m –15m, New ML20 mk11 tunes 20m-10m full details at: www.g4tph.com

NEW COMET 80/40m VERTICAL model CHA7350H, 1Kw (SSB) Japanese quality £349.95 www.nevadaradio.co.uk

I-Pro HOME MULTI BAND 400W VERTICAL – Stocktaking, 3 only, to clear at £199.95 www.nevadaradio.co.uk

VHF ANTENNAS FROM I0JXX for 6m, 4m, 2m and 70cms. UK made power splitters for 4m, 2m and 70cms, clamps, brackets, insulators, HF vertical and radial plate, Alimast. Please see www.aerial-parts.co.uk.

NEED A LOW PROFILE (2.3m), Neighbour friendly, Very Rugged Telescopic Mast with 77 lbs Headload capability. Affordable Reconditioned CLARK SCAM 12m MASTS. Like No Other! Details m0rbs@btinternet.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

'GITE, VOSGES EASTERN FRANCE at JN28RJ for up to 13 persons. Registered for those handicapped and/or blind. Roman ampitheatre and Mosaic Museum both ½ km. High spot 375m central for tourism (see web-site). Good take off has 2m/70cm colinear plus over 40m space. Visit www.apollon-gite-grand.fr or Tel:00 33 (0) 670 968 765'

PAFOS, CYPRUS. Pafos, 2 bed villa. Simple HF station 300m ASL. www.domsvilla.co.uk

ACCOMMODATION NORTH COAST SCOTLAND. Self catering, B&B, camping. Discounts for licensed amateurs. GM4JYB Tel: 01847 851774. Web: www.letsgonorth.co.uk/dunnet_head Email: briansparks@dunnethead.co.uk

HOLIDAY WITH YOUR AERIALS! Self-catering, smoke-free twin-bed studio cottage, near the middle of long 3-acre garden. Sleeps 2. Peaceful, electrically quiet rural area. Non-amateur owner OK with (big!) aerials. £250 p/w (Sat-Sat). Diana, 01308 485 301 (W-Dorset).

Computer Software

PROGRAMMING CABLES & SOFTWARE FOR YAESU RADIOS Http://www.g4hfq.co.uk bob.freeth@g4hfq.co.uk (01425) 618092

CONTEST LOGGERS - SD by EI5DI. Free and Unrestricted in all RSGB HF Contests. www.ei5di.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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Adertisers Index

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 94 of April issue).

FOR SALE

12m WESTOWER galvanised 2 section crank-up tower. With Cushcraft A3S 3-ele tri-band beam, Ham M rotator, 8 XY 2m J-Beam, 8' tube extension, all cables. Buyer to dismantle and transport. Serious and sensible offers invited. Ted, G3ISD, 01795 477 431 g3isd@tiscali.co.uk (Sittingbourne, Kent).

AMERITRON AL84 HF RF AMP. Mechanically complete, recommend checkout before powering. £150, buyer to inspect / collect, call for further details or request a photo. Alastair, GM3NKG, 01698 881 896, gm3nkg@gmail.com (Larkhall).

BENCHER BY2 iambic paddle in chrome. Really excellent condition, complete with adjustment Allen key, lead complete with 3.5mm jack, all ready to use. £75 inc postage. Alan, G4BLI, 07759 821 742, g4bli@uwclub.net (Plymouth).

COLLECTORS ITEM. Rothermel D104 crystal mic, original box, £20. AEA Packratt PK-232 multimode data terminal, manual, £20. Three 13" lengths of waveguide 14 with integral flanges each end, £5 each. Alloy microwave 1.2m rolled edged dish, £40. All + p&p. John, G3IGV 01208 73202 (Cornwall).

COLLINS MECHANICAL FILTER F455 FA21 526-9427-00, 455kHz, 2.1kHz b/w, new & unused, £75. Three new & unused Cathodeon 10.7MHz LSB crystal filters BP4133-00, £10 each or £25 the three. Nick, G3KWJ, 01372 270 364, nbvalentine@talktalk.net (Surrey).

COLLINS, 30L1. Excellent condition, with user manual, £500. Icom IC-7000, complete with all accessories, £750. Mike, M0AOM, 0034 965 977 261, mikem0aom@hotmail.com (Spain, but in UK for 3 weeks in late June).

COMPLETE COLLINS S-LINE STATION, mint condx. 75S-3C Rx, AM filter, 500Hz CW filter, 200Hz xtal CW filter. 32S-3WE Tx. 516F-2 PSU. 312B-4 station control. SM-3 desk mic. CP-1 xtal pack. Original manuals. Collins connecting leads, 30L-1 linear. £2500, may split. John, G3XNH, 01953 788 376 (nr Norwich).

COMPLETE RADIO STATION: Yaesu FT-840, Tennamast & cage, MA5B, Yaesu 650 rotator + controller, Hustler 5 band vertical antenna, 2 power supplies, Bencher paddle key, Daiwa electronic keyer, mic & headset, noise limiter, all connections and more. Excellent condition, £1300. John, 2MOBNP, 01563 530 046 (Kilmarnock).

DIAMOND CP-VU8 HF vertical antenna. Been in use 7 months, just taken down, back in box, instructions, all parts ok, £250 ONO. Dave, G1DBR, 01606 556 702, stanley.ross2@btinternet.com (Mid Cheshire).

FT-690 Mk1, 6m portable multimode. Elderly but in good condition, only used in shack. Boxed with mic, cover etc, £100 OVNO. Glenn, G6HFF, 01204 595 615, glenn.bates@talk21.com (Bolton, Lancs).

