



# RadCom

Radio Society of Great Britain  
Advancing amateur radio since 1913

## Elecraft KX2 10W 80-10m

A tiny, fun radio that's a great performer says Peter Hart, G3SJX





# WATERS & STANTON

EUROPE'S HAM STORE



**W**aters & Stanton, Europe's HAM STORE remains the only ham radio store in the UK where you can experience all of the world's top-end traditional HF transceivers from the incredible Elecraft K3S through to the Icom IC-7851. Additionally, we remain the only company which can give you all of the world's best SDR transceivers to experience

and compare with one another too, Apache Labs through to the mighty Expert Electronics MB1.

We do not have just the radios either, we have a contest-grade antenna farm with everything from a 3 element SteppIR for HF through to a 63 element 23cms Yagi, to service the requirements of radios such as the Kenwood TS-2000 and the Icom IC-9100.

We have some exciting new products coming along soon too, including the soon-to-be-released Apache Labs Anan-8000DLE which takes transceiver performance to a new level.

If you truly want to try out and compare radios, new and old, there remains only one place in the UK to do it, Europe's Ham Store. Justin Johnson G0KSC

## FLEX RADIO

BEST TRADE-IN / TRADE-UP PROGRAM IN THE BUSINESS, CALL FOR DETAILS

### Flex Maestro

The FlexRadio Maestro™ is an intuitive, plug-and-play control console that directs operation of any FLEX-6000 Signature Series transceiver without the need of a traditional PC. **£1299.95**



### Flex-6500

The FLEX-6500™ is for the advanced operator who desires extended performance across four slice receivers. **£4049.95**



### Flex-6300

The FLEX-6300 provides an entry point into multi-dimensional amateur radio operations from CW to the latest digital modes. **£2499.95**

### Flex-6700R

An SDR receiver for the most demanding of Amateur's needs on HF/VHF wideband receiver. **£5799.95**

### Flex-Control

A FlexControl is the ultimate VFO and radio control accessory for all FlexRadio Systems' software defined radios. **£139.95**



**Battery** - Make the Maestro more portable with this battery. **£29.95**

We are the UK's only dealer where you can test and compare Flex, Apache & Expert Electronics all under one roof. **CALL NOW** to book a demo

### Flex-6700

Capable of displaying up to 8 slice receivers on two antennas at any one time from HF through to 2m **£7199.95**

### Maestro Accessories

**Tilt** - Stand for Maestro gives variable tilt. **£98.95**

## RT SYSTEMS

EASY TO USE PROGRAMMING SOFTWARE AND CABLES FOR MOST RADIOS



For Icom ID-5100E with USB-29A cable kit (WCS-D5100-USB) .....	<b>£46.95</b>
For Icom IC-7100 with USB-RT501 cable kit (WCS-7100-USB) .....	<b>£46.95</b>
For Icom IC-7300 with USB-RT42 cable kit (WCS-7300-USB) .....	<b>£34.95</b>
For Icom IC-9100 with USB-RT501 cable kit (WCS-9100-USB) .....	<b>£39.95</b>
For Kenwood TM-V71 with USB-K5G cable (KRS-V71-USB) .....	<b>£46.95</b>

For Kenwood TS-480 with USB-63 cable (KRS-480-USB) .....	<b>£46.95</b>
For Kenwood TS-590S(G) with USB-63 cable (KRS-590-USB) .....	<b>£46.95</b>
For Kenwood TS-2000 with USB-63 cable (KRS-2000-USB) .....	<b>£46.95</b>
For Yaesu FT-817 with USB-62B cable (ADMS-4AU-USB) .....	<b>£46.95</b>
For Yaesu FT-857/897 with USB-62B cable (ADMS-4BU-USB) .....	<b>£46.95</b>
For Yaesu FT-991 with USB-42B cable (ADMS-991-USB) .....	<b>£34.95</b>
For Yaesu FT-DX1200 with USB-63 cable (ADMS-DX1200-USB) ....	<b>£46.95</b>
For Yaesu FT-450 with USB-63 cable (ADMS-450-USB) .....	<b>£46.95</b>
For Yaesu FT-DX3000 with USB-63 USB cable (ADMS-DX3000-USB) .....	<b>£46.95</b>
For Baofeng UV-5R with USB-K4Y USB cable (BAO-5R-USB) .....	<b>£46.95</b>
For Yaesu FT-991 software only (ADMS-991-U) .....	<b>£26.95</b>

CAN'T FIND THE CABLE FOR YOUR RIG? CALL US TO GET YOURS WITH FULL RANGE STOCKED

Waters & Stanton Ltd, Spa House, 22 Main Road, Hockley, Essex SS5 4QS

W&S @ Jaycee, 20 Woodside Way, Glenrothes, Fife KY7 5DF



**01702 204965**



**sales@wsplc.com**



**01592 756962**



@wsplc



blog.hamradiostore.co.uk



facebook.com/WatersandStanton



Waters and Stanton



**jayceecomms@aol.com**



# SPECIAL DEALS AND FREE SHIPPING THROUGHOUT THE FESTIVE PERIOD

Join our mailing list for exclusive offers [www.hamradiostore.co.uk](http://www.hamradiostore.co.uk)

**SteppIR** **SOLE UK IMPORTER**, European Distributor and Service Centre Call for best prices.

## BUYING STEPPIR

There has always been a wait for getting your SteppIR antenna from the USA. Things are changing and we now aim to carry stock of the more popular items.

3 Element 20-6m Yagi weighs 26.3kg and boom length of 16ft (STIR-00203) .....	<b>£2174.95</b>
2 Element 20-6m Yagi weighs 13.6kg and boom length of 4.7ft (STIR-00202) .....	<b>£1549.95</b>
Vertical 40-2m base kit with 16ft telescopic pole and travel bag (STIR-00301) .....	<b>£429.95</b>
SmallIR Vertical 20-6m weighs 5.4kg and length of 18ft (STIR-00218) .....	<b>£999.95</b>
BigIR Vertical 40-6m weighs 6.8kg and length of 33ft (STIR-00417) .....	<b>£1249.95</b>



## 3 ELEMENT YAGI

This 3 element Yagi covers all bands from 40m to 6m. On 40/30m the antenna acts as a rotary dipole.

Boom: ..... 4.87m  
Longest element: ..... 11.9m  
Weight: ..... 23kg  
Power: ..... 3kW

**£2174.95**



## 2 ELEMENT YAGI

This 2 element Yagi covers all bands from 20m to 6m. Fully adjustable to any frequency within the range. Also available with 40/30m driver option.

Boom: ..... 1.44m  
Longest element: ..... 10.97m  
Weight: ..... 13.6kg  
Power: ..... 3kW

**£1,399.95**

## SMALLIR 20-6

SteppIR verticals are the only true 1/4 wave continuous coverage antennas available for the HF bands. The technology has had a profound impact on improving vertical antenna performance over that of traditional designs.

**£999.95**

## THE BIG IR

Here we have one of the best verticals that you can buy. It covers all bands from 40m to 6m and measures 10.05m long. It is self supporting in winds up to 50mph.

**£1249.95**

## WE ALSO STOCK MANY SPARES AND CABLES FOR YOUR STEPPIR ANTENNA

### 4 core control cable

Required for some antennas such as the SmallIR and BigIR

### 12 core control cable

Required for some antennas such as STIR-00202 and STIR-00203

**£2.50 per meter**

### 10-1105 Vertical Rain Cap

Protect your antenna from the rain and elements by installing this vertical rain cap.

**£14.95**

### Core Control Cable

Available in 4, 12 or 16 core SteppIR antennas require one of these cables in order to get the most out of your antenna and rotator.

### Heat Shrink for Telescopic Pole 3 Inches

Reinforce and secure your telescopic fibre glass pole with heat shrink wrap. Comes in 3 inch length.

**£3.95**

## CRANKIR

Vertical 40-2m base kit with 16ft telescopic pole and travel bag. (STIR-00301)

**£429.95**

## DB-42 MONSTIR

The DB42 Monstir Pro is currently the largest of the Dream Beam series of Yagi antennas, with 5 elements on 20m-6m and 3 elements on 40/30. The DB42 has a 49ft looped driven element.

Boom: 13.0 m  
Longest Element: 14.9 m  
Weight: 108 Kg  
Power: 3 kW

DON'T SEE WHAT YOU NEED? CALL US FOR AVAILABLE STOCK AND BEST PRICES

## ELECRAFT ACCESSORIES - UK'S OFFICIAL DEALER

### P3 PANADAPTER

Panadapter display adds a visual element to signal hunting with fast real time spectrum and waterfall! Perfect for K3 and K3S with fast set up.



Kit: **£819.95**  
Full: **£859.95**

### XG3

Programmable, 160-2 m RF signal source with four calibrated output levels. It's ideal for receiver calibration, sensitivity tests, signal tracing, and as a VFO for homebrew projects

**£219.95**



### T1A

The only 20W automatic antenna tuner that is sized to match today's small QRP rigs. T1 can be used with any 0.5-W to 20-W transceiver covering bands in the 160-6 m range

**£194.95**



### KPA500

160-6m 500+ Watts Solid State Auto Band Switching Linear Amplifier in a compact package the size of the K3

Kit: **£2449.95**  
Ready Built: **£2649.95**



### MH3

Hand mic with up/down buttons for added control for KX2 and KX3

**£79.95**



### KAT500

High power auto tuner and smart antenna switch which can be used with K3, K3S, KPA500 and other HF transceivers.

Kit: **£799.95** Ready Built: **£839.95**



BUY NOW  
PAY LATER  
FINANCE AVAILABLE!  
CONTACT US FOR  
MORE DETAILS

[www.hamradiostore.co.uk](http://www.hamradiostore.co.uk)

Pay us a visit and check out our amazing demo facility  
Sign up to our Weekly Deals at [hamradiostore.co.uk](http://hamradiostore.co.uk) for exclusive deals and latest news





## KENWOOD DEALS

KENWOOD DEALER OF THE YEAR 2016

### TH-D74

New 144/430 MHz handheld featuring Kenwood's APRS, Automatic Packet Reporting System, and the popular D-Star. Kenwood has made it possible to use this handheld in a wide range of radio applications with wideband reception function allowing the user to receive HF SSB and CW.

**£599**



### KENWOOD ACCESSORIES

Dynamic hand mic with up/down control (MC-43S) **£20.95**

Popular desktop mic with PTT (MC-60A) **£127.95**



Desk mic for DSP transceivers (MC-90) **£204.95**

Speaker with high/low filters & two inputs (SP-990M) **£219.95**

High quality deluxe headphones (HS-5W) **£56.95**



### TS-590SG

Be witness to the evolution of KENWOOD's pride and joy - the TS-590SG HF transceiver - pushing performance and technology to its utmost limit, with the receiver configured to capitalise on roofing filter performance and IF AGC controlled through advanced DSP technology.

**Call for best prices**



### TS-480HX/TS-480SAT

Perfect for base station use with a separate control panel available with 200W (HX) or ATU (SAT)

**Call for best prices**



## ICOM DEALS

OFFICIAL RE-SELLER



### IC-7300

HF-4m transceiver with integrated SDR and built-in wide frequency automatic antenna tuner, ideal for field operation. Operate with 100W on HF/50MHz and 50W on 70MHz.

**£1199.95**

### SP-38

Matching speaker designed specifically for the IC-7300 improving sound quality and experience

**£129.95**



### IC-9100

Complete 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. Only UK Dealer where you can fully demonstrate the IC-9100"

**£2699.95**



### ID-51E-PLUS2

2m/70cm handheld with the same features as its previous iteration plus new 'Terminal mode' and 'Access mode' for connecting to D-star through the internet and places where no D-Star repeater is usually accessible

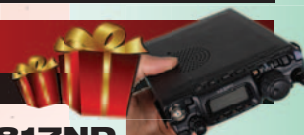
**Call to Pre-Order yours now**



FULL RANGE OF RT SYSTEMS SOFTWARE AND CABLES FOR ALL KENWOOD, ICOM AND YAESU

## YAESU DEALS

OFFICIAL RE-SELLER



### FT-991A

Successor to the FT-991 this all band HF to UHF transceiver which includes Yaesu's System Fusion as well as traditional modes. The FT-991A packs the same features as the FT-991 plus an added real time spectrum display and multi-colour waterfall display

**Call for best price**



### FT-450D

Compact yet superb HF/50MHz radio with state-of-the-art IF DSP technology configured to provide worldclass performance in an easy to operate package.

**Call for best price**



### FT-DX1200

HF + 6m transceiver provides up to 100 Watts on SSB, CW, FM and AM (25 Watts carrier) and a rugged state of the art highly balanced receiver circuit configuration for top performance on today's crowded bands.

**Call for best price**



### FT-2DE

2m/70cm dual band handheld transceiver designed with ease of use in mind such as its 1.7 inch full back-lit touch panel display. Includes FM and System Fusion modes.

**Call for best price**



### FT-857

World's smallest HF/VHF/UHF 100W mobile transceiver including DSP

**Call for best price**



### FT-891

100W HF + 6m mobile transceiver with AM, USB, LSB and CW modes featuring triple conversion, noise blanker and attenuator.

**Call for best price**



### FT-817ND

The Yaesu FT-817ND is the world's first self-contained, battery-powered, Multi-mode, Portable Transceiver covering the HF, VHF and UHF bands!

**Call for best price**

### YAESU ACCESSORIES

Desk mic with PTT (MD-100A8X) **£119.95**

Studio quality base mic (MD-200A8X) **£249.95**

CAT communications via USB (SCU-17) **£109.95**

High performance external speaker (MLS-100) **£28.95**

Base speaker with audio filtering (SP-8) **£119.95**

Internet repeater enhancement system (HRI-200) **£119.95**

External ATU for FT-897 & FT-857 (FC-30) **£263.95**



### FTM-3200DE

Rugged yet compact System Fusion/FM 65W mobile transceiver. Loud and Crystal Clear Front Panel Speaker with 3W of Audio Output. Instantly recognises digital or analogue transmission and adjusts automatically for flawless co existence of both digital and analogue users.

**Call for best price**



**Want to pay weekly? Call Dan Thomas 2E0DVT for a custom quote**

**Want a second hand trade in? W&S can give you the best prices**

Waters & Stanton Ltd, Spa House, 22 Main Road, Hockley, Essex SS5 4QS



**01702 204965**



**sales@wsplc.com**



@wsplc



blog.hamradiostore.co.uk



facebook.com/WatersandStanton



Waters and Stanton

W&S @ Jaycee, 20 Woodside Way, Glenrothes, Fife KY7 5DF



**01592 756962**



**jayceecomms@aol.com**



# Contents

January 2017

## News and Reports

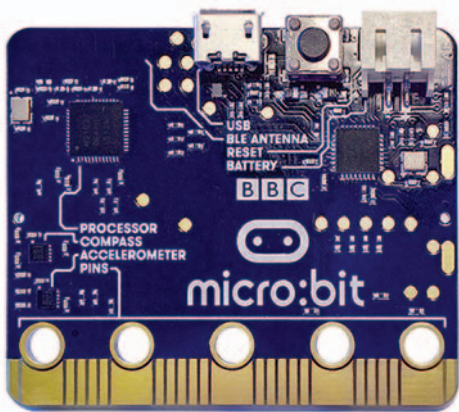
Around Your Region – Club events calendar	82
Around Your Region – Events roundup	85
New products	14
News	12
RSGB Matters	6

## Regulars

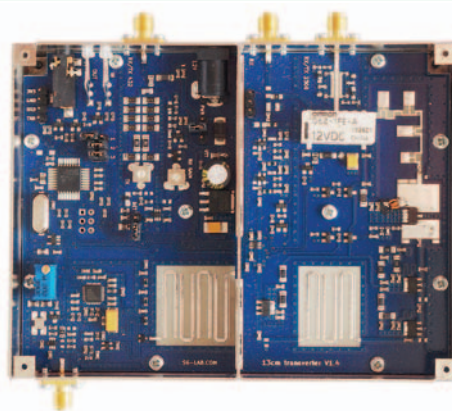
Advertisers index	91
Antennas, Mike Parkin, G0JMI	46
ATV, Dave Mann, G8ADM	92
GHz bands, Dr John Worsnop, G4BAO	63
HF, Martin Atherton, G3ZAY	56
Members' ads	94
Propagation, Gwyn Williams, G4KFH	81
Rallies & events	95
Special events, Silent Keys	95
Sport radio, Steve White, G3ZVW	80
The last word	94
VHF / UHF, Richard Staples, G4HGI	60

## Reviews

Book review, Giles Read, G1MFG	55
Elecraft KX2, Peter Hart, G3SJX	30
SG-Lab 2.3GHz transverter, John C Worsnop PhD CEng MIET, G4BAO	70



20



70

## Technical Features

Design notes, Andy Talbot, G4JNT	16
Moxon Rectangle stealth beam for 20m, Chris Zeal, G4BGM	40
The BBC micro:bit and amateur radio, Jonathan Hare, G1EXG	20
Weak signal modes on 28MHz, Rober Laphorn, G3XBM	77

## Features

2016 RSGB IOTA contest, Mike Franklin, G3VYI	74
CHOTA, Elaine Richards, G4LFM	38
Contesting shake-up, Steve White, G3ZVW	27
Jamboree on the Air, Elaine Richards, G4LFM	64
MX0VRC DXpedition to Lundy, Nigel Brown, G0GDA	36
Ofcom's approach to VDSL, Mark Walls	44
WEEE, Peter E Chadwick, Sen MIEEE, G3RZP	26



Cover image: The Elecraft KX2.  
Image by Kevin Williams, M6CYB.

**RadCom** THE RADIO SOCIETY OF GREAT BRITAIN'S MEMBERS' MAGAZINE

**Managing Editor:** Elaine Richards, G4LFM, [elaine.richards@rsgb.org.uk](mailto:elaine.richards@rsgb.org.uk)  
**Technical Editor:** Giles Read, G1MFG, [giles.read@rsgb.org.uk](mailto:giles.read@rsgb.org.uk)  
**Layout and Design:** Kevin Williams, M6CYB, [kevin.williams@rsgb.org.uk](mailto:kevin.williams@rsgb.org.uk)

All contributions and correspondence concerning *RadCom* should be posted to: *RadCom* Editor, 3 Abbey Court, Fraser Road, Priory Business Park, Bedford MK44 3WH  
Phone 01234 832 700, fax 01234 831 496, [radcom@rsgb.org.uk](mailto:radcom@rsgb.org.uk)

*RadCom* is published by the Radio Society of Great Britain as its official journal and is sent free and post paid to all Members of the Society. The February edition of *RadCom* is expected to arrive with most Members by 27 January, although this can take up to a week longer in some cases; international deliveries can take longer still.

© Radio Society of Great Britain

All material in *RadCom* is subject to editing for length, clarity, style, punctuation, grammar, legality & taste. Articles for *RadCom* are accepted on the strict understanding that they are previously unpublished and not currently on offer to any other publication. Unless otherwise indicated the RSGB has purchased all rights to published articles. No responsibility can be assumed for the return of unsolicited material.

The online *RadCom* is at [www.rsgb.org/radcom/](http://www.rsgb.org/radcom/)  
Technical supplement *RadCom Plus* is available to RSGB Members online at [www.rsgb.org/radcom-plus](http://www.rsgb.org/radcom-plus)  
*RadCom Basics* for Members new to the hobby can be found at [www.rsgb.org/radcom-basics/](http://www.rsgb.org/radcom-basics/)



The RSGB is on Twitter @theRSGB



Find us on Facebook at  
[www.facebook.com/theRSGB](https://www.facebook.com/theRSGB)



## A message from the RSGB President

Seasons greetings to all RSGB Members. My best wishes for a very successful and prosperous 2017. One of my New Year resolutions is to work hard to get the greatest satisfaction and enjoyment out of everything to do with amateur radio. You may wish to share that ambition. Your Board has certainly been spending time looking forward, assessing our strengths and challenges in order to produce a future strategy. All Members are about to be invited to take part. Please seize that opportunity.

What do I remember from 2016? Lots – but I will mention just two. The Tim Peake contacts with schools via amateur radio were brilliant. Working with ARISS and RSGB, young people enjoyed the excitement of communications. We really must continue to build on that. My second highlight is about our brilliant volunteers. They do a fantastic job for us all and need our thanks and support. Their expertise, commitment and enthusiasm are essential and we need more of them. A big New Year thank you – and to our small and dedicated HQ staff.

We become amateurs to use the radio spectrum. Work undertaken by RSGB and its volunteers to protect it is largely unseen but absolutely vital. The society works both internationally and nationally to influence solutions to the difficult problems of rising noise levels, interference and commercial pressure on frequency use. Support with those alone is worth my subscription! Never has it been more important to ensure an even greater focus on helping to get and keep members on the air.

While deserving recognition as a statutory service, but let's also remember that having fun and enjoying each other's company has always been a feature of amateur radio. Long may that continue. Nick Henwood, G3RWF

## Board & Regional Elections 2017

This is the time of year when we call for volunteers to step forward for election at the AGM. The 2017 AGM will take place at the Angel Hotel in Cardiff on 22 April 2017.

As the Board Chair outlined on page 6 of the November *RadCom*, the Society is run primarily by its Members and we need volunteers who are willing and able to give their time and enthusiasm to keep the wheels turning.

In 2017 we will be looking to appoint one elected Board Director, one nominated Board Director and five Regional Managers. The Board vacancy is a result of Steve Hartley, G0FUW, coming to the end of his 3-year term in office. Steve is not seeking re-election.

The following Regional Manager vacancies also arise due to the end of the current post holders completing their 3-year terms, or because they were co-opted into a vacancy after the last AGM: Region 2 – Scotland North & the Northern Isles (Denny Morrison is currently co-opted), Region 5 – West Midlands (Martyn Vincent is seeking re-election), Region 7 – South Wales (Glyn Jones is currently co-opted and is seeking election), Region 10 – South & South East (Mick Senior is seeking re-election), Region 12 – East & East Anglia (Keith Haynes is currently co-opted and is seeking election).

Nominations for elected Board Directors and Regional Managers require the supporting signatures of ten RSGB Corporate Members. Nominations for the Regional Manager vacancies must come from Members who reside in the relevant Region.

Further information about the election vacancies, together with nomination forms, can be accessed from the RSGB website ([www.rsgb.org.uk/elections2017](http://www.rsgb.org.uk/elections2017)) or can be obtained by post from the General Manager at RSGB HQ. Completed papers, with their supporting signatures must be received by noon on 1 February 2017.

Nominated Directors are recommended to the Board by the Nominations Committee and approved by the Membership at the AGM. The Nominations Committee are currently looking for suitably qualified and experienced candidates to join the Board and would particularly like to see Members coming forward with marketing/promotional skills and/or those who can help to enrich the gender/ethnic diversity of the current Board.

Those elected will also help to take the Society forward to 2020 with a revised strategy, which we plan to launch at the AGM. Volunteers are not paid but out-of-pocket expenses are covered. If we do not get volunteers we will either need to reduce services or increase subscription to pay for additional staff.

If anyone has any questions about the elections or would like to discuss the roles, please contact the Board Chair, Steve Hartley, G0FUW, for the Director vacancies, via email to [g0fuw@rsgb.org.uk](mailto:g0fuw@rsgb.org.uk), or Philip Hosey, M10MSO, for the Regional Manager vacancies, via [rm8@rsgb.org.uk](mailto:rm8@rsgb.org.uk)

## Train the Trainers

Region 4 hosted the Train the Trainers event in October. The event was open to all RSGB Members and attracted not only Region 4 Members but also those from as far afield as Glasgow to the North and as far South as Nottingham. The event was organised by members of the Stockton & District Radio Group and hosted by Wearside Electronics and Amateur Radio Society.

The reports from the attendees following the course were all positive with a great deal of respect aimed at the trainers for the quality and quantity of the material presented. All agreed it was a valuable and entertaining day's event that provoked each of the Members to review his/her own training techniques.

By providing this course, the RSGB TEC and Regional team are not only making progress in improving training techniques but also has created a comradeship and support between trainers and ultimately between clubs, promoting the values and principles that make our hobby worth pursuing.

The photo shows, from the left, Anthony, MORHJ, Mac, 2E0RYE, Brian, G8AOE, Tony, G3MAE, Paul, M0PGX, James, 2M0RMP, Howard, G1GB0, Tom, Nancy, G7UUR, Paul, M0VRW, Simon, M0CYD, David MONDT. The Trainers (seated) are David, G0EVA, Derek, G7LFC and Paul, G4DCV.





## YOTA 2017 Summer Camp



The RSGB is extremely proud that the UK has been selected to host the 2017 YOTA summer camp. Between 5 and 12 August, Gilwell Park, which is located on the edge of Epping Forest and has 108 acres of woodland and has a permanent amateur radio shack complete with antenna towers, will be home to young radio amateurs from around the world. Twelve national societies have so far applied to send teams of young people to YOTA 2017. The Youth Committee Chair will shortly be writing to all young Members inviting them to apply for a place in the UK team at YOTA 2017, and the successful applicants will be named in a few months. We also need a UK Team Leader to supervise the UK team, who should ideally be between 18 and 30 years of age; previous experience of working with young people would be useful. If you think this role is for you, please contact the Youth Committee Chair via email to [youth.chairman@rsgb.org.uk](mailto:youth.chairman@rsgb.org.uk).

The RSGB is very pleased to say that the Membership is getting behind this event and personal donation are coming in with Supporter pins being sent out. If you would like to add your name to that Supporter list, see that panel at the bottom of this page for details.

## IOTA Memorandum

A Memorandum of Understanding was signed between the RSGB and Islands On The Air (IOTA) Ltd at the RSGB Convention, the signatories being RSGB President Nick Henwood, G3RWF and IOTA Programme Administrator Roger Balister, G3KMA. The document sets out the terms of the partnership between the two bodies and what each could expect of the other going forward. We all look forward to IOTA continuing to develop and grow in the future. See [www.rsgbiota.org](http://www.rsgbiota.org) for full information.

Front: Nick, G3RWF (L), Roger, G3KMA (R).  
Back, L-R: Graham, G4FSG, Johan, PA3EXX, Steve, G0FUW, Stan, G4XXI, Cezar, VE3LYC, Steve, M1ACB.



## Amateur Activity on 47GHz

The RSGB has released a briefing paper on amateur activity at 47GHz. This was prompted by the band being in the scope of ITU and CEPT studies for next generation, 5G smartphones. It is just one of the many aspects of RSGB spectrum defence work from LF to millimetre waves. The paper may be found on the Spectrum Forum pages of the RSGB website at <http://rsgb.org/main/about-us/committees/spectrum-forum/papers-and-consultations/>

## Vacancy for *RadCom Basics* Editor



*RadCom Basics* (formerly the *New Starters Newsletter*) has been a bi-monthly eNewsletter for new radio amateurs and those looking to extend their knowledge.

Over the last three and a half years more than 80 features have been written and published. The RSGB would like to maximise the use of the content that has been produced and is, therefore, looking for an editor for *RadCom Basics*' content on the RSGB website. The role will include categorising the existing content and making it easier to find. The editor will also work out what, if any, content is missing and either write or commission new features accordingly.

If you're interested, please contact RSGB General Manager Steve Thomas, M1ACB via email to [gm.dept@rsgb.org.uk](mailto:gm.dept@rsgb.org.uk)

**Help YOTA 2017 and get a free  
supporters' pin by signing up **Today!**  
[www.rsgb.org/yotasupporter](http://www.rsgb.org/yotasupporter)**





## QSL Matters

Since 2012, the RSGB has been a world leader in promoting responsible QSLing. It has encouraged Members to 'think before they send' and to use OQRS, Club Log and Logbook of The World as alternatives to the routine sending of paper cards. There's no doubt that many Members are helping to reduce costs and environmental impact. Unfortunately, an increasing number of cards are being returned in bulk from other bureaux marked 'not a member' or 'does not collect'. So perhaps for 2017 we should change our slogan from 'think' to 'Check before you send'.

Stephany, G1LAT is now the new short call Contest group sub-group manager. Cards and envelopes are currently being transferred. Her details can be found on the RSGB website, follow the links to the QSL pages from the 'Operating' tab on the main menu.

It's with great sadness that we report the sudden death of our long time G3M-P group sub manager, Gordon Brown, G3MZV. Well known to many Members, Gordon will be very much missed. The Bureau is therefore in need of a replacement volunteer for what is to become a slightly enlarged and busy group, G3M-S. If you would like to help, have time, space and some basic computer skills, including the use of a spreadsheet, please email the bureau via [qsl@rsgb.org.uk](mailto:qsl@rsgb.org.uk)

## Reunification of RAYNET

At the RAYNET AGM, held in Cambridge on 29 October, RSGB President Nick Henwood, G3RWF and Cathy Clark, G1GQJ, Chairman of the Radio Amateur's Emergency Network, signed the agreement between the two organisations, for the reunification of RAYNET operations, as from 1 January 2017. Once the formalities associated with the change of name to RAYNET-UK are finalised, the merging of the emergency communications groups currently with the RSGB into this new entity will begin.



An EGM of the Network at the Cambridge meeting voted unanimously to change the name, and also to undertake various adjustments to the Network constitution, to achieve this aim. This brings to a conclusion some three years of negotiation and discussion, undertaken by members of the RSGB Emergency Communications Committee and the Network Committee of Management, with the creation of a single structure for UK amateur emergency communications.

The last formal stage of the RAYNET reunification process has just been completed. At the November meeting of the RSGB Board, reunification was approved. The process of setting up RAYNET-UK is ongoing and the Emergency Communications Committee page on the RSGB website will be updated regularly with progress reports.

## Remote Operation

Following a number of requests from Members, the RSGB Board would like to explore the possibility of enabling the use of a remote controlled station based at the National Radio Centre. This could be using the existing FlexRadio equipment, or maybe something else. We are looking for Members who would be willing and able to form a small project team to develop the idea into a working solution. Please send expressions of interest and a short statement of what you could bring to the project to [gm.dept@rsgb.org.uk](mailto:gm.dept@rsgb.org.uk) by the end of January.

## Innovations Working Group

Part of the breadth of amateur radio is research, experimentation and pushing the boundaries of what we do. The Board has decided to form an Innovation Working Group and is seeking applications from Members who might be interested in taking part.

The required qualifications are simply an open and inquiring mind together with an enthusiasm to look for the new and the different within amateur radio.

Who knows what we might find! Explore with us, 'outside the box'.

Applications to Steve Thomas, M1ACB, RSGB General Manager via email to [gm.dept@rsgb.org.uk](mailto:gm.dept@rsgb.org.uk)

## 60m Band Changes

Jose, CT1EEB reports from Portugal on changes to the 60m allocation in that country. These include some of the existing channels, plus the new WRC15 allocation. The new 60m band licence allows 5371.5kHz and 5403.5kHz A1A and J3E, plus 5351.5kHz to 5366.5kHz using A1A and J3E.

Jari, OH2BU reports from Finland that all OK stations will get permission to use 5351.5 – 5366.5kHz with 15W EIRP, starting on 1 January 2017. The special OH licences are now valid for a maximum of five years.

## Correction

In the article on Station Gilnahirk in the December 2016 *RadCom*, the list of operators contained an error. The entry regarding Les Drakeford, should have read L Drakelorr. Les Drakeford was a Voluntary Interceptor and part of the Arkley Group, SCU3. His son, Norman, took over the callsign G2DWB in 1982. Our apologies for this error, which occurred during the preparation of the article.

## VHF Propagation Volunteer

The RSGB Propagation Studies Committee (PSC) is looking for someone to focus on studies of abnormal VHF propagation.

One of the tasks to be undertaken will be to study all information concerning exceptional contacts and reception reports in order to establish if there are patterns of linked propagation modes that might have previously been missed. A priority in this particular area is to look at contacts where the propagation path has occurred as a result of the linking of tropospheric and ionospheric modes. When such studies have been developed, the conclusions need to be initially shared and freely discussed with other members of PSC.

A further aspect of the role is to be able to communicate the results of to RSGB Members and beyond via presentations and articles in *RadCom*. A really good working knowledge of VHF propagation and communication skills are important for this role.

If you are interested please email Steve Nichols, GOKYA, via [psc.chairman@rsgb.org.uk](mailto:psc.chairman@rsgb.org.uk) including a brief résumé of what you would bring to the role.

## Congratulations

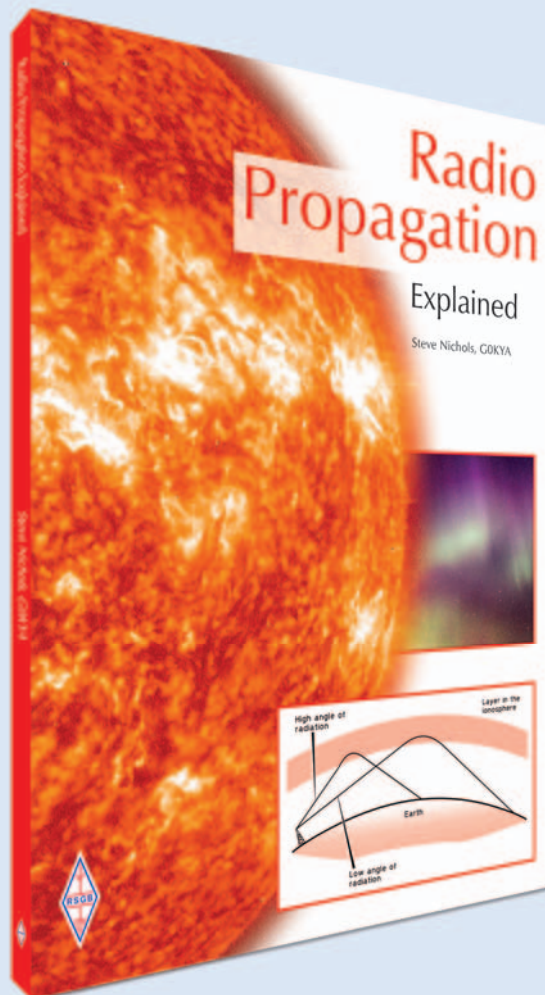
To the following Members whom our records show as having reached 70, 60 or 50 years' continuous Membership of the RSGB.

70 years  
Manchester Wireless Society G5MS

60 years  
Mr A V H Davis G3MGL  
Mr S J Gilbert G3OAG  
Mr J E C Baldwin G3UHK  
Crystal Palace Radio  
and Electronics Club G2LW

50 years  
Peter Lennard G3VPS  
Mr M A Huish G3VRV  
Mr R J Dinning GM0GOV  
Mr P Braet ON5BD  
Mr R B Crofts VK4YB  
Weston Super Mare RS G4WSM





## Radio Propagation Explained

Steve Nichols, G0KYA

Understanding radio propagation is essential for anyone with an interest in radio communications who wants to know how signals travel from A to B. Written by acknowledged expert Steve Nichols, G0KYA, *Radio Propagation Explained* provides everything you need to know about this fascinating topic.

Looking at HF to VHF, UHF and beyond, *Radio Propagation Explained* provides a practical understanding of radio propagation. It looks at the Sun, sunspots, ionospheric propagation, ionospheric storms and aurora, tropospheric propagation, meteor scatter and space communications, including satellites and Earth-Moon-Earth signals. The book also includes information on computerised HF propagation predictions, greyline propagation, low frequency (LF) propagation, Sporadic-E, amateur radio modes like WSPR, PSK and JT, web resources and much more. There are descriptions of the properties of the amateur radio bands and how to get the best performance when using them.

*Radio Propagation Explained* draws on material from the hugely popular *Radio Propagation Principles & Practice* book previously published by the RSGB and enhances it with the latest advances in the field of propagation. Steve shows how radio amateurs can, by studying propagation, gain a more rewarding experience and increase their chances of making the on-air contacts they want.

*Radio Propagation Explained* is thoroughly recommended reading for everyone who wants to understand radio propagation and make the most of their radio activities.

Size 240x174mm, 128 pages,

ISBN 9781 9101 9328 0

**Non Members' Price: £12.99**

**RSGB Members' Price: £11.04**

Also available on



E&OE (All prices shown plus p&p)



**Radio Society of Great Britain [www.rsgbshop.org](http://www.rsgbshop.org)**

3 Abbey Court, Priory Business Park, Bedford, MK44 3WH.

Tel: 01234 832 700 Fax: 01234 831 496

FROM **FREE P&P**   
on orders over £30. See Page 78



## TEC Schools Link at Principia Conferences

The first week of November found TEC Schools Link attending two conferences, one in Portsmouth and one in York. With Tim Peake as the star turn, these two-day events were to promote STEM subjects in schools. One of the two days was an Activity day, with lots of activities from many supporting bodies, all geared to showing the breadth and excitement of STEM. The second day at the school conference, Tim Peake, fresh from his 6 months on the International Space Station, gave a short introduction, memorable for playing a very loud recording of the launch sound of the rocket engines used to send the ISS crew into orbit. Just when you thought it was really loud, the remaining engines lit up and you felt it through the floor. Tim stayed all day and made a point of meeting and talking to every single school pupil. Lots of photographs, lots of parents and teachers joining in. We were all jealous when RSGB President Nick Henwood, G3RWF got himself photographed alone with Tim.

Schools Link, ably supported by representatives of the Youth Committee, Regional Team and local clubs, ran a table of demos that were very popular. We also were able to talk to teachers including some from the "Principia 10", the schools who had contacted Tim by amateur radio in 2016. Sandringham School, the first UK school to make contact, were there, led by Head teacher Alan Gray, G4DJX. They now have their own shack and have been enormously successful in training their pupils for the Foundation and now the Intermediate licence. We also met with Wellesley House School, who were presented with a special award by Nick to recognise their continued promotion of amateur radio. All the schools we met had enthusiastic teachers and enthusiastic pupils. Young people aren't inspired by technical subjects? Just the opposite, five minutes with them and your own head would be spinning with new ideas.

Derek Hughes, G7LFC has been appointed as Project Leader for the RSGB Training and Education Committee Schools Link working group. The aim of Schools Link is to find ways of supporting teachers delivering the curriculum, by providing additional help and materials for those places where radio examples help illuminate it. The focus is on teachers and supporting the curriculum, rather than directly on school students or on getting amateur radio into schools. We thank Derek for volunteering to lead this important project team.

For more information on this valuable work, go to [rsgb.org/schools-link-project/](http://rsgb.org/schools-link-project/)

Philip Willis MOPHI, RSGB Training and Education Committee Chair



RSGB President Nick Henwood, G3RWF meeting Tim Peake at the UK Space Agency Portsmouth Principia schools conference. He thanked Tim for raising the profile of amateur radio and inspiring young people through the ISS amateur radio school contacts.

**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 N Tideswell, 2E0BHS	Mr K V Dohme, LB5OA	Mr J Moore, M6HJV	Mr M Wickens, M6VMS	Mr K Thwaites, RS310659
Mr M Newcombe, 2E0DQK	Wellesley House RC,	Mr D Vayalambone,	Mr J Wasilewski, M6XEW	Mr C Ellery, RS310660
Mr A M Mundy, 2E0LWR	MODLI	M6HJY	Mr A Hamill, M10HMY	Mr G Lunt, RS310661
Mr M Heenan, 2E0SFS	Miss E Reeve, M0GET	Mr P Day, M6HTQ	Mr T E Scott, MW0TJS	Mr M Pollard, RS310676
Mr A Spears, 2E0SJA	Mr A Beacham, M0IBX	Mr C Bonham, M6HUB	Mr R Scott, N1LUK	Mr J Tondeur, RS310703
Mr G Mounntain, 2E0UGM	Mr N Newman, M0ICH	Mrs R Harwood, M6HUQ	Mr D L Blunt, N6EWY	Mr J Conway, RS310835
Mr W Little, 2MOWML	Mr J Salek, M0ICL	Mr P Martin, M6HWB	Mr K Blackmon, NA5XX	Mr G Grundill, RS310850
Mr T Dommett, G1MOK	Kings School ARS, MOKSO	Mr J Redgrave, M6HWD	Mr F Benson, NC4FB	Mr R Hill, RS310851
Mr G Dodwell, G4CFS	Mr G Fernando, M000X	Mr P Stokes, M6HXG	Mr A Tiihonen, OH2JCW	Mr G Nelson, RS310873
Mr D Hall, G7JAX	Mr A Vincent, M0URF	Mr G Oliver, M6HYQ	Mr J Vanhamel, ON5ADL	Mr G Coney, RS310950
Mr P Slight, G7PMQ	Mr P Setter, M0XMT	Mr C H T Ng, M6ILC	Mr P Storton, RS195255	Mr C Krupinski, SQ50MZ
Mr M Osborn, G8ZMF	Mr C O'Broin, M0ZCO	Mr Y Agmon, M6ISL	Mr B Dyson, RS310250	Mr R S Smith, VA6EME
Mr A C Subramanya,	Mr A May, M1BSX	Mr R Hillier, M6RNI	Mr S Entwistle, RS310421	Mr G L Ellingson,
K2ARV	Mr G Robinson, M6BUS	Mr S McBain, M6TSJ	Mr C Smith, RS310505	WA0WHE
Mr J K O'Connell, K2QA	Mrs A Hoskins, M6DMY	Mr S Rowland, M6TVE	Dr G Roberts, RS310639	Mr N L Blades, WR3KI
Mr M Creech, KD1VY	Mr S Yardley, M6HGR	Mr D J Smith, M6UVD	Mr G Lamming, RS310643	Mr D C Bender, WW6D

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

Mr P Pain, 2E0DZR	Mr AWR Street, GOJYI	Mr T J Allen, G4BGO	Mr H King, G8DXV	Mr C R Day, M1EAK
Mr D Byrne, 2E0UBD	Mr G A Richards, GOPWX	Mr S McGrory, G4GNP	Mr R McEwan, GM4VWV	Mr I Leather, M1ICL
Mr D Ledger, 2E1ILH	Mr S M Bowles, G0UWF	Mr P J Chapman, G4JCG	Mr O Gundersen, LB1RG	Mr S Rear, M1SEM
Mr P A Woodward,	Mr B G Martlew, G1NXS	Mr I Vincent, G4MLY	Mr A Hoskins, M0DOP	Mr J Laws, M6HWN
2E1PAW	Mr S Somerfield, G1RTG	Mr D H Slade, G4YTB	Mr S Seaward, M0SMJ	Mr L Salmon,
Mr P D Marney, 2E1PDM	Mr B Panton, G1TWY	Mr P N McTaggart, G6BJO	Mr M Cox, M0XOC	RS199335
Mr C T Cosgrif, GODZC	Mr A G Ball, G3UQW	Mr R Milroy, G7LUU	Mr S Churchill, M1CCC	Mr E Durrant, VK2JI





**NEW  
TITLE**



**ONLY  
£5.99**

## The RSGB Vintage Rig Guide

Edited by Steve White, G3ZVW

Amateur radio equipment saw great changes from the 1960s onwards with the arrival of solid state designs and there is plenty of superb equipment from the latter decades of the 20th century available in the second hand market. This brand new publication focuses-in on the amateur radio equipment from these decades in the same format as the popular *RSGB Rig Guide*, describing the basic information about the equipment along with when it was first made and what it may be worth.

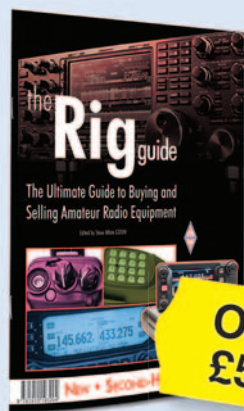
Covering the mid-1960s to 1990s the *RSGB Vintage Rig Guide* covers the equipment from manufacturers that were never in the standard *RSGB Rig Guide* along with the items that have been discontinued from the listings in early editions of that publication. So manufacturers such as Drake, Heathkit and KW are now included for the first time. There are brief synopses of all the manufacturers and a useful guide on what to smell, feel and look for when buying vintage radio equipment. Details of over 300 receivers, transmitters, transceivers and linear amplifiers are included as are likely trade-in and second-hand prices from dealers.

If you are interested in vintage amateur radio equipment, either because you have some, are interested in restoring something or you want to know its likely value this book provides a valuable insight. Recommend reading for anyone interested in old equipment

Size 210x297mm 80pages, ISBN 9781 9101 9330 3

**Price: £5.99 post free (UK only)**

**SPECIAL  
OFFER  
Buy both for  
only £9.99**



**ONLY  
£5.99**

## The Rig Guide

Edited by Steve White, G3ZVW

### What should you pay for a second hand radio?

*The Rig Guide* is a unique publication that sets out to answer the question 'what is the right price for this radio?'. What will you get for a radio if you trade it in or try to buy or sell it on an online auction site? - *The Rig Guide* provides the answer.

Size: 210x297mm, 96 pages ISBN: 9781 9101 9302 0

**Price: £5.99 post free (UK only)**

**£80E** (All prices shown plus p&p)



**Radio Society of Great Britain [www.rsgbshop.org](http://www.rsgbshop.org)**

3 Abbey Court, Priory Business Park, Bedford, MK44 3WH.

Tel: 01234 832 700 Fax: 01234 831 496

**FROM  
FREE P&P**  
on orders over £30. See Page 78



## Barry 50th anniversary

Barry Amateur Radio Society members and past members recently enjoyed a 50th anniversary reunion dinner. The evening was a great success, in particular the endless loop of old club photographs from the club's history – what changes in 50 years! The club was formed in 1966 as a Student Union society under the wing of the then Science Master Dan Adams, GW3VBP (SK). Until recent years it was known as the Barry College of Further Education Radio Society. The Society benefited from the close link with the College as accommodation and equipment was freely available. From its early days the Society has annually commemorated the Marconi-Kemp radio tests in the Bristol Channel and members still operate from Flatholm Island as GB5FI to honour Marconi. It's a very active club and they are very proud of their history and, with the support of its membership, has plans to do even more in the future. You can find out more at [www.bars.btik.com](http://www.bars.btik.com)



## All three radio exams passed in one day

Ivana Tomic is the first woman to pass all three amateur radio exams (Foundation, Intermediate and Advanced) in a single day. She achieved the feat at an exam session held at Imperial College, London in October 2016. Ivana is a research assistant in the Adaptive Emergent Systems Engineering group in the Department of Computing where she works on privacy and security for Internet of Things devices. She says that she's been interested in electronics and communications since school and that having her licence allows her to experiment and to support other students get their own licences. She initially plans to put her licence into action supporting an amateur radio CubeSat satellite being designed and constructed at Imperial to manufacture spacecraft for science and education on orbit.



## EDR 90th anniversary

Eksperimentrende Danske Radioamatører (EDR), the Danish national amateur radio society, will be active with a special callsign, OZ90EDR, in 2017 to celebrate its 90th anniversary. The QSL manager is Allis, OZ1ACB and you can QSL via Logbook of The World, eQSL, Club Log OQRS or direct/through the bureau. Details about the cost of direct QSLing, rules of an award that will be available and other information will be found on their website, [www.edr.dk](http://www.edr.dk)

## Collins radios net

European Collins Collector Association (CCA) is a group dedicated to the use of Collins radios. It holds two nets each week, on Thursdays at 1300UTC on 14.263MHz  $\pm$  QRM and on Saturdays at 0900UTC on 7.165MHz  $\pm$  QRM. [www.ccae.tm6cca.com](http://www.ccae.tm6cca.com)

## Repeater and beacon updates

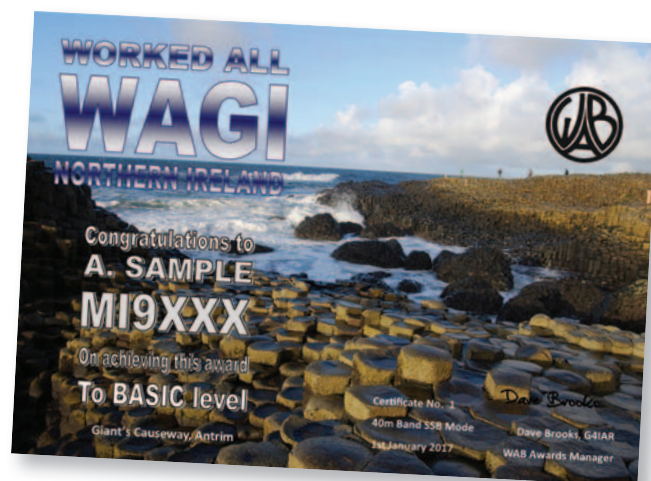
GB3CF has implemented a dual mode Fusion repeater using Yaesu equipment coupled with Arcom logic. There are some minor problems to be resolved but users can look forward to full internet connectivity soon.

10GHz beacon GB3LEX has been taken out of service for investigation following reports that although it was audible locally, listeners further away were unable to hear it. Further info will be available in due course via [www.leicestershirepeatergroup.org.uk](http://www.leicestershirepeatergroup.org.uk) or from G4AFJ on 01455 823 344.

## Worked All Britain

From 1 January 2017, Worked All Britain (WAB) is introducing a new award for working the 10km Ordnance Survey grid squares of Northern Ireland. This is in response to a request from amateurs based there, to try to encourage more activity in the Province. There are several stages to the award and the requirements vary according to the frequencies used and the location of the claimant. There are seven initial certificates and each will show a scene from the seven counties of Northern Ireland.

The award has been named the Worked All GI award (WAGI) and WAB has been assured by those suggesting the award that despite GI not being the only Northern Ireland prefix, this will not be an issue! Full details are on the website [www.worked-all-britain.org.uk](http://www.worked-all-britain.org.uk)



## Moving On columnist SK

It is with deep regret that we learned of the death of John Welsh, GONVZ, on Saturday 5 November 2016.

In his own words, John was born "a long time ago", started building crystal sets at age 10 and then studied physics at college. He progressed to valve receivers, valve transmitters, tape recorders, hi-fi systems and lots of other home electronics. After working on RAF radar for his National Service he worked for GEC for 40 years and part of the job was explaining to senior management – in simple terms – how things worked.

Licensed in 1980, he joined Verulam ARC and wrote early articles for their newsletter. He taught the Technical Basics and Transmitters and Receivers part of the syllabus to the first half dozen Foundation courses run by the club. More recently, *RadCom* obtained permission and adapted many of his *Verulam News* technical articles into the Moving On column, which ran for several years.



## AEA IsoLoop antenna offered on loan



An AEA IsoLoop antenna is available for loan to any radio amateur who is resident in a retirement or care home where the erection of outside visible aerials is not allowed. This particular antenna was advertised in a recent copy of *RadCom* as a free donation by the owner, Lenio, G000S, who was moving to South America.

Gavin, G6DGK is looking after the antenna with the aim of handling the loan process. A couple of years ago, whilst visiting his daughter who lives near to Sydney, Gavin visited a nearby member of the Blue Mountains ARC and took part in their 80m net. One of the members in that net was resident in a retirement care home where no outside aerials were permitted and his signal, produced via a magnetic loop aerial, was booming in despite him being some long distance away.

The aerial has been fully checked over and refurbished, thanks to Chris, G3YTU, and comes complete with an instruction/operating manual, the controller and all necessary leads. The aerial may be operated either in horizontally or vertically polarised

modes and is complete with a suitably stable base and mounting tubes to facilitate the different polarisations. This aerial is designed to operate on frequencies between 10 and 30MHz and is physically small enough to be used in a bed sitting room in a retirement home measuring a maximum of about 5 feet tall, 2ft 6" wide and about 8" in depth, with a circular base diameter of 18".

If you think you would benefit from the use of this magnetic loop aerial, send an email to [radcom@rsgb.org.uk](mailto:radcom@rsgb.org.uk) preferably entitled Antenna Loan. Transport and/or shipping can be discussed with the recipient.

## TX Factor Episode 13

The latest episode of TX Factor, the amateur radio TV show, is now available. In the latest episode, the team talk to Jim Bacon, G3YLA and Steve Nichols, G0KYA about how weather affects our DX, and presenter Bob McCreadie, G0FGX realises a boyhood dream by climbing aboard the *MV Ross Revenge*, home of Radio

Caroline. The Martello Tower Group recently operated GB5RC from the famous pirate radio vessel and in the latest episode, Tony Horsman, G0MBA and Keith Maton, G6NHU explain about the background of the radio ship and discuss organising this most special of Special Event stations from the River Blackwater in Essex. The photo shows Bob McCreadie, G0FGX from TX Factor in the Radio Caroline studio and you can watch Episode 13 of TX Factor at [www.txfactor.co.uk](http://www.txfactor.co.uk)



## VHF/UHF contest

RSGB General Manager Steve Thomas, M1ACB visited Sheffield & District ARS. Following his talk, he made a presentation to Don, G4LOO for his achievements in the October VHF/UHF contest. Don operated the Luton VHF Group callsign, G2L and was the winner in the 3.4GHz Open Section in the October 432MHz-248GHz Contest in 2016 and runner-up in the 10GHz Open Section of the October 432MHz-248GHz Contest.

## South East Tutors

Cray Valley RS, a member of the South East Tutors (SET) group of clubs, opens the 2017 SET training calendar with a Foundation licence course held over two consecutive Saturdays starting on 4 February 2017 in Eltham, London SE9. This course is followed by fully taught Intermediate and Full licence courses plus additional Foundation course(s) later in the year. For February Foundation course registration please contact Kevin, MOKSJ by email to [courses@cvsr.org](mailto:courses@cvsr.org)

The Intermediate course runs over three Sundays from 5 March to 2 April at Bromley in Kent, run by Bromley & District ARS. There is another Foundation course run over two Sundays between 17 September and 8 October, also at Bromley in Kent. Finally the Full training course takes place over four Saturdays and two Monday evenings between 2 October and 25 November at Eltham, run by Cray Valley RS.

## Radio Rally's Live

A new Facebook group, called Radio Rally's Live [*sic*] has been created by Stephen, G7VFX, so that early birds, traders and rally organisers can post photos and live video that might tempt those who are undecided, first thing in the morning, if they want to go to that day's rally. This is a closed, but lightly moderated group at [www.facebook.com/groups/579213752263817](https://www.facebook.com/groups/579213752263817)

## Video presentations

Krystyna, Chair of Sheffield & District Wireless Society is producing a series of YouTube video presentations for Foundation licence holders on the club's YouTube channel ([tinyurl.com/zfe3hbp](https://tinyurl.com/zfe3hbp))

There will be ten videos for Foundation: Introduction and Registration; Nature of Amateur Radio; Safety; Licensing Conditions; Propagation; Antennas & Feeders; Transmitter & Receivers; Electro Magnetic Compatibility, Technical Basics and Understanding Repeaters.



# New Products

## Myantenna end fed wires

The most popular version the EFHW 8010 uses a design to make it resonant on the 80/40/30/20/17/15/12/10m bands without the need for a tuner and handles up to 1kW. This antenna is 130ft long and uses stealth marine grade 18 SWG black covered wire, with a large commercial grade balun incorporating a silver Teflon SO-239 socket.

The antenna can be used in a variety of installations, such as horizontal, vertical, inverted V, inverted L, zigzag and still perform well with reasonable SWR. The Measured VSWRs curves were taken with the antenna in an inverted V shape with the centre of wire at 20 feet and ends at few feet above ground. Priced at £159.95 the antenna is available from Nevada Radio. Details at [www.nevadaradio.co.uk](http://www.nevadaradio.co.uk)



## Battery charger

The new Nitecore I4 battery charger can charge virtually all types of cylindrical battery with charging currents of up to 1 amp. It uses active current distribution technology to select the correct charge based on battery capacity. Charging voltages are selectable from 1.2V, 3.7, 4.2V and 4.35V for the different types of cylindrical battery available on the market, the unit will also recover depleted IMR batteries (lithium manganese). The list of battery types this unit can handle is long and includes Ni-MH AA, AAA, AAAA, C and D cells plus various Li-ion/IMR/LiFePO4 types.

The Nitecore I4 sells for £29.95 and is available from Nevada Radio, see [www.nevada.co.uk](http://www.nevada.co.uk)

## SDRPlay RSP2

The RSP2 builds on the well-established RSP1, the 12-bit SDR for general applications such as Panadapter and short wave listening applications. The RSP2 has a number of new features resulting in a higher spec for amateur radio as well as useful features for numerous scientific, educational and industrial SDR applications.

Amongst the additions, it has 10 built in front-end pre-selection filters, with substantially enhanced selectivity and a software selectable multi-level low noise preamplifier. There is a high impedance input for long wire antennas and built in software selectable MW / FM notch filters. There is RF screening within the strong plastic case for the standard RSP2.

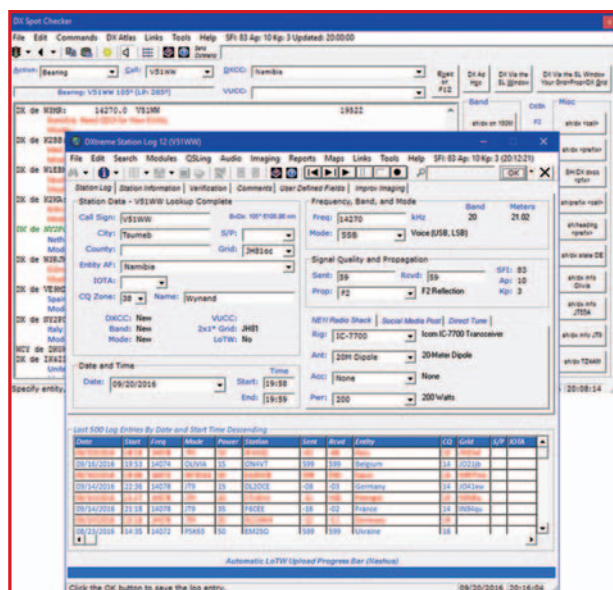
When used together with SDRUno software, the RSP2 becomes a high performance SDR platform. The RSP2 is available direct from [www.sdrplay.com](http://www.sdrplay.com), from SDR-Kits or Martin Lynch & Sons.





### Tilt-over device

TowerMate is a mast/tower tilt-over device that keeps Yagi type antennas horizontal when lowering (luffing) and raising. This enables the antenna to be safely located from high winds and be readily accessible for maintenance. Depending upon the tower configuration, it is possible to store an antenna on or very close to ground, making it ideal for one-person antenna operation rather than relying on friends and family to help. Once the boom is fitted to TowerMate, one person can assemble the antenna elements and put some of the largest amateur radio antennas on to a tower. It is rated to take antennas up to 150kg in weight and to survive wind gusts up to 130kph. Towermate is operated by gravity. It includes a precision cut cam-pendulum and housing that locks shut in the vertical position and disengages automatically as the tower begins to luff over. Laser cut BZP steel and high strength aluminium is used throughout. TowerMate is supplied ready to be fitted to stub masts of 2"/50mm. Square or round antenna booms up to 4"/100mm can be accommodated. It can be used stacked and, where required, has pre-drilled holes for mounting antenna boom trusses. Priced at £399 + shipping, it is available from [www.towermate.co.uk](http://www.towermate.co.uk)



### DXtreme software

A new version of this logging program for amateur radio operators, *DXtreme Station Log 12*, is now available. Just a few of the new features include automatic Logbook of The World where users can set it so it uploads each log entry automatically when added, capturing and saving the QSO Record Status from the LoTW server as part of the process. There is a box on the Station Log toolbar that lets users type a callsign to search quickly for a station in their log. If the call is in the log, a list of QSOs with it appears on a popup window. The QSL image previewer is larger, as is the QSL Image Explorer, which also lets users call-up the log entry associated with each QSL image. Improv Imaging has its own, dedicated previewer and explorer. *DXtreme Station Log 12* retails for US\$89.95 worldwide for internet distribution. Reduced pricing is available for upgrading users, and CD shipment is available at a nominal surcharge. For more information, visit [www.dxtreme.com](http://www.dxtreme.com)



### Band Optimised Log Periodic Array

InnovAntennas Limited has introduced the first in a series of BOLPA Yagis, the Band Optimised Log Periodic Array. They say it provides exceptional performance on 5 HF amateur bands simultaneously from a single feed point so is suited to the modern-day SDR radios where multiple band receiver slices can be used at the same time.

The BOLPA is a result of 2 years' worth of development and testing and came from the combination of several Monoband logs, arranged upon the same boom. The result after some experimentation? The BOLPA-10 that covers all bands from 20m through to 10m (usable right up to 30MHz).

Full details are at [www.innovantennas.com](http://www.innovantennas.com)

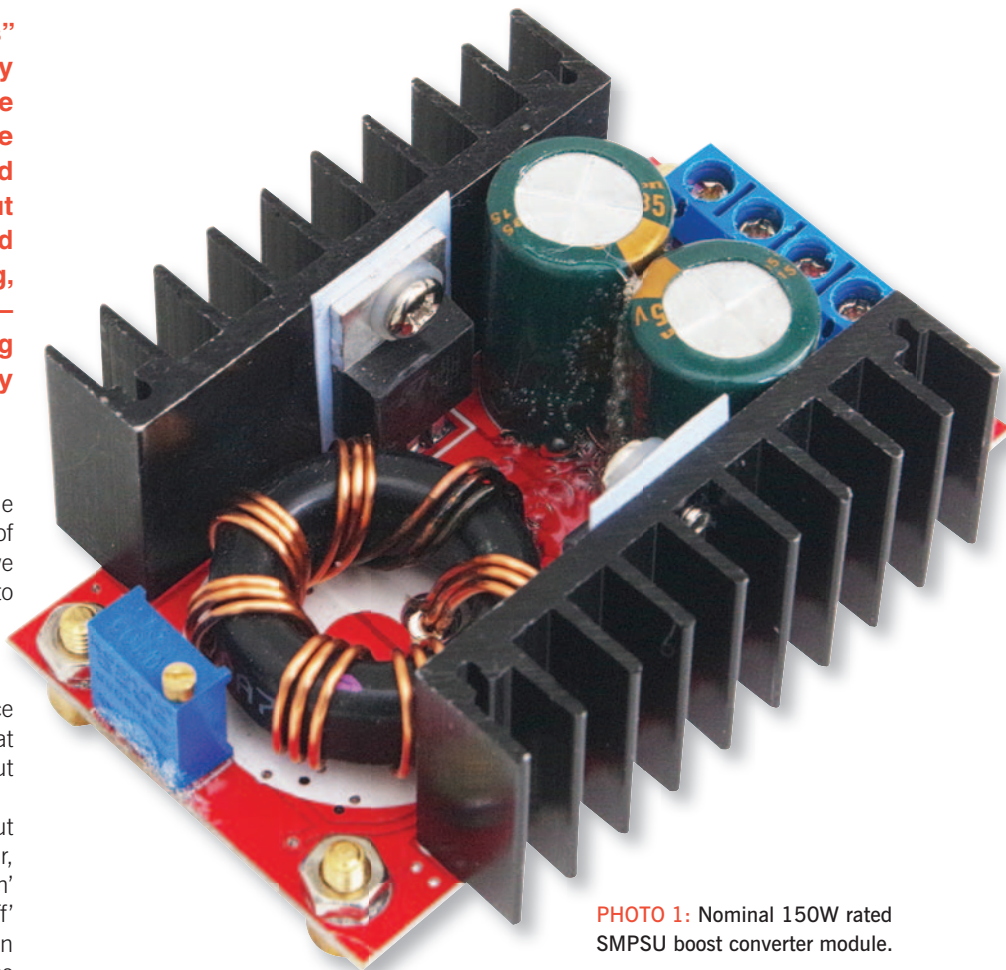


# Design Notes

**“Switch mode power supplies” – words that may irrationally strike fear and terror into the hearts of radio amateurs because of the potential for interference and noise these PSUs can generate. But SMPSUs can be cleaned up and, used with proper filtering and screening, can be made as quiet as needed – versatile and useful, as well as being cheaper, lighter and more readily available than linear PSUs.**

Here we’re going to have a quick look at the basics of SMPSU design to get an outline of how they work. By understanding this, we can go a long way to see why and how to make them clean and interference free and adapt for our own purposes, or make our own. We’ll also look at a couple of low cost modules from a popular e-commerce site. We’ll start by considering just those that take a DC input directly. We’ll worry about mains supplies later.

An SMPSU works by chopping the input voltage and feeding this into an inductor, whose task is to store energy during the ‘on’ periods, then deliver it to a load during the ‘off’ periods. Inductors always ‘try’ to maintain the *current* flowing through them, whereas the *voltage across* the inductor can change as much and as fast as it wants. If a constant DC voltage is applied across an inductor the current through it will steadily rise according to the relationship  $V.t = I.L$  ( $t$  is seconds,  $L$  is inductance in henries). When the voltage is removed, the current tries to maintain itself and the resulting voltage flies up to as high as it needs to be to try to maintain that current. If the voltage is dissipated into something (energy is lost), the resulting current falls. If the circuit is just opened so ‘no’ current can flow in a loop, the voltage can be theoretically infinite, but in practice flies up to a sufficiently high value to lose itself either in a spark or be absorbed by inter winding capacitance or anywhere else it can be dissipated. It is this disconnect between off and on voltages across an inductor that is exploited in an SMPSU. We can see that provided the *average volt.seconds* across an inductor can be maintained at exactly zero, everything will be happy and a finite constant average current can then be allowed to flow in it.



