



# RadCom

Radio Society of Great Britain  
Advancing amateur radio since 1913

## *SEASON'S GREETINGS* from the RSGB







**ML&S - THE UK'S NO.1 YAESU DISTRIBUTOR**

**ML&S - The World Famous Ham Radio Store**

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

**SAFE ONLINE SHOPPING**

Shopping online with ML&S is safe and secure. E&OE



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

**COMING SOON! YAESU FTdx101D SDR HF/50MHz. DEPOSIT ONLY £100 - FINAL PRICE AND AVAILABILITY TBA**

YAESU is excited to introduce a new High-Class HF/50MHz 100W Transceiver. The new FTdx101D utilises the latest SDR Technology and classified as our High-End HF line, the FTDX series, which amateurs have come to know represents quality.

The new Yaesu FTdx101D (100W) and FTdx101MP (200W) first shipment due early 2019.

**SEE OUR WEB SITE FOR ITS REMARKABLE FEATURES.**



### YAESU FT-818!

**6W 160m-70cm Handie.**

MkII version of the ever popular FT-817, 6W, Larger Battery, TCXO as standard, 5MHz.

**ML&S: £599.95**  
**In Stock!**

- Increased power output 6W (SSB, CW, FM), 2.0W (AM Carrier) \*NEW!
- Improved frequency stability  $\pm 0.5$  ppm: Built-in TCXO-9 \*NEW!
- Larger battery capacity: 9.6V/1,900mAh (SBR-32) \*NEW!
- 5MHz band (WRC-15 + UK frequency) Operation available \*NEW!
- 208 Memory Channels / 10 Memory Groups
- Operates on 160-10m, HF, 6m, 2m and 70cm Bands

- Ultra Compact and Portable
- Two Antenna Connectors
- IF Shift, IF Noise Blanker, IPO, ATT
- CW "Semi-Break-in", CW Reverse, CW Pitch Control
- Built-in Electronic Keyer
- Multi-Colour Easy to see LCD
- Internal Battery Operation Capability
- ARS Automatic Repeater Shift
- APO Automatic Power Off
- Front Panel Key Lock Mode



**FOR MORE INFORMATION CLICK [WWW.HAMRADIO.CO.UK/FT818](http://WWW.HAMRADIO.CO.UK/FT818)**

### NEW YAESU FTM-7250DE

**NEW PRODUCT**

**2/70 50W C4FM Mobile**

**ML&S: £229.95**



**FOR MORE INFORMATION CLICK [WWW.HAMRADIO.CO.UK/FTM7250DE](http://WWW.HAMRADIO.CO.UK/FTM7250DE)**

### YAESU FT-991A

Compact base station radio with beautiful touch-screen display & 160-70cm coverage. HF/50/144/430MHz. All-Mode "Field Gear" Transceiver

Offering superb performance from Top Band to 70cm, the FT-991a is compact without being too small, easy to use without missing out on features and above all great value for money.

**ML&S NOW ONLY £1189.95**



**FOR MORE INFORMATION CLICK [WWW.HAMRADIO.CO.UK/FT991A](http://WWW.HAMRADIO.CO.UK/FT991A)**



### YAESU FT-70DE

**5W Rugged Designed (meets IP54) Handie**

Covering 108-137MHz Airband AM and 2/70 transceive on FM/C4FM Digital. A massive 700mW of audio ensures extra-loud volume with Clear Voice Technology.

**ML&S: £189.95**

### YAESU FT-65E

**VHF/UHF 2m/70cm Dual Band FM Handheld**

The Yaesu FT-65e dual-band 2 metre/440MHz has three output power levels: 5, 2.5 or 0.5 watts. Receive coverage is 65-108 (FM broadcast band), 136-174 and 400-500MHz. The FT-65e is compact and light, yet ruggedly constructed. The speaker provides a full 1 Watt of powerful, clear audio. **ML&S: £89.95**



### YAESU FT-2DE

**Handheld with Large LCD Display**

Advanced FT-2DE C4FM/FM 144/430MHz Dual Band Digital Handie

**ML&S: £379.95**



**YAESU CASHBACK**  
 Expires 31st Dec.  
**£45**

# YAESU

**The radio**

Cashback offers available July 24th to October 30th 2018.

For full terms & conditions see [www.HamRadio.co.uk/cashback](http://www.HamRadio.co.uk/cashback)

### YAESU FTdx3000D

**HF/6m Base Station**

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

**ML&S: £1449.95**

**FOR MORE INFORMATION CLICK [WWW.HAMRADIO.CO.UK/FTDX3000D](http://WWW.HAMRADIO.CO.UK/FTDX3000D)**



**YAESU CASHBACK**  
 Expires 31st Dec.  
**£90**

### YAESU FT-dx5000MP LTD

**HF/50MHz 200W Transceiver Twin RX**

**ML&S NOW ONLY: £3199.95**

**ADD SM-5000: £3599.95**

**FOR MORE INFORMATION CLICK [WWW.HAMRADIO.CO.UK/FTDX5000MP](http://WWW.HAMRADIO.CO.UK/FTDX5000MP)**



**YAESU CASHBACK**  
 Expires 31st Dec.  
**£270**

### 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 still less than £1000.

**ML&S NOW ONLY: £939.95**

**FOR MORE INFORMATION CLICK [WWW.HAMRADIO.CO.UK/FTD1200](http://WWW.HAMRADIO.CO.UK/FTD1200)**



**YAESU CASHBACK**  
 Expires 31st Dec.  
**£90**

### YAESU FT-891

**HF/6m Base/Mobile**

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!

**ML&S NOW ONLY: £599.95**

**FOR MORE INFORMATION CLICK [WWW.HAMRADIO.CO.UK/FT891](http://WWW.HAMRADIO.CO.UK/FT891)**



### YAESU FT-450D

**The best value HF/6m Base with ATU on the planet**

**£589.95 NOW ONLY: £599.95**

**FOR MORE INFORMATION CLICK [WWW.HAMRADIO.CO.UK/FT450D](http://WWW.HAMRADIO.CO.UK/FT450D)**



### YAESU FT-2980D



**ML&S £149.95**

**FOR MORE INFORMATION CLICK [www.HamRadio.co.uk/ft2980](http://www.HamRadio.co.uk/ft2980)**

### YAESU FTM-3207DE

**C4FM 430MHz 55W Transceiver**



**ML&S £189.95**

**FOR MORE INFORMATION CLICK [www.HamRadio.co.uk/ftm3207](http://www.HamRadio.co.uk/ftm3207)**

### YAESU FTM-3200E

**C4FM 2m Transceiver**



**65Watt 144MHz with AMS 2m Mobile.**

**ML&S £179.95**

**FOR MORE INFORMATION CLICK [www.HamRadio.co.uk/ftm3200](http://www.HamRadio.co.uk/ftm3200)**

**With new digital C4FM (Fusion).**



**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**



**Click [www.HamRadio.co.uk](http://www.HamRadio.co.uk) for our full range of YAESU products**



# KENWOOD

## NEW KENWOOD TS-890S HF/50MHz/70MHz Base Station

**NEW AVAILABLE NOW**

FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/TS890S](http://WWW.HAMRADIO.CO.UK/TS890S)



CALL FOR PRICE OR SEE: [HamRadio.co.uk/ts890](http://HamRadio.co.uk/ts890)  
TRADE IN'S TAKEN!

Full Down Conversion and Roofing Filters Promise the Best Performance of Your DX Life.

FULL operation on HF/6m/4m (yes, it really has 70MHz!)

- ✓ Full Down Conversion RX
- ✓ H-mode Mixer
- ✓ High C/N 1st LO
- ✓ Built-in Roofing Filters
- ✓ 500Hz / 2.7kHz / 6kHz / 15kHz
- ✓ 7 Inch Colour Display
- ✓ Roofing Frequency Sampling Band Scope
- ✓ Auto Scroll Mode
- ✓ Multi Information Screen
- ✓ 100W Heavy Duty Built-in Antenna Tuner

### KENWOOD TH-D74E



Dual Band Handheld with unique APRS, D-Star & HF SSB receive coverage.

APRS communication protocol that provides real-time data communication in both directions by applying the packet communication, corresponding to the APRS. Share of position information and local information using a GPS, such as a message exchange, communication using a variety of functions can be enjoyed in this unit alone.

ML&S:  
£499.95

FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/THD74E](http://WWW.HAMRADIO.CO.UK/THD74E)

### NEW!! ICOM IC-9700 2/70/23 BASE STATION ONLY £1795.95

# ICOM

All mode, tri-band transceiver covering 144MHz, 430MHz as well as 1.2GHz



NEW PRODUCT

- Supports CW/AM/SSB/FM/RTTY and D-STAR Digital Voice and Digital Data modes
- 144MHz and 430MHz band is direct sampling. The 1.2GHz uses down conversions as well.
- Full duplex operation/ Dual Watch (no VHF/VHF or UHF/UHF capability.)
- PA will provide a powerful 100 W (144MHz), 75W (430MHz) and 10W (1200MHz) output
- 4.3" touchscreen colour TFT LCD
- Smooth satellite operation with normal/reverse tracking and 99 satellite channels
- D-STAR provides clear digital audio
- Voice recording/playback function (SD memory card)
- Audio scope • CW full break-in

### NEW ICOM IC-R8600



New 100kHz-3GHz Receiver with SDR technology from IC-7300.

ML&S: £2499.95

FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/ICR8600](http://WWW.HAMRADIO.CO.UK/ICR8600)

### ICOM IC-7851

HF/50MHz Base Station Transceiver IN STOCK NOW



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 CLICK  
[WWW.HAMRADIO.CO.UK/IC7851](http://WWW.HAMRADIO.CO.UK/IC7851)

### TYT MD-UV380



DUAL BAND VHF/UHF DMR HANDHELD  
137-174/400-480MHz DMR Handie 5W.

RRP:  
£139.95  
ML&S:  
£119.95

### ICOM IC-R30 SCANNER



NEW PRODUCT

ML&S ONLY:  
£569.95

100kHz-3.3GHz,  
AM/FM/WFM/SSB/CW.  
Digi-Modes P25/NXDN/  
dPMR & D-Star.

FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/ICR30](http://WWW.HAMRADIO.CO.UK/ICR30)

### ICOM IC-7100

HF/6/4/70 Base & Mobile Transceiver with remote control head unit.



ML&S: £999.95

FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/IC7100](http://WWW.HAMRADIO.CO.UK/IC7100)

### ICOM ID-5100

ML&S: £574.95



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

FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/ID5100](http://WWW.HAMRADIO.CO.UK/ID5100)

**LOOKING FOR  
COMMERCIAL GRADE  
DMR FROM YOUR  
FAVOURITE STORE?**

### TYT MD-9600



New improved model now in stock.

### KENWOOD TS-590SG

160-6m Base with ATU. Upgraded version HF & 6M FULL DSP Base Transceiver



CALL FOR PRICE

FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/TS590SG](http://WWW.HAMRADIO.CO.UK/TS590SG)

### KENWOOD TS-990S

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



CALL FOR PRICE

FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/TS990S](http://WWW.HAMRADIO.CO.UK/TS990S)

### ICOM IC-2730

DUAL BAND MOBILE  
ML&S £289.95



FREE MBF-4

A practical easy to use Dual Band with remote head.

FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/IC2730](http://WWW.HAMRADIO.CO.UK/IC2730)

### ARR AR-DV10

NEW PRODUCT

ALL MODE  
100kHz-1.3GHz  
Digital Receiver



"The most  
Advanced Hand  
Held Receiver  
available today"

RRP £999.95  
ML&S Only £939.95

FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/ARVDV10](http://WWW.HAMRADIO.CO.UK/ARVDV10)

### TyT MD-380

DMR Handie from TyT. Simple to use, bomb-proof performance DMR 70cm Handie. In stock now! MD-380 also available.



### ICOM IC-7610



NEW PRODUCT

The Icom IC-7610 is a complete redesign of the former IC-7600 following on from the huge success of the IC-7300. 100W, Dual band receive and a huge widescreen display.

**IN STOCK TODAY!**

PLEASE SEE OUR WEB SITE for more information with prices

FOR MORE INFORMATION CLICK [WWW.HAMRADIO.CO.UK/IC7610](http://WWW.HAMRADIO.CO.UK/IC7610)

### ICOM ID-4100E

Very first D-Star 2/70 mobile radio with built-in terminal mode/access point.

£299.95 with  
FREE SHIPPING!

The ID-4100 makes using DSTAR more fun and more comfortable thanks to the terminal mode/access point mode for the first time in mobile devices. This feature enables DSTAR via the Internet from any location you do not have access to a DSTAR repeater.

FOR MORE INFORMATION CLICK [WWW.HAMRADIO.CO.UK/ID4100](http://WWW.HAMRADIO.CO.UK/ID4100)



**ML&S No. 1 FOR SDR RADIO Click [www.HamRadio.co.uk](http://www.HamRadio.co.uk) for our full range of SDR products**

**ML&S - The World Famous Ham Radio Store**

**ML&S**

**0345 2300 599**  
**Web: [www.HamRadio.co.uk](http://www.HamRadio.co.uk)**

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



**FOLLOW US ON TWITTER AND FACEBOOK [HamRadioUK](https://www.facebook.com/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

**The next generation of transceivers from FlexRadio are finally here.**



**64/6600 Stock Arriving Weekly!**

Following on from the previous range, the new 64/6600 series offer the latest SDR technology housed in a stylish cabinet with or without the inbuilt colour screen and control functions. The ultimate performance direct sampling SDR technology and the best value for the serious HF/6m operator. Designed for the Ham who wants to operate the radio exclusively as a server from PC, laptop, Maestro, Mac, or iOS clients – whether local or remote.

**COME AND SEE OUR DISPLAY UNIT FOR THE FLEX RANGE OF SDR TRANSCEIVERS**



**FLEX MAESTRO PLUG-AND-PLAY CONTROL CONSOLE FOR THE FLEX-6000 SERIES.**  
Click [www.HamRadio.co.uk/flex](http://www.HamRadio.co.uk/flex)

**Advanced SDR available with or without front panels.**

**FLEX 6400: £1999.00.**  
**FLEX 6400M: £2999.00.**

**FLEX 6600: £3999.**  
**FLEX 6600M: £4999.**



**FREE UK SHIPPING ON THIS PRODUCT**

**UK's EXCLUSIVE DISTRIBUTOR**

[www.HamRadio.co.uk/7000DLE](http://www.HamRadio.co.uk/7000DLE)

**RSPduo**

**INNER SDR**



**£239.95**

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

**ANAN-8000DLE NOW ONLY £3599.95**



station at our

[www.HamRadio.co.uk/8000DLE](http://www.HamRadio.co.uk/8000DLE)

**NEW! HEIL PRAS PARAMETRIC RECEIVE AUDIO SYSTEM**

Totally enhance, modify, shape, and improve the audio output of your receivers or transceivers using three separate equalization controls. Supplied with Powered Speaker using a 24 Watt Class-A Amplifier.

**IN STOCK: £469.95**



**The FDM-DUO is a game-changer - a top-end SDR with dials and knobs!**

**ML&S: £939.95**

Also available in special red edition: £979.95

Receive only version also available: £749.95.

**click!**  
[www.HamRadio.co.uk/fdmduoR](http://www.HamRadio.co.uk/fdmduoR)

**SDRplay RSP-1a**  
Only £89.95



**1kHz-2GHz & 10MHz BW.**

Brand new design, the RSP1a is a major upgrade to the popular RSP1 offering a powerful wideband full featured SDR covering 1kHz to 2GHz & up to 10MHz visible bandwidth. Better still, it's "Built & Designed in Britain"!!

**SDRplay RSP2**  
as RSP1a plus 3 SW inputs.  
Only £154.95



**SDRplay RSPPro**  
as RSP2 but in steel case.  
Only £189.95

**120W HF/50MHz Linear Amplifier & Auto ATU with built-in PSU.**

**NOW AVAILABLE FROM STOCK: £1099.95**





# Contents

December 2018

## News and Reports

Around Your Region – Club events calendar	84
Around Your Region – Events roundup	88
New products	14
News	11
RSGB Matters	6

## Regulars

Advertisers index	93
Antennas, Mike Parkin, G0JMI	16
GHz bands, Dr John Worsnop, G4BAO	32
HF, Martin Atherton, G3ZAY	26
LF, Dave Pick, G3YXM	24
Members' ads	94
Propagation, Gwyn Williams, G4FKH	96
QRP, Steve Hartley, G0FUW	66
Rallies & events	95
Silent Keys	95
Sport radio, Steve White, G3ZVW	48
The Last Word	97
VHF / UHF, Richard Staples, G4HGI	30

## Competition

Resistor polyhedra, Dr Mark R StJ Foreman	44
---	----

## Reviews

Book review	65
-------------	----



## Technical Features

30 minute J-pole, Mark Hales, 2E0ERX	82
Data, Andy Talbot, G4JNT	34
Design Notes, Andy Talbot, G4JNT	54
EMC, Dr David Lauder, G0SNO	70
Multi-mode diode tester, Dave Ellis, G4AJY	40
RF meter for low power, Andy Nehan, G4HUE	76

## Features

Churches & Chapels on the Air	56
FUNcube – 5 years since launch, Graham Shirville, G3VZV	22
GNU Radio Companion Course, John Worsnop, G4BAO	20
Index 2018	72
RSGB Convention	62



Cover image designed 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 January 2019 edition of *RadCom* is expected to arrive with most Members by 21 December 2018 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. See [tinyurl.com/radcompix](http://tinyurl.com/radcompix) for info on taking photos for publication.

The online *RadCom* is at [www.rsgb.org/radcom/](http://www.rsgb.org/radcom/)  
*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/)  
Abbreviations and acronyms we use are listed at <http://tinyurl.com/RC-acronyms>



The RSGB is on Twitter @theRSGB



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



# Recognition: Supporting, encouraging and recognising the work of our volunteers and staff

As part of the RSGB's five-year strategy, we strive to enhance support and recognition of our volunteers, as well as developing ways of working with them more closely. With just 11 full-time and 5 part-time members of staff managing all of the commercial and operational functions of the Society, our 800-plus volunteers, who deliver local and national services, are the backbone of our organisation.

Regional advice and support activities are coordinated locally by District Representatives (DRs) and regionally by Regional Representatives (RRs). To enable our representatives to provide the most accurate and up-to-date information relating to all of the Society's activities, a project is underway to update and improve the availability of information through our website.

**How can we ensure that our volunteers feel part of the organisation?**  
Our volunteers need to know the differences that their efforts make to the success of the RSGB.

We have many opportunities for self-development or to take the lead in one or more of the Society's wider roles. We have over 20 specialist Committees and Groups, each with a specific focus and all need continued injection of new and updated expert input. Several Committees have formal recognition outside of the RSGB and are represented by our volunteers in Government and academic policy groups, both in UK and internationally.

Work is in progress to develop clearer definitions of individual Committee responsibilities and a better way of ensuring interaction and sharing of information between our experts. It is important that the views of all interested Members are properly represented through the appropriate Committees. The volunteer structure within the RSGB is being examined to ensure that it continues to meet the changing needs of our volunteers and Members.

**How can we improve our communication with our volunteers?**

The RSGB is committed to improving the communication with both its Members and volunteers. Technology allows for efficient distribution of information to volunteers. We centrally administer many targeted email circulation lists that keep volunteers up-to-date with news and changes, together with RSGB Affiliated Club News and GB2RS news bulletins. Plus, of course, there's *RadCom*, sent to all Members.

The Volunteer Leadership Team (VLT) was launched in 2018 to provide a vehicle for formal interaction between the Regional Teams, Committees, Honorary Officers and the Board. Mixed working groups during the meetings ensure that input is captured from all the volunteer groups. Focusing upon specific topics at each meeting ensures that the Board is alerted to the needs of volunteers and can more confidently make decisions based upon meaningful input.

**How can we better prepare our volunteers for the roles they undertake and regularly update them?**

To be effective, volunteers must be regularly kept abreast of changes to policy and aware of organisational changes and projects.

Proposed changes are carefully cascaded to relevant groups of volunteers in a planned order to ensure that each receives the necessary information in advance of publication in *RadCom*, GB2RS and on social media. Where time allows, and for larger initiatives, the VLT is briefed ahead of any wider publicity to ensure that our volunteers are able to confidently answer queries from Members and clubs.

Training for the Regional Team has been in place for some years and efforts are being made to ensure that new appointees receive training soon after appointment, together with regular updates for existing DRs and RRs.

**How will our volunteers know that they are fulfilling the organisation's objectives for their role?**

Every volunteer deserves regular feedback on their performance. It is important that volunteers not only secure personal satisfaction from their efforts, but that they are also aware of the benefit of their efforts to the wider organisation. Honest, constructive two-way feedback is encouraged.

Committee Chairs, Honorary Officers and the Regional Team report to their respective Board Liaison Member. Any shared or major issues are identified and tabled at each Board meeting.

Further support and training will be given to Committee Chairs, Honorary Officers and the Regional Team to ensure that volunteers know the value of their individual contributions.



## Summary

- Further development of the Volunteer Leadership Team (VLT) – three meetings are planned for 2019 (March, July and November). A small planning group drawn from the VLT meets regularly to consider suggested meeting topics and priorities. Ideas for future VLT meetings may be sent to John Rogers via email to [MOJAV@rsgb.org.uk](mailto:MOJAV@rsgb.org.uk)
- Initiatives are underway to improve the toolkit available for Regional and District Representatives in supporting clubs and individual Members. These additional resources build on the already popular seasonal club briefings highlighting news and progress.
- The volunteer organisation of the RSGB is being studied by a Board member to establish if any changes are necessary. The objective is to improve and clarify volunteer communications between each other, the Board and HQ. An interim report for discussion and consideration is expected by early 2019.
- An ongoing review to update the terms of reference of all Committees and Honorary Officers is to seek clarity of purpose. This work started in 2017, and will identify and seek to resolve overlaps in responsibility between Committees and fill any gaps.
- We have seen a recent increased number of responses to advertisements for committee and other volunteer vacancies. The recruitment and selection process will continue to be transparent and is based on experience and knowledge. All short-listed applicants will have the benefit of an interview, either face-to-face or via Skype. Current volunteer vacancies are listed on the RSGB website at <https://rsgb.org/main/about-us/volunteering-for-the-rsgb/> or for those Members interested in seeking election to the Board, please send an email to [company.secretary@rsgb.org.uk](mailto:company.secretary@rsgb.org.uk)
- Work to increase feedback to volunteers and provide individual support continues. Whilst a formalised process would be time-consuming, we must ensure that all volunteers are able to discuss any issues in an open and constructive manner and any priority issues addressed (and actioned promptly, where possible).
- We are increasing the links with external Specialist Interest Groups (SIGs) who may not have an obvious or designated route for communication with the RSGB. An additional Honorary Officer has recently been appointed (see page 8) who will co-ordinate the dialogue with all SIGs. Early discussions have been very positive and we look forward to more closely supporting the groups.
- What further should the RSGB be doing for its volunteers? If you have ideas or requests that you would like to share then please email them straight to me via [chairman@rsgb.org.uk](mailto:chairman@rsgb.org.uk)

Ian Shepherd, G4EVK, RSGB Board Chairman  
[chairman@rsgb.org.uk](mailto:chairman@rsgb.org.uk)



## RSGB Convention Construction Competition winners

The RSGB Convention Construction Competition 2018, sponsored by Martin Lynch and Sons, was judged by Bo, OZ2M, Sam, G4DDK and Stewart, G3YSX. Congratulations to all the category winners:

- Innovation – Antony Watts, MOIFA, for a series of tools to help people learn to code and understand radio
- Technical Merit – Andrew Vare, G4XZL, for his approach to measuring noise
- Judges' Merit – Camb-Hams G3PYE team, for building 'Flossie 2' communications vehicle and for using it to serve the community
- Construction and overall winner of the Pat Hawker G3VA trophy – Dean Brice, GOUIL (below, left), from RAIBC, for his SDR transceiver.



## Spectrum Forum minutes available

The annual Spectrum Forum meeting took place in London on 27 October. The Spectrum Forum brings together the RSGB spectrum managers with other stakeholders, including committee chairs, special interest groups and other specialists that share an interest in spectrum management. Minutes can be found at [www.rsgb.org/sfmeeting2018](http://www.rsgb.org/sfmeeting2018)



## Region 9 volunteers wanted

Due to two Region 9 District Representatives standing down after many years of service to the RSGB and their areas. Region 9 Regional Representative Tom O' Reilly, G0NSY is looking for volunteers to take over the positions. Stephen Richardson, M0SLP covered Bedfordshire and Larry Smith, G40XY covered Buckinghamshire. The RSGB would like to thank them for their service to their fellow amateurs. The prime duties in this annual and renewable post will be to liaise with the clubs and individuals in that area. There are opportunities to assist others and develop your own ideas to promote interest in amateur radio with the help of a team within Region 9 (London north of the River Thames and the Home Counties). Anyone wishing to step into these roles should contact the Regional Representative Tom, G0NSY, via [rr9@rsgb.org.uk](mailto:rr9@rsgb.org.uk)

## New Planning Guide

The RSGB's Planning Advisory Committee has released its latest Planning Guide for Members. Now in its ninth edition and edited by PAC Chairman John Mattocks, G4TEQ, this popular guide draws on John's many years as a professional planning inspector and the work of the RSGB Planning Advisory Committee. The guide has been updated to reflect recent changes in the planning system and includes advice on making planning applications, enforcement notices and also appeals for amateur radio aerials and masts. The planning guide can be downloaded in PDF format from [www.rsgb.org/new-planning-guide](http://www.rsgb.org/new-planning-guide)

## Barney, G13KYP, Silent Key

Alexander Davidson Patterson (Barney) OBE FIEE, G13KYP, RSGB Past President

Barney Patterson, G13KYP / EI4BC died on 10 October 2018, peacefully, at home, surrounded by his family. He was the loving husband of Anne, beloved father of Alec, Janet, Hilary and Claire, and devoted grandfather to all his grandchildren.

He was a native of Delgany, Co Wicklow and a long-time Belfast resident. A skilled and patient mentor to many newly-licensed amateurs in the 1960s and 70s, there are tributes from some of those he mentored on the RSGB website. He was RSGB President in 1967 and IRTS President in 1971-1972 – the only person to have been President of both societies.

Barney, G13KYP was installed as the 33rd RSGB President at the AGM held on 17 January 1967, when around 100 people attended the Presidential Installation. During his Presidential year he attended many local club meetings, often making presentations such as when he visited the Manchester Group RAEN when they received the RAEN trophy award. Internationally, he also attended the IARC Convention at Geneva, the Knokke Convention and made a private visit to the ARRL National Convention in Montreal.

Two events stand out during his presidency. The first was the purchase of a property in Doughty Street, London for the Society's headquarters. After much discussion and many reports, the contract was signed on 26 June 1967 and the Society had a new home. The other major event during his term in office concerns *RadCom*. In 1967 the magazine was called the *RSGB Bulletin* and Council – the forerunner to today's RSGB Board – wanted to change the name. Barney, G13KYP steered the various meetings whilst this was discussed. At a meeting on 12 May 1967, the Council agreed to the use of the secondary title *Radio Communication* and eventually agreed that the new title of *Radio Communication* would be used from 1 January 1968. Other events that stand out were the re-titling of the *Handbook* to *The Radio Communication Handbook* and, sadly, the death of John A Rouse, G2AHL who had been General Manager of the RSGB and Editor of the Society's publications until his death in May 1967.

The RSGB sends condolences to Barney's family and many friends.



## QSL Matters

The National Hamfest at Newark is always interesting. It's great to meet many of our users and QSL volunteers. This year the QSL Bureau stand featured many frequently asked questions. In addition, staff are able to answer many questions from radio amateurs. Here are the top five queries received during the show.

Q1. How do I sign up for the bureau?

A1. *No need it's an automatic Membership or affiliated club/group benefit.*

Q2. How do I collect my cards in my Region?

A2. *Every callsign group has its own sub volunteer, it's not Region based.*

Q3. Who is my sub-manager?

A3. *All QSL details can be found on the RSGB website or in the current RSGB Yearbook. Every affiliated club receives a free Yearbook, if you don't have your own.*

Q4. Is there a limit on what I can send or receive, via the bureau?

A4. *Every member has a personal outgoing limit of 15kg each year, for single page, 140 x 90mm standard size QSL cards. (The limit is 20kg for affiliated clubs or groups). There is no limit on incoming cards.*

Q5. Collection envelopes with large value stamps, sent to my sub-manager come back with only a few cards – why?

A5. *In 2012 we introduced the 'send-all-send-any' policy to avoid cards waiting (often up to a year) before being sent out when the stamp value was reached. This has had a dramatic and positive on-going effect, reducing reply times for many users. Our recommendation is to only use 2nd Class stamps on collection envelopes.*

Another popular topic was 'I've sent out thousands of cards and only had a few replies'. Whilst the bureau has no magic answer to that one, we can offer many suggestions from our experiences. Computerised logs and card printing make it exceptionally easy to generate large numbers of cards very quickly. Sadly this takes little account of the availability destination, membership status of the recipient and their ability or desire to receive cards. In past times most amateurs QSLed one way or another. For many reasons this has changed and it's always advisable to check during the QSO if an exchange of cards is appropriate (or by searching QRZ.com before hitting the print button). Many successful UK stations do now operate a responsible QSLing agenda, responding to incoming cards received direct, via the bureau or by email request.



## Region 12 Regional Club of the Year

## YOTA from South Africa

Essex Ham's 23rd field event of the year was a chilly but rewarding one. Four stations were active on multiple bands from the group's popular Galleywood Common location, and the event saw the presentation of the Region 12 Large Club of the Year trophy by RSGB Regional Representative Peter Onion, G0DZB (right).



In the article last month about YOTA South Africa, it should be noted that the article was adapted for *RadCom* from the RSGB blogs and images prepared by Nathan, M1ONPR whilst the team were in South Africa. Peter Barnes, M0SWN and *RadCom* would like to thank Nathan for giving permission for his blog to be used as the basis for the article. The annual index on page 82 has been changed to reflect this.

## National Affiliated Clubs & Societies

To help the RSGB forge closer links with its National Affiliated Clubs and Societies, we have recently appointed Simon Taylor, M1WONWM as Honorary Officer responsible for this task. The RSGB would welcome feedback on the best way it can help and promote its National Affiliated Clubs and Societies. Simon can be contacted via [sig.manager@rsgb.org.uk](mailto:sig.manager@rsgb.org.uk)

## A new Legacy Committee member wanted

The RSGB Legacy Committee considers applications for funding from the sizable Legacy Fund. One of the current members is coming to the end of his terms and will step down if a new member can be recruited. There are only three or four meetings a year, with applications general discussed via email or Skype conference calls.

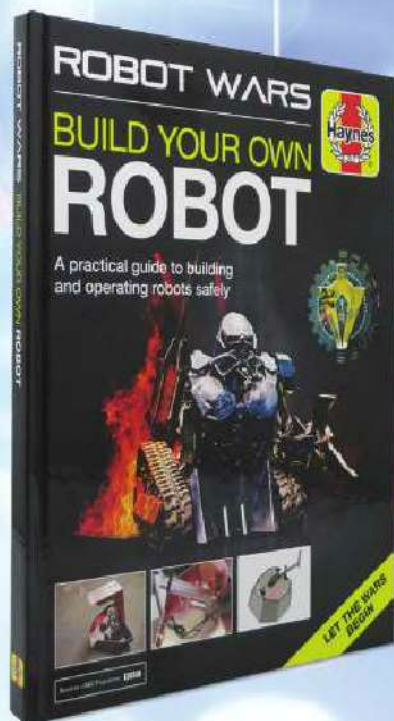
Information about the Committee and the projects it has supported is available via <https://rsgb.org/main/about-us/committees/legacy-committee/>

If you are interested in helping the Society to use the Legacy Fund to help deliver the RSGB's Strategy for 2022, please get in touch with Steve Hartley, G0FUW, via email to [legacy.chairman@rsgb.org.uk](mailto:legacy.chairman@rsgb.org.uk)

## An unfortunate typo

An unfortunate typo crept in the RSGB Matters item on the World Radio Conference Preparations step up in the November *RadCom*. It should, of course, refer to 50MHz not 5MHz the first paragraph. Apologies to the author and Members who may have been puzzled by the error.





## Haynes - Build Your Own Robot Manual

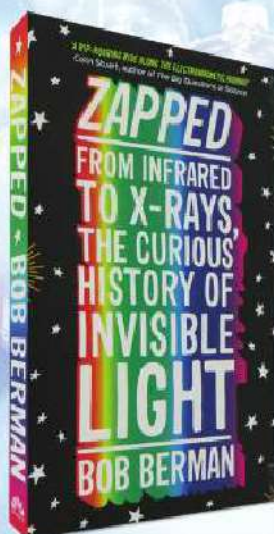
By James Cooper

Whether or not you are a follower of the highly successful TV series *Robot Wars*, this Hardback book is well written and detailed. This Haynes manual is produced in a similar style to the familiar 'how to' guides, but doesn't just include details about building robots.

*Haynes - Build Your Own Robot Manual* provides a behind-the-scenes look at the show – the arena, and both house and competitors' robots. Lavishly illustrated with high quality pictures there are step-by-step illustrated instructions for building three project robots, from a simple 'self-navigating' robot, to a fully controllable *Robot Wars* challenger. Why not indulge yourself whilst reading about construction techniques and of course competitor teams battling each other and the fearsome 'house robots'. Essential reading for all *Robot Wars* fans and anyone interested in something different to construct.