IC-735 with matching auto ATU (AT150), VGC, £375. Tokyo HyPower HC-400L ATU, £150. Alinco DR-410 70cm xcvr, £35. Daiwa DK-410 keying unit, £35. SEMA rotator AR-303, new, £50. Buyers collect or arrange collection. Chris, G0EXD, chrisg0exd@gmail.com, 01691 622 925 (Shropshire).

ICOM IC-2800 dual band radio 2m/70cm, £230 ono. Prefer buyer collects. MORMH, 07813 459 966, mikeandkirstie@talktalk.net (Kendal, Cumbria)

ICOM IC-7400 & matching PS-85 for sale. Both in excellent condition. No scratches or dinks. No issues with backlight on IC-7400. Original boxes, leads, microphone and manuals included. Prefer buyer inspects and collects but would post at cost. £800 ONO. Peter, G4URT, 01323 833 465, g4urt@btinternet.com (Eastbourne).

ICOM IC-7400 with wideband TX, boxed in mint condition from a non-smoking home. Also included is a hardly used Heil Pro headset. All ready for your 60m NoV, £875. Happy to demonstrate or can post at cost. Ian, M0IAA, 07929 505 683 (Wakefield).

ICOM IC-910HX multi-band all mode transceiver, including 23cm module. Original box, hand mic, handbook and Nifty Mini-Manual on the product. Equipment is in very good condition, £950. G7JCF. 01986 798 524, steve@sboldvic.demon.co.uk (Woodbridge).

KENT brass and wood Morse key, mint, in original packaging, £45. Charles, M0CDD, (Spalding) 01775 766 398, eves and weekends.

KENWOOD TS-50S brand new (located in Devon), £350 ONO. Sommerkamp FT-767 xcvr, no mic, all on spec, £100 ONO. Sommerkamp FP-767 power supply, £40 ONO. Adonis AM 503G base mic (PTT lock button missing), £25. Collect or carriage at cost. Dave, G1XWX, 01502 578 105, dave@m0dsb.fsnet.co.uk (Suffolk).

MFJ MAGNETIC LOOP MFJ-1788X, 7-22MHz 1m dia, 50Ω. Power 150W. Remote control included. Auto-band select. Dual fast/slow tuning buttons. Built in cross needle VSWR meter. Never been used outside. In excellent condition, £240 ONO. Peter Hall, G4AQA, 01482 655 856, peterdhall@yahoo.co.uk (Hull).

PIXIE 11, 40m with side tone, radio kit 80m, L match, LED SWR bridge, all with paperwork, £45, free postage. Colin, G0NJM, 01384 866 189, colin@cfwmartin.co.uk (Dudley).

RECEIVERS TRIO R1000 AND ICOM IC-R72. Both GWO with operation and workshop manuals. Offers. Collection preferred. Ray, G3RXG, 01934 843 562 (Cheddar).

SK CLEARANCE OBO M0ADF. Icom IC-746, VGC, manual, Icom fist mic, fused power lead, voice synthesiser, recently serviced by W & S, boxed, £599. Yaesu FRG-7700 HF communications receiver, VGC, £150. Yaesu FT-290 Mk 2, manual, mic, VGC, £150. Watson W25-AM regulated PSU, 25A, VGC, boxed, £65. FT-817 transceiver NOT ND. Boxed, complete with charger, mic, batteries, leads, manual. Sold with aluminium flight case, £375. Avair AV400 SWR/PWR meter, VHF/UHF, boxed, £35. MFJ-921 VHF ATU, 2m, 300W max, boxed, £79. MFJ 903 6m ATU, manual, £35. All owned by non smoker. Prefer buyer collects but will consider posting at cost. Clive, 01257 400 381, clive@keywestalarms.co.uk (Wigan).

SONY ICF-SW77 top of the range short wave portable with SSB, FM stereo etc. Little used and in original packing, £200 collected or plus £8 p&p. Robert, G4IHT, 01285 841 203, robert@riddington.me.uk (Tetbury, Glos).

SUPERB HILLTOP QTH, in 7 acres, SK GM3MOU, SW Scotland, 4 beds. Outstanding views of West Coast, Southern Uplands and Arran. Also 3 bed cottage plus barns with p/per for 2 further cottages. Wonderful QRN free DX/contest site. Initial enquiries to Frank, GM3JKS, 01465 821 228, frank@knockycoid.demon.co.uk.

TELEQUIPMENT D53 dual beam oscilloscope, type C amps 100mV/cm @15MHz, 100μV/cm @75kHz. GWO, original handbooks and on CD. 280 x 300 x 560mm. £50, buyer collects. Peter, G8EZE, 01531 636 068, swallowp@aol.com (Ledbury, Herefordshire).

TELETYPE 33, free to a good home, plus some paper tape and printer rolls. Also 19" rack, old Pertec mag tape deck, other old computer spares. M1BDY, 020 8220 0493 (eves), valeriebeard@rocketmail.com (Romford).

TRIO TS-520 SSB transceiver, 80 to 10m, brought in 1977 and still in very good condition, together with its operating manual, microphone, AC, DC leads and power/SWR meter, £150. Buyer collects. G3XKX, 01162 715 378, derykwills@btinternet.com (Leicester).

VERSATOWER 20/40ft extending tip-over mast. FREE to first person willing to dismantle the mast and transport it away. Chris Lennox, G4LXU, 07790 595 329 (Pateley Bridge, N Yorks).