**PHOTO 1:** Nominal 150W rated SMPSU boost converter module.

Consider the ‘buck’-SMPSU arrangement of **Figure 1**. When the switch is closed, the current in the inductor builds up, rising linearly according to the earlier equation. That current flows into the output smoothing capacitor and the load. When the switch is opened, current continues to flow in the same direction through the inductor, except that now it has to flow through the diode instead of the switch. The current is now falling; its rate of change has flipped, so the polarity of the voltage across the inductor flips, allowing the diode to keep the current flowing. If the switch is opened and closed at a regular rate, the rule that requires the average volt.seconds to be zero across the inductor means that during the on period,  $T_{on}$ , a voltage of  $V_{in} - V_{out}$  appears across the inductor and during the off period,  $T_{off}$ , that voltage is equal to (minus)  $V_{out}$ . So by switching with a square wave with unequal on and off times, in order to maintain the *average volt.seconds = zero* rule, this equation

must hold:  $(V_{in} - V_{out}) * T_{on} = V_{out} * T_{off}$   
With a bit of rearranging, we get the condition  $V_{out} = V_{in} * T_{on} / (T_{on} + T_{off})$

In other words  $V_{out}$  is proportional to  $V_{in}$  and the duty cycle of the switching waveform. If we monitor the output voltage and compare against a reference, the error signal can be used to adjust the duty cycle to maintain  $V_{out}$  constant. We have a stabilised step down SMPSU. Remember, the current flowing through the inductor is rising and falling continuously in order to maintain the on and off voltage imposed across it. Since this current forms the load current it must be smoothed. That is the job of the output capacitor. The output  $C$  is not part of the SMPSU process itself; its task is just to smooth the output and prevent the changing inductor current from passing through into the load itself.

The buck-mode converter shown can generate an output voltage that can only be lower than the input. **Figure 2** shows an

alternative arrangement called a 'boost-mode' converter that always generates a voltage higher than the input. During the switch on time, the inductor current builds up just as it did for the buck design. But now, when the switch is off, the current has to flow through the diode directly into the load and there is no upper limit to where that voltage can end up. Since it is in series with, and added to the input,  $V_{out}$  must be higher than  $V_{in}$ . If we continuously operate the switch at a constant rate we again force an average voltage across the inductor of zero, which is only possible if  $V_{in} \cdot T_{on} = (V_{out} - V_{in}) \cdot T_{off}$  or by rearranging  $V_{out} = V_{in} \cdot (T_{on} + T_{off}) / T_{off}$ . Now the output capacitor has a harder task as it has to store the entire energy from the off period and deliver it to the load during  $T_{on}$ . Once again, by feeding back a divided down portion of the output, comparing it against a reference and using this to control the duty cycle of the PWM waveform, a constant stepped up output voltage can be generated. These two topologies form the basis of nearly all SMPSUs. Typical switching frequency in all modern SMPSUs is in the region 25 to 200kHz, with some advanced designs running even higher, even over 1MHz.

### Isolated SMPSUs

What happens if we are not allowed a direct connection between input and output? Such is the case with all mains input SMPSUs, where we must have isolation from the mains input. The solution is to incorporate a transformer inside the module with isolated primary and secondary windings. As we are already switching the PSU at a high frequency, this transformer can be made of ferrite material, which makes it lightweight and small (even for SMPSUs delivering hundreds of watts). **Figure 3** shows a transformer built into a 'buck' converter. The right hand side has the traditional diode, inductor and capacitor arrangement seen before, but there is more than just a transformer here. The extra complexity comes about as the zero mean volt. seconds rule applies equally to transformers as it does to inductors. So, bearing in mind we are supplying the transformer's primary with an arbitrary duty cycle input voltage, we must be able to 'reset' the core during the off period so its mean flux is always zero. Some of the flux is lost in transferring the energy into the secondary winding, and hence out, but there is plenty left. That is the task of the centre tapped winding and the input-side diode. Any residual flux left in the core when the switch is off causes current to flow out of the primary through this diode and back into the supply. When there is no output load all the input is returned to the supply and the SMPSU consumes nearly no power. Since the flux must be allowed to die completely before

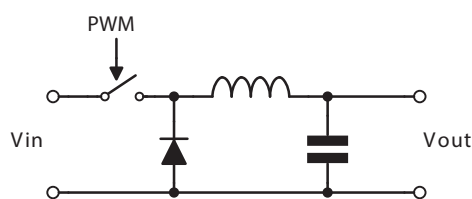


FIGURE 1: Buck mode (step down) SMPSU.

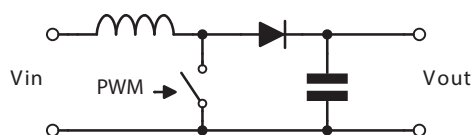


FIGURE 2: Boost mode (step up) SMPSU.

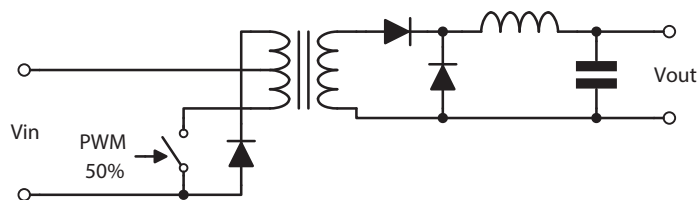


FIGURE 3: Buck mode controller with isolating transformer.

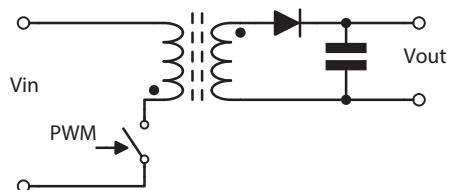


FIGURE 4: Boost controller with isolated inductor windings.

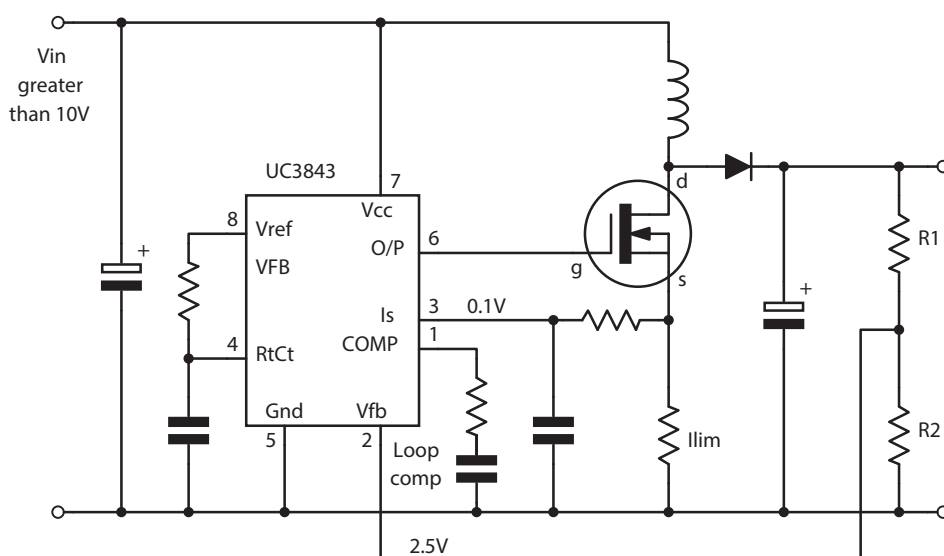


FIGURE 5: Circuitry around the UC3843 SMPSU controller chip.



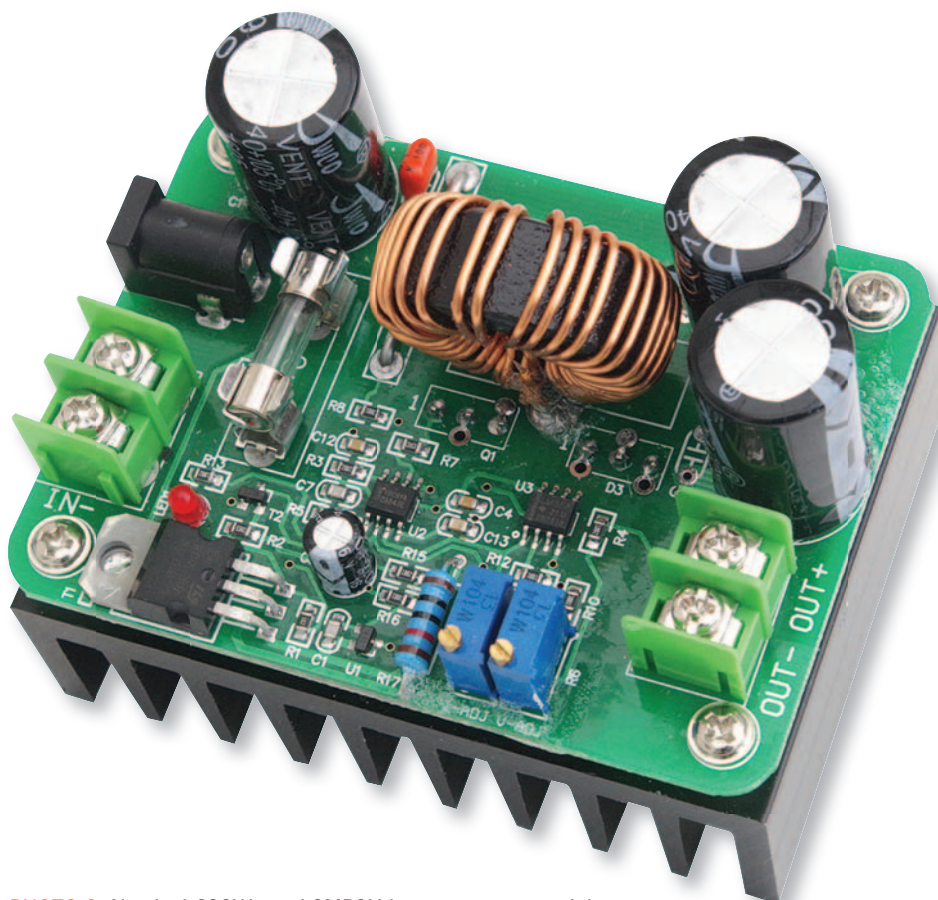
the switch is turned back on, the off period,  $T_{off}$  must be greater than  $T_{on}$ , or duty cycle must always be lower than 50%. While this would have been a major limitation in the simple supply of **Figure 1**, an additional transformer now gives us the luxury of also changing voltages by varying the primary / secondary turns ratio,  $N_p / N_s$ . So now  $V_{out} = V_{in} * T_{on} / (T_{on} + T_{off}) * N_s / N_p$ . With few turns of wire for the secondary output, this makes it ideal for transforming from the typical 320V DC input from rectified mains. Many SMPSU controller chips have options allowing a maximum 50% duty cycle to be forced.

Boost designs can also be used with isolated windings. This gives one of the more elegant and simplest SMPSU concepts. **Figure 4** shows the idea. The switching inductor itself is now made with primary and secondary windings, which opens up all sorts of possibilities as the voltages across the two windings follow the same ratio as they do in transformers. *Please note, though, it is NOT an actual transformer. Inductors and transformers have very different principles of operation.* We can have  $N_s$  lower than  $N_p$ , giving an overall step down. The vast majority of small mains SMPSUs including 'wall-warts' work like this. Or we can make  $N_s$  much higher than  $N_p$ , giving a step-up, and this way we can generate very high output voltages from a battery supply – many kilovolts if we want, provided a suitable high voltage diode and capacitors are used.

Regulation and feedback is made complicated with isolated designs by the need for that isolation. Many small PSUs provide an extra winding on the inductor whose rectified mean output is proportional to  $V_{out}$ , then feed this isolated voltage back to the controller. Another is to use a reference and comparator in the output side and feed the correction back through an opto isolator. This is done in bigger PSUs and many laptop supplies.

### Controller chips

The variable duty cycle switching waveform and voltage feedback comparison is usually performed in a dedicated SMPSU controller chip that also directly drives MOSFET switches. There are hundreds of different types of such chips, but one of the simplest and easy to use in homebrew designs is the UC3842 to UC3845 family of 8 pin devices. **Figure 5** shows a simple non-isolated step up converter using the UC3843. Compare the components to **Figure 2**. In addition to that, there is built in current limiting by monitoring the average (smoothed) input current passing through the FET switch.



**PHOTO 2:** Nominal 600W rated SMPSU boost converter module.

A control system adjusts the duty cycle to ensure a potted-down version of the output (via R1 and R2) is equal to its internal 2.5V reference. Other components are used for loop stability compensation and for setting the basic oscillator frequency. For more details, including help on inductor selection and construction, see the data sheet. Most of the big catalogue suppliers stock this very popular chip series and they usually provide downloadable data sheets.

### Ready made modules

Two non-isolated boost modules suited to a wide range of applications can be seen in **Photo 1** and **Photo 2**. These were obtained from eBay (search using the term 'boost SMPSU module'; they appear to be available from several suppliers). These ones are rated respectively for up to 150 and up to 600 watts. There is a bit of advertising licence here as those power throughputs are only possible towards the maximum rated input voltage. But even so, they seem very capable.

Both modules use the UC3843 chip, with the small module rated for 10 to 35V input and up to 35V output with a maximum input current of 10A. The large one is rated for 10-60V input, up to 80V output and

16A input current. After delivering 28V at 3A for 20 minutes, the smaller one was only running comfortably warm to touch. I had no load sufficient to test the high power one properly.

One example of usage could be for supplying a constant 13.8V from lead acid batteries as they discharge from 13V to 10V. Another, generating a 28V or 50V supply from a nominal 12V input for medium to high power RF PA stages. In this latter application, as the SMPSU module uses a well-known chip type we can get at the voltage feedback control circuitry for our own purposes. How about monitoring reflected RF from the antenna and using it to reduce the PA voltage to protect the device against poor match? Or automatically adjusting PA volts to a linear power amplifier with mean drive level to optimise efficiency and battery life? Or replace the inductor with a dual winding one to make a high voltage PSU for valve equipment?

### EMC and filtering

Now we have seen how SMPSUs work, we should have enough insight and inside knowledge to see how they can be made clean and spurious free, and useable. More on that next time.

# Exciting New Yaesu Field Gear

HF/50 MHz 100 W All Mode Transceiver

## FT-891



Actual Size

## An Innovative Multi-band, Multi-mode Transceiver within an Ultra Compact Body

- Rugged construction in a Compact Mobile Package (W 155 x H 52 x D 218 mm)
- Stable 100 Watts of RF Power Output with efficient Dual Internal Fans
- Legendary Yaesu Receiver Performance
- Triple Conversion receiver with a 1st IF frequency of 69.450 MHz
- 3 kHz Roofing Filter (equipped as standard)
- Detachable Front Panel permits convenient mounting and operation
- Large Dot Matrix LCD display with Rapid Spectrum Scope
- Enhanced Operating Features:
  - Large diameter Main Tuning Dial (41 mm) with Torque adjustment
  - Pop-up Menus for quick and easy operation
  - Large Transmit /Receive indicator
  - Three Programmable Front Panel Function Keys
- Especially designed FC-50 External Antenna Tuner (Option)



# The BBC micro:bit and amateur radio

**The micro:bit is a tiny low cost single board computer that the BBC has developed to inspire children to learn more about programming [1, 2, 3, 4]. It includes a high performance microcontroller (PIC), has USB and Bluetooth functionality, as well as having a built-in magnetometer and accelerometer.**

This article is intended to introduce how the BBC micro:bit will be useful in developing all sorts of interesting projects, especially for young people. I hope it will also be useful for amateur radio club activities. This article shows some simple amateur radio projects. It's not about examples of great coding – I have opted a simple 'get you started approach' – you can, of course, develop the code as much as you wish. **Photo 1** shows a general view of the BBC micro:bit and **Figure 1** identifies the major items.

## The BBC micro

In the 1980s the BBC introduced a microcomputer to teach basic programming skills through their TV series *The Computer Programme*. Along with the ZX81 and various other iconic computers many were inspired to take up a career in programming. Unfortunately, the decades that followed were a poor time for learning programming, with many information and communication technology (ICT) courses simply focusing on how to handle a spreadsheet and write a Word document.

In 2016 the BBC launched the BBC micro:bit to stimulate another explosion of programming enthusiasm and skill in children [1]. The device is now available to buy and so has opened up the devices to a wider audience (eg through the pi-store [2] or on eBay for around £12-14).

The micro:bit is a small PCB that has an edge connector allowing access to many of the microcontroller pins. Three of the chip ports (port 0, 1 and 2), the 0V and +3V are accessible via 4mm holes on the PCB that fit standard banana plugs. A multiway edge connector block can be used to make it easier to connect to the other pins.

There are three switches: switch A and B on the front and a reset switch on the back. The front of the PCB also includes a 5 x 5 pixel LED display that can be used to draw images or scroll messages. The LEDs can not only be switched on and off but can also be adjusted in brightness.

*Elektor* magazine has developed an edge connector PCB that also includes thermometer and barometer devices, accessible via [5]. With their software it converts the micro:bit into a tiny weather station, which might be useful for P or for contest events. If you don't want to use the weather station parts it can still form a useful edge connector to get at the ports of the micro:bit, see **Photo 2**.

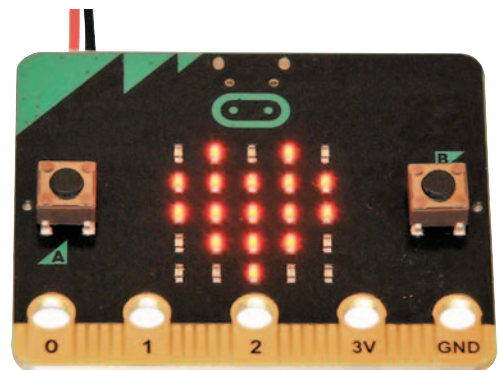
## BBC micro:bit specifications

- PCB size 43 x 52mm
- Nordic nRF51822 16MHz 32-bit ARM Cortex-M0 microcontroller, 256kB flash memory, 16kB static RAM, 2.4GHz Bluetooth Low Energy wireless networking
- NXP/Freescale KL26Z 48MHz ARM Cortex-M0+ core microcontroller
- 3-axis accelerometer sensor
- 3-axis magnetometer sensor (to act as a compass / metal detector)
- microUSB connector
- battery connector
- display consisting of 25 LEDs in a 5x5 array
- I/O includes five x 4mm banana plug ring connectors and 23-pin edge connector, three PWM outputs, 17 GPIO pins, six analogue inputs, serial I/O, SPI, and I<sup>2</sup>C.

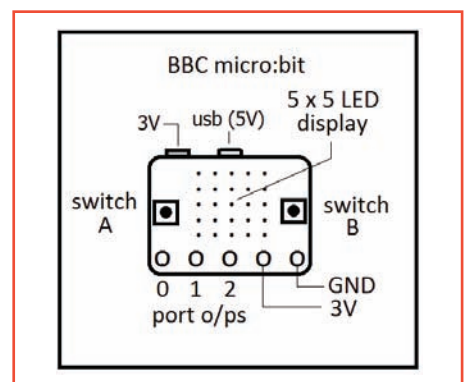
The microcontroller on the micro:bit only has only a relatively small amount of memory space to play with compared to more advanced ICs, however there is still a lot of scope for useful and interesting projects.

## Power requirement

The micro:bit can be powered from the 5V from a USB connection (or other USB type power supply) or by 3V (2 x AAA) via the built-in connector. The microcontroller



**PHOTO 1:** The BBC micro:bit with a penny for scale.



**FIGURE 1:** Diagrammatic view of the BBC micro:bit.

actually runs on 3V so there is an internal regulator / step-down IC. When the micro:bit is running, its LED display takes very little current, and in many circuits takes just a few mA so the power requirements are perfect for battery powered projects.

## Free programming online

The BBC Micro:bit website allows you to program the board in a variety of different languages and styles including Javascript, Microsoft Block Editor, Microsoft Touch develop, and Python (called micro Python). It's all free online [1, 3, 4, 5, 6].

In principle all you have to do to program the micro:bit is to write your program online (or on your computer, see *Mu* editor described later) using one of the options and let the interface convert this into a hex file that can be sent ('flashed') to the micro:bit [1, 3]. You simply plug the micro:bit into a USB port on your computer and the

computer handles everything [1, 2, 3, 4, 5]. While the file is being downloaded to the micro:bit a yellow LED on the back of the PCB rapidly flashes. Once the download has been successful the program automatically runs on the micro:bit, powered from the 5V supply from the USB cable. If there is an error, the micro:bit scrolls a message on its LED display – usually telling you the line number where there may be a problem.

## Python and Mu

You can also download the free Mu application (it does not need installing) that you can use to write micro Python programs on your PC (rather than online) and 'flash' them to your BBC micro:bit board [5]. I have chosen to use the Mu editor in this article. There are a lot nice tutorials to help you start learning Python and a good PDF is shown in the references [4]. Sometimes when you are debugging a circuit, changing the code and so flashing it to the micro:bit time after time, you may get an error. I found that if I cancelled the box that came up (it may take a few clicks), it finally sent the code to the micro:bit all OK.

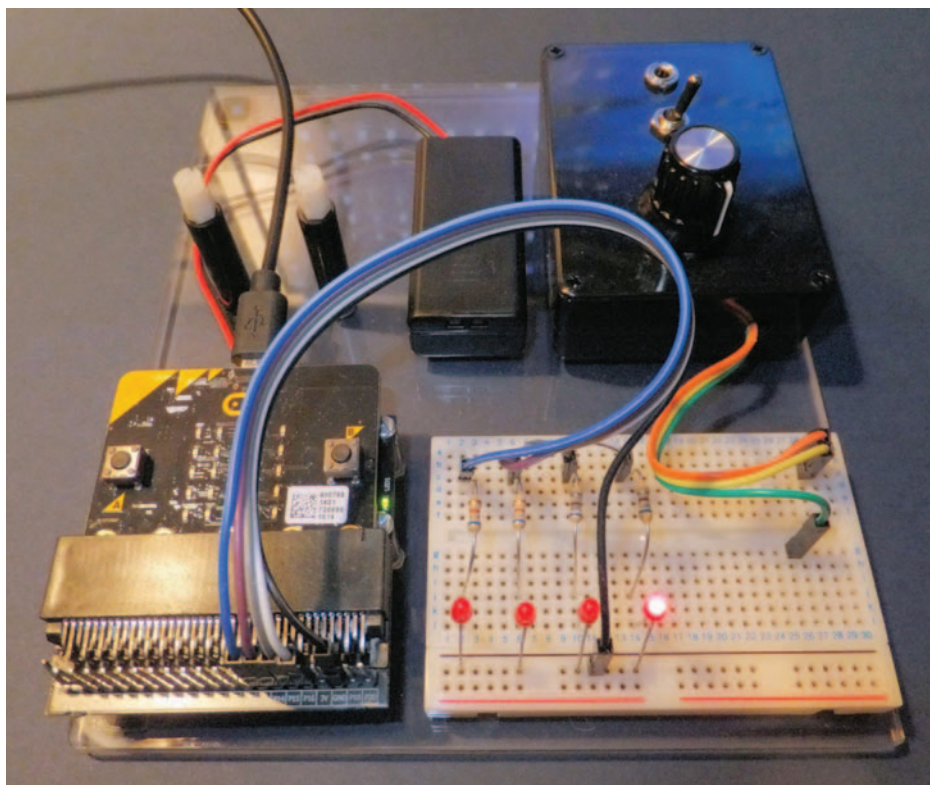
## Where are my files?

The files are sent directly to the micro:bit via the software. When using the Mu editor on my PC [5] I found the micro:bit folder by going from the C drive to →users→???→python (where ??? is a name that is specific for your file system, eg your computer name). Once the program is working I usually go to this folder and copy a version into a separate folder in my Documents folder. If you don't change the file name, any changes you make will be saved over the top of the last version of the software, so it's worth saving versions using different file names to suit.

## Notes on programming

You need to type in the code carefully. The Mu editor is very particular about spaces, as they are important for the whole structure and flow of the code. The two sets of code shown in **Figure 2** are identical apart from a single extra space (on line 5) – but it's enough to stop the program from working! This particular program will flash an LED (and series resistor) connected between port 13 and ground.

The programs described in this article are all very simple and won't win any awards for programming style, but they will get you started. This approach has obvious limitations; when I tried to extend the 'letters' Morse code program (see later) to include the numbers and signs all together, I

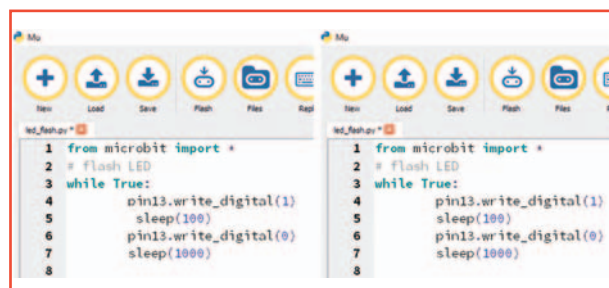


**PHOTO 2:** My experimental micro:bit setup showing the edge connector, breadboard and battery holder (2 x AAA). The black plastic box wires to a stereo 3.5mm socket for headphones, a 1k volume pot and switch for mono / stereo. The two plastic post on the left with two nylon bolts can be used to support the micro:bit via the 4mm holes if the edge connector is not needed.

found it would not 'flash' to the micro:bit, even though I knew each separate program worked OK. I guess there were simply too many 'if' statements, so better quality coding style is needed (probably making use of Python 'dictionaries' etc). I have added notes in the code to help explain. These note are for people who have at least gone through the basic Python tutorials [1, 3, 4, 5].

## Demo / example programs

I have created some demo programs so you can quickly get an idea what the micro:bit can do [5, 7]. For examples there is a program that goes through some of the images the micro:bit can display as well as a simple clock and compass direction images. Load them up into Mu and 'flash' them into the micro:bit to see what they do. If you make any changes to the program it will save them over the top of the original file, so it's worth saving a copy of the original somewhere if you want to go back to it later.



**FIGURE 2:** The extra space on line 5 of the left hand example is sufficient to stop the program working.

## Project 1: micro:bit controls LEDs

The micro:bit board comes with a built in 5 x 5 (= 25) LED display, so it can obviously control LEDs. The code shown in **Figure 2** (the example of the extra space) shows how easy it is to make an LED flash on port 13 say. The edge connector on the PCB has many of the output ports of the microcontroller assessable for you to use. Some are used to control the on-board 5 x 5 display so we will use some of the other 'free' ports.

**Jonathan Hare, G1EXG**  
j.p.hare@sussex.ac.uk



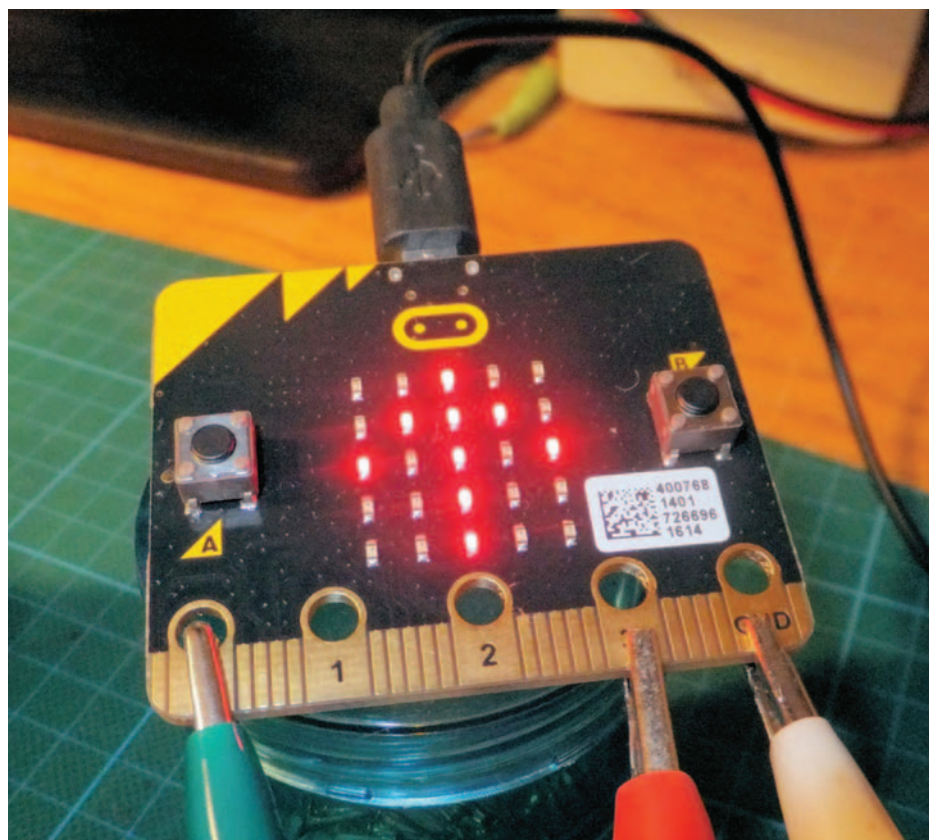


PHOTO 3: Rotator controller readout display (arrow pointing 'north').

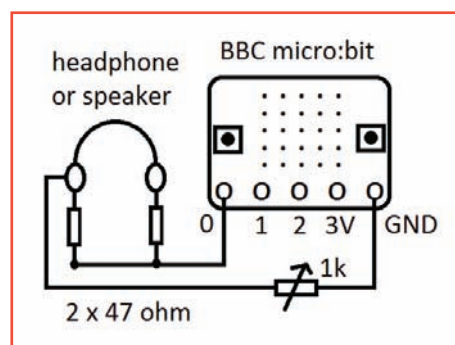


FIGURE 3: Morse demo circuit.

I wired four LEDs to port 13 to port 16 using series resistors (680 ohms) between each pin and LED. You can download the code and take a look at it: it simply lights the LEDs so they chase one after the other up and down the line of LEDs (see my video [7]). You can see that once you have the basic Python code set up it's as easy as 'pin13.write\_digital(1)' to set a port high (3V) or 'pin13.write\_digital(0)' to set low (0V). These outputs can turn things like LEDs on and off but also provide pulse width modulation (PWM) to create analogue outputs and power control etc.

### Project 2: Morse on a micro:bit

I have created three very simple Morse

code programs that you can use to practice listening to Morse code characters: 1) Morse code letters 2) numbers and 3) signs.

The Morse code audio appears on port 0 (pin 0 on the micro:bit, and the earth 0V (GND) of course). This can drive a small loudspeaker (preferably high impedance) or headphones. I fitted a 47 ohm resistor in series with each headphone insert, then put them in parallel and used a series 1k pot as a crude volume control (see Figure 3) via the headphones screened earth connection.

The format is the same with all three programs. The program plays a random Morse character and then leaves a 1 second gap for you to try and recognise the character. The LED displays the character for a second, then clears and the next character plays. This continues for as long as it's powered. The Letters program plays all 26 letters of the alphabet, numbers plays 0, 1...9 and the Signs program plays the Morse code for ., ? = / + and \*.

### Brief explanation of the Morse 'Numbers' Python code

You can download the programs from my website [5] into the MU editor but you should also open in Notepad (which all Windows machines have). Here is a brief explanation of the 'numbers' Morse code program (a part of which is shown in Figure 4).

It starts with the 'import' statements, which instructs extra code to be included so we can make use of the 'random' and 'music' functions later on in the code. The main code is held in a 'While' loop that makes sure that the program keeps repeating itself rather than just running through once.

The code then generates a random number between 0 and 9 using 'random.randrange(9)'. If this generates (say) 3, then the 'if' statement will move the code along so it plays 3 in Morse code. This is done using 'music.play ([ "xx" ])'. If xx is C5:1 the micro:bit will play a C note (of a certain pitch – '5') for a period of one unit – a 'dit' (dot). If we use C5:3 we get a C for three units – a 'dah' (dash). "R.1" creates a gap of one unit between the 'dits' and 'dahs'. 'music.set-tempo (bpm=yyy)' sets the speed of the Morse: 180 is about 12 words per minute. A lower value gives slower Morse, and a higher value, faster.

Note the difference in Python between = (used to assign a value eg bpm=120) and == (used to see if something is equal to something else, eg if answer == 4...) [4].

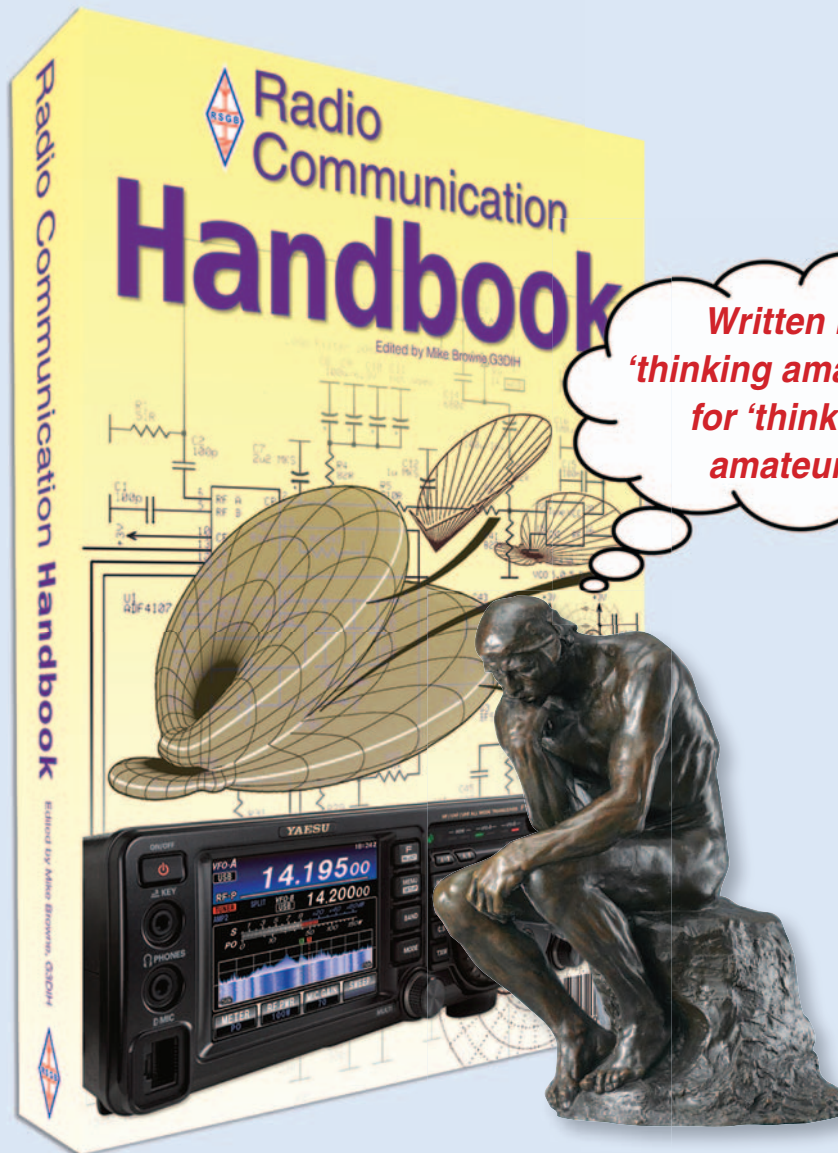
### Project 3: callsign identification

The Worthing Radio Club meets Wednesdays at Lancing Parish Hall. It is really too small a room to have a PA system to help those with hearing difficulties, as it would be uncomfortable for those who can hear well. One of the club members had the idea of asking all those with hearing problems to bring along their 70cm handheld transceivers with an earpiece. Now when we have a presentation the (licenced) speaker has a small 70cm transmitter running low power into a small antenna. This signal can then be picked up by the members' handheld radios and they can adjust their own volume as they require.

To be legal, I used a micro:bit to send the club callsign in Morse every 10 minutes. The LED display shows the current character being sent. The initial tests used 3V (two AAA's) to power the micro:bit but a simple Zener regulator circuit from the handheld supply would also do. I low-pass filtered the micro:bit output and fed the attenuated audio into the mic. line to the transmitter. It sends the club callsign every 10 minutes, but you can of course modify the code to send your own club callsign. Such a simple device could be used as the basis of simple beacons or test transmitters etc.

### Project 4: rotator controller readout

Some of the micro:bit ports can accept analogue voltage inputs (0 – 3V), converting them to a value between 0 – 1023. Here I make use of this in a very simple and basic



**NEW  
TITLE**

## RSGB Radio Communication Handbook

Edited by Mike Browne, G3DIH

Since 1938 the RSGB has published the *RSGB Radio Communication Handbook* and it remains one of the most enduring guides in the world to amateur radio technology and practice.

As always, this new edition of the *RSGB Radio Communication Handbook* has been updated, rewritten and provides an invaluable guide to amateur radio theory and practice. With around 600,000 words, 2000 illustrations and diagrams in 25 chapters and two appendices in 864 pages it covers the breadth of amateur radio.

Readers will find explanations from the basic components of amateur radio to semi-conductors through oscillators, amplifiers, mixers, transmitters, receivers and even a complete transceiver project. There are chapters covering design and practice in VHF/UHF, Microwaves and frequencies below 1MHz. *RSGB Radio Communication Handbook* does not stop here and you will find chapters dedicated to propagation, antenna basics and transmission lines. Antenna design is not forgotten and you will find whole chapters dedicated to practical antennas for HF, VHF/UHF and Microwaves. There are further chapters covering a wide range of topics from Morse code, Data communications, EMC, Measurement & Test Equipment and even practical guides to the 'the great outdoors' and 'construction and workshop practice'.

You will find hundreds of pages packed with the distilled knowledge and experience of acknowledged experts on each topic. In amateur radio there is always plenty to learn and this book is the ideal way to expand your knowledge on your favourite activity, or to discover and explore something new. Whatever you use it for, the *RSGB Radio Communication Handbook* will become a valuable tool that helps you get the very best out of amateur radio.

**Written by 'thinking amateurs', for 'thinking amateurs' the RSGB Radio Communication Handbook is simply the book that every radio amateur should have.**

210x297mm 864 pages, ISBN: 9781 9101 9326 6

**Non Members' Price: £29.99**

**RSGB Members' Price: £24.99**

**NEW  
LOWER  
PRICE**



**Radio Society of Great Britain [www.rsgbshop.org](http://www.rsgbshop.org)**

3 Abbey Court, Priory Business Park, Bedford, MK44 3WH.

Tel: 01234 832 700 Fax: 01234 831 496

**FREE P&P**  
on orders over £30. See Page 78

**E&OE** (All prices shown plus p&p)





## Find New Pleasure in Creating Your Own Unique Voice

Ultimate  
Reference  
Microphone

# M-1

Revolutionary dual microphone configuration features both dynamic and condenser components

Nine-band graphic equalizer for each microphone element

TBC (Treble Boost Cowling) produces a unique tonal texture

PTT key with smooth operating air cylinder construction



### «Uncompromising attention to detail»

- ⊕ Solid aluminum die cast mic stand
- ⊕ High visibility On Air LED
- ⊕ Large display (featuring anti-reflective AR coating)
- ⊕ Built-in record and playback feature
- ⊕ Headphone output for real-time monitoring
- ⊕ Built-in one-click Low-Cut filter
- ⊕ Cannon-type (XLR) Output
- ⊕ One-touch PTT keylock

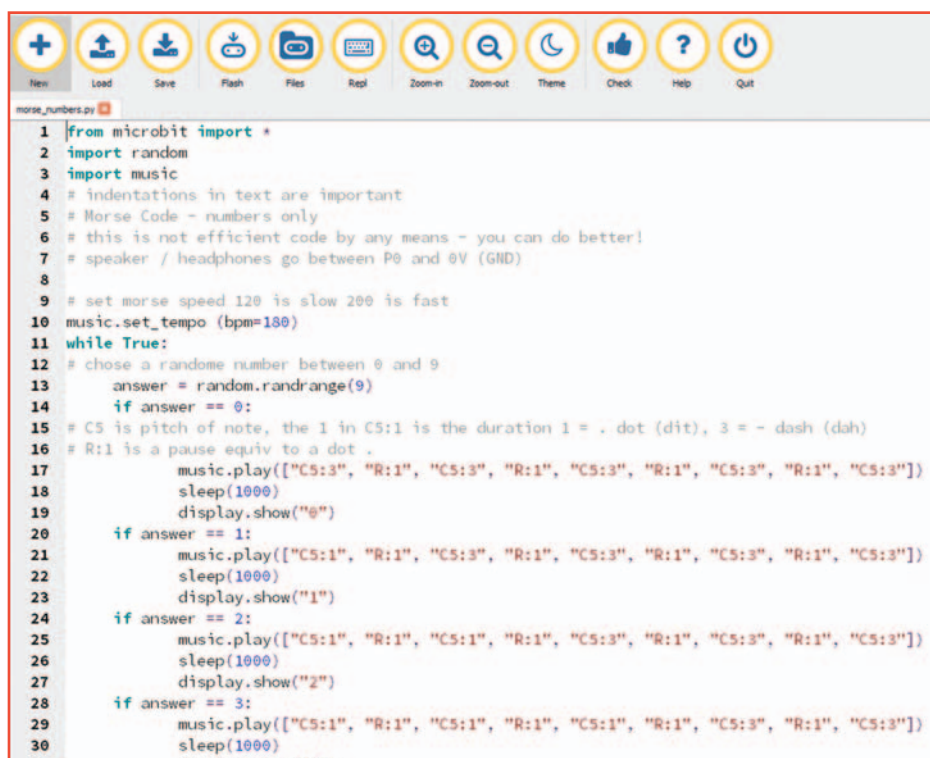


FIGURE 4: A section of the Numbers program.



FIGURE 5: Code to scroll the micro:bit temperature across the screen every second.

antenna rotator display. If you are controlling something like a 2 element beam, which is not too directional, this display would be adequate. I often turn my beam into the direction of a station and then I peak the position for maximum signal. In this case a very accurate beam heading is not required – just a rough idea of the beam heading. As the rotator moves around its rough position is mirrored on the micro:bit display. I have put together a video about the micro:bit and you can see the rotator display in action on my YouTube video [7].

Many rotators have a potentiometer built into the rotator housing that provides position information voltage back to the controller down in the radio room. I used the

3V supply from the micro:bit to go to the 'ends' of the rotator potentiometer and sent the wiper signal to the micro:bit analogue input (port 0). It would be worth putting a low pass filter (eg a 22k resistor and 0.22µF capacitor) on the micro:bit input to reduce mains pickup and RF voltages causing problems.

The code converts the voltage reading into the corresponding arrow images showing the eight positions of the compass: N, NE, E, SE, S, SW, W, NW... and back to N again. The software simply checks the range of the voltage and displays the appropriate arrow, ie if the voltage input is between 0 and 64 show 'north' or UP arrow, 65 to 192 for NE etc. Each step is about

128 units except the two north headings that share 64 each 'end'. I haven't built in any hysteresis when checking the voltage so the display may jitter around if the rotator position just happens to be on transition from one compass heading to the neighbour (ie if the wind is blowing the rotator from side to side). **Photo 3** shows the display.

The N bearing being shared at 0 and 360 degree means the range of voltage detection in the code is slightly different from the other headings.

If the micro:bit display moves in the opposite way to the rotator then simply reverse the 0 and 3V connections to the rotator pot. If your rotator 'stop' position is in a different place, you can of course change the code to suit your particular setup, or even just rotate the position of the micro:bit display!

### Project X: interesting things

There are all sorts of exciting things the micro:bit can do and I recommend you read the online information [4] and go through the simple tutorials (it's worth making sure you have the latest version and I will try and keep the link on my web page up to date [5]). The board has an accelerometer and a magnetometer and there is even an on-board thermometer that you can access. The code in **Figure 5** shows you how simple it is to access these functions – it scrolls the micro:bit temperature across the screen every second.

### Other bits(!)

I will continue to develop projects with the micro:bit but I am also happy to post your ideas and code so we can build an archive for everyone to use – so if you are inspired to experiment with the micro:bit, do send me your code :-)

I would like to thank Alan, G4GNX and Phil, G4UDU from the Worthing club for their help during the preparation of this article.

### Websearch

- [1] BBC micro:bit – <https://www.microbit.co.uk/>
- [2] <https://thepihut.com/collections/microbit/products/micro-bit>
- [3] a good beginners book: *micro:bit basics* by Tony Loton, 2016. ISBN 9781537331010
- [4] <https://media.readthedocs.org/pdf/microbit-micropython/latest/microbit-micropython.pdf>
- [5] G1EXG's BBC micro:bit page – [www.creative-science.org.uk/bbcmicrobit.html](http://www.creative-science.org.uk/bbcmicrobit.html)
- [6] Python Mu editor for the PC – <http://codewith.mu/>
- [7] My Youtube channel, [www.youtube.com/watch?v=WmI9QreKvm0](http://www.youtube.com/watch?v=WmI9QreKvm0)



# The WEEE

## (Waste Electrical and Electronic Equipment) Directive and Disposal of Old Electronic Equipment

**The intention of this short article is to bring the attention of Members to regulations regarding the disposal of old equipment and components, some of which contain material that is now classed as 'Hazardous Waste', while most equipment is no longer disposable as 'Household Waste' ie should not put in the dustbin.**

The fastest growing area of waste within the EU, and possibly in the world, is electronic and electrical waste – old computers, washing machines, refrigerators, freezers, microwave ovens, TV sets, electronic games, radio receivers as well electronic test equipment and, at a lower level, amateur equipment. Some of the especially older amateur and surplus equipment is a bigger hazard than might be envisaged because it contains 'Hazardous Waste'. This includes components and equipment containing carcinogens or potential carcinogenic materials such as poly chlorinated or poly brominated biphenyls (PCB and PBB), asbestos and beryllium oxide as well as heavy metals such as lead, mercury, gold and cadmium that could, as salts, contaminate the drinking water supply, and it is not permissible to dispose of such material as normal household waste.

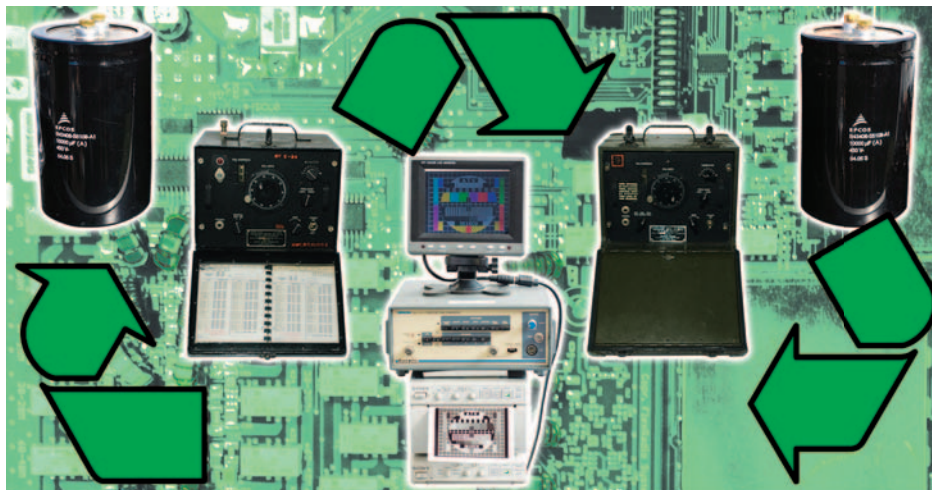
Although the UK is intending to leave the EU, it is very likely that the regulations will still be applied, especially with the increasing amount of waste equipment being scrapped, in many cases because spare parts are no longer available.

More modern equipment still needs to be disposed of as WEEE, although the definition of EEE is equipment 'with a voltage rating of less than 1000 volts AC or 1500 volts DC' – so it could be argued that an amplifier with an operating anode voltage of 2kV is not EEE!

Solid state transceivers and transmitters may have RF power transistors containing beryllium oxide, and these should be marked as 'Hazardous – Sealed Parts containing Beryllium Oxide'. Any failed transistors should be placed in doubled sealed plastic bags and marked in the same way.

Disposal of batteries, especially NiCd, is best done at a battery recycling point – these are often to be found in the larger supermarkets. Batteries are **not** covered by the WEEE Directive but by a separate Battery Directive.

For those who have collected lots of older equipment over the years, disposal may need to be considered by those responsible for clearing out the shack after the operator is no longer able to



Regulation regarding the disposal of old equipment and components has tightened up.

do so. It is important to ensure that people doing that are aware of the requirements under the WEEE Directive. Waste electrical and electronic equipment can be disposed of at a Household Waste Centre in the area designated for WEEE material, but it needs to be made clear at the time that the items may contain Hazardous Waste. Items with CRTs are generally treated separately at a Household Waste site because of the danger of implosions if just 'heaved into a skip', and although an item may not look like a TV set or a computer monitor, it should have a label identifying it as containing a CRT.

Oil filled transformers and chokes, wartime American 'bathtub' metal cased capacitors and metal cased paper capacitors can contain PBBs or PCBs and so should be packaged in some way that the cans cannot be punctured. Mercury vapour rectifiers, examples being any of the 866 family, 872, 83, RG1-240A, Marconi/Osram GU1, GU5, GU7, GU8, GU11, GU20/21 should be carefully packed so that they cannot be broken and the package should be marked as containing mercury. Note that the similar 3B28 and GXU1 valves are xenon filled, and so are not hazardous if broken – provided nobody cuts themselves on the glass!

Certain military surplus may contain meters that had luminous scales: the dual pointer meter for the WW2 beam approach equipment is an example, and although quite safe if the glass is unbroken, these are radioactive and the dust from flaking luminous paint is a hazard. Incidentally, the cross pointer R1155 D/F meter is not in this category. Other military equipment with luminous markings may similarly be a hazard: also some older voltage regulator valves, radar T/R cells and the like contain small amounts of radioactive

material to ensure rapid 'striking' in the dark, but they should be marked with the usual radioactive symbol. More information can be found at [1]. Such items should be identified when taken to a Household Waste Disposal Centre

It is vaguely possible that some WW2 IFF and radar equipment is still around which, by mistake, did not have the demolition charges disabled before being released onto the surplus market. Some years back, a garden shed in west London was demolished in an explosion caused by deterioration of such charges. Should it be suspected that one of these is present, do not touch and contact the police as a matter of urgency.

In conclusion, irresponsible disposal of old equipment and components can lead to a number of problems, some of them of a legal nature and should be avoided. WEEE Disposal is required to be free under the terms of the Directive.

### Thanks

The author is grateful to Phil Williams, G6AQP and Greg Logelain of the Chartered Institution of Wastes Management for their technical assistance in the preparation of this article.

### Websearch

[1] [www.orau.org/ptp/collection/consumer%20products/electrontubes.htm](http://www.orau.org/ptp/collection/consumer%20products/electrontubes.htm)

**Peter E Chadwick,  
Sen. MIEEE, G3RZP  
g8on@btinternet.com**

# Contesting in 2017

Feature

**In 2017 much of the work of the 2015 Presidential Review of Contesting and the changes subsequently agreed will be implemented. It won't be a case of 'all change', but there will certainly be significant change.**

Discussions and suggestions at the Contesting Forums held at the RSGB Convention in October (Photo 1) also had a bearing on how rule and event changes were decided on.

## VHF

There are big changes at VHF.

The nights of some **UKACs** will change. This is for two reasons. Firstly it is to stop the 6m UKAC always clashing with the SHF UKAC; and secondly so that there will be a 4m UKAC session every month. The latter will coincide with the Continental NAC 4m contests. Before I lay out the new (generic) calendar for the UKACs, I need to mention that a new series of **Low Power FM contests** is being introduced. Each session will run for one hour, ahead of the 4m, 2m and 70cm UKACs. The aim here is to attract new blood into contesting.

The new calendar for the UKACs will be:

- 1st Tuesday: 1900-2000 Low Power 2m FM  
2000-2230 2m UKAC
- 2nd Tuesday: 1900-2000 Low Power 70cm FM  
2000-2230 70cm UKAC
- 2nd Thursday: 2000-2230 6m UKAC
- 3rd Tuesday: 2000-2230 23cm UKAC
- 3rd Thursday: 1900-2000 Low Power 4m FM  
2000-2230 4m UKAC
- 4th Tuesday: 2000-2230 SHF UKAC  
(different bands at different times)

The UKAC scoring system for 2017 has been posted on the VHFCC website (<http://www.rsgbcc.org/hf/information/vhfcc-2016survey-output.pdf>). To give weekend contests a boost there will be a new element of the VHF Championship for clubs, where the score from every individual from a club entering the major weekend contests will count towards a club award.

## HF

Firstly, the General Rules will disappear. Henceforth each contest will have its own set of rules. It wasn't many years ago that the submission times for logs were reduced to their current figure, but for 2017 they are being further reduced. For short contests, logs are now due by the end of the day following the contest, while logs for longer contests will be due within five days of the end of the contest. Special contest



**PHOTO 1:** The contesting trophies prior to their presentation at the RSGB Convention. Courtesy G6XSY.

callsigns or club callsigns may be used in all RSGB HF Contests from 2017. The HFCC Adjudication Principles that were published in April 2016 will be implemented for 2017. This means most contests will have penalties for busted QSOs. These can be found under the Info tab on the HFCC web pages. Logs from previous contests from 2016 onwards are available for you to download, so now it is possible to compare your performance against others.

Now, let's look at some specific events.

**CW AFS** and **SSB AFS** will have separate sections for 400W, 100W and 10W entries. Scores will not be normalised by band or power. There will no longer be a restriction on operating on both bands, except that only one signal may be transmitted at a time.

**1.8MHz AFS** (Club Calls Contest) will become dual mode – SSB and CW – and will be scored with a multiplier for each Club HQ plus the first member of each Club you contact.

In the datamodes sessions of the **3.5MHz Club Championship** contests the scores will no longer be normalised for PSK and RTTY.

In the two **1.8MHz contests** additional district codes have been added for Northern Ireland.

In the **Commonwealth Contest** up to seven separate UK&CD 'HQ' stations are permitted to be active – and they can be contacted for points and bonuses by all UK&CD stations on all five contest bands.

Penalties will not be applied in the **RoLo Contests**, because it is important for adjudication that a complete record of all QSOs is maintained.

The rules for **Field Days** (CW and SSB) have been changed substantially, in accordance with the results of a survey of participants held in

May 2016. The rules of the events have been harmonised and a Fixed Station section has been introduced. DXCC multipliers will be used in both events. Importantly, the equipment requirements for both CW and SSB Field Days have been made the same. HFCC hope this will encourage clubs to enter both.

In the **IOTA Contest**, band change restrictions have been removed for Multi-Op stations.

Because of poor propagation and poor support, the **International DX Contest** is being suspended until an appropriate point in the next sunspot cycle. The **International Sprints** are being wound-up completely, as are the **80m Club Sprints**. A new autumn Club series is required and HFCC is inviting suggestions for it. It is likely, but not necessary, to be an 80m event using CW and SSB, with two one hour sessions in each of the months from August to November (on the second Wednesday and fourth Thursday evenings). The event should include a club-based element and should be aimed to encourage participation and mentoring of contesters. The series will include an activity on Sunday 8 October, while the **DX Contest** is suspended. HFCC will select a number of suggestions and conduct a poll to select the new series. If you have any ideas, they need not be fully worked out, but HFCC needs to have heard from you by 31 January for them to be considered. Please e-mail [hfcc.chair@rsgbcc.org](mailto:hfcc.chair@rsgbcc.org)

**Steve White, G3ZVW**  
[steve.g3zvz@gmail.com](mailto:steve.g3zvz@gmail.com)



# MOONRAKER

Radio Communications Manufacturer and Reseller

Moonraker UK Limited  
Cranfield Road  
Woburn Sands  
Bucks MK17 8UR  
Open Mon-Fri 9-5:30pm

Sales Line 01908 281705

E-mail: sales@moonraker.eu

Web: www.moonraker.eu

PayPal

VISA

MasterCard

Sign up to our **NEWSLETTER**  
to get amazing subscriber only deals  
• lots of offers have been less than **HALF PRICE**  
• 20,000+ subscribers and growing

**SIGN UP TODAY!**

**wouxun**

Authorised dealer

**KG-UV950P** Quad band 10/6/2/70 up to 50W...£249.95 **now just £239.95**

**KG-UV950PL** Quad band 6/4/2/70 utilising the now popular 4m band.....£269.95 **now just £249.95**

**KG-UV9D** Pro-Pack Complete Radio Kit.  
A complete handheld kit with every accessory you could ever need..... **just £149.95**

**Wouxun W0/PC0-003** Software lead for mobiles  
..... **£19.94**

**Wouxun W0/PS0-110** Software lead for handies  
..... **£20.50**



**KENWOOD**

Authorised dealer

**NEW IN NEW IN NEW IN NEW IN**

**TH-D74E VHF/UHF Digital transceiver with D-Star**  
**In stock now £599.95**

This Dual Band Amateur radio is packed with convenient features and the advantage of a digital transceiver with D-STAR, APRS/NAVITRA support. Featuring colour transflexive TFT display that offers excellent visibility in day or night. Plus, built-in GPS and Bluetooth support, as well as Micro USB and microSD/SDHC this radio is ready to harness the exciting developments in radio communications.



**YAESU**

Authorised dealer

## Hand-helds

**FT-2DE C4FM/FM** dual band digital handheld with 1.7" high resolution touch screen display.. **our price £419.99**

**FT-1XDE C4FM/FDMA** dual band digital handheld with 3 digital and 1 analogue mode, V/D, Data FR and Voice FR all at great Moonraker price..... **our price £329.00**

**VX-8DE** Tri-band Handheld for 6/2/70cm with GPS/APRS and wideband RX..... **our price £269.99**

**VX-6E** Dual Band Handheld for 2/70cm 5 watts..... **our price £199.99**

**VX-3E** Dual band 2/70cm RX 0.5-999MHz, 3 Watts output..... **our price £159.00**

**FT-60E** Probably the best dual band handle on the market..... **our price £129.00**



## Mobiles

**FTM-400XDE** dual band digital mobile with 3 digital and 1 analogue mode, V/D, date FR and Voice FR mode all at a great..... **our price £519.00**

**FTM-100DE** Digital Dual Band Mobile Transceiver with C4FM & FM144/430 with 50W out at..... **our price £299.00**

**FT-8900R** Quad band 10/6/2/70cm 28-430MHz, 50 Watts output..... **our price £319.99**

**FT-8800E** Dual band 2/70cm RX 10-999MHz, 50 Watts output..... **our price £299.99**

**FT-7900E** Dual band 2/70cm 50/40 Watts with wideband RX..... **our price £249.99**

**FTM-3200DE** is a ruggedly built yet compact C4FM/FM VHF mobile transceiver, providing high output power of up to 65 Watts to ensure stable long-distance communications..... **our price £199.99**

**FTM-3100DE** 144MHz 65W FM Single band analog mobile transceiver rugged & compact 2m mobile with front speaker..... **our price £149.00**

All Yaesu accessories in stock on line at [www.moonraker.eu](http://www.moonraker.eu)

## HF Transceivers

The **FT-991** is the next generation in all mode, all band MF/HF/VHF/UHF transceiver with C4FM (System Fusion) Digital capability. The FT-991 includes multi-mode operation on CW, AM, FM, SSB, and Digital Modes (Packet, PSK31, RTTY and C4FM), with 100 Watts of HF/50MHz Capability (50 Watts VHF/UHF). **Our price £949.00 (A version £1299.00)**

**FT-817ND** The world's first self-contained, battery-powered, Multi-mode Portable Transceiver covering the HF, VHF, and UHF bands. Providing up to five watts of power output, the FT-817 is designed for operation on the 160-10 meter HF bands, plus the 6 metre, 2 metre, and 70 cm bands. **Our price £599.99**

**FT-857D** is the world's smallest HF/VHF/UHF mobile transceiver and provides base station-type performance from an ultra-compact package that's ideal for mobile or external battery portable a work. **Our price £799.00**

**FT-450D** is a compact yet superb HF/50MHz radio with state-of-the-art IF DSP technology configured to provide World Class performance in an easy to operate package. Suitable for all applications; beginners, casual operators, enthusiasts, portable/field users and emergency service providers at all a new low low price. **Our price £599.00**

**FT-DX1200** provides up to 100 Watts on SSB, CW, FM, and AM (25 Watts carrier) and a rugged state of the art highly balanced receiver circuit configuration for top performance on today's crowded bands. Similar to the high-end "YAESU FT DX" series, it uses 32-bit high speed floating point DSP for renowned proven performance and at an amazing low price. **Our price £1049.00** (with and extra **£85 cashback** from Yaesu UK)



**NEW IN NEW IN NEW IN NEW IN**

**FT-891 HF/6 All Mode Transceiver - Buy from stock now £689.00!**

The NEW FT-891 offers up to 100 Watts of HF/6m output power with efficient dual internal fans, coupled with Yaesu's legendary receiver design, triple conversation with a 1st IF frequency of 69.450MHz for really outstanding performance.



The **ICOM IC-7300** has landed HF/ 6 & 4m Transceiver **at just £1199.95**

The IC-7300 is a revolutionary compact radio that will excite HF operators from beginners to experts. This new model has a high-performance real-time spectrum scope and employs a new RF direct sampling system. The IC-7300's real-time spectrum scope provides top-level performance in resolution, sweep speed and dynamic range. While listening to received audio, the operator can check the real-time spectrum scope and quickly move to the intended signal. The combination of the real-time spectrum scope and waterfall function improves the quality and efficiency of HF operation. The new RF direct sampling system employed by the IC-7300 realises class leading RMDR (Reciprocal Mixing Dynamic Range) and Phase Noise characteristics. In addition, the IC-7300 features the 70MHz band (European versions only), a large touch screen colour TFT LCD, convenient multi-function dial knob, automatic antenna tuner, voice recorder function and more.



Authorised dealer

**BAOFENG** 寶鋒

Authorised dealer

The every growing Baofeng family - Quality products at amazing low low prices

**UV-5RC PLUS** Amazing dual band handle. Full 4.5 Watts, 136-174/400-470MHz plus 65-108MHz RX comes complete with desktop charger, antenna, belt clip, and an amazing 1800mAh battery as standard and that's not the best bit £49.95..... **Now just £29.99!!**



**ALINCO** New products arrive at Moonraker

**New Alinco DR-735E 2/70cm Dual Band Transceiver..... £299.95**

Full Duplex, Extended RX 108 - 174 MHz, 400 - 479 MHz, Large Display with "rainbow" of colour options, 1,000 Memories, Scan facility, Power 50/20/5w output, Computer programmable with free downloadable software, Internal duplexer allows single antenna socket for dual band antennas.



**Alinco DJ-MD40 UHF Digital and analogue FM Handheld Transceiver..... £179.99**

The Alinco DJ-MD40 Handheld Transceiver is built to commercial standards, being both rugged, dust and splash proof (to IP54 standard).

The radio covers 400 to 480 MHz and will work on both analogue FM and DMR digital modes.

Output power is selectable from: 5, 2.5, 1 or 0.2 watts.

**Alinco DM-30E Switch Mode Power Supply..... £89.95**

This CE-Approved, affordable switching power supply packs a lot of features into an ultra-compact, lightweight design that features 9-15VDC variable output and delivers up to 20A continuous, 30A peak. Convenient for radio users, the Noise Offset Circuit moves unwanted switching noise to another frequency. Other features include a large illuminated digital Volt/Amp meter, rear panel binding posts (30A peak/a pair), front panel quick terminals (5A peak/a pair, banana for E, Anderson power Poles for T), voltage adjust (9-15V) or fixed at 13.8V, ripple less than 80mVp-p and triple circuit protection for short-circuit, over temperature, and current limiting.



**MOONRAKER**

**Moonraker MT-270 25W dual band mobile transceiver..... at an incredible £79.95**

Now over 600 units sold and counting, amazing radio at an amazing price with all the basic features you need to get up and mobile

**Frequency:** 136-174, 400-480MHz  
**Channels:** 200

**Channel Spacing:** 25KHz, 20KHz, 12.5KHz

**Phase Lock Step:** 5KHz, 6.25KHz, 10KHz, 12.5KHz, 15KHz, 25KHz

**Working Voltage:** 13.8V DC CTCSS, DCS, 5 Tone, 2 Tone, DTMF

**Size:** 90(W) x 35(H) x 118 (D) mm Weight 408g



**LEXION**

**VV-898 Dual Band Mobile Transceiver**

What a great entry level dual band rig, with only 10 Watts it is ideal for the new foundation pass holders. Comes complete with radio bracket and keypad microphone - all for a price you just won't believe **Moonraker Super Special**

**£99.95**  
**Now £59.95!**



**PRICE MATCH!** Due to Brexit prices are going up weekly! But massive stocks mean we still have some stock at old prices - Call or email us now for the **BEST DEAL** around **Visit us now at [www.moonraker.eu](http://www.moonraker.eu)**



# A very Merry Christmas to all our customers now and in the future!

We look forward to serving you again in 2017



Chris Taylor GOWTZ joins the ever expanding Moonraker Team – after spending over three decades in the industry we are pleased to have him on board. If you know Chris why not call for a catch up, or drop him an email at [chris@moonraker.eu](mailto:chris@moonraker.eu) I am sure he will be glad to hear from you

## Cable

RG58 Standard, 5mm, 50 ohm, per metre	£0.35
RG58-DRUM-50 Standard, 5mm, 50 ohm, 50m reel	£14.95
RG58-DRUM-100 Standard, 5mm, 50 ohm, 100m reel	£24.95
RG58M Mil spec, 5mm, 50 ohm, per metre (best seller)	£0.60
RG58M-DRUM-50 new 50m reel of mil spec RG58 in a great handy size only	£24.95
RG58M-DRUM-100 Mil spec, 5mm, 50 ohm, 100m reel	£44.95
RGMINI8 Mil spec, 7mm, 50 ohm, in grey per metre (amateur favourite)	£0.75
RGMINI8-DRUM-100 Mil spec, 7mm, 50 ohm, in grey 100m reel	£64.95
RG213 Mil spec, 9mm, 50 ohm, per metre	£1.30
RG213-DRUM-50 Mil spec, 9mm, 50 ohm, 50m reel	£59.95
RG213-DRUM-100 Mil spec, 9mm, 50 ohm, 100m reel	£109.95
WESTFLEX103 Mil spec, 10mm, 50 ohm, per metre	£1.50
WESTFLEX-DRUM-50 Mil spec, 10mm, 50 ohm, 50m reel	£69.95
WESTFLEX103-DRUM-100 Mil spec, 10mm, 50 ohm, 100m reel	£129.95
300-20M Ladder Ribbon, best USA quality, 300 ohm, 20m pack	£17.95
300-DRUM Ladder Ribbon, best USA quality, 300 ohm, 100m reel	£69.95
450-20M Ladder Ribbon, best USA quality, 450 ohm, 20m pack	£19.95
450-DRUM Ladder Ribbon, best USA quality, 450 ohm, 100m reel	£79.95

## Antenna Wire

Perfect for making your own antennas, traps, long wire aerials etc.