Size 216x279mm, 176 pages  
ISBN: 9781785211867

**Special Offer Only**  
**£13.79 (40% OFF)**



## ZAPPED

*From Infrared to X-rays, the  
Curious History of Invisible Light*

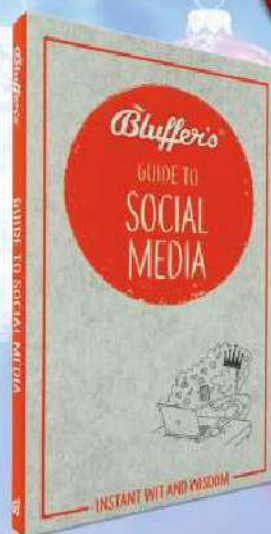
By Bob Berman

The universe is made of light. As you read this you are being swarmed by radio waves; step outside and you'll get a dose of ultraviolet and infrared from the sun. *ZAPPED*, written by Bob Berman, tells the story of all the light we cannot see, tracing infrared, microwaves, ultraviolet, X-rays, gamma rays, radio waves and other forms of radiation. This book provides a view of the historic, world-altering discoveries in the 19th century through to their central role as invisible light in our modern way of life.

*ZAPPED* tells the story of the unseen energies all around us. Bob reveals what microwaves from smartphones do to our brains, how birds use ultraviolet light to track prey, why gamma rays are the most powerful form of light, and much more. *ZAPPED* offers a teasing peek into the future and some of the startling technologies we might yet live to see. With a unique talent for making science relatable and fun, Bob Berman provides a lively, and informative book.

Size 190x198mm, 272 pages  
ISBN: 9781 7860 7373 0

**Non Members' Price: £9.99**  
**RSGB Members £7.49 (25% OFF)**



## Bluffer's Guide to Social Media

By: Susie Boniface

This new edition of the *Bluffer's Guide to Social Media* is as the name suggests an insight into all things social media. This fun guide is packed with interesting information, insights and tips, making it perfect for both pros and those who are new to social media.

Designed so you can instantly acquire all the knowledge you need to pass as an expert in the world of social media. Know what to say, what not to say, what to post, what not to post, and what excuses to make if you don't know the difference between a tweet and a dweet, or even a retweet (which, any tweeples worth their salt will know is always called an RT). Never again confuse a LOL with an ROFL, a selfie with a shelfie, or Godwin's Law with the Streisand Effect. Bask in the admiration of your fellow social media aficionados as you pronounce confidently on the chances of Facebook going the way of Friends Reunited and Bebo, and why MySpace could be the Casio keyboard of the 21st century. Above all don't hold back when it comes to saying what you really think of trolls, pointing out that there has never yet been one who had a healthy mental attitude, a steady job and the requisite intelligence to write anything worth reading.

Written by experts and offering readers the opportunity to pass off appropriated knowledge as their own, the *Bluffer's Guides* provide hard fact masquerading as frivolous observation in one witty, easy read.

Size: 178x110mm, 128 pages  
ISBN: 9781785212291

**Non Members' Price: £6.99**  
**RSGB Members' Price: £4.68 (33% OFF)**

**GREAT  
CHRISTMAS  
GIFTS**



**Radio Society of Great Britain**  
**www.rsgbshop.org**

3 Abbey Court, Priory Business Park, Bedford, MK44 3WH.  
Tel: 01234 832 700 Fax: 01234 831 496

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

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



## RSGB Convention video releases

The RSGB Convention 2018 was a great success with over 600 visitors attending. We video many of the lectures and then release them throughout the year, first to Members via the RSGB website, then, later, publicly on YouTube to help advertise the Convention and to generate wider interest in amateur radio. We have started by releasing four important videos, including two straight to YouTube to get things moving.

- The Convention video of Tim Duffy, K3LR, giving his keynote speech *The K3LR Super Station* is now on YouTube. Tim is amongst the leaders, if not the leader, in the contesting field. He talks about his contest station and, as he puts it, 'keeping ham radio fun and alive'.
- Don Beattie's talk *So what has the IARU ever done for us?* is now live on YouTube too. Don Beattie, G3BJ, President of IARU Region 1 describes what the IARU is doing, the changing challenges of representing amateur radio globally, and what the world would be like without IARU.

On the Members' part of the RSGB website you will find *FT8 Performance Secrets* by Neil Smith, G4DBN and *Microwave Engineering – From Death Rays to Dinner*, by William Eustace, M0WJE. You will find all of our videos at [www.rsgb.org/videos/](http://www.rsgb.org/videos/) – follow the links to RSGB Convention lectures and then 2018 for the latest ones. More to come!

## NRC news

The RSGB's National Radio Centre (NRC) at Bletchley Park (BP) is now open seven days a week, with the experimental Tuesday opening becoming permanent. As always, they need more volunteers to help ensure that they are fully staffed, so if you know someone who might join the team, do please email [Martyn.Baker@rsgb.org.uk](mailto:Martyn.Baker@rsgb.org.uk)

Visitor numbers continue to be strong, especially in the school half term week when it was particularly busy. The NRC recently welcomed two pre-booked groups: a party from the Blind Veterans Association and a contingent of Air Cadets from Gloucestershire, who were specifically interested to come to the National Radio Centre. NRC volunteer Mervyn did a great job engaging them.

Recent visitor Tom Howie is an RSS veteran (see photo) who worked at Arkley View, Barnet (for MI5/6) and was also stationed in Cairo for the RSS. The volunteers were privileged to be able to talk with him, during which he was able to confirm to procedures for handling the VI log sheets, that the volunteers readily tell to NRC visitors, and the importance of the VI contribution to BP. RSGB Members can download a free admission voucher to Bletchley Park from the RSGB website at [www.rsgb.org/bpvoucher](http://www.rsgb.org/bpvoucher)



## John, G3WFM, Silent Key

John Crabbe, G3WFM, passed away in the early hours of 18 October 2018 at the age of 87, after having been unwell for some time.

For many years John volunteered for the RSGB at Potters Bar, working as archivist/historian, RSGB National Amateur Radio Museum curator, and manager of the RSGB shack. A very active amateur in his own right too, right to the end, he had diverse interests ranging from HF DX up to satellites, microwaves and amateur television.

In 2008 John was awarded the prestigious Founders' Trophy for his many years' distinguished service to the RSGB (see *RadCom* June 2008, page 7). His other interests included dancing, jazz music and steam trains; he also had an extensive model railway layout in his loft. Our thoughts are with his family and friends.

## Congratulations

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

70 Years		50 Years	
Derby & District ARS	G2DJ	Swindon & District ARC	G8SRC
Mr R Staniforth	G3EGV	Mr J Wresdell	G3XYF
Mr J D Forward	G3HTA	Mr I Wilson	G3YUZ
Mr I M Waters	G3KKD	Mr J D Garner	G3ZJG
		Mr J F Greenwood	G3ZJY
		Mr J Reed	G3ZMD
60 Years		Mr P W Brown	G4AJE
Mr R W Emery	G3FYX	Mr M Richards	GW4APF
Mr D Blake	G2FT	Mr D G Hobro	G4IDF
Mr C K Richardson	G3NAE	Mr R B Geddes	G8GGI
Dr J E Larson	G3NBL	Mr R B Kerr	GM4FDT
Mr M S Box	G3RZG	Mr D S Jones	GW3XYW
		Mr T H Clark	K4SHY

### The RSGB welcomes to the RSGB family the following new Members who have joined their voice to ours, helping to keep the RSGB strong.

Mr P Norman, 2EOBJP	Mr M Jennings, G8EJN	Mr M Kincaid, M6PLQ	Mr K Campbell, RS308893	Mr D Blanchard, RS319889
Mr E Scott, 2EOEVM	M M Hearne, G8FBA	Mr M Thompson, M6PPU	Mr T Jones, RS313867	Mr A Selwood, RS319893
Mr M Jenkins, 2EOEYB	Mr N Humphreys, G8SEW	Mr I Chilton, M6UYT	Mr M Sprague, RS317020	Mr J Townsend, RS319909
Mr R Johnston, 2EOIJJ	Mr A Ferguson, GM6UJF	Mr P Mircea, M6VSS	Mr I Harbert, RS317286	Mr P Goodier, RS319921
Mr A McDonald, 2EOLDG	Mr H Richards, GW4DWN	Mr M Daniels, M6WLZ	Mr S Gibson, RS319315	Mr R Wood, RS319976
Mrs L Johnston, 2EOLIN	Mr D Buhman, K0DSP	Miss S Burdis, M6WZB	Mr I Gould, RS319410	Mr M Morgan, RS319987
Mr A Eid, A92FF	Mr E Seacord, K2AVP	Mr D King, M6YZR	Mr K Polston, RS319747	Mr P Walmsley, RS320001
Mr P Mialon, F1EMX	Mr R Rischpater, KF6GPE	Ms C Pischke, M7CAR	Mr T Cottingham, RS319774	Mr K B Tang, RS320005
Mr R Alders, G0CCK	Mr S Holmes, M0HYY	Mr D Ward, M7DVP	Mr J Baines, RS319784	Mr G Clarke, RS320014
Mr S B Venner, G0TAN	Dr B Witvliet, M0IJQ	Mr G Sangwell, M7GLS	Mr G Goddard, RS319801	Mrs C Campbell, RS320030
Mr C Abrey, G3RZY	Central England Contest Group, M0IOX	Mr C Sharp, M1M6XCS	Mr R Hewitt, RS319814	Mr M Campbell, RS320031
Mr P Sharpen, G3XXG	Mr A Rawlinson, M0ZJQ	Mr P Green, MW0RJG	Mr S Kent, RS319815	Mr J Daniels, RS320032
Mr R Johnston, G3YEK	Mr T Broom, M6IEH	Mr E Maher, MW6PQU	Mr J Thompson, RS319816	Mr D O'Mahoney, RS320074
Mr D O'Keeffe-Pemberton, G6HZJ	Mr A Browning, M6JYF	Mr K Hasenbank, N0IZE	Invicta Contest Group, RS319824	Mr P Harclerode, RS320123
Mr S Hayter, G6RAQ	Mr S Goodwin, M6KGY	Mr M Brodeur, N2NSL	Mr J Cox, RS319834	Mr L Williams, RS320125
Mr A Pilkington, G6YGC	Ms E Troupe, M6MXT	Mr D Pearl, N2SLO	Mr T Campbell, RS319835	Mr A C Kwok, VR2ZVD
Mr A Bates, G7FTP	Mr J Blackwell, M6NMS	Mr G Kelley, N9FQF	Mr J Howarth, RS319875	Mr W Heilnsis, WB2VJSJ
Mr M Jones, G7UQN	Dr M Sayed, M6OUF	Mr E D Christensen, OZ1EHJ	Mr E Mansfield, RS319876	Mr J Eichorn, WD1P
Mr M W Keeping, G8AVZ		Dr F Archangelo, PY2ZX		

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

Mr A Teed, 2EOLWT	Mr P J Copeland, G0FJS	West Tyrone ARC, GN4OMA	Mr A Vitiello, M0SPV	Mr B P Lionel, MW0BUD
Mr G Stephens, 2EOONC	Mr A B Beard, G0GJR	Mr A Evans, GW4HDR	Mr R J Moles, M0UVA	Mr R Hammond, MW5EPA
Mr D Meehan, E12EMB	Mr P Trigwell, G0VRR	Mr G R Jones, GW4UCK	Mr I Leather, M1ICL	Mr A Mackay, RS197261
Mr K Danks, G0DBI	Mr S D Glazard, G1XYO	Mr J Jesson, KC2VGL	Mr I McMahon, M3WUN	Mr D Swanger, RS312332
Mr P A Griffin, G0DJF	Mr K A Butcher, G4NLO	Mr J E Brooks, M0HJO	Mr R Read, M3YAR	Mr R Turpin, WA4KCN
Mr D J Harding, G0DJH	Mr L R Odell, G4ROC	Mr I Johnson, M0OCM	Mr W Millar, M1ONUM	
Mr T D Ople, G0FHW	Mr G Starkey, G4ZBF	Mr P J Tomlinson, M0PJT	Mr B Thomson, M0MGTX	



## Upcoming DXpeditions

The Holy Land DX group (4Z5FI, 4Z4KX, 4Z4AK, 4Z5LA, 4X6HP, 4Z5IW, 4X6YA, 4X4DZ and 4X1VF) will operate from the heart of Masada fortress between 4 and 6 January 2019. They will use 4XOM. Starting at 0730UTC on the 4<sup>th</sup> and ending at 0600UTC on the 6<sup>th</sup>, they will run two stations on the 10 to 80m bands using CW and SSB. The QSL manager is Antonello, IK2DUW.

Ronald, PA3EWP, Martin, PA4WM and Tom, GM4FDM are participating in a DXpedition to Tonga in November. They will leave Europe on 13 November and will leave Tonga on 27 November. The callsign to look out for is A35EU. They intend to operate from the Heilala Lodge Resort, which is at the north end of the main island. They hope to operate three stations and use vertical antennas including VDAs. They will be attempting operations on 160 and 80m using inverted L type antennas. CW/SSB and RTTY into Europe will be the main priority. They will use Elecraft K3s along with amplifiers and have already constructed 2 element VDAs for 30, 20 and 17m with verticals for 15, 12 and 10m. 40 and 80m vertical raised and tuned radials, 160m will be Inverted L. QSL direct using OQRS Clublog, Logbook of The World and the bureau to Tom, GM4FDM, whose details are on QRZ.com. See <http://tonga.ildxt.eu> for further information.



## Summits on the Air (SOTA)

David Stansfield, G0EUV, from Morpeth, has reached SOTA Mountain Goat status after six years of participating as an activator. His first SOTA activation, in May 2012, was on Place Fell G/LD-027 in the Lake District, while his 1000th point (to achieve Mountain Goat) came on Ben Macdui, GM/ES-001, in the Cairngorms, on 11 September 2018. Congratulations to David, who looks set to continue activating extensively in Scotland and Northern England. For more information about the Summits on the Air programme, please visit the website at [www.sota.org.uk](http://www.sota.org.uk)



## Taking Education to the Stars

Dave Honess, M6DNT writes on pages 84/85 of the popular Raspberry Pi magazine *MagPi*, issue 75, about 'Taking Education to the Stars'. He covers Astro Pi, Tim Peake KG5BVI / GB1SS and, of course, ARISS – Amateur Radio on the International Space Station – whose amateur radio educational work has reached tens of thousands of young people world-wide. You can download a free PDF of the magazine at [www.raspberrypi.org/magpi-issues/MagPi75.pdf](http://www.raspberrypi.org/magpi-issues/MagPi75.pdf)

## National Hamfest

The LAMCO team had a great time at this year's National Hamfest. Thanks to everyone who showed their face at their stand. They hope to see you all again next year, so put the dates in your diary – 27 & 28 September 2019.

## National Hamfest Winners

At the 10<sup>th</sup> anniversary National Hamfest, Icom UK kindly donated a 'station-in-a-box' for the raffle. The winner of the Icom IC 7300 was Grant Cratchley, G4ILI. From left to right are Graham Boor, G8NWC from the National Hamfest organizing committee, Grant, G4ILI, Sam Taylor-Nobbs from Icom UK and Chris Danby, RadCom Advertising Manager.



Yaesu UK also kindly donated a 'station-in-a-box' at the National Hamfest and their prize caught up with the winner later. He was W Jones, M0YAV from Hereford, seen here with his prize including the Yaesu FT-991A and everything else needed to put a complete station together.







## Next steps on the road to WRC19

IARU volunteers have been working for three years to progress Agenda Item 1.1 for the World Radio Conference 2019. This agenda item seeks a Region 1 allocation around 50MHz for the Amateur Service in the Radio Regulations Table of Frequency Allocations, to align with the allocations in Regions 2 and 3.

Extensive work has been undertaken in the African Telecommunications Union, CEPT, Arab Spectrum Management Group, RCC and of course ITU to gain support for such an allocation rather than the current country-by-country allocations under Article 4.4 of the Regulations. IARU has represented the global voice of amateur radio in these meetings, arguing that new applications in amateur radio require significant bandwidth at 50MHz and has set out a proposed utilisation of the band that supports its claim. IARU has also engaged in extensive work on sharing studies using propagation models recognised by ITU and CEPT.

After many weeks of planning and meetings in both regional and global forums post WRC-15, the next step on the route to WRC-19 took place recently, where CEPT project team PTD considered its position on this agenda item in preparation for the CEPT Conference Preparatory Group meeting in November and the ITU CPM in February 2019. The work during this meeting was enhanced by the presence of EURAO, which cooperated with IARU to seek the best possible outcome for the amateur service on this WRC-19 agenda item. The Amateur Service has met strong opposition from a few nation states who argue that the 50MHz band is already allocated to other services in their countries (following the closure of many broadcasting stations in recent years which operated in this band) and believe that sharing the band presents problems.

At this meeting two options were prepared. The first, preferred by the majority of CEPT administrations actively participating in discussions, proposes a 2MHz secondary allocation for inclusion in Article 5 of the ITU Radio Regulations. The second option, which is the result of a major compromise brokered by the amateur movement following the last PTD meeting and is preferred by EURAO and IARU, would see a 500kHz primary allocation from 50.0 – 50.5MHz and a secondary allocation from 50.5 – 52.0MHz. Either option would improve the current 50MHz international mechanisms that permit amateur operation on a non-interference, non-protected basis. These options will be further considered at the next PTD meeting.

It is hoped that the co-operation between IARU and EURAO will continue in future CEPT activities, which are relevant to amateur radio.

## Get on air and make some noise

“Get on air and make some noise” is a phrase often used to encourage amateurs to be active on the air and use the bands that are available to us. One thing that’s often glossed over is how to actually *make* that noise. It can be scary to make that first contact. In his podcast, Onno, VK6FLAB discusses making your first contact and has lots of advice to offer. To listen to the podcast, visit <http://podcasts.itmaze.com.au/foundations/> and scroll to the bottom for the latest episode.

### News in Brief

The Caboolture Radio Club reports the start of operation of a new beacon station on the 2200m band. The Australian Communications and Media Authority has granted permission for continuous operation of a beacon on 137.444kHz using the callsign VK4RBC at QG62lw using WSPR2 (6H00F1D) plus CW ident. Power is 1W EIRP into a 500m long wire, 40m max height. In the gaps between transmission, the station will report all WSPR decodes to WSPRnet.org

The Minister of Economic Development approved, with a Decree on 5 October, an update to the Italian National Frequency Distribution Plan between 0 and 3GHz. Within this plan, the frequency band 5351.5 - 5366.5kHz is also attributed to the amateur radio service with the status of a secondary service. The stations of the amateur radio service using the 5351.5 - 5366.5kHz frequency band must not exceed the maximum equivalent isotropic power of 15W EIRP (WRC-15). In the absence of an express indication of any different sign, the Decree will enter into force 15 days after publication. The Italian national society's website says the decree was published on 19 October, so 15 days from then is 3 November, so Italian activity on 60m should be well under way by the time you read this!

## CDXC presentation



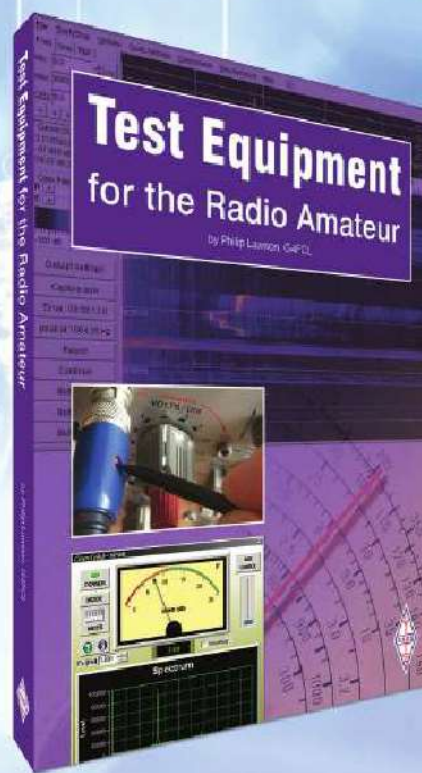
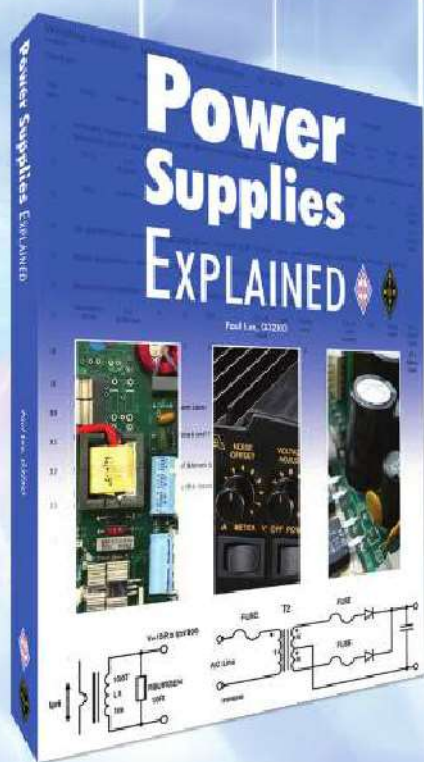
Don, G3XTT travelled to the Clipperton DX Club meeting at Troyes in France to present a plaque from the Chiltern DX Club congratulating CDXC France on their 40th anniversary.

## ML&S Hog Roast date



The ML&S Annual Hog Roast & Open Day will be on Saturday 1 December. Sponsored by Yaesu, Icom & Kenwood, the store will have its usual extra-low prices, lecture streams and manufacturers on site. Bacon butties for the early birds and a succulent pig in a bun for lunch! Doors open 8am and close at 4pm. For more details, see [hamradio.co.uk/hogroast](http://hamradio.co.uk/hogroast)





**NEW  
TITLES**

## Power Supplies Explained

By Paul Lee, G3ZKO

A power supply is something that is often overlooked by radio amateurs, as for many it is simply the box that provides stable DC voltage. A modern power supply is though much more, combining theory that dates back to the nineteenth century incorporating the latest techniques in digital control, with a wealth of electronics practice in between. *Power Supplies Explained* sets out to explain what that box is doing, through to designing your own bespoke power supply.

Beginners are wary of the challenging mixture of digital, analogue, magnetics and control loops, with cooling, EMC and safety to contend with as well. *Power Supplies Explained* seeks to detail how circuits are chosen for the application and how circuits are designed including their inductors and transformers. Calculations are outlined in a simple way so that the reader can use them as a basis for their own designs.

Chapters include descriptions of 'linear' supplies and a wide range of 'switched-mode' types from simple buck converters to the latest off-line high-efficiency topologies. Examples are based around typical radio amateur requirements and are versions of commercial products that the author has successfully designed. There are also chapters on magnetics theory, control loops, EMC, practical construction techniques, test equipment and much more. High voltage power supplies are included with comprehensive guidance on safety.

*Power Supplies Explained* sets out to dispel the mystery and encourage readers to 'have a go' with their own designs.

Size 174x240mm, 320 pages  
ISBN: 9781 9101 9364 8

**Non Members' Price: £14.99**

**RSGB Members' Price: £12.74**

Also available on



## Test Equipment for the Radio Amateur

By Phillip Lawson, G4FCL

This book is aimed at the radio amateur, listener and electronic enthusiast who wants to make a variety of measurements without necessarily spending a fortune on expensive test equipment. It is a very practical book, designed to help you develop care and skill in making the most common and important measurements, quickly, safely and affordably.

In this new fifth edition of *Test Equipment for the Radio Amateur*, the reader will find, for the first time, extensive links to internet sources for access to the very latest information on construction projects, equipment and measurements. The sections on commercial and home-brew equipment have been separated for clarity, new items added and some dated items removed. Timeless reference data has been retained; some items of technical theory have been given their own section, and extended, for those who wish to deepen their understanding of these areas. This book is designed to give an overview of how each item of test equipment works, what it can be used for and even how much it might cost. Many general measurements, plus specific measurements on transmitters and receivers, are described in detail. Matters such as the effect of the test equipment on the circuit to be measured are especially considered, so that the measurement results may be interpreted correctly. A large section of the *Test Equipment for the Radio Amateur* is devoted to home construction, as it is frequently possible to make an extremely useful item of test equipment for a fraction of the price of its commercial counterpart.

*Test Equipment for the Radio Amateur* is a practical guide to getting the most out of your equipment and understanding exactly how your station is performing. It is simply a must have book for every radio amateur.

ISBN: 9781 9101 9365 6

Size: 174x240mm, 192 pages

**Non Members' Price: £14.99**

**RSGB Members' Price: £12.74**



**Radio Society of Great Britain**  
**www.rsgbshop.org**

3 Abbey Court, Priory Business Park, Bedford, MK44 3WH.  
Tel: 01234 832 700 Fax: 01234 831 496

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

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



# New Products

## /analogue handheld

I band digital/analogue e with or without GPS are packed transceiver in y covering both 2m and RF output. The handheld ad, colour display that, in vs amongst other things, nce between stations. For utilises DVSI's AMBE+2 ul 1W audio output. The he VHF broadcast band r your favourite broadcast 5 is packed with many ig a 14 hour digital record £139.95 (non-GPS) and on). The unit is available Nevada Radio and all UK [www.nevadaradio.co.uk](http://www.nevadaradio.co.uk)



## IC-9700 VHF and Up all-mode SDR transceiver

Icom Inc has released more details about the launch of the IC-9700, the VHF/UHF/23cm all-mode SDR transceiver. Icom plans to release this high-performance SDR transceiver early next year and it should be available for sale in the UK in February 2019, with a suggested retail price of £1795.95 inc. VAT. Please note that this target price and UK availability may be subject to change. You can contact your Icom amateur radio dealer who will be able to put you in their order books. Some of the planned features for the IC-9700 include

- All mode, tri-band transceiver covering 144MHz, 430MHz as well as 1.2GHz
- Supports CW/AM/SSB/FM/RTTY and D-Star digital voice and digital data modes
- 144MHz and 430MHz band is direct sampling. The 1.2GHz uses down conversions as well.
- PA will provide a powerful 100W (144MHz), 75W (430MHz) and 10W (1200MHz) output
- Smooth satellite operation with normal/reverse tracking and 99 satellite channels
- CW full break-in

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



## Gutter clips for stealth wire antennas

Many radio amateurs face restrictions when they want to install HF antennas at home. Often the best solution is a wire antenna installed around the plastic rain gutter of a house. SOTABEAMS now stocks some handy hooks that can be used to clip a wire round guttering. A pack of 36 clips is priced at £1.50. [www.sotabeams.co.uk](http://www.sotabeams.co.uk)

## Two new linears

RM Italy ([www.rmitaly.com](http://www.rmitaly.com)) has two new linears, the MLA100 12V HF and 6m 100W linear amplifier and the BLA600 a 500W AC HF and 6m linear power amplifier. The MLA100 is a compact wideband HF and 6m linear amplifier capable of 100W HF (80W 6m) output from 5W input drive, suitable for any of today's QRP transceivers. It features automatic / manual band selection, rapid switching between receive and transmit by PIN diode RF switching, making it suitable for all modes of narrow band modulation and QSK operation. Both output power and antenna VSWR are displayed on the front panel by dual LED bar graph displays. The amplifier is fully protected against excessive temperature, antenna VSWR and input overdrive. It utilises a pair of Mitsubishi RD100 MOSFET transistors. Weight: 1.5kg. Dimensions: 190mm x 185mm x 80mm. Available with or without the heatsink cooling fan.

The BLA600 is a fully automatic compact AC (selectable 100, 115, 230 and 240V AC), wideband HF and 6m linear amplifier capable of 500W+ output. It features fast PIN diode RF switching has a user selectable mode for CW QSK operation. It has a 2x16 character liquid crystal display, separate LED displays for output power and antenna VSWR. Input drive is from 1 to 40W. It has 3 user configurable antenna outputs. Dual large diameter MCU-controlled variable speed cooling fans for quiet operation. It has a quiet 1200W linear power supply with an active bridge rectifier for greater efficiency. It utilises the NXP MRFE6VP5600 50V MOSFET. Weight 21.5kg. Dimensions: 430mm x 142mm x 324mm.







has a large, backlit, liquid crystal display to display input and output power, SWR, voltage, current, temperature, amplifier status and any warning messages, making operation of this modern amplifier simple and user friendly. The inbuilt ATU and power amplifier stage can be used independently of each other. The ATU can match loads of 14-500Ω from 1.8 to 30MHz and 50 to 54MHz. The amplifier measures 265 x 162 x 80mm (excluding protrusions) and weighs 3.25kg. It requires an external DC power supply delivering between 12 and 15V DC. Maximum current draw is 30A. The XPA125B retails at £449.99 (shipping excluded). Contact Sinotel UK for further details or [www.sinotel.co.uk](http://www.sinotel.co.uk)

### Vortex Remote Antenna Switch

The VRAT (Vortex Remote Antenna Switch) was designed by Steve, G0UIH at Vortex with the RF work by Camtech PCB in Haverhill. It consists of two parts, the indoor Switching Box that would normally be located in the shack and the outdoor/external Relay Box. Both enclosures are professionally manufactured in the UK from 2mm aluminium complete with silk screen graphics and logos. The switch box also includes fully detachable front and rear panels and LEDs showing the output port and the 'Rat's Eyes' on power up. The switch operates 6 ports, covers all HF bands and is an impedance controlled design. To optimise port isolation, two relays per port are used. The bespoke relays are rated at 30A by ganging 2 x 15 amp outputs. Power rating is estimated at around 5kW and at 2kW key-down the relay box never got warm. The VRAT is available with either SO239 (PTFE) sockets as the outputs or 'N-Type' (PTFE) as an option. The VRAT is currently available direct from the Vortex Antennas website and is priced at £380. [www.vortexantennas.co.uk](http://www.vortexantennas.co.uk)



### New 40m antenna

Innovantennas recently designed a 40m 4-element Yagi. The finished antenna is shown in the photograph. It was tested by Nick, XQ1KZ from the Antofagasta DX Contest Group location in Chile by beaming to EU and the USA with good reports. The antenna will be used at the CB1H site.

### IC-R30 App

After recently being demonstrated at the Tokyo Hamfair, the new RS-R30I (for iOS)/RS-R30A (for Android) remote control software for the IC-R30 Communications Receiver is now available to download for free from the App Store and Google Play. RS-R30I and RS-R30A enable you to wirelessly connect to the IC-R30 and remotely control VFO operation, memory channels, a variety of scans and the voice recording functions. Using the optional VS-3, Bluetooth headset, the VS-3 and iOS™ / Android™ device can be wirelessly connected to the IC-R30 at the same time. You can control the IC-R30 from the connected device while listening to the received audio on the VS-3 optional Bluetooth headset. A brochure about this new software can be downloaded from [www.icomuk.co.uk/files/icom/PDF/productLeaflet/RS-R30I\\_RS-R30A.pdf](http://www.icomuk.co.uk/files/icom/PDF/productLeaflet/RS-R30I_RS-R30A.pdf)

### New books

Currently, around 300+ Kiwi-SDRs are available at [www.sdr.hu](http://www.sdr.hu) and most of these cover the entire HF spectrum. Consequently, monitoring and decoding of professional HF digital data stations is more convenient than ever before. Hundreds of screenshots will be published in the new 2019 editions of the various Klingenfuss books. Published on 10 December will be the 2019/2020 Guide to Utility Radio Stations, the 2019 Shortwave Frequency Guide, the 2019 Super Frequency List on CD and the 2019 Frequency Database for the Perseus LF-HF Software-Defined Receiver. [www.klingenfuss.org](http://www.klingenfuss.org)

### Mast Rating System

Telescopic glassfibre masts are a popular option for portable antenna supports. However, as they vary widely in strength and stiffness, it can be hard to compare them. SOTABEAMS has developed a simple metric that allows an objective comparison to be made. The SOTABEAMS Mast Rating System (SBMRS) uses the length and the weight of the mast to calculate a strength figure for a mast. This makes it very easy to compare different products. Details at [www.sotabeams.co.uk/blog/strength-rating-system-for-telescopic-fibreglass-masts/](http://www.sotabeams.co.uk/blog/strength-rating-system-for-telescopic-fibreglass-masts/)





# Antennas

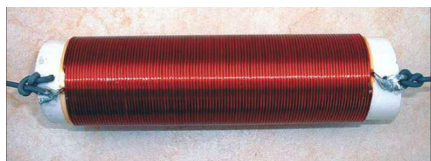


PHOTO 1: Example of a 120μH loading coil used in the G3TKN loaded 80m & 40m dipole.

**A** dipole is a convenient antenna for getting active on a specific band. However, it is possible to modify a dipole to enable it to resonate on another band providing a two, or even a three, band antenna.

When is a transmission line an antenna, or an antenna a transmission line?

When examining the impedance at the input to an open ended transmission line, this tends to be either a capacitive or inductive reactance depending on the electrical length of the transmission line. When the transmission line's length is not significantly long, the line's resistance tends to become insignificant compared the reactance presented at its input, such that:

$$\text{Input impedance} \approx -j(Z_0 \cot \theta) \Omega \quad (\text{eq 1})$$

where  $Z_0$  is the characteristic impedance of the transmission line,  $\theta$  is the line's electrical length (in degrees) and  $\cot$  (coangent) is the reciprocal of the tangent. The operator  $j$  is used to show that this is a reactive impedance.

When an RF signal is applied to the open ended transmission line, as the electrical length of the line increases towards an electrical quarter wavelength (ie towards  $\lambda/4$  or  $\theta = 90^\circ$ ), the reactance is capacitance. However, as the line's length exceeds an electrical  $\lambda/4$ , but is less than an electrical  $\lambda/2$ , the reactance is inductive. This situation then repeats as the line's length is extended.

Similarly, if the transmission line is terminated in a short-circuited load, then the reactance at its input can be found using:

$$\text{Input impedance} \approx +j(Z_0 \tan \theta) \Omega \quad (\text{eq 2})$$

However, the reverse now occurs for the terminated line's reactance and this is inductive up to  $\lambda/4$  and capacitive



PHOTO 2: G3TKN's 80m & 40m loaded dipole that used a ferromagnetic 1:1 balun.

above  $\lambda/4$  to  $\lambda/2$ . The concept of this situation for both open-circuited and short-circuited transmission lines is shown in **Figure 1** [1].