YAESU FT-8900R quad band FM transceiver 10m-6m-2m-70cm. Includes MH-48 DTMF mic, mobile bracket, separation kit, operating manual and original box. Good condition, £290. Cushcraft AR-10 Ringo 10m monoband vertical, VGC, £75. Dez, G3WW, 07743 174 912 (Biggleswade).

YAESU FT-897D boxed, manual, internal battery and charger and LDG auto tuner, £800. Icom IC-7000 boxed, user manual, remote mount kit, frequencies extended by dealer, £800. All in good working condition. No offers. Tony, G4SJI, 01964 615 073 (East Yorkshire).

YAESU FT-900AT HF xcvr, boxed, VGC, £425. Yaesu FT-857D HF/VHF/UHF xcvr, boxed, as new, £485. Cushcraft MA5B HF Mini Beam, 2 years old, £375. 3 element 6m beam, £30. Wanted: TS-590. Keith, G4GZS, 07859 917 317, keith@jpl.co.uk (Warwickshire)

YAESU G1000DXC ROTATOR. New, unused, abandoned project, with control box, cable, plugs and in original box, £400. Prefer buyer inspects and collects. £400. Steve, G4LRT, 01604 740 633 (Northants).

WANTED

3" CRT – 3FP7 or similar. Must have P7 (long persistence) screen. B H Twist, G3NFY, 01643 706 823 (at 3.30 pm if poss, email preferred) bill.g3nfy@googlemail.com (Minehead, Somerset).

BC-348 CASE and AVC control knob, TCS Rx front panel, ART 13 plate and antenna meters & info regarding ART 13 channel crystals / assembly. Also any spares for these sets for restoration and personal use. C Young, M0BGA, 01637 675 848 rory100@yahoo.com (Newquay).

BELLING-LEE 8-way unitor plug, pattern 102 and cover, from the 1960s. Designation is B-L L654/P for the plug and B-L 654/C3 for the cover. Photos available. Happy to purchase, or any advice appreciated. Richard, GM0OGN, 01871 810 024, gm0ogn@gmail.com, (Outer Hebrides).

DISABLED FAN of old days seeks, early DX QSL cards, *Short Wave Magazine* 1955 to 1958 inclusive, memorabilia etc. Mike, 8 Windsor Road, Reydon, Southwold,Suffolk, IP186PQ.

GENERAL RADIO precision condenser type 722 FS5. 1942 WW2 vintage item, also any other equipment made by this USA company. John, G0LJS, 01225 859 088 g0ljs@arrl.net (Chippenham, Wilts).

ICOM IC-910 XH in good clean working condx, MUST HAVE 23cm unit fitted and working. I will pay up to £1000 for the right rig. Must have boxes & manual as supplied by Icom. Alan, G0HEL, 01380 871 088 (Trowbridge).

KENWOOD TS-950SDX, must be unmodified and in good condition. G8NOF, 07855 959 498 (Warwickshire).

KINETIC VIRTUAL RADAR SBS-1 and antenna in working condition. John G0LJS 01380 859 088, hubertsims@btinternet.com (Chippenham).

KW 1000 linear amp, handbook and circuit. Your price. GW7CSK, 01443 671 089, gw7csk@supanet.com (Rhondda Valley).

LABGEAR LG300 mod/power unit, or complete LG300 Mk2 both units. Derek Dunn, G8KOV, 01548 531 368, derekdunn101@btinternet.com (Kingsbridge, Devon).

MANUALS (descriptions, parts lists, circuit diagrams/schematics) or partial information for Racal MA1105 Bargraph and Racal MA2360 Panoramic displays, which I need to restore. Any information would be appreciated and costs reimbursed. Ideally I would like to purchase original manuals. John R Dore, GW3XPK, 07771 992 632, johnrdore@gmail.com (Llangurig).

MARCONI INSTRUMENTS DIGITAL SYNCHRONISER typeTF2170B for use with sig gen type TF2002B. Details of price, serviceability, condition etc (preferably via email) please. Tony Wadsworth, G3NPF, 01903 746 959, a.wadsworth@tesco.net (Storrington, West Sussex).

SILENT KEY CLEAROUT or not just wanted. I collect QSL cards for historic interest; any date but preferably before 1970. Can collect or arrange collection. Tony, G4UZN, 01132 693 892, AQuest1263@btinternet.com (Leeds).

SPARK KEY wanted. Looking for a Marconi Morse telegraph key 'Marconi's Wireless Telegraph Co Ltd', or any interesting Morse key from the spark era or more recent. John, G0RDO, 01626 206 090, john@morsemad.com (Newton Abbot).

TELEPOST LP100A meter, cash waiting for complete working model. Daniel Prout, M3BRV, 01594 560 100, m3brv@aol.com (Forest of Dean).

YAESU YF-112C 500Hz CW 2nd IF crystal filter for FT-840. Ron, G3SEN, 07747 136 077 (Nottingham).

HELPLINES

Can anyone help me locate Flip/Flop electronic panels for a Philips N4450 tape recorder? Any costs would be covered. Graham, G7KYX, 01205 871 624 (Lincolnshire). *[Please note that last month we incorrectly printed this as a N3350, for which we apologise - Ed].*

RALLIES & EVENTS

2 JUNE - SPALDING & DARS ANNUAL RALLY – The Sir John Gleed Technology School, Halmer Gardens, Spalding, Lincs PE11 2EF. TI S22, free CP, OT 10am. TS, C, CBS. John, G4NBR, 07946 302 815, rally-secretary@sdars.org.uk. [www.sdars.org.uk].