SEW-50 Multi stranded PVC covered wire, 1.2mm	£19.95
SCW-50 Enamelled copper wire, 1.5mm	£24.95
HCW-50 Hard Drawn bare copper wire, 1.5mm	£29.95
CCS-50 Genuine Copperweld copper clad steel, 1.6mm	£29.95
FW-50 Original Flexweave bare copper wire, 2mm	£34.95
FWPVC-50 Original clear PVC covered copper wire, 4mm	£44.95
FW-100 Original high quality flexweave antenna wire, 100m reel	£59.95
FWPVC-100 Original PVC coated flexweave antenna wire, 4mm, 100m reel	£79.95

## Rigging Accessories

Get rigged up, for full list of all options visit our website!

PULLEY-2 Adjustable pulley wheel for wire antennas, suits all types of rope	£24.95
GUYKIT-HD10 Complete heavy duty adjustable guying kit to suit up to 40ft masts	£54.95
GUYKIT-P10 Complete light duty/portable guying kit to suit up to 40ft masts	£39.95
SPIDER-3 Fixed 3 point mast collar for guy ropes	£5.95
SPIDER-4 Fixed 4 point mast collar for guy ropes	£6.95
PTP-20 Pole to pole mast to clamp up to 2" to 2"	£5.95
DPC-W Wire dipole centre to suit either 300 or 450ohm ladder line	£5.95
DPC-S Wire dipole centre to suit SO239 to suit cable feed connections	£6.95
DPC-A Dipole centre to suit 1/2 inch aluminium tube with terminal connections	£7.95
DPC-38 Dipole centre with SO239 socket with two 3/8th sockets to make mobile dipole	£6.95
DOGBONE-S Small ribbed wire insulator	£1.00
DOGBONE-L Large ribbed wire insulator	£1.50
DOGBONE-C Small ceramic wire insulator	£1.20
EARTHROD-C 4ft copper earth rod and clamp	£24.95
EARTHROD-CP 4ft copper plated earth rod and clamp	£16.95
ESRV-ES In-line SO239 replacement socket for 300 or 450 ohm ladder line	£6.95
AMA-10 Self amalgamating tape for connection joints, 10m length	£7.50

## Mounting Hardware & Clamps

We have all the mounting brackets you could possibly want - for all options see our website

TRIPOD-HDA Free standing, heavy duty, fold away tripod, which adjusts from 50-65mm	£149.95
TRIPOD-25L Free standing heavy duty tripod to suit masts 65mm or less	£79.95
TRIPOD-20L Free standing heavy duty tripod to suit masts 2 inch or less	£74.95
TRIPOD-15L Free standing heavy duty tripod to suit masts 1.5 inch or less	£69.95
TK-24 Heavy duty galvanised pair of T & K brackets, 24 inches total length	£29.95
TK-18 Heavy duty galvanised pair of T & K brackets, 18 inches total length	£24.95
TK-12 Heavy duty galvanised pair of T & K brackets, 12 inches total length	£19.95
SD-9 Heavy duty galvanised single stand off bracket, 9 inches total length	£9.95
SD-6 Heavy duty galvanised single stand off bracket, 9 inches total length	£6.95
CHIM-D Heavy duty galvanised chimney lashing kit with all fixings, suitable for upto 2 inch	£24.95
CAR-PLATE Drive on bracket with vertical up stand to suit 1.5 or 2" mounting pole	£24.95
CROSS-2 Heavy duty cross over plate to suit 1.5 to 2" vertical to horizontal pole	£14.95
JOIN-200 Heavy duty 8 nut joining sleeve to connect 2 X 2" poles together	£19.95
PTM-S Pole mounting bracket with SO239 for mobile whips, suits upto 2" pole	£19.95

## RM Linear

These superb linear amps have just arrived from Italy, great range to suit all bands and at realistic prices. In stock now!

### HF Linear

NEW DESIGN BLA 350 mains powered solid state amplifier with a 300W output covering top band to 10m

£649.95 now just £599.95

HLA 305V 12v 250W Professional Wideband HF 1.8-30MHz Amplifier with LCD. With LCD and built in fans

£599.95

HLA 305 12v 250W Professional Wideband HF 1.8 - 30MHz Amplifier with LCD but without fans

£579.95

HLA 300V+ 12V 300/550W SSB output 1.8 to 30MHz with cooling fans

£449.95 now just £429.95

HLA 300+ 12V 300/550W SSB output 1.8 to 30MHz without fans

£399.95 now just £429.95

HLA 150V+ 12V 150/250W SSB output 1.8 to 30MHz with cooling fans

£399.95 now just £349.95

HLA 150+ 12v 150/250W SSB output 1.8-30MHz without fans

£349.95 now just £329.95

KL 505V 12v 300/600W SSB 3.6-30MHz adjustable amplifier with Pre-Amp

£299.95 now just £249.95

KL 505 12v 300/600W SSB 3.6-30MHz adjustable amplifier with Pre-Amp

£249.95 now just £229.95

KL 506 12v 300/600W SSB 3.6-30MHz amplifier with Pre-Amp

£299.95 now just £279.95

KL 405V 12v 200/400W SSB 3.6-30MHz adjustable amplifier with Pre-Amp

£179.95 now just £149.95

KL 405 12v 200/400W SSB 3.6-30MHz adjustable amplifier with Pre-Amp

£149.95 now just £129.95

KL 203P 12V 100W output with pre-amp 20-30MHz without fans

£49.95 now just £39.95

KL 203 12V 100W output 18-30MHz without fans

£44.95 now just £37.95

### VHF/UHF Amplifier

LA 250V 12V 200W 140-150MHz Professional amplifier with fans

£499.95 now just £449.95

LA 250 12V 200W 140-150MHz Professional amplifier without fans

£449.95 now just £419.95

ULA 100 12V 100W 420-440MHz ideal for handies due to 5w input power

£449.95 now just £399.95

KL 145 12V 100W 100-150MHz solid state linear amp

£149.95 now just £129.95

LA 145 12V 85W 135-175MHz wideband linear amp

£149.95 now just £129.95

LA 144 12V 70W 135-175MHz wideband linear amp

£99.95 now just £89.95

### Patch Leads

PL58-0.5 1/2m Standard RG58 PL259 to PL259 lead

£3.50

PL58-10 10m Standard RG58 PL259 to PL259 lead

£8.95

PL58-30 30m Standard RG58 PL259 to PL259 lead

£16.95

PL58M-0.5 1/2m Mil Spec RG58 PL259 to PL259 lead

£4.50

PL58M-10 10m Mil Spec RG58 PL259 to PL259 lead

£12.95

PL58M-30 30m Mil Spec RG58 PL259 to PL259 lead

£27.95

PL213-10 10m Mil Spec RG213 PL259 to PL259 lead

£18.95

PL213-30 30m Mil Spec RG213 PL259 to PL259 lead

£39.95

PL103-10 10m Mil Spec Westflex 103 PL259 to PL259 lead

£29.95

PL103-30 30m Mil Spec Westflex 103 PL259 to PL259 lead

£69.95

(All other leads and lengths available, ie. BNC to N-type, etc. Please phone for details)

### Connectors

PL259-6mm Standard plug for RG58

£0.99p

PL259-9mm Standard plug for RG213

£0.99p

PL259-7mm Standard plug for Mini8

£0.99p

PL259-6C Compression type for RG58

£2.50

PL259-9C Compression type for RG213

£2.50

PL259-103C Compression type for Westflex 103

£5.50

NTYPE-6 Compression type plug for RG58

£3.95

NTYPE-9 Compression type plug for RG213

£3.95

NTYPE-103 Compression type plug for westflex 103

£6.00

BNC-6 Compression type for RG58

£1.50

BNC-9 Compression type for RG213

£3.50

SO239-N Adapter to convert PL259 to N-Type male

£3.95

NTYPE-PL Adapter to convert N-Type to PL259

£3.95

BNC-PL Adapter to convert BNC to PL259

£2.00

BNC-N Adapter to convert BNC to N-Type male

£3.95

BNC-SMA Adapter to convert modern SMA radio to suit BNC

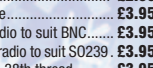
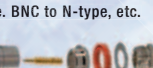
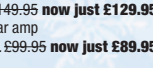
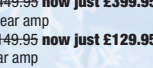
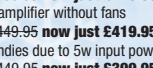
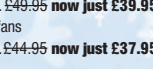
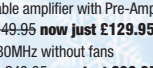
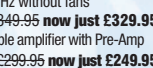
£3.95

SO239-SMA Adapter to convert modern SMA radio to suit SO239

£3.95

PL259-38 Adapter to convert SO239 fitting to 38th thread

£3.95



## MFJ

### Antenna Tuners

See our website for full details.

#### Automatic Tuners

MFJ-925 Super compact 1.8-30MHz 200W	£199.95
MFJ-926B remote Mobile ATU 1.6-30MHz 200W	£319.95
MFJ-927 Compact with Power Injector 1.8-30MHz 200W	£309.95
MFJ-928 Compact with Power Injector 1.8-30MHz 200W	£249.95
MFJ-929 Compact with Random Wire Option 1.8-30MHz 200W	£259.95
MFJ-991B 1.8-30MHz 150W SSB/100W CW ATU	£279.95
MFJ-993B 1.8-30MHz 300W SSB/150W CW ATU	£309.95
MFJ-994B 1.8-30MHz 600W SSB/300W CW ATU	£409.95
MFJ-998 1.8-30MHz 1.5KW	£729.95

#### Manual Tuners

MFJ-16010 1.8-30MHz 20W random wire tuner	£79.95
MFJ-902B 3.5-30MHz 150W mini travel tuner	£134.95
MFJ-902H 3.5-30MHz 150W mini travel tuner with 4:1 balun	£149.95
MFJ-904 3.5-30MHz 150W mini travel tuner with SWR/PWR	£149.95
MFJ-904H 3.5-30MHz 150W mini travel tuner with SWR/PWR 4:1 balun	£184.95
MFJ-901B 1.8-30MHz 200W Versa tuner	£119.95
MFJ-971 1.8-30MHz 150W mini travel tuner with SWR/PWR	£139.95
MFJ-945E 1.8-54MHz 300W tuner with meter	£149.95
MFJ-941E 1.8-30MHz 300W Versa tuner 2	£164.95
MFJ-948 1.8-30MHz 300W deluxe Versa tuner	£174.95
MFJ-949E 1.8-30MHz 300W deluxe Versa tuner with DL	£199.95
MFJ-934 1.8-30MHz 300W tuner complete with artificial GND	£229.95
MFJ-974B 3.6-54MHz 300W tuner with X-needle SWR/WATT	£229.95
MFJ-969 1.8-30MHz 300W all band tuner	£249.95
MFJ-962D 1.8-30MHz 1500W high power tuner	£339.95
MFJ-986 1.8-30MHz 300W high power differential tuner	£399.95
MFJ-989D 1.8-30MHz 1500W high power roller tuner	£439.95
MFJ-976 1.8-30MHz 1500W balanced line tuner with X-Needle SWR/WATT	£589.95



## Tuners

LDG Z-817 1.8-54MHz ideal for the Yaesu FT-817	£129.95
LDG Z-100 Plus 1.8-54MHz the most popular LDG tuner	£169.95
LDG IT-100 1.8-54MHz ideal for IC-7000	£179.95
LDG Z-11 Pro 1.8-54MHz great portable tuner	£179.95
LDG KT-100 1.8-54MHz ideal for most Kenwood radios	£209.95
LDG AT-100 Pro II 1.8-54MHz	£244.95
LDG AT-200 Pro II 1.8-54MHz	£259.95
LDG AT-1000 Pro II 1.8-54MHz continuously	£499.95
LDG AT-600 Pro II 1.8-54MHz with up to 600W SSB	£394.95
LDG YT-1200 1.8-54MHz 100W for FT-450D, FT-DX1200 & FT-DX3000	£209.95
LDG YT-100 1.8-54MHz ideal for your Yaesu FT-857D	£199.95
LDG AL-100 1.8-54MHz 100w designed for the Alinco range of transceiver	£139.95

## Power Supplies

PS30SWII 25A continuous switch mode PSU with variable output voltage and cigar socket also includes noise offset function **SPECIAL OFFER** £99.95 £79.95

QJPS30II 30A continuous, includes lovely large meter displays and large ear terminals for that thick power cable on high powered rigs **SPECIAL OFFER** £79.95 £69.95



# Elecraft KX2

## pocket sized HF transceiver

**I**t is four years since Elecraft launched their small KX3 portable HF transceiver and it has proved very popular. Now we have its little brother, the KX2, even smaller and lighter and able to fit into a jacket pocket yet retaining virtually all the features of the KX3. Covering from 80m to 10m with 10W, it boasts a high performance spec and feature set from the top of the range K3 / K3S base station.

### Basic functions

The KX2 will operate over a supply voltage range from 8V minimum to 15V maximum and this can be either from an external DC supply or from an internal battery pack. The battery pack, an optional extra, is a 3-cell Li-ion unit providing 10.8V nominal with a capacity of 2600mAh and connects internally via a flying lead and plug. If an external supply is used instead this overrides the battery pack if fitted when the voltage is higher. The associated external charger, also an optional extra, recharges the battery fully in about 2 to 3 hours. The battery needs to be removed for charging; this cannot be done in situ.

The transmitter power is set automatically according to the supply voltage with 10W available from the higher supplies, switching to 5W maximum below about 11V. Lower power operation is also selected if the temperature of the PA transistors rises excessively. Lower power output can also be set manually in fine steps all the way down to 0W. The specification states that the transmit power is a little lower on the 12m and 10m bands but I found that not to be so in the review sample.

Note that following a firmware upgrade early in 2016, the maximum power output of the KX3 on some of the bands has been increased to 15W. This has been done by reconfiguring the ALC parameters and does not involve any changes to the hardware.

Unlike the KX3, the KX2 does not cover 6m, or 160m on transmit although a 160m position is provided on the band selection button. The receiver tunes up to 32MHz and down to 500kHz but the sensitivity drops rapidly below 3MHz. Full VFO transmit coverage is provided



The Elecraft KX2 is tiny and will fit into a jacket pocket. The optional internal battery pack and ATU mean it can be used virtually anywhere.

on the 60m band with all modes available. USB, LSB, CW, CW reverse sideband, and a number of data modes are all provided. AM receive and transmit are included from firmware version 2.68 / 1.48, but not FM.

Unlike the KX3 and other Elecraft models, the KX2 is only available as a factory-assembled item and not as a kit for home assembly. Apart from the battery, other optional internal units include an ATU and an auxiliary output expansion board. These boards can be added later and can be installed by the user. The ATU matches over a wide range of impedances including end-fed wires. An internal microphone allows the radio to be used as a handheld or in an emergency if no other microphone is available. A separate microphone is not included with the radio but the MH3 hand microphone is available as an accessory.

Other accessories include a 100W amplifier with or without a built-in ATU, two styles of padded carrying cases and two CW keying paddles. These keying paddles attach securely to the case of the radio in an arrangement common with the KX3. This provides a firm stable base, preventing the paddle from moving around during use and is easily removed for transport. The KXPD3 paddle, originally supplied for the KX3, uses a precision aluminium housing and the KXPD2 is a lighter, more compact version.

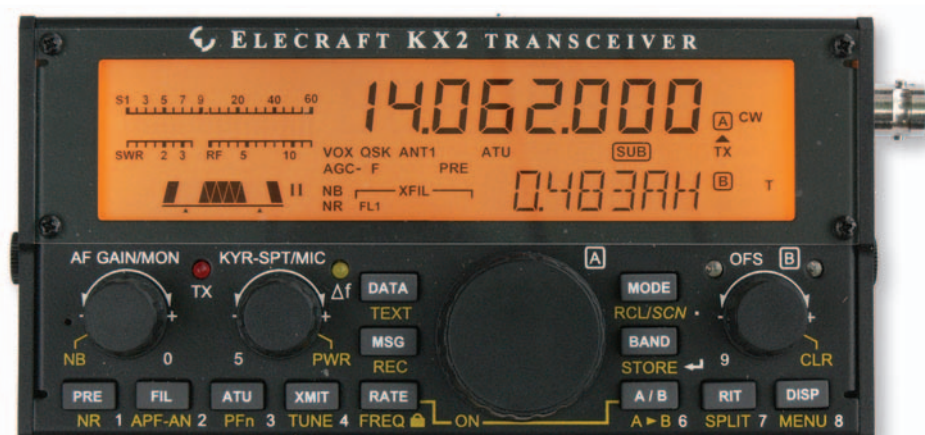
Older KXPD3 paddles supplied with one long and one short thumb-screw mounting bolt need to have the long bolt replaced with another shorter one, or at least ground down a little, to avoid any damage to the KX2.

The KX2 is provided with a hard copy instruction manual running to 72 pages describing in detail all the functions and controls. Each additional option has its own manual and in common with all Elecraft products, all are also available to download from the Elecraft website.

### Design and construction

The KX2 uses an SDR design and architecture that is essentially the same as the KX3. On receive, incoming signals are mixed directly to baseband using quadrature switching mixers and all signal processing is performed by DSP. The bandwidth at baseband is limited to 15kHz prior to feeding the ADC and DSP from which an IF at 8kHz is selected for further signal processing functions. With the KX3, processing directly at baseband (0Hz IF) is the norm, an 8kHz IF is selectable if image signals are a problem. Image in the adjacent channels is a consequence of this architecture but is minimised by careful design and nulled down to low levels as part of the factory calibration procedure.

The front end includes a switchable



The small number of controls mean that most have more than one function. Display visibility is excellent.

preamplifier or attenuator, PIN diode switched band-pass filters and latching relay switched low-pass filters. On transmit, the baseband I and Q signals are mixed directly to RF using a separate mixer and then amplified to the final power level through the same filtering used on receive.

Although optional narrow filters (roofing filters) can be fitted for baseband filtering with the KX3, this is not an option and is fixed at 15kHz with the KX2. This allows a 30kHz section of the band ( $\pm 15$ kHz) to be passed to the DSP. The DSP provides true dual receive operation (dual watch) with the main receiver using VFO A routed to the left audio channel and the second receiver using VFO B to the right audio channel. Both IF frequencies must lie within the baseband window so with VFO A centred on the 8kHz IF, VFO B must be within the range  $+7$ kHz to  $-23$ kHz of VFO A for independent stereo operation. This is generally sufficient to cover DX split frequency operations, particularly on CW.

The KX2 is constructed using a two-part metal case that separates to gain access to the battery pack. The overall size is 147 x 50 x 40mm and weighs 370g without the battery or added options. This is about half the weight of the KX3 and is considerably smaller. A foldaway leg allows the radio to be operated either flat on a table or tilted as required. A small built-in 25mm speaker on the back plate provides audio for a quiet environment but care should be taken when opening or closing the case to avoid pinching or straining the speaker wires. The case provides the heatsink for the transmitter amplifier devices and can get quite hot with heavy transmit use.

### Controls and connections

Considering that the KX2 provides most of the same functions as the KX3, the smaller front panel area poses quite a challenge to making a suitably friendly user interface. The display is the same amber backlit LCD panel as fitted to the K3 and KX3 and occupies half of the

available panel area. The same displayed items are shown, the various icons and labels, both VFO frequencies, bargraph meter displays and filter passband shapes. The monochrome display has excellent visibility in bright sunlight.

The reduced number of rotary controls and buttons means that every control is used for a multitude of functions. The main VFO-A uses a 25mm diameter rotary control and this also selects bands, modes, set menu items etc. A second smaller rotary provides VFO-B and this is also used in conjunction with surrounding buttons to set RIT/XIT offsets, select menu items, display options and more. Two other rotaries between them provide control of the AF gain, transmit power, monitor, keyer speed and in association with adjacent buttons adjust the filter bandwidth and shift, adjust the noise reduction, noise blanker etc. Some traditional front panel controls are inevitably relegated to the ever-growing menu system such as RF gain control, AGC settings, VOX, CW pitch and drop back delay. A single programmable function key provides quick access to any one of the menu items. It's all in there, highly configurable and fully covered in the manual.

Interface connections are similar to the KX3 except that there is no I and Q mixer output to drive a panadapter display. Apart from the single antenna connector that uses a BNC socket and the power that uses a 2.1mm socket, all other interfaces use 2.5mm or 3.5mm stereo and multipole jack sockets. Except for the antenna, these are all grouped together at one end of the case. The microphone uses a 4-pole 3.5mm jack that also accommodates PTT and VFO frequency stepping UP/DOWN buttons. A standard 3.5mm stereo jack is used for headphones or external powered speakers. To interface a PC soundcard for data mode operation, the microphone and headphone sockets must be used as audio and PTT lines are only available on these sockets. Another 3.5mm 4-pole jack provides a connection to the USB or RS232 ports of a PC and a grounding line for switching transverters or linear amplifiers. The appropriate interface cable, USB or RS232, can be supplied with

the radio. A further jack provides for CW keys or paddles. With the optional expansion board fitted a 2.5mm stereo jack provides two further programmable auxiliary switch lines.

### Receiver features

The functions provided in the KX2 are largely the same as in KX3 and indeed also the K3 and K3S. A brief summary follows. Check out the other reviews for more details.

The usual facilities for A/B VFOs and split frequency operation are provided with RIT and XIT. 100 general-purpose memory channels are provided and you can assign a five-character text label. Easy to use but you cannot toggle between VFO and memory modes. Four quick access memories are provided for each band selected by the keys. Scanning across the memories or between frequency limits is also included.

The usual receiver functions are provided. The AGC is fully adjustable for attack and decay rates, threshold, hold time and slope including an off setting and a pulse rejection mode. Noise blanker and noise reduction functions are fully adjustable and an auto-notch is included but there is no manual notch. The channel filter is adjustable over wide limits for bandwidth and shift with settings stored separately for each mode. On RTTY, dual peak filters are implemented in both standalone and soundcard modes. A narrow audio CW filter is provided. Audio equalisation filtering for SSB and CW modes and tuning aids for CW and data modes are all included. Automatic tuning for CW and PSK signals can also be selected.

The K3 and KX3 both implement a number of DSP processed audio effects for use with stereo headphones. The KX2 currently implements one such effect termed 'delay'. Quasi-stereo processing helps with the copy of weak signals or in pile-ups, reducing fatigue and creating an illusion of greater acoustic space.

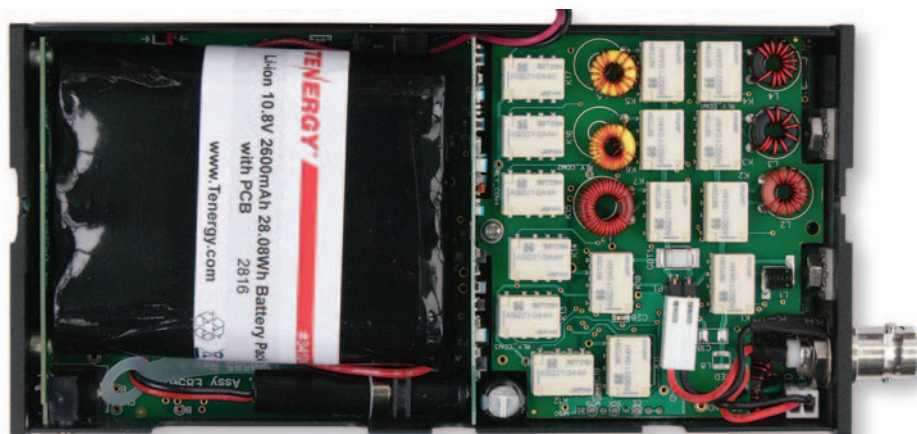
### Transmit features

SSB functions include VOX, speech processor and a transmission monitor together with an 8-band audio equaliser similar to that used in the receiver. For noisy environments, a noise gate can be enabled to mute the microphone audio below a selected audio threshold. Transmit metering in bargraph format can be set to show either RF power and SWR or compression level and ALC.

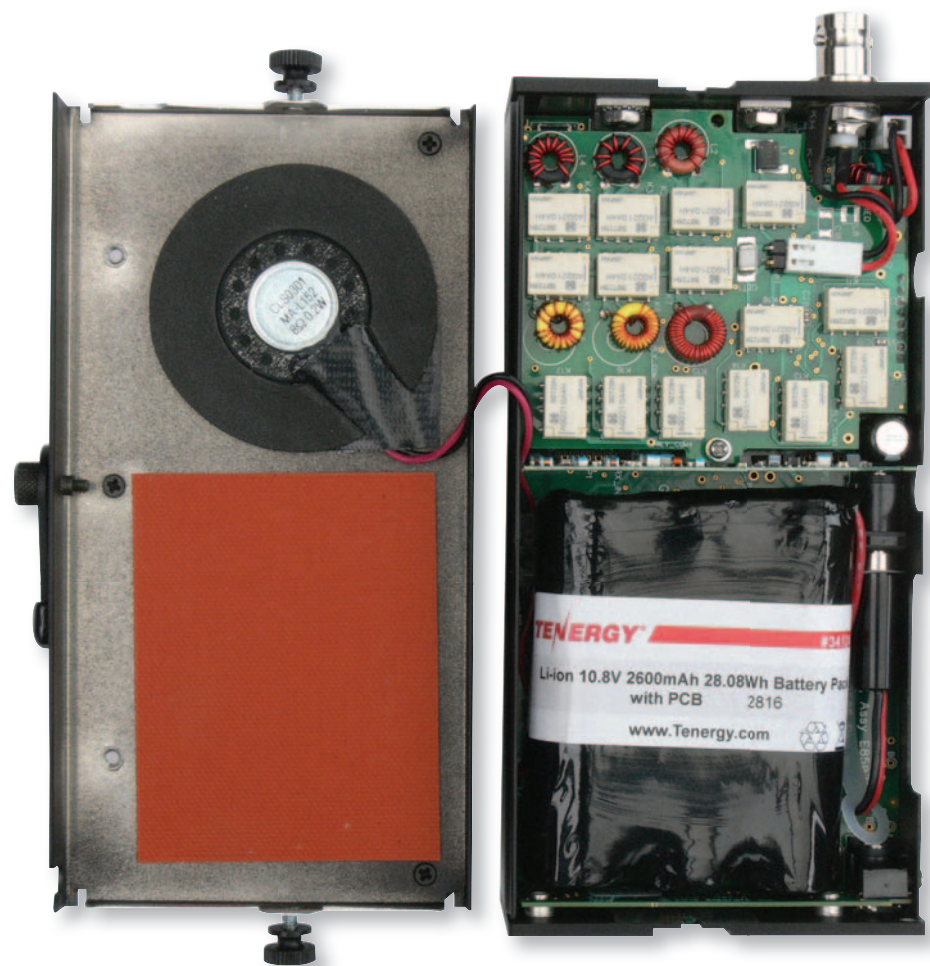
On CW there is the usual provision for full and semi break-in but the drop-back delay is a menu item. The front mounted keying paddle can be used simultaneously with an external

**Peter Hart, G3SJX**  
peter@g3sjx.freemove.co.uk





KX2 with back opened to show the battery and ATU board.



The 25mm speaker is adequate in quiet environments. Care must be taken to avoid damaging its leads.

keying source such as a PC for contest operation and separate settings for both are provided via the menu. A tune button is provided on the front panel that transmits a carrier on any mode and at a level that can be menu programmed.

A built-in CW keyer operates over the range 8 to 50wpm with a front panel speed control, adjustable weighting and selection of various keying configurations. Three message stores are provided each holding up to 250 characters and these are also used on certain data modes.

A digital voice recorder provides two voice

messages each up to 15 seconds in length for transmission. The messages can be set to repeat continuously after a predefined time interval.

### Data modes

The KX2 supports data modes in a number of ways with four mode variants selectable. It can be used on RTTY, PSK-31 and PSK-63 modes standalone without the need for an external PC. Decoders are built in for these modes, as well as for CW, and display the output on a

scrolling 7-character area of the LCD. A CW to Data converter allows RTTY or PSK messages to be transmitted without the need of a computer by keying the message in CW using the internal keyer. The CW message stores can also be used.

Conventional audio-based data using a PC soundcard connects via the microphone and headphone jacks and can either use PTT control or VOX. VOX on data modes with the drop-back delay reduced to minimum gives a fast changeover. The KX2 Utility program also includes a terminal function for RTTY, PSK and CW modes allowing a full page of received data to be displayed with a transmit buffer and 16 message stores for each mode, everything you need for typical QSOs.

### Additional functions

KX2 Utility is a useful software application free to download from the Elecraft website. Apart from the terminal function for CW and data modes this program enables firmware upgrades to be downloaded and installed on the radio. It also provides keyboard editing of the CW/data message stores in the radio, a custom power-on banner, saving and restoring of configuration settings and TX gain calibration.

The 7-character display area of the LCD normally used to show the VFO-B frequency can alternatively display a number of housekeeping functions. These include the power supply voltage or current, the PA temperature, audio level and the amp-hours of supply used since the last reset. This is particularly useful to gauge how much charge remains in the battery. If the auxiliary I/O option is fitted, the time can be displayed but only if the radio is powered. If the battery is removed for charging, the time function only continues for 2 hours until it is lost, generally less than the time required to recharge the battery.

As with the K3 and KX3, transverters are very well supported with the KX2. Up to seven transverter bands may be set-up and these are included within the band scrolling selection. Final frequency readout (up to 24GHz), IF, offset and drive power are all user settable. Only 3 digits for the MHz are displayed, eg 296 for 1296MHz, but this is generally sufficient to avoid confusion. There are no separate RF connections to support transverters; both the receive and transmit path must be connected via the main antenna jack and the drive power is a minimum of 100mW.

### Measurements

The full set of measurements is given in the table. Sensitivity across the bands 80m to 10m was similar to or just slightly less than the KX3 and perfectly adequate. On 160m, sensitivity was down by 10dB and then drops rapidly across the medium waveband being down by 40dB at 1MHz. The S-meter calibration showed





Take **your** amateur  
radio to new heights  
in 2017

[www.sotabeams.co.uk](http://www.sotabeams.co.uk)

Tel: 07976-688359

All items shipped from our UK factory. Prices exclude p&p.



Time to learn CW? Our **Palm Morse keys** are great for beginners and experts alike!

**Huge range stocked**



Time to put up a new antenna? Our Military Green **Heavy Duty Wire** is super popular.

**Only £9.95/ 50m reel**



Raise your game with a portable set-up this year. Our Band Hopper antennas are a complete system including feeder and even guying for your mast—all in one lightweight neat package. They are multi-band resonant antennas—no tuner needed. Probably the most popular portable antennas ever made.

**From as little as £49.95**



Take the strain out of raising and luffing aerial masts - Fit a winch system specially prepared by Goodwinch Limited



David Bowyer, M1AEI has for some time now been preparing 12 volt winch systems for 40, 60, 80 and 100 ft Strumtech Versatowers, as well as similar other models like Radio Structures, Westower, Altron and Tennamast.

The prepared narrow drum TDS-8.5 or 12.0 waterproof winch systems come ready made up on galvanised back plates and spacers as required to ensure that the back plate does not interfere with the front tube.

The solenoids are repositioned with remote wiring to keep the weather off them (although they are sealed). The rope fixing hole on the drum is prepared to get the original mast rope through twice. We also disable the freespool (the yellow knob).

Finally, we fit an Anderson quick disconnect fitting on the end of the winch supply cables and another on a battery harness with battery posts on the other end, then bench test and run.

The special prices for fellow Radio Amateur enthusiasts is **£550** plus carriage and VAT for 40 & 60ft standard Strumtech Versatowers with small to medium head loads using the TDS-8.5.

Alternatively, **£575** plus carriage and VAT for 60, 80 & 100ft heavy duty towers especially with heavy head loads using the TDS-12.0.

Carriage is £30 plus VAT (UK mainland excluding offshore islands and the Scottish Highlands).

We also have the ATV 4000 winch system (see inset picture above) for the smaller tower at **£245** plus **£18** carriage and VAT.

**GOODWINCH LIMITED**

East Foldhay, Zeal Monachorum, Crediton, Devon, EX17 6DH, England

Tel: 01363 82666

Fax: 01363 82782

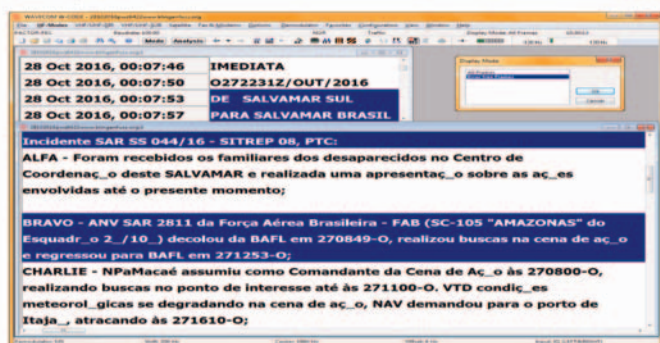
E: [sales@goodwinch.com](mailto:sales@goodwinch.com)

W: [www.goodwinch.com](http://www.goodwinch.com)

AS MOST OF OUR BUSINESS IS UK & EUROPEAN 484 DEALERS AND OVERSEAS SALES, ALL PRICES ARE PLUS CARRIAGE AND VAT

## Latest HF Frequencies for SDRs and Web-SDRs Worldwide Broadcast and Utility Radio Stations

Up-to-date frequency, schedule and digital data code information for users of powerful new Software-Defined Radios (SDRs) combined with professional digital data decoders such as PLATH and WAVECOM!



### 2017 Shortwave Frequency Guide - EUR 40 = £ 36

370 pages. 13,800 entries with all broadcast and professional utility stations worldwide. Latest schedules for 2017. Clearly arranged and really user-friendly. 21st edition!

### 2017 Super Frequency List CD - EUR 30 = £ 27

4,900 shortwave broadcast frequencies. 8,800 frequencies of utility radio stations, plus 23,700 formerly active frequencies. 460 fascinating new digital data decoder screenshots. 23rd edition!

### 2017/2018 Guide to Utility Radio Stations - EUR 50 = £ 45

**includes Supplement January 2018 with hundreds of new frequencies!**

550+16 pages. 8,800 frequencies and hundreds of data/SDR screenshots. Frequencies, stations, call signs, codes, abbreviations, meteo/NAVTEX/press schedules, and much more. 29th edition!

### Radio Data Code Manual - EUR 40 = £ 36

600 pages. Digital data transmission on HF. Military modem standards. Meteo and aero codes. Unidcode. Hundreds of screenshots. Used by radio monitoring services worldwide. 18th edition!

### Modulation Types on 4 CDs - EUR 110 = £ 98

Total 194 recordings from VLF to SHF. Ideal for tuning practice and professional radio monitoring.

Payment by Mastercard, Visa, bank, cash (EUR only). No cheques! Worldwide postage is £ 5 per kg. See our website and free 2017 catalogue for package prices, detailed descriptions, recommendations from all over the world, and hundreds of the very latest radio monitoring screenshots. We've been leading in this field for 48 years!

Klingenfuss Publications · Hagenloher Str. 14 · 72070 Tuebingen · Germany  
Fax +49 7071 600849 · Phone 62830 · [info@klingenfuss.org](mailto:info@klingenfuss.org) · [www.klingenfuss.org](http://www.klingenfuss.org)





The KX2 end panel contains most sockets other than the BNC RF socket, which is on the other end.

around 50-60 $\mu$ V for S9 with the preamp in circuit or around 500 $\mu$ V without the preamp. Precise readings are not possible due to the limited resolution of the bargraph. The AGC characteristic is similar to the KX3, clean in operation and fully adjustable. The default settings are a reasonable compromise. The audio looked very clean with a low noise floor.

The only significant spurious response is the image that occurs due to the 8kHz IF at a frequency 16kHz LF of the receive channel. This measured 60dB down or better across most of the bands. Switching mixers also function with harmonic signals. On all bands from 3.5MHz up there is sufficient front end selectivity to reduce the third harmonic response by around 70dB. However, on 1.8MHz there is no such selectivity and the third harmonic response at 5.4MHz is only 8dB down.

A consequence of the architecture used for the receiver is that the oscillator is on an adjacent channel and could leak to the antenna and cause interference close-by to an adjacent receiver. This was measured as about -45dBm worst case with the preamplifier off or -65dBm with the preamplifier on. The KX3 includes an isolation amplifier that can be enabled if leakage is a problem but this is not provided in the KX2.

The strong signal performance is excellent for a radio of this type. Two-tone intermodulation results at 20kHz spacing show dynamic ranges approaching 100dB in SSB bandwidths and over 100dB in 500Hz CW bandwidths. These figures reduce close-in by about 8dB at 2kHz spacing. Reciprocal mixing phase noise results are also very good compared to most other radios but some 20dB worse than the outstanding figures measured for the KX3. The KX3 is

still by far the best I have ever measured for reciprocal mixing for any radio. ADC overload and reciprocal mixing generally limit the blocking performance.

The receiver performance was unchanged over the supply voltage range of 7.8V to 15V. The current consumption with the preamp off was typically 175mA with the display backlight illuminated, reducing to 150mA with the backlight off and rising to 2A on transmit at full power.

Transmit measurements made with a 13.8V supply show that 10W output could be achieved on all bands and intermodulation distortion was very reasonable. With 11V supply, distortion levels rise rapidly on the higher bands in particular and should be limited to 6-8W PEP output. The compressor added to the inband distortion (3<sup>rd</sup> order) but the wider band was unaffected. The AM performance was clean and looked good at all power levels.

The CW rise and fall times measured about 4ms and are nicely shaped, similar to the KX3. First characters are clean with no added distortion. Full QSK has two settings, normal and fast. Delays with the normal setting are longer than the KX3 and it is just possible to listen between dots at 20wpm. In the fast setting it is just possible to listen between dots at 40wpm but audio artefacts can be annoying. Sequencing for linear amplifier switching allows for a 7ms amplifier switching time: a fairly fast linear is needed.

### On-the-air performance

The KX2 is a radio that needs some time to fully appreciate all its features and learn how to

drive. Time spent with the operating manual is essential, even just to turn it on! This requires two button presses to avoid accidentally turning on and draining the batteries when packed in a rucksack. Once through the learning phase the radio is easy to use but you do need to understand the logic of the controls and know where everything is located.

I found the main tuning drive rather small and it would benefit from a finger indent. VFO-A has only 96 steps per revolution and VFO-B only 48 steps. Two tuning rates can be quickly accessed and for normal use VFO-A is used for fine tuning and VFO-B for coarse tuning. Mode dependent coarse step sizes are selected from the menu. By juggling between the two VFOs and setting an appropriate coarse step size a reasonable compromise can be found between fine tuning signals and moving quickly around the bands.

The receiver performed very well, and was quiet, sensitive and clean sounding with no trace of overload on strong signals. The audio quality was good on headphones or external powered speakers but the small internal speaker struggled somewhat. Strong amateur SSB stations heard on 160m caused some initial confusion, as they were clearly not on that band. They were identified as on 60m as the measurements revealed. It didn't help that my 160m dipole is also a good performer on its third harmonic.

The audio quality on transmit was good using the Elecraft MH3 hand microphone. The internal microphone was not quite so good but still acceptable. CW QSK was very effective and clean in operation. Built-in data operation allows basic QSOs or for monitoring but used with the KX2 Utility application it becomes much more versatile. I made a few QSOs in the WAE RTTY contest with this setup. I used KX2 Utility to install a firmware upgrade, which was accomplished easily and without any problems. I linked the KX2 satisfactorily to my PC running Logger32 for my station log using KX3 parameters. This all seems quite straightforward.

### Conclusions

The KX2 is a fun radio and a great performer. Ideal for SOTA mountain-top operations it can be taken anywhere. Very rich in features and highly versatile, it can be used as a QRP station, a hand portable, a standalone RTTY/PSK station or out and about searching for local sources of QRM and noise.

Stocked in the UK by Waters and Stanton, prices depend on the options included but start at around £860.

My thanks to Waters and Stanton for the loan of the radio.

### Reference

KX3 Review, *RadCom* April 2013, pp 35-38

## Elecraft KX2 measured performance

### RECEIVER MEASUREMENTS

Frequency	-----SENSITIVITY SSB 10dBs+n:n-----	
	Preamp Off	Preamp On
3.5MHz	1.4 $\mu$ V (-104dBm)	0.28 $\mu$ V (-118dBm)
5MHz	0.8 $\mu$ V (-109dBm)	0.16 $\mu$ V (-123dBm)
7MHz	0.8 $\mu$ V (-109dBm)	0.18 $\mu$ V (-122dBm)
10MHz	1.1 $\mu$ V (-106dBm)	0.25 $\mu$ V (-119dBm)
14MHz	0.9 $\mu$ V (-108dBm)	0.2 $\mu$ V (-121dBm)
18MHz	1.1 $\mu$ V (-106dBm)	0.25 $\mu$ V (-119dBm)
21MHz	1.1 $\mu$ V (-106dBm)	0.22 $\mu$ V (-120dBm)
24MHz	1.0 $\mu$ V (-107dBm)	0.2 $\mu$ V (-121dBm)
28MHz	1.1 $\mu$ V (-106dBm)	0.22 $\mu$ V (-120dBm)

AM sensitivity (28MHz) Preamp on: 1.1 $\mu$ V for 10dBs+n:n at 30% mod depth  
 AGC threshold: selectable 11 – 110 $\mu$ V  
 AGC attack time: adjustable  
 AGC decay time: 250-350ms (fast), 0.75-3.7s (slow)  
 Inband intermodulation products: -42dB (AGC fast), -50dB (AGC slow)

### BANDWIDTH/MODE

SET TO	-----BANDWIDTH-----		
2.4kHz USB	-6dB	-60dB	-70dB
500Hz CW	2440Hz	2675Hz	2690Hz
	542Hz	777Hz	790Hz

### INTERMODULATION (50kHz Tone Spacing) 500Hz bandwidth CW

Frequency	-----PREAMP OFF-----		-----PREAMP ON-----	
	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
3.5MHz	+28.5dBm	100dB	+9dBm	96dB
7MHz	+33.5dBm	106dB	+5.5dBm	96dB
14MHz	+33dBm	105dB	+6dBm	96dB
21MHz	+32dBm	103dB	+6dBm	95dB
28MHz	+31.5dBm	102dB	+5dBm	94dB

### CLOSE-IN INTERMODULATION ON 3.5MHz BAND 500Hz bandwidth CW

Spacing	-----PREAMP OFF-----		FREQUENCY OFFSET	RECIPROCAL MIXING DYNAMIC RANGE 500Hz bandwidth CW		
	3rd order intercept	2 tone dynamic range		21MHz	7MHz	3.5MHz
2kHz	+15dBm	91dB	2kHz	96dB (-123dB/Hz)	106dB (-133dB/Hz)	104dB (-131dB/Hz)
3kHz	+15dBm	91dB	3kHz	98dB (-125dB/Hz)	108dB (-135dB/Hz)	107dB (-134dB/Hz)
5kHz	+16.5dBm	92dB	5kHz	100dB (-127dB/Hz)	110dB (-137dB/Hz)	110dB (-137dB/Hz)
7kHz	+19.5dBm	94dB	10kHz	102dB (-129dB/Hz)	111dB (-138dB/Hz)	112dB (-139dB/Hz)
10kHz	+22.5dBm	96dB	20kHz	102dB (-129dB/Hz)	111dB (-138dB/Hz)	113dB (-140dB/Hz)
20kHz	+27dBm	99dB	50kHz	100dB (-127dB/Hz)	109dB (-136dB/Hz)	113dB (-140dB/Hz)
30kHz	+27dBm	99dB	100kHz	102dB (-129dB/Hz)	111dB (-138dB/Hz)	115dB (-142dB/Hz)
50kHz	+28.5dBm	100dB	150kHz	105dB (-132dB/Hz)	113dB (-140dB/Hz)	117dB (-144dB/Hz)
			200kHz	108dB (-135dB/Hz)	116dB (-143dB/Hz)	118dB (-145dB/Hz)

### TRANSMITTER MEASUREMENTS WITH 13.8V SUPPLY AND POWER LEVEL SET TO 10W

FREQUENCY	CW POWER OUTPUT	HARMONICS	INTERMODULATION PRODUCTS	
			3rd order	5th order
3.5MHz	10.5W	-58dB	-39dB	-51dB
5MHz	10.1W	-56dB	-40dB	-52dB
7MHz	10.2W	-60dB	-38dB	-47dB
10MHz	10.3W	-57dB	-39dB	-50dB
14MHz	10.4W	-52dB	-36dB	-41dB
18MHz	10.3W	-62dB	-37dB	-48dB
21MHz	10.3W	-50dB	-34dB	-41dB
24MHz	10.1W	-46dB	-34dB	-44dB
28MHz	10.1W	-46dB	-34dB	-44dB

Transmit intermodulation product levels are quoted with respect to PEP and measured at 10W PEP on all bands.

FREQUENCY OFFSET	TRANSMIT NOISE 7MHz 10W CW O/P
1kHz	-84dBm/Hz (-124dB/Hz)
2kHz	-87dBm/Hz (-127dB/Hz)
3kHz	-88dBm/Hz (-128dB/Hz)
5kHz	-89dBm/Hz (-129dB/Hz)
10kHz	-91dBm/Hz (-131dB/Hz)
20kHz	-94dBm/Hz (-134dB/Hz)
50kHz	-93dBm/Hz (-133dB/Hz)
100kHz	-96dBm/Hz (-136dB/Hz)
150kHz	-98dBm/Hz (-138dB/Hz)

Carrier suppression: -60dB  
 Sideband suppression: -40 to -45dB  
 Transmitter AF distortion: <1%  
 Microphone input sensitivity: 1.5mV for full output  
 Data T/R switch speed: mute-TX 26ms, TX-mute 32ms, mute-RX 70ms, RX-mute 8ms

NOTE:  
 All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on USB with receiver preamp switched out and 2.4kHz bandwidth.



# MXOVRC DXpedition to Lundy

**K**eith, M0KJA, Mark, G0GQT and Nigel, G0GDA, all members of Virtual ARC, visited the Isle of Lundy in May 2016.

It was 'all systems go' from our end – we drove through the night on Sunday 1 May and arrived in Ilfracombe at 8am, in plenty of time to sail to Lundy Island at 10am. Having parked the two cars outside the Check In office at the harbour, we were informed that "due to force 6 winds in the Bristol channel there would be no sailing that day"! The receptionist said that she would try to obtain a substitute form of transport in the form of a helicopter but there was no way all our gear (20 items) would be coming with us. The best she could do was to send the equipment by boat on the Wednesday... Great!... no equipment, no DXpedition.

After a lot of begging, pleading and grovelling, the three of us – and our equipment – arrived safely altogether by chopper. I cannot praise the ladies from the Ilfracombe office enough. Their help was invaluable.

## Getting on the air

We set up one station and, following a great meal at the pub, we managed to get on the air the first evening, making around a hundred contacts. Having been up for about 40 hours, we soon 'hit the hay'. The island runs on locally generated power that operates from 6am until midnight, so torches are needed for night time toilet visits. Following another magnetic cloud eruption, the band conditions were so flat that you would need an iron to make them any flatter.

On Tuesday we put up the rest of the aerals – 80m and 40m straight dipoles, 20m sloper, a 9 element Tonna and the second vertical dipole, which meant that all stations were up and running. We had made choke baluns out of FT240-61 ferrites for fitting aerial end and bought bypass filters



Stonycroft cottage is just about the highest point on the island at 150m ASL.

from ML&S where Richard, Tony and Steve had been their usual helpful selves. Someone had switched off 10m, 12m, 15m and 40m so we had limited bands to work with due apparently to yet another solar flare just for good measure.

Mark went on the 2m UK Activity Contest on Tuesday evening and absolutely smashed it with a score of more than one million points.

## Little bits of good propagation

On 20m, PSK came to the rescue when the going became even harder. We did have an opening on Tuesday and again on Thursday on 40m where we had the pileups and worked many UK stations, which was great. Friday brightened up on 20m and several busy times were had but by late afternoon we had to start dismantling the aerals and equipment. We just left a vertical dipole up for a little operating early on Saturday morning before vacating the cottage at 9am and sailing back to the mainland in the afternoon.



The team that went to Lundy: Keith, M0KJA, Mark, G0GQT and Nigel, G0GDA.

There was a lot of interest in our little venture including an email from a station in Antarctica saying they had seen us on the cluster and been trying to call us but couldn't make it so they wished us all the best.

## Small but excellent

The weather was great and we had wall to wall sunshine every day. The contacts we didn't get were made up with pints at the bar. Whilst the prime objective was the DXpedition, we wanted a holiday as well, so a little sunbathing was thrown in for good measure. Lundy is a small but excellent place where the natives are both helpful and friendly and the food is good. Just don't expect television, internet or mobile phone coverage as there isn't any.

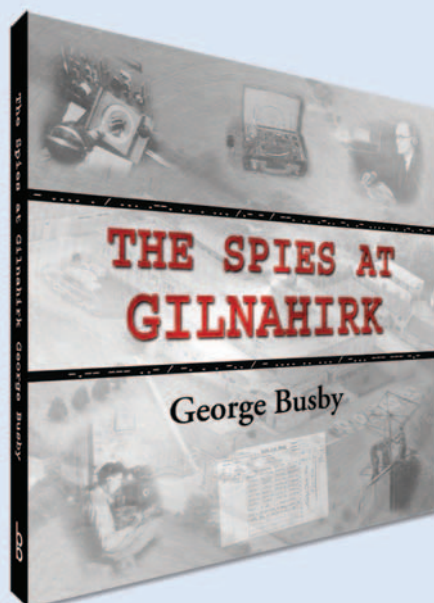
Would we go again? You bet we would.

## Background on Lundy

Lundy is a 400 foot granite outcrop, the largest island in the Bristol Channel. It lies 12 miles off the coast of Devon. The highest point is Beacon Hill, 469 feet (143m) above sea level. In summer the *MS Oldenburg* brings day-visitors who stay for a few hours; the voyage takes on average two hours, depending on ports, tides and weather. At all other times, those who are staying in the 23 holiday properties and the residents have the island to themselves.

**Nigel Brown, G0GDA**  
windom@gmx.co.uk

**NEW  
TITLES**



## The Spies at Gilnahirk

By George Busby

Whilst many know about Bletchley Park's role in WWII breaking the Enigma codes, fewer know the hugely important role of the Y service and the many radio amateurs involved in the collection of signals in WWII. This book focuses on the Y service station in Gilnahirk in Northern Ireland and sets out the story of those radio amateurs involved and why Gilnahirk was such an important centre in the Y service operations.

Many who know about the Y Service will know that in WWII many RSGB Members became 'Voluntary Interceptors' who collected German signals at home and posted these logs to the mysterious PO Box 25, Barnet, London. For those in Northern Ireland, Gilnahirk was the final destination of PO Box 25 that collated the amateur logs along with the logs from the larger military 'Y' listening station, before they were telexed to the codebreakers at Bletchley Park. Operations carried out here were of the upmost secrecy and its work carried on well beyond WWII, despite the closure of Bletchley Park. The unpretentious buildings largely attracted little attention despite a burst of press attention in 1951 when the Ministry of Finance tendered for the construction of a radio station but refused to comment on who it was for. Working in utter secrecy until its eventual closure in 1978, the Gilnahirk site was heavily involved in collecting signals during the Cold War.

*The Spies at Gilnahirk* provides a fascinating insight into the activities of the Radio Security Service and this little known site at the core of the Enigma story. Recommended reading for anyone interested in WWII codebreaking and the Enigma story.

Size: 215 x 205mm, 144 pages, ISBN: 9781 9106 5708 9

**Non Members' Price: £12.99, RSGB Members' Price: £11.04**

## The Cray Valley Years

by Bob Treacher M0MCV

As the Cray Valley Radio Society celebrates its 70th anniversary this lavishly illustrated book captures the highs and lows of one of the United Kingdom's most well-known, and successful, amateur radio societies. From its modest beginning in 1946 to the highs of the wonderfully successful special event station for the London 2012 Olympic and Paralympic Games this book covers the history of this famous club. Learn why the Society took the unusual step of becoming a company limited by guarantee in the 1970s; share in the success and disappointment of field days and national and international contests; and obtain first hand appreciation of the Society's expertise in organising special event stations, not only on a local scale, but in the national and international arena. This fascinating read provides real insight into a club that also had prestigious and highly successful celebrations of the Millennium, HM Queen Elizabeth II Golden Jubilee, the bi-centenary of the Battle of Trafalgar, and more.

240 x 174mm, 220 pages,  
ISBN 9781 9101 9329 7

**Non Members' Price: £14.99,**

**RSGB Members' Price: £12.74**



## Cold War Counterfeit Spies

*Tales of Espionage - Genuine or Bogus?*

By Nigel West

Throughout the Cold War and beyond, publishers have produced countless stories of espionage, treachery and deception. What Nigel West has discovered is that many were in fact the stories themselves. In this remarkable investigation into the claims of many who portrayed themselves as key players in clandestine operations, the author has exposed a catalogue of misrepresentations and falsehoods. Did Greville Wynne really exfiltrate a GRU defector from Odessa? Was the frogman Buster Crabb abducted during a mission in Portsmouth Harbour? Did the KGB run a close-guarded training facility, as described by J. Bernard Hutton in *School for Spies*, which was modelled on a typical town in the American mid-west, so agents could be acclimatised to a non-Soviet environment? This book is filled with fascinating insights into the exaggerations and outright fabrications that some have published as fact in recent times.

256 pages, 157 x 236 mm, Hardback,  
ISBN 9781 4738 7955 3

**Non Members' Price: £25.00**

**RSGB Members' Price: £18.75**



**25% OFF**  
(usual rrp)

\* Usual RRP  
E&OE (All prices shown plus p&p)



**Radio Society of Great Britain [www.rsgbshop.org](http://www.rsgbshop.org)**

3 Abbey Court, Priory Business Park, Bedford, MK44 3WH.

Tel: 01234 832 700 Fax: 01234 831 496

**FROM  
FREE P&P**  
on orders over £30. See Page 78



# Churches & Chapels on the Air 2016

**C**hurches and Chapels on the air (CHOTA) is an annual event organised by the World Association of Christian Radio Amateurs and Listeners (WACRAL).

In 2016, CHOTA was held on Saturday 10 September and almost 40 stations registered for the event including one in Belgium and one in Denmark. Seventeen different locator squares were activated, with four stations in IO92, IO83 and IO94 and eight squares only having one station active. The furthest north was Haroldswick Methodist Church on the island of Unst, GB2HMC (IP90), east was Dungen Parish Church. MN0GKL, in IO64. In the west the furthest was at Nørre Vedby Church on Falster Island, Denmark (JO54). The furthest south was GB1SKC at St Keverne Church in Cornwall (IO70).

## GB1SMB

Planning for GB1SMB at St Mary's Church, Buckden started back in April. It was decided to erect a G5RV antenna in the grounds of St Mary's Church on Friday so as not to interfere with other activities and events that the church had planned for Saturday. We had identified two suitable trees that could be used to hold up the ends of the G5RV and after a couple of attempts to throw the lead cord over high branches, we succeeded in hoisting up the antenna. Unfortunately, the rain overnight had worked on the ropes holding up the G5RV and, with shrinkage; one end of the antenna was now lying on the ground. A



The team operating GB5IVE in Cornwall.

quick repair and we were in business again. The Icom 7200 was up and running and our first contact was at 9.30am with GB1SKC, St Keverne, Cornwall, a great start.

We had a very lively period where we had QSOs with a number of churches and chapels including Gloucester Cathedral, who had erected their long wire from the top of the Cathedral at around 200 feet. We also had a visit by Bishop David (Bishop of Huntingdon) who showed a great interest in our activities and asked many questions. During the day members of the public visited the church for tea and cakes, many came to see the station and were interested in what we were doing. We had a total of 29 QSOs, 12 being with other churches and chapels including GB0SBC, the most northerly church on mainland Scotland. One contact was with OT4ERW/P, a small chapel in Belgium.

Thanks to Steve, G1KWF, Brian, G8CHC, Richard, M6TXR, Clive, G3NKQ and Mervyn,

G4KLE, who all took turns in operating and logging. We would also like to thank the Revd Jes Salt and all members of St Mary's Church, Buckden for making us very welcome. Could we do it again next year, please?

Mervyn S Foster, G4KLE

## GB0LOW

I operated GB0LOW from my local village church in Lowthorpe, located in the middle of the East Riding of Yorkshire. I was helped by Mike, MOVOZ. We made over 40 QSOs with 100W to a 60m doublet held by up the church tower. 16 churches were contacted including Geoff operating on Isle of Unst, all on 40m SSB. A quick look on 20m SSB netted USA, VE and Kuwait – these QSOs impressed our visitors.

John, G3XYF

## GB5IVE

The weekend at St Ive Methodist Chapel, Liskeard, Cornwall was set up by Mark Chanter, MOWMB. The station, GB5IVE, made over 100 contacts during the six hour event. Fourteen of those contacts were other UK CHOTA stations. We took advantage of the great conditions before and after the event and made over 250 contacts. Visiting amateurs over the weekend included MOZCP, M6JIY, MOCCA, MOBHG and a few members of the public.

Mark Chanter, MOWMB

## GB2SJB

While attending church on a Sunday morning in 2015, I started to have a discussion about the 'strange looking long pole' that was erected in my rear garden, with Steve Nicholls. After explaining



Lowthorpe church, where CHOTA co-ordinator G3XYF operated GB0LOW.



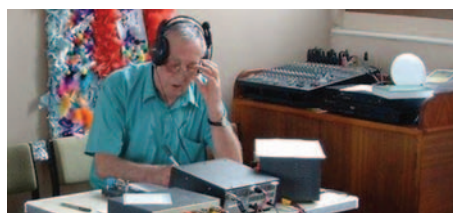
Bishop David of Huntingdon takes the mic at GB5IVE.



Operating GB2SJB outside St John the Baptist church, Suffolk.



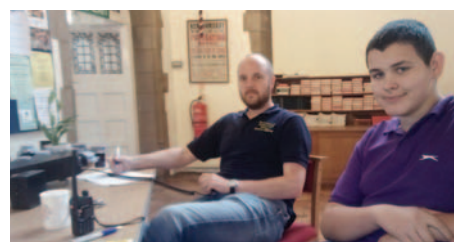
GB4SBC made 88 QSOs including 15 to other CHOTA stations.



The CW station operating GB1LIM in Wigan.



GBOWAC at St Mary the Virgin, Essex.



Iván, M6HET is pictured with Stewart, MOSDM at the St Anne's Church.

that I was an avid CB radio operator, Steve disclosed that he was a radio amateur with the callsign G0JFM. He invited me to see his shack and see what it's all about. Seeing Steve making contact (with not much effort) with a station in Canada, I was completely sold the idea of becoming a radio amateur! Having completed the Foundation course and examination through the Felixstowe & District ARS, I helped Steve organise a station for CHOTA at Saint John the Baptist church in Wantisden, Woodbridge, Suffolk.

We used Steve's Yaesu FT-450 with his ATAS mag-mount aerial, using only 100W. I took along my Yaesu FT-857D, but without batteries and, the church having no mains electricity, it was pointless. *Note To Self:* remember to take batteries with rig when planning mobile operations!

We had 14 successful QSOs and it was a thoroughly enjoyable day. This was my first time in taking part in a Special Event Station and I can certainly recommend it.

**Paul Griffiths, M6PNC**

### GB4SBC

The station was set up at St Barnabas Church, Franche, Kidderminster. Conditions were again poor. We started on 80m for about two hours and managed to make 29 contacts, including two churches. Then we moved to 40m, by that time it was alive with inter-G type QSOs. So the remainder of our time was spent there, although we ended up on 20m for the final 3 contacts. In all, we made 88 QSOs including 15 churches / chapels. The VHF station only managed 8 QSOs.

Equipment on HF was the Icom IC-7300, 100 watts to a G5RV, the centre of which was hoisted to the top of the flagpole on the church tower.

**Geoff, G4ACS**

### GBOWAC

Rather better conditions than last year for the station at St Mary the Virgin, Wendens Ambo, Essex. Using 40m, 14 other CHOTA stations were contacted and about four others were heard but not raised. We used a Yaesu FTdx1200 running 60W to an inverted V half wave dipole in the church graveyard.

**Robert Wilson, G3YZO**

### GB1LIM

Once again the friends at Lowton Independent Methodist Church in Wigan handed the church over for the day to Newton-le-Willows ARC for CHOTA. Conditions were poor but GB1LIM was active on HF, VHF and UHF using datamodes, CW and, this year, we also worked DMR via our local Brandmeister Repeater, GB7JL, and via our local All\*Star node thanks to the NoV holders.

As is the custom at the church and the radio club, a copious amount of tea was consumed and a great day was had by all. We took the opportunity to get members of our current Foundation course on the air and we are pleased to say they passed the exam two weeks later.

**Alan Nixon, G1EFU**

### GB2SAG

In September, South Kesteven ARS operated St Anne's Church in Grantham for the Churches and Chapels on the Air (CHOTA). One of the highlights was junior member Iván, M6HET (who is an ATC cadet at the 47F Grantham) making a contact with the GB75ACO station commemorating 75 years of the Air Training Corps.

**Andrew Garratt, MONRD**



The most northerly church in the UK.

### GB2HMC

Transmitting from the most northerly church in the UK, I was delighted to make contact with two CHOTA stations – GB0LOW in Lowthorpe and Halifax Radio Club, who were operating from Blackshaw Head Methodist church. Notwithstanding the European contest on 20m, I did manage a few contacts on 20m (one at 14.165 and the rest on 14.300MHz – those in between were full of contesters) including a Castles On The Air station. The day was reasonably successful since I finished with two QSOs with North Carolina and Florida.

It's interesting to note that the bulk of my QSOs were on 17m. 40m, generally speaking from my point of view, was quite poor. All in all, I'm really glad that I chose Shetland for this event.

**Geoff, G0PFH**

**Elaine Richards, G4LFM**  
radcom@rsgb.org.uk



# Moxon Rectangle

## stealth beam for 20 metres

**W**ire antennas have been and will always be the backbone radiating system of the majority of fixed HF amateur radio stations. However, the capability to rotate a beam antenna can give the radio operator far more control over the transmitted and received signal particularly on long haul contacts in today's band conditions.

Although even on 80m some can boast rotary arrays, for most of us a beam means 20m and above. This project provides a low cost, rugged lightweight beam with good gain, great front to back ratio and full-size elements for 20m. Easily constructed from readily obtainable components and having reduced visibility characteristics, it aims to be neighbourhood friendly. Although this article refers to measurements for a 20m version, the design can be modified for other bands.

### Beam design type

The beam type chosen is the Moxon Rectangle. Full credit is given to the late Les Moxon, G6XN for his creative design, probably partly based on the Button Beam by Fred Caton, VK2ABQ [1]. In my opinion Moxon's 2 element design, in its wire element format, gives more 'bang per buck' than many other arrangements. Having used this beam for some 5 years at my West Sussex QTH at a height of only 20 feet, raising it recently to 25 feet, I have consistently been impressed with the performance. A search on the internet for the Moxon Rectangle will give all the necessary electrical design measurements, including the *Moxon Rectangle Generator* [2], which gives the two wire element lengths for any frequency and the critical spacing details. You will also find in browsing the web that the Moxon Rectangle has almost a cult following. References [3] and [4] are informative.

Measurements in this article are for the 20 metre band. In my version, the matt black finished, tapered spreaders and black wire elements aim at elegant simplicity with a low visual profile. It is also lightweight, weighing in at around 3kg. With this beam more is less!

**Photo 1** shows a general view of the completed aerial (which is, of course, hard to see because of its 'stealth' nature). **Photo 2** is a close-up of the central spreader plate, which is key to the design.



**PHOTO 1:** General view of the completed aerial (which is, of course, hard to see because of its 'stealth' nature).

### Parts and sources

- A 40 x 23cm plastic chopping board for the centre spreader plate. I got mine from Robert Dyas but there are many sources
- The element spreaders are 6m fibreglass telescopic fishing poles, available from fishing tackle shops and a wide range of online sources. You will need four
- A 3m fibreglass pole for the feed support and reflector support
- Plastic/nylon pipe clips to suit large end diameter of spreaders (4 required) and the shorter element supports (2 required) – available from DIY suppliers (take sample sections with you to check the size)
- M4 size *stainless steel* nuts, bolts and washers in various lengths. Obtain sizes as required – marine chandleries and internet sources are your best bet
- The sub mast side support is made from a 150/200mm shelf bracket (dependant on the spreader plate size) – I used Homebase part no 015082/030192
- For the sub mast I used a 32 by 300mm furniture leg, Homebase part no 298984
- You'll need a supply of cable ties. I used 5mm width, but that's not critical. They're available from electrical suppliers. Some of the cheaper types break down in ultraviolet light so it's worth getting ones intended for outdoor use
- The element wire should be multi strand 32/0.2 (no thinner). I used RS 356-729 32/0.2T3 Black 50711
- Use a moulded dipole centre connector with a built in SO239 coax socket – advertised in *RadCom* and elsewhere

- 1:1 coax balun, wound on an appropriate core and weatherproofed in a suitable plastic box (see Photo 2)
- A small amount of fishing line – thicker line is easiest to handle. Tie knots using a non slip fisherman's knot [5]
- Black underseal paint, eg Hammerite Stone Chip Shield, from Halfords etc
- Some 30-minute two part epoxy glue
- Some self-amalgamating tape
- Some 600 grit wet and dry paper
- A little petroleum jelly.