When a span of wire is installed horizontally above the ground, provided the ground below the wire is conductive, then the ground starts to behave as if it were the second conductor of a transmission line formed with the wire-span, such that:

$$Z_0 \approx 138 \log_{10} \frac{4h}{D} \Omega \quad (\text{eq 3})$$

Where  $Z_0$  is the characteristic impedance seen at the wire-span's input,  $h$  is the height of the wire-span above the ground (in mm) and  $D$  is the wire's diameter (in mm). Interestingly,  $Z_0$  calculated by this equation does not depend upon the length of the wire-span making it useful as will be shown later. The concept of a wire-span run horizontally above the ground is shown in **Figure 2** where  $Z_0$  is the impedance as viewed from one end. This equation is a derivative of the transmission line equation, although its derivation is outside the scope of the Antennas column you can find more information at [2].

To summarise, when an RF signal generator is connected to one end of the wire-span and ground, then as the line's length is varied so the impedance seen by the generator tends to be a capacitive or inductive reactance depending upon the wire-span's length.

Note: it is important not to confuse  $Z_0$  with the impedance seen between two wire-spans forming a dipole where a feeder cable is to be connected (ie the feed point impedance).

## A theoretical loaded dipole for the 80m and 40m bands

The length of resonant half wavelength dipole for the 40m band centred on 7.1MHz can be calculated using:

$$\text{Wire-span length} \approx \frac{150}{7.1} \times 0.95 = 20.07\text{m}$$

where the '0.95' factor allows for the reduced velocity of the wave along the wire-span that occurs from factors including the effect of radiation, the wire's insulation dielectric properties and how the ends of the dipole are terminated [3].

When installed above the ground at a height of around 9 to 10m, with its ends terminated with 'dog-bone' type insulators, the wire-span can be expected to have a feed point impedance of close to 70Ω when operated at 7.1MHz. As a result, this arrangement provides a low SWR and a good match to 50Ω. However, if this antenna was to be operated at 3.65MHz, then the feed point impedance is closer a capacitive reactive impedance of around -j1000Ω, giving a poor match to 50Ω.

To enable the antenna to operate on 3.65MHz, a suitable loading coil and a short length of wire can be added to each end of the wire span as shown in **Figure 3**.

As described in the July 2018 Antennas column, the effect of the loading coils and

Mike Parkin, G0JMI  
email2mikeparkin@gmail.com

## *The Legend Continues*

The Transceiver that could only be created by Yaesu  
Offering New Excitement and Surprises

*In homage to Sako Hasegawa*

**FTDX101MP** [200W]

HF/50MHz TRANSCEIVER

*The Ultimate*

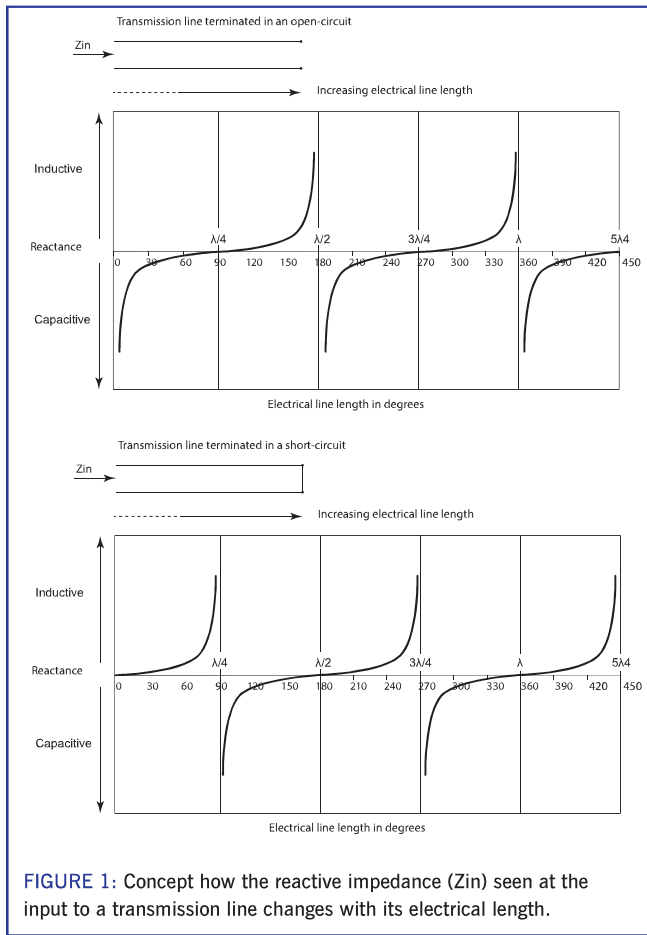
**FTDX101D** [100W]

HF/50MHz TRANSCEIVER

- Superb and Astonishing Close-in Dynamic Range
- 9MHz IF Roofing Filter Producing Excellent Shape Factor
- 400MHz HRDDS (High Resolution Direct Digital Synthesizer)
- Hybrid SDR: Direct Sampling & NBW (Narrow Bandwidth) SDR
- Completely Independent Dual Receivers
- High-Q VC Tuning Front-End
- Yaesu Renowned Interference Reduction System
- Large Touch-Panel Precision Colour Display
- 3DSS (Three Dimension Spectrum Stream) Waterfall Display
- Active Band Indicator with LED illumination of the operating band, enables rapid band changes
- MPVD (Multi-Purpose VFO Outer Dial) provides Sub VFO dial, Clarifier operation, VC-TUNE adjustment, VFO fine tuning or a CS (Custom Selection) function







the additional short wires (EW) is to tune the antenna to a desired lower frequency.

Assuming sufficient space is available, then an inner wire-span of 20.07m could be extended using two wires of 2.2m in length each. This gives an overall length of the antenna of close to 24.5m, however this is smaller than a  $\lambda/2$  resonant dipole centred on 3.65MHz whose length is closer to 39m.

With the 20.07m long wire-span of diameter 1.6mm that is installed at 10m above the ground, and well clear of any close objects or structures, the impedance of each leg of the wire-span can be found using equation 3:

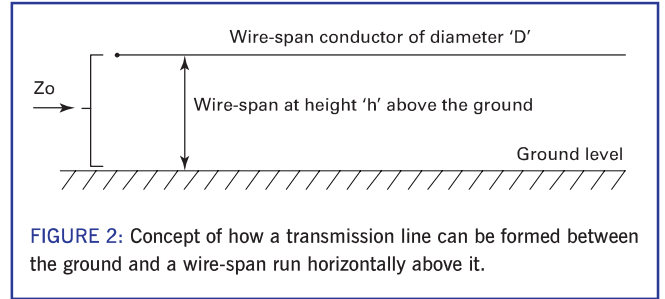
$$Z_o \approx 138 \log_{10} \frac{4 \times 10,000}{1.6} \approx 607 \Omega$$

To determinate the impedance at Point A in Figure 3 at 3.65MHz, this requires the value of  $\Theta$  (ie electrical length of the wire-leg) to be determined as follows:

At 3.65MHz, a 'free-space' quarter wavelength ( $\lambda/4$ ) is given by

$$\frac{300}{3.65} \times 0.25 = 20.55 \text{m}$$

To allow for the velocity of the wave along the wire, a correction factor of 1.05 has been used.



Therefore to find  $\Theta$ , for an extension wire of 2.2m in length, this is given by

$$\left( \frac{2.2\text{m} \times 1.05}{20.55\text{m}} \right) \times 90^\circ = 10.117^\circ$$

The reactance seen at Point A is given using equation 1:

$$\text{Extension wire impedance} \approx -j(607 \times \cot 10.117) \approx -j3402 \Omega$$

(Note: this is a capacitive reactance.)

Next, it is necessary to determine the impedance at Point B in Figure 3 (ie for each leg of the 40m dipole). Each dipole leg is not an open-circuit because the end is terminated by an inductor followed by the extension wire. Consequently, at 3.65MHz, the impedance at Point B in Figure 3 can be determined using equation 2 [4]:

Here  $\Theta$  is now given by

$$\frac{10.035\text{m} \times 1.05}{20.55\text{m}} \times 90^\circ = 46.146^\circ$$

$$\text{Dipole leg impedance} \approx +j(607 \tan 46.146) \approx +j631 \Omega$$

(Note: this is an inductive reactance.)

An indication of each loading coil's reactive impedance ( $X_L$ ) can now be found as follows:

$$X_L \approx -1(+j631 + (-j3402)) \approx +j2771 \Omega$$

(Note: this equation gives an inductive reactive. This inductive reactance neutralises the overall capacitive reactance to resonate the antenna on 3.65MHz).

An indication of the inductance (L) can then be determined from:

$$L(\text{H}) \approx \frac{X_L}{2\pi f}$$

where L is the inductance (H) and f is the frequency (Hz).

$$L(\text{H}) \approx \frac{2771}{2\pi \times 3.65\text{MHz}} \approx 120.8 \mu\text{H}$$

Figure 3 summarises the theoretical antenna derived above.

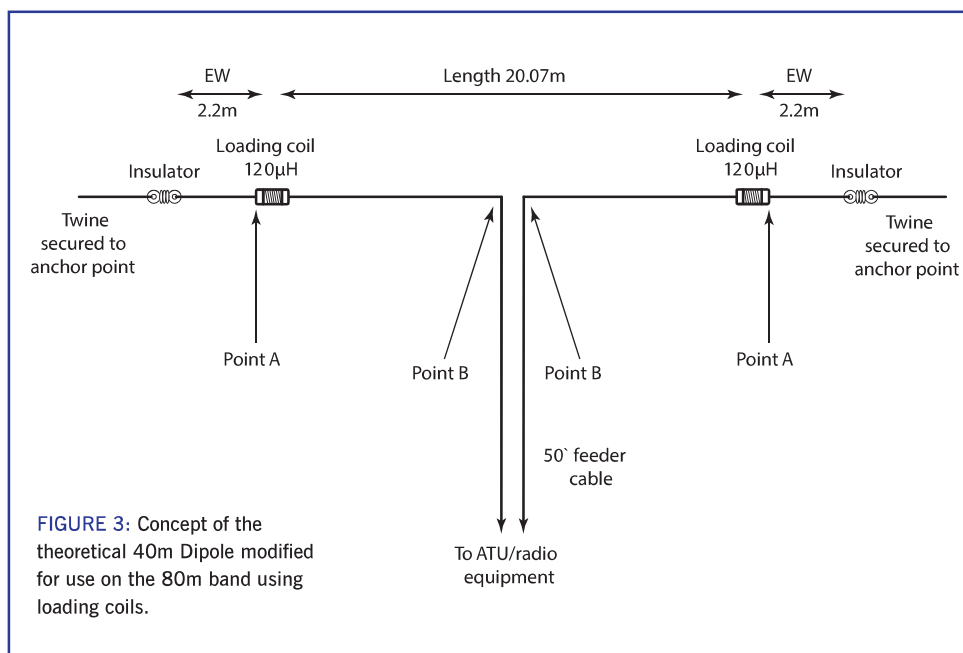
# 80m and 40m loaded dipole designed by Vince Lear, G3TKN

An example of a loaded 80m and 40m dipole was produced by Vince Lear, G3TKN, and published in *RadCom* several years ago [5] [6]. This antenna was based on a design by W J Lattin, W4JRW, which was published in *QST* [7]. The concept of the antenna is shown in **Figure 4**, where it can be seen that each inner dipole leg has been extended to 10.66m to enable the inner dipole to resonate at 7.1MHz. This effect was also found by W4RJW when he constructed his antenna. (Interestingly, multiplying 10.66m by four gives a value close to the free-space wavelength for the inner dipole.)

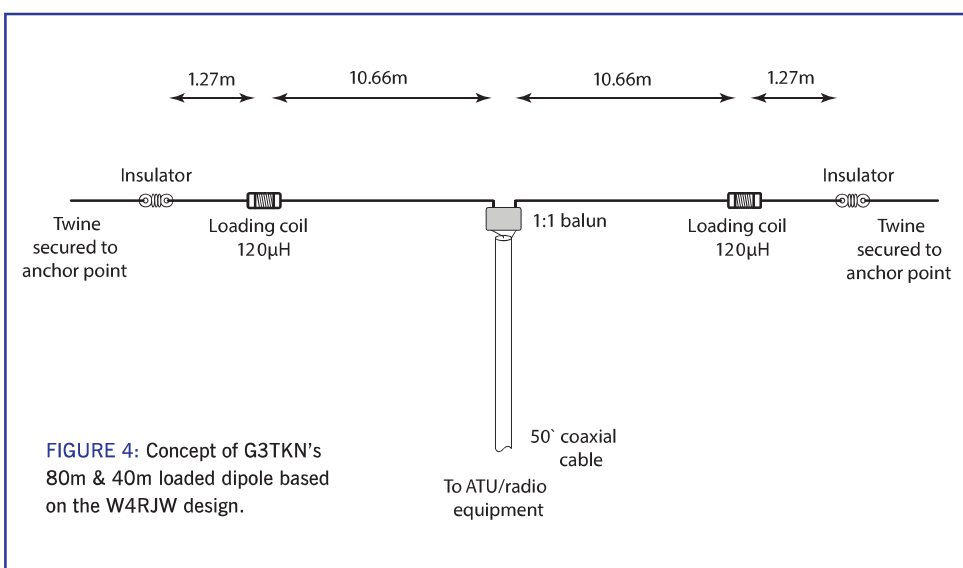
The loading coils used for the antenna comprised 104 turns wound onto a 40mm diameter plastic tube of length 178mm, with a coil length of 140mm. An example is shown in **Photo 1**. This arrangement gave an inductance of close to 120 $\mu$ H. G3TKN found that to resonate the antenna on 3.774MHz required each extension wire to be 1.27m long (ie around 930mm shorter than shown in Figure 3). However, the length of each extension wire could be equally adjusted to suit the section of the 80m desired. It is also useful to note that the antenna's bandwidth on the 80m band is about  $\pm$ 30kHz of the desired frequency (ie between SWR points of 2:1).

The antenna's feed point impedance is low and should provide a reasonable match to 50 $\Omega$  on the selected part of the 80m, 40m and 15m band (where the inner dipole operates as a third harmonic antenna). 50 $\Omega$  coaxial cable was used as the antenna's feeder, however a 1:1 balun was necessary to minimise the effects from common-mode currents. G3TKN used a commercially available ferromagnetic 1:1 balun, however a 1:1 current choke could be made by winding around 8 turns of the coaxial feeder (eg RG58) around a pair of stacked ferrite rings. However, it is good practice to use an ATU to maximise the performance of the antenna.

This antenna performed reliably when used with RF power levels up to 100W. However, heavier duty 120 $\mu$ H loading coils may need to be constructed if higher power levels were to be run. **Photo 2** shows the completed loaded dipole, which may be used for reference.



**FIGURE 3:** Concept of the theoretical 40m Dipole modified for use on the 80m band using loading coils.



**FIGURE 4:** Concept of G3TKN's 80m & 40m loaded dipole based on the W4RJW design.

## Acknowledgments

Following the July Antennas column, my thanks are passed to John Lenahan, KORW for his help and time with the material forming the basis for this Antennas column. John sent in several *QST* references providing invaluable background to the equations used. Thanks are also passed to Mike Hall, G3USC, for his comments and observations related to loaded antennas.

## References

- From *RSGB Radio Communication Handbook*:  
[1] 5<sup>th</sup> edition, Chapter 12, HF Antennas, pages 12.26 to 12.28  
[3] 13<sup>th</sup> edition, edited by Mike Browne, G3DIH,

Section 13, Antenna Basics and Construction, Page 13.2

From *ARRL QST*:

- [2] October 2003, Designing a Shortened Antenna by Luiz Duarte Lopes, CT1EOJ, Pages 28 to 32  
[4] March 1990, Evolution of the Short Top-Loaded Vertical by Charles J Michaels, W7XC, Page 28  
[7] April 1961, Multiband Antenna using Loading Coils by W J Lattin, W4JRW  
[5] *RadCom*, October 2004, An 80m and 40m Loaded Dipole by Vince Lear, G3TKN, Pages 84 to 86  
[6] *HF Antennas for Everyone* edited by Giles Read, G1MFG, Chapter 1, Horizontal Antennas. Pages 73 to 77



# GNU

## Radio Companion Course



Deep concentration during the GNU Radio Companion course!

### Introduction

For a while I've wanted to understand a little more about writing software for SDR. Some time ago I discovered something called the 'GNU Radio Companion' [1], which seemed to be a graphical environment for doing just that. Now, my engineering background is in analogue radio design, and my only experience in software has been recently writing simple low-level PIC code and some Pascal 30 years ago. Once I started to investigate GNU radio I quickly became lost in a sea of software engineering jargon that I couldn't get past. I found a few beginners' pages on the internet, but they seemed to be aimed at people who already knew the basics of software design. Not until I found an excellent 4-part GNU Radio Companion Primer on the web pages of Professor Sharlene Katz, from California State University, Northridge [2] did I realise that getting the basics was quite simple.

Using the old adage of "if you want something doing properly, do it yourself" I decided that it would be fun to try and organise an 'absolute beginners' course on the GNU Radio Companion, so that I could learn more about it and help others. A chance meeting with Derek Kozel, KOZEL (now MWOLNA) and Heather Lomond, MOHMO at the RSGB Convention in 2017 kicked off a series of events that led to this course being born.

With the help of RSGB Legacy Committee funding, I organised a 1-day seminar on the Friday before the 2018 RSGB Convention. Although billed as a 'beginners' course we felt it necessary to make sure that participants

were those who had some kind of relevant track record and would thus gain significantly from the event. Invited applicants agreed to pay a £60 fee to join it. This fee included an RTL SDR dongle and a USB stick with a bootable environment to run the GNU Radio Companion on the delegates' PC. We rapidly filled the course with 20 delegates and unfortunately had to turn away others to keep the course size manageable.

### Course content

I was determined that the course should be attractive to people with just basic PC skills but little or no software background, but also allow those with more advanced Software skills to learn something. The team of three made this easy as Derek is a recognised expert in GNU Radio from his time at Ettus Research and Heather and I have backgrounds in electronic engineering and education. Heather specialises in real time software and my background is in RF hardware. I came up with a syllabus and we decided that we would make it hands-on.

Heather began the course with a quick guide to the Linux environment and the GNU Radio Companion (GRC), which ended up with everybody using GRC to generate a 1kHz tone from their PC sound card and apply filtering to it. I then followed on by covering a little introductory theory behind DSP and Heather continued to take the delegates through adding software instrumentation such as oscilloscopes, spectrum analysers and waterfall displays. The next step was to

use the RTL dongle to build a 50MHz SSB receiver and receive a real signal off air. After lunch, Derek demonstrated SDR transmitters using GRC and the delegates built an FM receiver to listen to the signals generated by them. He moved on to more advanced topics such as downloading new signal blocks such as a range of satellite decoders and support for a number of SDR transceivers using GitHub. The day finished with a demonstration by the team from SDRPlay describing GRC support for their receiver range.

### Aftermath

Feedback on the course was VERY positive, with a number of delegates asking when the next one would be! The answer to that is "watch this space", as plans are afoot to run the course again in 2019. You'll find further mentions of the course in my own GHz Bands column, plus Andy, G4JNT has a lot of positive words about it in this month's Data.

### Websearch

[1] GNU Radio – [www.gnuradio.org](http://www.gnuradio.org)

[2] GNU Radio Primer part 1

– <http://bit.ly/2z3axDq>

**John C Worsnop**  
**PhD CEng MIET, G4BAO**  
[john@g4bao.com](mailto:john@g4bao.com)



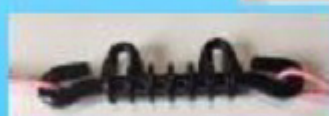
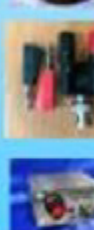


[www.sotabeams.co.uk](http://www.sotabeams.co.uk)

Tel: 01625-501643

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

## Christmas shopping made easy with our Christmas Selection on the webstore



## Handy presents from less than £5!

# PEAK<sup>®</sup>

electronic design ltd

10% Online Discount for Radcom Readers!

Use code: **RADCOM10** during checkout

[peakelec.co.uk](http://peakelec.co.uk) 01298 70012 (+44 1298 70012)

UK delivery  
£4.80inc VAT



PayPal

### DCA75 Advanced Semiconductor Analyser and Curve Tracer

#### Online upgradeable

Great for testing, identifying and measuring a huge range of discrete semiconductor devices such as transistors, MOSFETs, diodes, IGBTs, LEDs and much more!

- Graphics display shows you detailed component schematics.
- Connect any way round!
- Built-in USB offers amazing PC based features too such as curve tracing and analysis in Excel.
- PC software on a USB flash drive.
- Includes Alkaline AAA battery, universal test probes and comprehensive printed user guide.



"A very capable analyser"  
RadCom

£101.25  
with discount!

~~£112.50~~  
~~(£9.75+VAT)~~

### LCR45 LCR and Impedance Meter with Auto and Manual modes

#### Ideal for hobbyists and professionals

The latest version of our popular LCR meter not only identifies and measures your passive components (Inductors, Capacitors and Resistors) but also measures complex impedance, magnitude of impedance with phase and admittance too! Auto and Manual test modes allow you to select the test frequency and component type.

- Continuous fluid measurements.
- Improved measurement resolution: ( $<0.2\mu\text{H}$ ,  $<0.2\text{pF}$ ).
- Test frequencies: DC, 1kHz, 15kHz, 200kHz.
- Measure the true impedance of speakers and more.
- Great for hobbyists and professionals.



~~£91.50~~  
~~£76.25+VAT~~

£82.35  
with discount!



Limited time offer. It's only possible to show summary specifications, ask if you'd like detailed data. Further information is also available on our website. Product price refunded if not h



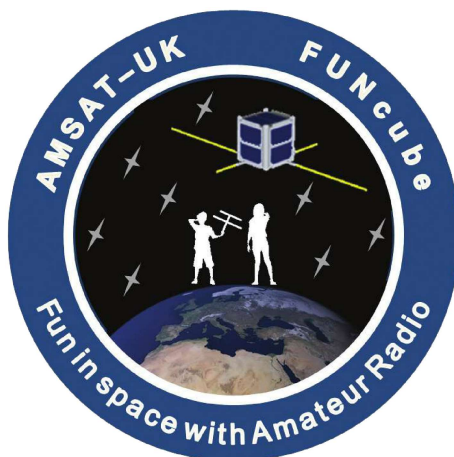
# The FUNcube Project – five years since launch

**O**n 21 November, we were able to celebrate the fact that FUNcube-1 (aka Oscar 73) has been in space for five years.

The FUNcube project commenced not long after the concept of CubeSats (spacecraft as small as 10 x 10 x 10cm and with a mass of around 1kg) had been created, and very soon after an infrastructure and industry to develop and support the launches of such spacecraft had begun.

The initial idea was to produce the simplest possible 1U CubeSat that could be used by schools and colleges for educational STEM outreach (Science, Technology, Engineering and Mathematics) and also by radio amateurs for communications through a transponder. The original working title for the project was actually KISScube – which clearly shows where the work started.

At that time AMSAT-UK had never developed a complete satellite of its own and had never even considered doing so. We were therefore lucky that the development of CubeSats and some bequest funding, through the RCF, enabled the idea to become a reality. We were also fortunate to be able to put together a small team of specialists with skills covering the software and hardware needed both on the ground and in space. Additionally, a close relationship with ISIS – Innovative Solutions In Space BV



The AMSAT-UK FUNcube Mission Patch.

– enabled us to gain access to cost effective subsystems and structures and also their test facilities when required.

Launched from an underground silo in Russia on a DNEPR rocket, actually a converted intercontinental ballistic missile (ICBM), the first signals were heard, by ZS1LS in South Africa, at 0737UTC. The data was then automatically uploaded by the FUNcube Dashboard to the Data Warehouse in the cloud, and, as if by magic, the telemetry values appeared within a few seconds, on the screens at the RSGB's National Radio Centre at Bletchley Park.

Since launch more than 1250 stations have provided data to the Warehouse and many schools and colleges have used the signals for demonstrations and all manner of STEM activities – exactly as planned.

The spacecraft has continued to operate nominally since launch and we have experienced fewer than ten unexpected restarts of the microcontroller that is responsible for most of the on-board operations. Generally, we have operated under autonomous control with high power telemetry when the spacecraft is in sunlight and with low power telemetry and transponder on when in eclipse. One of the original constraints that we were very concerned about was the power budget. Less than 2 watts orbit average was all we expected from the sun-synchronous orbit, with 60 minutes in sunlight and 35 minutes in eclipse. In reality, the battery voltage has never dropped below 8.01V so all has been well in that department.

The original illumination level experienced by the spacecraft during each orbit was planned to be about 65 minutes in sunlight and 30 minutes in eclipse. Due to a drift in the orbit, this has now changed and the spacecraft will be experiencing continuous sunlight for the next six months, so our concern is now more about on-board temperatures and how to ensure that the battery is not over charged!

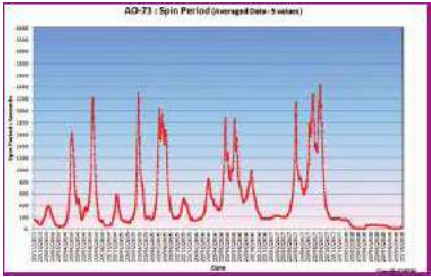
It is believed that the spin rate is affected, to some degree, by the amount of current flowing in the wires between the solar panels and the EPS (electrical power system board) so, whilst the spacecraft is in continuous sunlight the plan is to have extended period of high power telemetry and either lower power telemetry (safe mode) or transponder on. This should show up in the graphs that are kindly produced for us by Colin, VK5HI and his team in Australia.

When FUNcube-1 was launched there were almost no linear transponders available for amateur use. Since then there have been many more CubeSats placed in orbit and many more transponders are now available. The fact that FUNcube was the first one and that it is



The AMSAT-UK FUNcube team toasting the successful launch at the RSGB's National Radio Centre.

**Graham Shirville, G3VZV**  
g.shirville@btinternet.com



AO-73 Averaged Spin Rate 18th October 2018  
The plot that shows the average spin rate of AO-73 on 18 October 2018.

still working gives the team some considerable pleasure.

Since the launch of FUNcube-1, the AMSAT-UK team has also supported the FUNcube-2 payload on UKube-1 for the UK Space Agency. Additionally, another CubeSat called Nayif 1, from the United Arab Emirates, was launched early in 2017 and that also carries a FUNcube payload.

As well as these spacecraft, which are already in orbit, it is expected that two more will be launched later this year. At the time of writing, they are both scheduled to be on the same Space-X launch from Vandenberg in late November 2018.

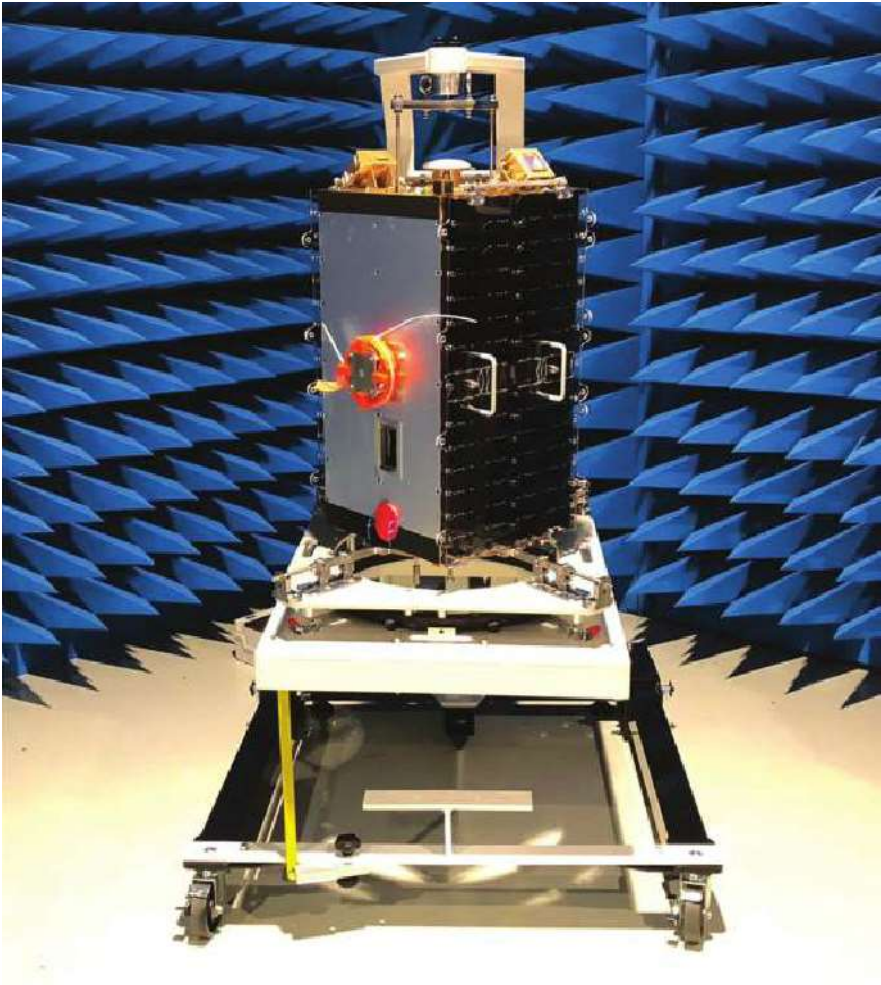
The first is an enhanced FUNcube called JY1Sat. This is being developed by the Crown Prince Foundation in Jordan. The spacecraft has been named in honour of the Crown Prince's grandfather, King Hussein, who operated using his personal amateur radio callsign which was simply JY1.

In addition to the usual suite of FUNcube capabilities it will also be capable of downlinking images in SSDV format. This image format, developed by Phil Heron, MIOVIM, for use in High Altitude Balloons, is now also being used from lunar orbit by AO-94.

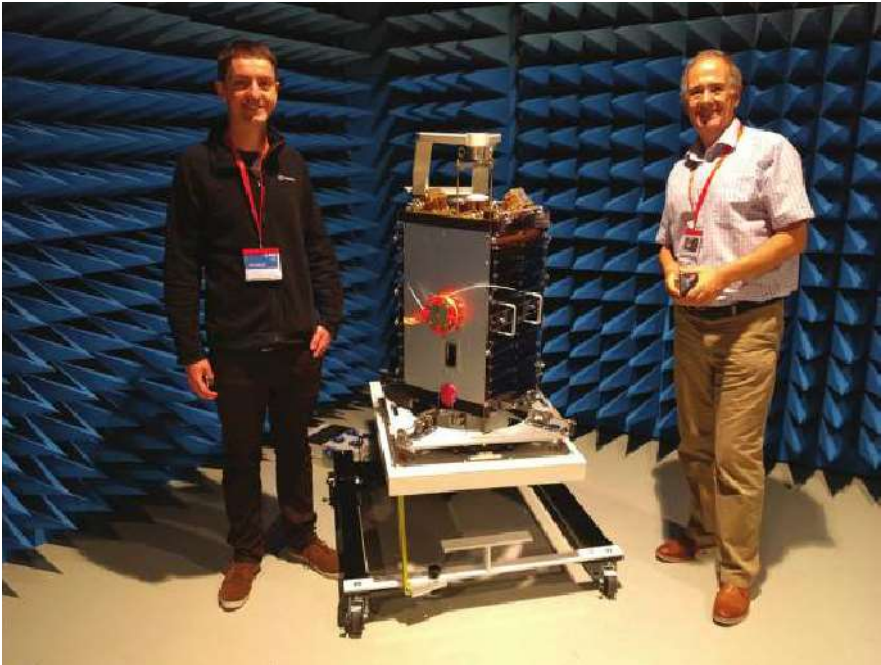
A new Dashboard has been developed for this mission and it will be made available, nearer to the launch date, from the FUNcube website.

AMSAT-UK has also developed a FUNcube payload for the ESEO mission. ESEO is a 50kg class microsat that incorporates experimental payloads from a number of universities around Europe. This will provide similar telemetry to its predecessors but will have a more powerful transmitter and thus be even easier to hear. For amateurs, this payload will also provide a single channel L/V transponder for FM.

The ESEO project is being funded by the ESA Education Office and has been in development for more than ten years. More information on this mission is at [www.esa.int/Education/ESEO](http://www.esa.int/Education/ESEO) and up-to date details about FUNcube activities can be found on the FUNcube website, <https://funcube.org.uk/>



The European Student Earth Orbiter (ESEO) is an ESA educational programme.



David Bowman, GOMRF and Pete Bartram admiring the finished spacecraft in the anechoic chamber at ESA's ESTEC facility in the Netherlands.



# LF

## All the latest news on the LF bands from receiver tests to DX working.

Stefan, DK7FC has obtained permission to carry out experiments on 17.47kHz, not far from SAQ's frequency. His vertical wire antenna is pretty good but still very small compared to the sort of thing that traditional VLF stations such as SAQ might use. After many days of continuous transmission using EbNaut, Edgar in Moonah, Tasmania successfully decoded the two-character message '73'. The distance is 16,786km, an astonishing achievement for an amateur station on VLF. Experiments continued and eventually Edgar decoded the three-character message 'UFB' which was the ultimate goal for these tests. Stefan estimates his ERP at 2mW and Edgar's receive setup was a 1m active probe fed into a Steinberg audio interface, no down-conversion required at this frequency!

### EbNaut on LF

Interest in the EbNaut system has increased thanks to such impressive results and a few experimenters in both Europe and the USA have been trying it out on the 136kHz band. Whilst these tests have been taking place, Dominico, IZ7SLZ has been running an EbNaut auto-decoder. At the end of September it decoded K3RWR's 15 character message 'K3RWR\_FM18QI\_73' on a couple of occasions. The advantage that EbNaut has over other narrow bandwidth modes is probably reduced on 136kHz due to the more unstable conditions, but this proves that it is still capable of excellent results.