8 JUNE - CENTRAL SCOTLAND MINI HAM RADIO CONVENTION – Crofthead Farm Community Education Centre, Templar Rise, Livingston EH54 6DG. OT 9.50/10am, TS, FM, B&B, LEC, RSGB, WIN, C. [uk.groups.yahoo.com/group/cshrc].

9 JUNE - 12th 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. [www.snadarc.com].

16 JUNE - 26th NEWBURY RADIO RALLY - Newbury Showground, next to M4 J13 in Berkshire. TI S22 (V44), free CP, OT 9am (visitors), 8am (sellers), £2 visitor, £10 CBS pitch. WIN, C, DF, TS, FM, CBS, SIG. See G7N taking part in the 6m contest. Contact rally@nadars.org.uk. [www.nadars.org.uk].

22 JUNE - ROCHDALE & DARS SUMMER FLEA MARKET – St Vincent's Church Hall, Caldershaw Rd, Rochdale OL12 7QL. OT 10.15am, £2.50, TS, B&B, SIG. Pitches £7.50. G0PUD, 0161 285 1600, info@vintage-radio-repair.co.uk.

22 JUNE - SOUTH LANCS SUMMER RALLY – Bickershaw Labour Club, Bickershaw Lane, Bickershaw, Wigan WN2 5TE. OT 9.30am (traders 8am). £1.50, TI, B&B, C, DIS, CP, SIG, DF, TS, LB. Allan, 2E0RAG, 07533 970 841, rally@slarc.co.uk. [www.slarc.co.uk/rally].

23 JUNE - EAST SUFFOLK WIRELESS REVIVAL (Ipswich Radio Rally) – The Orwell Crossing Lorry Park, A14 Eastbound, Nacton, Ipswich, IP10 0DD. TI S22, CP, OT 9.30, £2, CBS, B&B, SIG, LRC, RSGB book stall, GB4SWR HF station, Kevin, G8MXV, 07710 046 846. [www.eswr.org.uk].

23 JUNE - SOUTH MANCHESTER RADIO & COMPUTING CLUB AMATEUR RADIO CAR BOOT SALE – Trafford MV Rugby Football Club, MacPherson Park, Finneybank Road, Sale, Cheshire M33 6LR. Pitches 9.30am £10 per car + 2 people, Transit vans £15. OT 10.30am, £1, C, LIC, CP TI S22. Terry, G6CRF g6crf@gmx.com or 07838 138 306.

23 JUNE - LAM COMMUNICATIONS RALLY IN AID OF CANCER RESEARCH – Elsecar Heritage Centre, inside Building 21, located 2.2 miles from LAM Communications Ltd. TS from Icom UK, Kenwood and Yaesu UK. OT 10am to 4pm.

28 – 30 JUNE - HAMTRONIC SHOW, FRIEDRICHSHAFEN – Messe, Friedrichshafen, Germany. TS, FM, CP, SIG, LB, C, DF, LEC, CS. Large RSGB book stall. [www.hamradio-friedrichshafen.de/html/en].

30 JUNE - WEST OF ENGLAND RADIO RALLY – Cheese & Grain, Bridge Street, Frome, Somerset BA11 1BE. CP, OT 10am, £2.50. TS, RSGB book stall, C, DIS. Shaun, G8VPG, 01225 873 098, rallymanager@westrally.org.uk. [www.westrally.org.uk].

2 JULY - FRISKNEY & EAST LINCOLNSHIRE COMMUNICATIONS CLUB DESKTOP SALE – Friskney Village Hall, Church Road, Friskney, Lincolnshire PE22 8RD. OT 7pm (traders 6pm), £1.50, Tables £3.50. Free tea & coffee, raffle. Ian Donnelly, 2E0XOD, 07554 362 020. [www.felcc.com].

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:

Mr W G Metcalfe, G0WGZ	5/4/2013
Mr T A Coton, G1AUX	25/4/2013
Mr G L Sanderson, G2DBT	31/3/2013
Mr L D Davey-Thomas, G3AGA	15/4/2013
Mr J N Headland, G3BFP	28/3/2013
Mr F F Oldfield, G3DVK	31/3/2013
Mr F Harrop, G3DVL	11/4/2013
Mr L M Airey, G3GEJ	28/3/2013
Mr J A Ewen, G3HGM	5/4/2013
Mr K W Darby, G3MLD	12/4/2013
Mr R A McCowatt, G3WPK	2013
Mr L Dixon, G3XXQ	
Mr S Sutherland, GM4BKV	3/4/2013
Mr K J Hampson, GM4DUX	2013
Mr D W Fletcher, G4FUS	17/3/2013
Mr E J Daniels, M0EJD	2012
Mr D A Dyke, RS22834	
Mr J A Garry, RS96295	20/4/2013
Mr M E Bazley, VK6HD	4/2013

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.