### Centre plate construction

Locate the centre of chopping board and using a protractor mark the spreader positions, ensuring correct angles are maintained as in the centre plate drawing (see **Figure 1** and Photo 2). It may help to cover board with paper (fixed with masking tape) as it's hard to mark the board surface with pencil.

Offer up the large spreader outer sections, element supports, the pipe clips, balun unit, shelf brackets and sub mast and 'dry assemble' on the centre plate. When satisfied with locations of components, drill the necessary holes and mount the parts, starting with sub mast and shelf bracket supports (**Figure 2** and **Photo 3**). The clips must be mounted along the 140° lines as per the drawing so the large spreader outer sections are set at the critical angles in order to provide the antenna elements with the correct fastening points. When satisfied with the positioning of component parts, drill the centre plate appropriately using a sharp drill



**PHOTO 2:** Close-up of the central spreader plate, which is key to the design.

to match the appropriate bolts. Now remove all parts from centre plate and set them aside.

### Painting the spreaders and supports

Firstly, take the four larger fishing poles and remove the thinner top section; these can be set aside as they're not needed for this beam. Then take apart the 3 metre pole and select the suitable sections for the reflector support (2m) and the larger cross section for the feed point support (1.5m). This latter support should have an internal diameter able to take a length of RG58 coax feed from driven element feed point (dipole centre connector) to the balun unit mounted on the centre plate. Disassemble all the retained poles into sections.

Start preparing the poles by lightly sanding with 600 grit 'wet and dry' paper. Cut each sheet into 6 pieces and leave them soaking for 10 minutes before use in water with dash of

washing up liquid. By wrapping the wet and dry around each section in turn, abrade them just enough take the shine off the finish. This is an easy job and should only take about 40 minutes per long spreader. Dry the pole sections with a cloth and leave to 'air'. Before spraying, use masking or electrical tape to protect the relevant male ends as they are a tight friction fit and should not be painted.

Spraying is best done outside on calm dry day or in the garage with door open. Lay all the pole sections side by side to optimise spray coverage and after each spray layer dries (15 minutes, or one cup of tea) rotate the poles about 90 degrees and repeat process. All sections should be dealt with in an easy few hours.

The spreaders can be assembled later when required – a spot of suitable super glue can be applied to the joints or, if you do not wish to commit, a couple of turns of good quality electrical tape will suffice. I did no

more than pull the sections out firmly with slight twist and they have remained locked for 5 years.

### Painting the centre plate sub mast

The small mast that fits into the rotator is made from a metal DIY table leg and shelf brackets. These are the only items that could rust (made from mild steel). They are already painted but should be given several additional spray coats of the black underseal paint. Three coats can be done in an hour.

### Painting the centre plate (chopping board)

The chopping board is sprayed on the underside with underseal paint. Test a small area for adhesion and if necessary undercoat as appropriate first (see test patch in Photo 3).

### Driven and reflector elements

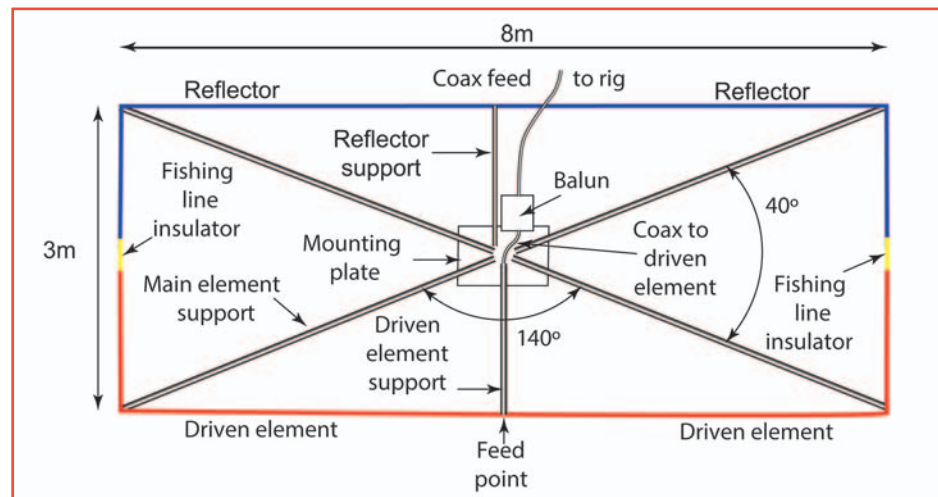
Based on a centre operating frequency of 14.2MHz, make the driven element 10.1m and the reflector 10.6m in length. At the insulated spacer end of elements allow a small extra length (the small coiled portion in **Photo 4**). This will provide for easy lengthening if needed. Use fishing line or cable tie to provide insulated gap, using a non slip knot when tying nylon line. I initially used a cable tie but amended this to fishing line. Photo 4 should make this stage clearer.

### Feed point support

Take the feed point connector unit and fit it over the smaller end of the feed point fibre glass support (1.5 metres). Before doing this ensure the RG58 coax is a snug fit through the smaller end – trim this end to suit. Secure the connector with two-part epoxy resin. Take a 2m length of RG58 coax and fit a PL-259 plug to one end – but do not run it through support at this stage.

### Assembly method

Refer to Photo 2. Start with the centre plate assembly using a garden table or work bench to provide support. First fit the sub mast and side supports. Following this, mount the spreaders using pipe clips and as extra mechanical security fit cable ties round each spreader between the clips (drill hole either side of spreader at clip). These are not shown on the photo.



**FIGURE 1:** General representation of the 'stealth' Moxon.





PHOTO 3: General arrangement of the stub mast and bracket.

Fix the balun unit to the plate at using suitable nuts and bolts. Take the pre-prepared wire elements (driven and director) and offer up to the spreaders. Note that the fastening points are 1.19 metres from the ends of the driven element and 1.43 metres from ends of the reflector (see Moxon Generator [2] detail). When satisfied with positioning, fasten with cable ties (not too tight at this stage so you can adjust or cut them off if necessary).

Next fit the feed point support and driven element support. These items should be trimmed for length. Connect the driven element sections to the feed point unit and the *approximate* centre of the reflector element to its support point with small cable tie – securing it with a dab of epoxy is helpful. Take the pre-prepared coax link, cut to length to suit the balun box position and fit a second coax plug. Connect the plugs to the feed connector and balun unit. Connect the insulated sections between the element ends. Now move the spreader support fastenings (along spreaders only) if necessary to mechanically trim the beam.

### Testing

Using a suitable temporary support (step ladder, piece of mast etc), raise the beam to about 2m above the ground. We are now ready to connect some RF to the balun unit input and examine the resonance. The best way is to use an antenna analyser but if this is not available then use an appropriately small amount of RF in conjunction with SWR meter and draw a graph of frequency against SWR. The resonance should be at about 14.0MHz at this height, based on a target resonant frequency of 14.2MHz. Note: the resonant frequency will *rise* 1 to 1.5% when the beam is at the operating height. Now install antenna at operating height and check its resonance. As required, lengthen elements from the small coil of spare wire (or prune it) accordingly. Go carefully at this stage – even though this beam is fairly forgiving it pays to proceed with caution.

Once satisfied with the assembled unit, tighten all fastening points and seal the connections with self amalgamating tape (or your other method of choice). I think the

terminal points are best waterproofed with a little water resistant grease or petroleum jelly (Vaseline).

### Rotator system

I initially fitted a TV type rotator to my 20ft homebrew tilt over mast. It worked for about three years until a storm stripped the gears. The beam survived. I then got a mid-range Yaesu rotator, even though the smallest type is more than capable of handling this beam.

I have always found it a good discipline to turn my rectangular configured beams end on to the wind in stormy weather.

### Conclusions

My stealth beam has been in use for some five years. Its longevity is in no small part due to the humble fibreglass fishing poles. A homebrew Yagi I built with the wire elements sleeved inside fibreglass poles has also been highly successful. It is still working on a rooftop mast system after 20 years! These fibreglass poles can really be tough.

I have just improved my mast system by purchasing a pump up system, which is very versatile. This beam is so light that a manual push up mast will work fine and these seem very good value for money.

I am able to work ZL and VK with the best of them and DX in all directions. The low visual impact of the antenna keeps my neighbours happy to so it's win-win!

Happy 'stealth DXing' with yours.

### Websearch

- [1] See August 2016 *RadCom* Antennas column
- [2] [www.ac6la.com/moxgen1.html](http://www.ac6la.com/moxgen1.html)
- [3] [www.qsl.net/dk7zb/Moxon/Moxon.htm](http://www.qsl.net/dk7zb/Moxon/Moxon.htm)
- [4] <http://tinyurl.com/havm3go>
- [5] [www.animatedknots.com/nonslipmono/](http://www.animatedknots.com/nonslipmono/)



PHOTO 4: General view of the driven element.

**NEW  
TITLES**



## RSGB Yearbook 2017

Edited by Mike Browne, G3DIH

The *RSGB Yearbook 2017* contains the latest details of over 86,000 UK and Irish Republic callsigns in 544 pages and remains the most comprehensive guide to amateur radio in the UK and worldwide.

Added to the callsign data there are 176 pages of invaluable reference material. There is all the latest information on every aspect of the RSGB. Regional information provides details of the RSGB Regional Manager Team, local clubs, contest, repeater and emergency groups alongside examination details. There is a huge range of information sections included from Repeaters, Beacons, Band Plans, RSGB Awards, RSGB Contests and HF Propagation Predictions for 2017.

### FREE CD with RSGB Videos

The bonus CD contains all the 176 information pages of the *RSGB Yearbook 2017* in a searchable PDF format, also four amateur radio videos produced by the RSGB. These new videos include:

- GB1SS schools calling Tim Peake
- 21st Century Hobby - youth video
- Amateur radio - a world of possibilities
- RSGB volunteers video

The *RSGB Yearbook 2017* is the essential publication for every well-equipped shack.

210x297mm 544 pages,  
ISBN: 9781 9101 9323 5

**Non Members' Price: £19.99**

**RSGB Members' Price: £16.99**

## RSGB Deluxe Logbook & Diary 2017

Nothing sits better on the bench of an amateur radio shack than a well maintained logbook, providing at a glance records of those special contacts. If you are looking for an attractive way to record your log, the *RSGB Deluxe Logbook & Diary 2017* provides an ideal solution. Attractively designed this popular annual book contains a wealth of extra material.

*RSGB Deluxe Logbook & Diary* contains the latest UK Band plans, RSGB Contest Calendar, DXCC prefix list and RSGB QSL Bureau information, a locator map (and an explanation of how locators work), repeater information, diary section, notes pages, handy lists of operating abbreviations & codes. The logbook section isn't forgotten either and there is a generous log section with plenty of space.

The *RSGB Deluxe Logbook & Diary 2017* includes:

- Current UK band plans
- European locator map
- Prefix guide
- Repeater listings
- QSL bureau information
- RSGB Contest Calendar
- Generous Log section
- 2017 Diary
- Handy lists of abbreviations & codes

Much more than a standard logbook - yet at the same price!

Size 210x240mm

**Non Members' Price: £4.99**

**RSGB Members' Price: £4.24**

## Callseeker Plus 2017

### UK and European callsign information

Whilst the *RSGB Yearbook 2017* provides the latest UK and Republic of Ireland callsign data you can have even more with the *Callseeker Plus 2017*, as it also provides a host of European callsign data as well.

*Callseeker plus 2017* is easy to use and provides call information from 9A, DL, EA, ES, F, HA, HB9, I, LX, LY, OE, OH, ON, OZ, SM, SP, SV and Z3. You can search by callsign, name or location and navigating through the search results is quick and easy. *Callseeker Plus 2017* is the ideal way to search for European QSLs

*Callseeker Plus 2017* also boasts a host of "extras" from across Europe, including the *RSGB Yearbook 2017* reference information pages in an easily searchable PDF format providing the very latest amateur radio reference information from the UK and around the World.

### RSGB Videos

This year we also include four amateur radio videos produced by the RSGB.

### Two formats – one price

The *Callseeker Plus 2017* is also available as either a traditional CD ROM or an USB Memory Stick version. The CD is in the full jewel case whilst the memory stick is encased in an Eco bamboo shell. Both provide a great alternative to the traditional *RSGB Yearbook*.

**Cheaper than a RSGB Yearbook 2017 – what a bargain!**

**Non Members' Price: £16.99,**

**RSGB Members' Price: £14.44**



**Radio Society of Great Britain [www.rsgbshop.org](http://www.rsgbshop.org)**

3 Abbey Court, Priory Business Park, Bedford, MK44 3WH.

Tel: 01234 832 700 Fax: 01234 831 496

**FROM FREE P&P**  
on orders over £30. See Page 78

**E&OE** (All prices shown plus p&p)



# Ofcom's approach to VDSL

**A**s Director of Spectrum Technology, Engineering and Enforcement at Ofcom, I enjoy the opportunity to meet with representatives of the RSGB. Radio amateurs are an important stakeholder group for Ofcom and, as a licence holder myself, I have a personal interest in the hobby.

It is clear from my discussions that there is some concern within the radio amateur community about the impact of VDSL (Very High Speed Digital Subscriber Line) and other new technologies. I'd like to address that concern, and also explain a little about Ofcom's role.

Since Ofcom was created thirteen years ago, there have been considerable technological, social and economic changes. Our predecessor, the Radiocommunications Agency (RA), had around one hundred field engineers operating from a number of regional centres. In recent years, given the more challenging economic climate, public bodies like Ofcom have had to ensure we use our resources as efficiently as possible. This has allowed us to reduce our like-for-like real-terms budget for 11 years in a row.

This means our Spectrum Engineering Officers must prioritise and address a wide range of services. They are responsible for investigating interference affecting everything from emergency services to business radio, mobile phone networks, fixed links and satellites. They are also engaged in proactive work to identify unlicensed use of spectrum, and they assist with scientific research and measurements aimed at protecting and managing the airwaves.

Many RSGB Members may have fond memories of the days of the Radio Interference Service or the RA. Of course, times must change, and today our thirty engineers must cover the entire UK. As you would expect, their time is in great demand. So it's vital that we prioritise and target the work we do in the field.

In recent meetings with the RSGB we have discussed the issue of interference, including interference caused by the deployment of VDSL by Openreach. We at Ofcom appreciate that many radio amateurs invest a lot of time and resources in their hobby. We also appreciate how frustrating it can be when reception is affected by external sources such as VDSL.



This type of issue is more problematic when working on HF bands, particularly when on the fringes of what is feasible.

The RSGB is having ongoing discussions with Openreach and Ofcom on the effects of VDSL. Openreach has been receptive, and has sought to resolve faults on its network that have created some individual issues. But those efforts may not solve every problem experienced by individual radio amateurs. So we have worked with the RSGB and Openreach to better understand the issues. One outcome has been to conduct a joint research project looking at a small sample of VDSL cases. From Ofcom's perspective, we know there are over six million VDSL installations throughout the UK. These installations provide high-speed internet connections to millions more businesses and consumers.

By comparison, the number of unconfirmed reports of interference to radio reception received by the RSGB is just over 100. This represents a very small proportion, given the millions of VDSL lines in use, but I understand that is probably of little comfort if you're one of those affected.

Our work indicates that under certain conditions the emissions from overhead cables carrying VDSL services can raise the local noise floor and this may affect a receiving station in certain bands if the antenna is located close to overhead cables. This may limit the capability to receive weaker transmissions. Faults in the Openreach plant may cause the noise floor to be higher than normal and Openreach endeavour to get such issues fixed whenever they are identified.

Such problems may be challenging to resolve, and may persist even when Openreach has rectified any network issues, although careful design and location of a receive station including the aerial systems also plays a significant part in preventing or rectifying problems.

We understand how frustrating such cases can be, though it is hard for Ofcom to intervene. We are required to act reasonably, responsibly and to make efficient use of our resources.

We must be proportionate, accountable, transparent and consistent. Given the scale of VDSL interference, attempting to fix individual cases may not be proportionate and in the wider public interest. Nor might we have the legal powers to intervene in all cases.

Although we are sympathetic to radio amateurs experiencing issues with interference, the hobby, by its very nature, often relies on receiving signals far weaker than would normally be used in commercial radio use. Of course, that can sometimes lead to unavoidable interference. Unfortunately, operators who are seeking to receive a weak signal from a distant source can't be guaranteed access to interference-free use of the radio spectrum in all circumstances. Indeed, Ofcom can't guarantee interference-free spectrum to any stakeholder.

So we will continue to judge each case on its merits and exercise discretion on what further action is appropriate in individual cases.

Ofcom will always be on hand to offer advice and assistance in response to reports of interference to radio communications.

We also welcome the RSGB's EMC Help page <http://rsgb.org/main/technical/emc/> which assists not only Members, but anyone who may be affected by VDSL or other interference problems.

## RSGB Comment

Whilst we are grateful to Ofcom for stating their position, many of the views are not shared by the RSGB. The EMC committee will publish a reply in the next issue of *RadCom*. Meanwhile, Members' comments on this article would be welcome via the EMC Matters forum or to [emc.chairman@rsgb.org.uk](mailto:emc.chairman@rsgb.org.uk)

## Mark Walls

Ofcom Director of Spectrum,  
Technology, Engineering and  
Enforcement

**bhi**

## Clean up weak signals.. ..with a **bhi** DSP noise cancelling product!



**NES10-2 MK3** - Amplified DSP Noise Cancelling Speaker  
- 2.7W audio output - Headphone socket - 8 filter levels - Rotary filter select knob - Connect to a 12V DC power supply - Easy to use!

**Dual In-Line** - Dual Channel amplified DSP noise eliminating module - Suitable for all radios, receivers and SDR - Mono or stereo input & output options - 7W mono audio output, line level & headphone o/p sockets - Ideal for DXing and special event stations - Includes new improved DSP noise cancelling!



bhi Ltd, 22 Woolven Close,  
Burgess Hill RH15 9RR, UK  
Tel: 01444 870333

Check out our website  
for some festive offers!

### DESKTOP



Amplified DSP base station speaker - 10W audio  
- Separate volume and filter level controls - 8 DSP filter levels 9 to 35dB - Speaker level and line level audio inputs - Sleep mode - Size 200x150x160mm - Supplied with manual, audio lead and fused DC power lead



### DSPKR

10W amplified DSP noise cancelling speaker - Easy control of DSP filter - Sleep mode - Filter select & store - Volume control - Input overload LED - Headphone socket - Supplied with manual & fused DC power lead

### NEIM1031 MKII

Fully featured Amplified Noise Eliminating In-Line module  
- 2.8W audio - Audio & line level inputs/outputs - 50Hz to 4.5KHz bandwidth - 12 to 24V DC - Headphone socket - Separate input level & volume controls - 8 filter levels 9 to 35 dB



### Compact In-Line

- Use in-line with your radio and headphones  
- New improved DSP noise cancelling  
- Easy to use with mono or stereo inputs  
- 8 filter levels 9 to 35dB  
- Separate volume control & input overload  
- Use mobile or in the shack - Over 40 hours battery life from 2 x AA cells or use 12V DC input - Size: 121x70x33mm



[www.bhi-ltd.com](http://www.bhi-ltd.com)



Designed and built in the UK, the SDRplay Radio Spectrum Processors are wideband full-featured SDRs. All they need is a PC and an antenna to provide excellent communications receiver functionality. Combined with the power of our own SDRplay SDR software, enjoy all modes of operation while monitoring up to 10MHz of spectrum at a time. The new RSP2 provides three software selectable antenna inputs, & additional stability and clocking features—visit [www.sdrplay.com](http://www.sdrplay.com) for more information

- RSP1 £118.80 including VAT & RSP2 £156 including VAT
- 12-bit ADC silicon technology (not another 8 bit dongle!)
- Good sensitivity, selectivity and low noise floor
- Perfect for use as a Panadapter
- Ideal for portable operation (powers via USB)
- Covers all amateur bands through HF, VHF and UHF
- Real time visualisation of an entire band's activity
- Strong and growing software support network

[www.SDRplay.com](http://www.SDRplay.com)

SDRplay Ltd.

6 Thornes Office Park Monkton Road Wakefield, WF2 7AN

## Job opportunity

### Duty Engineering Officer: Spectrum

Based in Baldock, Hertfordshire

Ofcom is the independent regulator and competition authority for the UK communications industries.

Ofcom's Spectrum Services Team is part of Spectrum Engineering & Enforcement (SE&E) whose aim is to keep the spectrum free from interference.

**The Role:** The Spectrum Services group is seeking to appoint one **Duty Engineering Officer** to work as part of a 12-person team working in pairs within a 24-hour shift working pattern.

You will act as the point of contact for the reporting and elimination of interference on a national and international basis.

In addition, be first point of contact responsible for Case Management for Safety of Life, Critical Services, domestic and commercial reports of other potential Interference.

Ofcom offers competitive salaries plus pensions and flexible benefits package.

For more information and to apply for this role see:

[www.ofcom.org.uk/jobs](http://www.ofcom.org.uk/jobs)

Closing date:  
4 January 2017

**Ofcom**  
making communications work  
for everyone



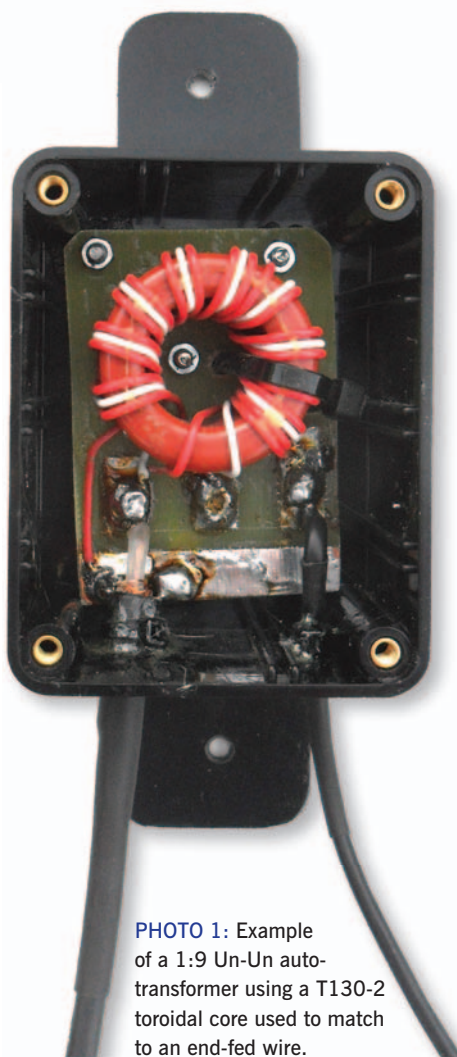
# Antennas

**This month we have an overview of matching unbalanced HF antennas using an unbalanced-to-unbalanced (Un-Un) transformer, followed by a summary of examples of this technique.**

## Unbalanced antennas, the end-fed wire

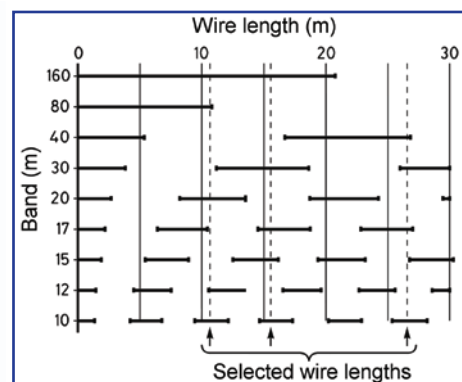
An example of an unbalanced antenna is the end-fed wire. It comprises a simple span of wire suspended as high as possible between two anchor points. This may seem a rather straightforward antenna, however an end-fed wire can achieve surprisingly good results and can be fairly inconspicuous compared to other types of antenna. With the antenna's wire span secured at height at each end, the equipment is connected to the wire span's nearer end using a short length of wire run from the aerial tuning unit (ATU) unbalanced termination. The ATU then provides the mechanism to match the antenna to the transceiver. However, one of the undesirable aspects of the end-fed wire is that it can present a wide range of impedances at its feed point and many ATUs have difficulty accommodating such a range. In addition, with the wire being directly connected to the ATU, a significant amount of the transmitted RF power could be radiated in the shack. This is could result in various undesirable effects including RF burns and interference to other equipment.

The length of the wire span determines the lowest band that is practical to use and several sources provide suitable guidance on wire length, eg [1], [2]. An eighth wavelength ( $\lambda/8$ ) span of wire is about the minimum practical length one can use and this tends to present a low impedance at the wire's end. The same wire will also work as quarter wavelength ( $\lambda/4$ ) antenna and similarly tends to present a low impedance at its end. However, when the wire becomes a half wavelength ( $\lambda/2$ ) the impedance presented is very high and can result in problems with trying to match the antenna to the transceiver using a conventional ATU. Similarly, when the wire is a wavelength ( $\lambda$ ) long then the impedance presented becomes high. When the wire becomes two wavelengths long ( $2\lambda$ ), the impedance presented tends to be low at its end.



**PHOTO 1:** Example of a 1:9 Un-Un auto-transformer using a T130-2 toroidal core used to match to an end-fed wire.

Guidance for selecting an optimum length for an end-fed wire antenna was described by Alan Chester, G3CCB, based on matching an end-fed wire using conventional ATUs that use variable inductance / capacitance to tune out mismatches [2]. **Figure 1** illustrates the wire lengths covering the nine HF bands starting with 160m. The heavy lines running horizontally indicate areas where the impedance presented at the wire's end might exceed the matching capabilities of many ATUs. To assess if a particular length of wire is suitable, a vertical line is dropped down the diagram. Where the vertical line encounters a heavy line, then this wire length could be expected to be difficult to match using a conventional ATU. Within **Figure 1**, three broken vertical lines have been included to indicate



**FIGURE 1:** Aerial wire lengths, showing 'no-go' lengths for various bands (see text).

practical lengths that cover more than one band. As an example, using the broken line for a 26.5m wire length, this allows potentially eight bands to be covered from 160m (excluding 10m, where difficulties in matching could be encountered using a conventional ATU).

## An overview of the Un-Un transformer

A technique to resolve situations where the impedance presented by an end-fed wire exceeds the ATU's capabilities is to transform the impedance to bring it into the range of most ATUs. A method to do this is to use an unbalanced radio frequency auto-transformer connected between the antenna and the ATU. This arrangement has the advantage that a length of coaxial cable can be run between the ATU and the transformer allowing the antenna's feed-point to be remotely located outside, away from the shack. Assuming the antenna is situated at a suitable distance, this arrangement has the advantage of minimising RF power from being radiated within the shack, so avoiding any undesirable effects that this may cause. However, it may be necessary to earth the shield of the coaxial cable to minimise any common mode currents. The concept of this arrangement is shown in **Figure 2**.

## The Un-Un transformer

Transformer baluns using iron powder toroid cores can be constructed to cover frequency ranges from about 2 to 40MHz. Balanced versions of the transformers were described in the October Antennas column,

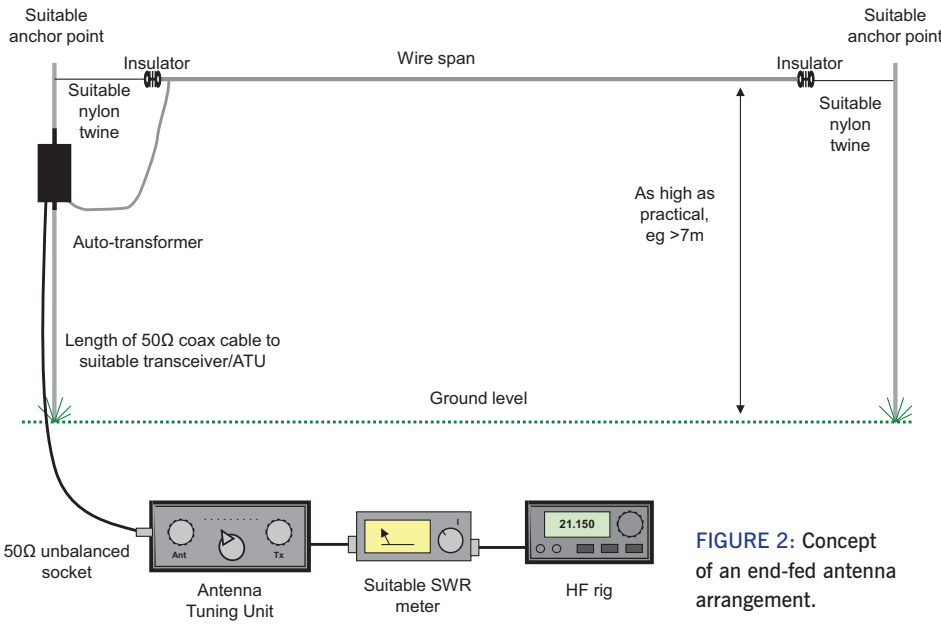


FIGURE 2: Concept of an end-fed antenna arrangement.

where the operation of these transformers was summarised. To enable the transformer to work efficiently, it is important that the wires forming the windings are laid side-by-side to maximise the magnetic field coupling between them. There will always be some leakage inductance associated with a transformer and this increases in proportion to the transformer's self-inductance. Therefore, a transformer that works well at 3.5MHz may not work as well at 28.5MHz and this often shows as a worsening SWR as the frequency is increased.

The concepts of a 1:9 and a 1:4 impedance transforming ratio unbalanced-to-unbalanced auto-transformers (Un-Uns) are shown as **Figure 3**. If the end-fed wire is thought of as being connected to the transformer's secondary winding, then the ATU's unbalanced 'antenna' socket is connected to the transformer's primary winding. The antenna's impedance

presented at the transformer's secondary winding is transformed down to present a lower impedance at the primary winding, enabling it to be brought within the capabilities of most ATUs.

Peter Miles, VK6YSF and John Parfrey, MOUKD have published several toroid iron powder core Un-Un 1:9 and 1:4 impedance ratio auto-transformer designs for use with end-fed wires, with details made available online [3], [4]. These designs used both the T130-2 and larger diameter T200-2 Micrometals iron powder toroids obtainable from online suppliers.

A series of tests were made for 1:9 transformers wound on both T130-2 and T200-2 cores with approximately 10m of RG58 50Ω coaxial cable connected to the unbalanced primary winding. This was to simulate the situation where the transformer is used remotely from the transmitter (eg at the antenna feed point). The 1:9 T130-2 transformer comprised 9

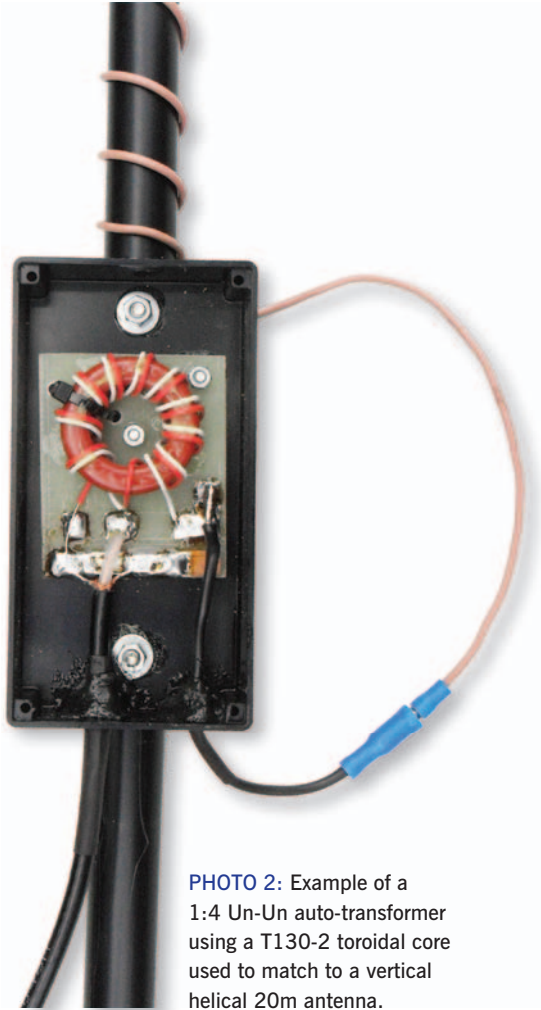


PHOTO 2: Example of a 1:4 Un-Un auto-transformer using a T130-2 toroidal core used to match to a vertical helical 20m antenna.

trifilar wound 3-wire turns, while the 1:9 T200-2 transformer comprised 18 trifilar wound 3-wire turns. A 450Ω dummy load was connected to the secondary winding and the coaxial cable was connected to the transmitter via an SWR meter. A CW signal of 35W was applied and the SWR recorded at a range of frequencies. The results from these tests for both types of toroidal core are shown in **Table 1**.

A second series of tests were made for 1:4 transformers wound on T130-2 and T200-2 cores. Similarly, approximately 10m of RG58 50Ω coaxial cable was connected between the transmitter/SWR meter and the transformer's primary winding. The 1:4 T130-2 transformer comprised 9 bifilar wound 2-wire turns while the 1:4 T200-2 transformer comprised 18 bifilar wound 2-wire turns. The results from these tests are shown in **Table 2** using a 200Ω dummy load connected to the secondary winding for both types of toroidal core.

TABLE 1: Comparison of the measured SWR for T200-2 and T130-2 toroidal cores tested for 1:9 transformer turns configuration.

MHz	T200-2 SWR	T130-2 SWR
1.90	1.5:1	4:1
3.65	1.3:1	3:1
5.28	1.2:1	2.5:1
7.10	1:1	1.2:1
10.12	1:1	1.05:1
14.15	1.05:1	1.15:1
18.12	1.05:1	1.05:1
21.20	1.4:1	1.2:1
24.95	1.8:1	1.2:1
28.50	1.5:1	1:1
50.20	4:1	1.1:1

TABLE 2: Comparison of the measured SWR for T200-2 and T130-2 toroidal cores tested for 1:4 transformer turns configuration.

MHz	T200-2 SWR	T130-2 SWR
1.90	1.5:1	4:1
3.65	1.3:1	3:1
5.28	1.2:1	2.5:1
7.10	1:1	1.2:1
10.12	1:1	1.05:1
14.15	1.05:1	1.2:1
18.12	1.1:1	1.05:1
21.20	1.4:1	1.2:1
24.95	2.2:1	1.2:1
28.50	1.8:1	1:1
50.20	5:1	1.1:1

Mike Parkin, G0JMI  
email2mikeparkin@gmail.com



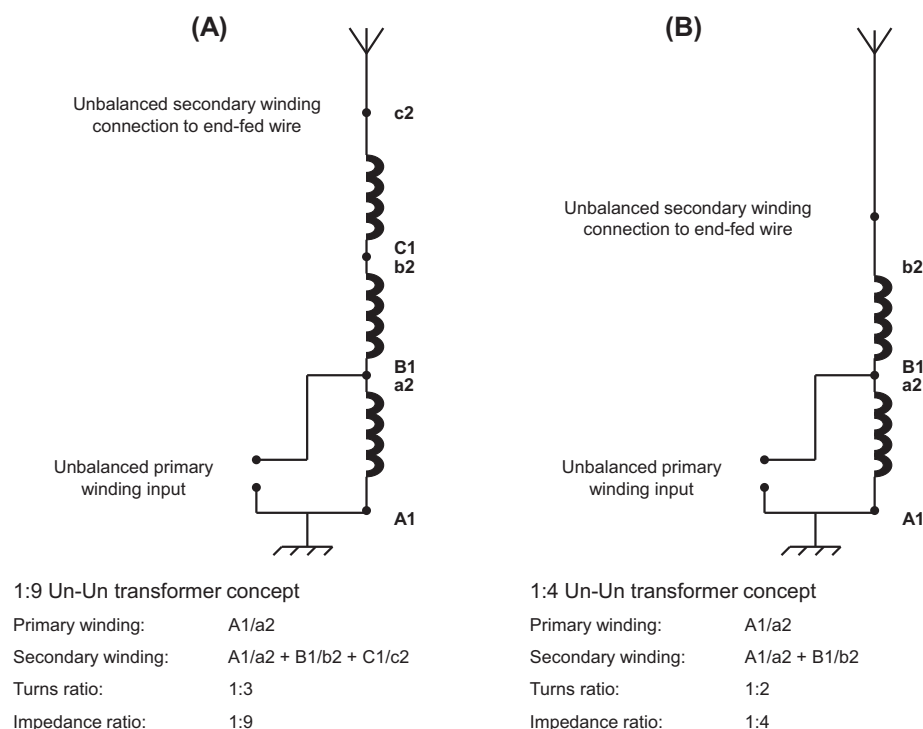


FIGURE 3: Concept of (A) 1:9 and (B) 1:4 Unbalanced-Unbalanced (Un-Un) transformers.

The two types of transformers tested used plastic insulated 0.7mm diameter copper single core wire for the windings. Figures 4 and 5 summarise the connection arrangements for these transformers for both types of toroidal core used.

The results indicated that, when tested:

- the more inductive T200-2 1:9 and 1:4 transformer configurations had a tendency to be more effective between 1.9 and 21.2MHz compared to the T130-2 transformers
- the lesser inductive T130-2 1:9 and 1:4 transformer configurations tended to be more effective from 7 to 50MHz compared to the T200-2 transformers.

### Examples of 1:9 and 1:4 Un-Un transformers in use

**Photo 1** illustrates an example of a 1:9 impedance ratio transformer using a Micrometals T130-2 iron powder toroid core that was used to match an end-fed wire covering the 40m to 10m bands. The antenna had a wire span of about 10m and this was mounted at around 7m. This transformer comprised 9 trifilar wound 3-wire turns with a small gap left between each turn as shown. **Photo 2** illustrates an example of a 1:4 impedance ratio transformer similarly using a Micrometals T130-2 iron powder toroid core that was used to match a helical vertical antenna tuned to the 20m

band. This transformer comprised 9 bifilar wound 2-wire turns with a small gap left between each turn as shown. Photos 1 and 2 show where the connection of the coaxial cable was made to the primary winding with the secondary winding's connection to the antenna. Another example of the use of the Un-Un transformer technique to match an end-fed wire antenna covering the 80m to 10m bands was published by Jos van Helm, PA1ZP, in the February 2016 *RadCom* [5].

### Conclusion

The Un-Un auto-transformer provides a means to match a transceiver/ATU to an unbalanced end-fed antenna. A variety of impedances can be expected to be encountered for this type of antenna depending upon the antenna's length and frequency in use. The Un-Un transformer provides a potential solution to enable the impedance presented at the antenna's feed-point to be matched using a conventional ATU that otherwise could be difficult to achieve.

### References

- [1] *HF Antennas for Everyone*, edited by Giles Read, G1MFG: Chapter 1, pages 1 to 3
- [2] *RSGB Radio Communication Handbook, 12<sup>th</sup> edition* edited by Mike Dennison, G3XDV, and Mike Browne, G3DIH: Section 15, Practical HF Antennas, Pages 15.13 to 15.15. (There is very similar material in the 2016 edition – Ed.)
- [3] VK6YSF projects, Peter Miles, [http://vk6ysf.com/unun\\_9-1.htm](http://vk6ysf.com/unun_9-1.htm)
- [4] MOUKD amateur radio projects, <https://mOukd.com/homebrew/baluns-and-ununs/91-magnetic-longwire-balun-unun/>
- [5] *RadCom*, February 2016: A 3 or 5 Band End-Fed Antenna by Jos van Helm, PA1ZP

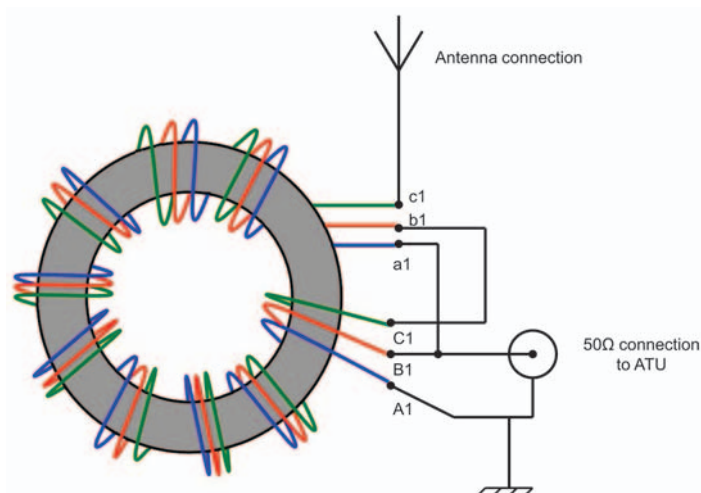


FIGURE 4: Un-Un 1:9 transformer connection details.

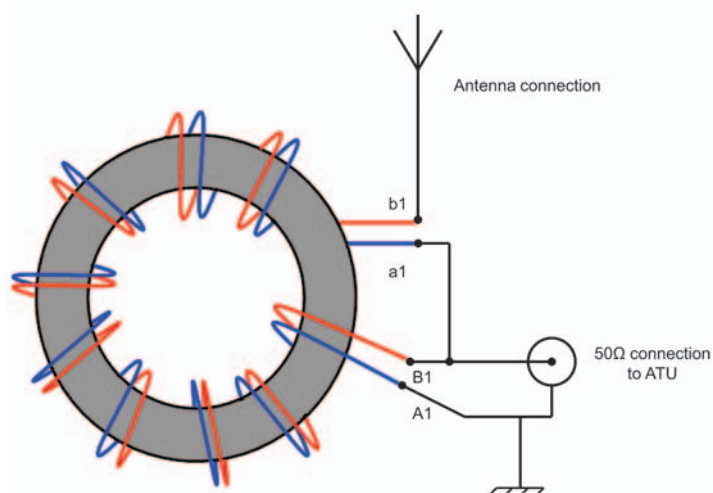




FIGURE 5: Un-Un 1:4 transformer connection details.

# ML&S

**Tel: 0345 2300 599**  
**Web: HamRadio.co.uk**

**SAFE ONLINE SHOPPING**  
 Shopping online with ML&S is safe and secure. E&OE

 **PayPal**

 FOLLOW US ON TWITTER AND FACEBOOK **HamRadioUK**

**Martin Lynch & Sons Ltd.** Wessex House, Drake Avenue, Staines, Middlesex TW18 2AP. E-mail: [sales@hamradio.co.uk](mailto:sales@hamradio.co.uk)  
 Opening Hours: Mon - Fri: 8.30am to 5pm. Sat: 9am to 4.30pm. International Tel: +44 1932 567 333

**DUE TO PRICE INCREASE ON ALL YAESU PRODUCTS, PLEASE SEE WEB OR CALL FOR LATEST PRICES.**

## YAESU FT-991

**HF-70cm with ATU Built-In**

Want Touch Screen Display with 160m through 70cm?

We have our final batch just arrived to beat the inevitable price increase.

**FT-911a now in stock - with updated features** Upgrade your original FT-991 to an 'A' model. Speak to our sales team.



Offering superb performance from Top Band to 70cm, the FT-991 is compact without being too small, easy to use without missing out on features and above all great value for money. **We love this compact base station radio. Beautiful touch-screen display & 160-70cm coverage.**

**BEAT THE PRICE INCREASES**  
**CALL NOW!**



**YAESU FTdx9000 SERIES**  
 Yaesu Flagship Champion!

**YAESU FT-817ND**  
 The Worlds Only All Band Portable!

**YAESU FTM-100DE** C4FM (Fusion) 2m Transceiver. 65W, 144MHz with AMS.

**YAESU FTM-3200E** Latest 2/70 Mobile with new digital C4FM (Fusion). Buy the HRI-200 Wires 11 Interface for only £99.99.

**YAESU FT-857D** Includes YSK-857 Remote Head Kit.

**YAESU FTM-400DXE**  
 Four modes of transmission. Large colour touch screen display.

**NIFTY DESK-TOP STAND**  
 For Yaesu FTM-400 series.

**ATAS-120A**  
 ATAS-120A Auto Mobile 40m-2m Antenna for FT-857/897/450/991.

**YAESU FT-8900E**  
 With **FREE** YSK-8900 Remote Kit. High-power FM on 10m, 6m, 2m & 70cm. When your local repeater is busy, slip onto 10m & work DX!

**YAESU FT-2D**  
 C4FM/FM 2/70 Dual band Handie.  
**FREE NH-85a11u Snapshot Camera.**

**YAESU VX-3E**  
 Micro Handie 2/70 with scanner.

**YAESU FT-60E** Twin band Handie.

**YAESU FT-1XE** Dual Band Full Digital Handie.

**YAESU VX-6E** 2/70 handie

**YAESU VX-8DE** Triple Band 6/2/70 with enhanced APRS.

**YAESU VR-120D**  
 100kHz - 1300MHz FM/WFM/A.

**YAESU VR-160** Miniature communications receiver.

**MD-100A8X** Base Station Microphone.

**MD-200A8X** Elite Deluxe base Station Microphone.

**YAESU DR-1XE** 2/70 C4FM + advanced mixed-mode repeater.

## YAESU ROTATORS

G-450C..... **SEE WEB**  
 G-1000DXC..... **SEE WEB**  
 G-5500..... **SEE WEB**  
 G-2800DXC..... **SEE WEB**  
 GS-065 Mast bearing..... **SEE WEB**  
 GC-038 Lower clamps..... **SEE WEB**  
 Rotator cable 25m..... **SEE WEB**  
 Rotator cable 40m..... **SEE WEB**  
 Rotator connector plugs..... **SEE WEB**  
**ML&S CARRY THE LARGEST STOCK OF YAESU ROTATORS IN THE UK AND AT THE BEST PRICES. CABLE & PLUGS ARE EXTRA.**



**NEW! MyDEL RADIO DUST COVERS**  
 See [Hamradio.uk/covers](http://Hamradio.uk/covers)  
 Beautifully crafted and hand stitched. Soft liner to deter from scratching radio. Most types in stock, only £29.95.



## YAESU FTdx3000

**HF/6m Base Station**

We have so many Customer Reviews of this brilliant HF Transceiver from Yaesu that it would take this entire page to print them. Suffice to say, it's a winner.

**Looking for a HF/6m Base Station sized radio at a VERY LOW PRICE?**

## YAESU FTdx1200

**HF/6m Base - Sister Rig to FTdx3000**

Can't quite stretch to the FTdx3k? No worries! The ever dependable FTdx1200 is available at a special price before the October PRICE INCREASES from Yaesu Japan.



See ML&S video review [HamRadio.co.uk/ftdx1200video](http://HamRadio.co.uk/ftdx1200video)



**HF/6m Base/Mobile**

## YAESU FT-891

A modern day FT-857 without 2&70. Bang up to date in looks and smaller than a 2m only FM rig of 25 years ago!  
**IN STOCK - NOW**

## NEW! Yaesu announce new M-1 Reference Microphone

- 9 Band Graphic Equaliser
  - Two microphone inserts
  - Treble Boost Cwling
  - Recording & Playback facility
  - Limited Edition 60th Anniversary with Gold Band
- Available shortly £595.00



## FT-450D WITH MyDEL MP-30SW BEST PRICE SEE WEB PLEASE



What a winning bundle! A brand new 3-year warranty FT-450D HF/6 with Auto ATU & a MyDEL PSU.

## YAESU FTdx5000MP LTD



The FT DX 5000MP HF/50MHz 200W Transceiver is a Premium Class Yaesu radio with 2 independent receivers plus many unique options and accessories designed to meet the performance requirements of even the most demanding serious Amateur Radio operator.

**In stock and on demo.**



## NEW ICOM IC-7300

THE UK'S LARGEST ICOM  
HAM RADIO DEALER!

Mike Richards G4WNC's full  
in depth technical review.  
See [www.MLandS.tv](http://www.MLandS.tv)

100 Watt - HF/50/70MHz TRANSCEIVER with SSB / CW / RTTY / AM / FM

**FINALLY EX-STOCK!** Call NOW to place your order.



The IC7300 sports HF+6m+4m coverage, it's 100W, houses an eye-catching touchscreen TFT display and includes an internal antenna tuner.

**Pssst!** Heard about the new Icom IC-7610? See our web site for more details!

## ICOM IC-7600 NOW ONLY £2399.95 LIMITED TIME OFFER

Large enough to feel like a proper base station format but won't take up an entire desk top, the IC-7600 is one of our most popular and reliable HF/6m transceivers. Call today to discuss your package with the very best in trade-in offers.



This Mid-range HF base station from Icom has arguably the best screen for user interface in the business.

**ICOM IC-7851 IN STOCK NOW!**



See [HamRadio.co.uk/ic7851](http://HamRadio.co.uk/ic7851)

Built to order like its predecessor, the new IC-7851 is set to be a master-class transceiver of the highest order. Based on the Limited production run and very exclusive IC-7850, the IC-7851 is available today to order. Top prices paid on all trade-ins. For more information call today.

**ICOM IC-9100 ML&S NOW ONLY £2499.95**  
HF through to 23cms Base Transceiver.

Or Plus 4 Pack with all 4 options. Only £3399.95  
UX-9100 23cm Module.....£623.99  
UT-121 D-Star Board.....£180.00



**NEW! NIFTY DESK-TOP STAND HOLDER FOR ICOM ID-5100. ONLY £29.95**



**ICOM IC-2730 DUAL BAND MOBILE ML&S £269.95**

A practical easy to use Dual Bander with remote head.



**ICOM ID-5100 ML&S ONLY £499.95**

Latest 2/70 D-Star Touch Screen Transceiver from Icom. Bluetooth connectivity and second station control through an Android device.



**ICOM IC-7100**

RRP £1249.95  
ML&S NOW ONLY £999.95  
WITH FREE SD CARD & HM-151 MIC.

Includes pre-programmed SD Card for D-Star repeaters.

### NEW ICOM ID-51plus 2

The new third generation ID-51A PLUS 2 versions adds two exciting new D-STAR modes of operation:

- Terminal Mode
- Access Point Mode



Available in 5 colours. For more details and price see [hamradio.co.uk/id51plus2](http://hamradio.co.uk/id51plus2)

ML&S HAS SOLD MORE KENWOOD HAM RADIO THAN ANY OTHER DEALER OVER THE LAST 10 YEARS

## NEW LOW PRICES ON KENWOOD



**TH-D74E**

Dual Band Handie with unique APRS, D-Star & HF SSB receive coverage.  
**£599.95**

See [hamradio.co.uk/thd74e](http://hamradio.co.uk/thd74e)

**KENWOOD TS-590SG HF/6M TRANSCEIVER**



**160-6M BASE WITH ATU ONLY £1159.95**

Add an MC-60A DESK MIC worth £119.95 for only £110!

Upgraded version HF & 6M FULL DSP Base Transceiver  
The best-selling HF transceiver just got even better.

**KENWOOD TS-990S HF+6M FLAGSHIP**



**200W HF/50MHz Base Station Transceiver with Dual TFT Display and Dual Receiver.**

See [HamRadio.co.uk/ts990](http://HamRadio.co.uk/ts990)

**SEE OUR WEBSITE FOR OUR FULL RANGE OF KENWOOD PRODUCTS**

**Wouxun**

**WOUXUN HANDIE, KG-UV9D PROPACK ONLY £149.99**

- KG-UV9D Transceiver
- Two batteries
- Two belt-clips
- Software and transfer data cable
- Fast charger dock and power supply
- Hand speaker mic
- Battery eliminator
- Manual
- Wrist strap
- Leather case
- In-car charger
- SMA-PL259 adaptor
- Hands-free kit



**WOUXUN KG-UV950PL NOW WITH 4M! ONLY £249.99**



Up to a full 50W output on 4m, this unique QuadBand mobile/base from Wouxun exclusive to ML&S. Bands covered are 4m / 6m / 2m / 70cm.

**WOUXUN KG-UV950P ONLY £239.99**

**Quad band heaven!**



**KG-UV950PL: £249.99**

**MS-5 HANDS FREE MIC**

Looking for a hands free mic for you car that actually works?

The MS-5. A safety microphone for mobile or base use that really is "plug & play". Available for most Icom, Kenwood & Yaesu Radios.



**ONLY £39.95**

**NEW CG-PK4 Pocket Keyer**  
CG Antenna introduce the new pocket Electronic Memory Keyer.

- Extremely small size
- Very low power consumption (160MicroAmps)
- Four memories with Auto Repeat function
- Selectable Keying Weight
- Built-in side tone ideal for training
- Keying speed 8-50WPM
- Advanced Paddle Mode
- Straight Keyer Mode

Only £44.95

**POCKET OSCILLOSCOPE**

**ONLY £125.00** DSO-Quad

Tiny pocket size 4 channel digital oscilloscope for common engineering tasks. Built-in signal generator, internal Lipo battery.



**KENT MORSE KEYS**

See web for full range and specifications

- Kent Morse Practice Oscillator.....£31.95
- Kent Twin Paddle Key.....£114.95
- Kent Twin Paddle Key Kit.....£98.95
- Kent Hand Key.....£99.95
- Kent Hand Key Kit.....£86.95
- Kent Single Paddle Key.....£95.95
- Kent Single Paddle Key Kit.....£94.95
- Kent KT-1 Professional.....£109.95
- Kent Vail

Lever Correspondent Replica. £219.95



**You can now order from ML&S for delivery on a Saturday or Sunday!**  
Order before 3pm as late as Friday of each week and see it delivered at the weekend.

**Web purchases:** Just select Saturday or Sunday at the check-out or call to place your order for Saturday or Sunday delivery on **0345 2300 599**







## SHACK-CAMS

ML&S introduce a new range of Shack-Cams. Protect the contents of your Shack with these simple easy to install "Shack-Cams".

**From only £129.95**

See [HamRadio.co.uk/shackcams](http://HamRadio.co.uk/shackcams)

Works straight out of the box, connect to your WiFi, activate your FREE on-line account and that's it. If your camera is stolen you've still got the recording - it's all stored FREE for 7 days on the cloud.

**Two-year warranty on all MyDEL PSUs**

## NEW! MyDEL-DYNA 1D MICRO-HANDIES



Sold as a twin pack, these micro-sized light-weight & licence free communication "walkie-talkies" can be used for many commercial & leisure applications. Super small & lightweight, integral antenna & very loud crisp audio. Can also be programmed to cover 70cm at up to 1W output.

**SOLD IN PAIRS, RRP £99.99,**

**INTRO OFFER ONLY £79.99 OR INDIVIDUALLY AT £44.99**

See [HamRadio.co.uk/1D](http://HamRadio.co.uk/1D)

**MyDEL MP-30SW1V £89.95**



25Amps, 9-15V DC, super light with digital metering for Volts & Amps.

**MyDEL MP-50SW111**



**50 Amp DC power supply £125.00**

Probably one of the lightest 50Amp DC power supplies available today, the new MP-50SW111 weighs in at only 2.2Kilos (4.85lbs). Unbelievably compact, measuring a mere 195mm wide, including chunky rear terminals and front panel knobs.

**MyDEL MP-304MKII £99.95 Heavy Duty LINEAR 30Amp**

For those of you that prefer old style non-switching technology in your power supply we think this new 30 Amp from MyDEL is the one. Switchable Volts/ Amps with large precise metering (analogue of course!) variable Voltage, Cigar socket output for all your accessories, twin front panel outlets for up to 6Amps and two large binding post terminals for up to 30Amps. Remember, all MyDEL PSU's come with a two year no quibble guarantee.



**MyDEL CG-3000R ANTENNA TUNER NOW ONLY £249.95**

The best value remote wire antenna tuner now with remote control included.

**ML&S ARE PROUD TO BE THE SOLE IMPORTER OF AUSTRALIA'S FAMOUS BUSHCOMM ANTENNA RANGE.**

These wire antennas are made from high strength steel wire, designed to withstand the harsh outback weather and built to last for reliable HF communication solution. Take a look at our features antenna, the Bushcomm SWC-100 3.5-30MHz. No tuner required.



see [www.HamRadio.co.uk/swc-100](http://www.HamRadio.co.uk/swc-100)

## NEW! ADMS SOFTWARE FROM RT SYSTEMS



Rather than fiddle about programming your rig with the small buttons on the front panel, a far easier method is to use specifically written software & programming lead from RT Systems.

**ML&S now stock the most popular range in stock for Yaesu, Icom & Kenwood products.**

See: [www.hamradio.co.uk/rtsystems](http://www.hamradio.co.uk/rtsystems)



## NEW MYDEL MAGNUM PI

A standard Raspberry Pi kit, fully assembled and flashed with the relevant firmware when connected to a DV5Mini for DMR operation when connected to your DMR Handie or Mobile. You no longer have to tie your main PC or laptop to the DV4Mini dongle to use it, instead a very compact and lightweight Magnum + DV4. Gary Spiers MOTIG has even produced a video at ML&S showing users how simple it is to set up. The Magnum-Pi is just £79.95 alone or you can buy both ready configured for £169.95.

See [HamRadio.co.uk/magnum](http://HamRadio.co.uk/magnum)  
To view the video see: [www.MLandS.tv](http://www.MLandS.tv)

## HELITRON DV4MINI USB STICK FOR D-STAR AND DMR



DV4mini is a tiny but powerful USB stick that can change any PC into a HOTSPOT for the modes D-Star and DMR (C4FM Fusion is being prepared). It contains a powerful 32-bit micro controller as well as a complete 70cm transceiver and modulator/demodulator for GMSK and 4FSK (including raised cosine) as well as a USB interface.

**ONLY £104.95. see [www.MLandS.co.uk/dv4mini](http://www.MLandS.co.uk/dv4mini)**

**NOW AVAILABLE IN 2M**

## NEW PRODUCT! SHARKRF OPENSLOT STANDALONE DIGITAL IP GATEWAY & HOTSPOT



Supports DMR (Brandmeister, DMRplus), D-Star (DCS, REF/DPlus, XRF/DExtra, XLX), System Fusion (FCS, YSFReflector) networks.

More supported networks and features will be available with new firmware releases. Supports cross modem modes. Talk with your C4FM radio on DMR, and with your DMR radio on System Fusion networks! Very easy to use, works without a computer. No additional hardware required, works out of the box. All accessories included. Web interface for configuration and monitoring. Custom 2FSK/4FSK RF protocol support with TDMA. USB powered, low energy consumption, 20mW RF output. Runs fully embedded software written in pure C, running on an embedded real time operating system. No Linux, bulky Windows software or failing SD cards!

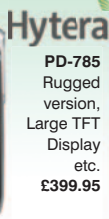
ML&S are the UK Distributor for this product. **ONLY £209.95** see [HamRadio.co.uk/openspot](http://HamRadio.co.uk/openspot)

## LOOKING FOR COMMERCIAL GRADE DMR FROM YOUR FAVOURITE STORE?



**X1P Ultimate DMR Handie, GPS & Bluetooth.**

**PD-685G**  
70cm, Small, lightweight & slim this version has GPS fitted.  
**Price from £599.95 £399.95**



**PD-785**  
Rugged version, Large TFT Display etc.  
**£399.95**



**MD-785G**  
Base or mobile with GPS. **£395.95**

## MD-390 DMR HANDIE FROM TyT NEW MODEL



An updated version of the UK's best-selling DMR Handie, the NEW MD-390. Better ergonomics, better water resilience, improved menu system, option GPS. **Free programming lead & software.**

**AVAILABLE NOW FROM ONLY £149.95.**

See web for full details.

## AIRSPY & SPYVERTER COMBO



Low cost, high performance SDR receiver. Covering DC-1.8GHz with 20MSPS sampling anywhere in the range. Only 3.5dB NF between 42MHz-1GHz.

**ONLY £219.95** See [HamRadio.co.uk/Airspy](http://HamRadio.co.uk/Airspy)



Touch Paddles by



For more information, prices & technical information email [Array@HamRadio.co.uk](mailto:Array@HamRadio.co.uk)

## HUGE CHOICE OF HF LINEAR AMPLIFIERS & ML&S



**SPE 1K-FA.** 1kW 160m-10m The Solid State HF amplifier that started it all. Compact, fully auto (inc ATU). **£2899.95**



**SPE 1.3K-FA.** Latest 160m-4m 1.5kW (700W on 4m) lightweight Solid State amplifier with built-in PSU. **£2599.95** or **£3599.95** with Auto ATU.



**SPE 2K-FA.** 160-6m 2kW The ultimate Solid State 2kW Amplifier with Auto ATU, multi-antenna sockets and more. **£4999.95**



**Acom 2000A.** Fully automatic 2kW 160-10m HF Amplifier with built-in Auto-ATU. **£4699.00**



**Acom 1500.** 160-6m 1.5kW Amplifier using 4CX1000A/8168. Easy to use bar graph tuning display. **£2899.95**



**Acom 1000.** 160-6m 1kW Amplifier. Easy to operate with LCD message display. Acom's best seller. **£2149.95**

**Acom 1010.** 160m-10m 700W HF Amplifier using 4CX800A (GU74B) tetrode. **£1589.95**



**NEW OM2000A+ 2kW Fully Automatic HF+6m Amplifier.** Compact and powerful without the worry of solid state PA's. **£4499.95**

**Full OM Power range available. See [www.HamRadio.co.uk/ompower](http://www.HamRadio.co.uk/ompower)**



# ML&S

**Tel: 0345 2300 599**  
**Web: HamRadio.co.uk**

**SAFE ONLINE SHOPPING**  
Shopping online with ML&S is safe and secure. E&OE



FOLLOW US ON TWITTER AND FACEBOOK **HamRadioUK**

E&OE

## ACCESSORIES AND ANTENNAS ON SHOW AT THE NEW SUPERSTORE!

### Wonderwand Wonderloop Antennas

#### WonderWand Widebander

1.8-460MHz with 1.3M Whip!.....£129.95

#### Wonder-TCP

40-10m Tuneable Counterpoise.....£59.95

or buy both together for only **£169.95!**



The UK's favourite rig-mounted antenna system!

#### New! WonderLoop 4010. 40m -10m

If you are an avid FT-817 or KX-3 operator and enjoy nothing more than heading for the hills on a weekend to active those rare WAB squares. Take a look at the all new WonderWand WonderLoop Antenna. Incorporating their easy to use tuning circuit, which offers frequency coverage from 40m-10m and handling 10W of RF power, you can be on the air in seconds. The tuning unit is enclosed within a lightweight ABS case, no larger than a pack of cards. This means you will no longer need to carry around all those additional extras needed to string up a wire in the field. There is also no need to worry about running a counterpoise with this efficient loop design. So how does it perform? As we had sunshine this afternoon, we popped out into the car park here at ML&S and attached the loop to our demo FT-817. Within minutes we had tuned to the 20m band worked into EA, I and 9A. Not bad for 5W and the 'shack' in our hand.



**ML&S PRICE ONLY £99.95**

For full info & video see: [www.HamRadio.co.uk/wonderloop](http://www.HamRadio.co.uk/wonderloop)

### HighEndFed Antennas



A professional range of End Fed Wire antennas from the Netherlands. Each antenna is hand made, individually tested for resonance and SWR. All you have to do is take it out of the box and string the antenna up in the air, add a coax feed back to your radio.

HEF/3BAND 40/20/10m 200W, 11.85m Long.....£134.95  
HEF/5BAND 80/40/20/15/10m 200W, 23m Long.....£149.95  
HEF/40m-QRO 40m Mono Bander, 2kW Only 20m Long.....£219.95  
HEF/20m-QRO 20m Mono Bander, 2kW, Only 10m Long.....£199.95  
For the full range see [www.HamRadio.co.uk/hyendfed](http://www.HamRadio.co.uk/hyendfed)

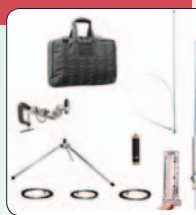
### Super Antenna MP1DLR Package

A complete portable antenna packaged based around the world's best selling SuperStick

#### MP1DLR Package

##### includes:

- MP1B antenna (SuperSlider Coil, SW1 SuperWhip, 2 extension rods and nut)
- MR1C Counterpoise
- TM2 SuperPod Tripod
- UM2 SuperMount
- GB1 Go Bag
- FG1 Frequency Guide
- MC80 80-meter coil



#### Super Antenna Features:

- Ham bands: 40m-30m-20m-17m-15m-12m-10m-6m-4m-2m-70cm
- Frequency Range: HF 7MHz-30MHz continuous
- Frequency Range: VHF 48 to 144MHz continuous
- SWR: 1.5 : 1 or better
- Rated Power: 500W SSB; 300W CW / DIGITAL
- Antenna Weight: < 2 pounds (1kg)
- Also configurable for up to 450MHz
- Standard 3/8"-24 male thread for mounting
- TM2 SuperPod tripod included with carry bag
- MC80 80m coil included for 80m band
- Optional MR series radial sets available
- Optional MC60 60m coil for 60m band

**NEW IMPROVED VERSION**

**All for only £259.95**

Plus £10.95 post & packing

For the complete range of Super Antenna products see [www.HamRadio.co.uk/Superantenna](http://www.HamRadio.co.uk/Superantenna)

**Fed up with paying over the odds for Diamond Antennas? So were we. Even lower prices for 2016! Huge selection always available,**

#### Base Antennas

CP-VU8 80m-70cm 200W Compact HF Base, only 2.7m Long!.....  
X-30 2/70, 3/5.5dB, 1.3m Long.....  
X-50N 2/70, 4.5/7.2dB, 1.7m Long.....  
X-300N 2/70, 6.5/9dB, 3.1m Long.....  
VX-1000 6/2/70 2.15/6.2/8.4dB 1.42M Long.....  
X-510N 2/70 Fibre glass 8.3/11.7dB gain, 5.2m long "N".....  
V-2000 6/2/70, 2.15/6.2/8.4dB, 2.5m Long.....  
X-7000 144/430/1200MHz (2m/70cm/23cm) 8.3dB (144MHz), 11.7dB (430MHz), 13.7dB (1200MHz) 5M Long.....