### DX News

I wouldn't like to give the impression that EbNaut is the only mode in use these days but it is the focus of some experimental interest. In day to day operating there is a huge amount of WSPR activity on both the LF and MF bands and QSOs taking place using JT9 and occasionally FT8. OPERA is still popular, it is simple to use and capable of very good results.

Luis, EA5DOM's first DX of the season came in late August when his 475kHz WSPR transmission reached N1BUG, 5,578km away. Luis runs 80W into a 90m wire on the side of a tower block.



Tests on the LF capability of some current transceivers at the recent RSGB Convention.

Mal, G3KEV reports that winter conditions are starting to take effect on 472kHz. In one October night his WSPR transmissions were copied by AA1A, N1BUG and W1TAG.

WH2XND near Phoenix, Arizona is regularly spanning the Pacific to VK using WSPR on 136kHz, whilst on 472kHz Roger, VK4YB is being received all over the USA at distances greater than 15,000km. His signals have also been recorded by 'SWLKQ40LS' in northern Norway. Roger's antenna has been mentioned before in this column but it's worth recalling that it consists of two half waves on 472kHz arranged to place the current in 120ft verticals on each side of a hill, giving directional characteristics. See his QRZ page for details. SWLKQ40LS is in fact Bjarne Mjelde who is a keen MW DXer using a KiwiSDR. You can listen to his 'Arctic SDR' via SDR.hu, just search on there for 'arctic'.

Activity from South America is quite rare but LU1DOW's 472kHz WSPR signals reached LA2XPA in late September, a distance of 12,365km. He has also been received by WA2ZKD and N3FL on the east coast of the USA at over 8,000km. In Uruguay, CX4DI tells me that CX2DDP/B has been testing a 500W beacon on 473kHz. At the time of writing the signal has been copied in Brazil by PY3CRX.

### Receiver tests

For a presentation at the RSGB Convention, David, GOMRF gained permission from Martin Lynch to test the LF receive capability of some current transceivers. In general he found that most sets work quite well on 472kHz but get a little worse on 136kHz. Many radios have an attenuator which is automatically switched in below 1,600kHz, this obviously compromises the LF performance. I know that Kenwood radios usually have an internal jumper to bypass this if desired. A PDF of the presentation is available on my website at [wireless.org.uk](http://wireless.org.uk) and on GOMRF.com if you want to see the full table of results.

I was recently given the opportunity to try the new version of the basic SDR-Play receiver, the RSP1A. As an owner of the old RSP1 I was interested to see how the two compared in LF and MF use.

I live 12 miles from the high-power transmitters at Droitwich and in the major lobe of the medium wave antenna. The combination of 198, 693, 1053 and 1215kHz at high level gives any receiver a hard time. I can't even use an IC-7300 on 160m without installing a high-pass filter! My LF and MF receivers have band-pass filters in front in order to make them useable, but just out of interest I decided to try the RSPs on a 100ft untuned wire antenna to see how they coped. This is the situation that many casual users may be in when they first try receiving on LF.

I used the SDRUno software recommended by the manufacturers and tried listening to two known signals: the German data transmission on 138.8kHz and Birmingham airport's NDB on 406kHz, both of which should be '5 & 9' on a properly set up LF receiver. The RSP1 managed to receive 138.8 at 25dB above noise in a 2.2kHz bandwidth whereas the new RSP1A managed 35dB with the MW band-stop filter in use, a very worthwhile improvement. Tuning to 406kHz I noticed a similar improvement on the new RSP: the old receiver gave 22dB above noise and the new one managed about 30dB, again with the MW filter in use. A 6dB improvement over the RSP1 was also seen at 60kHz when I checked the MSF time broadcast from Anthorn.

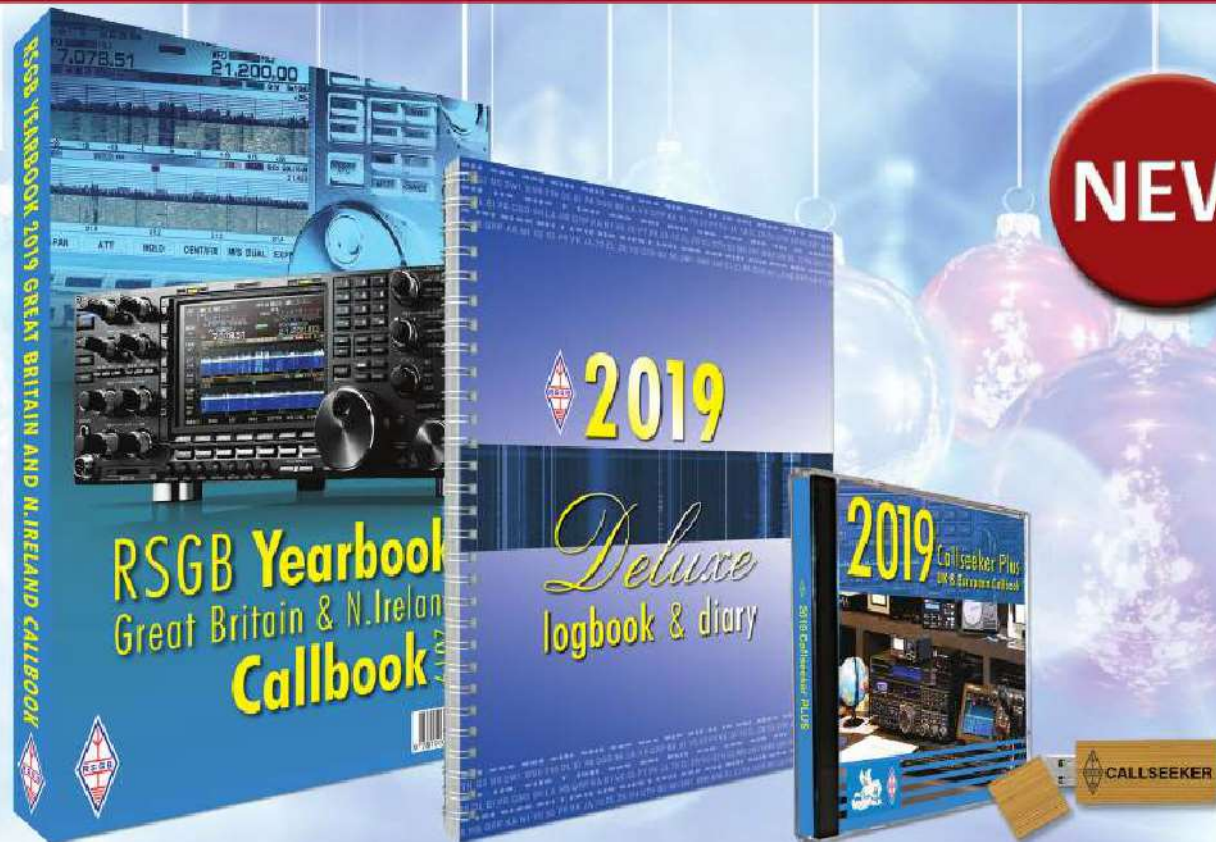
The key to the improved performance at my QTH is definitely the new MW notch filter, which has more than 30dB attenuation between 660kHz and 1,560kHz. The RSP1A also has FM band 2 and DAB notch filters.

Whilst experimenting with SDRUno I tried starting a second 'VRX' (virtual receiver) and found that I could monitor both the 136 and 472kHz bands simultaneously by routing one VRX to the left channel of my sound card and the other to the right. This may be a way to implement a dual band grabber if ever my SoftRock receivers fail!

The RSP1A is available from various outlets, including SDRplay themselves, for about £90. Thanks to SDRPlay for the loan of the RSP1A.

**Dave Pick, G3YXM**  
daveyxm@gmail.com





## RSGB YEARBOOK 2019   RSGB DELUXE LOGBOOK & DIARY 2019   CALLSEEKER PLUS 2019

Edited by Mike Browne, G3DIH

There are more Great Britain and Northern Ireland callsigns on issue than ever and they are all included in the *RSGB Yearbook 2019*. With thousands of changes and updates included, this book contains the very latest details available with around 88,000 callsigns

The *RSGB Yearbook 2019* is also the most comprehensive guide available to amateur radio in the UK and worldwide. Starting with the latest information about the RSGB, its committees and services you will also find local information about our regional representation, affiliated clubs, contest groups and repeater groups. There is a huge section on operating, which covers from operating abroad, through Special Contest calls, RSGB Trophies, RSGB Awards to HF propagation forecasts for 2019.

Providing much more than a simple list of callsigns, the *RSGB Yearbook 2019* is an essential purchase for every amateur radio shack. The *RSGB Yearbook 2019* puts at your fingertips the best source of amateur radio information available.

210x297mm 528 pages,  
ISBN: 9781 9101 9357 0

**Non Members' Price £17.99**

**RSGB Members' Price £15.29**

For many there is nothing better than looking at a well maintained log book to bring back memories of challenging QSOs and memories of old friends. The impersonal face of a computer log is replaced by the tactile and easy to follow log book. If you are looking for an attractive way to record your log year by year the *RSGB Deluxe Log Book & Diary 2019* provides an ideal solution.

This logbook contains a wealth of extra material. Not only is there a generous log section with plenty of space for you to record a whole year activity, but much more. The *RSGB Deluxe Log Book & Diary 2019* contains the latest UK Band plans, RSGB Contest Calendar, DXCC prefix list and RSGB QSL Bureau information. It has a locator map (and an explanation of how locators work), repeater information, diary section, notes pages, handy lists of operating abbreviations & codes - pretty much everything you want to know when operating is included. If you want to keep your log for years to come and make it easy to look over then the *RSGB Deluxe Log Book & Diary 2019* provides an attractive logbook that will grace any shelf for years to come.

Size 210x255mm, 80 pages  
ISBN: 9781 9101 9344 0

**Non Members' Price: £4.99**

**Members' Price: £4.24**

The *Callseeker Plus 2019* not only benefits from the very latest UK and Northern Ireland callsign data but it also offers a host of European callsign data too. It is so easy to search for the callsigns included all on a simple to use interface that takes up no hard disk space as it runs straight from the CD or memory stick. You can search quickly by callsign, name or location and navigating through the search results is quick and easy. You can even print the results in a variety of formats including straight to an address label.

*Callseeker Plus 2019* also includes the 50 sections and 170 pages of information from the *RSGB Yearbook 2019* in an easily searchable PDF format.

### Two formats - one price

The *Callseeker Plus 2019* is 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 are highly portable and easy to use and provide a great alternative to the traditional RSGB Yearbook.

CD Version: ISBN: 9781 9101 9358 7

Memory Stick: ISBN: 9781 9101 9359

**4 Non Members' Price: £16.99,**

**RSGB Members' Price: £14.44**

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



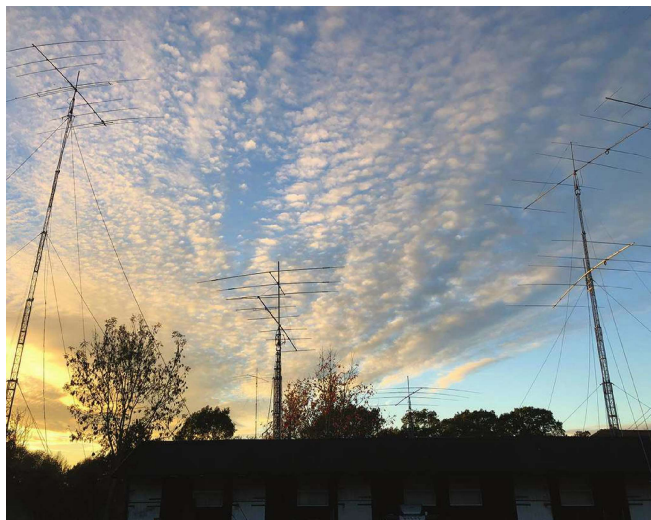
**Radio Society of Great Britain**  
**www.rsgbshop.org**

3 Abbey Court, Priory Business Park, Bedford, MK44 3WH.  
Tel: 01234 832 700 Fax: 01234 831 496

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



# HF



Some of the antennas at the M6T contest station in Suffolk. Photo courtesy M0SDV.



Some of the antennas at VK9XG. Photo courtesy G3TXF.

**D**espite a zero sunspot count for much of October and a Solar Flux Index around 70 (as low as it gets) there was some remarkable DX propagation on the higher bands.

Two simultaneous DXpeditions were on the air providing a lot of excitement. VK9XG, by the 6Gs, was active from Christmas Island at a range of 7,500 miles and a bearing just north of east. VP6D was active from Ducie Island at a slightly greater range of 9,000 miles and a bearing just north of west. Adjusting for time differences you might expect similar propagation to both islands and so it turned out. Both were worked from somewhere in the British Isles on all bands from 160 – 10m! Ducie was the harder one on HF with a few very brief openings on 15m and above between 1630 and 1900UTC, but may have been the easier one on LF. Sunrise shut down the morning LF propagation to Ducie from the rest of Europe before it affected the UK whereas for Christmas Island the UK always had to penetrate the wall of callers to the East.

I have noted before that the area around Pitcairn Island (including Easter Island and part of French Polynesia) is a propagation hotspot. But, as your target moves west across the Pacific, the path becomes more northerly and more difficult. Tonga is pretty much over the North Pole and you'll see what a difference that makes when the A35EU

team are on (see later). Moving further west from Tonga takes the path to a north-easterly direction and propagation improves to places like Guam, Palau, and Australia.

The CQWW SSB Contest at the end of October was a great test of propagation. Morning signals from the east on 15m were remarkable, with stations worked in China, Japan, Guam, Macao, Hong Kong, Malaysia (E & W), Indonesia, Philippines, Australia (VK2, 4, 8 and 9) and Cambodia. Even 10m produced Reunion Island, India and Christmas Island. The afternoon was less good as there were some openings to the US East Coast and the Caribbean but they were very patchy and generally only to the better-equipped contest stations.

Chris, G3SVL sent in a report from VK9XG, "The CQWW SSB Contest coincided with the last weekend of the 6Gs DXpedition to Christmas Island (VK9X). There was no record set for multi-two from VK9X and our aim was to remedy that. Our claimed score is 1.4m points from 1,500 QSOs. Doing the contest from the southern hemisphere was a new experience for the four of the team who operated. We found it difficult to break EU and NA pile ups and were largely search and pounce. It was hard going at times, with 10 of our 34 operating hours achieving fewer than 20 QSOs. On the plus side, the sheer joy in the voice of someone we had called when they worked out we were a contest-rare DXCC and Zone 29 mult made up for the low rate. We made 41 QSOs across the bands with 30 different UK stations – M6T

making it on all bands except 160m. Across the bands, UK QSOs looked like this: 160/0; 80/1; 40/3; 20/1; 15/30; 10/6."

The IOTA Management Team announced six new IOTA groups at the RSGB Convention last month. Details can be found on the IOTA-World website but in summary the islands are: Kataja Island (Sweden/Finland – Gulf of Bothnia), Morane Atoll (Tuamotu Islands), Puerto Rico's Coastal Islands (already activated by EI9FBB), Yakutat County Group (Alaska), Bering Sea Coast East Group (Siberia), and Kuril Islands North (Siberia). Two teams have announced plans for the Swedish/Finnish island as soon as the ice melts, a Russian team including R7AL and RA1ZZ will visit both the Siberian groups next summer, and Cezar, VE3LYC with Adrian, KO8SCA will head for Morane Atoll (OC-297P) and the very rare Acteon Group (OC-113) from 4-18 December this year (see <http://tx0a-tx0m.weebly.com>). A few more groups will be announced at Friedrichshafen next year.

## DXpeditions

PA3EWP, PA4WM, EI5IX and GM4FDM set out for Tonga (OC-049) to arrive mid-November to operate for approximately two weeks as A35EU. They will have three stations on the air, with vertical antennas (including VDAs), and may try 160 and 80 with inverted-Ls. Their licence does not include 60m but they will ask about it when they arrive. CW, SSB and RTTY for

the European openings will be the main priority. The rigs are K3s with amplifiers. See <https://tonga.ildxt.eu/>

The Russian Robinson Club will be active from Shif Island (AS-189P) in Iran from 17-23 November. They will be using the 160-10m bands on CW, SSB and FT8.

Nobu, JAOJHQ has announced plans to activate T32NH (OC-024) from the Captain Cook Hotel from 5-11 December, including the ARRL 10m Contest. Listen for him on FT8 and CW on 1.8 - 50MHz.

Sookun Chae, 4W/HL1AHS and Tae-Su Song, 4W/DS3EXX plan to be on the air from East Timor (OC-148) from 26 Nov to 3 Dec.

Stan, K5GO, will be operating from Cayman Brac (NA-016) as ZF9CW until early December.

DS4NMY is active as DT8A from King Sejong Station on King George Island (AN-010) in Antarctica until 18 December. He has an FT-1000MP Mark V Field with 100 watts to a dipole on 40/20/17/15/12. He operates FT8, CW and SSB.

Former RSGB President, Nick, G3RWF will be active as 5Z4LS from Kenya around the time of the CQWW CW contest in late November.

WB21QU will be in Samoa (OC-097) as 5W21Q on 40-10m from 18-27 November.

JA1FMN plans to be on the air as V63PSK from 19-25 November, from Weno Island in Chuuk State (OC-011). This will be a holiday style operation on 40-15, FT8 and JT65.

6V1A will be on Goree Island (AF-045) from 7-9 December with 6 local ops.

Alex, K2BB and Paul, UU0JR plan to be on the air from Nosy Be Island (NA-057) from 19-29 November. They are hoping to operate as 5R8R on CW, SSB and Digital modes on 1.8 to 28MHz.

TABLE 1: 2018 Worked DXCC Entities (ranked by All). Showing Top 4 from RSGB or British Isles table in Club Log plus submitted scores or Club Log scores of recent correspondents where available.

Call	CW	SSB	Data	All
M0NKR	164	203	180	263
G4TUK	156	144	213	261
G0DWV	175	172	166	250
G3TBK	235	156	127	239
G3PXT	104	125	204	222
CT7AGZ	196	1	165	217
G8APB				198
G3SVD	123	139	0	195
GI4DOH	175	6	87	193
G3SVK			179	179
G4IDL	165	0	64	168
G4XEX	81	87	125	168
G3HQT	161	0	0	161

JG8NQJ will be back at the weather station on Minami Torishima (OC-073) until mid-February 2019. In his spare time he will perate as JG8NQJ/JD1 mostly on CW, RTTY and satellite using an FT-450 with 50W into a two element HB9CV for 17 and 20m.

Correspondence

(FT8 in italics where known). New correspondent Paul, G3XKQ, wrote in with an exclusively 40m CW report. He uses 400W to a ground plane with elevated radials – and it clearly works well. He found: 3B9FR, 6D50I, 7Q6M, 8Q7s, 9K2NO, 9V1YC, 9X0T, A75GM, CEs, DPOGVN, DT8A, FM5FJ, FY/DL5FAB, HC2AO, JY5HX, KL7SB, LUs, P4/DL1AOB, PZ5JW, RI1ANL, TI5/N3KS, VP6D, VK9XG, VK9XT, VKs, Ws 0-9, XE1RK, XT2SZZ, YB0ARJ, YJ0GC, Z23MD, ZD9CW, ZLs.

Ken, CT7AGZ said October had been a bumper DX month with two ATNOs in the form of YJ0GC and VP6D. He found: 10m – LU8EX, HI8S, 9Z4Y, J35X, LU5UEA, XQ6CFX, D44TWO, 9Z4Y, TR8CA, CX7CO, 3B9FR, P4/DK8YY, 9X0T; 12m – J68GD, TU5MH, VP6D, SU9JG, A41ZZ, RI1ANL, D44TWO, YB1TAM, J35X, VU2ABS, CE7KF, KG4HF, Z21MH, 3B8FA, FR4KL, 3B9FR, 9X0T; 15m – 6D50I, VP6D, XT2SZZ, PJ4/NE9U, TU5MH, DT8A, KG4HF, J6/K1ZZI, TI2CC, V51MA, V47JA, P4/NN5E, PZ5RA, 9Q6BB, FR4PF, ZD9CW, 8Q7YC, SU9JG, D44TWO, TT8KO, 3B9FR, YV6CA, A61FK, A92GE, VK8AW, A41ZZ, 9X0Y, TO6OK, 9X0T; 17m – VP9/W4GE, VP6D, J68GD, TU5MH, VK9XG, 7X5FG, A75GA, 8Q7PE, D44TWO, OY1CT, KG4SS, 4J100RO; 20m – Z23MH, VP9/K4AJA, VP6D, 4U1ITU, 8Q7YC, 9X0T; 30m – TU5MH, YJ0GC, 8Q7YC, 9X0T, 7X5FG, OX3XR; 40m – VP6D, VK9XG, VP6D, YJ0GC, 8Q7YC, 9X0Y; 80m – ZL3IO, V31MA, P4/DL1AWD, D44TWO, V31MA, 4S7AB, 7X4AN, A41MS, 9K2HS; 160m – D44TWO. It seems that southern Europe is the place to be for DX.

Peter, G4XEX comments that DX stations should pay more attention to the information on the cluster to avoid putting their pile-ups on

TABLE 2: Forthcoming DX activity.

Until 27 Nov	A35EU
Until 18 Dec	DT8A
17-23 Nov	VP2MUW
17-23 Nov	Shif Island AS-189P
18-27 Nov	5W21Q
19-25 Nov	V63PSK
19-29 Nov	5R8R
21-28 Nov	J8NY
26 Nov – 3 Dec	4W activity
5-11 Dec	T32NH
6-16 Dec	OC-113 and OC-297P
7-9 Dec	6V1A (AF-045)
August 2019	St Paul Island
2020	Sable Island

top of a simplex operation just above them. He found: 15m XT2SZZ, ZS6JES; 17m – FM5FJ, J68GD; 20m – KG4SS, YV5AAX, P4/NN5E, KG4HF, VA7DP, ZL3NB, VK2QV, FP/DK7L/M, PJ2/KB7Q, 6D50I, 9X9PJ, 9Q6BB, P4/NT5B, ZF1A, D4C, FY5KE, OX7A, E44WE.

Peter, G3HQT was pleased with his DX haul achieved without using FT8: 15m – ZD7BG; 17m – KG4HF, XT2SZZ; 20m – D44TWO, FK8IK; 30m – 9X0T, VK9XG, VP6D, YJ0GC; 40m – 8Q7YC.

Fred, G3SVK found: 17m – ZS2I, S01WS, 9X0T, ZD9CW, TO6OK, XT2SSZ, VK9XG; 20m – TO6OK, P4/DL1AOB, V85TL, HS5NMF, 9M2YDX, HS0ZJU, HS2NBR, YC6MYO, D44TWO, 9M2PJL, SV2ASP/A (Mt. Athos), HS2KWO, 3B9FR, XT2SZZ, 9M6ZAE, 5R8UI, PZ5K, VP9/AA4V, VP9/K4AJA; 40m – FM5FJ, 9X0T, P4/DL1AOB, TT8KO, FY/DL5FAB, HZ1TT, 8Q7YC, RI1ANL, 8Q7PE, PJ2/QI9WI, TF3WK, CO2WD, P4OT, XT2SZZ, PJ4/NE9U, J88GD, LU1DK, VP6D, JT1CO, VK9XG, 9K2NO, N4SF/VP9, F6CUK/FJ, ZF2IN, ZF2RR, PZ5K, VP9/AA4V, 3B9FR, BD7LMD, JH1HDT, Z61DX, 7Q6M.

Chris, G8APB found a wide range of DX on his verticals and 4-ele SteppIR: 10m – CA3BD, VP8NO, FR5FC; 12m – TA4SO, ZS6WN; 15m – CM2RSV, HI8S, KG4HF, HK3W, PYs, ZP6ARO, CE5AUC, CX1RL, LUs, VU2IBI, YC1CUZ, 9G5AR, ZS6WW; 17m – TO6OK, XE2JS, CO3JR, VP2ETE, NP3DM, KG4HF, HK3C, CE2SQE, LU5VW, TA9P, AP2MQ, VK8ZI, YB4NY, ZS6WB, FR4OS, 3B8GF; 20m – VP9AD, HI8MDQ, T45FM, CE3OP, AP2HA, VU2AF, 9K2OF, BG9NJY, BX2AFU, JAs, DS2GOO/3, HS5NMF, DU1/JH1FNS, YF3ESW, VK7BBB, VK2DX, ZL3NB, JW9L; 30m – VK3VM, ZS3AZ, ZS6JES; 40m – EX7DY, A41ZZ, BG9HKP, BV2FB, BI4SDT, HS1EDI, VR2IL, YF7SPN, YC8PB, VK2LAW, VK3GL; 160m – OX3LX.

Finally, Gordon, G3PXT had another busy month: 15m – K4AJA/VP9, KG4HF, YB; 17m – D44TWO, BY, CO, JA; 20m – P49X, D44TWO, VK9XT, HK4GSO, HI8S, KG4WV, JA, ZL, VP6D, E44WE, VP5W, ZF1A; 40m – LU, VK, VP9AD, BY, HI8PAP, YB, KV4FZ, VP6D, P4OT, VK9XG, ZF1A, ZF9CW, KP3Z, PZ5K; 80m – LU, CO, TR8CA, XE1USG, ZL2OK. He has now automated FT8 so that he doesn't need to touch the keyboard at all. His slightly-bent-at-the-ends 80m dipole has produced 90 DXCCs this year.

Finally

Thanks as always to my correspondents, to DX-World, 425 DX News and Daily DX.

Martin Atherton, G3ZAY  
g3zay@btinternet.com





Radio Communication Manufacturer & Reseller

**Sales line 01908 281705**

E-mail [sales@moonraker.eu](mailto:sales@moonraker.eu)

**CK LIVE STOCK LI**

**www.moonraker.eu**

**YAESU**



#### Base

<b>FT-DX3000</b> HF/50MHz 100W Transceiver.....	<b>£1449.00</b>
<b>FT-DX1200</b> HF/50MHz 100W Transceiver.....	<b>£929.00</b>
<b>FT-991A</b> HF/50/144/430 MHz All mode field transceiver .....	<b>£1199.00</b>
<b>FT-450D</b> HF/50MHz entry level transceiver .....	<b>£569.00</b>

#### Mobile/Portable

<b>FT-857D</b> HF/VHF/UHF 160-70cm 100W SSB/AM/CW/FM Transceiver.....	<b>£685.00</b>
<b>FT-891</b> HF/50MHz 160-6m 100W all mode transceiver.....	<b>£589.00</b>
<b>FT-817ND</b> HF/VHF/UHF 160-70cm 5W backpack transceiver .....	<b>£525.00</b>
<b>FTM-400XDE</b> Dual band 2/70cm digital mobile transceiver .....	<b>£479.00</b>
<b>FTM-100DE</b> Dual band 2/70cm digital mobile transceiver .....	<b>£299.00</b>
<b>FT-8900</b> Quad band 10/6/2/70cm mobile transceiver .....	<b>£269.00</b>
<b>FT-7900</b> Dual band 2/70cm mobile transceiver .....	<b>£249.00</b>
<b>FTM-3200DE</b> 2m digital mobile transceiver.....	<b>£179.00</b>
<b>FT-2980E</b> 2m FM 80W mobile transceiver.....	<b>£149.00</b>
<b>FTM-3100DE</b> 2m analogue transceiver.....	<b>£129.00</b>

#### Handheld

<b>FT-2DE</b> Digital dual band 2/70cm handheld transceiver.....	<b>£379.00</b>
<b>FT-70DE</b> Digital dual band 2/70cm handheld transceiver .....	<b>£189.00</b>
<b>VX-8DE</b> Tri-band 6/2/70cm handheld transceiver .....	<b>£289.00</b>
<b>VX-6E</b> Dual band 2/70cm handheld transceiver.....	<b>£159.00</b>
<b>VX-3E</b> Dual band 2/70cm handheld mini transceiver.....	<b>£139.00</b>
<b>FT-65E</b> Dual band 2/70cm entry level handheld transceiver.....	<b>£89.95</b>
<b>FT-25E</b> Single band 2m band transceiver.....	<b>£69.00</b>

**TYT**



**Now you can go digital on the road with the TYT MD-9600 DMR Digital Mobile Two-Way Radio!** The MD-9600 gives you crystal clear, noise-free audio of over-the-air digital communications in your vehicle, full analogue transceiver capabilities, and bundles it all together at a price you can afford!.....**£279.95**

**Inrico**



#### TM-7 Network Mobile Radio £139.95

Android based POC Radio (PTT over Cellular)  
The Inrico TM-7 network radio is the first mobile network radio. Great for amateur radio use with the new IRN platform, for Zello, Team Speak 3 and Echolink via 3G or WiFi. And it works as WiFi hotspot too!



#### T320 4G/WiFi Network Handheld Radio £169.95

This radio is cellular so works like a walkie talkie but uses the cellular network as a repeater! This means hand held to hand held or handheld to mobile comms around the world. Companies like ID offer a suitable sim with EU roaming from £3.99 a month or if you are in the UK Freedomop is available otherwise you can use it on WiFi! Using Apps like Zello & Teamspeak you can talk privately for just the cost of your sim! Please note this radio does not transmit on the amateur bands. For the Radio amateur you can link to many networks using the International Radio Network. For the non-amateur think of it as well behaved CB with worldwide coverage or Private 1 to 1 calls! For the private use all the advantages of cell phone coverage while looking professional. Please note this version uses unlocked Android and allows you to fully utilise the PTT functions

#### Features

- Intelligent Global Intercom • More than 80 Hours standby time
- Dual chamber speaker to give Enhanced audio • GPS built in
- Micro 5 pin data line • Supports MP3 & MP4 • 2.4 inch High Quality Screen
- Extended memory up to 32GB • Waterproof IP54

#### DMR Dual Band Transceiver

**MOONRAKER**

Dual Band DMR has arrived with twice the fun with the MOONRAKER HT-500D Dual Band DMR Digital & Analogue hand held Radio!

The HT-500D takes the experience of DMR to a new level with features designed for the amateur radio user.

**Amazing value £199.99!**



#### MT-270M

Dual band mobile transceiver  
136-174/400-450MHz 25W

**Amazing value £79.95!**



**MT-SC** Software cable .....

**£9.95**

**MT-DC** Cigarette lighter and power cable .....

**£9.95**

**MT-RM** Replacement microphone.....

**£12.95**

**PRESIDENT ELECTRONICS**

#### Ronald

10/12m mobile transceiver  
AM/FM 50W+ PEP

**Amazing value £169.95!**



**Lincoln II** Plus 10/12m mobile transceiver AM/FM/LSB/USB/CW 35W ... **£239.95**



**AnyTone**

#### AT-778UV

Dual band 136-174/400-490MHz  
30W FM mobile transceiver  
**Amazing value £99.95!**

#### AT-D868UV

VHF/UHF DMR Handheld **£139.95**

The AnyTone D868UV radio was designed to conform to the DMR Tier I and II requirements. The radio offers 4,000 Channels, 10,000 Digital Talk Groups with 150,000 Contacts. The large colour display offers clear information about the radio operation and function, including displaying who you are connected to. The powerful transmitter is very reliable and offers up to 7 Watts of power for a hand-held. The Anytone AT-D868UV has been designed for radio amateurs and has the ability to take the radio outside of the code plug in VFO mode (Single button press) So it is a dual band Hand held with DMR rather than a DMR radio with a dual band handy!



**LEIXEN**



#### WV-898 £59.95

Dual Band  
136-174/400-470MHz 10W  
mobile transceiver

**WV-898S** Dual Band 136-174/400-470MHz 25W mobile transceiver..... **£69.95**

**WV-898SP** Dual Band 136-174/400-470MHz 25W mobile backpack transceiver, this mobile backpack transceiver you can take virtually anywhere you need it! Leixen combined their micro-compact, 25 watt Dual Band UHF/VHF Mobile Radio with a powerful 12A Li-Ion rechargeable battery and put it all in a sturdy chassis you can fit in your pack or emergency bag for use anytime, anywhere! .. **£149.95**

**WV-89C** software and cable for all Leixen transceivers

**ICOM**

#### Base



#### IC-7610 HF/50MHz SDR base transceiver ..... £3499.95

Following on from the technology incorporated into the IC-7300, the IC-7610 adopts the same RF direct sampling system for signal processing. By converting the analogue signal directly to a digital signal and processing it within the FPGA (Field Programmable Gate Array), it provides improved transmission phase noise and excellent RMDR of 105 dB (at 1 kHz detuning).



#### IC-7300 HF/50/70MHz base transceiver ..... £1199.00

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.

#### Mobile



#### ID-4100 D-Star dual band mobile transceiver ..... £475.00

The ID-4100 makes using DSTAR more fun and more comfortable thanks to the terminal mode / access point mode for the first time in mobile devices. This feature enables DSTAR via the Internet from any location you do not have access to a DSTAR repeater.

#### IC-2730E Dual band mobile transceiver ..... £289.00

This stunning new dual band mobile transceiver features a large high-contrast LCD screen with backlight, V/V and U/U simultaneous receive capability and optional Bluetooth® connectivity for hands-free and remote control communications.

**SPECIAL OFFER • SPECIAL OFFER**

**ICOM ID-4100**  
**£299.95**

**BAOFENG**

New version of this ever popular handle - and now with a 4.5W on 2m - Comes complete with desktop charger, antenna, belt clip & high power 1800mAh battery and now with FREE earpiece all for less than £30!

**UV-5SRC+** Dual band 136-174/400-480MHz 4.5W handheld transceiver..... **£29.95**

**BL-5** Replacement 1800mAh battery..... **£12.95**

**UV-5SM** F1st speaker microphone..... **£9.95**

**UV-5BE** Battery eliminator..... **£9.95**

**UV-5SC** Soft case..... **£9.95**

**UV-5PC** Software cable..... **£9.95**



**NEW IN • NEW IN • NEW IN • NEW IN**

#### Baofeng DM-9HX DMR Digital & Analogue Transceiver ..... £89.95

Another great product from Baofeng making DMR affordable to everyone. Comes complete with high gain antenna, belt clip, hand strap, desktop charger, 3800mAh battery, user manual and earpiece

- Text receiving and sending with at most 64 characters.
- Frequency editing under Channel mode
- Digital Monitor Mode: support communication when frequency, time slot and colour code is paired, regardless of Contact ID, RX Group list

Customize shortcut keys: including long-press and short-press with Side Keys. Edit shortcut keys with Programming Software.