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
14/06/2013	GB2MOF	Museum of Flight	East Lothian	LH	GM4UYZ
23/04/2013	GB2KAY	Kay Kendal	Hull	LH27	G1OSG
01/06/2013	GB6GNB	Gnosall Nuclear Bunker G2763	Gnosall Nuclear Bunker	TLHV27	G7TCW
	GB1SNB	Shenstone Nuclear Bunker G2771	Shenstone Nuclear Bunker	TLHV27	G7TCW
	GB0RNB	Rugeley Nuclear Bunker G2769	Rugeley Nuclear Bunker	TLHV27	G7TCW
	GB4SNB	Standon Nuclear Bunker G2773	Standon Nuclear Bunker	TLHV27	G7TCW
	GB6OCS	Our Queen's Coronation	Gillingham	TLH27	M0AAK
	GB6COD	Collingwood Open Day	Fareham	TLHV27	G3ZDF
	GB4NR	Newbury Rally	Berkshire	TLHV27	G6EES
	GB4AOT	Abingdon On Thames	Abingdon	LHV2	G6ZHB
07/06/2013	GB4CSR	Corbridge Steam Rally	Northumberland	TLHV27	M0TYN
08/06/2013	GB4PFD	Penwortham Field Day	Preston	TLHV27	G4PF
	GB8MTB	Museums On The Air	Norfolk	LHV2	G8IVK
15/06/2013	GB1HW	Hepworth Wakefield	Wakefield	LHV2	G0EVA
	GB2WVG	Woodhouse Village Gala	Notts	LHV27	G4WPW
	GB2CWM	Cold War Museum	Suffolk	TLHV	G4XVE
	GB2SRF	Segedunum Roman Fort	Wallsend	LHV27	G7MFN
	GB2VCB	Visitor Centre Bennachie	Scotland	LH	G3ALZ
20/06/2013	GB2CS	Cheshire Scouts	Cheshire	LH27	G1GYJ
21/06/2013	GB0APS	International Museums On The Air	Leicester	LHV2	G0IJM
28/06/2013	GB0CTC	Crook Town Carnival	Crook	LHV27	G7OCK
29/06/2013	GB1BW	Brawdy	Pembrokeshire	LH2G	W4RVA

5 JULY - RSGB CENTENARY DAY – National Radio Centre, Bletchley Park, Sherwood Drive, Bletchley, Milton Keynes. G100RSGB on the air, DF hunting, exhibitions and lectures. Join RSGB Patron, HRH Duke of Edinburgh, KC, KT, HQ staff, Board members, volunteers and Members to celebrate the 100 years of the RSGB. Friday evening is the Centenary dinner at Horwood House near Buckingham. This is open to all RSGB members and their guests to join us for fun evening of entertainment, good food and a chance to catch up with friends, etc. We can expect an interesting forward look from our guest speaker Prof Peter Cochrane, OBE, G3RVC. Horwood House is the venue of the RSGB Convention and very convenient for visitors who have been at the Centenary Day at Bletchley Park. We have also arranged overnight accommodation for those who need it. Numbers for both the dinner and accommodation are limited and will be sold on a strictly first-come-first-served basis. [www.rsgbshop.org.uk].

6 JULY - BANGOR AND DISTRICT ARS RALLY – Donaghadee Community Centre, County Down BT21 0HB. OT 11.30, £3. TS, B&B, SIG. Bill, GI4AAM, 02891 816 707, bill.langtry@btinternet.com. [www.bdars.com].

7 JULY - BARFORD NORFOLK RADIO RALLY – Barford Village Hall & Green, Barford, Norwich NR9 4AB, TI S22, CP, OT 9.00 £1.50 (U16s free). C, DF, WIN, TS, B&B. Contact radio@dcpmicro.com. [www.norfolkamateurradio.org].

7 JULY - CORNISH RAC 50th MOBILE RALLY – Penair School, St Clements, Truro, Cornwall, TR1 1TN. TS, B&B, C, TI, CP. OT 10.30, £2. Steve, 01209 844 939, g7voh@btinternet.com. [www.gx4crc.com].

7 JULY - 17th RED ROSE QRP FESTIVAL – Formby Hall, Alder Street, Atherton, Manchester M46 9EY. Free CP, OT 11.00, £2 (U14 free). TS, SIG, B&B, DF, LB, C. Les, G4HZJ, 01942 870 634, g4hzj@ntlworld.com.

13 JULY - 2nd NORTH WAKEFIELD RADIO CLUB RALLY – Drighlington Meeting Hall, Moorland Road, Bradford BD11 1JZ. TS, B&B, C. Tony Mawson, 0774 000 3159, tonymawson@btinetrnet.com.

14 JULY - MCMICHAEL RALLY AND BOOT SALE – Reading Rugby Club, Holme Park Farm Lane, Sonning La. (B4446), Sonning on Thames, RG4 6ST, TI, free CP, OT 9.30, £2. LB, C, SIG, WIN, TS, CBS. Pete, G8FRC, 01189 695 697. [www.McMichaelRally.org.uk].

21 JULY - AMATEUR RADIO IN THE COUNTRY – Upton Bridge Farm, Long Sutton TA10 9NJ. Amateur radio, QRP & homebrew in a country setting. TS, FAM, SIG. Tim Walford, G3PCJ, walfor@globalnet.co.uk.

14 JULY - STOCKPORT RALLY – Walthew House, Shaw Heath, Stockport SK2 6QS. OT 10am, £2. TS, DIS, CP, C, TI 145.550MHz. Tables available £10 each. Nigel, G0RXA, 0161 428 8413 (eves).