#### Mobile Antennas

NR-770RSP 100W, 2/70, 3/5.5dB, .98m Long, spring loaded.....  
NR-7900 2/70, 3/2.6dB, 1.46m Long.....  
AZ-504FXH Extremely compact dual band antenna for 144 & 430MHz. 15.5" long.....  
MR-77 Magnet mount/antenna combination. Includes 13' RG58 coaxial cable with BNC or SMA connector.....  
SG-7500 2m/70cm, GAIN 3.5/6.0, 41" long.....  
SG-7700 1/2wave C-Load radialless(144MHz), 2x5/8wave radialless(430MHz), 3.5dB(144MHz), 6.0dB(430MHz). 1.06m long.....  
SG-7900.....

#### Duplexers/Triplicers

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

#### Switches

CX-210A 2-way, SO-239 Die Cast.....  
CX-210N 2-way, N-Type, Die Cast.....  
CX-310A 3-way, SO-239, Die Cast.....  
CX-310N 3-way, N-Type, Die Cast.....

### Hustler Antennas



Hustler are one of America's oldest manufacturers of Ham Radio antennas. The famous "White Whips" have been seen on many cars operating HF mobile. Their HF base range of 4, 5 or 6-BTV antennas are probably the easiest to assemble and get going and of course are ground mounted, operating with just an earth spike mounted close to the base.



#### See web for full listing!

##### Base Station Range

Free standing, max 7.3m tall, 1kW

4-BTV 40/20/15/10m.....£189.95

5-BTV 80/40/20/15/10m.....£229.95

6-BTV 80/40/30/20/15/10m.....£269.95

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

### COAX CABLE STRIPPERS

#### DXE-UT-8213

ONLY £44.95!

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).

#### DXE-15035 ONLY £23.95

Great for everything from RG-58 up to Ultraflex 10! Designed for stripping RG-8, RG-213, 400MAX, and similar size cable. Simple to operate, they are preset.



### Messi & Paoloni

Full range of Messi & Paoloni Low Loss Professional Coaxial Cable in stock now!

#### NEW PRODUCT!

##### M&P ULTRAFLEX 13 "MOON INTERCEPTOR" COAX CABLE



Straight from their factory in Italy comes the new very high grade low

loss coaxial-cable specifically designed for HF/VU high power amplifiers and moon-bounce operation. New improved dielectric design with low attenuation even at 10GHz. Full copper 19-wire strand construction means you can use around the rotator without risk of fracture.

Further information see:

[www.hamradio.co.uk/ultraflex13](http://www.hamradio.co.uk/ultraflex13)

##### M&P ULTRAFLEX 7

7.3 LowLoss cable, 50 Ohm, double shielded.

##### M&P ULTRAFLEX 10

13.3mm LowLoss cable, 50 Ohm, "alternative for RG-213"

##### M&P BroadPro50

double jacket 12.4mm LowLoss cable, 50 Ohm, double jacket.

Further prices and full details see web: [www.hamradio.co.uk](http://www.hamradio.co.uk)

Any of our cables can be ordered in any length you require. There is a 10% discount for 100m+. If you require specific lengths then please call.

### mRS MiniVNA Antenna Analysers

Perfect for checking antennas and RF circuits for hams and commercial users.

MiniVNA Pro with Bluetooth 100kHz-200MHz.....£329.95

MiniVNA Extender For Pro only, extends range to 1500MHz.....£299.94

NEW MODEL! MiniVNA Tiny

Huge coverage, 1MHz-3GHz, Android controllable..... ONLY £379.95



### MyDel-Sark110 Vector Impedance Antenna

The SARK-110 Antenna Analyser is a pocket size instrument providing fast and accurate measurement of the vector impedance, VSWR, vector reflection coefficient, return loss, and R-L-C (as series or parallel equivalent circuits). Typical applications include checking and tuning antennas, impedance matching, component test, cable fault location, measuring coaxial cable losses, and cutting coaxial cables to precise electrical lengths. The SARK-110 has full vector measurement capability and accurately resolves the resistive, capacitive and inductive components of a load. The measurement reference plane is automatic adjusted via the Open/Short/Load calibration standard to enable the accurate impedance measurements at the end of an intermediate coaxial cable. **ONLY £359.95**



### MFJ Products - Lots more MFJ stocked!



MFJ-939 Plug & Play 200W ATU, you won't even know it's there!.....  
MFJ-974HB Manual ATU for balanced line antennas, 160-10m.....  
MFJ-974 as above but without 160m.....  
MFJ-16010 Random Wire ATU 160-10m.....  
MFJ-949E Manual ATU metered, Dummy Load, 1.8-30MHz, 300W.....  
MFJ-901B Manual Mini ATU 1.8-30MHz, 200W.....  
MFJ-971 Manual ATU metered, 1.8-30MHz, 200W.....  
MFJ-904H Manual ATU, metered, inc balanced, 1.8-30MHz 150W.....  
MFJ-969 Manual Roller ATU Metered 1.8-54MHz, 300W.....  
MFJ-993B Auto ATU Metered 1.8-30MHz, 300W.....  
MFJ-1786X Magnetic Loop 10-30MHz, 150W re-built & re-aligned by ML&S.....  
MFJ-1788X Magnetic Loop 7-22MHz, 150W re-built & re-aligned by ML&S.....  
MFJ-259C Antenna Analyser 530kHz-230MHz.....  
MFJ-266 V/U Portable Antenna Analyser 1.5-18MHz + 300-490MHz.....  
MFJ-269C 530kHz-230MHz, 415-470MHz Analyser.....  
MFJ-260C Dummy Load 300W SO-239.....

..... See Web for prices .....

### DX Accessories are available at ML&S



### Array Solutions

#### PowerMaster II



VSWR & RF Power Meters.

#### AIM 4300DX



Lab & Field Grade Impedance Analyser.

- StackMatch 3/5/10kW Stack Match & Power Splitter Antenna
- SixPack RatPak Range of Remote Antenna Switches
- Vertical Phased Array Controllers
- Baluns & Un-Un Transformers
- K9AY Loop, Beverages, Shared Apex Arrays & Low Band Antenna Products

### microHAM

RF Vector Signal Meter  
Station Master & Station  
Master Deluxe Network  
Controller



#### USB micro KEYS II

All-in-one USB Interface



Station Master & Station Master  
Deluxe Network Controller



For more information, prices & technical information email [MicroHam@HamRadio.co.uk](mailto:MicroHam@HamRadio.co.uk)

### Daiwa Meters

All featuring cross needle display offering unrivalled accuracy for SWR & Power



CN-101L 1.8-200MHz. 15/150/1.5kW.....£87.95  
CN-102L 1.8-200MHz. 20/200/2kW.....£97.95  
CN-103LN 140-525MHz. 20/200W. N-Type.....£97.95  
CN-801HP 1.8-200MHz. 20/200/2kW. PEP Reading. Large display...£119.95  
CN-801HP3 1.8-200MHz. 30/300/3kW. PEP Reading. Large display...£139.95  
CN-801VN 140-525MHz. 20/200W. N-Type.....£104.95





**FACTORY  
APPOINTED DEALER**

As the largest UK dealer of Flex SDR Products, ML&S always carry stocks of each model and have demonstrators available.

### FLEX 6300

1.8-60MHz, 2 Slice RX  
100W SDR TCVR.



**ML&S Price: £2499.95  
ON DEMO & IN STOCK  
NOW!**

Flex-Maestro Self-contained remote controller for the 6000 series .....	£1199.95
Flex-6300 1.8-60MHz, 2 Slice RX 100W SDR TCVR.....	£2499.95
Flex-6500 1.8-60MHz, 4 Slice RX SDR 100W Transceiver .....	£4049.95
Flex-6700 1.8-60MHz, (+RX 135-165MHz) 8 Slice RX SDR 100W Transceiver .....	£7199.95
Flex-6700R as above, Receiver only .....	£6599.95
Flex 1500 SDR Low cost SDR Transceiver, connect via USB & you have 5W 160-6m.....	£749.95

There is so much to detail so check out our web page [HamRadio.co.uk/maestro](http://HamRadio.co.uk/maestro) for more information.

## RF EXPLORER 3G COMBO HAND HELD SPECTRUM ANALYSER



Up until now the RF enthusiast have had to limit themselves to cheap "RF Power Detector/ Frequency counter" devices. But these are limited to display data for a single point of maximum power, and traditionally power metrics are too unreliable, in the order of 20dB or even 30dB inaccuracy. In contrast, a spectrum analyser like RF Explorer will display full frequency spectrum in the band, including carrier and modulated shape, it will display Spread Spectrum activity, if that exists, and will show bandwidth to monitor collisions, frequency deviation from expected tone, etc.

**NOW ONLY £209.95**

## SUNSDR2PRO TRANSCEIVER

- 10KHz-65MHz RX
- 95-148MHz RX
- 1.8-54MHz + 144MHz TX
- Separate independent RX path based on Direct Down Conversion principle (DDC)
- Separate independent TX, based on the Direct Up Conversion principle (DUC)
- 20W output (ideal to drive Amp)
- LAN-cable for connecting to local network
- OS Windows XP/7/8 x32 or x64, OS Linux Ubuntu x64



In stock & on demo.

**£1249.95**

See [HamRadio.co.uk/sunsdr](http://HamRadio.co.uk/sunsdr)

## NEW EXPERT ELECTRONICS MB-1



This 100W DDS SDR base station transceiver is powered by an internal core i5 3GHz processor running W10. It has so many advanced and leading edge features its technical specification sheet would fill 3 pages of this magazine.

**Limited quantity available NOW!**

**With Auto ATU £4599.95, without £4299.95**

see [HamRadio.co.uk/MB1](http://HamRadio.co.uk/MB1)

*"For a New Direction  
in Ham Radio"*

## SDSRplay RFS



- Robust and strong plastic case
- Continuous coverage from 10kHz to 2GHz
- 12-bit ADC silicon technology (not another 8 bit dongle!)
- Built-in High-Performance front-end filters • Up to 10 MHz bandwidth
- Good sensitivity and selectivity
- Low noise floor
- Simple USB interface (type B socket)
- SMA antenna socket
- Powers over the USB cable
- SDRUno - World class SDR software

**ONLY £119.95**

For more info see  
[HamRadio.co.uk/SDRPLAY](http://HamRadio.co.uk/SDRPLAY)

## MYDEL COAX SWITCHES

MYDEL CO-201 COAXIAL SWITCH 2-WAY COAX SWITCH SO-239. 500W MAX .....	<b>SPECIAL OFFER £19.95</b>
MYDEL CO-201N 2-WAY COAX SWITCH. N-TYPE SOCKETS. 500W MAX .....	<b>SPECIAL OFFER £21.95</b>
MYDEL CO-201AM 2-WAY DELUXE HEAVY DUTY COAX SWITCH SO-239 1KW .....	<b>SPECIAL OFFER £32.95</b>
MYDEL CO-201AN 2-WAY DELUXE HEAVY DUTY COAX SWITCH N-TYPE 1KW .....	<b>SPECIAL OFFER £33.95</b>
MYDEL CO-301M 2-WAY DELUXE HEAVY DUTY COAX SWITCH 1KW .....	<b>SPECIAL OFFER £39.95</b>
MYDEL CO-301N 2-WAY DELUXE HEAVY DUTY COAX SWITCH N-TYPE 1KW .....	<b>SPECIAL OFFER £40.95</b>

### FUNCUBE DONGLE PRO+ £149.99



- Coverage is from 150kHz (yes, that's kHz) to 1.9GHz. There is a gap between about 250MHz to 410MHz. There isn't a gap anywhere else.
- Eleven discrete front end filters, including some really, really serious SAW filters for 2m and 70cm
- 0.5ppm TCXO
- Much improved phase noise
- Better Dynamic Range by up to 7dB
- Tuner PLL Steps from memory
- All this plus more and still no drivers required!



Hear those weak signals with a bhi DSP noise cancelling product!

**NES10-2 MK3**  
Amplified DSP  
Noise Cancelling  
Speaker  
**£109.95**

- 5W input & 2.7W audio
- Headphone socket
- 8 filter levels
- Rotary filter select knob

**Dual In-Line**  
Dual Channel DSP noise eliminating module  
**£199.00**



- Suitable for all radios, receivers and SDR
- Mono or stereo input & output options
- 7 watt mono audio output, line out and headphone out
- Ideal for DXing, special event stations and field day events
- New improved noise cancelling!

**DSPKR - 10W**  
DSP Speaker

Easy to use - Sleep mode

- Filter level select & store
- Separate volume control
- Input overload LED

**DESKTOP**

- Separate volume and filter level controls - 8 DSP filter levels
- Speaker level and line level input - Sleep mode
- Easy to use
- Size 200(h)x150(d)x160(w)mm
- Supplied with manual, audio lead and fused DC power lead



### ELAD FDM-S2

Direct sampling receiver based on 122.88MHz 16bit single channel ADC converter covering HF 6m and offering the possibility to exploiting the under-sampling mode. **£449.95**

### ELAD FDM-DUO

**MULTI-USE 5W SDR  
TRANSCIVER**



Crafted out of beautiful aluminium, if Ferrari were to ever build a radio, this would be it. Designed using the very latest SDR technology, 10kHz-54MHz, Direct Conversion RX operating at 122.88MHz. The small transceiver employs a fast analog-digital-converter that samples the received HF directly into digital signals and a downstream DSP module provides for filtering and processing. Another ARM processor handles the signals of the control unit. All Mode, in stock.

**BLACK £949.95 RED LIMITED EDITION £949.95**

### PERSEUS VLF-LF-HF RECEIVER

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

**ONLY £659.95**



### ELAD FDM-DUO"R"



Receive only version of the popular FDM-Duo 5W SDR Transceiver. Coverage is 9kHz-54MHz, direct sampling. Identical to the TX variant but introduced because of many requests from SWL's and users who wanted RX only. The price is cheaper at only £639.95.

**ML&S PRICE: £679.95**

### NEW! CLOUD IQ ONLY £579.95



Available HF/6m SDR with IQ Streaming & built-in Internet Server.

See [HamRadio.co.uk/cloudiq](http://HamRadio.co.uk/cloudiq)

### NEIM1031 MKII



Fully featured Amplified Noise Eliminating In-Line module

- 2.8 W audio - Audio & line level inputs/outputs
- 50Hz to 4.5KHz bandwidth
- 12 to 24V DC, 500mA
- Headphone socket

**£149.95**

### New Compact In-Line

- Compact DSP noise cancelling module with new improved DSP algorithm giving even better noise elimination
- Easy to use with mono/stereo inputs
- Use mobile or in the shack
- Over 40 hours battery life from 2 x AA batteries or use 12V DC input
- Size: 121x70x33mm


**£179.95**





# ML&S

**Tel: 0345 2300 599**  
**Web: HamRadio.co.uk**

**SAFE ONLINE SHOPPING**  
Shopping online with ML&S is safe and secure. E&OE

 **PayPal**

  FOLLOW US ON TWITTER AND FACEBOOK **HamRadioUK**

**Martin Lynch & Sons Ltd.** Wessex House, Drake Avenue, Staines, Middlesex TW18 2AP. E-mail: [sales@hamradio.co.uk](mailto:sales@hamradio.co.uk)  
Opening Hours: Mon - Fri: 8.30am to 5pm. Sat: 9am to 4.30pm. International Tel: +44 1932 567 333

## LDG AUTO TUNER RANGE

**Factory appointed distributor**

ML&S have the largest stock of LDG outside the US.



Now Available! RT-600

The RT-600 is a 600 watt PEP coax in / coax out remote tuner designed to be placed near the feedpoint of the antenna. Place the RT-600 near the feedpoint and the virtually eliminate all feedline loss due to SWR. DC powered over the coax by the RC-600 control unit (included). **See web for price.**

<b>RT-100</b>	100W Weather proof remote Auto ATU.....	<b>£249.95</b>
<b>RC-100</b>	Remote control for RC-100, + DC power over coax .....	<b>£249.95</b>
<b>AT-1000pro11</b>	1kw Flagship Auto ATU. Separate external head-up large format meter .....	<b>£519.95</b>
<b>M-1000</b>	Large Analogue meter for the new AT-1000Pro11 .....	<b>£139.95</b>
<b>M-600</b>	Optional 4.5" meter for the AT-600Pro11 .....	<b>£129.95</b>
<b>YT-1200</b>	(formerly AT-450) for ALL Yaesu HF Transceivers.....	<b>£244.95</b>
<b>AT-600pro11</b>	NEW MODEL 600W pep, Optional external 4.5" Meter.....	<b>£395.95</b>
<b>AT-200pro11</b>	Designed for new generation of rigs.....	<b>£259.95</b>
<b>AT-897Plus</b>	Bolt-on Alternative Auto Tuner for the FT-897 .....	<b>£209.95</b>
<b>IT-100</b>	New version of the AT-7000 .....	<b>£179.95</b>
<b>YT-100</b>	AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control.....	<b>£199.95</b>
<b>Z-817</b>	Ultimate autotuner for QRP radios, including the Yaesu FT-817D .....	<b>£129.95</b>
<b>Z-100Plus</b>	Ultimate autotuner for Yaesu FT-817D .....	<b>£169.95</b>
<b>Z-11ProII</b>	Portable compact & tunes 100mW to 125W.....	<b>£179.95</b>
<b>KT-100</b>	Dedicated tuner for Kenwood radios.....	<b>£209.95</b>
<b>RBA-1:1</b>	Probably the best 1:1balun out there.....	<b>£32.95</b>
<b>RBA 4:1</b>	Probably the best 4:1 balun out there.....	<b>£34.95</b>
<b>FT-Meter</b>	Neat Analogue back-lit Meter for FT-897/857. S-meter, TX Pwr, ALC Etc.....	<b>£54.95</b>
<b>FTL- Meter</b>	Jumbo version of the famous FT-Meter .....	<b>£85.95</b>

## PALSTAR ATUs & Dummy Loads

<b>New SP-30B/C</b>	Real wooden enclosure housing speaker. Available in Cherry or Black .....	<b>£114.95</b>
<b>New SP-30H</b>	Huge real wood enclosure housing speaker. Available in Cherry or Black.....	<b>£197.95</b>
<b>HF-Auto</b>	1.5kW PEP fully automatic ATU for QRO.....	<b>£1799.95</b>
<b>AT-500</b>	600W PEP Antenna Tuner .....	<b>£579.95</b>
<b>AT-2K</b>	2000W PEP Antenna Tuner.....	<b>£699.95</b>
<b>AT-2KD</b>	Differential 2kW PEP Antenna Tuner.....	<b>£679.95</b>
<b>AT-4K</b>	2.5kW PEP Antenna Tuner .....	<b>£1025.95</b>

<b>AT-5K</b>	3.5KW PEP Antenna Tuner .....	<b>£1329.95</b>
<b>BT-1500A</b>	Balanced Antenna Tuner.....	<b>£799.95</b>
<b>PM-2000AM</b>	Power/SWR Meter.....	<b>£189.95</b>
<b>PM-2000A</b>	Base Power/SWR Meter.....	<b>£229.95</b>

### PALSTAR DUMMY LOADS

**DL-1500 (1.5KW) DL-2K (2kW) DL-5K (5kW) See web for prices.**

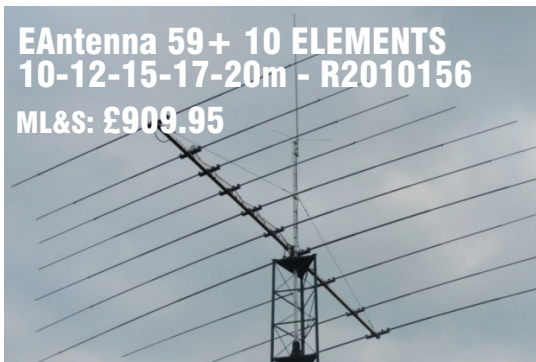


## The Famous EAntenna Range from Spain

LFA Antennas built to a high specification re-engineered using quality materials

For more info see [www.HamRadio.co.uk/eantenna](http://www.HamRadio.co.uk/eantenna)

**EAntenna 59+ 10 ELEMENTS**  
**10-12-15-17-20m - R2010156**  
**ML&S: £909.95**



The new EAntenna 59+ is a 5 band, 10 element beam antenna with superb performance for a boom length of only 5.75 metres. Computer optimized design to attain the best performance from an antenna of this size. Start chasing DX now!

<b>V/U Beams</b>		
R2010105	144LFA5 5 ele 2m beam .....	<b>£89.95</b>
R2010109	50LFA3 3 ele 6m beam .....	<b>£139.95</b>
R2010121	70LFA3 3 ele 4m beam .....	<b>£77.95</b>
R2010139	432LFA15 15 ele bea .....	<b>£113.95</b>
R2010251	ea270zb9 4/5 ele 2m/70cm beam .....	<b>£53.95</b>
R2010253	ea642zb7 2+2+3 ele 6m/4m/2m beam.....	<b>£94.95</b>
<b>V/U Verticals</b>		
R2010800	ea270j dual band vertical j pol.....	<b>£34.95</b>
<b>HF Antennas</b>		
R2010013	dbz40 double bazooka 7mhz wire antenna .....	<b>£47.95</b>
R2010048	ea1015204080dxs 5 band HF dipole .....	<b>£101.95</b>
R2010904	5 band cobweb 500w antenna .....	<b>£279.95</b>
R2010904.3	5 band cobweb 3kw antenna .....	<b>£349.95</b>
R201005	ea101520dx dipole 3band HF dipole .....	<b>£55.95</b>



## CIRO MAZZONI PROFESSIONAL LOOPS

In Two Sizes. Baby Loop & Midi Loop.

An Italian manufacturer **Ciro Mazzoni** has perfected the design and is able to offer two versions covering the entire 80m-10m range built to ultra-professional standards.

### BABY LOOP

6.6MHz-29.8MHz with Mk2 Controller With RS-232 Rig Control interface.

### MIDI-LOOP

305MHz-14.5MHz with Mk2 Controller. With RS-232 Rig Control interface.

**RS232** Control your new **Ciro Baby** or **Midi Loop** via either a Yaesu or Icom transceiver. As you change bands the loops follows automatically, no need to enter the frequency used via the keypad.



Now with totally new controller!

ML&S are the sole distributors of **Ciro Mazzoni** Loops for UK & Ireland.

**SEE WEB FOR LATEST PRICES**

## RADIOSPORT HEADSETS

## RADIOSPORT



Whether for DXing, contesting, field day, or casual everyday use we think you'll agree Radiosport headsets have the features you want. ML&S are proud to have been appointed their distributor and have stock today.

All headsets are supplied with GEL Cushions giving extra comfort and FREE cloth covers.

<b>RS60CF</b> Deluxe Dream Edition Stereo Headset with boom (as featured) ..	<b>£219.95</b>
<b>RS20S</b> Deluxe Dream Edition Stereo Headset only no boom .....	<b>£129.95</b>
<b>Mini-XLR</b> lead set for any radio (Yaesu/Kenwood/Icom/Flex/Elecraft) .	<b>from £59.95</b>
<b>PTT-FS-RCA</b> Foot switch with 7ft cable with phono plug .....	<b>£44.95</b>
<b>PPT-HS-RCA</b> Hand PTT Switch, 7 foot cable with phono plug .....	<b>£44.95</b>

How about an additional 3.5mm socket on the opposite ear cup to allow "tethering" of another headset for a logger or maybe just an additional pair of ears?

**HAM RADIO TRAINING ACADEMY NOW OPEN. BOOK NOW! FOR FURTHER INFORMATION SEE: [HamRadio.co.uk/training](http://HamRadio.co.uk/training)**

# Book Review 2016

It's January, the time I look back over last year's books and choose my overall favourites

## Radio Propagation Explained

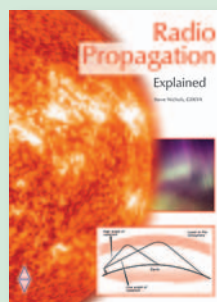
By Steve Nichols, G0KYA

This recently-released book is a development of Ian Poole's earlier *Radio Propagation – Principles and Practice*. An accomplished writer, Steve is also the chair of the RSGB Propagation Studies Committee and his experience shines thorough in this book, which is a fine example of how 'two heads are better than one'.

As radio amateurs we are all affected by the vagaries of propagation, which influences our signals on all bands from LF to microwaves. Mastering – or at least beginning to understand – propagation is a key aspect of getting the best from our hobby, and this comprehensive book will teach you a fantastic amount.

Whether you're looking for a general guide to band characteristics, an unbiased look at the world's most powerful propagation prediction software, or simply want something to dip into, you're guaranteed to learn a lot. I've picked it as my number one book of the year because there's such a huge amount to discover about propagation and this book is an excellent, world-class guide.

ISBN 9781 9101 9328 0, 128 pages, 210 x 297mm  
Non-Members' price £11.99, Members' price £10.19



## Operation BIG

By Colin Brown



Operations don't come much bigger than "The race to stop Hitler's A-Bomb" and this book is a jaw-dropping description of just what happened. It's an 'un-put-downable' tale of the moves and counter-moves between Germany and the rest of the world over the development of atomic power and The Bomb in the Second World War. If the *Rig Guides* hadn't been so good this would probably have been my number selection from the year – it really is brilliant.

Descriptions include how the entire world's supply of heavy water was smuggled – several times – in just 26 jerrycans, once alongside millions of pounds' worth of diamonds aboard a jury-rigged raft. Then there are the photographs, for example five men casually beside a great pile of uranium bricks they've just dug up from a hidden cache.

You couldn't make this stuff up if you tried. Secret nuclear research going on beneath the "Virus House" in the Institute for Biology. Top-secret nuclear research papers hidden in a barrel in a cess pit. Hidden wiring from old bugs in a Georgian manor house. It is truly fascinating, intriguing, and cries out to be read.

New paperback  
ISBN 9781 4456 6467 5  
288 pages, 240 x 165mm  
Non-Members' price £14.99  
Members' price £11.24 (25% off)

## The Rig Guide and The Vintage Rig Guide

Both by Steve White, G3ZVW

I'm taking the unusual step of jointly nominating two books for the same position this year. *The Rig Guide* and the *Vintage Rig Guide* are sort of two sides of the same coin. Each provides a detailed look at a very wide range of equipment, presenting the information in easy-to-use tabular format. There's normally a photograph, brief description of the equipment including things like modes, bands, power and so on. There's also a very useful price guide, showing what you can expect to pay now and what you might get as a trade-in value from a dealer. The *Vintage* book also generally includes the year the equipment appeared, which in some instances can be eye-opening.

Generally speaking, radios from about 1965 to 1990 (and handhelds to 2000) appear in the *Vintage* book, and more modern radios in the *Rig Guide*. It's interesting to note that the *Vintage* book contains a lot of radios that never appeared in earlier editions of the *Rig Guide*. Both books contain an index of *RadCom* equipment reviews for their respective time periods.

Apart from making interesting reading in their own right, these books are also invaluable if you're looking at buying or selling used equipment and could easily make their cost back in just one informed transaction. Either of those reasons would be good enough to get into my top three. As these two books are so complimentary to each other they are available to buy together at a handy discount compared to their individual prices – another very good reason for them being in my top three; they were only just pipped at the post for the number one spot.

*The Rig Guide*: ISBN 9781 9101 9320 4, 96 pages, 210 x 297mm, Price £5.99 (inc P&P)

*The Vintage Rig Guide*: ISBN 9781-9101-9330-3, 80 pages, 210 x 297mm, Price £5.99 (inc P&P)

Special offer: buy both together for £9.99 (inc UK P&P)



Giles Read, G1MFG  
giles.read@rsgb.org.uk



# HF

**P**ropagation was poor for much of the autumn with solar flux in the 70s and large coronal holes producing a high speed solar wind of charged particles.

The CQWW SSB Contest was hit by seriously disturbed conditions, which meant that very few US stations were worked on 21MHz and none on 28MHz. From the M4A station (with a 5-element monobander) we failed to hear any Japanese stations on 21MHz and although some equatorial Asian stations in eg Thailand and Singapore were audible many of them were very hard to work as southern Europe had much better propagation. The LF bands were also very poor in the contest with few US stations worked on 3.5/7MHz. There were occasional good days, however, and on one day around mid-November the 21MHz band was full of VK stations during the morning.

The V6Z DXpedition by Chris, GM3WOJ and Keith, GM4YXI also had poor conditions as the K index was high on many of their operating days. Club Log shows no British Isles QSOs above 21MHz and only 12 on 21MHz itself. 18MHz seems to have been even worse with only one British QSO. The star band was 14MHz with around 70 long path QSOs in the morning. 40 stations got through on 10MHz during the morning but only a handful managed QSOs on 7MHz and below. I heard V6Z briefly on 7MHz around 1600 on Sunday 30 October but the contest QRM made it impossible to attempt a QSO. Their Club Log Leaderboard shows GM3POI as the leading UK station with 8 band / mode slots. G3XRJ was second with 5.

The ZL7G operation had slightly better conditions and may also have benefited from some antipodal focussing; all directions from ZL7 lead to Europe and reported beam headings were all over the compass. Like V6Z they didn't manage any British Isles QSOs on 24 or 28MHz but 7/10/14MHz were star performers with 168/156/139 QSOs respectively. 21MHz was the upper 'edge band' with only 6 BI QSOs. 3.5MHz yielded 87 QSOs and 1.8MHz yielded 19. Almost all QSOs on all bands were made between 06 and 1000UTC with just a handful of 3.5/7MHz QSOs around 1600UTC. G3XHZ, G3XRJ and G4CCZ topped the Leaderboard with 9 band/mode slots.

There is a fascinating article by Ed, N4II on grey line propagation in the current edition of QEX – the ARRL's specialist magazine for experimenters. He analyses a number of 80m



Keith, GM4YXI operating as V6Z in Micronesia.

QSOs between VK9CZ on the Cocos Keeling Islands (operated by GM3WOJ and GM4YXI) and the eastern US states. He notes that direct propagation along the grey line is an implausible mechanism and suggests that the most successful paths should be those that penetrate more deeply into the night-time hemisphere and are then deflected in the auroral zone; the smaller the required deflection the more successful the path. He also argues that the propagation is likely to be via repeated reflections between the E and F layers – in effect a duct mechanism. I strongly recommend this article to all with an interest in LF propagation. Go to [bit.ly/2fTDSaZ](http://bit.ly/2fTDSaZ) for a copy of the article. The G-ZL7 path may have been a more recent example of the effects described.

December and January are the peak times for 3.5MHz long path propagation (over Africa) to the northwest USA and Canada. Listen around 1600UTC for W7 and VE7 stations. On really good days it may be possible to work Hawaii and Alaska. Club Log data shows Hawaii 80m QSOs around 07 and 1600UTC (160m around 0600UTC), with Alaskan QSOs at similar times (but biased towards the 0700UTC slot). Please let me know what you work or hear at these times. It is worth remembering that the band plan deprecates local QSOs at the top and bottom ends of 80m so please keep the DX areas (3500-3510 and 3775-3800) clear so that weak DX stations can be heard.

During 2017 Irish amateurs will be operating nine special event stations EI11WAW to EI99WAW to celebrate the 'Wild Atlantic Way' or 'Slí an Atlantaigh Fhiáin'. This is a tourist route

around the west coast of Ireland. There will be a certificate for working all 9 stations (one per county) and special QSLs will be issued.

## IOTA

A major IOTA DXpedition is being planned for February-March 2017 to commemorate the 120th anniversary of Fridtjof Nansen's legendary expedition to the Arctic Ocean. Five operators expect to be active as RT9K/9 from the Firnley Islands (AS-054), Tyrto Island (AS-121), Nansen Island (AS-104) and the Scott-Hansen Islands (AS-068). Plans are to spend 4-5 days on each island, and to operate CW, SSB and digital modes with three stations on 40-10 metres. Check [www.qrz.com/db/RT9K/9](http://www.qrz.com/db/RT9K/9) for updates.

VA2NDX/VYO from Charlton Island (NA-173) will be QRV 28-30 July 2017, including next year's IOTA Contest. The ops, VA2AMH, VE2MBT, VE2SSS, VE2WHZ and VE2YAG are all members of the NORDX Club. See <http://www.nordx.net>.

Due to problems with the inter-island boat Japan's Nara DX Association has delayed the Mwokil Island (OC-226) operation to spring 2017. See V6J on QRZ.com for more information.

7Y94I is expected to be the call for an IOTA DXpedition to Rachgoun Island (AF-094) by the Algerian Amateur Radio Union. No dates known as yet.

Craig will be QRV as VK5CE/8 from the Sir Edward Pellew Islands (OC-198) from 1-5 November 2017. He says this will be his most adventurous and exciting DXpedition ever



ZL7G Chatham Island QTH showing some of the verticals - Photo G3TXF

which he has been working on since 2011. See <https://oc198.wordpress.com/>

AA4NC is going to San Andres, HKO, (NA-033) for the ARRL International DX Contest on 18-19 February and will stay until early March. He will be joined for the ARRL DX SSB Contest by HK6F, LW9EOC and WJ20.

H74B and H74W will be the calls of EA3BT and EA3WL for an expedition to Nicaragua's Big Corn Island (NA-013) from 31 December to 6 January. They will mainly be on SSB but may do some CW.

DL5XL and DL1SU will be QRV as DP1POL and DPOGVN from the German Antarctic Neumayer III base (AN-016) until February. Over at Ongul Island (AN-015) JG2MLI will be QRV for the whole of 2017 as 8J60JARE to celebrate the 60<sup>th</sup> anniversary of the Japanese Antarctic Research Expedition, part of the International Geophysical Year 1957/58. I have usually found that Ongul Island stations peak at around 340 degrees over the North Pole.

Down at the British Antarctic Survey's Rothera Base on Adelaide Island (AN-001) a number of operators including M0ZX (VP8DOI)

will be QRV during January and I hope that one of them may get a chance to visit the summer out-station at Fossil Bluff on Alexander Island. This is in the super-rare AN-018 and has only been activated in a significant way by VP8GAV in 1994 and VP8DMH/P in 2010. Fossil Bluff activity is certainly not planned – but you never know.

## Correspondence

Ken, CT7AGZ reported that it had been "quite a good month, with plenty of DX about and a few openings on 10/12m too". He thought the ZL7G team did a great job and was pleased to work them on 5 bands with his 100 watts. V63YY on 30m was an All Time New One for him. He has also started operating on data modes. Ken found: on 10m – 9G5AM, ZD8W; 12m – 7P8EUDXF, 9G5AM, VP2EGR, 4K9W; 15m – J6/WB2YQH, ZD8W, VP2EGR, 3B8CF, TF3JB, YD1NDX, TR8CA, 5R8IC, PJ2/PA3EYC; 17m – ZD8W, PJ2/PA1CC, TG9ADM, KP2/K3CT, VP2EGR, 7Z1JA, ZL7G, 9J2BO, OH0/DL6UAA, PJ6/K2HVN; 20m – 9G5AM, ZD8W, PJ2/DK3DM, AD8J/HR9, ZL7G, XT2AW, 5H3MB, 4KRA29, JA's; 30m – VP2EGR, ZL7G, 8P9JH, V63YY; 40m – CM2YV, HI3Y, VP2EGR, ZL7G, 8P9JH, VP2V/K6TOP, 8P9JH, 4U1ITU, AD8J/HR9, JY9FC, EA9UG, FK8CE, ZL2IO, TR8CA;

80m – VP2EGR, ZL7G.

Peter, G4XEX was battling an increased noise level from new street lights but still managed to work quite a lot with his picnic table antenna. He writes that he was amazed by the number of stations active from PJ2, PJ4 and VP2 and wondered if there was enough space on the islands for all the antennas! He found: on 15m V51WW, HC2AO, P40L, VU2RCT, PJ2/DL8OBQ, PJ4/NT5V, HK3W, 4M1F, PZ5K, 5R8IC; 17m CW, 5H3PM, 7P6EUDXF, VP2V/K6TOP, HI5TEJ, 8P9JH, PJ4/N5JR; 20m - PJ2/PA1CC, D4Z, 3W2KK, 3V8SS, V47T, VK4KW, 6W1RY, E21YDP, V5KPO, S9YY, 5K3W, 9G5AM, VP2EGR, VU2XE, YE1AR, VK5MAV, V85TL.

Tom, G4IDL had a quiet month but found: on 12m – PZ5k; 17m – ZD8W; 20m – TLOA; 40m – HC2AO, ZL7G, VP2EGR, LU2YT, & TZ4AM.

Fred, G3SVK focussed on 40m (where he worked all around the world) but also managed to catch ZL7G on three bands. He worked: 17m - KP2/K3CT, J68GD, ZD8W, VP2EGR, PJ4/N5JR, ZL2AGY; 20m – TLOA, V6Z, HS3XVP, PJ4/K2NG, VP2EGR, ZL7G, FK8IK, VK3ADT, 4U1ITU, HS70A, 6V1IS/P, 5R8IC, TF3CW, JAs, ZL2CC, ZL1ALA; 30m – TZ4AM, VP2EGR, ZL7G; 40m – 9G5AM, HC2AO, KP4/KB7Q, CO2AME, PJ4/NA2AA, ZL3XDJ, ZL7G, TZ4AM, ZD8W, AD8J/HR9, J68GD, YE1AR, PJ4/N5JR, VP2EGR, 8P9JH, VP2V/K6TOP, CO3ET, JH1HDT, 4U1ITU, JY9FC, VK2GR, 6V1IS/P, 4L1MA, 5R8IC, CA2LQA, S01WS.

Peter, G3HQT was chasing occasional new ones for the year having collected enough awards in the past with his old AR88 and 807-based transmitter. This month he found: 10m – 5R8UP; 17m – TLOA; 30m – ZL7G, V6Z, VP2EGR; and 40m – TZ4AM.

Gordon, G3PXT was busy on the bands with: on 10m – PYs, LUs, & XT2AW; 12m – S9YY; 15m – 4S7AVR, 5A1AL, 7P8VA, CE4SFG, CE6MBK, CO2XV, CO2AO, CP1FF, CX2AQ, CX9BU, FG5BZ, FR400, HP2SM, HR1LW, J9/NX8G, P40A, P40L, PJ4/W2ID, PYs, LUs, S9YY, TI2AIM, TR8CA, VK6AS, VP2EGR, VU2RMS, XT1AGI, XT2AW, YV3BAR, ZS6s; 17m – 7U62AR, 9N7XW, A61CP, BH8SZY, FR40M, PY2VM, S9YY, WP4PGY, ZA5G; 20m – 9N7FD, 9N7XW, CO8AF, HS5IHQ, J73WA, JAs, LU8HGI, PY2DN, PZ5K, VU2AE, YE4IJ, YV7DX; 40m – 9W8LIF, A73A, BD7MYM, BV2FB, E20WXA, HBOA, JA2BAY, JA2JID, JF3VAX, OH0V, PJ2VA, RK0UJS, VK3BL, VK7YUM, YC4KRZ, YD2YIZ, & ZL1BRL.

## Finally

Thanks as always to my correspondents, to DX-World, 425 DX News and Daily DX.

**TABLE 1: 2016 Worked DXCC Entities (ranked by All) showing top 3 from RSGB Members table in Club Log plus submitted scores or Club Log scores of recent correspondents where available.**

Call	CW	SSB	Data	All
MONKR	174	240	74	271
G4PTJ	217	139		271
G5LP	261	77	199	264
G1XOW		244		244
G4IDL	207		79	210
G3SVK	210			210
G14DOH	204	32	80	207
CT7AGZ	203	2	13	205
G0RPM	131	70	136	202
G3HQT	193		71	196
G4XEX	113	124	102	177
G3PXT	71	102	151	164
G4CCZ	111	64	50	138

**Table 2: Forthcoming DX activity.**

Until 24 Dec	9Q0HQ/3
Until Feb	DP1POL & DP1GVN
16-18 Dec	6V1A
31 Dec – 6 Jan	H74B and H74W
Jan-Feb 2017	E51MAF Nth Cooks
12-19 Jan	T88WM
25 Jan – 1 Feb	HI1UD (NA-122)
31 Jan – 1 Feb	VK5CE Gabo Is
13 Feb – 3 March	Raivavae by US ops
18 Feb – early Mar	HKO by AA4NC
Feb – March	Arctic Legend IOTA trip
10-19 March	E51KTA
28-30 July	VA2NDX/VYO (NA-173)
1-5 November	VK5CE/8 (OC-198)

**Martin Atherton, G3ZAY**  
g3zay@btinternet.com



# ALINCO

QUALITY • STYLE • PERFORMANCE



**£599.95**

## DX-SR9

### New Hybrid HF Transceiver with SDR capability

Fitted with Narrow filters, IF Shift, RF pre-amp, noise blanker and CW keyer with full break in. For the QRP enthusiast a special super low output power setting

#### SPECIFICATIONS

- Transmit: 1.8-30MHz Amateur Bands (5MHz Band Transmit is optional with modification)
- TX: SSB, CW, AM, FM
- Power: up to 100 W SSB/CW/FM - 40W AM
- QRP Mode: (0.1-2.0)W extra low power setting
- RX - 150-29.999MHz (when optional 5MHz mod is enabled, RX extends to approx 35kHz-34.999MHz)

*Alinco suggests reviewing the free SDR software available, before purchasing this radio*



**£469.95**

## DX-R8E

### Top selling desktop

### HF communications receiver

- Frequency range: 150kHz-34.999MHz
- Modes: AM/FM/LW/MW/CW/LSB/USB
- 600 memory channels
- Power: 11.7-15.8V DC
- Optional: 12V DC - 1A supply...£15.95

**£179.95**

NEW



## DJ-MD40

### Digital/Analogue UHF Handheld

- DMR tier 1 & II
- Voice recorder
- Text messages
- Call logs
- Scan facilities
- IP54 Commercial Grade
- 1,000 channels memory
- Power: 5/2.5/1/0.2W
- Free programming for your area
- ...plus lots more

**SPECIAL**  
**£349.95**  
**£299.95**



## DJ-G7E

### TRI-BAND Handheld Radio with die-cast chassis

- Covers: 2m/70cms/23cms
- Wide band RX 0.5-1299.95MHz AM/FM/WFM
- Full duplex operation of any two bands 144MHz, 430MHz, 1200MHz
- 39 CTCSS and 104 DCS encode/decode.
- 1200mAh Li-ion battery & Drop-In charger
- 1000 Memory Channels

**£249.95**



## DR-638HE

### VHF/UHF 145/433MHz mobile FM transceiver

- Covers: 144-146 / 430-440MHz (2m + 70cms amateur bands)
- 50W of power on 145MHz / 40W on 433MHz
- Large, clear LCD display with new user selectable colour blend feature
- EMS-77 multi-function DTMF hand mic included

**£299.95**

NEW



## DR-735E

### Twin Band Mobile - with "Rainbow" display

- Full featured VHF/UHF transceiver
- Extended RX 108-174MHz, 400-479MHz
- 1,000 Memories
- Power 50/20/5W output
- Computer programmable with free downloadable software

**£169.95**

## DR-138HE

### Hi-power VHF 145MHz FM mobile transceiver

- Frequency range: 144-146MHz (137-174MHz with dealerware)
- Output power selectable: 60W/25W/10W
- Channel spacing: 25kHz (Wide) 20kHz (Middle) 12.5kHz (Narrow)
- Squelch carrier/CTCSS/DCS/5Tone/2Tone/DTMF

**£169.95**

## DR-B185H

### High power 5-85W VHF FM transceiver

- Frequency coverage: 136-174MHz
- Channel steps: 5, 8.33, 10, 12.5, 15, 20, 25, 30, 50kHz
- CTCSS, DCS encode/decode, DTMF
- Super-wide alphanumeric display

**£119.95**



## DM-330FXE

Standard version  
Fitted with two USB ports

## Communications Grade

### 30A Power Supplies

- Low Noise - Switch Mode
- Patent noise offset circuit
- Voltage & Current meter
- Variable Voltage output
- Car Cigar socket output
- 2.5kg (with AC lead)

**£129.95**



## DM-330MWMKII

Deluxe version  
(with extra filtering)

## DJ-A10E

Tough, Rugged Mil Spec VHF Handheld plus FM radio receiver, c/w NiCads & Charger

**£89.95**



## DJ-500

VHF/UHF handy and Li-ion battery Built-in vox & FM radio coverage

**£99.95**



## DJ-V57

VHF/UHF Handy + tough case & IPX7 waterproof fully featured

**£129.95**



## DJ-175E

Quality 2m Handy in tough polycarbonate body 5W and extended RX

**£109.95**



NEW

## DM-30E Switch Mode

25A (30A peak) Supply  
• Output: 9-15 Volts  
• Digital Volt/Amp meter  
• Noise offset circuit

**£89.95**



**EDX-2**  
120W weatherproof auto HF antenna tuner

**£299.95**



## EMS-14

Desktop Electret Microphone For DX-70, DX-77, DX-SR8, DX-SR9

**£69.95**



# www.nevadaradio.co.uk

NEVADA - UK Importers & Distributors of Alinco

Unit 1 Fitzherbert Spur Farlington Portsmouth PO6 1TT

phone 023 9231 3090

email sales@nevada.co.uk

fax 023 9231 3091



icom

YAESU

KENWOOD

AOR

IN STOCK!



### IC-7300

- 100W HF+6m+4m
- RF direct sampling
- Touch screen control
- Great reviews!

GENEROUS  
Part X  
CALL NOW!  
**£1199.95**

IC-718.....100W 160-10m base/portable.....£589.95  
IC-7100.....HF/VHF/UHF 4m (70MHz) touchscreen.....£999.95  
IC-7200.....HF+6m rugged style transceiver.....£829.95  
IC-7410.....HF+6m 100W DSP Base TX + ATU.....£1449.95  
IC-7600.....HF+6m twin DSP base transceiver.....£2399.00  
IC-7851.....HF/6m all mode, output: 5-200W.....£899.95  
IC-9100.....HF+VHF/UHF transceiver.....£2699.00  
IC-2730E.....145/433MHz large screen.....£269.95  
ID51EPlus.....Dual Band Handheld D-Star.....£299.00  
ID5100E.....Standard version Dual Band D-Star.....£499.95  
AH-4.....Automatic antenna tuner 120W.....£333.95  
UT123.....Digital/GPS unit £2820 etc.....£249.95  
SM50.....Top of the range desktop microphone.....£249.95  
SM30.....New compact style microphone.....£119.95  
SP23.....Deluxe extension speaker.....£249.00  
SP33.....New style speaker "sounds great".....£129.95  
SP34.....Filtered speaker 7800/7700 etc.....£239.95  
IC-R6.....1300 ch H/H scanner 1-1300MHz.....£179.95  
HM151.....Multi-function hand microphone.....£49.95

### PALSTAR

**HF-Auto** 1.5kW fully auto antenna tuner  
Covers 6-160m  
Output power: 2-1800W  
Display: 4 line large print  
**£1699.95**

**AT-2K** 2kW manual antenna tuner  
Covers 6-160m  
Output: 2000W PEP  
Metering: Active cross needle  
**£599.95**

**AT-500** 600W manual antenna tuner  
Covers 6-160m  
Output: 600W PEP  
Built in 4:1 balun  
**£529.95**

**AT-5K**.....3.5kW manual tuner.....£1249.95  
**AT-4K**.....2.5kW manual tuner.....£999.95  
**AT-2KD**.....2kW Differential manual tuner.....£599.95  
**DL-1500**.....1500W high power dummy load.....£199.95  
**BK4C/1:1**.....4Kw 1:1 ratio current balun.....£84.95  
**BK4C/4:1**.....4Kw 4:1 ratio current balun.....£84.95

### nevada QUALITY POWER SUPPLIES

2 YEAR WARRANTY!



**PS-40M Linear**  
• 40A (max) with meter  
• Voltage: 1.5-15V DC  
• Cigar adaptor output  
**£129.95**

PS-30M.....Linear 30A (max) 3-15V DC.....£99.95  
PS-08.....Linear 8A (max) 13.8V DC.....£34.95  
PSW-50.....Switch mode 50A (max) 9-15V DC.....£129.95  
PSW-30.....Switch mode 30A (max) 9-15V DC.....£79.95  
PSW-30H.....Switch mode 30A (max) 9-15V DC.....£69.95  
PS23-SW1.....Switch mode 23A (max) 13.8V DC.....£59.95  
PSW-07.....Switch mode 7A (max) 13.8V DC.....£29.95  
PSW-04.....Switch mode 5A (max) 13.8V DC.....£24.95

### COMET Power Meters



**CMX-200 SWR Meter**  
• Cross needle/AVG/PEP  
• Frequency range:  
1-200MHz  
• Power:  
3/300/3kW  
**£79.95**

CMX-400.....140-525 MHz 200W.....£89.95  
CMX-2300.....Two in one unit HF, VHF, UHF.....£139.95

### DAIWA Products



**CN-801HP**  
Top of the range meter  
• 1.8-200MHz  
• 20/200/2kW  
**£429.95**  
**£109.95**

CN101L.....1.8-150MHz.....£99.99 £74.99  
CN801-SII.....900-2500MHz 200mW/20W N type.....£199  
CN801VN.....SWR/PWR 140-525MHz N type.....£119.95  
**CS201A** 2 Way Antenna Switch,  
SO239 type.....£24.95  
**CS201G11**..2 Way Ant Switch N Type.....£29.95

NEW



### FT-991A

- All new Multiband Transceiver
- Coverage 160-6m, 145/433MHz
  - All modes AM/FM/SSB/Data
  - 100W HF/6m-50W 145/433MHz
  - NEW colour waterfall display

**£1369.95**

FT857D.....Multiband HF/VHF/UHF mobile.....£799.95  
FT817ND.....All mode multiband portable.....£599.95  
FT450D.....100W all mode HF/6m+ATU.....£679.99  
FT891.....HF/6m mobile/base TX.....£689.95  
FT7900E.....Twinband 145/433MHz mobile.....£249.95  
FT1DE.....Ipx5 digital handy.....£269.95  
FT2DE.....FREE SNAPSHOT MIC.....£399.95  
FTM400XD.....FREE SNAPSHOT MIC.....£524.95  
FTM100DE.....New C4FM 50W Dual Band Mobile.....£299.99  
FTDX3000D.....100W HF/6m all mode TX.....£170 CASHBACK  
FTDX1200D.....100W HF/6m all mode TX.....£85 CASHBACK  
VX6E.....Submersible 145/433MHz handy.....£159.95  
G2800DXC.....Extra heavy duty rotator.....£929.95  
G1000DXC.....Varispeed heavy duty rotator.....£489.95  
G450C.....Rotator + 25m cable kit.....£389.95  
40m-WP.....40m rotator cable w/plugs.....£94.95  
25m-WP.....25m rotator cable w/plugs.....£65.95  
GS-065.....Medium stay bearing.....£55.95

### MIDLAND Amateur Radio



**CT-890**  
Dual Band Handheld  
with colour screen

- UHF-VHF/UHF-UHF/VHF-VHF
- 88-108MHz FM receiver
- Vox function
- Full Duplex
- 999 memories
- 2,600 mAh Li-ion battery

**£129.95 now £99.95**

CT-410.....UHF Handheld.....£79.95 £59.95  
**Base Antennas - Fibreglass**  
X-50.....Dual Band 200W 1.7m.....£69.95  
X-30.....Dual Band 150W 1.3m.....£59.95  
F22.....144MHz 200W 3.2m hi-gain.....£89.95

**Mobile Antennas**  
NW-2000.....Dual Band 98 cm fold over.....£39.95  
NR-770S.....Dual Band 43cm 100W.....£24.95  
NR-770R.....Dual Band 98cm 200W.....£29.95  
AZ-504.....Dual Band 46cm 50W.....£26.95  
M-285.....144MHz 5/8 whip 50W.....£24.95

**KW-520 SWR/Power Meter**  
• 1.8-200, 140-525MHz  
• Power: 5/20/200/400W  
**£99.95**  
KW-505.....(15-150)MHz 100W.....£22.95

### TYT - UHF DMR Radio!



**MD380**  
• 70cm UHF band  
• 1W or 5W output  
• 1,700 mAh Li-ion battery  
• Easy to programme  
• Includes **FREE** lead and software  
**£149.95 £129.95**

### Digital Scanning Receiver



**WHISTLER TRX-1**  
Adaptive digital  
trunking scanner

- 25-1300MHz with gaps
- DMR
- Hytera XPT
- MotoTRBO. Cap. Plus
- MotoTRBO. Con. Plus
- MotoTRBO.

**£419.95**

### ANYTONE AT-588



4 Metre 50W FM Transceiver

- Covers: 66-88MHz
- Memories: 200
- DTMF Microphone
- CTCSS/DCS/DTMF
- 2 Tone / 1 Tone
- Compander function

**£129.95**

DEMO MODEL



### Kenwood TS-990S

- HF/6m Radio
- Dual TTF display
  - 200W output
  - Our Demo - just a few hours use!

ONE ONLY  
DEMO MODEL  
Generous Part X  
2 Year Warranty  
**£4795.00**

TS-2000X.....Allbander classic includes 23cms.....£1469.00  
TS-480SAT.....100W mobile/base HF/6m ATU/DSP.....£659.95  
TS-480HX.....200W DSP mobile/base HF/6m.....£719.95  
TS-590SGE.....100W DSP HF/6m all mode TX.....£1159.95  
TS-2000E.....HF 50/144/430MHz transceiver.....£1279.95  
TM-V71E.....Twinband 145/433MHz with APRS.....£299.95  
TM-281E.....High power 2m 145MHz mobile.....£169.95  
TMD-710GE.....Twinband VHF/UHF/APRS/TNC/GPS.....£479.95  
TH-D72E.....VHF/UHF handheld GPS/TNC/APRS.....£399.95  
MC60A.....Classic style desktop microphone.....£122.95

NEW

**Kenwood TH-D74E**  
Dual Band Handheld with APRS  
and Digital (D-STAR) capability

- Built in GPS
- Wide band receive HF, VHF, UHF
- IF filtering / DSP

**£599**

### Network Antenna Analysers



**MetroVna DELUXE**  
with Bluetooth connectivity

- Covers up to 250 MHz
- Same spec as Pro below

**FREE DELIVERY £299.95**

**MetroVna Pro Model**  
with Bluetooth connectivity

- Touch Screen - colour
- Freq coverage: 1-180MHz
- Measures: SWR, R, Z, X, phase, filters, Return Loss
- Transmission Loss
- Link by Bluetooth or USB

Phone not included  
**FREE DELIVERY £269.95**

### 1kW - End Fed Wire Antennas



**MyAnt EFW 80-10**  
Resonant on 80/40/  
30/20/17/15/10m  
NO ANTENNA TUNER  
REQUIRED!  
Length: 130ft  
**£159.95**



**MyAnt EFW 40-10**  
Resonant on 40/20/15/10 +  
WARC with tuner Length: 63ft  
**£149.95**

### MFJ



**MFJ-1835**  
NEW 5 Band  
Cobweb Antenna  
**£209.95**

225.....1-180MHz graphic analyser.....£299.95 £269.95  
226.....Graphic analyser (1-230) MHz.....£359.95  
259C.....HF/VHF portable antenna analyser.....£279.00  
266.....New style HF/VHF/UHF analyser.....£349.95  
269C.....HF/VHF Digital Analyser.....£369.95  
550.....Popular Morse code practice key.....£19.95  
557.....Morse code key with oscillator.....£46.95  
901B.....Versa Tuner 200W HF.....£119.95  
912.....Remote 4:1 balun box.....£84.95  
931.....Artificial ground unit.....£114.95  
934.....300W Tuner + artificial ground.....£209.95  
941E.....300 Watts max Versa Tuner II.....£149.95  
945E.....1.8-60MHz 300W manual tuner.....£139.95  
948.....300W PEP reading antenna tuner.....£159.95  
949E.....300W tuner + Dummy load.....£189.95  
959C.....Receive antenna tuner + pre-amp.....£145.95  
969.....300W tuner 160-6m.....£229.95  
971.....Portable Ant. tuner 1.8-30MHz.....£122.95  
986.....1.5kW HF tuner.....£369.95  
989D.....1.5kW HF tuner.....£399.95  
998.....1.5kW Auto Tuner 1.8-30MHz.....£179.95  
998RT.....1.5kW remote Auto ATU.....£779.95  
1025.....Noise canceller/signal enhancer.....£209.95  
1026.....ORF eliminator + active antenna.....£214.95  
1701.....6 Way coax switch 2.5kW (SO239).....£89.95  
1704 (P).....4 way coax switch 2.5kW (SO239).....£84.95  
1704 (N).....4 way coax switch 2.5kW (N type).....£95.00  
4416B.....Super battery booster.....£174.95

NEW



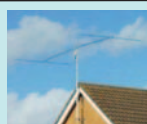
**690D**  
Digital 50W  
solder station  
**£179.99**



### AOR AR-DV1

NEW Analogue/Digital Voice Receiver  
Decodes virtually ALL popular digital modes:  
DMR, D-STAR, Yaesu Fusion & lots more  
• 100KHz-1300MHz Wide band reception  
4GB SD CARD included  
**£1299.95**

### PRO-ANTENNAS - British Made!



**Dual Beam Pro**  
Covers: 20, 17, 15,  
12, 11, 10 plus 6m  
(with a suitable ATU)  
• Power: 1KW  
(600W 30/40m)

- Turning radius: 2.5m
  - Overall span of main element: 5.0m
  - Overall span of end elements: 2.5m
  - Support Mast required 1.5" to 2" Dia.
  - Weight: (inc. bracket & matching unit): 4.0kg
- £249.99**



**I-Pro Home**  
Very efficient Vertical  
covering: 20, 17, 15, 12, 11,  
10 plus 6m (with suitable ATU)  
• Height: 5.0m  
• Span of end elements: 2.5m  
• Weight (inc matching unit): 4.5kg  
• Power: 1kW PEP  
**£259.99**

### spiderbeam

**Antennas, Telescopic Poles, Aluminium Masts**  
**UL-404L Ultra-lite Expedition antenna**  
Dipole covers: 40, 20, 17, 15, 12, 10.6m.....£99.95  
**Fibreglass Telescopic Poles**  
12mtr Heavy Duty.....£89.95  
18mtr Standard.....£199.95  
22m 'Long John' NEW.....£399.95  
26mtr Standard.....£499.95  
Base Plate for Fibreglass Poles.....£28.95  
**Aluminium Telescopic masts**  
10 metre Standard.....£279.95  
10 metre Heavy Duty.....£299.95  
12.5 metre.....£319.95  
14.5 metre Heavy Duty.....£399.95

### Headphones



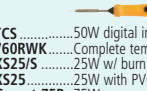
**Kenwood HS5**  
Communications  
Headphones  
**£59.95**  
**Yaesu STA77**  
Stereo  
Headphones  
**£69.95**  
**Kenwood HS6**.....lightweight style.....£35.95

### COMET

**HF Antennas**  
CWA1000.....5 band trapped dipole 19.9m long.....£124.95  
CHA250BX.....Wide band vertical (80-6mtrs).....£349.00  
**VHF/UHF Antennas**  
GP1-M.....145/433MHz length 1.25m.....£59.95  
GP3-M.....145/433MHz length 1.78m.....£69.95  
GP6-M.....145/433MHz length 3.07m.....£99.95  
GP9-M.....145/433MHz length 5.15m.....£149.95  
GP15N.....50/145/433MHz length 2.42m.....£119.95  
GP93N.....145/433MHz+23cms length 1.78m.....£99.95  
GP98.....145/433/1200MHz length 2.94m.....£119.95  
**50MHz Antennas**  
CA52HB.....2 element Yagi.....£79.95  
CA52-HB4.....4 element Yagi.....£129.95  
**Quad Band Mobile for FT-8900**  
UHV-4.....Mobile whip 4-Bands 10/6/2/70cms.....£69.95  
**Antenna Tuners**  
CAT-10.....10W 3.5-50MHz Manual Tuner.....£99.00  
CAT-300.....300W 1.8-60MHz Cross Needle.....£199.95  
**Accessories**  
CBL-2500.....Balun 2.5kW (CW) 1.8-56MHz.....£44.95  
CBL-1000.....Balun 1kW (CW) 1.7-30MHz.....£39.95  
CF-30MR.....Low Pass Filter 1.8-30MHz 1kW CW.....£59.95  
CF-360A.....Duplexer 1.3-30/49-470MHz.....£49.95  
CF-4160B.....Duplexer 1.3-170/350-540MHz.....£39.95  
CF-416A.....Duplexer 1.3-170/350-540MHz.....£39.95  
CF-530.....Duplexer 1.3-90/125-174MHz.....£49.95

LOTS MORE on our WEBSITE!

### Soldering Irons



**TCS**  
760RWK.....50W digital iron + temp control.....£69.95  
X525.....25W w/ burn proof silicone cable.....£29.95  
X525.....25W with PVC mains cable.....£24.95  
Gascat 75P.....75W gas powered.....£39.99

**PRICE  
PLEDGE**

we always aim to be competitive  
*seen it cheaper - then let us know!*

call 023 9231 3090 open: Monday to Friday 9.00am - 5.30pm

**nevada®**



# VHF/UHF

**S**uper Moon brings super EME conditions with an unique extreme moonbounce contact.

Late October presented another major tropo opening that extended right up into the high GHz spectrum. Once again the tropo range extended down to southern France and northern Spain and there were excellent openings into central Europe.

The RSGB & IARU coordinated 2m CW Marconi Contest occurred on 4/5 November with propagation conditions and activity from the UK being particularly poor. From a personal point of view it also highlighted how poor my CW is compared to yesteryear and definitely more practice is required! There were numerous DX stations on the band as this a well supported contest in Europe.

Meteor scatter enthusiasts have been kept busy with Martin, GM6VXB/P activating rare wet squares as he operates from any possible site aboard ships or platforms in the North Sea. November also saw the peak of the Leonids meteor shower, which sadly seems a shadow of its former self. However, there were some reasonable bursts during the peak over the evening of 17/18 November. Any chances of a visual display were dashed by bad weather, thick cloud and heavy rain over much of the UK. The Super Moon (where the moon was at its closest point to Earth) occurred on 14 November – the closest since 1948. This is good for EME operators, as the path loss is reduced with such an exceptional perigee.

Another major event in November was the 2nd leg of the ARRL EME contest. Although this occurred the weekend after the Super Moon, conditions were still good and many stations took advantage of the lower path loss. Two main expeditions on the air during this period were E44CM (KM17ru) and XV4F (OJ39ew). E44CM, was on the air from Jericho city in Palestine, operated between 15 and 24 November by DXpeditioners Chris, PA2CHR and Jos, PA3FYC. Their setup included on 144MHz: FT-857 / 2 x 20-ele X-polarised antennas with 16dBd gain and Italab power amplifier. On 432MHz the FT-857 again and 27-ele DK7ZB antenna with 17.7dBd gain, mechanical polarisation control and 400W power amplifier.

XV4F was operated from Vietnam by Keith, G4FUF, located in the Mekong Delta region in Tra Vinh Province close to the Co Chien river, some 100km SW from Ho Chi



**PHOTO 1:** The world's smallest EME antenna, used by Tom, M0ABA/MX0CNS to work HB9Q and DL7APV.

Minh city. The equipment used included 2 x 12-ele IOJXX vertically polarised antennas, FT-847 with BLF188 PA and HA8ET LNA, all equipped with 7/16 connectors as N types suffer significant failures in the tropical environment. More information on these and other expeditions can be researched at the Make More Miles On VHF Website [1].

## The world's smallest EME antenna

Readers over the past few months will remember the amazing results that Tom,

MOABA/MX0CNS and the Essex DX Group have achieved using small antennas on 70cm EME in a quest to try and find the minimum antenna possible to make an EME QSO. Originally starting with a single 7 element Yagi, the number of elements was gradually reduced – with the previous report showing an excellent contact using just a 3 element antenna. This was a fantastic achievement in itself but with careful planning and waiting for optimal conditions a world record was achieved using just 2 elements on the GTV antenna. The design

of the antenna is somewhat unusual in terms of the driven element developed by DG7YBN with the unique GTV antenna design [2]. Coupled with the excellent conditions, Tom made JT65B QSOs with HB9Q [3] and DL7APV [4], generating an incredible 260W EIRP from his system. Tom's mission throughout 2016 was to try and find the minimum antenna size to make an EME QSO and finally completed with the two 70cm big guns after many sessions.

## Tropo and Sporadic-E

Lyn, GW8JLY (IO81) was QRV during the tropo openings on 27 September and was very fortunate to make a contact with EA8TX in locator IL18QI (Canary Islands). Lyn has a poor take off to the south west and it's far from easy to make any QSOs in that direction, let alone a QSO with EA8 at 2,808km. These rare contacts have been and always will be his very best distance (ODX) worked via tropo propagation on the 2m band. Almost a month later, on 29 October, there was more tropo propagation but this time not to faraway EA8 but to places much nearer to home. QSOs were completed with French stations in locators JN03, IN93, IN94, IN95 and Spanish stations in locators IN73 and IN83. The following day, the 30th, the band was open again to Spain and a few more EA stations were worked. During the evening of 29 October the propagation had moved to the east and Lyn made QSOs with German stations in JO31 and Dutch stations in JO21 and JO22. All signals were very strong in Cardiff. On 2m meteor scatter Lyn completed numerous QSOs with Martin, GM6VXB/P in the rare 'wet' locators IO98, JO07 and JO17. This was Lyn's only chance to work these locators and he is very grateful for Martin's efforts. On 6m there were a few unusually late in the season Sporadic-E (Es) events. On 1 October, LA6OJ in JO38 was worked and on the 13th a few Italian stations in locator JN52. The final opening was as late as 15 October where more Italian stations were worked in JN35, JN45 and JN53 and 9A2PT in JN75. As far as I can remember this was the latest date ever for 'summer' Es. Lyn is hoping it won't be long before the winter Es season commences.