- Support analog repeaters and digital ones
- Dual-standby and dual display
- Driver-free programming cable, plug and play



**NEW IN • NEW IN • NEW IN • NEW IN**

**Are you a Retailer or an E-tailer looking for a better deal to compete online? - then contact us NOW!**

**www.moonraker.eu**

## MOONRAKER

### Yagi Antennas

All Yagis have high quality gamma match fittings with stainless steel fixings! (excluding Y64-2C)

<b>Y627-35</b> Dual band 3/5 element 3.5/12.5 dBd gain with one feed!.....	<b>£79.95</b>
<b>Y64-2C</b> 2 metre 4 Element (Boom 48") (Gain 7dBd).....	<b>£29.95</b>
<b>Y65-2</b> 2 metre 5 Element (Boom 63") (Gain 10dBd).....	<b>£69.95</b>
<b>Y68-2</b> 2 metre 8 Element (Boom 125") (Gain 12dBd).....	<b>£99.95</b>
<b>Y63-4</b> 4 metre 3 Element (Boom 45") (Gain 8dBd).....	<b>£79.95</b>
<b>Y65-4</b> 4 metre 5 Element (Boom 104") (Gain 10dBd).....	<b>£99.95</b>
<b>Y63-6</b> 6 metre 3 Element (Boom 72") (Gain 7.5dBd).....	<b>£99.95</b>
<b>Y65-6</b> 6 metre 5 Element (Boom 142") (Gain 9.5dBd).....	<b>£119.95</b>

### ZL Special Yagi Antennas

The ZL special gives you a massive gain for the smallest boom length ... no wonder they are our best selling Yagis!

<b>ZL5-2</b> 2 Metre 5 Ele, Boom 95cm, Gain 9.5dBd.....	<b>£69.95</b>
<b>ZL7-2</b> 2 Metre 7 Ele, Boom 150cm, Gain 11.5dBd.....	<b>£79.95</b>
<b>ZL7-70</b> 70cm 7 Ele, Boom 70cm, Gain 11.5dBd.....	<b>£49.95</b>
<b>ZL12-70</b> 70cm 12 Ele, Boom 120cm, Gain 14dBd.....	<b>£59.95</b>

### HB9CV

Brilliant 2 element beams ... ideal for portable use

<b>HB9-2</b> .....	<b>£34.95</b>
<b>HB9-4</b> .....	<b>£49.95</b>
<b>HB9-6</b> .....	<b>£59.95</b>

### Halo Loops

Our most popular compact antennas, great base, mobile, portable, or wherever!

<b>HLP-4</b> 4 mtr (size approx 600mm square).....	<b>£44. 95</b>
<b>HLP-6</b> 6 mtr (size approx 800mm square).....	<b>£49.95</b>

## MOONRAKER

### QRP Antennas

The Moonraker Whip range are great for getting on HF in a neat compact and totally portable way

**Whizz Whip** HF/HF/UHF portable antenna with telescopic whip - ideal for any situation where a long wire or vertical antenna is just not an option - get on air today for **just £99.95**

**Whizz Loop** 20-60m compact loop is ideal for QRP Transceivers when space is limited or using portable with a Yaesu FT-817ND or similar. Can be used indoors with surprising results and handy for travelling due to its "pocket" size antenna ideal for indoor or out and can be packed away and all for just **£69.95**

**Whizz Loop V2** (right) same as above but with a frequency range from 40-10m.....**£79.95**

## MOONRAKER

### Base Antennas

Simple plug and play HF antennas radial free and at a great price

<b>GP2500</b> All Band 80-6M Vertical TX 80-6M RX 2-90MHz, Power 250W Length 7.13M.....	<b>£199.95</b>
<b>GPA-80</b> budget version of GP2500 80-6M Length 6.0M.....	<b>£99.95</b>

## MOONRAKER

### Portable HF Kits

Great dual band kits for portable use, two compact dipoles on an upto 14ft mast just requires coax

<b>PK1217</b> HF Kit for 12/17M.....	<b>£149.95</b>
<b>PK1520</b> HF Kit for 15/20M.....	<b>£149.95</b>
<b>PK3060</b> HF Kit for 30/60M.....	<b>£154.95</b>
<b>PK4080</b> HF Kit for 40/80M.....	<b>£159.95</b>

(please note each kit requires two feeds)

### Mobile Antenna Mounts

<b>TRIMAG-S</b> Triple magnetic mount with S0239 antenna fitting with 4m RG58 and PL259 fitted - ideal for those larger antennas.....	<b>just £39.95</b>
<b>TURBO-S</b> single 170mm magnetic mount with S0239 antenna fitting with 4m RG58 and PL259 fitted - will suit most antennas upto 5ft.....	<b>£19.95</b>
<b>HKITHD-S0</b> Heavy duty hatch back mount with S0239 antenna fitting with 4m RG58 and PL259 fitted.....	<b>£32.95</b>
<b>HKITM-S</b> Mini hatch back mount with S0239 antenna fitting with 4m RG58 and PL259 fitted.....	<b>£32.95</b>



## MOONRAKER

### Multiband Mobile

Why buy loads of different antennas when Moonraker has one to cover all! SPX series has a unique fly lead and socket for quick band changing

<b>SPX-100</b> 9 Band plug n' go portable, 6/10/12/15/17/20/30/40/80m, Length 165cm retracted just 0.5m, Power 50W complete with 38th PL259 or BNC fitting to suit all applications, mobile portable or base - brilliant! .....	<b>£44.95</b>
<b>SPX-200S</b> 6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, PL259 fitting.....	<b>£44.95</b>
<b>SPX-300S</b> 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W, PL259 fitting.....	<b>£59.95</b>

## MOONRAKER

### VHF/UHF Mobiles

<b>GF151</b> Glass Mount 2/70cm, Gain 2.9/4.3dBd, Length 78cm complete with 4m cable and PL259.....	<b>£29.95</b>
<b>MRM-100</b> MICRO MAG 2/70cm, Gain 0.5/3.0dBd, Length 55cm, 1" magnetic base with 4m coax and BNC.....	<b>£19.95</b>
<b>MR700</b> 2/70cm, Gain 0/3.0dBd, Length 50cm, 3/8 fitting.....	<b>£9.95</b>
<b>MR777</b> 2/70cm, Gain 2.8/4.8dBd, Length 150cm, 3/8 fitting.....	<b>£19.95</b>
<b>MRQ525</b> 2/70cm, Gain 0.5/3.2dBd, Length 43cm, PL259 fitting (high quality).....	<b>£19.95</b>
<b>MRQ500</b> 2/70cm, Gain 3.2/5.8dBd, Length 95cm, PL259 fitting (high quality).....	<b>£26.95</b>
<b>MRQ750</b> 2/70cm, Gain 5.5/8.0dBd, Length 150cm, PL259 fitting (high quality).....	<b>£36.95</b>
<b>MRQ800</b> 6/2/70cm Gain 3.0dB/5.0/7.5dBdBd, Length 150cm, PL259 fitting (high quality).....	<b>£39.95</b>
<b>MRQ273</b> 2/70/23cm Gain 3.5/5.5/7.5dBdBd, Length 85cm, PL259 fitting (high quality).....	<b>£49.95</b>
<b>MRQ900</b> 10/6/2/70cm Gain 10m (2.15dB) 6m(2.5dB) 2m (2.8dB) 70cm (5.5dB) Length: 125cm PL259 fitting.....	<b>£49.95</b>

## MOONRAKER

### Coax Switches

<b>CS201</b> 2 Way Switch 3 X S0239, 2500W 1-1000MHz.....	<b>£19.95</b>
<b>CS201N</b> 2 Way Switch 3 X N-Type, 2500W 1-1000MHz.....	<b>£24.95</b>

### Lightning Arrestors

<b>ST-1</b> S0239 to PL259 adapter with earth wire connection.....	<b>£4.95</b>
<b>CDX-1</b> Lightning Arrestor 2 X S0239 sockets 400W.....	<b>£19.99</b>

### Dummy Loads

<b>DL-15</b> PL259 DC-800MHz 15W CW 20W 50 Ohms.....	<b>£24.95</b>
<b>DL-15N</b> N-Type DC-800MHz 15W CW 20W 50 Ohms.....	<b>£29.95</b>

### SWR Meters

<b>SWR-100</b> Frequency 26-30MHz 100W 50 Ohms.....	<b>£16.95</b>
<b>SWR-270</b> Frequency 120-500MHz 100W 50 Ohms.....	<b>£29.95</b>

### Ferrites

<b>FCS-S</b> to suit 6mm cable such as RG58.....	<b>£1.95</b>
<b>FCS-M</b> to suit 7mm cable such as MIN18.....	<b>£2.95</b>
<b>FCS-L</b> to suit 9mm cable such as RG213.....	<b>£3.95</b>

### GRP Fibreglass Base Antennas

### Diamond quality - Moonraker pricing

Diamond quality - Moonraker prices! These high gain antennas have been pre-tuned for your convenience, easy to use, easy to install, and a choice of connection ... look no further

<b>SQBM100P</b> 2/70cm 3.00/6.00dBd, RX 25-2000MHz, Length 100cm S0239.....	<b>£49.95 special offer £39.95</b>
<b>SQBM200P</b> 2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, S0239.....	<b>£54.95 special offer £44.95</b>
<b>SQBM500P</b> 2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, S0239.....	<b>£74.95 special offer £69.95</b>
<b>SQBM1000P</b> 6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, S0239.....	<b>£84.95</b>
<b>SQBM223N</b> 2/70/23cm, Gain 4.5/7.5/12.5dBd, RX 25-2000MHz, Length 155cm, N-Type.....	<b>£79.95</b>
<b>SQBM4010P</b> Quadband 10/4/2/70cm Gain 2.5/3.2/3.6/5.5dBd Length 120cm.....	<b>£69.95</b>
<b>SQBM6010P</b> Quadband 10/6/2/70cm Gain 2.5/3.0/3.6/5.5dBd Length 120cm.....	<b>£69.95</b>
<b>SQBM4060P</b> Quadband 6/4/2/70 Gain: 2.5/3.0/3.6/5.5dBd Length 120cm.....	<b>£69.95</b>

## MOONRAKER

### HF Wire Antennas

All our HF wire antennas are made with complete waterproof potted baluns and high quality "original" flexweave antenna wire.

<b>MDHF-80</b> 3.5MHz balun matched mono dipole, length 40m.....	<b>£59.95</b>
<b>MDHF-40</b> 7.0MHz balun matched mono dipole, length 20m.....	<b>£44.95</b>
<b>MDHF-20</b> 14MHz balun matched mono dipole, length 10m.....	<b>£39.95</b>
<b>OSHF-80</b> 3.5-30MHz balun matched off set dipole, length 40m.....	<b>£59.95</b>
<b>OSHF-40</b> 7.0-30MHz balun matched off set dipole, length 22m.....	<b>£44.95</b>
<b>OSHF-20</b> 14-30MHz balun matched off set dipole, length 11m.....	<b>£39.95</b>
<b>LWHF-160</b> 1.8-50MHz unun match end fed antenna, length 42m.....	<b>£49.95</b>
<b>LWHF-80</b> 3.5-50MHz unun match end fed antenna, length 20m.....	<b>£44.95</b>
<b>LWHF-40</b> 7.0-50MHz unun match end fed antenna, length 10m.....	<b>£39.95</b>

## MOONRAKER

Get great results with the Moonraker range of HF mobiles! From as little as £22.95!

### HF Mobiles

<b>AMPRO-10</b> Slim line design 28MHz 2m approx. 3/8th fitting.....	<b>£22.95</b>
<b>AMPRO-11</b> Slim line design 27MHz 2m approx. 3/8th fitting.....	<b>£22.95</b>
<b>AMPRO-12</b> Slim line design 24MHz 2m approx. 3/8th fitting.....	<b>£22.95</b>
<b>AMPRO-15</b> Slim line design 21MHz 2m approx. 3/8th fitting.....	<b>£22.95</b>
<b>AMPRO-17</b> Slim line design 18MHz 2m approx. 3/8th fitting.....	<b>£22.95</b>
<b>AMPRO-20</b> Slim line design 14MHz 2m approx. 3/8th fitting.....	<b>£22.95</b>
<b>AMPRO-30</b> Slim line design 10MHz 2m approx. 3/8th fitting.....	<b>£22.95</b>
<b>AMPRO-40</b> Slim line design 7MHz 2m approx. 3/8th fitting.....	<b>£22.95</b>
<b>AMPRO-60</b> Slim line design 5MHz 2m approx. 3/8th fitting.....	<b>£24.95</b>
<b>AMPRO-80</b> Slim line design 3.5MHz 2m approx. 3/8th fitting.....	<b>£27.95</b>
<b>AMPRO-160</b> Slim line design 1.8MHz 2m approx. 3/8th fitting.....	<b>£59.95</b>

Other frequencies available. Call or see online for more details.

## MOONRAKER

### Baluns & Ununs

High quality TX, RX baluns, and Ununs all fully potted and weather protected with S0239 socket

<b>MB-1</b> 1-30MHz 1:1 Current Balun 400W 50 Ohms.....	<b>£29.95</b>
<b>MB-4</b> 1-30MHz 4:1 Current Balun 400W 50 Ohms.....	<b>£29.95</b>
<b>MB-6</b> 1-30MHz 6:1 Current Balun 400W 50 Ohms.....	<b>£29.95</b>
<b>MB-1X</b> 1-30MHz 1:1 Current Balun 1000W 50 Ohms.....	<b>£39.95</b>
<b>MB-4X</b> 1-30MHz 4:1 Current Balun 1000W 50 Ohms.....	<b>£39.95</b>
<b>MB-6X</b> 1-30MHz 6:1 Current Balun 1000W 50 Ohms.....	<b>£39.95</b>
<b>MU-9</b> 1-50MHz 9:1 Unun 500W 50 Ohms.....	<b>£29.95</b>
<b>LWB-1</b> 0-40MHz Receive only 50 Ohms.....	<b>£24.95</b>



**COME AND VISIT US FOR A BROWSE, FRIENDLY IMPARTIAL ADVICE AND EXTRA INSTORE DISCOUNTS**

**OPEN**  
9:00AM-5:30PM  
MON-FRI

The largest stockist of Amateur, Scanner, CB and Hobby Radio products for 60 miles around. Plenty of parking and easy access from the M1 - come for a visit soon.

MOONRAKER





# VHF/UHF

**L**ast month we saw more high pressure systems across Europe and excellent DX on 2m and 70cm.

There were extraordinary conditions for October with two separate significant high pressure systems covering large swaths of Iberia, Central and Northern Europe. October is not usually known for such intense openings but many will recall back in the 1980s one of the UHF weekend contests occurred during super conditions on all UHF bands with 70cm sounding something like 40m!

On 6m there were isolated Sporadic-E openings to the Balkans and Italy coinciding nicely with the RSGB 6m AFS contest on 21 October. There were also QSOs into Scandinavia with SM4KYN (JO69) being very popular.

The main story however is the super tropo that occurred on 23-25 October favouring mainly south coast UK stations with some QSOs in Italy on 70cm, which are quite extraordinary.

## Band Reports

Dave, G7RAU (IN79) reports an amazing three days from 23-25 October with 2m wide open to DL, EA1, EA2, EA3, EA4, EA8, EI, F, G, GD, GI, GJ, GM, GU, GW, HB, I, OE, OK, ON, OZ, PA and SM. During the period Dave worked 492 QSOs on 2m in 102 squares and 18 DXCC. On 70cm 49 squares and 14 DXCC were worked. These QSOs were all a mixture of SSB/CW and FT8.

Highlights on 2m were 17 Italian stations with best DX to IK0IXO (JN52) and IK0BZY (JN61 Rome) at an amazing distance of 1634km. Notwithstanding the conditions on 2m, Dave completed with IK2OFO (JN45), which is an incredible distance on 70cm. On 2m again the strongest signal on the band by far was I3MEK (JN55) who was 59+30dB. Dave worked 38 EA stations across locator squares IL18, JN11, JN12, IN52, IN62, IN71 and IN82. A got-away was an EA4 in IN80, where Dave couldn't break into the local QSO.

Conditions to the east were excellent with nine OE stations worked on 2m and two on 70cm. Best was JN78, OK in JN69, JO60 and JO70 and DL as far as JO73 and OZ / SM in JO55, 46, 47 and 65. On the 24<sup>th</sup>, as Dave left for work at 0500UTC, beacons from Corsica (JN41) were very strong. Dave saw



The 2m EME (moonbounce) antenna at 9N7AP - with a stunning backdrop.

another 14 different Italian stations in FT8 on 2m whilst he was stuck in meetings. The big point to this opening was the intensity. Dave had  $\pm 100\text{kHz}$  blocking issues in the EA1 direction due to one of the ED1 beacons overloading the rig pegging the S-meter. On 2m and 70cm, HB9 beacons were the same strength, clearly some very select and low loss ducting. Dave spent most of his time using CW/SSB with some on FT8 and JT65. Dave comments that although he is in a well sort after locator, the activity when conditions are good it quite amazing.

Jon, G4MCU (JO01) writes, "After several decades of absence, I have been operational on 2m SSB since the end of February 2018. I have been using an old Eighties FT-290R and a small amplifier running only 25 watts to a 7-element antenna. I had not observed any spectacular tropo openings from Essex until 8 October when there was an excellent duct from JO01 to Scandinavia. During the evening I worked: OZ60L (JO65) 878km, SM7DTT (JO65) 923km and SM7NR (JO76) at an excellent distance of 1091km. During the morning of the 9<sup>th</sup> I worked SM7NR again with minimal activity detected from UK.

"On 70cm with 1W SSB from an FT-790R I worked OV2T (JO46) 774 km, OZ9FW (JO65) 882km and, in the 70cm UKAC on the 9<sup>th</sup>, with 1W SK7MW (JO65) 923km. The opening seemed very localised. There was not much good propagation in between; at least as far as my location in Hockley, Essex was concerned. However, good results can be had with a modest station."

Paul, G3YDY (JO01) has been very active on a number of the VHF bands. However, embracing the use of FT8 has brought a number of new locator squares and DXCCs. Using 2m FT8 he managed 8 new locator

squares and one new DXCC this month. Best DX being DK4MD in JN68. He was called by an OE on the 20<sup>th</sup> but that QSO was not completed. Some stats: 464 QSOs completed in 15 DXCC and 75 squares. A few SSB QSOs have been completed on 2m but nothing special worked. One less common QSO completed on 23 October was a JT9F Fast with DL9LBH in JN59 781km. Perhaps more use of this mode should be made on 2m. On 70cm FT8 there were 3 new locator squares worked this month, best DX being DG0KW (JO64) 890km on the 8<sup>th</sup>. Some stats for this band are 39 QSOs completed in 7 DXCC and 21 locator squares. There was also some nice DX for the October UKAC on this band best DX being SM7NR in JO76 1096km, S9 reports each way.

Bob, G8HGN (JO01) had an interesting and productive month. A few new squares worked and plenty of activity. Openings noted on the 5<sup>th</sup> to EA, 8th to 10th to OZ/SM and 18<sup>th</sup> to 25<sup>th</sup> starting to OZ/SM, through DL/OK, then HB/I and, finally, HB9 and southern F. He made 178 QSOs this month, 20 over 600km, 12 over 700km, 11 over 800km, 9 over 900km and just 1 over the 1000km mark. His highlights, oddly, were a partial QSO with IK4ADE in JN54 on FT8, both reports received but no final rogers, and seeing his call spotted on PSK reporter by IQ3AZ in JN65 on the I/9A border. Whether that was tropo or meteor scatter it is unsure. Either way it shows how pushing the boundaries of FT8 is very interesting. A completed QSO with OK1NI JO70 (2m FT8) on the 20th was his best DX at 1035km. Next best DK4MD in JN68 at 996km same day and mode. On 70cm noteworthy were OZ1SKY JO56 at 825km on the 8th, and DL9LBH (JN59) at 776km on the 25th, again FT8.



One of the many lectures in the VHF & Up stream at the RSGB Convention.

### RSGB Convention

One again the VHF lecture stream, compiled and chaired by G4SWX and G4HGI, at the RSGB's Convention was very well attended with excellent lectures. There's a full report on page 54.

Thanks to all the lecturers who gave up their time to share their knowledge. Some of the lectures will be available to view on the RSGB Members website later. In addition to the lectures highlighted on page 54, I would like to mention the FT8 Performance Secrets lecture by Neil, G4DBN. This was in great demand and he gave the lecture both on Saturday and Sunday. He investigated what really matters when starting to use FT8. Neil focused on some of the pitfalls in operation that were totally relevant for the VHF and microwave bands. For any VHF and up operator, Neil's superb website is certainly worth a visit [1]. Another point to mention is that the video of Neil's lecture is one of the first released by the RSGB on to the Members' area of the RSGB website. Go to [www.rsgb.org/videos](http://www.rsgb.org/videos) and look for RSGB Convention 2018 lectures, where you will find this fascinating talk.

Following on from his RSGB Convention lecture, another DXCC was worked on 2m taking John Regnault, G4SWX's DXCC entity count to 155. 9N7AP (Nepal) was worked on 26 October, the station operating from the Hotel Annapurna in Pokhara (NL18xf). Graham, G4DML (JO02) also worked 9N7AP soon after to complete his DXCC 100 entities on 2m.

Thanks to the good work done by Make more Miles on VHF there are full details and a list of QSOs on their website. [2] Ian White, GM3SEK has been a valued regular contributor to the RSGB Convention with technically sound and practical solutions as the basis for his lectures. Ian took a critical look at some long-established

methods for feeding Yagi antennas and identified a new list of Do's and Don'ts for modern conditions in his lecture entitled VHF Baluns – Fact and Fancy. The focus was very much on suppressing unwanted common-mode RF currents, to reduce both the received noise levels and the risks of causing interference on transmit. I am sure that it won't be long before Ian's lecture joins the list of 2018 RSGB Convention lectures available to Members on the RSGB website.

### FT8 calling frequencies

There was considerable discussion at the RSGB Convention regarding the original de facto 'allocation' of the calling frequencies or Centre of Activity, which were originally set in the WSJT-X and subsequent software packages like MSHV and JTDX. Discussion, because one frequency in particular is quite unsuitable, whereas the lower band frequencies seem to have now taken hold.

On 6m, 50.313 and 50.323MHz have grown in popularity and become bolt holes. The summer of 2018 established 70.174MHz as a calling frequency for 4m, chosen as a low enough frequency to coincide with as many countries' frequency allocations as possible.

70cm was allocated a frequency of 432.174MHz in the software, which really is in an odd place (for Region 1), being very close to the main SSB calling frequency of 432.200MHz. Whilst activity on 70cm is not in the higher reaches like 6m it would be constructive to try and find a more suitable frequency lower in the band before FT8 activity increases. The 70cm band plan on the RSGB website shows the following:

### 432.000 – 432.100MHz Telegraphy (CW) and Machine Generated Modes (MGM)

This 100kHz wide sub-band is allocated to modes with a maximum transmission

bandwidth of 500Hz. Earth-Moon-Earth (EME) activity using CW may often be found in the bottom 25kHz of the band. Occasionally you may also hear JT65 EME activity around 432.065MHz.

### 432.100 – 432.400MHz Narrowband Modes (CW/SSB/MGM)

Narrow-band modes with a maximum bandwidth of 2.7kHz are always located at the low frequency end of any VHF or UHF allocation. This is where you will find Morse (CW), telephony (SSB) and machine generated mode (MGM) activity such as JT65C and FSK441. In addition to the separate CW sub-band this is the area of the 432MHz band where operators make long-distance (DX) contacts. Even though FT8 has a 50Hz bandwidth, it has been used by numerous DX operators on the band to good effect. It would therefore be worthy of a lower frequency, maybe 432.124 to 432.154MHz.

This would also keep FT8 out of any possible contest activity should the two try to co-exist at the same time. All software packages can be configured to different frequencies easily so maybe there is a case to try and establish a new frequency for 70cm FT8.

### The UKSMG Winter Marathon

The UK Six Metre Group aims to promote and encourage activity on the 6m band and the Winter Marathon is an ideal opportunity to raise activity. The UKSMG Winter Marathon is open to *all* amateur radio operators worldwide (UKSMG membership is *not* required). The objective is to work as many 4 digit grid squares as possible on the 6m band between 1 December 2018 at 0000UTC and 31 January 2019 at 2359UTC. Logs can be submitted until 17 February 2019 [3].

### Sign off

An excellent month for VHF DX in October – but looking forward to the continuing storm season, its hard to see where any tropo conditions will come from. But the VHF bands are always full of surprises. Many thanks to all contributors this month and all the many conversations had at the RSGB Convention

#### Websearch

- [1] [www.g4dbn.uk/](http://www.g4dbn.uk/)
- [2] [www.mmmmonvhf.de/latest.php?id=4671](http://www.mmmmonvhf.de/latest.php?id=4671)
- [3] [www.uksmg.org/winter-marathon.php](http://www.uksmg.org/winter-marathon.php)

Richard Staples, G4HGI  
g4hgi@live.com



# GHz Bands

## SDR on the GHz bands

I've just returned from the RSGB Convention and from the GNU Radio [1] SDR software course that I organised on the Friday. As usual, I've come back buzzing with ideas for GHz bands projects. Continuing the recent theme of setting up a GHz bands station, this month I'm going to park the traditional transverter approach and look at using an SDR. It's becoming more obvious to me that the transverter approach from the 1970s is now rapidly becoming a thing of the past. The SDR course speakers, Heather, MOHMO and Derek, MWOLNA/KOZEL brought along several transmit/receive SDRs and showed us how to use GNU Radio Companion to rapidly prototype transmitters and receivers to run on a small computer. With RF hardware readily available that covers HF to 10GHz it's obvious that, for GHz experimenters, this will become the starter approach to getting on the low GHz bands up to 9cm, or to make a transverter driver for the higher bands. I won't cover the software aspects in any detail here, but I'll point you again to the excellent 4-part GNU Radio Companion primer [2] on the web pages of Professor Sharlene Katz, from California State University, Northridge. Judging by a letter in this month's Last Word from one of the course attendees, former RSGB President, Bob, G3PJT (and this month's Data column by G4JNT), it's clear that creating your own transmitters and receivers in software can be akin to first discovering radio, so I urge you to give it a go. You of course have the alternative of trying the SDR hardware with many of the ready-made SDR programs that I've mentioned in the past.

## A GHz bands setup using SDR

Figure 1 shows a concept triband transceiver setup using one of these GHz-capable SDRs. Remember that these units are optimised for the cellular

telephony bands so are perfect for our 23, 13 and even 9cm bands. The transceiver concept could just as easily be implemented as a single band without the extra complication of switching. There are some very cheap Chinese gain blocks on eBay to get the few mW from an SDR transmitter to a more useable level and I hope to review a typical one next month. Key components in Figure 1 are the band-specific bandpass filters and that is where the analogue world suddenly comes back to haunt us. Many will already have such filters on their existing transverter systems or alternatively, they could be implemented in 'pipe cap' technology [3]. Many of the high-power ex-cellular PAs for 13 and 9cm can be driven with just 0dBm (1mW) so in a single unit you could go from the filter output to QRO. There are triband dish feeds available such as [4] and surplus SMA coaxial relays can be used to perform the band switching.

## A new GHz bands email reflector

As many people seemed to be having trouble with the Yahoo ukmicrowaves email reflector, in October, Andy, G4JNT took it upon himself to create a new reflector [5] on groups.io. It seems to have met with almost universal approval and by now most people and the files have been migrated over to the new system. As was the case with the Yahoo reflector, this is not run by the UK Microwave Group so please refer any issues to Andy, not to them.

## Activity

Stuart, G1ZAR paid me a visit in September under the UKuG's Tech Support scheme [6] and we checked out and repaired his newly-obtained 10GHz system. He then went out portable in the SHF UKAC and made his first ever 10GHz QSO with G0LGS/P. This was a SOTA from G/CE-004 to G/CE-001 over 99km. It was done by tuning around

during the contest and tail ending another contact. 59 both ways. Welcome to the GHz bands, Stuart!

G1DFL continues to activate 24GHz. During the 3rd UKuG 24GHz Cumulative he took a Nortel ODU transverter, loaned from Mike, G0MJW, to a couple of locations. From Remenham Hill (IO91NM78VW), with a bit of a struggle he worked Barry, G4SJH/P who was at Walbury Hill (IO91GI44EN) at 45km. He then moved on to Britwell Hill (IO91LO98FM) and, using 144.390MHz talkback, found G3ZME/P on Brown Clee (IO82LS) some 188km distant. Unfortunately, the path is obstructed and despite several tries, 24GHz, unlike 10GHz, just would not go! He then worked Barry, G4SJH/P again and worked each easily on 24GHz SSB at 40km. This time signals were at good strength both ways.

## EME

G4LDR is now QRV on 3.4GHz EME with a 3m dish with f/D 0.45, fed by an OK1DFC septum feed without choke ring. On receive he uses a G4DDK VLNA9 preamplifier and a Kuhne Electronic 3.4GHz to 432MHz transverter and PA running 70W output. He had his first 9cm QSO with Peter, G3LTF, who has given Neil (and many others) a tremendous amount of encouragement and advice to get his EME system up and running.

## Beacons

G4UVZ reports that the GB3KBQ 10368.870MHz beacon has been upgraded and should have about 6dB more EIRP. It still uses the Pye HS400 high stability oscillator as a reference and FSK keying, but long-term plans are to install JT modulation. Reports are welcomed on Beaconsport.uk. In the autumn openings, the Martlesham 2320.830MHz beacon was spotted deep into Europe, including Austria and Poland. On 26 September at 15.09 it was spotted at 1010km by OE5VRL (JN78DK) and on 9 October at 1311km by SP4MPB (KO03HT).

## Websearch

- [1] [www.gnuradio.org](http://www.gnuradio.org)
- [2] <http://bit.ly/2z3axDq>
- [3] <https://bit.ly/2P18zlL>
- [4] <https://bit.ly/2QW0eaa>
- [5] <https://groups.io/g/UKMicrowaves/topics>
- [6] [www.microwavers.org/support.htm](http://www.microwavers.org/support.htm)

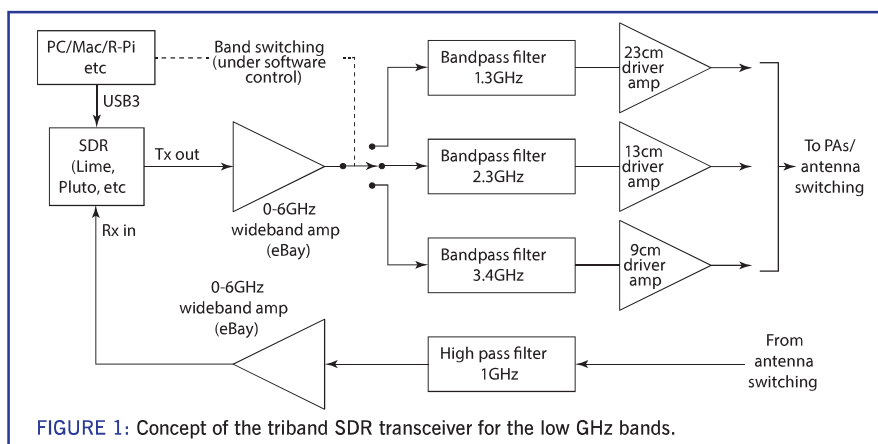


FIGURE 1: Concept of the triband SDR transceiver for the low GHz bands.

**John C Worsnop PhD CEng**  
**MIET, G4BAO**  
[john@g4bao.com](mailto:john@g4bao.com)

ICOM

HF/50/70MHz Transceiver

# IC-7300

## Revolutionary HF Transceiver with High Performance Real-Time Spectrum Scope



**Available now from authorised  
Icom UK Amateur Radio Dealers!**



Large Touch-screen Colour TFT LCD

- RF direct sampling system
- Class-leading RMDR and phase noise characteristics
- Outstanding real-time spectrum scope
- Audio scope function
- New 'IP+' function
- Large touch-screen colour TFT LCD
- SD memory card slot for saving data
- Built-in automatic antenna tuner
- High-resolution waterfall function
- Multi-dial knob for smooth operation
- And much much more!

**ICOM-UK**

Blacksole House, Altira Park, Herne Bay, Kent CT6 6GZ. UK. Telephone: +44 (0)1227 741741. Fax: +44 (0)1227 741742.  
e-mail: [info@icomuk.co.uk](mailto:info@icomuk.co.uk) website: [www.icomuk.co.uk](http://www.icomuk.co.uk)

**Count on us!**



# Data

## FT8 Chat

The trouble with writing a bi-monthly column with nearly two months lead time is that news, when it appears, can be nearly four months late! In October's column, after discussing how a chat mode using FT8 type signalling and messaging protocols could be designed, I summarised thus "... It is starting to look like a chat mode with the speed and weak signal performance of FT8 won't happen soon ..." Well, guess what. Within days of the text being sent in to the editor, news of a new FT8 Chat mode was announced. Named *FT8CALL*, it had been written completely independently of the WSJT-X suite by different authors, based on the FT8 work placed in the public domain.

That was the situation a couple of months ago. But even that has changed: it has now become *JS8CALL*. Which is fair enough, as the FT of FT8 stands for Franke – Taylor, the names of the two main authors and designers of the original code. JS belongs to the new independent writer. The User Group can be found at [1] which, although it was only started on 11 July, appears to have attracted over 6000 members (at the time of writing, mid-October). Full information on the mode and the download can be found at the rather long URL at [2]. It may be easier to use the term '*JS8CALL*' in a search engine to find the site.