19 JULY - SSC/AMSAT-UK CUBESAT WORKSHOP – Surrey Space Centre, University of Surrey, Guildford GU2 7XH. 9am-4pm, free. Amateur satellite beginners' session at 4pm. http://amsat-uk.org/colloquium/cubesat-workshop-2013/

19-21 JULY - AMSAT-UK SPACE COLLOQUIUM – Holiday Inn, Guildford GU2 7XZ. LEC from Alistair Scott, President of the British Interplanetary Society and Graham Coomber, G0NBI, RSGB General Manager. AMSAT shop, visits to SSTL integration laboratories & Surrey Space Centre. [www.uk.amsat.org].

26-28 JULY - LITHUANIAN NATIONAL HAMFEST. Dubiai village, district of Jonavos, Lithuania. [http://lrmd.lt/saskrydis_en.htm].

28 JULY - HORNCASTLE SUMMER 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, G3APU@yahoo.co.uk.

4 AUGUST - KING'S LYNN ARC RALLY & CAR BOOT – Gaywood Community Centre, PE30 4DZ. OT 10am, £2, TS, CBS pitches £8, C, CS (by prior arrangement), TI G3XYZ S20. Ray, G3RSV, 01553 849 700, ray-g3rsv@supanet.com. [www.klarc.org.uk].

9 AUGUST - COCKENZIE & PORT SETON ARC 20th ANNUAL MINI-RALLY NIGHT – Community Centre, Main Hall, Port Seton. Bring along your own junk and sell it yourself. Tables on first come first served basis. £2 for everyone. OT 18.30 to 21.30.

11 AUGUST - FLIGHT REFUELLING ARS HAMFEST – Cobham Sports and Social Club Ground, Merley, Nr. Wimborne, Dorset BH21 3DA. TI S22, CP, OT 10.00, TS, CBS, LB, C. Details hamfest@frars.org.uk. [www.frars.org.uk].

18 AUGUST - RUGBY AMATEUR TRANSMITTING SOCIETY ANNUAL RADIO RALLY

25 AUGUST NEW VENUE - MILTON KEYNES ARS RALLY

26 AUGUST Bank Holiday Monday HUNTINGDONSHIRE ARS RALLY

26 AUGUST - PONTEFRACT & DARS FAIR & JUNK SALE

1 SEPTEMBER - TELFORD HAMFEST

8 SEPTEMBER - FRISKNEY & EAST LINCOLNSHIRE COMMUNICATIONS CLUB RALLY

15 SEPTEMBER - TORBAY ANNUAL COMMUNICATIONS FAIR.

21 SEPTEMBER - FOG ON THE TYNE RALLY

27 & 28 SEPTEMBER - NATIONAL HAMFEST – brought to you by the RSGB in association with the Lincoln Short Wave Club. George Stephenson Pavilion, Newark and Nottinghamshire Showground, Lincoln Road, Winthorpe, Newark NG24 2NY. Free CP, TS, B&B, CB, C, SIG, Morse proficiency tests on demand, RSGB book stall, RSGB Services & Committees, DF, FM. [www.nationalhamfest.org.uk].

6 OCTOBER - AUTUMN MILITARIA & ELECTRONICS & RADIO AMATEUR HANGAR SALE

6 OCTOBER - BLACKWOOD DARS RALLY

6 OCTOBER - NEW DATE - 24th GREAT NORTHERN HAMFEST

11-13 OCTOBER - RSGB CONVENTION – The full convention programme of lectures for all interests will be available on the website later in the year. Principal sponsor Martin Lynch & Sons. [www.rsgb.org/rsgbconvention].

13 OCTOBER - HORNSEA ARC RALLY

19 OCTOBER - CARRICKFERGUS ARG RADIO RALLY

20 OCTOBER - GALASHIELS & DARS RADIO RALLY

10 NOVEMBER NEW DATE - WEST LONDON RADIO & ELECTRONICS SHOW (Kempton Rally)

16 NOVEMBER - HALTON & DISTRICT RADIO AMATEURS RALLY

24 NOVEMBER - CATS RADIO & ELECTRONICS BAZAAR

24 NOVEMBER - PLYMOUTH RADIO CLUB RALLY

30 NOVEMBER - 18th ROCHDALE & DISTRICT ARS TRADITIONAL RADIO RALLY

1 DECEMBER - BISHOP AUCKLAND RADIO AMATEURS CLUB RALLY

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 of the Society's work are free to contact the relevant person below. But 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
Srweart 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
Ed Taylor, GW3SQX, 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
Carlos Eavis, G0AKI
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
E-mail: GM.dept@rsgb.org.uk
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

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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/

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Use the website to find your nearest radio club and check out the facilities they have to offer.
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Main website: www.rsgb.org
Members Area: www.rsgb.org/membersonly

Log in using your callsign in lower case as the user name and your membership number, without the leading zeros (see your *RadCom* address label) as the password.
If you need to update your membership details, please visit www.rsgb.org/myaccount/.

GETTING STARTED IN SPORADIC-E

Marcus Walden, G0IJZ

The *RadCom* May 2013 article by Jim Bacon, G3YLA was well-written, informative and timely as we approach the northern hemisphere Sporadic-E season.