## Beacon news

After a break of a few months due to maintenance the 70cm beacon PI7CIS returned on 432.412MHz with its usual reliable signal from locator JO22dc. This is a very welcome return as this beacon is used for many propagation tests over the North Sea. More good news came on 25 November when cluster spots announced the restoration the ONOVHF 2m beacon on 144.418MHz and the 70cm beacon on 432.418MHz that had

been QRT since August. They were originally planned to be off the air for 12 months so excellent work by the beacon keepers.

Roger Gregory, G4OCO, Chairman of the Mid Cornwall Beacon and Repeater Group kindly sent in an update for the group's activities. The group currently operates and maintains beacons and repeaters at a site on Hensbarrow Downs, St Austell, NGR SW990574 and QRA IO70oj. Repeater GB3NC operates on 145.725MHz output and 145.125MHz input using 77Hz CTCSS or 1750Hz tone burst with 5 seconds of audio to access. On 70cm, GB3HB has its input on 434.9750MHz and output on 433.3750MHz, and requires similar CTCSS / tone access. The repeater uses a Diamond X200 antenna with a gain of 6dB. The antenna is fixed near the top of a 100' mast that is 1000' ASL and runs about 5W, giving an ERP of about 12W.

The group also manage the GB3MCB beacons on 50.0424MHz, 432.470MHz, 1296.860MHz and 10368.980MHz. Currently the VHF beacons on 70.025MHz and 144.469MHz are not on the air as both have been switched off, because they have been unable to get parts to repair them. The group plans to introduce a pledge system for beacon users to donate towards new beacons.

The 6m beacon was changed in August to new hardware that was supplied by the Six Metre Group. It runs a mode called PI4 and software can be downloaded free for decoding from the OZ2M website [5]. The beacon also transmits a CW identification. Other beacons are running normally. The group's website [6] gives up to date status information on the beacons and repeaters.

## 144MHz DX Combined Propagation Modes Study

Thanks to Tim, GK4LOH (IO70) for the following information regarding propagation testing on 2m. He says,

"I am investigating 144MHz combined mode propagation for the RSGB Propagation Studies Committee (PSC) and would like to hear from VHF operators about QSOs (or reception reports) that they think may have involved some combination of different propagation modes, for instance, using a Tropo duct to extend the range of a meteor scatter QSO. These events are rare; in many years of operating on VHF I recall only a handful of my own contacts where a combination of modes appears to have played a role. My hope is that many VHF operators will also have a few special contacts that they remember, and would share, as part of this investigation. In recent years, there have been several reports of Tropo (Tr) with meteor scatter (MS), particularly from EA8 to the EU, but there are many other possibilities too, including Tropo+aurora,

Tropo+aircraft scatter, Tropo+Es and auroral pings (MS+Au).

"My aim is to help develop an understanding of these rare events and hopefully encourage further experimentation. Please send any reports to g4loh.psc.study@gmail.com so they can be studied."

There have been reports this year from the spring and summer months of these extended combined propagation possibilities. Testing of potential paths is vital to discover the boundaries of 2m propagation.

## Aircraft scatter observations

Whilst activity in the Marconi 2m CW Contest was low from the UK it gave a chance to listen to the many stations from Europe on the band and analyse the potential for aircraft scatter enhancement over a path of 600-700km. From IO83 at a beam heading of 110-140° the high volume of aircraft over this path creates significant Doppler on a CW signal. It was also noticed how a multi path, multi reflected CW signal can sound, as if all the characters are chopped to the point where copy is very difficult. I thought at the time it was my poor CW but after more testing it was evident on a number of signals. Clearly using this mode of propagation there is potential for combined propagation (as mentioned earlier by Tim, GK4LOH). To test this you can download the software from Frank, DL2ALF via the Airscout website [7].

## UKSMG Winter Marathon

The UKSMG Winter Marathon continues until 2359UTC on 31 January 2017. It aims to promote and encourage activity on the six metre band and is open to all stations worldwide. UKSMG membership is not required with the objective to work as many 4 digit grid squares as possible. For further information please check out the UKSMG website [8].

## Sign off

Many thanks to all contributors. Please send all activity reports by the 3rd weekend in the month.

## Websearch

- [1] [www.mmmonvhf.de](http://www.mmmonvhf.de)
- [2] <http://dg7ybn.de>
- [3] [www.hb9q.ch/hb9q/](http://www.hb9q.ch/hb9q/)
- [4] <http://dl7apv.darc.de>
- [5] [www.rudius.net/oz2m/ngnb/pi4.htm](http://www.rudius.net/oz2m/ngnb/pi4.htm)
- [6] [www.gb3nc.org.uk](http://www.gb3nc.org.uk)
- [7] [www.airscout.eu](http://www.airscout.eu)
- [8] [www.uksmg.org/winter-marathon.php](http://www.uksmg.org/winter-marathon.php)

**Richard Staples, G4HGI**  
g4hgi@live.com



## New 2m Transverter

### TR 144-PRO

High Quality Made in Germany

RF range	144 ... 146 MHz
IF range	28 ... 30 MHz
IF input power	1 ... 50 mW / 60 ... 1000 µW switchable
Output power	25 W
IM3 of output signal	36 dBc @ 20 W PEP
RX gain	typ. 25 dB
Noise figure @ 18 °C	typ. 1.3 dB

Introductory price:  
**1385,- €**

#### New features

- X Status readout with an easy-to-read LCD-Display
- X Output from Local oscillator for a second converter or synchro receiver or predistortion downconverter on software defined radios
- X Second independent IF Receiver port to connect a second receiver such as Spectrum readout, SDR receiver or a „sun and moon noise meter“
- X Two equivalent HF-Antenna ports free configurable as receiver port or transmit port or two independent antenna systems
- X Monitored power amplifier with several protection circuits
- X Free configurable delay time of the internal sequence generator and open drain outputs for maximum flexibility
- X Possibility to control the transverter with serial interface direct with PC (not RS232)



Available now

shop.kuhne-electronic.de

Kuhne electronic GmbH

Scheibnacker 3  
95180 Berg - Germany

Telefon: +49 (0) 9293 / 800640

E-Mail: info@kuhne-electronic.de

KUHNE electronic

MICROWAVE COMPONENTS

Solutions for the wireless world

## W2IHY Technologies

Outstanding Transmit Audio Is Our Specialty

### 8 Band EQ

W2IHY 8 Band EQ & Noise Gate  
Thousands of Satisfied Users  
Worldwide



Add the legendary W2IHY 8 Band Equalizer And Noise Gate to your shack and get ready for great audio reports! From smooth rag-chew audio that makes them ask what you're running ... to penetrating DX/Contest audio that gets results, wide-range adjustability is at your command. Noise Gate reduces background noise for a cleaner, more effective signal. Universal Interface lets you use most any microphone with any radio including classics. I-K-Y selector for plug-n-play with popular brand microphones. Switched outputs for 2 radios. Headphone Monitor. RFI protection.

### EQplus By W2IHY

Premium Audio Processing



Did you turn on an amplifier? Your signal is loud and squeaky-clean. EQplus users hear that report all the time. Compressor/Limiter increases talk power without the distortion and restricted frequency response of ordinary speech processors. Dual Band EQ, Down-ward Expander for noise reduction, Effects for psychoacoustic magic. LED Bar Graph. Front panel controls. Universal Interface matches most all mics, all radios. I-K-Y mic selector. Switched outputs for 3 radios. Headphone Monitor. RFI protection. Powerful stand alone system or combine with W2IHY 8-Band EQ for maximum adjustability.

Products purchased from W2IHY include 30 Day Money Back Guarantee and 3 Year Parts/Labor Warranty.  
Top-rated Product Quality, Technical Support and Customer Service.

Awesome Audio  
Demonstrations  
www.w2ihy.com

**W2IHY Technologies Inc.**

19 Vanessa Lane, Staatsburg, NY 12580

845-889-4253 • email: julius@w2ihy.com



order online at [www.w2ihy.com](http://www.w2ihy.com)



## Atlas DCA - Semiconductor Analyser model DCA55

- Connect any way round.
- Automatically identify component type.
- Automatically identify pinouts.
- Supports Transistors, MOSFETs, Diodes, LEDs and more.
- Measure transistor gain ( $h_{FE}$ ).
- Measure  $V_{BE}$  (now 1mV resolution!)
- Measure leakage current.
- Measure MOSFET thresholds.
- Measure LED voltages.

Now with  
backlit display  
and AAA battery!

2 Year Warranty  
as standard

£48.00  
(£40.00+VAT)

UK delivery  
£3.00 inc. VAT



PNP Germanium Transistor ↓	NPN Silicon Transistor ↓	PNP Darlington Transistor ↓
RED GREEN BLUE Emit Coll Base ↓	RED GREEN BLUE Base Emit Coll ↓	RED GREEN BLUE Emit Base Coll ↓
Current gain $h_{FE}=67$ ↓	Current gain $h_{FE}=117$ ↓	Diode protection between C-E ↓
Test current $I_C=2.50mA$ ↓	Test current $I_C=2.50mA$ ↓	Current gain $h_{FE}=9124$ ↓
Base-Emitter V $V_{BE}=0.293V$ ↓	Base-Emitter V $V_{BE}=0.711V$ ↓	Test current $I_C=2.50mA$ ↓
Test current $I_B=4.981mA$ ↓	Test current $I_B=4.583mA$ ↓	Base-Emitter V $V_{BE}=1.321V$ ↓
Leakage current $I_C=0.027mA$ ↓	Leakage current $I_C=0.000mA$ ↓	Test current $I_B=3.720mA$ ↓
		Leakage current $I_C=0.000mA$ ↓

Just a few example  
screen shots

**PEAK**<sup>®</sup>  
electronic design ltd

Tel. 01298 70012  
[www.peakelec.co.uk](http://www.peakelec.co.uk)  
[sales@peakelec.co.uk](mailto:sales@peakelec.co.uk)

E&OE

# GHz Bands

**A** happy 2017 to all GHz bands readers and contributors. Let's hope that the New Year brings to fruition all those projects you have planned. The great thing about amateur radio is that it's a broad church and the GHz bands reflect this, covering state of the art homebrewing, DXing and contesting, narrow and wideband modes analogue and digital. I hope that this column is covering the topics that you are passionate about. If not, contribute!

## Digital modes on the GHz bands

Back in November I initiated the 'Wednesday Night Digifest' to encourage more terrestrial use of the seemingly-neglected digital modes on the bands above 1GHz. Centred around 1296.165, a group of us have been experimenting with digital modes and particularly aircraft scatter (AS). Using K1JT's WSJT10 and WSJT-X software [1] some interesting characteristics of their various modes have been (re)discovered. Sam, G4DDK is experimenting with the new MSK144 mode and found it works well on aircraft reflections. Testing from 2000UTC onwards with Neil, G4DBN (IO93nr) they saw many very fast Doppler shifting signals and these seemed to upset JT65c far more than JT4F or MSK144 modes. As the evening progressed, there seemed fewer well-placed planes so it seems you need to get on early. It's certainly worth trying AS digimodes, particularly if you can aim end-on to a set of planes on a glide-path or a busy route such as the stack of planes around the major airports. Interestingly, G4DBN finds that he gets the best reflections from distant 23/13cm beacons when the planes are beyond the beacon. GB3DUN, GB3ZME and GB3MHZ all give good reflections when there are no planes in the path, but plenty to the south of them. I've have had good QSOs with Neil when we both beam SW at the Heathrow aircraft 'stack'. You can read more about digimodes and MSK144 on the EME2016 website [2].

Setting up and using the WSJT software with a soundcard interface is covered in several places on the web such as [1] and [4]. Andy, G4JNT has provides a useful checklist to help:

- Correct soundcard selected
- Soundcard audio out connected to TX input
- Audio in connected to RX output
- Correct RX audio levels
- Correct mode AND submode selected
- PC timing correct to within a second.



PHOTO 1: The 2016 GMRT speakers and (2nd from right) chairman, GM80TI (photo: GM3PSP).

Get those right and it should work on RX. For TX,

- TX audio drive level set correctly (use the Tune facility)
- PTT control enabled via the correct COM port, CAT or by VOX
- Correct transmission period selected
- Correct period length selected.

Calling CQ on 23cm and above is quite unproductive due to very narrow antenna beamwidths. Get access to the ON4KST chatroom [3] and post a message announcing your intentions such as "CQ 1296.168 JT4F 1st QTF 345". This will let people know where and when you are active.

## Really small system EME

At the end of the 1296 ARRL EME contest in October, around moonset, I switched over to using my terrestrial system on the roof. Using 350W to a 44-ele Yagi with no elevation I easily worked both Dan, HB9Q and W6YX (the Stanford University big dish in California) on JT65c. Dan later emailed me saying that he'd worked single Yagi stations who were running 30-100W, as well as a 1.5m dish station with 10W! They included EA5DOM (1x35-ele Yagi, 50W), SM5EPC (1x48-ele, 30W) and K3GNC (1x23-ele, 100W). Phil, G3YPQ emailed to say that in the same contest he decoded the JT65C from HB9Q using just a 44-ele Yagi, an LNA4ALL wideband preamp at the feed point and an AR5000 receiver. As a self-confessed "EME virgin" he described the experience as "a magic moment, and motivation to improve". Recent experiments with the new QRA64 mode in WSJT-X 1.7 [1] indicate that it will be even better for small systems. EME is now quite achievable, especially if you get help from a mega dish at the other end!

## The GM Microwave Round Table

November saw another Scottish Microwave Round Table. This event goes from strength to strength with over 50 participants, things to buy and a great social programme. **Photo 1**

shows speakers G8CYW, G4BAO, GM4BYF and G4DDK, who covered a wide selection of topics from VHF transverters to nanowaves.

## Beacon news

The best news towards the end of last year was that on 4 November the new GB3CCX 6mm beacon became operational on 47.088940GHz from Cleeve Hill (IO81xw81). It runs 10mW to an omnidirectional 5dBi slotted waveguide at 4m AGL (334m ASL). It is co-located with the 10GHz beacon (which was also replaced and is now fully operational). Both are GPS locked to within a few Hz of the nominal frequencies. Pete, G4HQX has successfully copied the 47GHz beacon at distances of 11 and 39km, with signal strengths 599 and 569. There is a short video on YouTube [5] from the second location, IO81sr23.

## More 24GHz activity

Pete, G4HQX's new 24GHz Alcatel module-based gear got its first test recently, running 600mW to a 30cm dish. Accompanied by Keith, GW3TKH, they started out near the Severn Bridge to compare signal levels from GB3AMU (IO81JN94) on 24048.9400MHz at 35km, finding them very similar on their two equipments. Keith then moved to Cefn Y Galchen, IO81LS and Pete to Coaley Peak, IO81UR, and had a 59+ FM QSO at 52km.

## Websearch

- [1] <http://bit.ly/2b9mcSe>
- [2] <http://bit.ly/2ga1Miv>
- [3] [www.on4kst.info](http://www.on4kst.info)
- [4] <http://bit.ly/2fN4Wpj>
- [5] [https://www.youtube.com/watch?v=ZDqjwZxt\\_ms](https://www.youtube.com/watch?v=ZDqjwZxt_ms)

**John C Worsnop**  
**PhD CEng MIET, G4BAO**  
[john@g4bao.com](mailto:john@g4bao.com)



# Jamboree on the air



Angel of the North ARC and Northumbria ARC operated GB2TS.



GB2SG on the air with Dover ARC including G3ROO, MOPKH and G7SXD.

**J**amboree on the Air is an annual event in which half a million Scouts and Guides all over the world make contact with each other by means of amateur radio. The use of amateur radio means that many Scouts get the opportunity to discover the skills of radio techniques and electronics.

## International JOTA

The Pafos Radio Club of Cyprus ran, 5B4 SPD in conjunction with the 52nd Scout Group of Pafos, with their Scout Leader, Antonis Karseras, and 266 Air Scouts Yeroskipou. In total, 83 contacts were made to 23 countries, many of them JOTA stations. Club members taking part were 5Bs AIX, ALJ, AJG, AIK, AIF, MW and XB, along with many Scouts and Guides. A very enjoyable time was had by all and many of the Scouts and Guides got to talk on air to other JOTA stations. **Donald Radley**

## Around the country

It was a great weekend for Thornbury & South Glos ARC operating GB1OSG. John, M3EQQ and John, M0HFH were busy with youngsters making QSOs and CW competitions as well as Gary showing a few adults our SDR station. Numerous other QSOs were also made once members battled through the contests, QRM and other stations calling. The contacts included a new station Southern Ireland. **Mark Beasley, 2EORKM**

Dover Radio Club activated GB2DSG for Scouts and Cubs from various local Scouting groups. They were given a demonstration on antennas, sent and received Morse code via sound and light and demonstrated their knowledge of the

phonetic alphabet. They went on to speak to various amateurs and other groups from both the UK and Europe on a very crowded 40m band. The club is going to sponsor the training of four Scout Explorers in the near future. **Aaron Coote, 2E0FQR**

South Essex ARS operated GB2CIS for the 1st Canvey Sea Scouts at St Ann's Church, Canvey Island. There was a smaller than usual turn out but many of the young people had contacts with other JOTA stations. We used our Windom HF antenna and a 5/8 collinear for 2m at 30ft. Two Scouts were very interested in radio and, with luck, may decide to take up the hobby. **Terry Howchen**

Angel of the North and Northumbria ARCs combined resources to run a JOTA station from the Tyneside Scout HQ. Using GB2TS they operated on 80, 40, 20 and 2m. The 28 Scouts each gave at least two greetings messages and experienced the world of amateur radio. An important part of the day was the opportunity to undertake the training needed to achieve their Scout Communications badge. The day was a great success and closed with 28 happy Scouts and 9 tired amateurs! Thanks go to the Scout support staff for making the event a success. **Nancy Bone, G7UUR**

One of the largest JOTA events in Region 12 took place at the Belchamps Scout Activity Centre in Hockley. An estimated 200 youngsters took part, with many camping overnight. The event was co-ordinated by Scout leader Derek Hagan, MOSCE. Using GB1BEL, the event was supported by Essex Ham, who operated 2m and HF stations, helping to pass close to a hundred JOTA friendship messages. Keen to engage the youngsters, Nick, MONFE brought along a collection of interesting demos – the “your name in Morse” Internet

app that allows youngsters to transcode their names into audio and visual Morse, as well as a screwdriver-CW key and some Raspberry Pi-powered musical potatoes. Other activities included QSL card design, an electronics kit, Hamsphere, a two-way CW setup and a radio hunt using PMR handhelds. **Pete, MOPSX**

Norfolk Coast ARS ran two stations, GB1HS with the 1<sup>st</sup> Holt Scout group and the second at the West Runton Scouts HQ using their MXONCA club callsign. Both stations operated on 20m and 40m and band conditions were good, with some excellent QSOs with European stations. In addition both locations had 2m stations, allowing the Cubs and Scouts to exchange greetings with each other. All participants were taught to spell their name with the phonetic alphabet and by Morse code and after their QSO they were presented with a certificate for their achievements. **Steve Appleyard, G3PND**

The 7th Harlow Scout Group worked with Harlow & District ARC to contact over 200 stations around the world passing messages and sometimes speaking to members of the Scouting movement. Preparations began with 40ft aerials erected, followed by the Scouts spending an evening learning about Morse code, the phonetic alphabet, looking at Q-codes, and learning about the radio equipment. The Cubs and Scouts spoke to other members of the movement from as far away as South Africa and America. They also spoke to Scouts from Belgium, Croatia, Greece, Hungary, Romania, Russia and Ukraine to name but a few places. Club members helped the Scouts to decipher codes, write their own messages, recognise international callsigns and prepare to speak on the radio. **Mike Simkins**

Barnet Scouts asked Southgate ARC to put on a JOTA station at their campsite near Mill Hill

in North West London. The station for GB6BBS was kept simple: the club's Kenwood TS590SG, a homebrewed off-centre fed dipole for 80m – 10m, which was replaced on Sunday with 40m delta loop set horizontally at about 25ft, thereby reducing the local noise level by 20dB, plus computerised logging and rig control. We contacted around 35 stations, of which 18 were JOTA stations and seven of these were abroad. Full marks to Stefan, SA0AEK for obtaining the call SCOUT. As ever, many thanks to everyone we contacted to for their patience with the Cubs, Brownies and Beavers, and especially for humouring the operators. Operators were: G8DVJ, MOASA, G8RPA, G8EWG, G0ESF, G4DFB, G0RPM and G4GRS. **Keith, G8RPA**

Scouts Cubs Beavers and Brownies had a busy weekend at Queen Mary School in Cleethorpes, with contacts from around the world on PSK31, HF and on D-Star aided by Grimsby & Cleethorpes Scout Active Support Radio Scouting Team. There were 37 contacts from America alone. Despite the weather not being kind, the Mayor of North East Lincolnshire visited. Thanks must also go to Lou Fisher, KE0H DU who was kind enough to get up at 4am to support the event by being our American contact. **Bri Siddle, M6LZX**

South Kesteven ARS operated GB1GDS from the 1<sup>st</sup> Foston Scout Hut. The event was attended by the 1<sup>st</sup> Foston, the 2<sup>nd</sup> (St Wulfram's), 7<sup>th</sup> (St Johns) and 8<sup>th</sup> (Harrowby) Grantham groups, the 1<sup>st</sup> Ancaster, 1<sup>st</sup> Colsterworth and 1<sup>st</sup> Caythorpe & Duke's Covert groups also attended. Over 80 young Cubs, Beavers and other children passed messages using the main radio station, were shown data mode operating and had the chance to earn certificates and gain their Communication badges for various radio activities including Morse code and using licence free PMR radios to send messages. **Andrew Garratt, MONRD**

North Kent Radio Society would like to congratulate the 1<sup>st</sup> Fots Cray Cub Scout Group on a JOTA day – well done. **Kevin Middleditch, 2E0WCK**

Mid-Somerset ARC successfully operated GB1SMS for the 1st Shepton Mallet Scouts. Despite variable band conditions, QSB and QRM, we managed to work over 50 stations including 15 countries over four bands – 80m, 40m, 20m and 17m – during the limited 7 hour operation. 22 other JOTA stations were worked. **David Edwards, G8BFV**

Edwin, GOLPO and Neville, G8CDG from Braintree & District ARS visited Steeple Bumpstead Scouts and Cubs to prepare them for JOTA. GB1HCV

January 2017



Pafos Radio Club operated 5B4SPD in with Scouts and Air Scouts.



Thornbury & South Gloucestershire ARC operated GB10SG.



Essex Ham member Nick, MONFE helping with friendship messages.



GB2CIS hosted the 1st Canvey Sea Scouts at St Ann's Church, Canvey Island.

was set up over the weekend at Halstead and Colne Valley Scouts HQ, operating HF, VHF and DMR radios. While some Scouts were sending friendship messages to participants at remote locations including Scout HQ at Gilwell Park, others were practising basic Morse or carrying

**Elaine Richards, G4LFM**  
elaine.richards@rsgb.org.uk



out circuit testing under the guidance of club members and Scout Leaders - all contributing towards gaining badges. At 1930 on the 17m band, Melvin, G0EMK responded to a CQ call from VP8LP. An enthusiastic Scout and his leader were able to exchange messages with Bob from the Falkland Islands. **Geoff, G1WRH**

Denby Dale ARS put on GB100WYS at Bradley Woods Scout Camp and local Scouts attended. Over 20 were awarded their Communications badge, and several have begun their Foundation licence training. The station was set up in the main building, which was a fantastic location. We were able to use the already installed AV projectors to display the QRZ pages of stations as they entered the log. Data modes were also impressive when on the big screen, as everyone could see exactly what was going on. We even managed to receive some SSTV pictures. The club had multiple stations operating on several bands as well as several different modes including CW, SSB and data. **Darran Chappell**

GB2HWC was held the main room of the Pine Lodge and we had the use of Itchen Valley Radio Club's trailer mast and SteppiR antenna. The equipment consisted of a full-sized G5RV for general 80/40m HF usage, an inverted V aerial for data modes, the SteppiR for 20/15m HF and a 2m collinear for local 2m FM working. The 2m FM transceiver was a Yaesu FT-897, the 40/80m was a Yaesu FT-840, the SteppiR was connected to the IVARC TS0590 and the data modes kit arrived in a 19" rack-mount courtesy of Will, 2E0HAI. We also had several sets of Morse buzzers so the Scouts could send messages to each other. Will, 2E0HAI's data modes setup had its screens projected on to a wall so all could see what was going on. He used PSK, RTTY and SSTV. We were all fascinated to see SSTV pictures arriving from various parts of Europe. The HF rigs were mainly used for making contact with Scout Groups around the UK & near continent. The FM rig was used to make contact with local groups, such as Locks Heath and to local amateurs when conditions on HF were not so good. Liz, MOACL also managed to speak to Cairo Scouts. The Morse code buzzers were amazingly popular considering that most had not heard of Morse Code before the event. Some were even able to decode some letters without looking at the crib cards by the end of their session. The smiles on their faces was priceless. Thanks to all those involved, we could not have done it without such a great team and I thank you all for being part of that team! **Colin, G4GBP**

About 15 volunteers set up and operated the stations at Gilwell Park, operating GB2GP. Over 250 young people and 60 adults visited the event. There were 3 stations, with their large aerials, providing radio contact with Scout stations all over



Grimsby & Cleethorpes Radio Scouting Team and the Mayor.

The antennas for Harlow & District ARC and 7th Harlow Scouts.

Above: John, G8EWG minding a Cub passing a message, with Keith, G8RPA in the background.

Left: One of the stations run by Norfolk Coast ARS.

Stewart, M0SDM operating GB1GDS while one of the youngsters eagerly awaits his turn to pass a message.

the world. Contact was made all across Europe, North and South America and the Caribbean. One of the best contacts was with the Chief Scout of Namibia, in Southern Africa! Other contacts allowed youngsters at Gilwell to speak directly to other Scouts and find out what they did for their Scouting in their countries. Another activity at the event

was the electronic kit building – a small AM radio. Over 150 of the kits were built by the youngsters, who soldered all the components into a small circuit board. All went away with a working radio! In total we managed to contact over 380 radio stations around the world (not all Scouts!) in over 50 different countries. **Frank Heritage, MOAEU**





North Kent Radio Society and the 1st Foots Cray Cub Scout Group.



Braintree club member and Scout Leader Colin, M6NCU assisting with a friendship message.



Denby Dale ARS put on GB100WYS.



Liz, MOACL operating the HF station at GB2HWC.

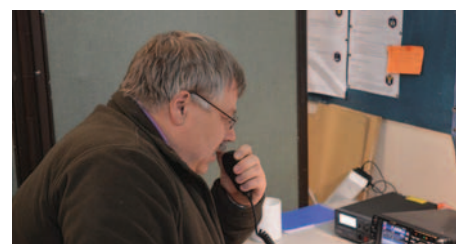
JOTA started as a bright day enabling the team from Colchester Radio Amateurs to erect the aerials and set up the radios for GB2CDS. At 10am our first set of Cubs arrived and it was straight in to the introductions, video and safety talk, then on to Morse deciphering and sending and receiving. While this was happening some of the Cubs were sending and receiving their greetings messages to Scouts far and wide. Later some Beavers arrived and they found out about the phonetic alphabet, and also sent and received greetings messages. Both the Beavers and Cubs were working to gain some parts of their Communicator Badge. The Scouts that joined us were given the opportunity to do some of their Communicator badge by passing a greetings message, tuning a radio and logging 25 contacts. **Richard Hudson, G7BIV**

Members of the Wirral & District ARC, organised GB2JAM for Scout and Guide groups across Wirral and Merseyside. The event was run from the 20<sup>th</sup> Birkenhead Scout Hut. Throughout the weekend, the station was supported by members of the club. A local Girl Guide who had visited last year's JOTA station came back and had a tour around. She spoke to a number of stations, including GBOCSC (Crawfordsburn Scout Camp JOTA Station), we are hoping to get her through the Foundation exam. On Sunday there were perfect conditions to go on 20m, to catch the continentals waking up, including the Ex- World Scout Bureau (HB9S). A visitor from 9<sup>th</sup> Birkenhead Scout Group spent three hours on site and spoke to a number of different stations

as well as taking part in the other activities that were on offer. Around 50 contacts were made during the JOTA activity. Over the weekend WADARC had put on a number of activities for the children to do including coding with a Raspberry Pi, talking on the radio and Morse. **Daniel Richards, M6CUL**

Mid-Somerset ARC operated GB1SMS for the 1st Shepton Mallet Scouts at their Scout Hall. Operation was limited to a couple of hours Friday evening and 9 to 4 on the Saturday (15th). The antenna was a full size G5RV but in a very much inverted V configuration, so not ideal. Rig was the club's TS-850 and a MFJ ATU. Band conditions Friday evening were very poor QRN at S9 on 40m not much better on 80m. We just worked a German JOTA station on 80 and a Belgian on 40m. Conditions Saturday were better, starting with long skip on 40m, where we worked a few JOTA stations in Europe – Holland, Belgium, Norway, Austria and Sweden. On 20m we worked a few more JOTA stations, then back to 40m where we worked Gilwell Park and the Scouts could say hello over the air. The highlight was a young Scout reciting his oath of promise as part of his investiture over the air to a JOTA station in Cumbria. In all we made 51 completed QSOs in 15 countries and 22 JOTA stations. Club members involved were G8BFV, MOPRF, M3MYM, GOFZI and MOALZ. Thanks to Adrian the Scout chairman and the Scout leaders, who much appreciated our efforts. **David, G8BFV**

Reports next year to [radcom@rsgb.org.uk](mailto:radcom@rsgb.org.uk) please!



Wirral & District ARC operated GB2JAM for Scouts and Guides across the Wirral.



Colchester Radio Amateurs put on GB2CDS for Colchester Scouts.



Over 250 young people took part in the events at Gilwell Park.





Happy New Year

# RADIOWORLD 2017

01922 414796 [www.radioworld.co.uk](http://www.radioworld.co.uk)

[sales@radioworld.co.uk](mailto:sales@radioworld.co.uk) Response within 24 hours

9.00am - 5.00pm Mon-Fri 9.30am-4.00pm Sat

UK & GLOBAL SUPPLIERS TO MILITARY, EDUCATION & GOVERNMENT REGISTERED WITH THE OFT. UK AND INTERNATIONAL SHIPPING AVAILABLE ON ALL PRODUCTS

**\*NEW PRICE\***



## Icom IC-7300 Tranceiver



**Free UK Delivery**



**Finance Now Available  
See Online for Details**

**Now £1,199.00**



### SP-38 external desktop speaker

"specifically designed to complement the appearance of the IC-7300 as well as improving the listening experience"

**Now £155.95**



### Icom IC-7300 Programming Software

"What a great way to be ready for those weekly nets without having to reset a lot of options on the radio!"

**Now £35.95**



### FT2DE C4FM/FM 144/430MHz Dual Band Digital Handheld Transceiver

"Exciting leading edge transceiver"

**Yours for £379.00**

"Blazing fast 400 MHz  
IF DSP technology"

### Yaesu FT-450D HF/6M Multimode Base Transceiver

Why not add a TX Modification..  
for only £19.96

"Enjoy world class performance in  
an easy to use, compact package"



### Yaesu FTM-400XDE C4FM FDMA

"enables you to transfer large amounts of data, text messages, images, and voice memo data with double speed in V/D mode"

Pssst.. The Original Version is now set to clear why not save yourself some money the original version is Only £439.96



**Yours For  
£524.95**

### Kenwood TS-480SAT

Free Rock Jaw  
Headphones Acero -  
Steel/Ebony



### Yaesu FT-60E Dual Band VHF/UHF Handheld Transceiver

**Yours For  
£129.95**

"password feature to prevent unauthorised use of your radio"

**Looking For a Spare Part? Searched Everywhere?  
Cant Guarante its Genuine?**

**Look No Further! All you need to do is email  
[sales@radioworld.co.uk](mailto:sales@radioworld.co.uk) and we will do our best to find  
a genuine spare part for your radio!**



Were welcoming 2017 and its out with the old and in with the NEW! Every month we have a new Discount code for you and thats not going to change... so getting your "NEW" is now even cheaper!

"JAN2017"

\*Online Only. Excludes some items, Price subject to chage with no notification\*

## Our Latest Used Equipment

### UHF/VHF Trancievers

FT-897 Portable Transceiver £469.00  
IC-251E 144MHz Multi Mode Base Radio £289.00  
Yaesu FT-290MkII 2m Multi-mode transceiver £279.00  
Icom IC-2340H Dual Band Mobile Transceiver £159.00  
Yaesu FT-736R 6m, 2m & 70cm Base £799.00  
IC-E208 Dual Band Mobile Transceiver £189.00  
Icom IC-7000 1.8 - 70cms Mobile Transceiver £749.00  
IC-E2820 Dual Band D-Star Transceiver with UT-123 £419.00  
Kenwood TM-V71E VHF/UHF Mobile Transceiver. £249.00  
Icom IC-T81E Quad Band Handheld Transceiver £179.00  
FT-1900 144 MHz FM Mobile Transceiver£100.00  
Kenwood TM-241E 2m FM Mobile £89.00  
Wouxun KG-UV920R Dual Band VHF/UHF Mobile Radio £159.00  
AnyTone AT-5189 25 Watts FM 70Mhz 4m Mobile Transceiver£99.00  
FT-620B 50MHz Multimode Transceiver £349.00  
Kenwood TM-D710GE VHF/UHF Mobile Transceiver£389.00  
Icom IC-9100 HF/VHF/UHF Transceiver Fitted With Dstar. £2,199.00  
Hytera MD785 UHF DMR Transceiver £349.00  
Yaesu FTM-100E Dual Band Fusion Mobile Transceiver £259.00

### Handheld Trancievers

Kenwood TH-D7E Dual Band Handheld £170.00  
Icom IC-E90 6m / 2m / 70cm Handheld£199.00  
IC-E91 Icom 2m/70cm Handheld Transceiver£209.00  
Yaesu VX-3E FM Daul Band Radio £99.00  
Yaesu VX6E 2m/70cm FM Handheld Transceiver £139.00  
CSC-90 Soft Case for VX-2E £10.00  
Yaesu FNB-102LI 7.4V 1800mAh battery £30.00  
IC-E80D Dual Band Digital Handheld Transceiver £259.00  
Icom ID-51E D-Star Handheld Transceiver £259.00  
Icom IC-E92D Dual Band Digital Handheld Transceiver £249.00  
Yaesu VX5R Triple Band Handheld Transceiver - Silver £159.00  
Icom IC-A24E Airband Transceiver £279.00  
Yaesu VX6E Dual Band FM Handheld Transceiver £125.00  
Retevis RT3 DMR UHF Handheld Transceiver £50.00

Do you have communications equipment that you would like to sell? Maybe your would like to partexchange you eqiuptment for something new! Then we can help, at Radioworld we buy in and partexchange with some of the best prices so why not give us a call, email or even pop into our store and our staff will be happy to help. You have nothing to lose but alot to gain.



### HF Trancievers

Kenwood TS-2000 All Band Base £899.00  
Yaesu FTV-1000 200 W Transverter matches FT-1000MP£599.00  
Kenwood TS-50S Mobile HF Transceiver£429.00  
Icom IC-756 HF Transceiver with Band Scope £699.00  
Icom IC-706 HF Multimode Transceiver £379.00  
Icom IC-775DSP HF Transceiver £1,399.00  
Icom IC-735 HF Transceiver With FM Fitted £349.00  
Kenwood TS-870SAT HF Transceiver £799.00  
Yaesu FT-767GX HF 6m & 2m & 70cms transceiver £699.00  
Yaesu FT-990 DC HF Base Station Transceiver £699.00  
Yaesu FT-1000MP Mark 5 Field £1,299.00  
Icom IC-7400 HF, 6m & 2m Transceiver £899.00  
Yaesu FT-107M HF Base Transceiver £399.00  
Yaesu FT-840 HF Transceiver FM fitted. £399.00  
Yaesu FT-1000 200 Watt HF Transceiver £999.00  
Icom IC-718 HF SSB CW Transceiver £449.00  
Icom IC-718 HF All Band Transceiver £499.00  
Kenwood TS-570DG/E HF Transceiver£539.00  
Kenwood TS-2000 All Mode Multibander Transceiver £969.00  
Yaesu FT-1000MP / AC HF Transceiver £899.00  
Yaesu FT-897D Multiband Portable Transceiver£599.00  
Icom IC-781 Multimode HF Transceiver £2,499.00  
Yaesu FT-2000 100W HF Transceiver £1,499.00  
Kenwood TS-870SAT DSP HF Transceiver £799.00  
Alinco DX-77E HF Transceiver £399.00  
Yaesu FT-897D Multiband Portable Transceiver£549.00  
Icom IC-7700 HF Transceiver with Built In Bandscope £3,995.00  
TENTEC 565 Orion HF Transceiver £1,399.00  
Icom IC-7600 HF Base Transceiver With Band Scope £1,899.00  
Yaesu FT-450D HF/6m Transceiver With Antenna Tuner £449.00  
Alinco DX-SR8 HF transceiver HF, 100W all mode £429.00  
TS-590S Base Station HF DSP Audio Transceiver £899.00  
IC-7410 HF/6M Ham Base Station Transceiver £949.00  
Icom IC-706 MkIIIG with DSP £599.00  
Icom IC-7100 All Band All Mode Transceiver £799.00  
Icom IC-7000 Multi Band Multimode Transceiver £769.00  
Yaesu SM-5000 Band Scope £349.00  
Icom IC-7410 HF Base Transceiver £949.00  
Yaesu FT-950 HF Transceiver £829.00  
Kenwood TS-2000 All Mode Multiband Transceiver £999.00  
Kenwood TS-570S HF + 50MHz Transceiver £599.00  
Icom IC-718 HF Transceiver with Dust Cover £469.00  
Yaesu FTDX1200 Base Station Transceiver£879.00  
Yaesu FT-1000MP MKV(5) 200w HF Transceiver £1,199.00  
Icom IC-756ProII HF Transceiver with Band Scope £899.00  
Yaesu FT-897D Portable Multimode Transceiver £549.00  
Yaesu FTDX1200 HF Base Stations Transceiver£879.00  
TenTec Omni VII 588 HF Transceiver £1,999.00  
Yaesu FT-950 HF Transceiver with Fitted Band Scope £869.00  
Kenwood TS-590S HF Transceiver with DSP £899.00  
Alinco DX-SR8 HF Transceiver £399.00  
Kenwood TS-590 HF Transceiver with Automatic ATU £799.00  
Icom IC-718 HF Multimode Base Transceiver £429.00  
Yaesu FT-950 HF Transceiver £799.00

Your security matters to us so here at Radioworld secure pay comes with the deal!





# The SG-Lab 2.3GHz transverter

**T**he SG-lab 2.3GHz transverter is the latest product from what I hope will become a family of low-cost, low-GHz bands transverters from SG-Lab in Bulgaria [1]. Using a 430 to 440MHz IF, it covers the whole 13cm band from 2300-2425MHz and it follows up on their successful 1.3GHz transverter.

## Features and functions

The transverter is a one-box system with a single transmit/receive switched antenna port or separate receive and transmit antennas via SMA connectors. It requires a nominal 12V supply and is self-contained in a tinplate box measuring 124 x 94 x 25mm. This makes it suitable for mast-mounting in a waterproof enclosure. It claims a saturated output power of 2W for a minimum of 200mW drive at 430MHz so should be ideal for use with portable multimode rigs like the Yaesu FT-817. It can be configured for split RX in and TX out and in this mode claims a receiver noise figure of 1.5dB. In common TX/RX mode the noise figure is claimed as 1.9dB. Antenna mode is selected by desoldering and moving a single, zero-ohm resistor. It has a built in high stability TCXO and an input for a 10MHz external reference oscillator. An internal directional coupler allows for an output SWR indicator to drive a tri colour LED. LED indicators also show input power level (low, normal, high) and you can monitor the TX power and SWR as a voltage.

PTT can be hard switched or RF sensed (RF VOX). The transverter has an integrated sequencer to control changeover and external amplifiers with an open collector NPN transistor capable of switching 30V at 0.3A. The control signal is delayed by 30ms after the PTT line goes low and RF power is applied to the output after an additional 30ms. The synthesiser allows four LO frequencies to be selected via jumpers, giving full band coverage. It has a neat feature that tells you what the current LO frequency is. After switching power ON, the input LED lights up in red for about 3 seconds. If you hold down the PTT during this time, you can hear Morse on 432.000MHz with the current LO frequencies for RX and TX.



**PHOTO 1:** Transverter with top lid removed (all photos courtesy SG-Lab).

Trimmers allow adjustment of RX gain and TX power and there is a PLL unlock warning LED.

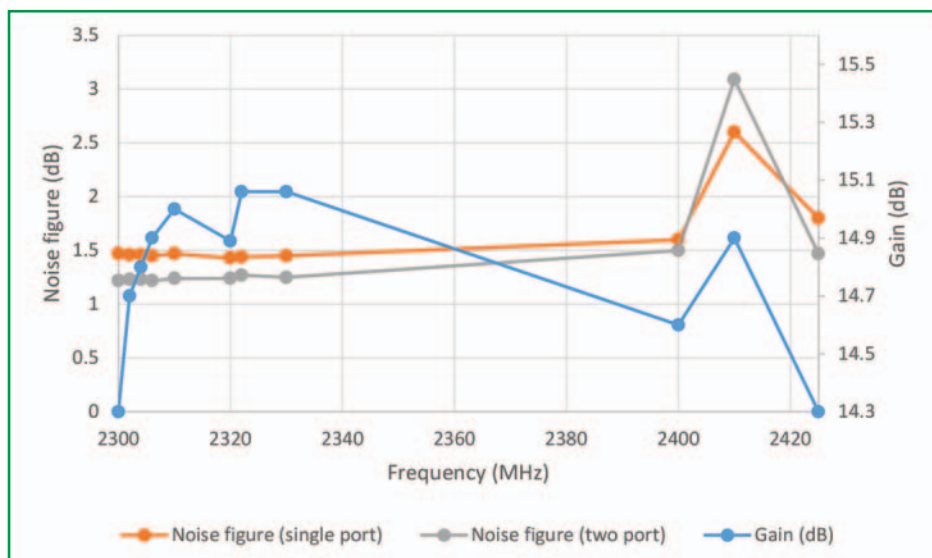
SMA connectors for TX (or TX/RX), RX and IF input, power and control connectors, and LEDs for input and output monitoring. There is an external 10MHz SMA input on the rear.

## Out of the box

The review transverter came with power and jack plugs for connection, a specification sheet showing the connections and LED functions, plus a small printed circuit antenna that could be used as a simple dish feed or a standalone portable antenna. **Photo 1** shows a general view with top lid removed. The front panel is simple (**Photo 2**) with

## Design and construction

The inside of the transverter can be glimpsed in Photo 1 (and the picture on page 5). It consists of a single surface mount printed circuit board with a screen down the centre, separating the IF switching and synthesised local oscillator and reference TCXO in the lower section and the RF circuitry in the upper section.



**FIGURE 1:** Noise figure and gain.

The transverter is really well made with cost minimisation as an obvious target. The build technique is that used in much low cost mass produced consumer Wi-Fi equipment and similar units. This is not a criticism: it's ideal for low cost units such as this!

I didn't get a circuit diagram of the unit, but it's easy to work out what's 'under the hood' by examining the PCB. The local oscillator is based around the ADF4350 chip that is used in a large range of RF generators these days and is under the control of an Atmel mega328 processor. The ADF4350 has an integrated voltage controlled oscillator (VCO) with a fundamental output frequency ranging from 2200 to 4400MHz with built in dividers for lower frequencies. In this transverter the four default LO frequencies are 1870, 1886, 1888 and 1968MHz, giving the possibility of 2300-2310MHz, 2316-2326MHz, 2318-2328MHz and 2398-2408MHz respectively for a 430-440MHz IF. This choice of four LO frequencies means it's ready for EsHail Sat 2 (expected to launch later in 2017) and for use as a multiband EME driver.

The RF section of the transverter looks like a conventional up/down superhet topology with a surface mount relay to do output RX / TX RF switching. Looking up the relay on the Farnell website shows that it has a good 30dB isolation, low VSWR to 2.6GHz and sells at around £5! Loss is around 0.5dB so it's fine for the few watts in this application. The transmit strip has a printed filter and uses the same SOT-89 1GHz LDMOS PA device that I used in a 1.3GHz driver design a while back, but it seems to perform well at 2.4GHz! The 2-stage RF amplifier uses a PHEMT in the first stage and bipolar transistor in the second stage. A solid state RF switch and printed filter after the mixer precede the low noise amplifier and PA stages. There is an input TX attenuator with a potentiometer allowing for control of 432MHz IF drive level up to 5W (although I'd recommend using a much lower level than this to avoid stray radiation) and a second potentiometer to set the receive chain gain.

### Synthesiser performance

Nowadays, almost the first question technical people get asked (or ask) about a new piece of amateur radio equipment is 'what's the phase noise like on it?' These days even the GHz bands are surrounded by high power transmissions such as digital TV and cellular phone networks and we want to co-exist with local high power stations in the busy UKAC contests. The noise performance of a rig's local oscillator and its effect on transmission and reception is therefore crucial.

I measured the noise at -86dBc/Hz at 10kHz offset, -96dBc/Hz at 50kHz and -102dBc/Hz at 100kHz. Considering the age and state of calibration of my ageing



PHOTO 2: Front view of the transverter.

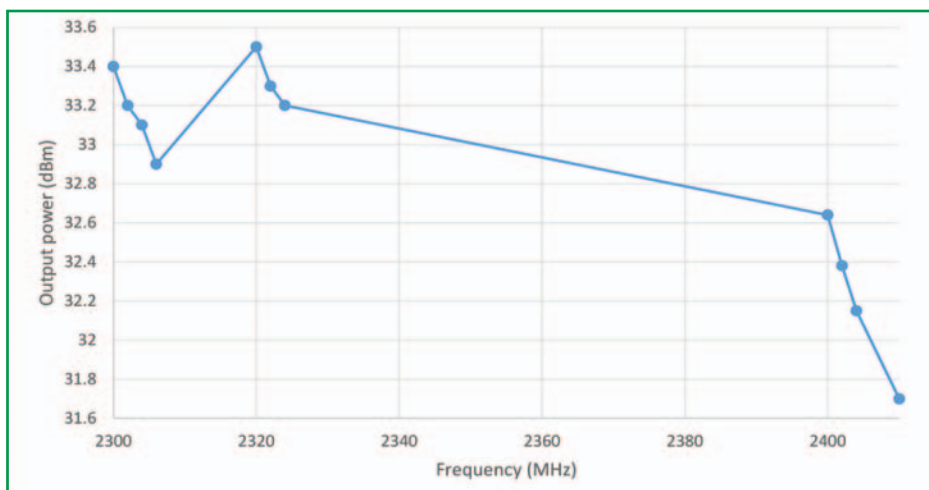


FIGURE 2: Transmit power vs frequency.

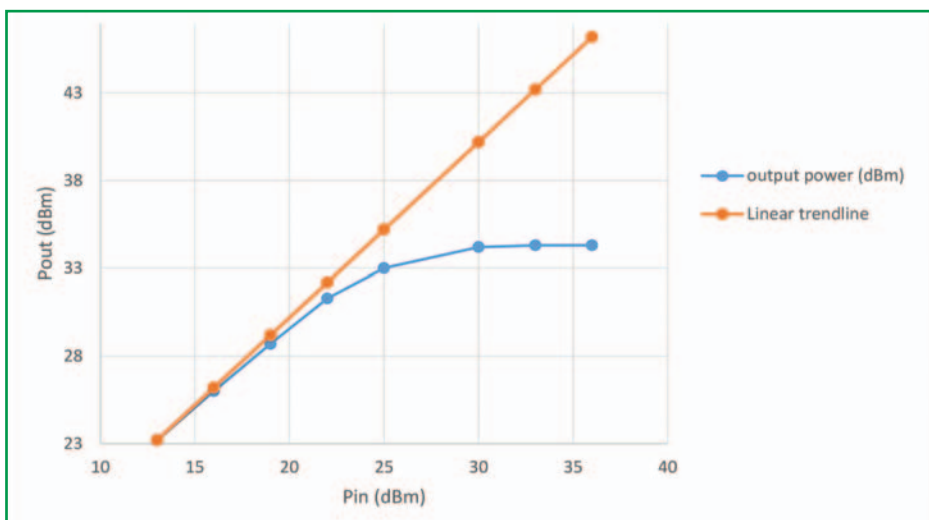


FIGURE 3: Output power vs input power.

HP spectrum analyser I'm comfortable with SG-lab's own measurement of the transverter's typical value of -90dBc/Hz using their FSP R&S spectrum analyser. The value also tallies with the datasheet plot for the ADF4350 chip's closed loop value for a 4GHz output divided by 2, of -95dBc/Hz at 10kHz offset. G4DDK recently confirmed [2] the value claimed by the new Kuhne MKU13G4 transverter as being almost identical. SG Lab tells me that they've recently found that it's possible to improve this value by 2-3dB with changes to the PLL filtering capacitors. So, in newer boards an additional SMD capacitor will be added.

As for frequency accuracy, shortly after switch on, using the internal TCXO the transverter was within a few tens of Hz of the frequency. This is more than adequate for most use, and if more accuracy is required, an external 10MHz reference can be used.

**John C Worsnop**  
PhD CEng MIET, G4BAO  
john@g4bao.com



### Conversion gain and Noise Figure

The total noise figure of the transverter was measured by treating it as a mixer. Test results are shown in **Figure 1**. In general, it exceeds the manufacturer's specification apart from a noise figure peak around 2410MHz, which I assume may be some sort of cavity resonance in the tinfoil box. As expected, turning the gain down degrades the noise figure. At 6dB gain it measured 2dB NF and degrades as the gain is further reduced.

### Effect of a strong close-in signal

Using a Kenwood TS-2000X receiver as a 430MHz IF, I did a subjective test of the transverter's LO noise performance. I fed an unwanted S9+10 signal from a crystal source at 2300.02MHz and a wanted S1 signal at 2300.01MHz from my signal generator to the transverter input. The interfering signal produced a barely noticeable rise in background noise on the wanted signal, showing that close-in noise of the receiver LO was acceptable.

### Transmit frequency response

The transverter was driven with a constant 200mW (+23dBm) and the input frequency moved across the whole 13cm band from 2300 to 2450MHz. **Figure 2** shows the results and it can be seen that the transverter is flat to 2dB over the whole band at this power level. Maximum power was at 2320MHz, falling slightly above 2400MHz.

### Transmitter harmonics

Transmitter harmonic spectrum was measured at 2320MHz using a spectrum analyser but no fundamental notch filter. I carefully controlled the fundamental level to the analyser to avoid overload. I could measure just the 4<sup>th</sup> harmonic, at -58dBc,

with all the other harmonics up to 24GHz less than -60dBc. Again, well within the manufacturer's claims.

### Transmitter linearity

Linearity is usually measured by inserting two closely-spaced RF carriers in to the IF input of the transverter and measuring the amount of 3rd order intermodulation on the output. This can be done by resistively combining two RF carriers or using an SSB transmitter with two tone modulation. Due to the difficulty in getting a very linear RF source at 432MHz (and the fact that I only have one decent signal generator!) I did not perform a two tone intermodulation test on the transverter. Some measure of linearity can be made by measuring the transverter's output power versus input power curve and measuring the 1dB compression point P1dB. The higher the P1dB the more linear the transverter, so I performed this test instead.

**Figure 3** shows the results. Saturated CW power of the transverter was around 34dBm and the P1dB was around +33dBm (2 watts). This compares well with the manufacturer's specification of 2W and indicates that the transverter is linear enough for SSB up to the 2W PEP level.

**Table 1** summarises my overall results in comparison to the manufacturer's figures. My test equipment comments should also be considered when reading this table.

### Test equipment used

All measurements in this review were made using 'good', surplus, amateur radio standard test equipment that does not necessarily carry a current professional calibration certificate, so measurements should be taken as a guide only. The following equipment was used:

- HP 8970A Noise Figure meter

- HP 346B noise head with HP 8493C 10dB attenuator
- HP 436A RF power meter with 8481A power sensor
- Narda 76910 10dB power attenuator
- HP 8592B spectrum analyser
- Marconi 2024 RF signal generator

### Conclusions

The transverter is, for the price, a very well designed, neat and compact unit, which, unlike some earlier, more expensive units covers the world-wide 13cm allocation. This makes it a good low cost entry point on to the 2.3GHz band, suitable for integration into terrestrial, satellite and EME systems.

The power output and receiver performance is such that it can be used on its own for local and occasional tropo DX contacts, but with an added power amplifier it will make a make a potent DX system. It is small enough to be masthead mounted and can be powered over the coax via a suitable bias tee. To do band switching while in use, you'll need to bring out wires from the two links to some sort of switching arrangement.

Its noise performance is as expected from a synthesised transverter and cannot be expected to match one with a crystal reference. Receive tests and quoted specifications have shown that it is on a par with competitors in this aspect.

Thanks to Hristiyan, LZ5HP of SG-Lab for the loan of the review equipment, the photos, and the manufacturers' specifications. The transverter costs around £190 plus or minus currency fluctuations; for ordering information email [info@sg-lab.com](mailto:info@sg-lab.com).

### References

- [1] [www.sg-lab.com](http://www.sg-lab.com)
- [2] Sam Jewell, G4DDK, The Kuhne MKU23G4, *RadCom* September 2016

**TABLE 1: Measured results and manufacturer's specification.**

Parameter	Measured	Manufacturer's min figure	Manufacturer's typical figure	Manufacturer's max figure
Frequency range RF (MHz)	2300-2425	2300	2300-2425	2425
Frequency range IF (MHz)	430-440	430	430-440	440
LO Accuracy at 20°C	See text		±1 ppm	
LO temp. stability -20 to +70°C	Not measured		±2.5 ppm	
Output power	2.0W P1dB	1.5W	2.0W	2.5W
Current consumption	1.2A at full power		1A	
Input power	300mW for 1W out	200mW		5W
Receive gain (adjustable)	10dB	0dB	15dB	+10dB
Noise Figure (Split mode)	1.2dB*		1.5 dB	
Noise Figure (Rx/Tx mode)	1.6dB*		1.9 dB	
Transmitter noise at 10kHz offset	-86dBc/Hz**		-90dBc/Hz**	
Spurious responses	< -58dBc		< -55 dBc	
Dimensions				114x104x25mm

\* There seems to be a box resonance effect giving a narrow peak of higher noise figure at around 2410MHz.

\*\* NB it does not produce the power output shown on the linear trend line; this is just a linear interpolation of the straight part of the curve in Figure 3.

+44(0)1588 620126  
www.thedxshop.com

# The DX Shop

...going the extra mile

## WE ARE NOW OFFICIAL DISTRIBUTORS FOR ICOM TRANSCEIVERS



+



=

# £100 DISCOUNT

## BUY THE ICOM IC-7300 AND THE GEMINI 4 MATCHING AMPLIFIER TOGETHER AND SAVE £100



**Gemini 4/6**

50/70MHz 300W dual Band

**£849** incl VAT

**Gemini 2**

144MHz 300W

**£899** incl VAT

**Gemini 70**

432MHz 300W

**£1099** incl VAT

**Gemini 23**

1296MHz 200W

**£1299** incl VAT

www.linearamp.co.uk

UK DESIGNED AND MADE



# LINEARamp

## WE ARE NOW OFFICIAL DISTRIBUTORS FOR APACHE ANAN SDRs

## PowaBeam ANTENNAS



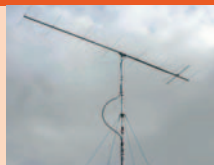
**6m 50MHz 6 ELEMENT  
WIDEBAND**

**£138.00** (incl. VAT)



**4m 70MHz 5 ELEMENT  
WIDEBAND**

**£82.80** (incl. VAT)



**2m 144MHz 9 ELEMENT  
COMMERCIAL**

**£154.80** (incl. VAT)



**70cm 432MHz  
24 ELEMENT**

**£178.80** (incl. VAT)

## Take the lead...



**BESPOKE CABLES**

Any coax Cable, any length with any connector. We are able to supply patch cables to long runs with termination to suit your requirements. RG174 to Hard line. Call us and discuss.

Free termination service available – we will make up your leads for you. We can make up phased matched cables to any frequency up to 3GHz on our VNA – ideal for any phase driven and polarisation switching situations.

SEE OUR WEBSITE FOR THE FULL RANGE

## TURN THAT ANTENNA

### SPID Elektronik

**RAU AZIMUTH ROTATOR**

- A lighter duty rotator
- Up to 180 Nm torque
- Worm gear drive so precise stop with nil backlash
- Supplied with digital controller
- Future-proof firmware upgradable via PROM
- Mast or head unit mounting with adaptor plate

Smaller Tri-band beams + VHF and UHF yagis



**RAK AZIMUTH ROTATOR**

- A medium to heavy duty rotator
- Up to 3240 lb-inch / 336 Nm torque
- Equivalent to G-1000/2800 but with digital control
- Worm gear drive so precise stop with nil backlash
- Supplied with digital controller
- Future-proof firmware upgradable via PROM
- Mast or head unit mounting with adaptor plate

Medium size HF/VHF arrays



**BIG-RAK HEAVY DUTY  
AZIMUTH ROTATOR**

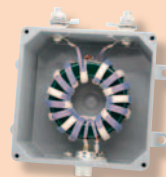
- A heavy duty rotator
- Up to 3600 lb-inch / 403 Nm torque
- Equivalent to G-1000/2800 but with digital control
- Worm gear drive so precise stop with nil backlash
- Supplied with digital controller
- Future-proof firmware upgradable via PROM
- Mast or head unit mounting with adaptor plate

Big HF antennas or multiple VHF/UHF Arrays



## QUALITY BALUNS AND UNUNS from

**BALUN DESIGNS**

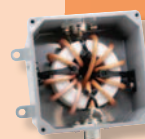


**4:1 CURRENT BALUN  
MODEL 4113ET**

- for 1.5-54 MHz
- 3kW power handling
- Insertion loss <0.2dB
- Silver plated SO239 connector
- Eyelets for wire attachment and at top to hang the balun

Ideal for Multiband doublets, Off centre fed Dipoles.

**£81.54**

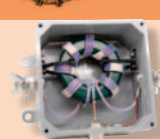


**1:1 ISOLATION BALUN**

- 1-31MHz
- 5kW power handling
- Insertion loss <0.2dB
- Dual Silver Plated SO239 connectors

Ideal for Dipoles & Verticals and as a Common mode current choke, keeping RF out of the shack.

**£95.94**



**9:1 UNUN**

- 1-5-54 MHz
- 2kW power handling
- Insertion loss <0.2dB
- Studs on sides with wingnuts
- Silver plated SO239 connector

Ideal for Verticals and Long wire antennas.

**£87.54**

COMPLETE ALT/AZ ROTATOR RANGE ALSO AVAILABLE. CALL OR SEE WEBSITE FOR PRICING

SEE WEBSITE FOR THE FULL RANGE WE STOCK



# The 2016 RSGB IOTA Contest

## – another successful year

**T**he RSGB IOTA Contest, using the Islands on the Air concept, was created in 1993 and is now a major international event, attracting thousands of participants from all over the world. Amateurs travel to islands around the globe, putting them on the air, making contacts with other islands and with those who are chasing islands.

The RSGB IOTA contest was increasingly popular in 2016, with 2469 entries, which is a slight increase on 2015. They were made up of approximately 700 island logs, up from 2015, 1500 World logs and 200 checklogs. The most popular World section was again the 12 hour CW category, with over 500 entries, and the most popular Island section was in the 12 hour CW single operator section with 180 entries. So CW is still a most popular contest model! It is great to see more island logs, let's hope the trend continues.

It is notable again that this contest is most popular in Europe but still more popular in China and Indonesia than in USA or Canada. Obviously this is an area for the Contest Committee to look at. The new Multi 2 Island station section attracted 21 entries, but it seems the logging programs, eg Wintest, had not all kept up with the new rules. It is good news that we had quite a good entry level for the new 'Newcomers' section, some of whom had good scores. Well done to them.

Propagation was OK with Sporadic-E in Europe on the higher bands at the start, with many southern Europe stations enjoying contacts on 10m, unlike last year. The effect was again to make this more of a Euro-centric scoring contest with American, Japanese and Oceania stations struggling to build good scores. The weather was kinder to most than last year, except in some USA locations.

There were 121 DXpedition stations in the contest, an increase on last year, providing some rare ones to be worked. Most of these were in Europe, where stations benefit from short skip propagation and holiday time operation. Additionally, there were 18 Oceania, 7 North American, and 21 Asian expeditions, including many rare ones. The soap box entries make great reading on the web results pages [1], and there are some excellent pictures in the gallery [2].

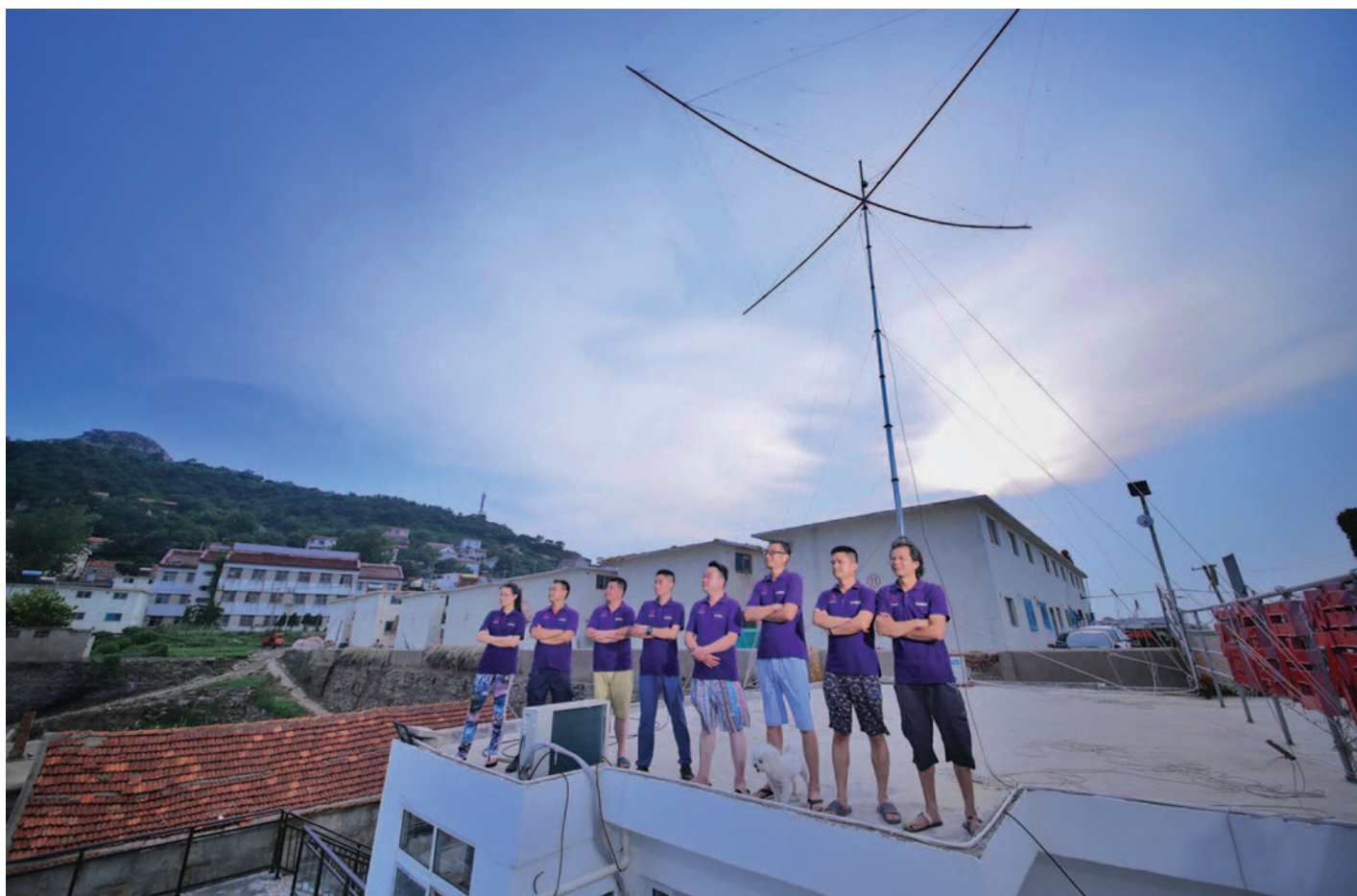
The range of station types is amazing, from multi op expeditions with big antennas to single operator holiday QRP stations on balconies. With simple antennas and a rare location, or just a holiday location, 12 or 24 hours,



The UR1G team who operated in the 2016 IOTA contest from EU-179.



The seven operators that make up the LA4C team from Utsira.



Members of the Nanjing Amateur Radio Club operating B4W from Dongxilian island, which is at AS-135.

this contest provides great fun. This is the main point of this contest, rather than being another rate contest. The island station exchange may seem long to some but it's the same for all contestants. Some of the best stories need mentioning here, go and look them up on the website at [3].

## Results

The full results, including soapbox comments, pictures and location maps, can be viewed on the IOTA results website [3].