It looks as if chat messages are encoded using source compression like Varicode, then the resulting bit pattern split into blocks and sent using FT8 type signalling. So chats are split in the middle and assembled from successive blocks.

## GNU Radio Companion

I write this a few days after attending a one day course on the GNU Radio Companion SDR design suite. (The course was organised by the RSGB, the day before the Convention and had 24 Members sign up for it). The GNU Radio suite is a plug-and-play software package; a fully graphical solution to designing a complete digital signal processing (DSP) system and

support for hardware, giving a real time software radio on a PC without having to understand the inner details of DSP or having to write any code.

On the course we used a Linux based suite with that operating system and the GNU software pre-installed on a USB stick supplied to each delegate beforehand. Within just two hours of the course starting, all of us had simple processing systems up on screen, whistling and shouting into microphones, generating sine waves and noise, filtering the results and displaying them on scope traces or in the frequency domain as FFT plots, or coming out of the computer speaker. By mid-afternoon we had all got the RTL 'Dongle' receivers, also supplied as part of the course, up and running and were receiving and decoding and displaying a test signal transmitted on 50MHz SSB. "It's just like using LEGO", was a comment heard more than once.

And it really was that easy. Using the graphical GNU Radio support package, you just drag and drop various blocks, like "Audio Source", "Bandpass Filter", "Audio Sink", "Frequency Domain FFT GUI" and "Waterfall Plot". Then type in a few settings, join the inputs to the outputs using mouse clicks and press 'GO'. There's a lot to learn as you go along, but this basic one-day introduction was more than enough to instil confidence to do a lot more with the package and learn how to take it a lot further.

Details of GNU Radio Companion can be found at [3] where it can be downloaded – and it is free. It is also available for Windows although, judging from a few comments on the course, that version is a bit slower than the Linux one. It is a bit unfortunate for me, as a dyed-in-the-wool Windows user, that the package we were using was Linux based. Although that part was plug-and-play and I didn't have to learn Linux commands for basic operation, my laptop did have to be closed down and rebooted from the USB stick. Afterwards it then does take an awful long time to get Windows back up and running so I shan't be using this particular laptop for GNU radio much. However, my shack desktop

machine is always switched on from cold every time it is used, so booting from a Linux USB stick is no big deal there – although I've yet to do it. Another laptop, one purchased without a pre-installed operating system – may be a personal prezzie before too long. But will have to install and investigate the Windows version – just to see, if nothing else.

## GNU Radio for new data modes

Whilst wading through the menus to find the blocks needed for the course practicals, I saw a lot of interesting things listed in there that will be worth further study. Blocks like error correction and synchronisation packages, OFDM, PSK and modulators and demodulators for other waveforms. Clearly using those will take a lot of studying, but it does look as if the modulation and demodulation of complicated digital waveforms is supported. So new modes and applications will come along as we plug these blocks together on screen and connect the RF hardware to an antenna.

The Companion will support many wideband SDR types; not only the RTL dongles and other simple ones, but also advanced high speed SDR interfaces like the Analog Devices Pluto board, Lime SDR and other package types, receive or transceive. Even the venerable and long-in-the-tooth SDR1Q is listed. More are coming along with the GNU Radio designers are adding and updating all the time.

### Websearch

- [1] JS8CALL user group <https://groups.io/g/js8call>
- [2] Information and download site for JS8CALL  
<https://docs.google.com/document/d/159S4wqMUVdMA7qBgaSWmU-iDI4C9wd4CuWnetN68O9U/edit>
- [3] GNU Radio Companion  
<https://wiki.gnuradio.org/index.php/GNURadioCompanion>

**Andy Talbot, G4JNT**  
[andy.g4jnt@gmail.com](mailto:andy.g4jnt@gmail.com)

# Ham Radio UK's Largest

**45 YEARS**  
and still  
**GROWING**

**LARGEST warehouse • LARGEST stock • LARGEST FREE car park**

## New From Ham Radio Store!

**KX-33** For KX2, KX3, FT-817 and FT-818  
**A Power Supply in your Pocket!**

**NEW  
PRODUCT**



This power supply is ideal for taking around. It fits into your pocket and plugs directly into Elecraft KX2 and KX3. Adaptor leads for FT-817/FT-818 and K3/10.

- 4 Amps
- 14V DC out
- 110 / 230V Auto
- Very Low Noise

**£69.95**

## The New 'Alex' Speaker Microphone Designed Exclusively for the Elecraft KX2 & KX3



- Great Tough Design
- Weather Resistant
- Up to 2W of Audio Output
- Great Mic Quality
- Built-in Lithium Cell
- On/Off + Volume Control
- LED Indicator
- Recharge USB lead
- Ready Wired for KX2 / KX3
- 12 Month Warranty

**Get up to 2W of Punchy Receive audio!** **£119.95**

## IC-7300 HF - 4m Transceiver



Almost every ham operator knows somebody who owns an IC-7300. That in itself is a great recommendation. It is the most successful radio for many years. Primarily because it is based on SDR that offers so many advantages and results in such a great receiver. And the added bonus with the IC-7300 is the 4m coverage. It's a great all in one station with lovely colour screen full of information. The internal ATU copes well with most antennas and the touch screen makes operations much easier to navigate the various functions.

**£1199.95**



## IC-7100

The Icom IC-7100 forms a complete HF station that includes 6m and 4m. Its compact styling and large display make it a great choice. The detached head unit and long cable enable you to use it mobile or just have the head unit on the table. This makes it acceptable even in a domestic situation.

**£999.95**



## IC-R30

The brand new IC-R30 covers 100kHz to 3.3GHz and as well as the analogue modes, also decodes D-Star. A lovely big screen with loads of memory capability built in recorder and long battery life with USB charging facility.

**£569.95**

**GOT ANY OLD MILITARY 1940's GEAR? We will collect it free of charge and pay you a nominal amount for it**

**FlexRadio**

## New Models Arrive!



**New!**

FlexRadio, the first of offer mainline SDR and Waters & Stanton, the first to bring it to the UK. Now the fourth generation is light years away from the early beginnings. Now even Mac owners can plug in and play with the new Flex range. It's never been easier to get going and it's never been easier to create your own remote control station.

## Flex-6600M

Top of the range for those who want absolute performance and versatility.

- 100W 1.8 - 54MHz
- 8" Touch Screen
- 4 Receivers 30kHz - 54MHz
- Spectrum Dynamic. 155dB
- Contest Pre-selectors
- Diversity Reception
- Panadaptor Zoom

**£4999.00**

## Flex-6400M

Packed with performance and versatility. It offers a lot of radio for your money.

- 100W 1.8 - 54MHz
- 8" Touch Screen
- 2 Receivers 30kHz - 54MHz
- Spectrum Dynamic. 144dB
- Contest Pre-selectors

**£2999.00**

## Flex-6400

This is the perfect answer to those who want to try SDR for the first time, but at the same time, need to experience top performance and versatility. There is no touch screen, because this model is designed to be tethered to your Windows or MAC PC. But make no mistake the level of performance you get is extremely high.

**£1999.95**

*Windows and Mac compatible*

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

**DON'T SEE WHAT YOU NEED? Call us for available stock and BEST PRICES**



call: **01702 204965** email: [sales@wsplc.com](mailto:sales@wsplc.com)

**Waters & Stanton Ltd • Unit 1 • Fitzherbert Spur • Farlington • Portsmouth • PO6 1TT**

[@wsplc](mailto:@wsplc)

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

[facebook.com/WatersandStanton](https://facebook.com/WatersandStanton)

[YouTube Waters and Stanton](https://www.youtube.com/WatersandStanton)



# Ham Radio UK's Largest

**45 YEARS  
and still  
GROWING**

**LARGEST warehouse • LARGEST stock • LARGEST FREE car park**

## New From Ham Radio Store!

**KX-33** For KX2, KX3, FT-817 and FT-818  
**A Power Supply in your Pocket!**

**NEW  
PRODUCT**



This power supply is ideal for taking around. It fits into your pocket and plugs directly into Elecraft KX2 and KX3. Adaptor leads for FT-817/FT-818 and K3/10.

- 4 Amps
- 14V DC out
- 110 / 230V Auto
- Very Low Noise

**£69.95**

## The New 'Alex' Speaker Microphone Designed Exclusively for the Elecraft KX2 & KX3



- Great Tough Design
- Weather Resistant
- Up to 2W of Audio Output
- Great Mic Quality
- Built-in Lithium Cell
- On/Off + Volume Control
- LED Indicator
- Recharge USB lead
- Ready Wired for KX2 / KX3
- 12 Month Warranty

**Get up to 2W of Punchy Receive audio!**

**£119.95**

## IC-7300 HF - 4m Transceiver



Almost every ham operator knows somebody who owns an IC-7300. That in itself is a great recommendation. It is the most successful radio for many years. Primarily because it is based on SDR that offers so many advantages and results in such a great receiver. And the added bonus with the IC-7300 is the 4m coverage. It's a great all in one station with lovely colour screen full of information. The internal ATU copes well with most antennas and the touch screen makes operations much easier to navigate the various functions.

**£1199**



## IC-7100

The Icom IC-7100 forms a complete HF station that includes 6m and 4m. Its compact styling and large display make it a great choice. The detached head unit and long cable enable you to use it mobile or just have the head unit on the table. This makes it acceptable even in a domestic situation.

**£999.95**



## IC-R30

The brand new IC-R30 covers 100kHz to 3.3GHz and as well as the analogue modes, also decodes D-Star. A lovely big screen with loads of memory capability, built in recorder and long battery life with USB charging facility.

**£569.95**

**GOT ANY OLD MILITARY 1940's GEAR?** We will collect it free of charge and pay you a nominal amount for it.

**FlexRadio**

## New Models Arrive!



**New!**

## Flex-6600M

Top of the range for those who want absolute performance and versatility.

- 100W 1.8 - 54MHz
- 8" Touch Screen
- 4 Receivers 30kHz - 54MHz
- Spectrum Dynamic. 155dB
- Contest Pre-selectors
- Diversity Reception
- Panadaptor Zoom

**£4999.00**

## Flex-6400M

Packed with performance and versatility. It offers a lot of radio for your money.

- 100W 1.8 - 54MHz
- 8" Touch Screen
- 2 Receivers 30kHz - 54MHz
- Spectrum Dynamic. 144dB
- Contest Pre-selectors

**£2999.00**

## Flex-6400

This is the perfect answer to those who want to try SDR for the first time, but at the same time, need to experience top performance and versatility. There is no touch screen, because this model is designed to be tethered to your Windows of MAC PV. But make no mistake, the level of performance you get is extremely high.

**£1999.00**

*Windows and Mac compatible*

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

**DON'T SEE WHAT YOU NEED? Call us for available stock and BEST PRICES**



call: **01702 204965** email: [sales@wsplc.com](mailto:sales@wsplc.com)

**Waters & Stanton Ltd • Unit 1 • Fitzherbert Spur • Farlington • Portsmouth • PO6 1TT**

@wsplc

blog.hamradiostore.co.uk

facebook.com/WatersandStanton

YouTube Waters and Stanton



## KENWOOD DEALS

OFFICIAL RE-SELLER

### TH-D74

New 144-430MHz 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

### 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 price

## ACOM

### ACOM-1000 HF Amplifier



We are now stocking the ACOM range of amplifiers. For the UK Ham operator, the ACOM-1000 is ideal as its 1kW output means it can coast along at the UK power limit. A single 4CX800A tube provides excellent efficiency and the pi-network tuning will handle VSWRs up to 3:1 with ease.

£2,299.00

## AOR of Japan

New!

### AR-DV-10

At last! A True Digital Scanner

- 100kHz - 3GHz
- 10 Digital Modes
- inc Icom, Yaesu, DMR
- Auto Mode Detect
- Water Resistant
- Micro SD card backup
- Lithium Battery
- Data Management

At last, a scanner that will allow you to listen to digital signals. It automatically detects the mode. Of course it also works on AM and FM as well. A total communications monitor in the palm of your hand.

£999.95

First shipment has now arrived!



### AR-8600 MkII

The AR-8600 MkII is a high performance all-mode communications receiver that covers the frequency range from 100kHz to 3GHz. As such it covers the complete radio spectrum. DC lead included.

£619.95

## YAESU DEALS

OFFICIAL RE-SELLER - FREE UK SHIPPING



### 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 100W on SSB, CW, FM and AM (25W 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-991A

Successor to the FT-991 this all band HF - 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.

WITH CASHBACK £1097



### 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 coexistence of both digital and analogue users.

Call for best price

### FREE Wide Band Service

Where applicable we can offer a FREE Wide Band modification on new equipment at the point of sale. Just ask on our sales line.



### Yaesu FT-818

The updated version

- 5MHz Coverage
- 6W Power Output
- High stability TCXO built-in
- Larger battery capacity



Order at the same time the matching Elecraft T1A Auto Antenna Tuner and save 10% the T1A kit. Handles coax and fed wire

### 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-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.

### FT-857

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

WITH CASHBACK £



### FT-DX101

HF - 4m 100W Roofing Filter Auto ATU 7" Colour Screen

Available late 2

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

WATERS & STANTON  
EUROPE'S HAM STORE



# Ham Radio UK's Largest

**45 YEARS**  
and still  
**GROWING**

**LARGEST warehouse • LARGEST stock • LARGEST FREE car park**

## Our Wide Range of Products for Ham Radio

### DIAMOND Yagi Antennas

A great range of 6m, 2m and 70cms light weight Yagi antennas rated at 100W with Japanese engineering



- A-502HBR .....6m 2 El. Phased 6.3dBi 400W.....£89.95
- A144S10R.....2m 10 Element 11.6dBi 2.13m boom.....£73.95
- A144S5R.....2m 5 Element 9.1dBi 1m boom.....£39.95
- A-430S10R ..70cm 10El, 13.1dBi 1.19m boom.....£52.95
- A-430S15R ..70cm 15 El, 14.8dBi 2.24m boom.....£62.95
- A-1430S7.....Dual 2m/70cm 7/9dBi 1.25m boom.....£129.95

### WATSON Base Verticals

Collinear (fibreglass) with 2" mast fittings

- W-30  
2m/70cm 3/6dBi Length: 1.15m.....£59.95
- W-50  
2m/70cm, 4.5/7.2dBi gain and 1.8 meters long.....£64.95
- W-300  
2m/70cm, 6.5/9dBi gain and 3.1 meters long.....£104.95
- W-2000  
6m/2m/70cm, 2.15/6.2/8.4dBi gain and 3.1meters long.....£104.95

### WATSON Switches

- CX-SW2PL / CX-SW2N  
2-way Coaxial Switch N-type or SO239 connectors.....PL259 £34.95  
.....N-type £41.95
- CX-SW3PL / CX-SW3N  
3-way Coaxial Switch N-type or SO239 connectors.....PL259 £54.95  
.....N-type £59.95
- CX-SW4PL / CX-SW4N  
4-way Coaxial Switch N-type or SO239 connectors.....PL259 £69.95  
.....N-type £79.95

### WATSON PSU

#### Power-Mite

20 Amp micro PSU variable voltage switchmode power supply, excellent value. £84.95

**Power-Max-45**  
45 Amp variable voltage switched mode power supply with 'noise shift' feature. £119.95

**Power-Max-65**  
65 amp variable voltage heavy duty switched mode power supply with 'noise shift' feature. £259.95

### Heil 'PRAS' Parametric Receiver Audio System



Here is a complete audio system that effectively replaces the rudimentary receiver audio amplifier in your receiver or transceiver. For maximum intelligibility the PRAS will work wonders. Very often a flat audio response is not what you need. And while a simple tone control might help, the parametric design enables much more complex and versatile response curves. And if you are having hearing problems, you can boost just that part of the spectrum that is causing you problems.

And to complete the system we include the Heil powered speaker as illustrated



£469.95

### TigerTronics Plug and Play - USB



Includes  
**FREE**  
Rig Lead

The easy way to interface your PC and radio for data operation. It comes with a USB lead to match your radio. Just tell us which radio you have and we will supply the necessary lead. £119.95

### bhi DS & EQ Audi Processor

#### ParaPro EQ-20-DSP

It's good to be able to stock a British designed and manufactured product. It's even better to experience the enhancement that this combined amplifier and processor will bring to your reception.



£259.95

### Diamond Dipole Baluns

- 1:1 50 Ohms SO-239  
A rugged dipole centre with built-in Balun. Completely weather sealed.  
BU-50  
1.7MHz - 40MHz 1.2kW.....£39.95
- BU-55  
3MHz - 75MHz 5000W.....£46.95



### AVAIR For All Occasions

There are times when you need a simple VSWR meter that you can take out portable or pop in the car. The Avair range are a very cost effective answer.

£49.95



#### AV-20

- 1.8 - 200MHz
- Scale 30W / 150W
- 3W for FSD
- Cross Needle
- SO-239

#### AV-40

- 1.44 - 470MHz
- Scale 15W / 150W
- 3W for FSD
- Cross Needle
- SO-239

### Hustler HF Verticals

#### 48TV

40m - 10m 4 Band vertical that will handle full legal power and can be ground mounted Height is 6.52m. £209.95

#### 58TV

The ever popular 5-band model that covers 80m to 10m. This is a great backyard antenna that can be ground mounted. The height is 7.64m £269.95

#### 68TV

This antenna is identical to the 58TV above but has the 30m band added. Again it handles full legal power and stands 7.3m high. £289.95  
All antenna are rated at 1kW.

### Diamond HF Mobile Whips

Here is a great range of single band whips that have PL-259 bases and an easily adjustable upper tuning section for quick hand adjustment.

- HF-10FX .....10m whip 1.1m long.....£58.95
- HF-12FX .....12m whip 1.1m long.....£58.95
- HF-15FX .....15m whip 1.2m long.....£56.95
- HF-16FX .....17m whip 1.2m long.....£40.95
- HF-20FX .....20m whip 1.2m long.....£63.95
- HF-30FX .....30m whip 1.4m long.....£63.95
- HF-40FXW .....40m whip 1.4m long.....£64.95
- HF-80FX .....80m whip 1.4m long.....£71.95

#### W-300S Magnetic Mount

This is a 3-way mount that is great for HF operation. SO-239 socket and 4.5m cable terminated in PL-259.....£39.95



### Mosley Mini Beam 5 Bands



- 10-12-15-17-20m
- 3 element on 10-15
- 1 Element 12m and
- Boom approx 2m
- Longest El. approx. 1.5m



call: **01702 204965** email: [sales@wsplc.com](mailto:sales@wsplc.com)

**Waters & Stanton Ltd • Unit 1 • Fitzherbert Spur • Farlington • Portsmouth • PO6 1TT**



@wsplc



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



[facebook.com/WatersandStanton](https://facebook.com/WatersandStanton)



[Waters and Stanton](https://www.youtube.com/WatersandStanton)





### Tune - Up with these MFI Tuners

MFI-16010	1.8-30MHz random wire 200W	£79.95
MFI-1623	Balcony antenna with tuner HF 200W	£198.95
MFI-901B	1.8-30 MHz versa tuner 200W PEP	£110.95
MFI-902B	3.5-50MHz 150W Travel Tuner	£121.95
MFI-902H	3.5-30MHz 150W Travel Tuner	£132.95
MFI-904	3.5-30MHz 150W Travel Tuner	£143.95
MFI-904H	3.5-30MHz 150W Travel Tuner	£165.95
MFI-914	Auto tuner extender extends	£88.95
MFI-9201	QRP pocket ATU 80-10m 25W	£55.95
MFI-925	200W Compact auto antenna tuner	£179.95
MFI-926B	200W PEP Remote mobile ATU	£330.95
MFI-927	200W remote auto tuner	£286.95
MFI-928	Basic 200W compact auto ATU	£229.95
MFI-929	Compact 200W 1.8-30MHz ATU	£253.95
MFI-933	Basic loop tuner 3.5-30MHz 150W	£209.95
MFI-935B	Portable multiband Loop ATU 150W	£231.95
MFI-936B	Heavy duty loop tuner	£286.95
MFI-939A	Plug and play auto ATU Alinco cable	£176.95
MFI-939L	Plug and play auto ATU Icom cable	£176.95
MFI-939K	Plug and play auto ATU Kenwood cable	£176.95
MFI-939Y	Plug and play auto ATU Yaesu cable	£176.95
MFI-941E	1.8-30 MHz antenna tuner 300W	£159.95
MFI-945E	1.8-54 MHz mobile antenna tuner	£154.95
MFI-948	1.8-30 MHz antenna tuner 300W	£187.95
MFI-949E	1.8-30 MHz ATU / dummy load 300W	£199.95
MFI-956	SW/MW/LW Preselector/tuner	£77.95
MFI-974B	3.6-54MHz 300W Balanced ATU	£231.95
MFI-974HB	HF 300W Balanced line ATU	£253.95
MFI-976	HF 1500W Balanced line ATU	£550.95
MFI-989D	HF 1500W SSB/CW roller tuner	£451.95
MFI-991B	HF Auto antenna tuner 150W	£253.95
MFI-993B	HF Automatic antenna tuner 300W	£289.95
MFI-993BRT	HF remote auto antenna tuner 300W	£330.95
MFI-994B	HF automatic antenna tuner 600W	£396.95
MFI-994BRT	HF remote auto antenna tuner 600W	£440.95
MFI-9982	HF 2.5kW antenna tuner	£771.95
MFI-998RT	HF 1.5kW remote auto antenna tuner	£848.95

### MFI-945E Compact 300W ATU



Compact tuner for coax systems. Meters power and VSWR. 1.8-60MHz

£145.95

### MFI-260C Dummy Load 300W



A great 50 Ohm dummy load, air cooled. Up to 650MHz with max. of 300W. SO-239.

£44.95

### MFI-939 Plug & Play Auto ATU

Here is an auto ATU with models dedicated for Yaesu, Kenwood, Icom and Alinco. Each one comes with a lead that plugs directly into your radio that provides power and operating signals back to the ATU. Tell us the model of your radio when ordering.



£176.95  
Ready to go!

### MFI-991B Auto ATU



Similar to the MFI-993BRT but without LCD display, antenna switch and balanced feed option. Ideal for coax or end fed wire.

£253.95



**MFI-413**  
Morse code tutor.  
£55.95

### MFI-557 CW Trainer



This unit comprises CW key, oscillator and speaker unit. Great for CW sending practice.

£47.95



**MFI-403P**  
Micro Keyer  
Here is a little micro keyer with twin pads and built in side tone. Ideal for QRP operators who want to travel light.

£75



**MFI-402**  
Nano Keyer  
A very compact little electronic keyer. Just 2" x 3" it will generate CW with its paddle from 5 - 65 sps. You keyer can be powered simply plugging into transceiver key socket. Video link on our site.

£7



**MFI-223**  
Antenna Analyser  
This very compact and handy antenna analyser covers 1 - 60MHz. It has a full colour LCD which offers a very clear graphical display. Includes rechargeable battery with USB lead. A great little bit of test gear.

£29



**MFI-225**  
Antenna Analyser  
1 - 180MHz measures a wide range of parameters including VSWR, Impedance, Return Loss, SWR, Capacitance, Inductance, Cable length. external 12v or USB power.

£23



### MFI-1799 Vertical

Here is a great design from MFI. It gives you true all band coverage - 80 40 30 20 17 15 12 10 5 and 2m! All you need from just one antenna. It requires no radials and stands approx 6m high. Power rating is 1.5kW. So with an amplifier you are set to radiate a great signal.

£503.95

### The Small Garden Solutions from W&S

#### MFI-1836H Cobweb



What is a cobweb? It's in effect a full size dipole bent into a square. This results in 1/8th wave sides. The antenna can be formed of multiple dipoles with a common feed via a balun. It is easy to support on a single mast and requires no rotating. This model covers 6 bands from 20m to 6m and will handle up to 1.5kW.

£269.95

#### Cushcraft MA-6B



Here is a new exciting design that operates as a 3 element Yagi on all bands from 20m to 10m. It uses end loading to reduce the element length to enable it to fit into quite small gardens. End loading enables the high current region to flow through full thickness element sections. Bandswitching is automatic and the whole antenna offers a light weight antenna solution in a compact array.

£699.95

#### MFI-1786X



The MFI-1786X covers 30m to 10m and handles 150W. Includes remote tuner and is around 1m in diameter. You also get low noise reception!

£539.95



#### MFI-2389

80m - 2m & 5ft! Here's a really cool little vertical. Less than 9ft tall, all bands, counterpoise radials and handles 200W.

£279.95



# Multi-mode diode tester

I have a plastic container half-filled with mixed diodes on my workbench. Many are unmarked but cover the range of signal and power types, Zeners, LEDs and even varactors (variable capacitance diodes). I recently decided it was time to sort these out so that I can use them in various projects.

## Tester required

I needed a simple tester that could do all the necessary tests in one low-cost, easy-to-build box or the job of sorting my diodes would be too tedious to even start. I came up with a really useful diode tester you can make for yourself for well under £20. Figure 1 shows the circuit diagram and the finished device is shown in Photo 1.

It's powered by a PP3 battery. The current demand is low, so the battery will have a long life. The circuit is based on a NE555 oscillator driving fast pulses via Q1 into L1, thus forming a simple switch-mode inverter with D1 and C3.

Those who are familiar with the NE555 may wonder at the way it's wired up. The conventional oscillator circuit, shown in Figure 2, uses a resistor (R2 in Figure 2) from open collector output pin 7 to the

Threshold and Trigger pins 6 and 2. However, I found that if I connected the resistor to the sink and source-capable output on pin 3 – which has the same logic state as pin 7 – I could get much narrower

pulses, which are more suitable for driving the BD139 switching transistor.

These high frequency, short pulses briefly turn on Q1, producing a very spiky, high voltage pulse at its collector due to the current flow and collapse in L1. This high voltage is rectified by D1 and smoothed by C3 to around 75V. This is fed via current limiting resistor R3 to a shunt regulator chain formed by the three 20V Zener diodes ZD1, ZD2 and ZD3. Switch SW1b is arranged to take the anodes of either ZD2 or ZD3 to ground, thus changing the voltage limit from 60V to 40V or 20V. The final voltage is fed to the digital voltmeter (DVM) module and also to the test terminals at SKT1. SW3 is configured as a changeover switch to swap the polarity of the output, very convenient for checking forward and reverse voltages.

The output impedance is high, limited to a maximum of about 7mA regardless of settings. At this current, the output will drop below 1V. It will rise to the correct voltages



PHOTO 1: General view of the completed diode tester.



PHOTO 2: Inside the device (battery not shown).

Dave Ellis, G4AJY  
djellis32@yahoo.com

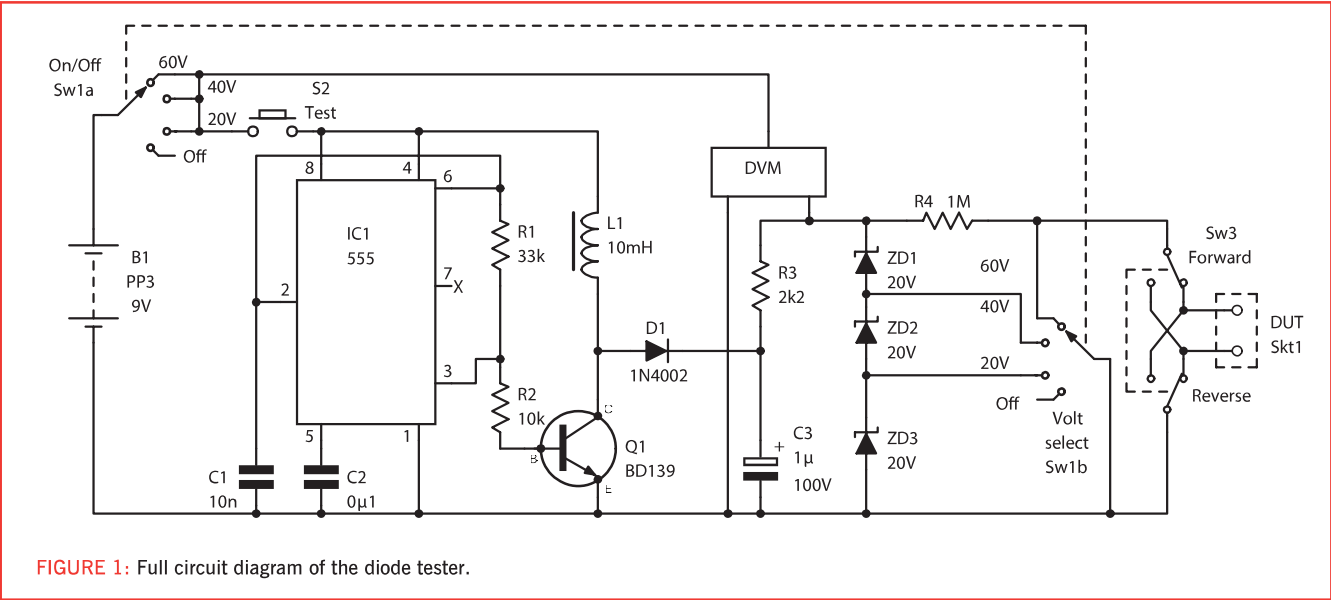


FIGURE 1: Full circuit diagram of the diode tester.



PHOTO 3: Typical test showing the 3.1V forward voltage of a blue LED.

as the current reduces to 2mA or less. This is sufficient to illuminate even low brightness LEDs, but too limited to over-drive an LED or to damage it in reverse test mode. So, when making tests you don't need any ballast resistors to protect your LEDs and Zeners – the tester takes care of that for you. And the tester will help you determine what sort of diode you have and its polarity, even if it's completely unmarked.

Construction

Construction is very straightforward. There are no particular layout requirements. I built my prototype on stripboard, mounting the

switches and DVM onto the front panel of the enclosure. The plastic box I used was 60 x 80 x 120mm that cost me about £3.50. My suggested stripboard layout is shown in Figure 3, whilst Figure 4 shows the general wiring diagram. Photo 2 gives a general guide to how I wired up my prototype. I built everything onto the front panel except the battery, which is mounted in the case itself. This makes for much easier building and service.

Mode d'emploi

In use, the DVM is illuminated as soon as the tester is switched on. It should read

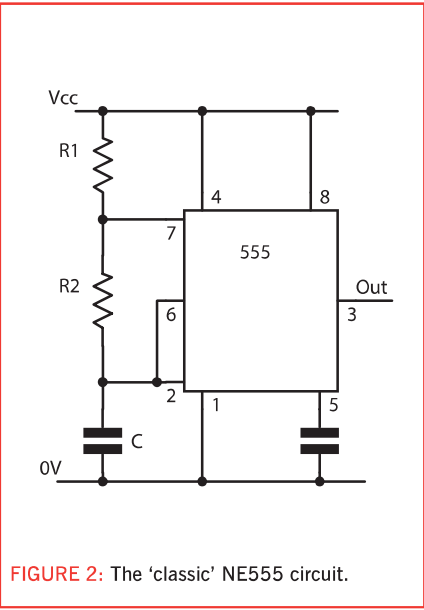


FIGURE 2: The 'classic' NE555 circuit.

0V because the inverter circuit isn't yet energised.

Set the voltage to 20V and place a diode between the two terminals. It doesn't matter which way round. In Forward mode, the red test socket is positive, but you never have to physically reverse the diode under test thanks to the Forward/Reverse switch, S3. Press S2 to run the oscillator and note the voltage reading. Then reverse the voltage by switching S3 and note the voltage again.

Silicon signal and power diodes should read about 0.7V in one direction and 20V (or 40V or 60V) in the other direction, ie they are not conducting. A specific voltage



reading such as 12V indicates a Zener. If you suspect that the device is a Zener of higher than 20V you can increase the test voltage to 40 or 60V using the rotary switch. Although there exist Zeners of (considerably) above 60V, I suspect they are relatively rare in most people's junkboxes.

Germanium diodes will read about 0.2-0.3V in the forward direction. Be aware that some germanium diodes have only a fairly low reverse voltage rating (the OA47 was only rated at 25V) so don't automatically assume you can test everything at 60V.

If the diode is an LED, it will be illuminated when testing in the forward direction (anode to the red terminal) and extinguished in reverse. The forward voltage is displayed (approximately 2V for red, green and yellow types, around 3V for blue and up to 4V for white). LEDs generally have very low allowable reverse voltage ratings – perhaps as low as 5V – but my experience is that I have never damaged a LED by applying up to 20V reverse voltage. (If you're expecting to test a lot of LEDs it may make sense to reconsider the voltage ratings of ZD1 to ZD3 so you can have, say, 5.1V, 24V and 60V ranges).

Note that although the test current is relatively small, 7mA maximum, this may exceed the forward current rating of a small number of special purpose diodes.

Finally, don't forget that you have to press the test button each time to do a test. No voltage will appear at the test terminals until then. This arrangement ensures a long battery life, since the only significant current draw occurs while the oscillator is actually running, other than that required by the DVM.

## Component availability

All the components are fairly inexpensive and readily available via eBay, the usual component distributors, or even at rallies. The only mildly unusual item is the 100V DVM, a small, panel mounted all-in-one digital voltmeter, but these are available as snap-in modules on eBay and elsewhere for a pound or so. The photos should give you a guide. Make sure you get a three-wire version (supply, ground, input) rather than the 2-wire versions that have a limited measuring range, typically 3-30V.

SW1 was a 4-way 3-pole unit (only two poles are used), which was under £1. You could choose to use a 6-way 2-pole switch to give a wider range of voltages, as hinted earlier – perhaps, with suitable Zeners, 5.1V, 12V, 24V, 40V, 60V.

The 10mH choke and 20V Zeners were bought in packs of 10, again for low cost. Everything else in the circuit should be even easier to obtain.