Jim provided a useful checklist regarding operating techniques but unfortunately neglected to mention the benefits of checking ionosonde measurements. Ionosonde data is now readily accessible through the Digisonde website and provides a real-time indication of propagation conditions. The links are
http://digisonde.com/index.html
http://digisonde.com/stationlist.html
http://digisonde.com/digisonde-station-map.html

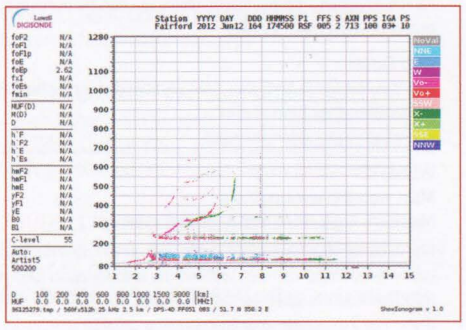
Of relevance to UK amateurs are the UK-based ionosondes (ie Chilton and Fairford) and nearby European ionosondes (eg Dourbes in Belgium, Juliusruh in Germany, Pruhonice in Czech Republic).

Normal ionograms show reflections from the E, F1 (sometimes) and F2 regions of the ionosphere as is evident in a recent Fairford ionogram (1130UTC on 23 April 2013). However, the presence of Sporadic-E often masks these normal reflections and extends much higher in frequency than is normally expected for the E region. The Fairford ionogram at 1745UTC on 12 June 2012 shows a strong Es reflection at a height of ~110km extending beyond 10MHz.

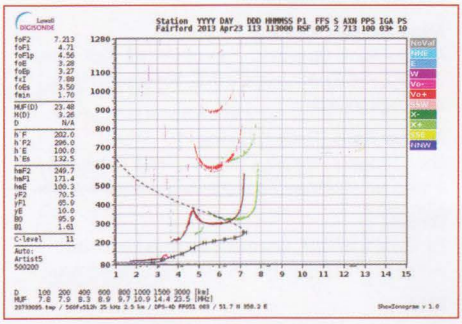
While ionograms show the frequencies supported by the ionosphere for vertically-incident waves, the maximum vertical frequency can be used to estimate the maximum frequency supported at oblique incidence. For a reflecting layer at a height of 110km, the maximum oblique frequency is ~5.4 times the maximum vertical frequency (reference: Davies, *Ionospheric Radio,* Peter Peregrinus, 1990). Using the Fairford ionogram at 1745 on 12 June 2012 as an example, the maximum oblique frequency supported over Fairford could have approached 60MHz (ie the 6m band would most likely have been open for links where Fairford was roughly the midpoint).

Evidence of Es over nearby European ionosondes would be an indication that paths in that general direction may be open.

In summary, ionosondes and their ionograms can be of great benefit to both HF and VHF operators. Monitoring of European ionosondes can provide an indication of which bands are likely to be open for Es propagation as well as the possible directions of propagation.



12 April with a strong Es reflection



Normal ionogram from 23 April.

OPTICAL COMMS

Bob King, G3ASE

Re: A history of optical communication by G8CYW in *RadCom* May 2013.

Seeing this article reminded me of an experiment I carried with the school club (G3MJJ) in the early 60s. I transformer modulated an Atlas A1/240 filament lamp with a 6L6 as the output valve in an audio amplifier. Not having the circuit diagram or photos I have to rely on memory. I think the Atlas lamp had a low thermal capacity filament and hence could be modulated direct. An ex-War Department (WD) optical piece of equipment was used to focus the beam. Ex-WD items were readily available from Lisle Street (London) and magazine advertisements.

The receiver was an OCP71 germanium transistor (or an OC71 with the paint scraped off so that it was photo sensitive) used with another lens focussing system. A transistor amplifier would have followed the OCP71. The distance for the experiment was from the top floor laboratory window to a field several hundred yards away. This could possibly have been extended, but the alignment of transmitter and receiver lens equipment was the most difficult part of the setup. Music and speech (one way of course) was quite satisfactory. I would imagine that this system was fairly safe from unauthorised interception.

TRANSATLANTIC SIGNALS

John W Heaviside, G3NYX

May I make a gentle correction to G0NVZ's article "Start Here – Did Marconi really hear those transatlantic signals?" (*RadCom* May 2013).

The ionised layer predicted by and previously carrying the name of my distant but illustrious relative, Oliver, is now designated the E layer. The F layer (that splits into F1 and F2 in summer) is the Appleton layer after Sir Edward of that name who actually proved the existence and measured the height of these layers some twenty years later.

INSURANCE

Andy Watts, G4VIW

For the past few months *RadCom* has been carrying advertisements from South West Broking Ltd offering insurance cover for amateur radio equipment. At the beginning of March, after a discussion with Julian Dent of South West Broking, I took out a 12 month policy covering equipment used at my home QTH and whilst operating anywhere in the UK and overseas.

Good job I did, because at the end of March I lodged a claim for equipment stolen at Alicante airport, Spain. How? A laptop bag containing my FT-817, Palm mini paddle and iPad2 etc was taken as my XYL and I were meeting relatives. Amazingly, none of us actually saw the bag disappear. Apparently Alicante airport is renowned for thieves who operate in gangs. Armed with a helpful police report (in Spanish) and a detailed claims form, Julian took up my case with the underwriters. I'm pleased to report that my claim has been met in full and the money paid directly into my bank account.

So, if any RSGB member is anxious about insurance, I can't speak highly enough of the level of service offered by South West Broking and the personal attention given by Julian Dent. Also, if my experience is anything to go by, keep equipment on you or within sight at all times.

Kevin, G0PQO

I will be one of the first members up for annual renewal following Bluefin's exit from the market. The firm I had used last year phoned me, inviting me to renew, but had "improved the product" and needed "a bit more information". There then followed a few trivial questions such as "did I have an aerial at home?" and they then they quoted me a renewal figure of almost a 50% increase on last year.