### Multi operator Island DXpedition Stations:

The Island Fixed and Island DXpedition multi-Operator sections are the most hotly contested sections. This year the RI1C group came out as top Island Multi one High power DXpedition station operating from EU133 Kotlin island with some impressive antennas, as can be seen in their picture on the website. The second placed High power multi one DXpedition was 9A0AA. The leading Multi two High power DXpedition entry was GM2T from Tiree, followed by EJOSR from Arran. The leading Low Power Multi one DXpedition station was 9A5D/P with two element monoband quad antennas for the HF bands. In second place was ED1K. The leading Low Power Multi two

DXpedition station was ED1M from Mouro island. In second place was a welcome entry from North America K1W on White island, who had an adventurous time as described in their soapbox with boats, lighthouse beam supports and foghorns. They were a great signal on 40m overnight.

### Single operator Island DXpedition Stations:

There are very many single operator categories. Entrants can choose by mode, assisted/non assisted, 12/24 hour and power. Some excellent scores were achieved; the single and multi-operator low power expeditions to remote islands are the heart of this contest. The leading single operator DXpedition Island SSB station was MM1E on Islay. The leading single op DXpedition Island CW station was 5P5CW on Aro, with ingenious big antennas and all the gear in his car front seat area! The leading single operator DXpedition Island mixed mode station was RU6DX/P on EU-185.

**Fixed Island Stations:** The leading Fixed Island Station was DL1KZA, followed by EI7M. It was welcome again to have PJ4DX putting in an entry from his South American island in the SSB section. The leading QRP Island station was 9A/HA3MY, followed by OZ/DL8MF. DL1KZA was first placed overall and top Fixed

Island station operating from the popular Ruegen Island, EU-057, in the Baltic. They managed 2700 QSOs and an impressive 657 multipliers. It's multipliers that matter in IOTA! Second placed Fixed island station was EI7M.

**Newcomers:** This year the categories and certificates awarded have been expanded to include the Newcomers section, for those licensed for less than three years. DL2KX was the Leading newcomer and YP8CW was second.

**World Stations:** The leading World Station was DK8ZZ, operating in the high power assisted Mixed category, followed by R7LV. In the world CW high power category UR7GO heads the assisted section ahead of LZ7W. In the world SSB high power category PI4DX heads the assisted section ahead of S51CK in the unassisted section. The leading QRP World station was PA4VHF followed by OK7CM. The World 12 hour sections again proved very popular with 420 entries, especially the CW section.

**Mike Franklin, G3VYI**  
mike.franklin3@btinternet.com

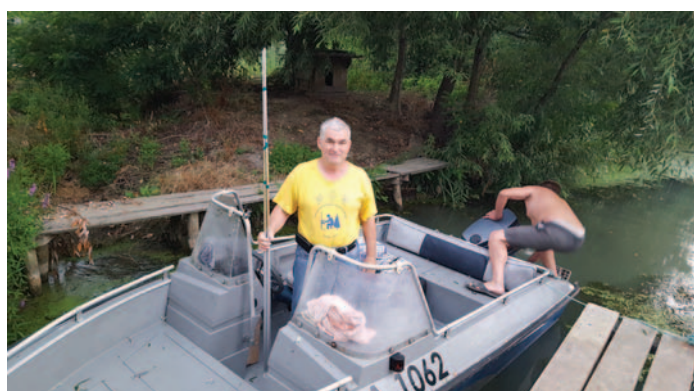




Luis, HP1ALX in his shack in Panama.



Steve White, G3ZVW operating the CO2FRC station in Cuba.



Leonid Sukharek, UT2II from the Ukraine.



The ES8/YL1ZX team operated from Kihni island.

## Logging and adjudication

This year we received 2,469 logs, including checklogs with 527,000 QSOs. Also you had the opportunity to enter/edit your location on Google Maps using your UBN key and you could email any IOTA contest related photographs, one per entry, to the contest manager via [iotacontest@rsgbcc.org](mailto:iotacontest@rsgbcc.org). We have received photographs from many stations that can be viewed at [2] and the majority of entrants have entered their location using Google Maps. Certificates awarded to leading scorers in each category and all Newcomers can be downloaded from the website and a list of RSGB trophy winners is published on the website via the Trophy tab.

Most logs were received directly onto the website and activated correctly, but with about 500 needing intervention to activate, and some 15 or so received as paper logs for typing up. When the robot sends the activation response please follow the instructions and complete the log entry activation form carefully, including DXpedition or Fixed island status.

A small number of logs still had missing information like the sent serials, or even the IOTA reference sent or received! Please check your log file before submission and heed any warnings received. It is easy to miss the sent IOTA reference in the Cabrillo

log generator on N1MM+, so take care and check it please. A few stations entered the 12hour section but operated for well over this limit. In some cases the overrunning contacts were moved to checklog status, but big overruns were moved to 24hrs status. If you wish to enter the 12hour section but operate for longer please send the whole log, not just the 12 hour section, as it helps the checking process.

Unfortunately this year one Fixed island station ended up in the DXpedition section after the appeal period had ended, we try to correct all errors but selecting the correct initial entry information on the robot web form, not just in the log itself, is the key.

A huge thanks has to be sent to Jim, MMOBQI and Marios, 5B4WN for help respectively in the checking process, processing of log entries and the running and provision of the log entry and adjudication software, and the excellent results website.

See you all next year!

## Websearch

- [1] [www.iotacontest.com/contest/iota/2016/finalScore.php?c1=a&c2=a&c3=m&c4=a&c5=a](http://www.iotacontest.com/contest/iota/2016/finalScore.php?c1=a&c2=a&c3=m&c4=a&c5=a)
- [2] <http://iotacontest.com/contest/iota/2016/gallery.php>
- [3] [www.iotacontest.com/contest/iota/2016/finalScore.php](http://www.iotacontest.com/contest/iota/2016/finalScore.php)

## Comments

DLOESA: greetings from the European Space Agency entry  
 KS4S: entered from Sunset beach  
 9H1AE: used a mag loop on a 7th floor balcony  
 CR5CW: had 30°C and very windy weather  
 9A6V/p: operated by 'hamlets'  
 VE7/GOTPH/p: went QRT due to discovering bear prints (my favourite!)  
 I3BQC/P: went to a 'lost' island on his tiny boat  
 M/DL1DAW: operated at the historic Marconi Tower  
 C4Z: suffered from poor propagation woes  
 DM9EE: fitted in operating with kids holiday  
 K1W: hung antennas on the lighthouse, suffered from the foghorn QRM and nearly sank  
 OH/SMOW: suffered thunder storms  
 EI1A: used green energy  
 The GM5TO group travelled to Arran again  
 GU3HFN: operated as a memorial to SK Member  
 VY0ERC: went Island hopping before the contest  
 SV5/G4DJX: enjoyed island holiday operation  
 9A5D/p: excelled by erecting lots of quad antennas  
 GW8K: formed an international team and many more!

# Weak signal modes on 28MHz

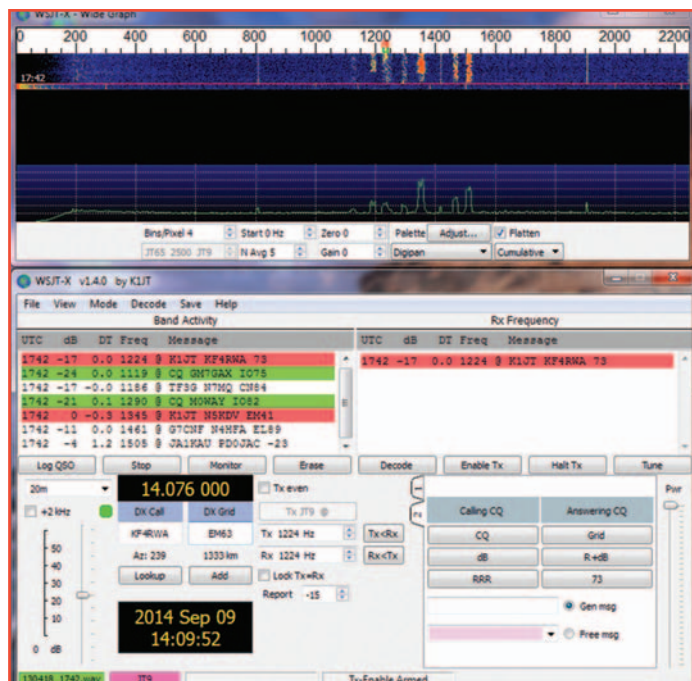


FIGURE 1: Typical WSJT-X operating screen.

**I was affected by a stroke 3 years ago that left me with a very poor voice. SSB, FM and AM are still possible for me, but are much harder nowadays. Determined to still enjoy the hobby, I turned to weak signal digital modes – and what a revelation they have proved!**

My main bands of interest are 28MHz (10m) and 50MHz (6m). On both bands my antennas are nothing special: a low end fed Par 3-band antenna on 28MHz and a V2000 vertical omni on 6m, fed with lossy RG58 coax in both cases.

## Propagation and activity

We are now on the downward slope of the current sunspot cycle. The conventional wisdom is that 28MHz is 'dead' for much of the year, but we now have weak signal modes that help to dispel this myth. Using WSPR (Figure 1) or JT65, one can be assured of monitors around the world, looking in a very narrow window in each case. Not only that, but these excellent modes only need very low power to prove a path is open. Although WSPR is theoretically a few dB better, I find

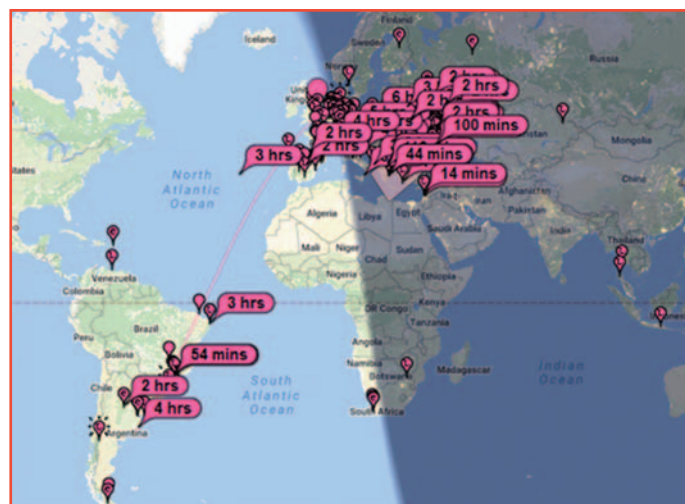


FIGURE 2: Typical PSKReporter map.

JT65 gets results more often, no doubt due to higher levels of activity. For both modes, WSJT-X v1.6 software may be used. This is free software by Joe Taylor, K1JT. PSKReporter is a central database where stations located anywhere in the world can upload their decoded transmissions as they happen. The locations are then shown on a map allowing transmitting stations to see where their signals have reached. More information can be found at <https://pskreporter.info/> and Figure 2 shows an example of PSKReporter in action.

When not looking for 2-way JT65 contacts it is possible to send 'probe' messages by replacing the callsign of the other station by 'B' such as "B <callsign> <locator>", which shows up on PSKReporter maps. For WSPR, the standard message format is used.

It is rare for a day to pass without 28MHz opening to somewhere. OK, unlike SSB at the height of a solar peak, one has to be patient, but there is usually plenty to get on with in the shack whilst JT65 is running in the background. No, weak signal modes have proved that 28MHz is 'open' far more often than is thought.

With SSB, brief openings are easily missed, whereas with weak signal modes they will be noticed. People do a quick tune across the band, assume it is 'dead' and go down a few bands. What I am advocating is to stick with 28MHz, run weak signal modes in the background and be prepared to be surprised.

With JT65 it is also possible to make basic QSOs at signal levels way below those needed for SSB or CW. It is important to ensure your PC clock is accurate. This is usually achieved using one of the many software packages that link to an internet time server. These update the PC clock at regular intervals and ensure that you transmit at the right times. Some sort of audio interface is also needed between the rig and PC. Although I use the Signalink interface, there are many low cost alternatives and designs available on the internet.

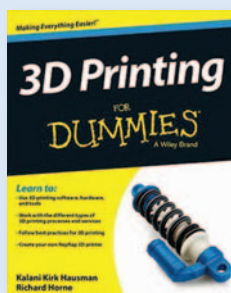
With WSPR and JT65, big stations, high power and beams are not needed. It brings back fun to amateur radio and at the same time advances radio science.

## Websearch

My G3XBM website (projects and interests) – [www.g3xbm.co.uk](http://www.g3xbm.co.uk)  
G3XBM blog, updated most days – <http://g3xbm-qrp.blogspot.co.uk/>  
WSJT-X download, JT modes and WSPR home page – <http://physics.princeton.edu/pulsar/k1jt/wsjsx.html>  
PSK reporter map (where you can see JT65 spots) – <https://pskreporter.info/pskmap.html>  
WSPR spots – <http://wspnnet.org/drupal/wspnnet/spots>  
PSKReporter – <https://pskreporter.info>

**Roger Laphorn, G3XBM**  
[rogerlaphorn@gmail.com](mailto:rogerlaphorn@gmail.com)





## 3D Printing for Dummies

By Kalani Kirk Hausman & Richard Horne

*3D Printing For Dummies* explains all that you need to know to get started printing out 3D

objects quickly and inexpensively!

With the growing availability of 3D printers at lower costs than ever before, *3D Printing For Dummies* provides a straightforward guide that examines the types of 3D printing technology available. You'll discover methods for the creation of 3D printable objects using software, 3D scanners, and even photographs. Stereolithography, selective sintering, fused deposition, and granular binding techniques are all explained. The book even provides a design for making your own 3D printer, the 'RepRap', and walks you through the process of creating a printer using open source designs, software, and hardware.

*3D Printing For Dummies* provides the knowledge needed to manufacture specialist parts of unusual design or construction at home. Be you keen constructor or just want to know about the technology, this book provides a fascinating guide to the possibilities of 3D printing.

Size: 188 x 234mm, 384 pages  
ISBN: 9781 1186 6075 1

**Non Members' Price £21.99**

**RSGB Members' Price £16.49**

**25% OFF**  
(usual rrp)



## Operation Big

*The race to stop Hitler's A-Bomb*

By Colin Brown

Few people know much about the German efforts to develop the atom bomb in WWII, fewer still are aware of the role of a Cambridgeshire manor house in discovering what the scientists involved knew. *Operation Big* describes this extraordinary story in detail.

A Cambridge professor recently found wiring under the floorboards of his country mansion, Farm Hall, he began uncovering the story of *Operation Big*. The manor house had an astonishing past as an MI6 staging post for some of the most secret operations of WWII. In April 1945, Farm Hall played an role in housing ten of Germany's top nuclear physicists, captured amid the chaos of the disintegrating Third Reich, they were flown to England covertly in a mission code-named Operation Big. Every word they uttered was bugged by MI6 eavesdroppers using the wires found by the professor.

Written by Colin Brown, *Operation Big* guides us through espionage, scientific discovery and questions of morality as the extraordinary truth surrounding Hitler's atomic bomb is revealed.

Size: 234 x 156mm, 304 pages,  
ISBN: 9781 4456 6467 5

**Non Members' Price £14.99**

**RSGB Members' Price £11.24 (25% Off)**

**NEW PAPERBACK VERSION**



## ARRL Handbook 2017

This 94th edition of the *ARRL Handbook for Radio Communications* continues to be a cornerstone of radio experimentation, discovery, and achievement.

This book covers a wealth of information: the fundamentals of electronics and radio signals, construction practices, antennas and propagation, equipment and circuit design, and other useful reference information.

The *ARRL Handbook 2017* provides applied theory and practical information concerning the fundamentals of radio electronics, circuit design and equipment, radio signal transmission and propagation, antennas, construction practices, and much more. Each chapter is filled with the most up-to-date knowledge representative of the wide and ever-expanding range of interests among radio amateurs. There are practical, hands-on projects for all skill levels, from simple accessories and small power supplies, to legal-limit amplifiers and high-gain antennas.

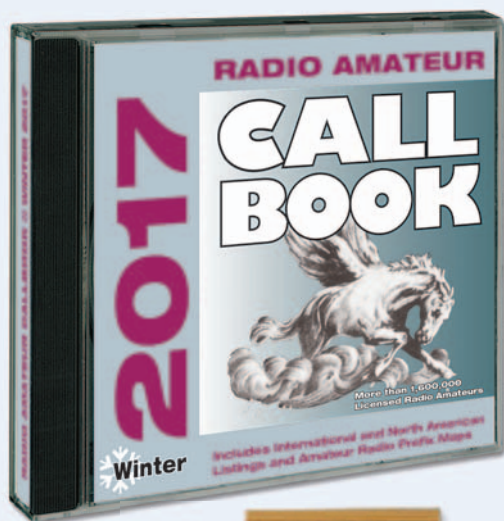
### FREE CD-ROM

The *ARRL Handbook 2017* includes a CD that contains the book as fully searchable text along with the illustrations, as well as expanded supplemental content, software, PC board templates and other support files.

Size 209x274mm, 1280 pages  
ISBN: 9781 6259 5062 8

**Non Members' Price: £49.99**

**RSGB Members' Price: £42.29**



## Pegasus Flying Horse World Callbook - Winter 2017

### CD & USB Stick

This is the very latest version of the popular *Pegasus Flying Horse World Callbook - Winter 2017*. Supplied as both a CD and USB memory stick, it contains the very latest Europe and US call data making it the most up-to-date and very best World Callsign Directory available. With more than 1.6million callsigns included and 60,000 email addresses, 60,000 QSL Manager listings and much more.

*Pegasus Flying Horse World Callbook CD* requires no hard disk space as it runs straight from the CD. The easy to use interface is available in four languages and provides instant access to label printing, CSV export functions, CW, 250 maps and hosts of other useful features. There is even a comprehensive help function for the less experienced. The *Pegasus Flying Horse World Callbook CD* is compatible with existing logging software and works on operating systems from DOS, Windows, Linux etc.

Easy to use and comprehensive the *Pegasus Flying Horse World Callbook* is a highly useful tool for every radio amateur's shack

**Non Members' Price: £44.99**

**RSGB Members' Price: £38.24**



# books from 2016



## Restoring Old Radio Sets

By Philip Lawson, G4FCL

For many there is nothing more charming than an old broadcast receiver glowing away in a substantial wooden or Bakelite case. However these are now a rarity and it is much more likely that old radio sets will be non-working curios found in a dusty, unloved condition. *Restoring Old Radio Sets* is a book that sets out to provide a step-by-step guide to bringing an old set back to life, getting it working properly and restoring its looks.

*Restoring Old Radio Sets* is a practical guide that explains what you need to do and how to do it when bringing an old radio back to life. You will find topics that include cleaning methods for electrical and mechanical parts, making typical electrical repairs and the process for performing live tests. There are sections on fault-finding methods and alignment & calibration of the working set. There are even useful guides to one of the major keys to completing a successful restoration - knowing how to treat the cabinet, be that - wood, Bakelite, or plastic. The tools, materials and techniques needed for your restoration are all discussed along with the care and maintenance of the finished item.

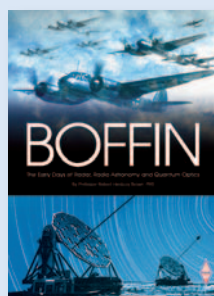
Armed with this book, the reader should be able to tackle an old set, get it working safely and finish-up with a really attractive piece of domestic furniture.

Size 174x240mm, 80 pages  
ISBN: 9781 9101 9322 8

**Non Members' Price: £8.99**

**RSGB Members' Price: £7.64**

Also available on



## Boffin

By Prof. Robert Hanbury Brown

Professor Robert Hanbury Brown was one of the most important figures in the development of radar and of observational astronomy that the UK has ever produced. This fascinating autobiography provides a unique account of the history of radar in WWII and the development of radio astronomy in the post war years.

*Boffin* traces the evolution of radar from the static Home Chain used in the Battle of Britain to the inclusion of the first airborne radars used in aircraft for night-fighting. The book covers his work on the polarisation of radio waves, crucial in determining the optimum configuration of the radar aerials on all the early air-to-surface equipment operated by Coastal Command. Air-to-surface radar played a huge role in the detection of surfaced submarines and the winning of the 'Battle of the Atlantic'. In 1942, Hanbury Brown was seconded to the US Naval Research Laboratory in Washington, and working in conditions of great secrecy, he continued the development of the Eureka and Rebecca airborne radar programme.

Post War Hanbury Brown was involved in the development of Jodrell Bank. *Boffin* describes this period and his later work where Hanbury Brown became perhaps best known for his invention of the optical intensity interferometer.

This book is thoroughly recommended reading for anyone interested Radar, Astronomy and much besides.

Size: 174x240, 144 pages,  
ISBN: 9781 9101 9309 9

**Non Members' Price: £12.99**

**RSGB Members' Price: £11.04**

Also available on



## Morse Code for Radio Amateurs

12th Edition

By Roger Cooke, G3LDI

*Morse Code for Radio Amateurs* is simply the 'book' for everyone who

wants to learn all about Morse code.

A third bigger than its predecessor, the book begins with a history of Morse code, moving on to what it means to radio amateurs. There is advice that explains Morse code keys and how to choose your own. There is information of how to start learning the code, increasing your speed and guides to the software that teaches you the code. There is even advice on the correct way to use a straight 'pump' as well as modern keys and paddles.

*Morse Code for Radio Amateurs* remains the 'book' for anyone wanting to add Morse code to their skills.

FREE CD included.

Size 210x297mm, 64pages,  
ISBN: 9781 9101 9319 8

**Non Members' Price: £8.99**

**RSGB Members' Price: £7.64**

## RSGB Prefix Guide

12th Edition

by Fred Handscombe, G4BWP

The *RSGB Prefix Guide* is the very latest amateur radio prefix information available.

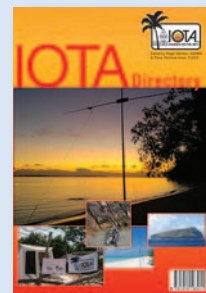
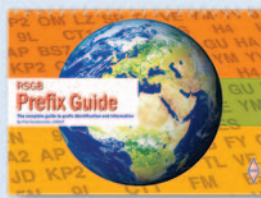
Fully updated with all the very latest changes in the amateur radio world, the *RSGB Prefix Guide* is the best guide to amateur radio prefixes.

This latest edition now uses colour to make listings clearer and easier to use. Still retaining its popular lay flat design this is a useful and useable books in amateur radio. Fully updated there are the usual series of changes to prefix listings including many detailed items such as the additional K1N prefix for Navassa Island and United Nations call 4U2U. Not only are the listings comprehensive but they are provided with a huge range of additional information covering references for continent, CQ Zone, DXCC, IOTA, ITU Zone, Latitude & Longitude

Size: 297x210mm (landscape), 80 pages  
ISBN: 9781 9101 9318 1

**Non Members' Price: £9.99**

**RSGB Members' Price: £8.49**



## IOTA Directory

17th Edition

Edited by Roger Balister, G3KMA and Steve Telenius-Lowe, 9M6DXX

If you are not aware of the Islands on the Air (IOTA) award programme this book explains this fascinating activity. The book aims to provide the most comprehensive guide to the programme and much more besides.

The *IOTA Directory* contains the complete, official listing of IOTA islands but is much more than just a simple list. There is much more besides with details of the latest IOTA Honour roll, Golden List, etc. The *IOTA Directory* provides everything you need to participate in IOTA, from lists of islands, through to application forms and masses of information and advice for island hunters, award applicants and DXpeditioners alike.

The multitude of islands and the IOTA programme laid out in this book makes it a must have if you are already involved or simply just interested.

Size 210x297mm, 128 pages  
ISBN: 9781 9101 9321 1

**Non Members' Price: £11.99**

**RSGB Members' Price: £10.19**



# Sport Radio

**T**here are a number of changes to a number of contests this year. Please see the separate feature on page 27 that details the changes and the reasons for them.

The first RSGB HF event of the year is CW AFS, on the 8th. Last year it had a different flavour, because 40m was added, making it a two-band contest. It was a popular move, 40m having been added to SSB AFS the year before. It is followed by SSB AFS, on the 14th. Both contests are qualifying events in the Affiliated Societies Super League series. The difference in the rules for these events this year is that there will be no normalisation of the band scores, making both contests essentially straight races to accumulate as many QSOs as possible across the two bands, plus there will be separate results tables for 10W, 100W and 400W stations.

A New Year means a new series of UK Activity Contests – and they are going to be a bit different this year. Those changes make January's VHF calendar look thus: on Tuesday 3rd the first ever Low Power 2m FM Contest takes place, immediately followed by the 2m UKAC. 70cm contests follow on Tuesday 10th. Once again there will be a 1-hour Low Power 70cm FM Contest, immediately followed by the 70cm

UKAC. A 6m UKAC will take place on Thursday 12th (not a Tuesday any more!), followed by a 23cm UKAC on Tuesday 17th. On Thursday 19th there's another 1-hour Low Power contest, this time 4m, immediately followed by the now monthly 4m UKAC. The SHF UKAC is on Tuesday 24th.

Away from RSGB events, the UK Six Metre Group's Winter Marathon continues until the end of January. It started on 1 December and has no specific operating periods because it is basically an exercise in working as many Locator squares as possible over the two months during which it runs. The IRTS 80m Counties Contest takes place on New Years Day. QSOs with EI and GI count for points. The 32 Irish counties act as Multipliers and a list of them can be found at [www.mapability.com/ei8ic/contest/eicounty.php](http://www.mapability.com/ei8ic/contest/eicounty.php). Propagation between Britain and Ireland should be good for the duration. The UKIICC 80m series continues, with an SSB session on the 4th. The ARRL (American) RTTY Roundup takes place for 30 hours over the weekend of 7th-8th. Send a signal report and serial number, but expect to receive a signal report plus a State code from US stations and a Province code from Canadians. Multipliers count just once, not once per band, and entrants are limited to a maximum operating time of 24 hours. Next come the two sessions of the European 160m CW Party. The first is on the evening of the 7th and the second is in the

early hours of the 8th. You can work the same stations in each session. What you send your QSO partners depends on whether you are a member of a club that's affiliated to the Association (in the UK that means FOC, FISTS, G-QRP and the Essex CW Club). If you are, send RST + name + club abbreviation + membership number; otherwise send RST + name + 'NM' (for non member). The Worked All Britain 1.8MHz Phone Contest takes place for four hours on the evening of the 21st. You don't have to be a member of the WAB Awards Group to take part. For those unfamiliar with the scheme, your WAB area is the 1st, 2nd, 3rd and 6th characters of your 8-digit National Grid Reference (eg NGR TQ345678 becomes WAB TQ36). The UKIICC 80m series has a CW session on the 25th. The CQWW 160m DX CW runs for 48 hours, starting at 10pm on the 27th. Exchange a signal report and your CQ Zone (UK=14). American and Canadian stations will send their State/Province code. With an exchange of a serial number only, the BARTG RTTY Sprint Contest is on the weekend of 28th-29th. Please note that for 2017 there are changes to the rules of all BARTG contests.

**Steve White, G3ZVW**  
[steve.g3zvw@gmail.com](mailto:steve.g3zvw@gmail.com)

## RSGB HF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Sun 8 Jan	CW AFS §	1400-1800	CW	3.5, 7	RST + SN
Sat 14 Jan	SSB AFS §	1400-1800	SSB	3.5, 7	RS + SN

## RSGB VHF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Tues 3 Jan	Low Power 144MHz FM	1900-2000	FM	144	RS(T) + SN + Locator
Tues 3 Jan	144MHz UKAC	2000-2230	All	144	RS(T) + SN + Locator
Tues 10 Jan	Low Power 432MHz FM	1900-2000	FM	432	RS(T) + SN + Locator
Tues 10 Jan	432MHz UKAC	2000-2230	All	432	RS(T) + SN + Locator
Thurs 12 Jan	50MHz UKAC	2000-2230	All	50	RS(T) + SN + Locator
Tues 17 Jan	1.3GHz UKAC	2000-2230	All	1.3G	RS(T) + SN + Locator
Thurs 19 Jan	Low Power 70MHz FM	1900-2000	FM	70	RS(T) + SN + Locator
Thurs 19 Jan	70MHz UKAC	2000-2230	All	70	RS(T) + SN + Locator
Tues 24 Jan	SHF UKAC	2000-2230 ~	All	2.3-10G	RS(T) + SN + Locator

## Best of the Rest Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange/info
1-31 Jan	UKSMG Winter Marathon	All	All	50	RS(T) + Locator
Sun 1 Jan	IRTS 80m Counties	1500-1700	SSB/CW	3.5	RS(T) + SN (EIs & GIs also send County)
Wed 4 Jan	UKIICC 80m	2000-2100	SSB	3.5	4-character Locator
Sat/Sun 7/8 Jan	ARRL RTTY Roundup	1800-2359	Data	3.5-28	RST+ SN (Ws send State, VEs Province)
Sat 7 Jan	EUCW 160m CW Party	2000-2300	CW	1.8	See text
Sun 8 Jan	EUCW 160m CW Party	0400-0700	CW	1.8	See text
Sat 21 Jan	WAB 1.8MHz Phone	1900-2300	SSB	1.8	RS + SN + WAB square
Wed 25 Jan	UKIICC 80m	2000-2100	CW	3.5	4-character Locator
Fri/Sun 27/29 Jan	CQ WW 160m DX	2200-2200	CW	1.8	RST + CQ Zone (Ws send State, VEs Province)
Sat/Sun 28/29 Jan	BARTG RTTY Sprint	1200-1200	RTTY	3.5-28	SN

+ VHF Championship event. § Super League event. ~ Different bands at different times. For all the latest RSGB contest information and results, visit [www.rsgbcc.org](http://www.rsgbcc.org)

**NOTICES TO READERS.** © Radio Society of Great Britain, 2016. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the Radio Society of Great Britain.

**ERRORS AND OMISSIONS.** Whilst the Radio Society of Great Britain (the publisher) takes all reasonable care in the production of *RadCom*, we can accept no responsibility for errors, inaccuracies or omissions contained within the magazine or any subsequent loss arising from any use thereof. Reliance placed on the contents of *RadCom* is at the reader's own risk. We urge any reader to take all precautions appropriate to avoid any loss or damage to equipment and ensure the personal safety of themselves and others when using material contained in *RadCom*. It should be also noted that patent or copyright protection may exist in relation to any items within this magazine. The RSGB does not accept any responsibility for failing to identify any such patents, copyright or any other protection. Readers are also reminded that the use of radio transmission and reception equipment (including scanning) is subject to licensing and the election of external aerials may be subject to local authority planning regulations.

**ADVERTISEMENTS.** Although RSGB staff and the staff of Danby Advertising (its Advertising Agent) take reasonable precautions to protect the interests of readers by ensuring as far as practicable that advertisements in the pages of *RadCom* are bona fide, the magazine and its publisher, the RSGB, cannot accept any undertaking in respect of claims made by advertisers, whether these advertisements are printed as part of the magazine, or are in the form of inserts. Under no circumstances will the magazine accept liability for non-receipt of goods ordered, late delivery, or faults in manufacture. Legal remedies are available in respect of some of these circumstances, and readers who have complaints should address them to the advertiser or should consult a local Trading Standards Office, or a Citizens' Advice Bureau, or their own solicitors. The publishers make no representation, express or implied, that equipment advertised conforms with any legal requirements of the Electro Magnetic Compatibility Regulations 1992. Reader should note that prices advertised may not be accurate due to currency exchange rate fluctuations, or tax changes.



The publishers make no representation, express or implied, that equipment advertised conforms with any legal requirements of the Electro Magnetic Compatibility Regulations 1992. Reader should note that prices advertised may not be accurate due to currency exchange rate fluctuations, or tax changes.

# HF F-Layer Propagation Predictions for January 2017

Compiled by Gwyn Williams, G4FKH

Time (UTC)	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
*** Europe								
Moscow	6662...	16666	636432346666	1.2544452112	...	55553	...	36561...
*** Asia								
Yakutsk	22.....	13444	1..22..24212	...	3	...	...	...
Tokyo	.....	12222	...332332221	...	22122	...	...	...
Singapore	.....	22222	...343222	...	1431..	...	...	...
Hyderabad	3.....	13332	3.....133331	...	1.133..	...	...	...
Tel Aviv	552.....	4555	5551...25555	2.5421243212	...	5444	...	...
*** Oceania								
Wellington	...11221...	...	145543...	...	15541...	...	...	...
Well (ZL) (LP)	.....	...	...	...	3442...	...	...	...
Perth	.....	111.	...24322.	...	33111.	...	...	...
Sydney	.....	1111.	...34421.	...	2453.	...	...	...
Melbourne (LP)	.....	...	12.....	...	23.....	...	...	...
Honolulu	11.2.....	...	12222...	...	1.1.....	...	...	...
Honolulu (LP)	.....	...	...	...	...	...	...	...
W. Samoa	...1.1.....	...	14332...	...	343.....	...	...	...
*** Africa								
Mauritius	2.....	222	3.....23333	1.....321.1	...	12.....	...	...
Johannesburg	32.....	33	33.....2344	11.....3322	...	21.....	...	...
Ibadan	4442...	1444	55541..13555	511421124533	...	5322341..	...	...
Nairobi	331.....	2333	433.....4444	1.1...14211	...	2..13.....	...	...
Canary Isles	6664...	1566	666531.14666	662643235665	11.654445321	...	...	...
*** S. America								
Buenos Aires	2222.....	1	3314.....12	11.3.....11	...	...	...	...
Rio de Janeiro	3323.....	3	3324.....133	22.3.....222	...	1.....	...	...
Lima	2212.....	...	22.3.....12	...	...	...	...	...
Caracas	3333.....	13	33.42.....23	...	23.....1.	...	...	...
*** N. America								
Guatemala	22221.....	1	23.33.....2	...	21.....	...	...	...
New Orleans	33331.....	2	23.32.....11	...	1.....	...	...	...
Washington	44442.....	24	44.432...134	...	2.111..	...	...	...
Quebec	44431.....	24	24.21...232	...	2112...	...	...	...
Anchorage	2321.....	...	1.....3.	...	...	...	...	...
Vancouver	2222.....	...	11.21.1...	...	11.....	...	...	...
San Francisco	22222.....	...	22.231.....1	...	1.....	...	...	...
San Fran (LP)	.....	...	...	...	1.....	...	...	...

**Key:** The figures represent approximate S-meter readings, whilst the colours represent expected circuit reliability. **Black** equals low to very low probability, **Blue** equals good probability and **Red** equals a strong probability. No signal is expected when a '.' is shown. The RSGB Propagation Studies Committee provides propagation predictions on the internet at [www.rsgb.org.uk/propagation/index.php](http://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. Due to the early deadline for this issue, up to date information on sunspot number was unavailable at the time of going to press, but the information will be on the *RadCom* section of the RSGB website by the time this edition is delivered.



Please send news reports to [radcom@rsgb.org.uk](mailto:radcom@rsgb.org.uk). To get future events listed here and put on GB2RS, email details of your meetings as early as possible to [radcom@RSGB.org.uk](mailto:radcom@RSGB.org.uk). Include your club name, RSGB Region number, contact name, callsign & phone number, date and details of meeting. Example: Fraser Road Radio Club, Region 9, Steve, M1ACB, 01234 832 700, 29 Oct, On the Air. We normally acknowledge all submissions within 3 working days: if you don't hear from us, please phone. We don't normally print 'closed', 'TBA' or 'every Tuesday'-type entries. The deadline for the February edition is **22 December** and for March edition it's **19 January**. For GB2RS, the deadline is 10am on the Thursday of the week of broadcast.

## CLUB EVENTS CALENDAR

### INTERNATIONAL

Pafos Radio Club, Cyprus  
Richard, 5B4AJG, 00 357 97 857 891,  
[5b4ajg@gmail.com](mailto:5b4ajg@gmail.com) [www.cyhams.org](http://www.cyhams.org)

International federation of Railway Radio  
Amateurs (FIRAC) [www.firac.org.uk](http://www.firac.org.uk)

The Radio Officers Association [www.radioofficers.com](http://www.radioofficers.com)  
For former British Merchant Navy Radio Officers.  
Weekly net Thursdays at 7.30pm on 3538kHz

### NATIONAL

Amateur Radio Caravan and Camping Club  
[membership@arcc.org.uk](mailto:membership@arcc.org.uk), [www.arcc.org.uk](http://www.arcc.org.uk)

AMSAT-UK, <http://amsat-uk.org/>  
Open net every Sunday, 10am, 3.780MHz (±).

British Amateur Radio Teledata Group  
[bartg@bartg.org.uk](mailto:bartg@bartg.org.uk), [www.bartg.org.uk](http://www.bartg.org.uk)  
Membership open to those interested in  
datacoms. Contests and awards organised.

British Railways Amateur Radio Society  
[m0zaa@brars.info](mailto:m0zaa@brars.info), [www.brars.info](http://www.brars.info)  
For those interested in amateur radio and railways.

Civil Service Amateur Radio Society  
Weekly net every Tuesday, 8pm, 3.763MHz.

Radio Amateur Old Timers' Association  
[MemSec@RAOTA.org](mailto:MemSec@RAOTA.org), [www.RAOTA.org](http://www.RAOTA.org)  
Nets: Wed 3.763 1000, 1.963 2100, Thurs 7.163  
1100, 3.763 1930 & Sun 3.763MHz 1000.

Travelling Wave Contest Group  
[secretary@twcg.org.uk](mailto:secretary@twcg.org.uk), [www.twcg.org.uk](http://www.twcg.org.uk)  
Friendly contest group

### REGION 1: SCOTLAND SOUTH & WESTERN ISLES

Regional Manager: Marcus Hazel-McGown, MM0ZIF,  
[RM1@rsgb.org.uk](mailto:RM1@rsgb.org.uk)

#### Ayr ARG

Charlie, MM0GNS, 01563 551 704  
6 Oscilloscope demo, Dennis, GM3YDN  
20 Darvel Telephone Museum, Max Flemmich

#### Livingston and District ARS

Cathie, 2M0DIB, 01506 433 846  
3 Closed  
10 Talk  
17 Training and operating  
24 Operating night  
31 Training

#### Lothians RS

Mike, MM0MLB,  
[secretary@lothiansradiosociety.com](mailto:secretary@lothiansradiosociety.com)  
11 Video evening at Edinburgh Cine & Video Soc  
25 Club night at Braid Hills Hotel

#### West of Scotland (Glasgow) ARS

wosars@gmail.com  
6, 13, 29, 27 Regular club night

### REGION 2: SCOTLAND NORTH & NORTHERN ISLES

Regional Manager: Denny Morrson, GM1BAN  
[RM2@rsgb.org.uk](mailto:RM2@rsgb.org.uk)

#### Aberdeen ARS

Fred, GM3ALZ, 01975 651 365  
5 Closed  
12 Junk sale  
19 Quiz night  
26 Construction & on the air

#### Glenrothes & District RC

Tam, MM0TGB, 0775 352 6498  
11 Catch up after the season

### REGION 3: NORTH WEST

Regional Manager: Kath Wilson, M1CNY,  
[RM3@rsgb.org.uk](mailto:RM3@rsgb.org.uk)

#### Chester & District RS

Bruce, M0CVP, 01244 343 825  
3 Construction competition  
10 Committee meeting  
24 Presentations by construction competition  
entrants

#### Macclesfield & District RS

Greg, M0TXX, [Info@gx4mws.com](mailto:Info@gx4mws.com)  
9 On the air  
16 Construction night  
23 MOPAI's DXpedition to Isle of Uist  
30 Film night

#### South Manchester R&CC

Ron, G3SVW, 01619 693 999  
5 My Christmas projects  
12 A road to nowhere, Peter, G0BHP  
19 Solar cycles, Ron, G3SVW  
26 Region 3 Deputy Manager, Dave, M00BW

#### Stockport Radio Society

Heather, M6HNS, 0750 690 4422  
3 Society night  
10 Net, 51.550MHz FM, 7.30pm then  
50.270MHz SSB, 8.15pm  
12 Net, 7.30pm, 145.375MHz  
17 Radio night  
21-22 Foundation course  
24 Skills night  
25 Club net, 3.660MHz, 7.30pm  
29 Foundation course revision and mock exam

#### Thornton Cleveleys ARS

John, G4FRK, 01253 862 810  
2 Closed  
9 Natter night/practical/on air  
16 UBA Contest discussion & soldering practical  
18 Committee meeting  
23 USB data interface club project, Ted, G3WBB  
28-29 UBA DX Contest  
30 Connector video, G8KBH

### REGION 4: NORTH EAST

Regional Manager: Ian Douglas, G7MFN,  
[RM4@rsgb.org.uk](mailto:RM4@rsgb.org.uk)

#### Colburn & Richmondshire District ARS

Colin Lyne, 01748 876 391  
12 Beginners' guide to VHF contests,  
G4FZN & G3XHB

#### Denby Dale RC

Darran, G0BWB, 0797 442 3227  
4 Noggin and natter night  
11, 25 On the air  
18 Building 40m transceiver, Howard

#### Sheffield & District Wireless Society

Krystyna, 2E0KSH, 0788 406 5375  
4 Closed  
11 Training and social night  
18 Getting started on datamodes  
25 Technical and training evening

### REGION 5: WEST MIDLANDS

Regional Manager: Martyn Vincent, G3UKV,  
[RM5@rsgb.org.uk](mailto:RM5@rsgb.org.uk)

#### Central Radio Amateur Circle

Martin, G1TYV, 07948 027 994  
3 144MHz UKAC  
5 Group meeting  
7 Shack on the air, group meeting

#### Coventry ARS

John, G8SEQ, 0795 877 7363  
1 G2FDC Trophy 1st round, 11am start  
6 Regular club meeting  
10 Annual dinner  
20 Charity quiz  
27 Video night

#### Glenrothes & District RC

Tam, MM0TGB, 0775 3526 498  
18 Discussion on AFS

#### Hereford ARS

Rod, M0JLA, 01432 356 079  
6 Curry night

#### Malvern Hills RAC

Dave, G4IDF, 01905 351 568  
10 PZ5K, CQ WW SSB contest operation,  
Roger, G4BVY

#### Midland ARS

Norman, G8BHE, 0780 807 8003  
4 New toys, open meeting and training classes  
11 Committee meeting and training classes  
15 Red Rose Winter Rally  
18 Social calendar, rally visits & training classes  
25 On the air, ragchew & training classes

#### Mid-Warwickshire ARS

Don, G4CYG, 01926 424 465, [mwars@mwars.club](mailto:mwars@mwars.club)  
12 Club net, 145.275MHz  
24 Mini talks

#### Nuneaton & District ARC

Neil, M0NKE, [info@ndarc.co.uk](mailto:info@ndarc.co.uk)  
5, 12, 29, 26 Club net, 9.30pm, 145.475MHz  
6 Pint & chat, Harvester, Nuneaton, 7.30pm  
20 AGM, 7.30pm

#### Salop ARS

[salopamateurradio@gmail.com](mailto:salopamateurradio@gmail.com)  
3, 10, 17, 24, 31 Club CW net, 4.30pm,  
144.070MHz  
4, 11, 18, 25 Club net, 8.30pm, GB3LH  
5 Natter night / committee meeting  
12 Video night  
19 Natter night  
26 Shack night with G3SRT on the air

The deadline for the February  
issue is 22 December, for the  
March issue it's 19 January and  
for the April issue it's 23 February

### South Birmingham RS

Gemma, M6GKG, gemmagordon.m6gkg@gmail.com  
3, 10, 17, 24, 31 Coffee morning, 11am, visitors welcome  
5, 12, 29, 26 Training classes with Dave, G8OWL  
6, 9 Work in the shack  
13, 20 Checking rally stock  
23 Discussion on 2017 rally visits  
30 Checking aerials for contests and field days

### Sutton Coldfield ARS

Robert Bird, rob2e0zap@gmail.com  
2, 16, 20 Open net, 145.250MHz, 7.30pm  
9, 23 Club meeting  
10 Open net, 70.475MHz FM, 7.30pm  
24 DMR open net GB7FW slot/local2, 7.30pm

### Telford & DARS

John, MOJZH, 0782 473 7716  
4 Committee meeting, GX3ZME OTA  
11 Update on winter projects  
18 Recording from Hamfest: G8GTZ, Chairman BATC  
25 Open forum on ideas for 2017

### Wythall Radio Club

Chris, G0EYO, 0771 041 2819  
1 Christmas Contest ends, 8pm,  
1, 8, 15, 22, 29 Club net, 145.225MHz or GB3WL, 8pm  
3, 10, 17 Morse class, free and easy  
6, 13, 20, 27 Nibbles night and shack operation, 7.30pm  
24 Cambridge Remote Station project, Bob, G3PJT  
30 Curry night  
31 Ask the Panel evening

### REGION 6: NORTH WALES

Regional Manager: Ceri Lloyd Jones, 2W0LJC  
RM6@rsgb.org.uk

### Dragon ARC

Stewart, GW0ETF, 0783 362 0733  
2 Film night  
16 WW1 Communications, 2W0CHV

### REGION 7: SOUTH WALES

Regional Manager: Glyn Jones, GW0ANA, RM7@rsgb.org.uk

### Aberystwyth & District ARS

Ray, GW7AGG, 01970 611 853  
8 Waunfawr Hall junk sale  
14 Talk on SDR by James, GW6JWD  
26 Net on 145.500 then 145.550MHz

### Cleddau ARS

Heinz, MW0ECY, 0774 804 7008  
2 QSL card printing  
9 Video/audio project  
16 Funding ideas  
23 D-Star evening

### Llanelli ARS

Craig, MW0MXT, 01269 845 773  
2, 23 Social evening  
9 On air night & club raffle  
16 DVD night  
30 Junk sale & club raffle

**Next deadlines are 22 December,  
19 January & 23 February**

### REGION 9: LONDON & THAMES VALLEY

Regional Manager: Tom O'Reilly, G0NSY  
RM9@rsgb.org.uk

### Aylesbury Vale RS

avrs@rakewell.com  
11 Annual dinner

### Edgware & DRS

Mike, G4RNW, 020 8950 0658  
12 AGM  
27 Natter night

### Harwell ARS

John, G6LNU, 01235 223 250  
12 Rally preparation + G6LNU Quiz

### Radio Society of Harrow

Linda, G7RJL, lcasey@imperial.ac.uk  
2 Standing waves, Brian, G3YKB  
6 Club night, talk  
9, 16, 23, 30 Club net, 8.15pm, 145.500 then 145.350MHz  
20 Surplus equipment sale  
29 Start of Foundation/Intermediate training

### Reading & DARC

Laurence, G2DD, 0758 470 6625  
26 Life on the Other Side, Jonathan, MOJSX

### Shefford & District ARS

John Burnett, john@hobart-europe.co.uk  
5 Welcome back meeting  
19 My contact with the last amateur out of Tehran, Geoff, G4CEP and Vic Ludlow  
26 Construction contest

### Southgate ARC

Keith, G8RPA, g8rpa@arri.net  
11 Closed  
25 Social evening at Chez TonTon

### REGION 10: SOUTH & SOUTH EAST

Regional Manager: Michael Senior, G4EFO  
RM10@rsgb.org.uk

### Coulsdon ATS

Mike, M1CCF, 020 8654 2582  
9 Annual dinner, Chateau Nepolian, Croydon

### Cray Valley RS

Richard, G7GLW, 0783 171 5797  
19 Annual planning meeting

### Crystal Palace R&EC

Bob, G300U, 0173 755 2170  
6 Digital mode radio, Damien, 2E0EUI

### Dover RC

Aaron, 2E0FQR, 0771 465 4267  
5 Gadget night (admittance £2)  
12 Talk on RF energy harvesting, MOXBW  
19 A look at Autocad and its inventor, MOPKH (admittance £2)  
26 Getting the most from your Icom IC-7300, Chris Ridley (admittance £2)

### Echelford ARS

John, G4GSC, 01784 451 898  
26 The Cassini mission to Saturn and landing Huygens on Titan, Professor David Southwood

### Horndean & District ARC

Stuart, G0FYX, 02392 472 846  
6 Natter night/social evening  
20 Annual quiz evening (other clubs are invited)

### Horsham ARC

Alistair G3ZBU, 0785 526 8666  
5 Bring show tell evening  
19 Social, The White Horse Inn, Maplehurst  
26 Winter curry night, The Haldi, Southwater

### Itchen Valley ARC

Ray, G3HRH, 01962 712 045  
6, 27 Club Meeting  
13, 20 Club Net 8.00pm/145.525 MHz

### Mid-Sussex ARS

Sue, G6YPY, 01273 845 103  
6 On the air  
13 Meet the committee  
20 Radio night  
27 Radio night and table top sale

### Southdown ARS

John, G3DQY, 01424 424 319  
5 Operating, CW practice at Hailsham shack  
9 Morse code, G3AGF, G3DQY, G4BJP, Sovereign Sailing Club (NB: new venue)

### Surrey Radio Contact Club

John, G3MCX, 020 8688 3322  
1, 8, 15, 22, 29 Net, 1905kHz, 9.30am  
5, 12, 19, 26 Net 70.300MHz 8pm  
6, 13, 20, 27 Net 145.350MHz 8pm  
9 3D printing, Gareth, G4XAT  
23 Chat and fix-it, John, G8MNY

### Sutton & Cheam RS

John, G0BWV, 020 8644 9945  
19 Radio quiz of the year

### REGION 11: SOUTH WEST & CHANNEL ISLES

Regional Manager: Pam Helliwell, G7SME  
RM11@rsgb.org.uk

### Appledore & District ARC

Alan, M6CCH, 01237 422 833  
16 Quiz night, John, G3JKL

### Exeter ARS

Nick, MONRJ, 01363 775 756  
3 GB3EX repeater net, 7.45pm  
10, 17, 24, 31 GB3EW repeater net, 7.45pm  
12, 25 Meeting in America Hall, 6.30pm

### Exmouth Amateur Radio Club

Mike, G1GZG, 01395 274 172  
4 Computer software talk/demo/downloads  
18 CW night, operating/tutorials/training, Tony, MOTHJ

### Mid Somerset ARC

Nick, 2E0FGQ, 01749 346 320  
10 Winter sale and activity night

### South Bristol ARC

Andrew, G7KNA, 0783 869 5471  
5 Practical evening on RTL dongles  
12 Committee meeting  
19 DVD night: The Secret War  
26 Open house and on the air

### Thornbury & South Gloucestershire ARC

Mark, 2E0RKM, 0777 629 2813  
6, 13, 20, 27 VHF net  
11 QGM  
18, 25 On the air

### Weston Super Mare RS

Martin, G7UWI, 01934 613 094  
2, 9, 23, 30 Construction, operating & natter night  
16 AGM



**FREE UK DELIVERY WHEN YOU SPEND OVER £200.00**

## YAESU

## ICOM

## KENWOOD

 <b>Yaesu FTM-100DR</b> £324.95	 <b>Yaesu FT-817ND</b> £599.95	 <b>Icom IC-9100</b> CALL	 <b>Icom IC-7100</b> £1199.95 + FREE SD Card	 <b>Kenwood TS-990S</b> CALL	 <b>Kenwood TS-480SAT/HX</b> £657.95 £719.95
 <b>Yaesu FT-450D</b> £647.95	 <b>Yaesu FT-991A</b> £1367.95	 <b>Icom ID-5100</b> Full Monty £749.95 + FREE SD Card	 <b>Icom IC-7600</b> £2397.95	 <b>Kenwood TS-590SG</b> £1,159.95	 <b>Kenwood MC-60a</b> £124.95
 <b>Yaesu FTM-400XDE</b> £587.95	 <b>Yaesu FT-857D</b> £797.95	 <b>Icom IC-7700</b> CALL	 <b>Icom IC-7851</b> £9999.95	 <b>Kenwood TS-2000e</b> £1279.95	 <b>Kenwood SP-23</b> £74.95
 <b>Yaesu FT-DX-5000 Series</b> CALL		 <b>Icom IC-7300</b> £1199.95	 <b>Kenwood TH D-74E</b> £599.95	 <b>Kenwood TMV-71</b> £299.95	

**OPENING SOON**



**OPENING SOON**

Only 200m away from the  
Barnsley Alhambra Shopping Centre.

Perfectly located for visiting our new showroom so  
your wife or partner can shop till they drop while you  
treat yourself to a new toy!

**OUR NEW ADDRESS**  
5 DONCASTER ROAD  
BARNSELY  
SOUTH YORKSHIRE  
S70 1TH



In aid of



## The LAMFEST

**Barnsley's HAM Radio Rally**  
**Saturday 8th July 2016**

**Doors Open 10:00am - 4:30pm**

**Building 21, Elsecar Heritage Centre, Elsecar,  
Barnsley, S74 8HJ**

In aid of



VISIT OUR WEBSITE TO SIGN  
UP FOR OUR MAILING LIST  
[WWW.HAMRADIO-SHOP.CO.UK](http://WWW.HAMRADIO-SHOP.CO.UK)  
NEWS-OFFERS-REWARDS  
/LAMCOMMS



**12 MONTHS WARRANTY USED ON LAMCO GEAR**  
**APPROVED**  
**YAESU KENWOOD ICOM**

VISIT OUR WEBSITE  
We have a secure online web  
shop feel free to browse  
[hamradio-shop.co.uk](http://hamradio-shop.co.uk)  
**ADD TO CART**



LAM Communications Ltd. | 5 Doncaster Road | Barnsley | South Yorkshire | S70 1TH | UK  
Shop Opening Times - Mon to Fri : 0930 hrs - 1730 hrs | Sat : 0930 hrs - 1600 hrs



**Yeovil ARC**  
**Rodney, MORGE, 01935 825 791**  
 5 Secret Listeners, G3MYM  
 19 Morse practice, G3MYM  
 26 Committee meeting and shack on the air

### REGION 12: EAST & EAST ANGLIA

Regional Manager: Keith Haynes, G3WRO  
 RM12@rsgb.org.uk

**Colchester Radio Amateurs**  
**Peter, G0DZB, 01206 792 950**  
 19 Members' round table

**Essex Ham**  
**Pete, M0PSX, news@essexham.co.uk**  
 2, 9, 23 Net on GB3DA, 8pm, with chatroom  
 and live audio feed at www.essexham.net  
 3 Start of online Foundation course  
 7 Essex YL net, GB3DA, 8pm

**Huntingdonshire ARS**  
**Phil, G7KJW, 01487 832 937**  
 12 Operation Black Buck  
 26 Emergency services comms

**Norfolk Coast ARS**  
**Steve, G3PND,**  
**info@norfolkcoastamateurs.co.uk**  
 5 Reviewing events for 2017  
 12 JT modes  
 19 The NCARS transmitter  
 26 2m linear amp

**South Essex ARS**  
**Terry, G1FBW, 0798 607 0040**  
 10 Prep for 32nd Canvey Radio Rally

### REGION 13: EAST MIDLANDS

Regional Manager: Jim Stevenson, G0EJQ  
 RM13@rsgb.org.uk

**Derby & District ARS**  
**Richard Buckby, radio@dadars.org.uk**  
 3 Junk sale  
 10 Committee meeting

**Leicester RS**  
**Sandra, G0MCV, 0793 027 4044**  
 2 Closed  
 9, 16, 23, 30 Morse class and on the air

9 What did Santa bring you?  
 (plus committee meeting)  
 16 On the air  
 23 Construction/project night  
 30 AGM

**Melton Mowbray ARS**  
**Phil, G4LWB, 01664 567 972**  
 20 LDMOS RF amplifier (part 2), David, G3YYD

**RAF Waddington ARC**  
**Bob, G3VCA, 0797 116 6250**  
 2, 9, 16, 23, 30 Club net, 145.325MHz, 8pm

**South Kesteven ARS**  
**Andrew, M0NRD, 0796 906 2859**  
 6 AGM

**South Normanton Alfreton & District ARC**  
**A Lawrence, 2E0BQS, 0115 930 7322**  
 2, 9, 23, 30 Natter night

**Next deadlines are 22 December,  
 19 January & 23 February**

## EVENTS ROUNDUP

### NATIONAL

**British Railways ARS** has a trophy – the **Tuckfield Trophy** – that it can award for outstanding service to BRARS. This year, the AGM unanimously agreed that, in the golden anniversary year, the trophy be awarded to Geoff, G4GNQ and his wife Coral to acknowledge the work both of them have put into keeping BRARS running over a very long period (decades rather than years). Congratulations to both.

### REGION3: NORTH WEST

**Bolton Wireless Club** has a new venue and the move will take place from the first meeting of the new year, on 9 January 2017. The first meeting, at Ladybridge Community Centre, Beaumont Drive, Bolton BL3 4RZ, will also be the AGM.

### REGION 4: NORTH EAST

Otley ARS ran a stand at Otley Science Fair on 12 November, with over 500 members of the public attending. The club is a regular at the event, the highlight of a week-long science festival. A key element was explaining how OARS had been involved with the Tim Peake contact with Ashfield Primary School, the only primary school in the UK to make contact back in May 2016, through the work of staff member Michael, M6FFK, who is also a member of the club. Members of the public were also shown a portable D-Star setup, HF and VHF rigs and an SDR radio, as well as being given the opportunity to communicate using PMR radios – a favourite with children exploring the science fair. Thanks go to David, M0HLL, Ian, G6OVR, Paul, M0PKW and Malcolm, M0JSE who helped man the stand during the day. OARS will next be working with Ashfield pupils on 13 December, running a YOTA station from the school.

Two candidates, Paul Bentley and Stefan Paulovic, received their practical assessments from Zoltan, M0MBA / HA5DZS on 14 November at The Angel of the North ARC after also passing the Intermediate exam. Zoli has been a mainstay of the club for 6 years and having completed his Electrical Engineering degree and then moved to Neurosciences at Newcastle University, he is about to finish his PhD and continue his academic career at the University of New York Campus in UAE. The club wish him all the best. The club held their Christmas meal on Saturday 12 November at the Gateshead Bowling Club, the oldest Bowling Club in the North of England. Ages ranged from 2 years old to 74 years young.

DRM Tony Bonney, M0RHJ presented Nancy Bone, G7UUR with a certificate for completing the recent Train the Trainers course.



Left: Denby Dale ARS entered the CQ WW contest from the club shack at Farnley Tyas using the Spiderbeam, 160 / 80 / 40m dipoles and a 1/4 wave vertical on 40m. Some of the less frequently heard stations worked were Macedonia, Qatar, United Arab Emirates, Montenegro, USA, Canary Islands, Canada, Brazil, Cape Town, Benin, The Gambia, Columbia, Venezuela, Barbados, Cuba, Senegal, Iceland and Argentina. The log has been submitted with a claimed score of 195,200 from 546 QSOs and many multipliers. Many lessons have been learned and they plan to do better next time.



### REGION 5: WEST MIDLANDS

There has been a recent Foundation pass at **Midland ARS**. Mark Rew passed thanks to his tutor, Martin Hunt. Congratulations to Mark.

### REGION 7: SOUTH WALES

It is with deep regret that the **Cwmbran & District ARS** has to announce the passing of Dr George Skea, MWOGUK, in November. Their thoughts are with his family – Bev his wife, Rhe and Jamie his daughter and future son in law. George was an active member of the club and heavily into D-Star. Nothing was too much trouble for him. Ken, MWOYAC, Chairman.

### REGION 9: LONDON & THAMES VALLEY

**Chertsey Radio Club** has a new website at <http://radio-club.co.uk> They can also supply, on demand, USA Ham Radio License exams and Foundation/ Intermediate practicals and exams. See their website for details.

### REGION 10: SOUTH & SOUTH EAST

Brede Steam ARS & Hastings Electronic & Radio Club organised, and ran, their first Foundation course over the weekend of 29-30 October. This was a trial for both clubs and it is hoped that it is a way of increasing membership and encouraging youngsters into the hobby. The weekend was successful, if not a lot of hard work, for the students and trainers alike. It is important that clubs undertaking this type of training organise somewhere for the training and practical assessment to take place, in this case The First Brede Scout Group provided the Scout Hut for the training and the BSARS club provided the VHF and HF stations necessary for the practical assessment at their shack. Breaking the training down into manageable bits helped with concentration and fatigue, on all parties. The students did very well and they are looking forward to doing their Intermediate exams. Thanks go to Phil, G3MGQ, Steve, MOSSR, Antony, G4CUS and Martin, MOMJU for giving up their time at the weekend for this new adventure. The two groups are now looking to run their next training weekend and if you would like to take part then please contact the BSARS Exam Secretary by email to [m0nuc.bsars@gmail.com](mailto:m0nuc.bsars@gmail.com)



The Hernia Inter Club Challenge Quiz was held on 26 October at Farnborough Community Centre (above). The clubs taking part were Bracknell, Basingstoke, Farnborough, Guildford, Horndean, Horsham and Wey Valley radio societies. A hugely enjoyable time was had by all, with 75 questions on general knowledge and amateur radio. Bracknell and Wey Valley drew with 54 questions each and a 10 question decider was initiated and Bracknell won. They now have to organise and hold the event at their meeting place next year.

### REGION 11: SOUTH WEST & CHANNEL ISLANDS

**Thornbury & South Gloucester ARC** can now boast a new 40m dipole thanks to the gallant efforts of a club members. Braving the cold but clear conditions they were able to re-install new feeders and the antenna so that the shack can operate to its fullest potential. The club has a full programme of antenna maintenance scheduled for the New Year to include other HF bands and the VHF/UHF antennas. The events are hoped to coincide with training of newer members thereby helping with their own programme of work. Thanks go to all the members involved in the maintenance that day.

**Torbay ARS** is approaching its 70th year and is still very active. In September the club took part in Railways on the Air from Buckfastleigh Station. Using GB2SDR, they managed to contact 178 stations around the world with the radio club's radio equipment into a simple wire antenna supported by a short mast (assisted by a couple of nearby trees). Using GB6GEO, they also operated from the grounds of Kents Cavern, a UNESCO designated world heritage site of outstanding geological interest for education, science and the community. This was the second time in the year that the radio society had put on a special station from this location.

In September, at the monthly meeting of Torbay ARS, an illustrated talk was given by David, G3WGN who has a great deal of experience in aerial design, proven over many years at contest working. He highlighted to the members with charts derived from computer modelling showing radiation patterns and mentioned that being familiar with the local terrain is very important. If tall obstacles are nearby, can the aerial be positioned to re-direct the aerial into another direction, making the best of what's available? If the ground slopes away from the aerial this can also alter the angle of radiation, often clearing tall obstacles, so the theory that aeriels are required as high as possible is not always the case. The club had a Show & Tell evening where the members were invited to bring along their normally home-based equipment to the HQ for the others to see, hear and talk about, with a chance to operate under the owners watchful eye, often showing them some of the tricks to use the rig easily.



## REGION 12: EAST & EAST ANGLIA

Club members made generous donations for the Braintree and District ARS surplus equipment sale. Items ranged from vintage Marconi and Cossor broadcast radios and an Eddystone VHF receiver to AVO meters, and other test equipment. Melvin conducted the auction, and Dave described the items. Monies raised will boost clubs funds, and where members made donations on a commission basis, some funds have been distributed to a local charity.



One of the construction projects at Norfolk Coast ARS has been the creation of a wheeled trolley for pedestrian mobile/portable operation (above). This was given its first outing during the month – it was wheeled along Cromer Pier at sunrise with the hope of working some interesting DX, given the sea take off from the 20m vertical dipole. A number of good QSOs were made on both SSB and CW with excellent reports, but the hoped-for VKs and ZLs did not appear – but like the fishermen alongside us on the pier, they will return with the hope of a bigger catch.



Congratulations to Dorothy, MOLMR, for being awarded the Most Improved Amateur award at the South Essex ARS AGM in November. Since taking up the hobby in 2014, she's taken part in numerous activities on different modes and bands, been active at field days, and runs her own Essex YL net. Pete, MOPSX was also presented with an award at the AGM for his contribution in supporting the club over the year.

South Essex ARS are moving to new premises. From 1 January the new venue is The White House, Kiln Road, Benfleet SS7 1BU. This is situated behind Castle Point Council Offices, Thundersley.



Towards the end of the year, Essex Ham took part in the 2m Activity Day, organised by the Thurrock Acorns ARC (above). Members made contact using FM, SSB and SSTV to support this on-air event. 2016 was a very busy year, running several special event stations, working with local schools, promoting the activities of local clubs, and helping to raise awareness of the hobby across Essex. The group completed its 20th Foundation Online course, with almost 400 people enrolling in 2016.



Wainwrights on the Air (or WOTA) was the topic of the presentation given by Kevin and his 10 year old daughter Lauren at the monthly meet of the Thurrock Acorns ARC. WOTA is an adventure radio program for amateur radio enthusiasts that is based in the Lake District. They have been working to complete the WOTA challenge by next year having already climbed over three quarters of the mountains. During the presentation Kevin, assisted by Lauren, told members about some of the adventures that have taken place while out in the Lake District including when a radio froze (it was very cold on top of the mountain) and another time when Lauren had to hold onto a rock when the wind got up on top of a peak.

## REGION 13: EAST MIDLANDS

RAF Waddington ARC is holding regular training courses at no charge. For initial contact please call Bob, G3VCA on 07971 166 250.



# ATV

## TV repeaters

Due to changes at Ofcom, new TV (and other) repeaters are becoming more difficult to get licenced. If you have a repeater licence that is not in use please consider handing this over to someone who *will* make use of it. This will be a much more effective solution than to wait for a new licence.