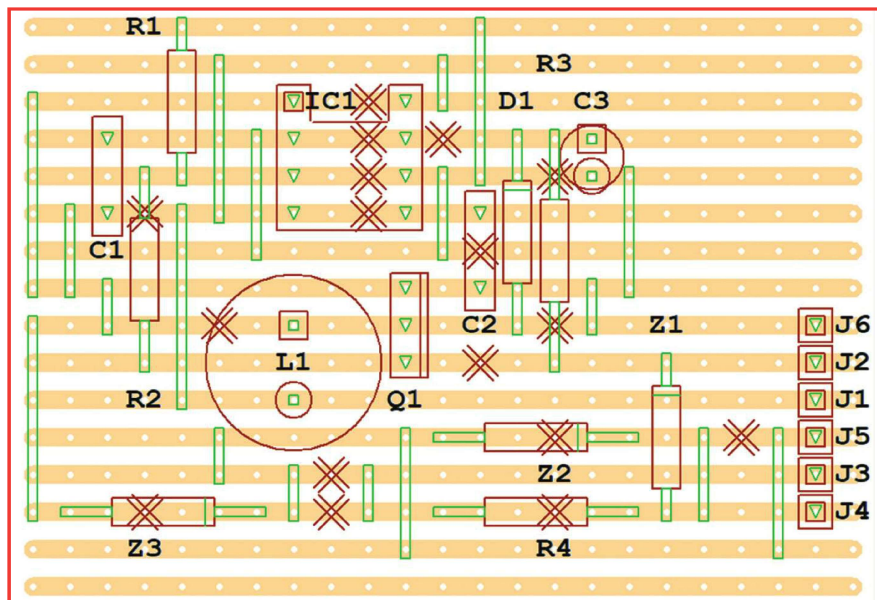


FIGURE 3: Suggested stripboard layout, from the component side. A 'double X' indicates a track break.

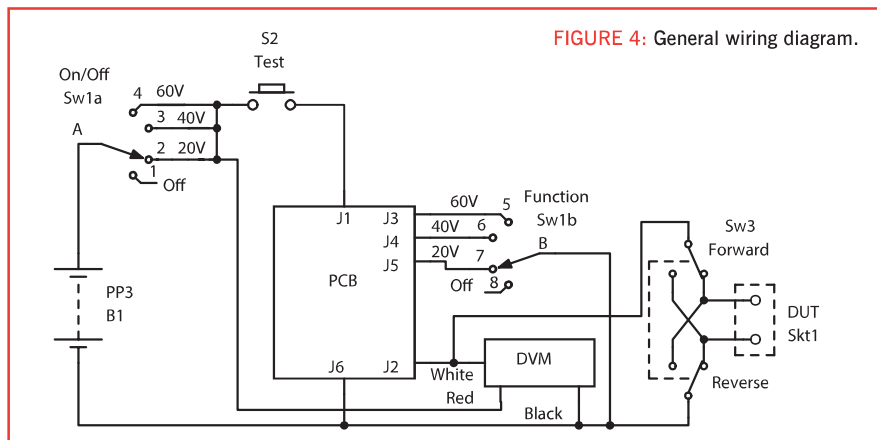


FIGURE 4: General wiring diagram.



PHOTO 4: Testing a 5.3V Zener diode.

**NEW**



## RSGB European Locator Map

If you are looking for something to grace the wall of your shack but also offers much more, then the RSGB European Locator Map could be for you.

This high quality Locator map is offset printed onto a thick 150gsm paper and contains all the features you would expect of this type of map. There is the usual QTH grid (Maidenhead) locator system covering Europe and a worldwide grid inset. You will see the various country prefixes which are easy to pick out at a glance and for extra reference large cities are also depicted. The map also includes a European DXCC table picked out with country flag which provides a checkbox for bands worked 6m, 2m, 70cm, 23cm & UHF. There are also other useful features such as a meteor shower calendar and a 2m & 70cm beacon list.

Delivered in a sturdy postal tube these large maps are 590x980mm and the ideal addition to any radio amateur shack.

**Non Members' Price £8.99**

**RSGB Members' Price £6.74 (25% OFF)**

**Members  
Only Offer**  
**RSGB Map Bundle**  
**Buy Both for**  
**Only £10.99**

## RSGB World Prefix Map - Radio Amateur's Map of the World

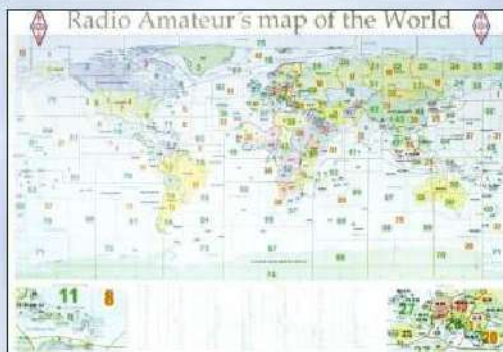
Not only does this map show the location of worldwide prefixes there is an A-Z list of prefixes and expanded map sections covering the Caribbean and Europe making them much easier to read. The handy countries list also shows the DXCC entities with their continent along with CQ and ITU region that they fall in.

980mm wide by 680mm tall (approx 38.5"x 27")

1: 42,000,000 scale.

**Non Members' Price £8.99**

**RSGB Members' Price £6.74 (25% OFF)**



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



**Radio Society of Great Britain**  
**www.rsgbshop.org**

3 Abbey Court, Priory Business Park, Bedford, MK44 3WH.  
Tel: 01234 832 700 Fax: 01234 831 496

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



# Competition

## Win £25 of RSGB vouchers using Ohm's Law

### Resistor polyhedra

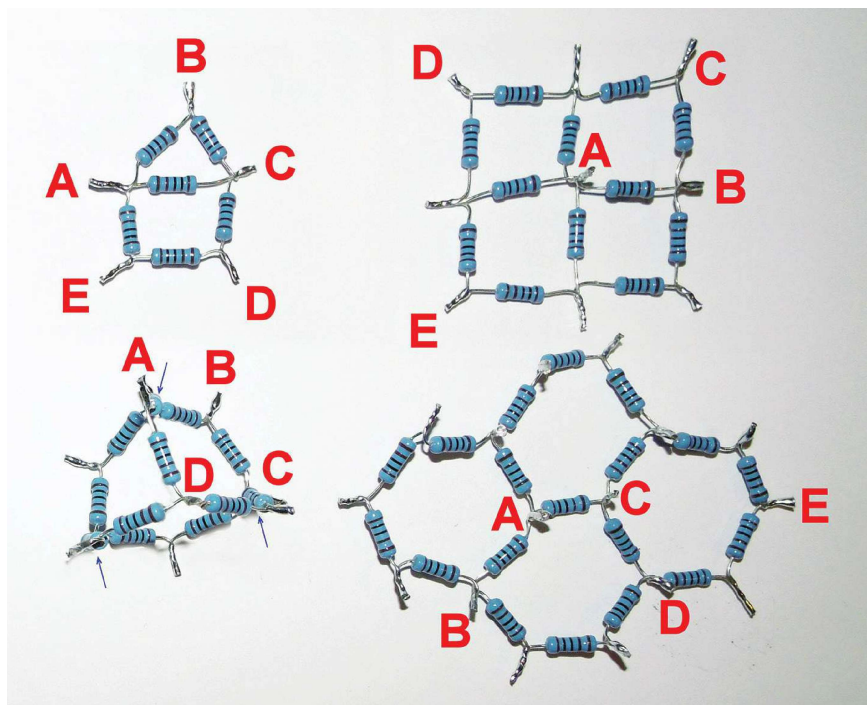
Years ago in *Elektor Electronics* there was an interesting contest that related to an infinite array of resistors [1]. I note that infinite cubic arrays of resistors have already been considered at great length in the physics community [2]. Flat, 2 dimensional polygonal arrays of resistors and capacitors have also been pondered at length [3]. So I wanted to consider something else. Being a chemist, I tend to think about polyhedral shapes other than cubes. I was thinking about infinite arrays of things like hexagonal prisms (but then I discovered someone else [4] has already done them). The crystal structures of diamond and zinc blende was the one I was thinking about. I wanted to restrict myself to small, non-repeating shapes.

The first polyhedron I thought of is a tetrahedron, seen in **Figure 1**. This is the same shape as a molecule of white phosphorous. If all the chemical bonds in white phosphorous were to be replaced with 1000Ω (1kΩ) resistors and two wires were fixed to two different P atoms, what would the resistance be between the two? The answer is simple: it would be 500Ω.

Now we should move onto something more interesting. If we stick a node in the centre of four 1000Ω resistors linked to each of the outer nodes (**Figure 2**) then things get a little more complex. My chemical mind notes that it also starts to look like basic zinc acetate.

We can go through the method of how to deal with this type of problem. The first step I think should be always to look for resistors that, due to symmetry, will have no current flowing through them. These should be removed to make the network more simple. Then treat the resulting series parallel network of resistors and work out the resistance. I got a value of 400Ω.

If I was to have a cube of 1kΩ resistors, as shown in **Figure 3**, what would the resistance be between points A, B, C and D? This is a rather more complex problem. We actually have three problems to consider in one object.



**PHOTO 1:** Some example networks with labelled points. Top left, Puzzle 1, top right Puzzle 2, bottom left Puzzle 3, bottom right Puzzle 6. Note that the Puzzle 3 network has three hard-to-see resistors end-on, indicated by (very) small arrows.

For the problem of the path A to B we can reduce the number of resistors we need to consider. If A is at +1 volt and B is at -1 volt then the centre point of four resistors will be at 0V. I would advise you to look at the networks for such an equipotential line where the junctions or centres of resistors are at 0V when the two terminals are at +1 and -1 volts. **Figure 4** shows how we can simplify the network.

I think the best way to attack the problem is to use Delta (Δ) / Wye (Y) conversions to alter the arrangement of the resistors, as shown in **Figure 5**.

Now we have some equations which will allow us to interconvert these networks. Following are some example equations.

$$R_{\alpha} = \frac{R_{\alpha\beta}R_{\alpha\gamma}}{R_{\alpha\beta} + R_{\alpha\gamma} + R_{\beta\gamma}}$$

$$R_{\alpha\beta} = \frac{R_{\alpha}R_{\beta} + R_{\alpha}R_{\gamma} + R_{\beta}R_{\gamma}}{R_{\gamma}}$$

If we do our first transformation we end up with the network shown in **Figure 6**.

Now, using the equation for resistors in parallel, we can get the network shown in **Figure 7**.

After a lot of transformations between delta and wye networks and using the series / parallel equations for resistors I obtained a

**TABLE 1: Results of van Steenwijk's calculations for variously shaped polyhedra.**

	R1	R2	R3	R4	R5
Octahedron	416.667Ω	500Ω	-	-	-
Icosahedron	366.666Ω	466.667Ω	500Ω	-	-
Dodecahedron	633.333Ω	900Ω	1066.667Ω	1133.333Ω	1166.667Ω

Dr Mark R StJ Foreman,  
G7LSZ / SA6BID  
foreman@chalmers.se

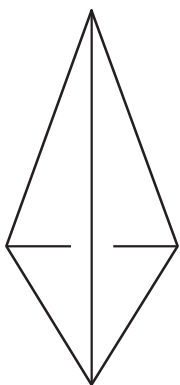


FIGURE 1: The tetrahedron ( $P_4$ ).

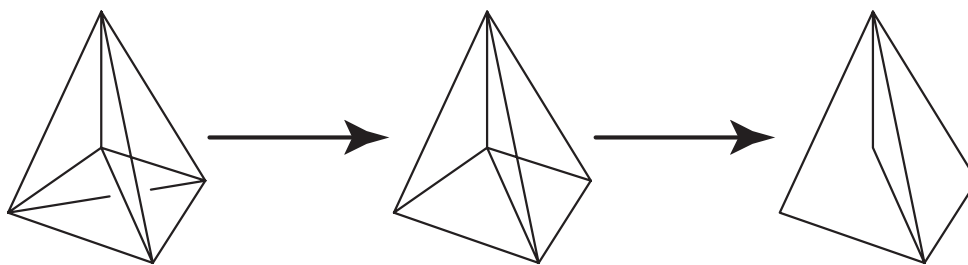


FIGURE 2: Evolution of the tetrahedron with the central atom.

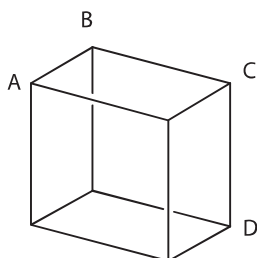


FIGURE 3: The cube.

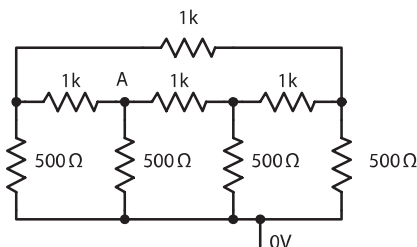


FIGURE 4: A circuit diagram for half of the cube (considering the A to B resistance).

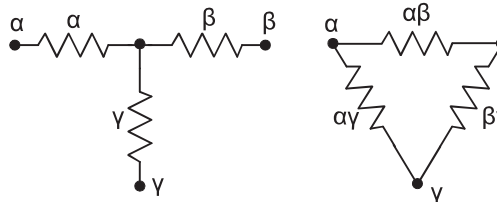


FIGURE 5: Figure 4 after Delta ( $\Delta$ ) / Wye ( $Y$ ) conversion.

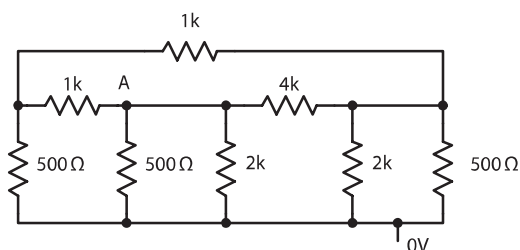


FIGURE 6: Circuit after the first transformation.

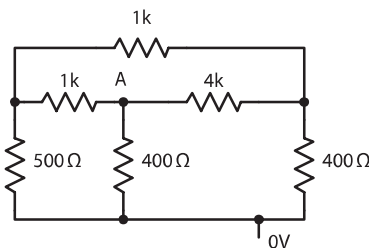


FIGURE 7: Simplifying the parallel resistances.

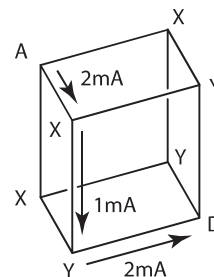


FIGURE 8: Applying Kirchhoff's first law.

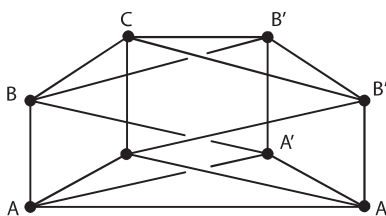


FIGURE 9: The square antiprism is much harder to solve than the cube.

resistance between the terminals A and zero volts of  $291.6666\Omega$ , which works out as a resistance of  $583.3333\Omega$  between A and B. Terminals A and C were a little easier: I got a value of  $750\Omega$ . Terminals A and D were easier still: I got a value of  $833.3\Omega$ . For the path A to D we can use the symmetry ( $C_3$  axis) of the cube to solve it with greater ease. Here we use Kirchhoff's first law (current or junction law), which states that the sum of the currents entering a junction must always be equal to the currents leaving the junction. Figure 8 shows the currents flowing through only three resistors in the cube.

If you add the currents in the other two AX, YD and the other five XY resistors you will get a total of 6mA flowing from A to D. By using Ohm's law you can calculate that the potential difference between AX, XY and YD are 2, 1 and 2 volts respectively. Thus the overall potential difference between A and D is 5V. Use Ohm's law again to give you  $833.3333\Omega$ . I then discovered that my approach to the A to D path in the cube has already been published by Allen and Liu [5]. Anyone who is struggling with the problems might find that reading Allen and Liu's paper will give them further clues.

When I compared my answers with those of van Steenwijk [6], I was glad to see that I had got the same answers for the tetrahedron and the cube. Van Steenwijk also did the dodecahedron, the octahedron and the isosahedron. His values for the resistance between the vertices of the polyhedra are tabulated in Table 1. The values of R1, R2, R3, R4 and R5 indicate the resistance between a pair of vertices

where the smallest number of resistors in the path between them is the subscript number.

We also have some other things such as the square antiprism seen in Figure 9 to consider. This one is much harder than the cube and I'll leave it to you.

### Brain-teaser competition

What we have for you is a contest for the 12 days of Christmas. There are twelve resistor networks of increasing complexity, based on a series of interesting molecules from chemistry. The carbon in each has been replaced with a point at which two or more resistors meet; each chemical bond has been replaced by a  $1000\Omega$  resistor. (You don't need to know the chemistry; the competition is all about calculating resistances in the shapes shown). Comparing Photo 1 with Puzzles 1, 2, 3 and 6 should give you a good idea how the puzzles are built up. Basically, any straight line is a  $1000\Omega$  resistor and there can be several resistors in series.



Send your entry by email (only) to [radcom@rsgb.org.uk](mailto:radcom@rsgb.org.uk) with the subject line "Polyhedra".

The rules are, briefly, that you can use any method to determine the values (up to and including physically building a model out of actual resistors). You are encouraged to show your working / methods. The author has built and measured, or calculated, values for all of the puzzle questions (some are seen in Photo 1 and Photo 2). Any answer within 2% of his values (other than an obvious pure guess) will be accepted as "correct" and the person who gets the most answers "correct" will be the winner. In the case of a tie, the author will judge the 'best' entry on the basis of the methods used by the entrant, with a preference for simpler rather than more complicated mathematical techniques. (A more

detailed set of judging criteria is available from [radcom@rsgb.org.uk](mailto:radcom@rsgb.org.uk) but this is intended to be a fun competition, entered into and judged in good spirits). The winner will be awarded £25 in RSGB book vouchers (redeemable in the RSGB bookshop).

## References

- [1] M Ohsmann, *Elektronika*, 2004, 30 (335), September, 80
- [2] M Q Owaidat, *American Journal of Physics*, 2013, 81, 918
- [3] H A Mavromatis, *American Journal of Physics*, 1995, 63, 85
- [4] M Q Owaidat and J H Asad, *The European Physical Journal Plus*, 2016, 131, 309
- [5] B Allen, T Liu, *The Physics Teacher*, 2015, 53, 75
- [6] F J van Steenwijk, *American Journal of Physics*, 1998, 66, 90

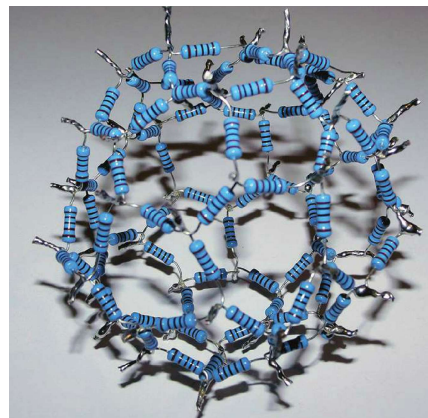
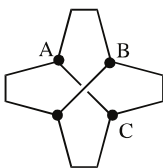
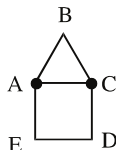


PHOTO 2: Proof that Puzzle 12 can be built.

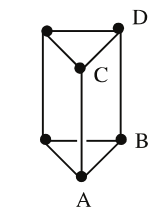
### PUZZLE 1:

"Houseane". What are the resistances from A to B, C, D and E?



### PUZZLE 4:

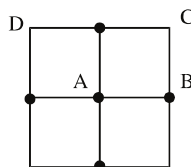
"Twistane". What are the resistances from A to both B and C?



### PUZZLE 5:

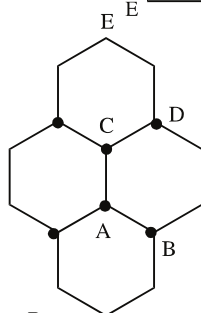
"Prismane". What are the resistances from A to B, C and D?

PUZZLE 2: "Windowpane". What are the resistances from A to B and C, B to D, C to D and C to E?



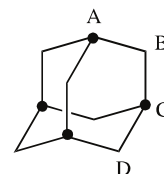
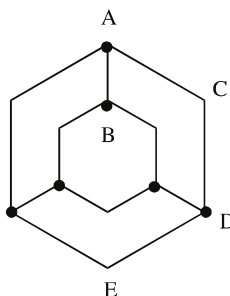
### PUZZLE 6:

"Pyrene". What are the resistances from A to B, C, D and E?



### PUZZLE 3:

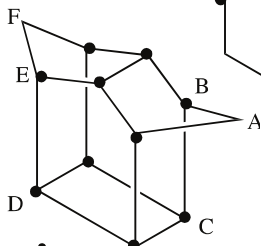
"Adamantane". What are the resistances from A to B, C, and D?



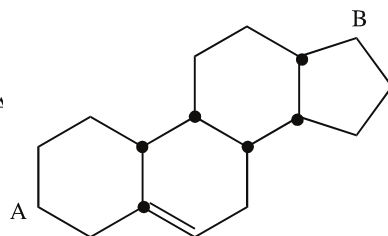
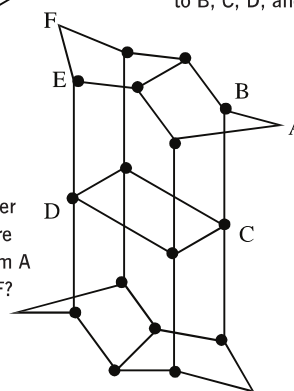
### PUZZLE 8:

"Basketane". What are the resistances from A to B, C, D, E and F?

PUZZLE 9: "Birdcage". What are the resistances from A to B, C, D, E and F?

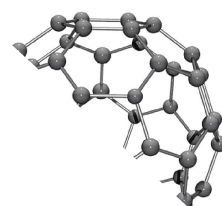


PUZZLE 10: "Bigger birdcage". What are the resistances from A to B, C, D, E and F?



PUZZLE 11: "Cholesterol" (some side groups removed); the double line is for two 1000Ω resistors in parallel. What is the resistance from A to B?

PUZZLE 12: "C60". This is a sphere made up of five- and six-membered rings (pentagons and hexagons) that are linked together. To help visualise your quest we've added an additional view of Puzzle 12: in the same form as the other puzzles (left) and as a sphere with the nodes marked with blobs (right). No two five membered rings share a side; each five-membered ring is surrounded by five six-membered rings. If you go from one of the points of a five-membered ring along the resistor shared between two six-membered rings that is perpendicular to the circle made by going through all five points of a five-membered ring then it will take you to the next five-membered ring.



# Enjoy a noise free Christmas... ..with a bhi DSP noise cancelling product!

**bhi**



## NES10-2 MK3

Amplified DSP speaker:

- Rotary filter select switch
- 8 DSP filter levels 9 to 35dB
- 5W input & 2.7W audio out
- 3.5 mm mono headphone socket
- On/off audio bypass switch
- 12 to 24VDC (500mA)

Simply plug in the audio and connect the power!

## Dual In-Line



Mono/stereo DSP noise eliminating module

\*\*\*Latest bhi DSP noise cancelling\*\*\*

- 8 Filter levels 8 to 40dB - 3.5mm Mono or stereo inputs - Line level in/out - 7 watts mono speaker output - Headphone socket - Easy to adjust and setup - Ideal for DXing, club stations, special event stations and field day events - Supplied boxed with user manual and audio/power leads - Suitable for use with many radios and receivers including Elecraft K3, KX3 & FlexRadio products

## DSPKR

10W amplified DSP noise cancelling speaker

- Easy control of DSP filter
  - 7 filter levels
  - Sleep mode
- Filter select & store function
- Separate volume control
  - Input overload LED
  - Headphone socket
- Supplied with user manual and fused DC power lead



## ParaPro EQ20 Audio DSP Range

- 20W audio power amplifier with parametric equalisation
- Fine tune your audio
- Optional bhi DSP Noise Cancelling and Bluetooth connectivity
- 4 versions available: EQ20, EQ20-DSP, EQ20-B, EQ20B-DSP
- Can be used with your bhi Dual In-Line, NEIM1031 & Compact In-line units



Shape your receive audio to suit your ears!

**Merry Christmas and  
Happy New year from  
all at bhi Ltd!**

## Compact In-Line



Compact handheld mono/stereo in-line DSP noise cancelling unit

- Easy to use rotary controls for all functions - New improved DSP noise cancelling - Use with mono or stereo inputs - 8 filter levels 9 to 35dB - Ideal for portable use & DXing
- Use with headphones or a small speaker
  - 12V DC power or 2 x AA batteries
  - Over 40 hours battery life
  - Size: 121mm x 70mm x 33mm
- Suitable for use with Elecraft K3 & KX3

**Revive your  
radio or speaker  
with a bhi DSP  
noise cancelling  
install module:  
NEDSP1061-KBD  
low level audio  
module or the  
NEDSP1062-KBD  
amplified audio  
module!**

## DESKTOP

- 10W amplified DSP noise cancelling base station speaker
  - Rotary volume and filter level controls
  - 8 filter levels 9 to 35dB
  - Speaker level and line level audio inputs
  - 3.5mm Headphone socket
  - Size 200(H)x150(D)x160(W)mm, Weight 1.9 Kg
  - For use with most radios, receivers & SDR including Elecraft & FlexRadio





# Sport Radio

**D**ecember is a quiet month for RSGB contests and on HF that is particularly so because there aren't any.

The first RSGB VHF contest is 2m AFS, which runs for six hours on Sunday 2nd. It is the third event in the 2018-19 Super League series. After that we have some Activity Contests; the 2m FMAC and UKAC on Tuesday 4th, the 70cm FMAC and UKAC on Tuesday 11th, and the 6m FMAC and UKAC on Thursday 13th. The 2nd Machine Generated Modes (MGM) Contest runs for 24 hours over the weekend of 15-16th. In addition to new modes such as FT8, more traditional modes such as RTTY and PSK are permitted, but CW and EME (moonbounce) are not. Then it's back to the Activity Contests, with the 23cm UKAC on Tuesday 18th and the 4m FMAC and UKAC on Thursday 20th. This is the final Activity Contest of the year. There is no SHF UKAC this month, because it would fall on Christmas day.

The ARRL 160m Contest continues until Sunday 2nd. Because the only stations that count for points are in the USA and Canada, pretty much all activity takes place when the entire radio path is in darkness. The UK Six Metre Group's Winter Marathon begins

on Saturday 1st and runs until the end of January. There are no specific operating periods. Just work as many Locator squares as you can, when you can. The ARRL 10m Contest runs for the entire 48 hours of the weekend 8-9th. Propagation for this one is likely to be challenging, to say the least, so although this is an ARRL contest I am going to issue a Wallpaper Alert for it. The reason I'm doing this is because there are likely to be so few entries from this side of the Atlantic you may only need to make a few QSOs to come first in your country/entity. The DARC (German) Christmas Contest takes place on the morning of Boxing Day, on 80m and 40m. For UK stations the band that will carry the bulk of the traffic will be 40m. The Worked All Britain Christmas Party runs for twelve days, starting on Boxing Day. The Stew Perry Top Band Challenge runs for 24 hours over the weekend 29-30th. Entrants may operate for a maximum of fourteen hours. This is a contest where distance is king, so an antenna with some low angle radiation is likely to serve you better than – say – a dipole or long wire. During adjudication entrants get their scores boosted, for working Low Power and QRP stations.

Looking ahead to 2019, the name of this column will be changing to 'Contesting'. This is news that was well received when

it was mentioned in the Contesting Forum at the RSGB Convention, back in October. On HF, something that should also make people happy is that the timings of the 80m/40m AFS contests in January are being changed. All three are being brought forward by one hour, to 1300UTC. This means 40m will stay alive for longer, before the skip goes long, and the final hour (now 1600-1700UTC) will be before high angle absorption prevents short range 80m QSOs from taking place. The dates are also changing a little, to avoid clashes with other contests. Next, two summer lunchtime QSO parties are being introduced, on 40m. The 80m Club Champs and Autumn Series will henceforth have Assisted and Unassisted categories in each section (10W and 100W). Finally, some experimental FT8 contests are likely to appear in the calendar. On VHF/UHF, some FM Activity Contests are likely to be replaced with MGM contests, but a firm decision hadn't been made at the time this column was written because an online poll was running.

**Steve White, G3ZVW**  
steve.g3zvw@gmail.com

## RSGB HF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Sun 2 Dec	144MHz AFS §	1000-1600	All	144	RS(T) + SN + Locator
Tue 4 Dec	144MHz FMAC	1900-2000	FM	144	RS + SN + Locator
Tue 4 Dec	144MHz UKAC	2000-2230	All	144	RS(T) + SN + Locator
Tue 11 Dec	432MHz FMAC	1900-2000	FM	432	RS + SN + Locator
Tue 11 Dec	432MHz UKAC	2000-2230	All	432	RS(T) + SN + Locator
Thu 13 Dec	50MHz FMAC	1900-2000	FM	50	RS + SN + Locator
Thu 13 Dec	50MHz UKAC	2000-2230	All	50	RS(T) + SN + Locator
Sat-Sun 15-16 Dec	Second MGM	1400-1400	Any MGM	50, 144	RST + 4-character Locator
Tue 18 Dec	1.3GHz UKAC	2000-2230	All	1.3G	RS(T) + SN + Locator
Thu 20 Dec	70MHz UKAC	1900-2000	FM	70	RS + SN + Locator
Thu 20 Dec	70MHz UKAC	2000-2230	All	70	RS(T) + SN + Locator
Tue-Fri 26-29 Dec	Christmas Cumulatives	1400-1600	All	50-432	RS(T) + SN + Locator

## Best of the Rest Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange (info)
Fri 30 Nov - 2 Dec	ARRL 160m	2200-1600	CW	1.8	RST (Ws & VEs also send ARRL/RAC section)
1 Dec - 31 Jan	UKSMG Winter Marathon	All	All	50	RS(T) + Locator
Sat-Sun 8-9 Dec	ARRL 10m	0000-2359	CW, phone	28	RS(T) + SN (Ws, VEs & XEs send State/Province code)
Wed 26 Dec	DARC Christmas Contest	0830-1100	CW, SSB	3.5-7	RS(T) + SN (DLs send DOK or 'NM')
26 Dec - 6 Jan	WAB Christmas Party	All	All	All	WAB Book number
Sat-Sun 29-30 Dec	Stew Perry Top Band Challenge	1500-1500	CW	1.8	4-character Locator (Grid) square

§Super League event. For all the latest RSGB contest information and results, visit [www.rsgbcc.org](http://www.rsgbcc.org)



ML&S - The World Famous Ham Radio Store

# ML&S

## 0345 2300 599

Web: [www.HamRadio.co.uk](http://www.HamRadio.co.uk)

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

FOLLOW US ON TWITTER AND  
facebook HamRadioUK

### NEW! BOXCHIP S700A

**DMR & LTE 4G  
Transceiver.**  
2W on 70cm  
DMR & 4G.  
Android 6, huge  
4" screen.

**In stock. £569.95**



### NEW! BOXCHIP S700B

Same as S700a but no DMR.

Boxchip S700B is an advanced professional  
handheld 4G LTE radio. The Large screen  
and quality finish is an ideal next step up  
from something like the RadioTone RT-4.

**In stock now only £369.95**



**NEW  
PRODUCT**

**Click!**

[www.HamRadio.co.uk/S700A](http://www.HamRadio.co.uk/S700A)

**Click!**

[www.HamRadio.co.uk/S700B](http://www.HamRadio.co.uk/S700B)

### NEW INRICO TM-7 NETWORK RADIO TRANSCEIVER

Mobile network Radio. Designed for the  
commercial world, but supported by Radio Hams  
through the IRN platform, Zello, Team Speak and  
EchoLink via the 3G or Wi-Fi connection. (Ham  
callsign required for IRN and EchoLink)

**NEW  
PRODUCT**



**Available now from ML&S: £139.95.**  
The unit will require simple programming  
before use.

See [MLandS.tv](http://MLandS.tv) & [click](http://click) Videos for full info.



**This year's  
HOG ROAST  
takes place  
on Saturday  
December 1st!**

Now in its 29th year,  
Martin & his gang put on  
a show in store offering  
unprintable prices  
across their product  
range. Representatives  
from Yaesu, Icom,  
Kenwood, BHi, RSGB  
and more are on site  
with the FAMOUS  
HOG ROAST kindly  
sponsored by Icom &  
Kenwood. Doors open  
at 8am and close at  
4pm.

### Radio Tone RT4 4G Internet Transceiver

Larger Screen &  
fully compatible  
with Zello PTT,  
International  
Radio Network &  
Echolink.

**RRP £299.95.**  
**ML&S £229.95**

For more details see:  
[HamRadio.co.uk/RT4](http://HamRadio.co.uk/RT4)



### Radio Tone RT-3 Internet Transceiver

As above with 2.3" Screen.

### Great value, dual band mobile and handheld transceivers



### MYDEL AT-778VU

Twin Band 2/70, 30W 250mhz,  
full feature. **£99.95 including  
programming cable**

### Anytone AT-D868UV 6W DMR/FM Handie

The latest Handie from Anytone  
offering 2/70 with both Digital  
DMR (Tier 1&2) and analogue  
(FM) operation. Fully programmable  
with 10,000 Digital Talk Groups,  
up to 150,000 contacts (!!) as  
well as multiple DMR ID numbers  
(Radio ID's) for a single radio. As  
recommended by Mr. DMR,  
Graeme Platts, G4XOF.

**ML&S Only £139.95**

**MYDEL**



**NEW  
PRODUCT**

### Anytone AT-779V 2m Micro Mobile Transceiver

Brand new on to the market, this new  
Micro-sized 2m mobile is so small you  
won't believe how tiny it is. Solid die-cast  
alloy construction and a full 15W output!

**Special Offer £69.95 - now  
comes complete with  
programming  
cable.**



**Only £169.95**

For more details see:  
[HamRadio.co.uk/RT3](http://HamRadio.co.uk/RT3)

### NEW! NISSEI DIGITAL POWER/SWR METERS

The RS-50 (120W 2m & 70cm) & 70 (200W  
160m-6m) are compact in-line meters that  
present power and SWR on a digital backlit  
LCD display.