We then had an interesting few minutes of increasingly sharp exchanges in which they changed the "improved product" to a "new/different product". And yes, after further exchanges, they could quote me on the existing product. Needless to say, I have now re-insured with another company (at a small increased cost to last year). Another example of "buyer beware".

May I start by being clear that no insurance company is endorsed by the RSGB and we receive no commission or other benefit from them. As I think we all know from television and other advertising, the insurance market is intensely competitive and often confusing with products being changed and, as you have found out, attempts made to increase premiums as a result. It is very much the case of "buyer beware" and shopping around, albeit there are limited companies in this segment of the market.
Graham Coomber, G0NBI, General Manager

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MY ANTENNAS

Richard, G4CDN, (JO02SS)

I thought you might like to see this image of my antennas. I took the image after peaking the sun noise on 144MHz and then checking that the ants were in fact pointing at the sun!

You can see 4 x 9-ele LFAs with mast head pre amp and Ecoflex 15 to a Elecraft K3 and the antenna between is a single 24-ele LFA for 432MHz fixed to the stub mast so it has no elevation. The HF vertical is a Cushcraft R8 on a 4m pole with 300lb fishing line as guys. It was taken on Saturday 20 April and yes, we always have beautiful blue skies in Norfolk!

A SAD LOSS

Chris Whitelaw, M0RKF

It is with much regret that I report the loss to the hobby of my 13 year old daughter, M6BEL. Kendra passed her Foundation licence with 99%, only getting one question wrong! (The one about which band commercial TV operates in!)

I bought her a Yaesu VX-7R and showed her the delights of HF using the TS-2000 and *Ham Radio Deluxe*. She spent quite a few hours wandering the bands, but didn't really understand contests, where people only want a signal report. She preferred the 2m/70cm repeaters. I noticed that her little Yaesu was gathering dust and out of charge and asked her what the problem was. At first she was reluctant to tell me, but she decided to show me by giving a CQ call on GB3SR.

We listened first, of course, and there was a lively traffic of CQs going on. There was some rag chewing, so we had to wait, but it was clear there were people out there. However, when Kendra said her callsign – all went quiet. No response. Not one.

There is, of course, no law in our hobby that dictates one must respond, so for a while she kept at it. Then, a G0 operator, whose callsign I will not repeat here, took her to task. And I quote... "Don't expect a reply from someone who **really** knows amateur radio. Anyway, you sound like a kid – who wants to be bothered with you?" Kendra tells me that either she is ignored, or gets a shirty response like this.

Frankly, I was outraged to hear someone who allegedly is a highly qualified operator speak to another licence holder in this manner.

We all started out at the beginning – no matter if we qualified last week, or 40 years ago. Take a look at the RSGB Membership and work out the proportion of males to females. Then, factor in the number of young operators. I wonder what the percentages are?

If we do not actively encourage young people into the hobby, it really will die with us. Don't we have enough to worry about with successive governments selling off bandwidth for a profit without playing into their hands by engaging on a policy of self-imposed extinction?

Kendra was quite keen on going for the 2E0 and, mathematically, is certainly capable of the M0 too. Unfortunately, she sees absolutely nothing in it any more. Having heard the way she, and other young operators are either ignored or given a hard time, I can't say I blame her.

It would however, be quite unfair of me not to acknowledge the three local stations who **always** have time for youngsters. So, Joan, M0JOA, Roger, M1RPY and Geoff, M0EKB, thank you!

PAT HAWKER

Brian, G0GSF

This Sunday (14 April) I was able to make a tribute to the late Pat Hawker MBE, G3VA at the annual reunion of RSS members, their families and others at Bletchley Park. I was asked to do so by the organisers as a result of my long-time connection with Pat, starting in about 1984, when I first wrote to him describing my improved version of the G5RV. That's the ZS6BKW. I spoke about his post-war work and especially the fifty years of Technical Topics.

The Reunion was well (70+) and the photo shows the six remaining members of the RSS who attended (unfortunately I don't have their names) plus the speakers (in the back row). Yours truly is second from the left.

MORSE IS WELL FED

Edwin Chicken MBE, G3BIK

How would you associate Morse code with the 'Masterchef' cookery programmes as broadcast on BBC Television?

Well, let me explain. Some of the Masterchef programmes take place in two locations. First in the studio kitchen and then in the kitchen of a commercial restaurant. The lead-in to part two shows the competitive chefs walking along a street in the direction of the restaurant, with a voice-over dialogue accompanied by background music. At the point where the chefs make their entrance to the restaurant, the voice commentary ceases, leaving only the music plus a clearly audible text transmission of professional quality tone-modulated Morse, at a modest speed.

The purpose of the Morse message is not obvious, but it repeats a few times the words "action time time" before the music stops at the beginning of the indoor cookery activities.

Personally, the very sound of this Morse transmission adds an additional pleasure to an already excellent TV programme, because Morse is itself music to my ears. It is in effect a second language to me, having been directly involved with it from a very early age, both professionally and as a licensed amateur radio operator. I actually read quietly and within my head so as not to offend others nearby, much of the textual content on the TV screen such as the who-did-what lists that follow the programmes.

And can anyone remember the much earlier TV series 'Inspector Morse', where that name was continually sent in Morse behind the theme music?

Finally, next time you are queuing with your shopping trolley, keep an open ear for Morse symbols coming from the digital till as the price information is being keyed in. They do not send meaningful Morse, but an assortment of sounds, some of which are identifiable as short-form letters in Morse code. Helps pass the time!!

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