## Digital TV transmission

Reduced bandwidth digital amateur television, RB-TV, continues to be a major part of modern ATV activity. Dave, G8GKQ is one of the main players in this area and he has contributed the following:

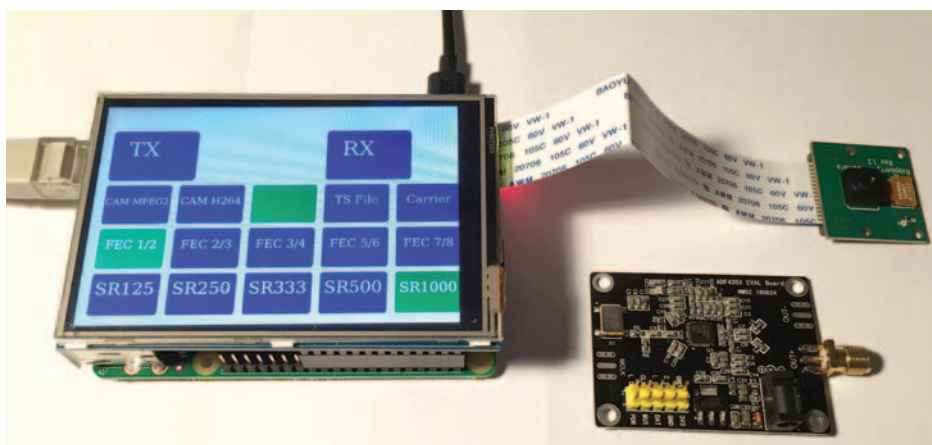
## Raspberry Pi DATV developments

A group of French TV enthusiasts led by Evariste, F5OEO, have developed a digital ATV transceiver based on the Raspberry Pi. Their prototype is described in the latest CQ-TV magazine and it is capable of generating standard definition TV pictures at 2MS/s from the Raspberry Pi camera. An external modulator, PA and filters enables a power output of up to 60W on 437MHz. The Raspberry Pi is controlled using a touch screen and there is no need for an external PC in normal operation. On receive, the Raspberry Pi takes the output from an RTL-SDR dongle and displays the demodulated picture on the touch screen.

Led by the BATC, work is now underway to develop a modulator kit for home construction that will allow the Raspberry Pi, with Evariste's software, to be used as the exciter for both RB-TV on 146MHz and normal bandwidth digital ATV on 437MHz. The increased speed of the new Raspberry Pi 3 will allow even higher symbol rates, with 8MS/s being demonstrated for short periods during bench testing.

Although the Raspberry Pi-based receiver shows promise, a more advanced version of the current MiniTuner for digital ATV reception is also being investigated. This tuner was described by Jean-Pierre, F6DZP during the BATC Convention at Cosford. It is hoped that this will receive from 146MHz all the way up to 2.4GHz without external frequency converters. Using updated software, it should also be capable of receiving DVB-S2 – allowing even narrower bandwidths to be used to transmit higher quality pictures.

You can follow some of the developments on the BATC Forum [1]. **Photo 1** shows the Raspberry Pi ATV transmitter during development.



**PHOTO 1:** The Raspberry Pi ATV transmitter during development.

## BATC CAT16

The annual meeting of the BATC took place in September at Cosford, near Telford. There was an extensive range of lectures and presentation on a variety of subjects including RB-TV. These are now all available to view online at [2]. Also there is a full write-up of the meetings by Rob, G8NXG, in the latest CQ-TV, #253.

As a contrast to the very modern RB-TV equipment another interesting display consisted of two working 405 line broadcast monochrome valve cameras, each about 60 years old. One used an Image Orthicon tube and the other was a Vidicon camera, both made by EMI in Hayes, Middlesex, England. These are maintained and displayed by Brian, G8GQS with help from Paul, G8KFW. The picture shows the cameras and the large control units connected by big multi-core cables – there's not a transistor or IC in sight! Brian has quite an extensive range of early broadcast equipment at his home museum in Surrey. It is a great tribute to him that most of it is well maintained and fully operational. You can see the contents of his museum on his website [3]. I find it fascinating to see the dramatic evolution of science and electronics by comparing these cameras to the matchbox size HDTV colour cameras available today for a few tens of pounds. What will there be in another 60 years?



**PHOTO 2:** Brian, G8GQS and two valve-powered cameras.

**ATV Activity Weekend,**  
6 May 1200 – 7 May 1800  
**IARU International ATV Contest,**  
10 June 1200 – 11 June 1800

## New author for ATV column

I have been writing the ATV column now for five years, following Roy, G8CKN, who wrote this column for many years previously. As from the March 2017 issue, Dave, G8GKQ has volunteered to take over. He is very active in the digital transmission area and I am sure will be a great contributor to this column.

Please send any future contributions to him, dave.g8gkq@gmail.com (or to me to pass on).

## Websearch

- [1] [www.batc.org.uk/forum/](http://www.batc.org.uk/forum/)
- [2] [https://wiki.batc.tv/Presentations\\_from\\_CAT\\_16](https://wiki.batc.tv/Presentations_from_CAT_16)
- [3] [www.tvcameramuseum.org/](http://www.tvcameramuseum.org/)

## Contests

For more details and how to enter see the BATC Forum [1]. All times are UTC.

**ATV Activity Weekend,**  
11 March 1200 – 12 March 1800

**Dave Mann, G8ADM**  
dave@satmann.eu



ICOM

HF/50/70MHz Transceiver

# IC-7300

Make all your  
Christmas Dreams  
come true...



...and have a  
great new year!

ICOM-UK

Blacksole House, Altira Park, Herne Bay, Kent CT6 6GZ. UK. Telephone: +44 (0)1227 741741.  
e-mail: [info@icomuk.co.uk](mailto:info@icomuk.co.uk) website: [www.icomuk.co.uk](http://www.icomuk.co.uk)



Count on us!



## For Sale

### FIBREGLASS TUBE

High strength tube, square box, rod, and other sections stocked in 6m lengths, can be cut.  
Engineered Composites, Chester. Tel: 01244 676000 e. [info@engineered-composites.co.uk](mailto:info@engineered-composites.co.uk)  
[www.engineered-composites.co.uk](http://www.engineered-composites.co.uk)

### SINOTEL UK - AUTHORISED UK

importers of Baofeng & TYT handhelds, Xiegu X108G HF transceivers. Accessories, antennas and more. [www.sinotel.co.uk](http://www.sinotel.co.uk), 01926-460203, [sales@sinotel.co.uk](mailto:sales@sinotel.co.uk)

**CTCSS ENCODER AND DECODER KITS, DTMF**  
Kits and Modules, PIC Microcontroller Development Kits. [www.cstech.co.uk](http://www.cstech.co.uk)

### USB CAT, CI-V & PROGRAMMING CABLES.

Control & programme your rig from your PC – logging, satellite tracking etc. SiLabs CP2102 or FTDI chipset for guaranteed reliability. For these and more great items go to [www.technofix.uk](http://www.technofix.uk)

### KITS & BUILT PRODUCTS

Transverters, 100W 4m Linear Amplifier, HF & VHF Preamps, Masthead VHF Preamps, 25W VHF Linear Amps, VLF & VHF Converters, VFO, Noise Bridge, HF Power Meter, Capacitance Meter, Regenerative Receivers, PSK31 Interface, Single & Tri-band PSK31 Receivers, Dual Peak Notch Filter, CW and Speech LS Audio Filters, VFO, etc. Tel: 01305 262250, [jean@spectrumcomms.co.uk](mailto:jean@spectrumcomms.co.uk), [www.spectrumcomms.co.uk](http://www.spectrumcomms.co.uk).

### COMPONENTS

Resistors, Capacitors, Trimcaps, 10mm Coils, Polyvaricons, Broadcast Variables, Dust Iron Toroidal Cores, Ferrite Toroidal cores, Binocular Cores, Ceramic Wafer Switches, Transistors, FETs, MOSFETs, Diodes, Linear IC's, CMOS 4000 series IC's, Connectors, Potentiometers, Tel: 01305 262250, [jean@spectrumcomms.co.uk](mailto:jean@spectrumcomms.co.uk), [www.spectrumcomms.co.uk](http://www.spectrumcomms.co.uk).

## Cards & Design

### QSLERS SPECIAL OFFER

1000 full colour both sides qsl cards £45 plus postage. 07720 580968 [www.QSLers.co.uk](http://www.QSLers.co.uk)

**LOW COST AND HIGH QUALITY QSL CARDS**  
By LZ1JZ QSL PRINT [www.LZ1JZ.com](http://www.LZ1JZ.com)

## Aerials

### MOCVO ANTENNAS

For all your amateur radio antenna needs. Full details at: [www.m0cvoantennas.com](http://www.m0cvoantennas.com)

### WESTERN HF 10

67ft wire dipole 160-6m, full details lookup m0bzi at: [www.qrz.com](http://www.qrz.com) buy direct: [m0bzi@outlook.com](mailto:m0bzi@outlook.com) or 07748331458 reviews at: [http://g0kya.blogspot.com/2010\\_08\\_01\\_archive.html](http://g0kya.blogspot.com/2010_08_01_archive.html) or <http://www.eham.net/reviews/detail/9424>

### G4TPH MAGLOOPS BACK IN PRODUCTION.

Remote tune and manual tune models for 40m through 10m. Details at [www.g4tph.com](http://www.g4tph.com)

### QUAD BAND COLINEARS.

10/6/2/70 Quad band 2.5/2.5/3.5/5.5 dbi gain only 1.2m length £59.95 ea 6/4/2/70 Quad band yes Includes 4m, 2.5/2.5/3.5/5.5 dbi gain 1.2m length £59.95 ea 2/70 Dual band 3.5/5.5 dbi gain 1.1m length only £37.95 ea. UK post £7.95. Website: [mirfield-electronics.co.uk](http://mirfield-electronics.co.uk) Email: [martin.stokes@hotmail.com](mailto:martin.stokes@hotmail.com) or Tel: 07825549430

### TYT MD380/MD390GPS

MD380 DMR radio inc. p/lead + s/ware £109.95, NEW MD390GPS waterproof DMR radio inc p/lead+s/ware £149.95 MD380 Li replacement battery £17.95, car adaptor unit £17.95, speaker mic £14.95, ear/mic £12.95. All inc post. Website: [mirfield-electronics.co.uk](http://mirfield-electronics.co.uk) Email: [martin.stokes@hotmail.com](mailto:martin.stokes@hotmail.com) or Tel: 07825549430

### TRAPPED DIPOLES & INVERTED-L

Spectrum Lite Trapped Dipoles with Low-Z twin feeder. Rated to full legal limit. Low TVI. Typically 2 to 3 S-points quieter than G5RV's and verticals. Air-cored low loss 1:1 Balun. Trapped Inverted-L aerials for small gardens. Spectrum Low-Z feeder available in 100 drums or by metre. Tel: 01305 262250, [jean@spectrumcomms.co.uk](mailto:jean@spectrumcomms.co.uk), [www.spectrumcomms.co.uk](http://www.spectrumcomms.co.uk)

## Computer Software

### SD CONTEST LOGGER - EI5DI.COM

Supports all RSGB, UKIICC HF contests and hundreds more. €20

## Miscellaneous

### ALL UK STATIONS – CALL IN ON OUR 'M1CRA' CHRISTIAN NETS!

WACRAL welcomes all amateurs & listeners to our Sunday morning 'GOOD NEWS' nets, now at 07300-0830 on 3.747 MHz +/- QRM and, again, at 14.00-15.00 on 7.147 MHz. Our 2m SSB net at 15.00 is held on 144.205 MHz. Or, do join us on Wednesdays 07.30 3.747 MHz +/- QRM, 10.00 on 7.147 MHz (if no contact established after 5 mins QSY to 3.747 MHz and 21.30 on 3.751 MHz, for nationwide Christian fellowship and relaxed chat. All times UTC. See [www.wacral.org](http://www.wacral.org) for more net info and WACRAL details or just call Ian G4OPP on 01622 746650 or [g4opp@wacral.org](mailto:g4opp@wacral.org)

### VINTAGE FIREWORK COLLECTOR

will pay cash and collect from anywhere call Tony - 07956 506300 Licensed explosive storage

## Equipment

### REPAIRS TO RECEIVERS, TRANSMITTERS

New/Old, valve/transistor. Call 07903 023437 for details: [www.kent-rigs.co.uk](http://www.kent-rigs.co.uk)

### RADIO REPAIRS BY MONKL

Icom, Yaesu, Kenwood etc, plus linear amplifiers, please contact Nick on 07770 397668 or email [np262@yahoo.com](mailto:np262@yahoo.com)

## Wanted

**VINTAGE RADIO & VALVES WANTED** national cash settlement for silent key, shack clearouts 07552 678725, [vintageradio@btinternet.com](mailto:vintageradio@btinternet.com)

Classified advertisements 58p per word (VAT inc.) with a minimum of 14 words £8.12. All classified advertisements must be prepaid. Please write clearly. No responsibility accepted for errors. Latest date for acceptance is 1st of the month prior to publication. Payment to: RSGB, 3 Abbey Court, Priory Business Park, Bedford, MK44 3WH

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

ACCESSORIES

AMATEUR  
RADIO

COMMERCIAL /  
PMR RADIO

AVIONICS

MARINE RADIO

RECEIVERS /  
SCANNERS

ANTENNAS

**ML&S** martin lynch & sons  
The World's Favourite Ham Store

Martin Lynch & Sons Ltd.  
Wessex House, Drake Avenue  
Staines, Middlesex TW18 2AP  
Web: [www.HamRadio.co.uk](http://www.HamRadio.co.uk)  
E-mail: [sales@hamradio.co.uk](mailto:sales@hamradio.co.uk)

### OPENING HOURS

Monday to Friday: 8.30am to 5pm  
Saturday: 9am to 4.30pm

**Tel: 0345 2300 599**  
Int'l. No: +44 1932 567 333

**DON'T MISS THE  
OFFICIAL ML&S POST  
CHRISTMAS SALE**

**DOORS OPEN 9am WEDNESDAY 28th  
THROUGH SATURDAY 31st DECEMBER!**

## Business Cards

**MLS martin lynch & sons**  
The World's Favourite Ham Store

Wessex House, Drake Avenue, Staines,  
Middlesex TW18 2AP  
Tel: 0345 2300 599  
Web: [www.hamradio.co.uk](http://www.hamradio.co.uk)  
E-mail: [sales@hamradio.co.uk](mailto:sales@hamradio.co.uk)

**spiderbeam**  
high performance lightweight antennas

YOUR FIBREGLASS ANTENNA SPECIALIST  
PORTABLE & HEAVY DUTY YAGIS (10 - 28 MHZ)  
40 - 60 - 85FT TELESCOPIC FIBREGLASS POLES  
[WWW.SPIDERBEAM.NET](http://WWW.SPIDERBEAM.NET)

**ANTENNA**  
Alpha Antenna

The World Famous S9 Antennas  
Loops/Transportable/Mobile  
[www.AlphaAntenna.com](http://www.AlphaAntenna.com)

**RCQ Communications Ltd**  
**USED EQUIPMENT WANTED**  
Call today on 079 408 37 408  
or E-mail: [g3rcq@yahoo.co.uk](mailto:g3rcq@yahoo.co.uk)  
**[www.g3rcq.com](http://www.g3rcq.com)**

**SHORTWAVE SHOP Ltd**  
Radio Communications Centre  
18 Fairmile Road Christchurch Dorset BH23 2LJ  
Phone/Fax 01202 490099  
[www.shortwave.co.uk](http://www.shortwave.co.uk)  
Specialist Suppliers of Amateur Airband Marine PMR &  
Equipment to the Business User and Hobby Enthusiast  
Opening times TUES - FRI 10am - 5.30pm SAT 10am - 1pm

**Sandpiper Aerials Ltd**  
For all you Antenna and associated  
Hardware needs, Contact us  
Tel: 01685 870425 Fax: 01685 876104  
[Sales@sandpiperaerials.co.uk](mailto:Sales@sandpiperaerials.co.uk)  
[www.sandpiperaerials.co.uk](http://www.sandpiperaerials.co.uk)

UK & EU Original Manufacturer  
BROADBAND HEXBEAMS  
**G3TXQ**  
[www.g3txq-hexbeam.com](http://www.g3txq-hexbeam.com)  
Call Ant MWØJZE on - 01554 749 630

**DG8SAQ Vector Network Analyzer**  
VNWA Accessories  
10W SSB Xcvr Kits  
Si570 VFO Kits  
RF PA Transistors  
PJ80 DF RX Kits  
SiLabs Si570 ICs  
Visit the Webshop!

**SDR-Kits**  
Email [info@SDR-Kits.net](mailto:info@SDR-Kits.net)  
[www.SDR-Kits.net](http://www.SDR-Kits.net)

**RIGOL**  
[WWW.RIGOL-UK.CO.UK](http://WWW.RIGOL-UK.CO.UK)

**Begali Keys** The Sound of CW  
[www.iaztel.com](http://www.iaztel.com) [www.radioworld.co.uk](http://www.radioworld.co.uk)  
ITALY UNITED KINGDOM

**RF PARTS COMPANY** Complete inventory for servicing amateur and commercial communications equipment  
From Milliwatts to Kilowatts

**RF POWER TRANSISTORS — TUBES — POWER MODULES**  
MOTOROLA • TOSHIBA • M/A-COM • MITSUBISHI

3-500ZG • 811a • 572B • 4-400a • 6146B  
3CX400A7 • 3CX800A7 • 3CX1200A7/D7/Z7  
3CX1500A7 • 3CX3000A7 • 4CX250B

**001-760-744-0700**  
**[www.rfparts.com](http://www.rfparts.com)**  
Email: [info@rfparts.com](mailto:info@rfparts.com)

435 South Pacific Street  
San Marcos, California 92078 U.S.A.

## Advertisers Index

bhi	45
DX Shop	73
Goodwinch Ltd	33
ICOM UK Ltd	89
Klingenfuss Publications	33
KMK Ltd	95
Kuhne Electronics	62
LAM Communications	84
Martin Lynch & Sons	49, 50, 51, 52, 53, 54, 90, 100
Moonraker	28, 29
Nevada	58, 59
OFCOM	45
Peak Electronics	45
Radioworld	68, 69
RF Parts Company	91
RT Systems Inc	95
RSGB	9, 11, 23, 37, 43, 78, 79
SDR Kits	95
SDRplay	45
SOTabeams	33
Upshot UK Ltd	95
W2IHY Technologies	62
Waters & Stanton	2, 3, 4, 98, 99
Yaesu UK Ltd	19, 24

To Advertise in  
**RadCom**  
the UK's Premier  
Amateur Radio Journal, Call  
**danby advertising**  
on 01603 898678

or email [adsales@rs.gb.org.uk](mailto:adsales@rs.gb.org.uk)

Copy to: Chris Danby, G0DWV,  
Danby Advertising, Fir Trees, Hall Road,  
Hainford, Norwich, Norfolk, NR10 3LX

**For cost effective Business Card advertising call  
Chris on 01603 898678 to find out more**



## FREE MEMBERS' ADS OF UP TO 40 WORDS

Email your Members' Ad to [memads@rsgb.org.uk](mailto:memads@rsgb.org.uk). You must include your name, callsign, phone number, email address and location (not counted in the 40 word limit). Optionally, attach your own photo of the item (min res 800 x 600, must be in focus and well lit). Max 1 ad per Member per month; other terms & conditions also apply (see [tinyurl.com/MemAdsInfo](http://tinyurl.com/MemAdsInfo)).

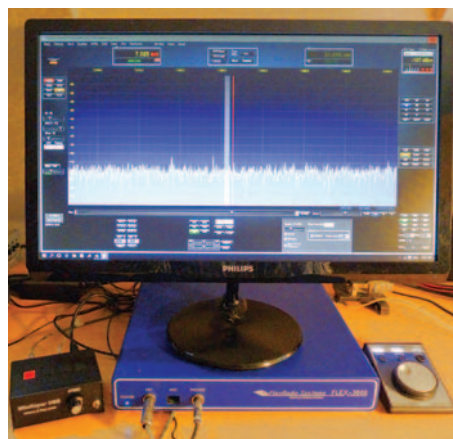
## FOR SALE

**120ft TRAILER MAST** 6 section motorised West Tower with caged DXC1000 rotator, GWO, £8,000. 160ft wind turbine survey mast, unused, 8x6m sections, substantial payload (or 2x80ft), £3,750. DB36 SteppiR, unused, boxed, £3,600. 1kW 2m Henry Tempo amp, VGC, £1,150. Offers. Graham, G4VRX 0781 100 0999, [g4vrx@aol.com](mailto:g4vrx@aol.com) (Birmingham).

**AOR AR5000+3 RECEIVER** complete with PSU, manual and disk, £750. Rupert Allen, 2EOREL, 01787 828 853, [allrupe@aol.com](mailto:allrupe@aol.com) (Sudbury, Suffolk).

**bhi NEIM1031** mark 1 In-line noise eliminating module. GWO. New units are £150, £75 or very near offer. Hansen FS-500V VHF 50 – 150MHz mains powered peak reading power / SWR meter, 0 – 200W. VGWO, £50 or very near offer. Bob White, G8SPC, 01275 874 001, [g8spc@blueyonder.co.uk](mailto:g8spc@blueyonder.co.uk) (Clevedon, Somerset).

**FLEX-3000 100W SDR RIG** with built-in auto-ATU, FlexControl tuning knob/ buttons plus a FireWire interface card (PCIe) for your PC. GWC, available because of upgrade. Offers around £500. Post at cost or deliver modest distance. Frank, GM3JKS, 01556 670 258, [frank.spires21@btinternet.com](mailto:frank.spires21@btinternet.com) (Dumfries & Galloway).



**FT-450D**, excellent condition, ideal novices set. With original receipt, £400 ono. Also Comet CM-420 144/430MHz SWR/PWR, £25 ono. Sonic SWR 7100s, £20 ono. TS-465b/u signal generator, £50 ono. Eddystone 670a, £50 ono. Trio 9R-59ds, £30 ono. Chris, 2E1BNF, 0779 099 3226, [cmdonaldson112@outlook.com](mailto:cmdonaldson112@outlook.com) (Meltham, Huddersfield).

**FTdx3000** purchased August 2015, used just 3 times. Continual hospital ops reason for not using. £1,000 ono, collect only, mint condition. Chris Jones, MMOGPL, text 0781 752 1553, [chrismm0pl@btinternet.com](mailto:chrismm0pl@btinternet.com) (Helensburgh, Scotland).

**ICOM PW1** 1kW solid state linear amplifier, excellent condition, c/w external mains filter and manual. £2,000, collection preferred otherwise can arrange consignment at cost. Malcolm, G3PDH, [g3pdh@btopenworld.com](mailto:g3pdh@btopenworld.com) (Norwich).

**IOTA EU-123 QTH.** Four bedroom bungalow, panoramic views, large landscaped garden and outbuildings. In small village, within twenty yards of sea but only 90min from Glasgow. Antennas available Hexbeam, 40m vertical and 80m full wave loop. Tom Cromack, GM0FGI, 01700 831 302, [tomcromack@btinternet.com](mailto:tomcromack@btinternet.com) (Kilchattan Bay, Bute).

**KENWOOD DM81** grid dip meter, £55. Morsematic MM1 memory keyer, £40. Datong FL1 audio filter, £20. SkyTronic 6A 13.8V linear PSU, £20. Ten-Tec 48057 4 pole 2.5kHz filter for Argosy, £20. All collect or plus postage. Tim, G4ARI, 01530 243 258, [Tim.Raven@capgemini.com](mailto:Tim.Raven@capgemini.com) (Leicestershire).

**KENWOOD TS-2000E.** Condition as new. Original boxes. Buyer collects, £850. Les, G4GMS, 01778 420 224 (Bourne, Lincs).



**KENWOOD TS-50** with matching auto ATU AT-50. Very clean and fully working. Very little used, complete with manual and leads. £395 plus £15 carriage, or inspect and collect. Robert Riddington, G4IHT, 01285 841 203, [robert@riddington.me.uk](mailto:robert@riddington.me.uk) (Tetbury).

**MFJ HF/VHF SWR ANALYSER 259B** complete with mains power supply, coaxial test leads, instruction manual and original box. £125 plus postage or collect by arrangement. Phil, G3SWH, 0193 483 2736, [phil@g3swh.org.uk](mailto:phil@g3swh.org.uk) (Bristol).



**MORSE INKER** made by Walters Electrical of London circa 1890. Complete, in good condition. Not cosmetically restored. Motor immaculate. £925. Stuart, G3YPS, 0780 360 1176 (Lincolnshire).



**RANGER 811H** linear amp, with manual. GWO (not kit), £500. P Fry, G4AKG, 01444 239 371, [peterandpat@burgess-hill.co.uk](mailto:peterandpat@burgess-hill.co.uk) (Burgess Hill, West Sussex).

**TRIO JR-599 CUSTOM SPECIAL** communications receiver for HF bands with optional 144MHz plugin fitted. Trio Model SP-5DS speaker. Homebrew ATU. All used but in working order. £60 for all. Buyer to collect or arrange transport. Pete Moore, 2E0FYQ, 0796 872 6834, [pete@azuremsl.com](mailto:pete@azuremsl.com) (Empingham, Rutland).



**YAESU FP/FT200 PSU/XCVR** (all black version), £120. Yaesu FC-902 ATU, £100. Yaesu FTV-901R transverter (all modules fitted), £250. Yaesu YD-844 mic, £45. Yaesu YD-148 mic, £45. Hansen FS-710V power meter, £50. Various electronic keyers, Katsumi, Daiwa, Kenpro. All good condx. Nigel, G4KZZ, 01723 890 786, [nipro@btinternet.com](mailto:nipro@btinternet.com) (N Yorks).

**YAESU QUADRA 1KW HF/6m AMP.** Boxed, in excellent condition. S/N 5C700024 with manual/leads for Yaesu equipment. Cost new £4,500 price £2,500 ONO. Prefer buyer collect. Terry, G0VVP, text 0753 390 6085, [t.sayner@ntlworld.com](mailto:t.sayner@ntlworld.com) (York).

## WANTED

**A KEYBOARD FOR A NASCOM** computer, or a complete Nascom, any version. Condition not important but must have a working keyboard. Could collect within reasonable day's travel, or pay + postage. Alan, G3MGU, 01189 784 450, [dodson318@btinternet.com](mailto:dodson318@btinternet.com) (Wokingham, Berks).

**EX WD RF UNIT 25, 26 OR 27.** Reasonable price paid. Working order not necessary. D Petty, G8ULM, 01799 218 728, [g8ulm@hotmail.co.uk](mailto:g8ulm@hotmail.co.uk) (Saffron Walden).

**I AM IN NEED OF A BUTTERNUT HF6V** or similar for spares or repair following damage during a move. Please let me know your price, location and a guide to the condition. Jeff Dixon, G6YIQ, [jeff@jeffdixon.email](mailto:jeff@jeffdixon.email) (Herts).

**ICOM IC-706 MK2G**, prefer one with original packaging. Also seek separation cable or kit. DSP and 350Hz filter would be nice. Roger, G0BSU, [roger@g0bsu.net](mailto:roger@g0bsu.net) (Wilmslow, Cheshire).

**ICOM IC-AT500.** Peter, G7AGB, 01202 695 350, [rothwellp@yahoo.co.uk](mailto:rothwellp@yahoo.co.uk) (Poole, Dorset).

**PLEASE HAS ANYBODY GOT** a separation lead for an ICOM 706? Maybe you had a radio and lead but didn't pass the lead on? It can happen! Any help would be appreciated. S Watson, M6CFU, 0789 695 0612, [fluffyrulesok@outlook.com](mailto:fluffyrulesok@outlook.com) (Norfolk).

**POWER LEAD** and users/instruction manual for a FDK MULTI-750E. This is an old 2m multimode rig. Andrew Neil Brown, MWOWEE, 01545 560 418, [andycmaww@btinternet.com](mailto:andycmaww@btinternet.com) (New Quay, West Wales).

**R1155**, unmodified. Also separate PSU and / or audio amp. Suitable loop aerial also needed. Adrian, GOPQT, 0798 557 5694, pandahopkins@uwclub.net (Dorset).

**TRANSFORMER** with 6.3V and HT winding of approx 250-300V for homebrew Top Band AM valve TX. Also variable tuning caps (not wide spaced), modulation transformer, a choke for the HT power supply and any other bits that might be of use. Ken, G6HZG, 01938 240 864, kp.electrical@yahoo.co.uk (Ryde, IOW).

**THE 7th HARLOW SCOUT GROUP** is looking for donations of any radio equipment suitable for use by Foundation licensees. If you have any equipment that you can donate, please contact Mike, G7OBS, mike@g7obs.net (Essex).

**VIBROPLEX JUNIOR** semi automatic bug key any condition or even parts for renovation WHY? John, G4LGX, jra\_hall@hotmail.com (Harrogate).

**YAESU FRG-7 RECEIVER** with fine tune fitted. Must be working, have no mods and be in good condition. Please email details and photos. David, G4EDR, 0798 106 0961, radioham73-qsl@yahoo.co.uk (Filey).

#### UP FOR GRABS

**FREE RSGB RADIO COMMUNICATION MAGAZINES.** Approx 55 years of *Radio Communication (Bulletin)* magazines from January 1961, no split, all or nothing, for collection only. Mike, G3TCL, 01480 383 494, mike.inbrampton@mail.com (Brampton, near Huntingdon, Cambridgeshire).

**I HAVE A COMMERCIAL YAGI BROADBAND ANTENNA** that I would like to donate to a suitable recipient/club, who would have to collect it. The antenna was purpose built using high specification material. It covers the frequency range 3-28MHz, is unused and still boxed in its wooden crate. It comes complete with coax adaptor and is made of aluminium piping with 3mm wall. It does not have a rotator or mast. Its size is a problem as it has a substantial footprint. It is about 40ft long and has a 40ft spread. Ideally it should be mounted on a 10m mast. Its twin worked voice successfully from Borneo to Africa on 100W. I would be grateful for any ideas on its disposal. Contact Rupert Ridgeway, via email to barito@rad.net.id.

#### RALLIES & EVENTS

Members of the RSGB Regional Team will be present with a bookstall at the rallies this month marked with an RSGB diamond.

**If your rally/event is not listed here, PLEASE SEND US FULL INFORMATION by email to radcom@rsgb.org.uk**  
That will ensure it gets into *RadCom*, on the

#### 15 JANUARY

**RED ROSE WINTER RALLY**, organised by West Manchester Radio Club  
Lowton Civic Centre, Hesketh Meadow Lane, WA3 2AH, just off the A580 East Lancs Road. Doors open at 11am, car parking is free. There will be trade stands, a Bring & Buy, special interest groups and an RSGB bookstall. Catering is available on site. Further details from John, on 0787 016 1953. [http://wmrc.org.uk/lowton\_winter.html].

#### SPECIAL EVENT STATIONS

These call signs 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. Details published here were kindly provided by Ofcom on 21 November 2016. Note that Ofcom no longer provides Regional Secondary Locator information (GM, MW, GI etc) for the NoV holder, replacing it with a # symbol.

Date	Call sign	Event Phonetics	Location	Parent Call sign
01/01/2017	GB0HCC	Hull City of Culture	East Yorkshire	G#6LNV
01/01/2017	GB6CRA	Christian Radio Amateur	Malvern	M#1CRA
01/01/2017	GB4BLC	Bedworth Lion Club	Bedworth, Warwickshire	G#8GMU
02/01/2017	GB0PAS	Pontefract Astronomical Society	Carleton, Pontefract	G#0BPK
08/01/2017	GB6SL	Hull Trawler St Louis	St Andrews Quay	G#4VHM
21/01/2017	GB2SLS	Sheringham Lifeboat Station	Norfolk	M#0SHK

#### 29 JANUARY

##### **HORNCASTLE WINTER AMATEUR RADIO RALLY**

Horncastle Youth Centre, Willow Close, Cagthorpe, Horncastle LN9 6B

Doors open at 10am and there is free car parking on site. Entry is £2. The venue is all on one level and so is suitable for less able visitors. There will be hot drinks and snacks available including bacon butties. The RSGB bookstall will in attendance. Details from Tony, G3ZPU on 01507 527 835.

#### 5 FEBRUARY – 32nd CANVEY RADIO AND ELECTRONICS RALLY

#### 12 FEBRUARY – HARWELL AMATEUR RADIO SOCIETY RADIO AND ELECTRONICS RALLY

#### 19 FEBRUARY – RADIOACTIVE FAIR AT NANTWICH

#### 26 FEBRUARY – CENTRAL COAST AMATEUR RADIO CLUB RALLY, AUSTRALIA

#### 26 FEBRUARY – PENCOED AMATEUR RADIO CLUB TABLE TOP SALE

#### 26 FEBRUARY – (BRATS) RAINHAM RADIO RALLY

#### 4 MARCH – LAGAN VALLEY ARS ANNUAL RALLY AND HAMFEST

#### 5 MARCH – EXETER RADIO & ELECTRONICS RALLY

#### 12 MARCH – DOVER RADIO CLUB RALLY

#### 19 MARCH – 32nd WYTHALL RADIO CLUB RALLY

#### 26 MARCH – CALLINGTON RADIO RALLY

#### 9 APRIL – NARSA EXHIBITION

#### 30 APRIL – CAMBRIDGE REPEATER GROUP RALLY

#### 30 APRIL – WEST LONDON RADIO & ELECTRONICS SHOW

#### 1 MAY (BANK HOLIDAY MONDAY) – 33rd DARTMOOR RADIO RALLY

#### 6 MAY – SERF

#### 7 MAY – DAMBUSTERS HAMFEST

#### 19-21 MAY – DAYTON HAMVENTION® (new venue)

#### 4 JUNE – SPALDING & DARS ANNUAL RALLY

#### 11 JUNE – JUNCTION 28 AMATEUR RADIO RALLY

#### 25 JUNE – WEST OF ENGLAND RADIO RALLY

#### SILENT KEYS

We regret to record the passing of the following Members:

Mr D A Griggs, GOIPT	19/10/2016
Mr D G Meaton, G1IKD	27/10/2016
Mr P G T Powell, G1PYJ	15/11/2016
Mr M R Smart, G3UXQ	30/10/2016
Mr K F Arnold, G3XNP	01/09/2016
Mr J Green, G3ZNV	
Mr B Fletcher, G4CWL	8/2016
Mr B H Slatter, G4DF	16/10/2016
Mr L R Bower, G4HKY	28/10/2016
Mr G L Kitson, G4ZAD	20/10/2016
Mr D L Barnes, G6IVE	10/10/2016
Mr J A Larkins, G8WKT	8/2016
Mr D P Hamilton, G8XJK	10/11/2016
Mr G Skea, MW0GUK	11/2016
Mr R Monk, M3MON	30/10/2016
Mr K H Hagemans, PA0JOH	11/2016
Mr D H Clements, RS14170	16/08/2016

#### 8 JULY – STOCKPORT RADIO SOCIETY RALLY

#### 14-16 JULY – HAM RADIO SHOW, FRIEDRICHSHAFEN

#### 23 JULY – FINNINGLEY AMATEUR RADIO SOCIETY RALLY

#### 13 AUGUST – FLIGHT REFUELLING ARS HAMFEST

#### 20 AUGUST – RUGBY ATS ANNUAL RADIO RALLY

#### 29-30 SEPTEMBER – NATIONAL HAMFEST

#### 13-16 OCTOBER – RSGB CONVENTION

#### 5 NOVEMBER – WEST LONDON RADIO & ELECTRONICS SHOW





## EXCELLENT CLUB LECTURE

**Chris Leviston, MOKPW (Furness ARS)**

After reading in *RadCom* about a new 'VHF and Higher' propagation video that the RSGB Propagation Studies Committee had produced, Furness ARS were keen to watch the video. In late October a copy was obtained via email and arrangements were made to follow up the video with a Skype call with one of the Propagation team. John, G4BAO, offered 20 minutes of his time for a Q and A session after the video had been watched. The 19 minute video was very informative and covered a whole host of VHF and above modes of propagation including Sporadic-E, meteor scatter, aurora, tropo and more. The Skype call with John went very well, with a great deal of questions answered. 20 minutes soon turned into over 40 minutes – many thanks for your time, John!

Although VHF and above is generally 'line of sight' in according to the Foundation syllabus, this video proves that's it's very different (as we all mostly know)... however it was pointed out to one Foundation candidate to ignore all this and choose 'line of sight' if the question crops up in his exam this month!

*Thank you for the kind feedback about the VHF propagation video presentation. So far it has been requested by more than 30 clubs. We always try to offer a Skype-based Q&A after it is shown if it's possible. Don't forget that we also have a similar video presentation for clubs and Skype Q&A on HF propagation too. More than 90 clubs have used it. Just email Steve Nichols, GOKYA via psc.chairman@rsgb.org.uk to request a copy.*

**Steve Nichols, GOKYA**

*Propagation Studies Committee chair*

## JUST WHAT IS IT?

**Steve White, G3ZVW**

I wonder if you would ask readers if they know what this is? I took the picture just the other week. The array consists of what appear to be seven circular stacked radomes. They are mounted on a short, stubby tower at the back edge of the beach at Kuta, Bali (Indonesia). There was a small, anonymous



building at the bottom of the tower. Sorry, there's no prize for guessing what it is, but it grabbed my attention because I've never seen anything like it before.

## MORSE KEYS

**Ray J Howes, G4OWY**

Never mind all those cheap Morse keys on eBay at £3.99 (November 2016 issue). I have a far better idea: a DIY Morse key. I made mine for less than 50p. Okay, it might not be able to knock out CW at the speed of light, but it is able to send at a speed that the vast majority of people can decipher – up to 20wpm. And what's more, it has an inbuilt automatic method of ensuring that CW is never sent faster than 20wpm: above that, it falls to pieces!

So, there is absolutely zero chance of ever inadvertently putting on the airwaves CW sent so fast that no human (unless of course, it will be transformed miraculously from a state of gibberish to a state of mildly interesting intelligence via a computer) could hope to understand it. Suffice to say, I commend the inexpensive DIY Morse key to anyone who (A), wants to save some cash and (B), more importantly, wishes to rid the amateur bands of CW sent by humans who presumably want to impress their fellow operators, or computers that send CW to other computers.

## EMC AND STREET LIGHTING

**John Neary, GONAJ**

I was very interested in the article on EMC and Street Lighting in the October *RadCom* as I have had a related problem for a number of years. Problems began after the re-building of a road junction 50 metres from my home that involved the installation of four large (and ludicrously bright!) sodium lamps to illuminate the junction.

After the work was complete I experienced interference on the 4m band, particularly 70.450MHz, the FM calling channel, which was repeated on 70.400, 70.500, and at 500kHz intervals up and down the spectrum, the lowest frequency interference at the top end of the 6m metre band, and upwards well into the FM broadcast band.

By observation I narrowed the problem down to one of the new lamps, which seemed to be the source whenever it was lit. The new lamps do not appear to have any antenna system, but just the normal photocell on top of the lamp that, presumably, controlled on off switching.

Reporting the problem to the local authority proved fruitless, despite two letters and an email, it did not even produce an acknowledgement.

Reporting the problem to Ofcom did produce a visit from one of their engineers. Unfortunately he visited during the day when

the lamp was off! So no demonstration of the problem was possible. He did, however, note my findings and went away 'to investigate further'. That was about 7 years ago and, to date, nothing has happened and the problem remains.

It's not too bad in the summer when the lamps switch on late in the evening, but as we approach winter, the 4m band becomes, not unusable, but difficult. Although local, strong signals come through the interference, weak signals don't. Enquiries with neighbours have not highlighted any of them having problems, as those who are broadcast radio listeners tend to use DAB, which is unaffected.

The interference is spread over approximately 100 metres in all directions from the junction, and being the only licensed amateur within that area it doesn't affect anybody else. It's annoying more than any great inconvenience, and even more annoying that nobody but me seems concerned.

## LEARNING NEW SKILLS

**Andy Ince, GM0BZS**

I only become active in amateur radio again in 2014 after a very long break. With more disposable income I decided to purchase a KX3 kit that I hoped to combine with my interest in hiking and back country skiing. This soon mutated to needing the 100W amplifier kit upgrade along with purchase of much needed quality feeder connectors, power supply etc. My half-built HF SSB transceiver project stalled and had been put on hold in 1988, which had stopped me from getting active but is something I will eventually get working!

I was very surprised how nervous I felt making contacts after such a long break from the hobby and spent much time listening to other amateurs and trying to learn procedure before making the jump. It took quite some time before I started to relax when answering calls but found the occasional competition gave me the opportunity to practice without having to commit to a long QSO. The thrill of hearing stations across the seas and oceans had returned and, unlike when a young SWL, I now had the opportunity to contact the stations. This would, of course, be by phone as my CW had long fallen by the wayside after gaining my Full licence in 1985. I have enjoyed numerous contacts in the last couple of years, mostly over quite modest distances but enjoyable all the same. My old copy of *Radio Amateurs Operating Manual* had aids for working stations in Italian, Spanish, German and French so I decided I should make an effort and learn a few words to exchange with my contacts in their own language. I find this has added enjoyment to the contacts and seems to be appreciated.

# Tell Santa what You Want to Find Under the Tree.

Use your new radio Christmas Day!

Get the programming kit for that radio to make setup fast and sooooo... easy!

297

293 unique radio Programmers...

Check for your radio model at: [www.rtsystems.com](http://www.rtsystems.com)

Available from RT Systems or Your Local Radio Dealer

Find dealers at: [www.rtsystems.us/dealerlist](http://www.rtsystems.us/dealerlist)

Order early to ensure delivery ! Gift wrap available on request

**rt SYSTEMS**  
RADIO PROGRAMMING MADE EASY

800-476-0719 | [www.rtsystems.com](http://www.rtsystems.com)

Personal Assistance: Mon.-Fri., 8:00-5:00

Sat. 9:00-1:00 Mountain Time

It's the perfect stocking stuffer!

Your radio does more than just memories. So does this software.

**SDR-Kits**

In Use by discerning Radio Amateurs - Universities and Professionals Worldwide!

**Vector Network Analyzer DG8SAQ VNWA 3E / 3**

Covers 1 kHz - 1.3 GHz with a dynamic range of 90dB to 500 MHz and >50dB to 1.3 GHz

After-Sales Customer & Technical Support

- S-parameter, S11, S12, S21, S22, VSWR, Smith Chart & Component values
- Time Domain - Distance to Fault Measurements - Network Matching tool
- Easy Installation - Windows 10, 8, 7, Vista (64 and 32 bit), XP supported
- Free Software & Helpfile: <http://sdr-kits.net/DG8SAQ/VNWA-installer.exe>

**VNWA 3 supplied with**  
3pc Male Amphenol Connex Calibration Kit  
RG223 Coax Cable + USB Lead **£422.40 + p&p**

**New! GPS Disciplined Reference Oscillator**

**SDR-Kits**  
Precision GPSDO Reference  
450 Hz - 800MHz  
Mfg by LeoBodnar (Electronics) Ltd

**Precision Frequency Clock for the VNWA3E and many other Shack Applications**

- Programmable Freq 450Hz-800MHz
- Stability 1 ppb 1E-9
- <60 sec Locktime
- Light & Portable

**Only £150 + p&p**

**New! SDRPlay RSP2**

Wideband SDR Rx with new Features

**£156 + p&p**

- 1 kHz-2000 MHz Coverage with SDRUno Software
- 3 switchable Antenna inputs incl Hi-Z & Bias-T
- 10 High Performance Band Pass Filters
- Switchable MF and VHF Broadcast Reject filters
- 12 Bit ADC plus all the functions of the RSP 1

**RSP1 in stock - excellent value and performance at only £118.80 + p&p**

**www.SDR-Kits.net**

Webshop Orders only - Paypal or Pro-Forma Invoice  
e-mail: [info@sdr-kits.net](mailto:info@sdr-kits.net) Prices shown incl VAT - p&p extra

SDR-Kits 129 Devises Road, Trowbridge, Wilts, BA14-7SZ UK VAT reg GB979776427

**VNWA 3E/3 - Synthesizer & VFO kits - Silicon Labs Si570 to 1.4 GHz - RF Transistors**

**www.upshot-uk.com**

**VERSATOWER Cables & Spares**

Upated Cable Sets for P60 and P80  
Cables made to your specification  
See new website for details

**VERSATOWERS ALWAYS WANTED**

**New & Used Mobile towers available from Stock**  
15m to 31.5m New or refurbished Upshot have the mast in stock for you...

Please contact James Pickance for further details on  
01590 670845 or email  
[james.pickance@upshot-uk.com](mailto:james.pickance@upshot-uk.com)

260 Bentley Way, Ampress Park, Lymington, Hampshire, SO41 8JW.

**www.mixw.co.uk**

**RigExpert & MixW**

RigExpert IT-24  
RigExpert WTI-1  
RigExpert AA-1400  
RigExpert AA-1000  
RigExpert AA-600  
RigExpert AA-230zoom  
RigExpert AA-170  
RigExpert AA-54  
RigExpert AA-30  
RigExpert TI-7  
RigExpert TI-8  
RigExpert Tiny

**for commercial radio**

ISM tester IT-24 2.4 GHz  
Antenna analyzer till 1400 MHz  
Antennas  
Cavity duplexer

**mixw@mixw.co.uk**  
Tel: 0208 591 2527  
KMK UK Limited  
OFFICIAL DISTRIBUTOR UK & EUROPE



I recently took part in the Cervantes 400 event organised by the Spanish national society URE and was surprised how much I enjoyed taking part. I originally worked the special event stations with little intention of gaining the awards on offer but soon realised that I could get the Silver Diploma without too much difficulty. I found myself drawn in to the event by the prospect of trying a little harder and getting a Gold Diploma. I found the stations were operated very professionally with good procedure under challenging circumstances. With many stations chasing the awards it was quite a learning curve for me on how to get my call noticed but throughout the event I maintained my pledge to follow the DX code of conduct. I was eventually rewarded with sufficient contacts to gain the Gold Award and then wondered if the Platinum was within my reach. I realised that this was not likely unless I could make some contacts with CW or data modes. The KX3 does provide the ability to decode and send CW, PSK31 and RTTY. It's probably not the best scenario to try a CW QSO 31 years after my last and as for trying out RTTY and PSK31 for the first time it may not have been the best learning environment to attempt contacts for an award. Still nothing ventured, nothing gained and I found to my great surprise that working all three modes was possible with a little planning and my confidence increased with each successful contact. It was a real thrill to make the final needed contact for the Platinum award.

With a shiny new iambic key waiting to be mastered and a clutch of new books from the RSGB bookshop I've rediscovered the fun and excitement of a hobby I first started 46 years ago with the building of a crystal set. I can trace my present career as a Network Specialist to that first interest sparked by the magic of radio and I'm impressed by the efforts now being made by the RSGB and dedicated individuals and clubs in encouraging youngsters in to the hobby. We need to inspire the next generation take careers in the STEM subjects and what better way than using amateur radio as a catalyst and practical example that they can experience first hand the practical application of those subjects while having fun.

*I am delighted you have got so much so soon from returning to the hobby. There is so much on offer and you have clearly grabbed that with both hands. As you may know, there is a lot of interest nationally in improving both the take-up and the enjoyment of STEM subjects; those two aspects are often intertwined of course. RSGB is driving this through its involvement with Principia and with the Training and Education Committee's Schools Link project, led by Derek Hughes, G7LFC. This aims to support and encourage school teachers by offering wireless-related*

*support materials and generally raising the awareness of teachers to the breadth of STEM-related material which radio offers. Schools Link is keen to hear from teachers and teacher trainers. If they can see what you have seen in radio, then they will be well on the way to inspiring the new generation of school children with the joys of the radio waves.*

**Philip Willis, MOPHI**

**RSGB Training & Education Committee Chair**

## THE END OF AMATEUR RADIO AS WE KNOW IT?

**Paul Burgess, G3VPT**

Last year a near neighbour had a solar panel installation installed on his bungalow roof that has resulted in high levels of interference over the entire short wave spectrum. It takes the form of S9 warbling carriers every 200kHz from around 2MHz to over 30MHz with lower levels every 100, 50 and 25kHz. This has prevented the use of 5398.5kHz during daylight hours. My normal background noise is around S4.

I submitted an online complaint to MCS of which the installer is a member, they "could not help" as it wasn't my installation but did pass it on to CERTSURE who told me the installation conforms to relevant requirements.

At this point I called in Ofcom. I could see it was going to be an uphill struggle when I asked the engineer what powers they had and was told "I wish you hadn't asked me that".

I also learnt from Ofcom that the manufacturers were aware of the problems and the equipment and installation was 'self certified'. The installer will not visit my home to see the problem. The Department of Trade and Industry have told me "hobby radio reception can be challenging and can be influenced by atmospheric conditions and can vary even from day to night".

## AMATEUR RADIO PLAQUE

**Francis Bell, G7CND**

I too came across the memorial plaque dedicated to Gerald Marcuse, G2NM President of the RSGB 1929-1930 and founder of the RAOTA while I was visiting Bosham recently. I photographed the plaque that was attached to a chair just outside the local church the chair's location enjoyed a view of the local harbour which is a popular



boating venue. If you don't know the location of Bosham it is a small village located in the general area of Chichester Harbour.

## RSGB MODEL T FORD

**Chris Rolfe, M3OZP**

I thought you might be interested in my latest acquisition. It's a Lledo Model T Ford Van to promote the RSGB. Apparently only 1000 were made. Mine is number 587. It appears to have been made in 1991 to celebrate 78 years of the RSGB. It's in pristine condition with box and certification of authenticity. I obtained it last week on eBay for £9.99.



## DISCONE ANTENNA

**Stephen Small, G4HJE**

I read with interest the Antennas section the December *RadCom* where MORHE was asking for information about a novel folding discone antenna which he suspected was of military origin.

Spot on, Bob. The discone was part of a naval UHF man portable pack known as 634. This was a six channel set operating in the range of 240-300MHz and designed for operators in the field to communicate with aircraft. When carried as a backpack the set used a whip antenna made from the same 'tape measure' flexible steel as the discone photographed for the article. The whips were very prone to snapping off at the base connector. The discone was designed to be used on a short folding mast of about 8 feet. It was claimed that the sets' range with discone had been set at 160 miles with an aircraft at 30,000 feet. The army also used the set (Army) Type SR A43R Mk II.

Information about Royal Navy radio kit can be researched by a Google search for BR 333, which can be downloaded as a PDF. The kit covered is that used between 1950s and 1980s.

## COUNTERFEIT ELECTRONIC COMPONENTS

**Bob Houlston, G4PVB**

I concur with Dr David Kirkby, G8WRB in *RadCom* November 2016. I have written to eBay about counterfeit goods previously and the best they could offer is that I return for a refund. But, as G8WRB implies, that's not much use when the item is installed and then found to be inadequate. With regard to entertainment agencies and the Musicians'

Letters published in 'The Last Word' do not necessarily reflect RSGB policy. 'Last Word' letters should be e-mailed to [radcom@rsgb.org.uk](mailto:radcom@rsgb.org.uk). Please note that letters submitted for 'The Last Word' may not be acknowledged. The RSGB reserves the right not to publish any letter, with no reason being given. It is a condition of publication that all letters may be edited for grammar, length and / or clarity. Due to the limited space available, please keep letters as short as possible.

Union, they have a 'fair' list. Agents of good repute go on the 'fair' list that we may all refer to. Maybe as consumers of components we could implement similar, possibly as a web page, because Feedback ratings on eBay seemingly don't amount to much.

#### Wilko Bulte, PA1WBU

In response to David, G8WRB's comment on counterfeit electronic components and specifically the AD548 based voltage references from the Far East I can report that I have acquired exactly such a module off eBay. It proved to be equipped with an AD548KH, with, and here it gets interesting, a data stamp of 0619. In other words: 2006, week 19. I think we can safely conclude that at least my module was built using a desoldered AD548. Which I don't mind, as it definitely should have most of its aging / drift behind it now. All in all the counterfeit assumption is not *per se* valid!

#### OFCOM

##### Geoff Wiggins, G4XMJ

I note with interest and dismay the letter from GW3TMP and his Ofcom experience. I won't go into my saga. Mine is very similar although for a different type of interference but the end result was the same. I was told the interference I was suffering wasn't harmful (what does that mean?) and that I could move frequency as I was frequency agile. Well that's not the point. I could change frequency but it would take me out of the part of the band I needed to be in (RTTY). I was also told we weren't primary users, wrong... 18MHz is a primary user band.

The Ofcom man whom I won't name here was extremely rude and very short with me and put the phone down on me in mid conversation! It is very clear to me Ofcom have absolutely no interest in assisting us in any way. Perhaps the RSGB need to have a talk to Ofcom and find out exactly what their position is on these matters.

*The RSGB has been talking to Ofcom and you will see that they have written an article in this edition of RadCom, mostly focussed on VDSL, but the discussions have been wider than that. The EMC Committee will be responding to the Ofcom article in the next edition of RadCom.*

**Steve Thomas, M1ACB**  
RSGB General Manager

#### TALKING TO THE PUBLIC

##### Philip Cross, G7MWH

Before I became licenced 25 years ago I used to wander around different shows and often came upon amateur radio club special event stations and, as much as I was interested, they never 'caught' me. Since being licenced, I still attend rallies and special event stations where we put on 'displays' – I have even taken part in some myself.

Some catch the enthusiasm of the public better than others. If we are not careful we don't demonstrate our hobby, we indulge ourselves – radio and associated equipment on a bench out of reach, no explanations, some scruffy bloke with his back to you talking to someone who isn't there, other members of the party talking among themselves. Well I was taught not to interrupt someone when they were talking, and the fact they have their backs to you means they are not interested.

We need a rethink about how we present ourselves and demonstrate what we are about, set up the equipment, have the radios scanning the repeaters, listening in on a net, put up some cards (readable from a distance) saying what we're doing, have a large monitor showing the earth tracking the satellites / space station, have on show VHF, UHF, HF and digital, with explanations. Then have the team offering tea / coffee while they chat, demonstrate (short demonstrations) of the equipment, more emphasis on chatting than operating. We should be inviting people in not scaring them off.

My wife has a Foundation licence and very rarely goes on air. She operates as well as anyone in fact she puts me to shame using her callsign before and after every over, is highly qualified in other fields and is not unused to speaking in public and standing her ground, but when asked why she does not use the radios she will tell you she feels intimidated by all the jargon and if she asks for an explanation she feels it's an effort for other hams to explain. Even RadCom uses acronyms and abbreviations etc, just expecting we will all understand – we don't. Please stop assuming we've all got some sort of degree in electrical engineering – we don't. On the practical side, great magazine. *I fully agree about the need to make special event stations (etc) more welcoming and*

*informative – there is nothing inviting about just seeing the back of someone's head, isolated from the world via headphones.*

*We are normally quite careful to expand acronyms and abbreviations on their first use in technical articles. Some regular and/or specialist columns employ certain terms and abbreviations (YL, ODX, SWL, QRM, CDXC...) on the basis that they are commonly used and/or easily looked up via standard reference books or the internet.*

**Giles Read, G1MFG**

RadCom Technical Editor

#### 2m REPEATERS

##### Laurie Bradshaw, GOMRL

How I agree with Theresa Cornwell's letter in the December RadCom! The result of turning repeaters over to various new modes and to the internet has, in my case, meant that I no longer use them. I have therefore cancelled my membership of the local repeater group, depriving them of much needed income. Unsurprisingly, that group's membership is now only about half of what it was, although there are now many M3s and M6s who could benefit. The reply to the letter seems to me to miss the point; if people want to use the new modes, that is fine, but the conventional users shouldn't be deprived of the basic function of repeaters.

#### BUYING OVERSEAS

##### Mike Yorke, G6WBX

The November 2015 New Products featured a LP060 Low Pass Filter from Bonito.

I am struggling to find a suitable method of payment to a country outside of the UK and, before I do, has anyone else bought one and did it work well?

I don't suppose that anyone in the UK is supplying these units?

#### SOLDERING

##### David Noakes, G6IYD

I would be interested to hear of others experiences of using lead-free solder.

As 'old' tin-lead solder is no longer used for electronic/electrical equipment under EU law, it is not supposed to be available from UK sellers. I have used both, and prefer tin-lead rosin (or resin?) core solder, largely due to the lower melting point, and less chance of damage to sensitive components. It is my understanding that there is no problem with using tin-lead for homebrew construction, but if you are making up something for others, or for sale, you are breaking the law. There is some controversy over using lead-free cored solder which may give off more harmful flux airborne products due to the higher temperatures required to reach melting point.

A useful article on the subject may be found at [radio-electronics.com](http://radio-electronics.com) 'Using lead-free solder'.



# ELECRAFT KX2



"The KX2 is a fun radio and a great performer"

## Reviewed this issue by Peter Hart G3SJX

The KX2 "stealth" transceiver can go wherever your imagination takes you. It's only 5.8 x 2.8 x 1.5" and weighs just 13 ounces, yet it puts out up to 10 watts, covers 9 bands, and shares many features with the KX3. It also works with the KXPA100 amp.

To maximize your freedom to roam, you can outfit your KX2 with an internal 2.6 amp-hour Li-ion battery. Current drain is as little as 135 mA, yielding up to 8 hours of typical operation on a single battery charge. There's also an internal automatic antenna tuner module (KXAT2), which can tune a random wire, dipole, or whip on multiple bands.

A rear tilt-foot angles the KX2 for use on any surface, from desktop to park bench to rock. The KX2 also makes a great mobile rig, and can even be used hand-held. It includes a built-in mic and speaker for HT-style operation, and will also work with any headset/mic having two 3.5 mm plugs.

The KX2's powerful 32-bit DSP offers dual watch, stereo audio, user-programmable filter bandwidths, noise blanking, noise reduction, and auto-notch. RTTY and PSK data modes are built in—no PC needed—as well as a memory keyer and digital voice recorder for transmit.



*Finally...a full-featured, 10-W, 9-band radio the size of an HT! (Whip antenna not included)*

"The monochrome display has excellent visibility in bright sunlight" - Peter Hart

See Page 1 for full contact details

**Call Us On:**  
**01702204965**

**Email:**

**Sole UK Official Dealer** [sales@wsplc.com](mailto:sales@wsplc.com)

## Quick Specs

- 5.8" x 2.8" x 1.5"
- Ultralight grab-and-go station
- 80-10 meters (9 bands)
- SSB / CW / Data / AM
- Up to 10 W TX
- Li-ion battery option
- Amp-hour meter
- Built-in mic and 0.5-W speaker
- Wide-range Internal ATU
- Perfect for SOTA and field ops

## KX2 Accessories

### KX2 Padded Carry Case



**CS40 - £38.95**

**CS60 - £54.95**



There are two padded carrying case options for the KX2



### KXBT2 Internal Battery Pack

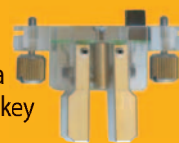
Make your KX2 truly portable giving you up to 8 hours of operating time. - **£69.95**

### KXBC2 External Fast Charger

Fully charge the depleted battery pack in 2 hours or 1 hour for normal charging. Charges outside the KX2. - **£29.95**

### KXPD2 Keyer

CW keyer paddle offering a lighter and more compact key over the KXPD3 - **£134.95**



### KXAT2 Internal Auto ATU



Internal automatic antenna tuner converts a wide range of impedances presented by antennas. - **£219.95**

### KXIO2 Real Time Clock



- **£84.95**

Real time clock and two programmable outputs for controlling external equipment

**For more accessories please see page 2**

**WATERS & STANTON**

EUROPE'S HAM STORE



# HEIL - THE UK'S OFFICIAL DISTRIBUTOR



## GM-ELITE Hand Microphone

GM-Elite contains two distinctly different high performance dynamic elements, available at the flip of a switch.

**£174.95**

## PRO-SET-6

### Headphones w/Boom Mic

Combined boom microphone and headset with HC-6 element which has a wide frequency range.

**£169.95**



## PRO-BK

It All Starts With The Microphone, a book written by Bob Heil creator of Heil microphones.

**£4.95**

## FS-3

### Foot Switch

Single channel foot switch to control the transmit/receive function of an amateur radio transceiver.

**£35.95**

## HM-12

Designed specifically for ham radio use its high output range works with low impedance radios

**£79.95**

## HTH I/K/Y

### Headphone w/PTT and Mic

Single sided, lightweight headset, which is hands free and provides high quality discreet two way communications.

**£38.95**



## HB-1

### Articulated Boom

An articulated arm capable of supporting up to 2.5lbs and with a reach of 40" giving you improved movement around the shack.

**£74.95**

## PR-40

Studio and Broadcast microphone offers amazing sounds quality for ham radio thanks to it's large diaphragm dynamic cardioid.

**£349.95**

## PRO-7

### Professional Boom Mic Headset

Bringing new technology the Pro-7 provides extreme comfort and amazing sound.

**£259.95**

Icom Model including lead

**£279.95**

## SM-1

### Shock Mount

8-point flexible suspension support system that helps suppress low-frequency rumble on the microphone line by absorbing and damping vibrations picked up from the studio desk or console.

**£69.95**

## PRO-SET-ELITE-6

### Headphones w/Boom Mic

Large dual headphones boom mic with HC-6 element and Heil Phase Reversal System.

**£199.95**

## HMM

### Clam Shell Mic

Microphone element within a clamshell design giving superior sound.

**£94.95**

**All HEIL parts and accessories** are available through us. **Call us for details**

## CABLES

### Required for most products

To find which cable/adaptor you will need please give us a call on

**01702 206835**

# MFJ'S ONLY OFFICIAL IMPORTER IN THE UK

## MFJ-1835

This five-band (20, 17, 15, 12, 10 Meters) half-wave open-loop is perfect for restricted space or portable operation.

**£209.95**

## MFJ-949E

Full 1.8-30MHz operation 300W antenna tuner with peak cross meter.

**£199.95**



## MFJ-434

Deluxe Voice Keyer.

**£219.95**

## MFJ-974HB

Fully balanced true balanced line antenna tuner

**£249.95**



## MFJ-266

HF/VHF/UHF antenna analyser with all RF-diagnostic functions you need.

**£389.95**

## MFJ-1786X

MFJ's tiny 36 inch diameter loop antenna lets you operate 10 through 30MHz continuously -- including the WARC bands! Ideal for limited space.

**£519.95**

## MFJ-1886X

0.5MHz to 30MHz receiving loop for massive reduction in receiving noise and those with limited space.

**£269.95**



## MFJ-259C

HF/VHF/220 MHz, .53-230 MHz, SWR Analyser.

**£299.95**

## MFJ-993B

300 / 150W Dual power ATU 1.8 - 30MHz.

**£309.95**

## MFJ-991B

HF 300/150W Dual Power ATU.

**£279.95**

## YRC-1X

Yaesu Rotator Controller with USB port for remote control, Graphic LCD screen, user-programmable callsign, 9/16" antenna direction display and more

**£369.95**



## MFJ-16010

200W variable random wire antenna tuner capable of matching almost any length wire from 160m-10m

**£79.95**

## MFJ-260C

Compact 300W dummy load handles 300W for 30 seconds or 25W continuous

**S0-239: £49.95**

**N-Type: £59.95**

## AL-811XCE

Linear Amplifier 10 - 160m 600W 3 x 811A.

**£999.95**

## MFJ-969

HF+6m 300W antenna tuner with roller, antenna switch and XMTR.

**£249.95**

## MFJ-998

ATU with full 1500 watts SSB/CW Digital & Analog SWR/WattMeter. 1.8-30MHz.

**£729.95**



## MFJ-704

Designed for HF operation with virtually no loss between 1.8-30MHz.

**£79.95**



## MFJ-226

VNA Antenna Analyzer covers 1 to 230 MHz, 1Hz resolution.

**£359.95 £339.95**

## MFJ-971

Compact 200-Watt portable tuner MFJ QRP transceivers.

**£139.95**



## MFJ-461

Pocket size morse code reader no cables or extras needed.

**£99.95**

## MFJ-926B

Remote 200W ATU can cover the entire HF band.

**£319.95**

## MFJ-994BRT

Heavy Duty remote 600W ATU 1.8-30MHz.

**£459.95**



## MFJ-269C

HF/VHF/UHF SWR Analyser

**£359.95**

**BUY NOW  
PAY LATER  
FINANCE AVAILABLE!  
CONTACT US FOR  
MORE DETAILS**

# www.hamradiostore.co.uk

Pay us a visit and check out our amazing demo facility  
Sign up to our Weekly Deals at hamradiostore.co.uk for exclusive deals and latest news



## Yaesu FTdx1200 HF/6m Base

- TX Frequency Coverage: 160 to 6 meters
- RX Frequency Coverage: 30 kHz to 56 MHz
- Spectrum Scope
- IF Width & IF Shift
- Roofing Filters (3/6/15 kHz)
- 5 to 100 watts (2 to 25 watts AM)
- 32 Bit High Speed IF DSP
- Automatic Tuner
- 4.3 in TFT full colour display
- Contour, DNR, IF Notch and APF



The Yaesu FTdx1200 provides sophisticated operation on 160 to 6 meters with up to 100 Watts on SSB, CW, and FM (25 Watts AM carrier)

**See website or contact our sales staff for our latest deal.**

# Two of the best selling HF Base Stations at two of the very best selling prices.

## Yaesu FTdx3000 HF/6m Base

- TX Frequency Coverage: 160 - 6 meters
- RX Frequency Coverage: 30kHz - 56MHz
- Operating Modes: USB, LSB, CW, AM, FM
- Digital Noise Reduction
- Large 4.3 inch (dia.) colour TFT display
- Power Output: 5 to 100 watts HF - 6m
- IF DSP
- Built-in Electronic Keyer
- Built In Antenna Tuner
- High Speed Spectrum Scope



The Yaesu FTDX3000 transceiver provides ultimate weak signal receiver performance in crowded, strong signal environments.

**See website or contact our sales staff for our latest deal.**

**Finance available at 19.9% apr or we are now able to offer a 12 month 'Buy Now Pay Later' deal to help spread the cost!**