**NEW  
PRODUCT**

**Click!**

[www.HamRadio.co.uk/nissei](http://www.HamRadio.co.uk/nissei)

**Introductory price:  
£69.95 each.**

### NEW! METROVNA-180 & 250 ANTENNA ANALYSERS



Both available from stock, Large clear  
16k touch-screen display, Internal Battery,  
Bluetooth, either 100kHz-180 or 250MHz,  
WIN10 or MAC or Android interface.

**METROVNA-180: £244.95**  
**250 VERSION: £274.95**

**NEW  
PRODUCT**

**Click!**

[www.HamRadio.co.uk/  
MetroVNA](http://www.HamRadio.co.uk/MetroVNA)



## Saturday 1st December



### ML&S HOG ROAST

# This year's HOG ROAST takes place on Saturday December 1st!



### MORSE KEYS

**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**

### KENT MORSE KEYS

See web for full range and specifications



- Kent Morse Practice Oscillator. **£43.95**
- Kent Twin Paddle Key. **£139.95**
- Kent Twin Paddle Key Kit. **£119.95**
- Kent Hand Key. **£119.95**
- Kent Hand Key Kit. **£104.95**
- Kent Single Paddle Key. **£119.95**
- Kent Single Paddle Key Kit. **£104.95**
- Kent KT-1 Professional. **£131.95**
- Kent Vail
- Lever Correspondent Replica. **£219.95**

**Full range of Messi & Paoloni Low Loss Professional Coaxial Cable in stock now!**

### M&P ULTRAFLEX 7

Ham Radio professional coaxial cable with stranded core (19 wires) and extraordinary flexibility. The external PVC jacket is in black UV resistant PVC. This cable delivers exceptional mechanical features and electrical properties. Notwithstanding its small dimension (7.3 mm) its performances are so good to outperform RG 213 U (10.3 mm) and put into shade the competitor cables of the same diameter.



**M&P ULTRAFLEX 7**  
7.3 LowLoss cable, 50 Ohm, double shielded.

**M&P ULTRAFLEX 10**  
10.3mm LowLoss cable, 50 Ohm, "alternative for RG-213."

**M&P BroadPro50 double jacket**  
12.4mm LowLoss cable, 50 Ohm, double jacket.

Any of our cables can be ordered in any multiple of 10m length. There is a 10% discount for 100m+.

**click!**

[www.HamRadio.co.uk/ultraflex](http://www.HamRadio.co.uk/ultraflex)



**ML&S ARE THE OFFICIAL UK IMPORTER FOR HEIL SOUND**



- Pro-Set 7 ..... **£239.95**
- Pro-Set 6 ..... **£134.95**
- Pro-Set IC ..... **£169.95**
- Pro-Set Elite 6 ..... **£169.95**
- Pro-Set Elite IC ..... **£199.95**
- Pro-Set 3 Headphones ..... **£99.95**
- PR-781 Microphone ..... **£189.95**
- PR-40 Microphone ..... **£289.95**

**click!**

[www.HamRadio.co.uk/heil](http://www.HamRadio.co.uk/heil)

### MyDEL-SF-401PLUS

**MyDEL**

**click!**  
[www.HamRadio.co.uk/sf401plus](http://www.HamRadio.co.uk/sf401plus)

RRP **£44.95**

**Special Offer £39.95**

### Daiwa Meters

**click!**

[www.HamRadio.co.uk/daiwa](http://www.HamRadio.co.uk/daiwa)



**NEW Daiwa meters in stock now.**  
See web for more info.

- CN-501H/VN/H2 SWR/PowerMeter ..... **£89.99**
- CN-101L 1.8-200MHz. 15/150/1.5kW ..... **£97.95**
- CN-102L 1.8-200MHz. 20/200/2kW ..... **£97.95**
- CN-103LN 140-525MHz. 20/200W. N-Type ..... **£99.95**
- CN-901HP 1.8-200MHz. 20/200/2kW. PEP Reading. Large display ..... **£139.95**
- CN-901HP3 1.8-200MHz. 30/300/3kW. PEP Reading. Large display ..... **£149.95**
- CN-901VN 140-525MHz. 20/200W. N-Type ..... **£119.95**



For more information, prices & technical information email [MicroHam@HamRadio.uk](mailto:MicroHam@HamRadio.uk)

### microHAM

**For the complete range of Array Solutions and microHAM**

**click!**

[www.HamRadio.co.uk/arrayolutions/](http://www.HamRadio.co.uk/arrayolutions/) or [microham](http://microham)



**SignalLink USB**

11 sound card Digital and

**click!**

[www.HamRadio.co.uk/tigertronics](http://www.HamRadio.co.uk/tigertronics)

**click!**

### RADIOSPORT HEADSETS

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.



**RS10SL**  
Listen only stereo lightweight headset for CW ops ..... **£119.95**

**RS60CF**  
Deluxe Dream Edition Stereo Headset with boom ..... **£239.95**

**RS20S**  
Deluxe Dream Edition Stereo Headset only no boom ..... **£139.95**

**Mini-XLR**  
Lead set for any radio (Yaesu/Kenwood/Icom/Flex/Elecraft) ..... **from £59.95**

**PTT-FS-RCA** Foot switch with 7ft cable with phono plug ..... **£44.95**  
**PPT-HS-RCA** Hand PTT Switch, 7 foot cable with phono plug .. **£64.95**

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?

**click!**

[www.HamRadio.co.uk/radiosport](http://www.HamRadio.co.uk/radiosport)

**FAST DELIVERY**

**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**





# ML&S NO. 1 FOR ANTENNAS, TUNERS, LINEAR AMPS & DUMMY LOADS

Now in its 29th year, Martin & his gang put on a show in store offering unprintable prices across their product range. Representatives from Yaesu, Icom, Kenwood, BHi, RSGB and more are on site with the FAMOUS HOG ROAST kindly sponsored by Icom & Kenwood. Doors open at 8am and close at 4pm.



## HUGE CHOICE OF HF LINEAR AMPLIFIERS & ML&S



**NEW!**  
SPE Expert 1.5K-FA  
Linear Amplifier  
£3999.95 Ready for  
pre-orders! See web.



SPE 2K-FA. 160-6m 2kW The  
ultimate Solid State 2kW Amplifier  
with Auto ATU, multi-antenna  
sockets and more. £4999.95

Please note: prices subject to change  
due to currency fluctuation.



**OM2000A+**  
2kW Fully Automatic HF+6m Amplifier. Compact  
and powerful without the worry of solid state  
PA's. £4499.95

OTHER OM LINEARS AVAILABLE ON REQUEST



**Acom 2000A.** Fully automatic 2kW 160-10m HF  
Amplifier with built-in Auto-ATU. £4895.95



**Acom 1500.** 160-6m 1.5kW Amplifier using  
4CX1000A/8168. Easy to use bar graph tuning  
display. £2999.95



**Acom 1000.** 160-6m 1kW Amplifier. Easy to  
operate with LCD message display. Acom's best  
seller. £2299.95



**Acom 1010.** 160m-10m 700W HF Amplifier using  
4CX800A (GU74B) tetrode. £1699.95

## MyDEL CG-3000R Antenna Tuner

The best value remote wire antenna tuner  
now with remote control included.

ML&S: £269.95



**Click!**  
[www.HamRadio.co.uk/  
mydelcg3000r](http://www.HamRadio.co.uk/mydelcg3000r)



## MICROSET DUMMY LOADS AND PREAMPLIFIERS



CF-30 30W Dummy Load 850MHz N-type socket ..... £49.95

CF-300 300W Dummy Load 1.2GHz SO-239 Socket ..... £129.95



SR-100 2m 100W Linear Amp ..... £244.95

SR-200 2m 200W Linear Amp ..... £409.95



PR-2B 2/70 Mast Head Pre-amp 100W throughput ..... £229.95

PR-430A 70cm Mast Head Pre-Amp. 100W throughput £169.95

PRH-430A as above, 500W throughput ..... £239.95

PR-145A 2m Mast Head Pre-Amp. 100W throughput ... £129.95

PRH-145A as above, 500W throughput ..... £219.95

PT-135 13.8V DC 35AMP Heavy Duty Commercial Grade  
PSU ..... £264.95

**Click!**  
[www.HamRadio.co.uk/microset](http://www.HamRadio.co.uk/microset)

## HF + 2 metres: Simultaneously.



### SuperWHIP Pro-Pack

Model: MP1DXTR2

Portable Tripod Antenna System

All Band Go Bag Travel Package

Price from £239.95 to £279.95

(see website for options)



[www.HamRadio.co.uk/  
superantenna](http://www.HamRadio.co.uk/superantenna)

- Work any HF band and 2 metres on one antenna
- Bands: 80-40-30-20-17-15-12-10-6-4m & 2metres
- Frequencies: 3.4-4.2 MHz, 6.9-70 MHz, 144-148 MHz
- Good SWR: No analyser or tuner needed
- 500 Watts SSB; 300 Watts Data/CW
- Color: Stealth Black and Metallic
- Including MC2 2m Coil
- NOW INCLUDED: MR642 and MR8075 Radial sets worth over £50!
- NEW! Backpack option now available.

**GB1 Super Go Bag**  
Travel Case for the Antenna  
and all its accessories included  
weighs 5 pounds (2.2 kg) loaded  
size 13"x9"x3.5" (33x23x8cm)



Contents of MP1DXTR2 package: MP1C SuperStick Antenna, SW1 SuperWhip, MC2 SuperPlexer, TM4N SuperPod, UM2 Universal Mount, MC60 6m Coil, GB1 Go Bag, FG1 SWR Ruler, Radial Sets: MR4010, MR2B, MR2Y, MR2R.

Note:  
Super Antenna components and  
modules are also available separately.



## Martin Wants Your USED EQUIPMENT!

**Best prices paid for  
good clean working  
Ham Radio.**

**Call now for instant offer or see  
[www.HamRadio.co.uk/Sell](http://www.HamRadio.co.uk/Sell)**



## PALSTAR ATUs & DUMMY LOADS



**New SP-30B/C** Real wooden enclosure housing speaker. Available in Cherry or Black ..... £129.95

**New SP-30H** Huge real wood enclosure housing speaker. Available in Cherry or Black ..... £197.95

**HF-Auto** 1.5kW PEP fully automatic ATU for QRO ..... **Save £100 this month!** £1499.95

**AT-500** 600W PEP Antenna Tuner ..... £529.95

**AT-2K** 2000W PEP Antenna Tuner ..... £599.95

**AT-2KD** Differential 2kW PEP Antenna Tuner ..... £599.95

**AT-4K** 2.5kW PEP Antenna Tuner ..... £1049.95



**AT-5K** 3.5kW PEP Antenna Tuner ..... £1199.95

**BT-1500A** Balanced Antenna Tuner ..... £859.95

**PM-2000AM** Power/SWR Meter ..... £249.95

**PM-2000A** Base Power/SWR Meter ..... £229.95

### PALSTAR DUMMY LOADS

**DL-1500 (1.5KW) DL-2K (2kW) DL-5K (5kW)** See web for prices.



**Click!**  
[www.HamRadio.co.uk/  
palstar](http://www.HamRadio.co.uk/palstar)



## 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 a reliable HF communication solution. No tuner required.

**Bushcomm Horizon 2040 Centre Fed Two Band Antenna.** 20/40m simple dipole for efficient operation. Only 13 metres in length. **£99.00.**

**Bushcomm Horizon End Fed 3 Band - 10m 20m 40m.** This antenna is designed and manufactured in Australia and is intended to offer simple and very efficient operation. Only 12 metres in length. **£109.95.**

**Bushcomm HORIZON 4080 Centre Fed Two Band Antenna.** 40/80m simple dipole for efficient operation. Only 13 metres in length. **£119.95.**

**Bushcomm Horizon Loop 20/10.** Designed to be used portable or as a small space permanent set up. **£299.95.**

**Bushcomm Horizon Loop 40/10.** Designed to be used portable or as a small space permanent set up. **£329.95.**

**Bushcomm**  
HF Antenna Systems



## Hustler Antennas

**HUSTLER**

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.

**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 ..... **£239.95**  
**6-BTV** 80/40/30/20/15/10m ..... **£279.95**

**click!**

[www.HamRadio.co.uk/hustler](http://www.HamRadio.co.uk/hustler)

## DIAMOND ANTENNAS

Huge selection always available

### Base Antennas

<b>CP-VU8</b>	80m-70cm 200W Compact HF Base, only 2.7m Long!	£419.95
<b>X-30</b>	2/70, 3/5.5dB, 1.3m Long	£44.95
<b>X-50N</b>	2/70, 4.5/7.2dB, 1.7m Long	£64.95
<b>X-300N</b>	2/70, 6.5/9dB, 3.1m Long	£89.95
<b>X-510N</b>	2/70 Fibre glass 8.3/11.7dB gain, 5.2m long "N"	£129.95
<b>V-2000</b>	6/270, 2.15/6.2/8.4dB, 2.5m Long	£109.95
<b>X-7000</b>	144/430/1200MHz (2m/70cm/23cm) 8.3dBi (144MHz), 11.7dBi (430MHz), 13.7dBi (1200MHz) 5m Long	£184.95

### Mobile Antennas

<b>NR-770RSP</b>	100W, 2/70, 3/5.5dB, .98m long, spring loaded	£36.95
<b>MR-77</b>	Magnet mount/antenna combination. Includes 13' RG58 coaxial cable with BNC or SMA connector	From £25.95
<b>SG-7500</b>	2m/70cm, GAIN 3.5/6.0, 41" long	£65.95
<b>SG-7700</b>	1/2wave C-Load radialless(144MHz), 2x5/8wave radialless(430MHz), 3.5dB(144MHz), 6.0dB(430MHz), 1.06m long	£79.95
<b>SG-7900</b>		£89.95

### Duplexers/Triplexers

<b>MX-72N</b>	1.6-150/400-460MHz Duplexer	£38.95
<b>MX-62M</b>	1.6-56/140-470MHz Duplexer	£59.95
<b>MX-610</b>	HF/6+2+70 (for FT-8900)	£69.95
<b>MX-2000</b>	6/270 Triplexer	£79.95
<b>MX-3000N</b>	2/70/23 Triplexer	£69.95

### Switches

<b>CX-210A</b>	2-way, SO-239 Die Cast	£46.95
<b>CX-210N</b>	2-way, N-Type, Die Cast	£54.95
<b>CX-310A</b>	3-way, SO-239, Die Cast	£59.95
<b>CX-310N</b>	3-way, N-Type, Die Cast	£89.95



## 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.

**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.

## Wonderwand Wonderloop Antennas

**Wonder Wand**  
Antennas U.K.

Designed and built in Great Britain

The UK's favourite rig-mounted antenna system!

**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!**

**NEW WonderLoop 750**  
7MHz-50MHz. Superb compact qrp portable loop for direct rig mounting.  
**ML&S Only £109.95**

**click!**

[www.HamRadio.co.uk/wonderloop](http://www.HamRadio.co.uk/wonderloop)

## mRS MiniVNA Antenna Analysers



Perfect for checking antennas and RF circuits for hams and commercial users.

**MiniVNA Pro 2 with Bluetooth**  
100kHz-200MHz ..... **£364.95**

**MiniVNA Tiny** Huge coverage, 1MHz-3GHz, Android controllable. .... **ONLY £419.95**



**click!**  
[www.HamRadio.co.uk/minivna](http://www.HamRadio.co.uk/minivna)

## MyDEL Sark110 Vector Impedance Antenna Analyser

Pocket-sized Antenna Analyser providing fast and accurate measurement of 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.



**ONLY £289.95**

**click!**

[www.HamRadio.co.uk/sark110](http://www.HamRadio.co.uk/sark110)

## YAESU YA-30



The Yaesu YA-30 is very simple to use. Just open the box, roll out the antenna outside where you want to erect. Snap in the supplied spreaders, connect the high quality coax cable assembly (terminated with PL-259's so you don't even have to fit any plugs).

**ML&S £229.95**

**click!**

[www.HamRadio.co.uk/ya30](http://www.HamRadio.co.uk/ya30)

## EAntenna 59+ 10 ELEMENTS 10-12-15-17-20m - R2010156

**ML&S: £999.95**



**LFA Antennas built to a high specification re-engineered using quality materials**

## The Famous EAntenna Range from Spain

**click!**  
[www.HamRadio.co.uk/eantenna](http://www.HamRadio.co.uk/eantenna)

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!

### V/U Beams

<b>R2010105</b>	144LFA5 5 ele 2m beam	£89.95
<b>R2010109</b>	50LFA3 3 ele 6m beam	£139.95
<b>R2010121</b>	70LFA3 3 ele 4m beam	£84.95
<b>R2010139</b>	432LFA15 15 ele bea	£119.95
<b>R2010251</b>	ea270zb9 4/5 ele 2m/70cm beam	£64.95
<b>R2010253</b>	ea642zb7 2+2+3 ele 6m/4m/2m beam	£129.95

### V/U Verticals

<b>R2010800</b>	ea270j dual band vertical j pol	£39.95
-----------------	---------------------------------	--------

### HF Antennas

<b>R2010013</b>	dbz40 double bazooka 7mhz wire antenna	£53.95
<b>R2010048</b>	ea1015204080dxs 5 band HF dipole	£133.95
<b>R2010904</b>	5 band cobweb 500W antenna	£284.95
<b>R20109043</b>	5 band cobweb 3kw antenna	£369.95
<b>R2010050</b>	ea101520dx dipole 3band HF dipole	£95.95

**DX**  
ENGINEERING

**DX Engineering are an American manufacturing company that specialises in Antenna Hardware built to the highest quality. Their product range is so huge the entire list would fill this magazine.**

**Call us or check out [www.HamRadio.co.uk/dxengineering](http://www.HamRadio.co.uk/dxengineering)**

**DX**  
ENGINEERING



# This year's HOG ROAST takes place on Saturday December 1st!

Now in its 29th year, Martin & his gang put on a show in store offering unprintable prices across their product range. Representatives from Yaesu, Icom, Kenwood, Bhi, RSGB and more are on site with the FAMOUS HOG ROAST kindly sponsored by Icom & Kenwood. Doors open at 8am and close at 4pm.



**ML&S are now the sole distributor for West Mountain radio products!**

The full range of RIGblasters, RIGrunners, PowerPoles and Battery Analysers are available today.

**WEST MOUNTAIN RADIO**



**RIGblaster** The easiest way to properly connect your radio to a computer so that you may operate using over 100 existing and future ham radio sound card software programs. You will be able to operate any sound-card based digital mode that your radio could not otherwise operate.



**RIGrunners** RIGrunner product line offers the most convenient and safest way to connect all your 12 VDC equipment to a power source. RIGrunner utilizes a 13.8 VDC power panel with simple-to-use Anderson Powerpole® connectors. Standardize all of your 12 VDC connections using the amateur radio ARES & RACES, RSGB, ARRL Powerpole® system.

#### DC Power Products

Power management devices to protect both the radio equipment and the power systems they are connected to. These devices provide both battery charge management and load management features.



**click!**  
www.HamRadio.co.uk/  
westmountainradio

**Wouxun**



FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/KGUV9DPROPACK](http://WWW.HAMRADIO.CO.UK/KGUV9DPROPACK)

#### WOUXUN UV9D PRO PACK

- 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

**ALL THIS FOR JUST  
£169.95!**

#### WOUXUN KG-UV950PL

**NOW WITH 4M!  
ONLY £289.95**

Includes FREE programming cable and software for only £289.95.



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.

FOR MORE INFORMATION CLICK  
[WWW.HAMRADIO.CO.UK/KGUV950PL](http://WWW.HAMRADIO.CO.UK/KGUV950PL)

## Hear those weak signals with a bhi DSP noise cancelling product!

#### NEW! PARAPRO

20W Modular Audio Power Amplifier - Parametric Equaliser - Optional bhi Dual Channel DSP Noise Cancelling and Bluetooth technology

Flexible, intuitive and easy equalisation for enhanced speech intelligibility. Shape the audio to suit your ears!

Four product options are available.

EQ20 - AUDIO DSP UNIT with Parametric equaliser .....£159.95

EQ20B - AUDIO DSP UNIT with parametric equaliser and Bluetooth.....£199.95

EQ20-DSP - AUDIO DSP UNIT with parametric equaliser and bhi DSP noise cancelling.....£259.95

EQ20B-DSP - AUDIO DSP UNIT with parametric equaliser, Bluetooth and bhi DSP noise cancelling .....£299.95

The EQ20 and EQ20B can be used with bhi Dual In-Line, Compact In-Line and NEIM1031MKII.



## ML&S are the sole UK distributors for the DV Mega Range of products.

**DVMEGA** is a collective name for digital voice and data related kits and modules. C4FM, DMR and D-STAR is supported with more digital voice and data modes added all the time.

#### DV Dualband (VHF/UHF) radio shield

This shield is compatible with Arduino UNO or MEGA. This module has a 10mW UHF and VHF transceiver on board. In combination with an Arduino you make your own stand-alone dual band hot spot. This module, together with the AMBE3000 forms the basis for a self-assembly D-Star kit transceiver.



#### NES10-2 MK3 Amplified DSP Noise Cancelling Speaker

Dual In-Line Dual Channel DSP noise eliminating module

**DSPKR - 10W DSP Speaker** Easy to use - Sleep mode

**NEIM1031 MKII** Fully featured Amplified Noise Eliminating In-Line module

**DESKTOP** Amplified DSP base station speaker - 10 Watts audio

**Compact In-Line** Compact DSP noise cancelling module with new improved DSP algorithm giving even better noise elimination

Please see web for prices.

**click!**

[www.HamRadio.co.uk/bhi](http://www.HamRadio.co.uk/bhi)



#### 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.

**ML&S  
PRICE:  
£209.95**

Click [www.HamRadio.co.uk/rfexplorer](http://www.HamRadio.co.uk/rfexplorer)

#### New RF Explorer WSUB1GPlus



**ONLY £169.95**

Click  
[HamRadio.co.uk/wsusb1g](http://HamRadio.co.uk/wsusb1g)

A truly hand-held Spectrum Analyser with a frequency range of 50KHz-960MHz. Windows/ Linux/MacOS Open Source & API Libraries.

#### MS-5 HANDS FREE MIC

Looking for a hands-free mic for your 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.

**click!**

**ONLY £39.95** [www.HamRadio.co.uk/ms5](http://www.HamRadio.co.uk/ms5)





# Design Notes

## Fractional synthesisers again

We first saw Fractional-N synthesisers in the April 2012 Design Notes, then looked in more detail of how they work in the November issue of that year. The June 2017 issue carried an update on calculating register values from first principles for the ADF4351 device, popular as a ready-to-go module available on eBay. To recap; a Fract-N synthesiser is a normal phase locked loop (PLL) synthesiser that operates with a high comparison frequency. The division ratio is 'jiggled' in a pseudo random manner to interpolate for an effective N divider that is not an integer. The result allows fine tuning steps to be obtained, at a small fraction of the comparison frequency. But the process does rely on the reference input to the phase-frequency detector ( $F_{PFD}$ ) being high enough so the effects of the jiggling can be filtered out.

We looked at two typical Fract-N synthesiser solutions: the LMX2470/LM2541 devices that both have the same Fract-N engine. Those can resolve to  $F_{PFD} / 2^{22}$  so can give particularly fine tuning that is useful for generating multi-frequency coded (MFSK) digital signals. Unfortunately the LMX2541, which is particularly convenient as it has an internal VCO, has a number of complications that make MFSK programming inelegant and tricky if wideband spurs are to be avoided when the frequency is changed even minutely. The other device we looked at, the popular ADF4351, is easier to program and control but can only offer a coarser tuning grid, typically a few kHz (or hundreds of Hz at lower frequency output).

Neglecting any output dividers used to supply lower frequencies, traditional Fractional-N synthesisers give an output frequency of

$$F_{VCO} = F_{PFD} \left( N + \left( \frac{F}{D} \right) \right)$$

The frequency setting resolution is therefore equal to  $F_{PFD}/D$ . If D is set to its maximum allowed value of  $2^{22}$  for the LMX devices and  $F_{PFD}$  is 20MHz (for example a 10MHz reference with the internal doubler active) it means a tuning resolution of 4.77Hz is possible. In practice, for generating MFSK modes, D is chosen so the tuning step is equal to that needed for the MFSK tone shift and F is then programmed in units of the tone number.

For example, JT4G modulation needs a tone shift of 315Hz, so for  $F_{PFD}$  equal to

20MHz we would use a value for D of  $20\text{MHz} / 315 = 63492$ . It works well enough and several V/UHF beacons have gone on air using such a scheme to generate JT4 and JT65 modulation. But it's not the best way to proceed, especially as the LMX2541 has to be treated in a slightly different way to avoid glitches and spurs due to the internal VCO recalibration process.

## The next generation

But there is now a new device, once again already popularised with ready-built modules available on eBay.

**Photo 1** shows such a module with a small PIC controller module added to program its registers via a serial interface from a PC. The additional 1000 $\mu$ F capacitor shown in the photograph helps clean up phase noise – see later. The ADF5355 is a next generation product capable of producing frequencies between 54MHz and 13.6GHz and, at the same time, giving exceedingly fine, sub-Hz frequency setting resolution. It's even finer than the LMX family can offer. It has an internal VCO covering 3.4 to 6.8GHz and an output divider in binary steps up to 64 for the 54MHz lower limit. The chip also has an output RF doubler, allowing a separate output port that delivers 6.8 to 13.6GHz

The ADF5355 achieves a fine frequency resolution with a dual Fractional-N engine. The output frequency is given by

$$F_{VCO} = F_{PFD} \left( N + \frac{F1 + \left( \frac{F2}{D2} \right)}{2^{24}} \right)$$

So now, not only can it offer the slightly higher resolution of  $F_{PFD} / 2^{24}$ , set using just the F1 register against the fixed denominator D1 (which is already better than the LMX family can offer), but now there is an additional 'fraction of a fraction' term available using a second set of F and D registers, F2 and D2. D2 can be programmed by the user up to a maximum of 16383 so the ultimate frequency resolution available with a much higher 125MHz reference (see later) is now

$$\frac{125\text{MHz}}{2^{24} \times 16383} = 0.00045\text{Hz}$$

That's *surely* more than accurate enough for most purposes. And this is at the VFO frequency; at VHF or UHF even this fine tuning resolution will be divided down to give microhertz steps.



**PHOTO 1:** ADF5355 Fractional Synthesiser module from an eBay supplier. The small extra PCB carries a PIC for translating serial commands from a PC. The 1000 $\mu$ F capacitor gives some extra supply decoupling to improve phase noise.

## Reference input

There is a price to be paid. The dual Fract-N process works best with a high frequency reference, or  $F_{PFD}$ . The 10 or 20MHz typically used with the LMX and ADF43xx devices is not really good enough for optimising low levels of spurs. The maximum specified input to the phase-frequency detector is 125MHz and the various eBay modules typically come with 25, 40 or 125MHz clock oscillators on board. The loop filters are designed for this PFD input and, as I discovered, testing with a 10MHz reference doubled to 20MHz gave poor results with the loop filter components built onto the module. Low frequency references could no doubt be made to give better results by redesigning the loop filter, but it all gets a bit complicated – and a high reference input is better anyway. Fortunately I have a commercial 40MHz lockable TCXO source, so with the reference doubler in use a quite acceptable 80MHz  $F_{PFD}$  is available for testing. But if the stability of the on-board supplied clock oscillator is adequate for your purposes, just use that.

## Calculating register values

First calculate  $F_{PFD}$ , the frequency into the phase frequency detector. In most cases this will be the input reference, which can be doubled by the on-chip reference doubler up to a maximum of 125MHz. Of the two modulus dividers, the first F1 works with

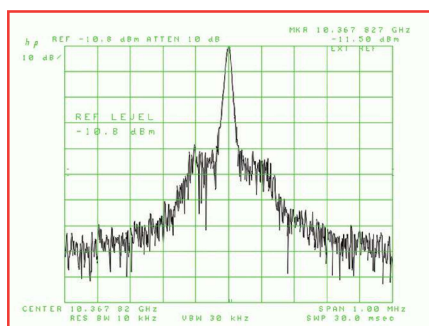


FIGURE 1: ADF5355 phase noise from the eBay board as supplied. (Courtesy of Brian, GM8BJF).

a fixed modulus of  $2^{24}$ , and the second F2 with the programmable denominator D2. Rearranging the equation shows better how the registers are set for any given output frequency.

$$F_{VCO} = F_{PFD} \left( N + \frac{F1}{2^{24}} + \left( \frac{F2}{2^{24} D2} \right) \right)$$

For an example, we'll use a reference frequency of 40MHz, doubled to 80MHz, and an output after the RF doubler of 10368.345MHz on output B, meaning that  $F_{VCO} = 5184.175\text{MHz}$ :

$$\frac{F_{VCO}}{80\text{MHz}} = 64.80215625$$

The integer portion gives  $N = 64$  to be put into the INT N register. Subtract this from the value calculated above, leaving a residue of 0.80215625. Multiply the residue by  $2^{24}$ , the fixed-value modulus of the first stage, to get the F1 value:

$$0.80215625 \times 2^{24} = 13457948.672$$

The integer portion of this is the F1 register, leaving a residue of 0.672.

Choose a value for the second modulus D2. Maximum frequency resolution can be achieved by making this the highest allowed, 16383. Here we will (arbitrarily) use the nearest exact binary multiple below that, 8192. Multiply the final residue by D2 to get F2:

$$0.672 \times 8192 = 5505$$

Discard any fractional part (but see later for exact frequency setting):

$$F_{VCO} = 80\text{MHz} \left( 64 + \frac{13457948}{2^{24}} + \left( \frac{5505}{8192 \times 2^{24}} \right) \right)$$

The resulting N, F1, F2 and D2 values then need to be formatted and correctly aligned into the bits that make up the 32 bit words sent to the chip registers. The data sheet [1] contains full information.

Ultimate frequency setting resolution is a function of  $F_{PFD}$  (the multiplied or divided  $F_{REF}$ ) and the two modulus values.

$$\text{Resolution} = \frac{F_{PFD}}{2^{24} \times D2}$$

so for  $F_{PFD} = 80\text{MHz}$  and  $D2 = 8192$ , the VCO frequency step or resolution is around 0.00058Hz. This step is either doubled or divided by Oddiv as appropriate.

If an exact frequency is needed, the second residue (0.672 in the example) needs to be manipulated. Find the lowest integer that, when multiplied by that figure, results in another integer. The lowest in this case is 125. So by making  $D2 = 125$  and  $F2 = 84$ , an output of exactly 10368.345GHz will result (assuming the 40MHz reference is spot-on).

## Shortcuts

When the device is used for real-time programming with frequencies calculated on the fly in a dedicated microcontroller, it can be very convenient to make  $D2 = 4096$ . Then the precise fractional frequency part is set by a continuous 36 bit word, the highest 24 bits forming F1 and the lower 12 bits F2. Since D1 is also a power of two, the integer N divider value can be stuck on the end of this, making a 48-bit (six-byte) binary word representing the VCO frequency in units of the grid size, or step. The 48-bit number can then be manipulated using straightforward binary addition and subtraction to change tone frequencies; the resulting F2, F1 and N registers will then fall out directly. The following bit pattern shows how the word is made up. The bits labelled 'N' correspond to the integer divider, 'B' the F1 first fractional value and 'a' to F2:

NNNNNNNN NNNNBBBB BBBBBBBB  
BBBBBBBB BBBBaaaa aaaaaaaaa

The values ends up with a 4-bit offset in the individual bytes and although this looks messy, it is actually remarkably useful. It means that byte alignment for many of the values correspond with their positions in the chip's registers as there is a four-bit offset present there for the register address. All of this simplifies microcontroller code and speeds things up, a useful prerequisite for real time reprogramming. See the data sheet for full details of register settings.

It's worth noting here that 48-bit integer arithmetic is beyond the capabilities of many of the high level languages used to program microcontrollers, at least to do so directly. It is even beyond the capability of an Excel spreadsheet but is, however, easily achieved by extending standard assembler routines. Any PIC can manage 48- or 64-bit arithmetic.

## Cleaning up the ADF5355

In the September 2018 Design Notes we saw the problems far-out phase noise can have on wide band modulation such as DATV and noted that the DATV community had found this issue with the ADF5355 synthesiser. Brian Flynn, GM8BJF, looked at this and

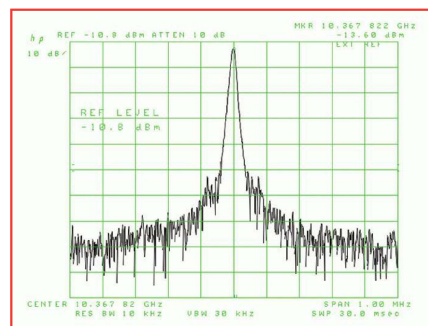


FIGURE 2: The reduced phase noise possible by placing a 3300µF low-ESR capacitor across C30. (Courtesy of Brian, GM8BJF).

wrote up his findings in the December 2017 issue of *Scatterpoint* [2]. He wrote "My initial hunch was that the power lines were the source of the noise. There are two voltage regulators on the boards, one a LT176333 (which powers both the 3.3V analogue and digital Vdd lines) and a LT17635 (which powers the VCO and charge pump circuitry with 5V). This is powered directly from the output of the regulator and there is no further on-chip regulation, whereas the 3.3V rails are further regulated down to 1.8V on-chip. Both the LT parts are billed as 'low-noise' in the data sheet, but I noted that the AD evaluation PCB design used AD parts that are considerably more expensive than the LT parts. Their respective data sheets reveal that the AD parts were about ten times less noisy. The simple expedient of adding a 3300µF low ESR capacitor across C30 (on the black PCB) bypasses the noise from the regulator output quite effectively. I used a Rubycon MBZ series 6.3V part with an ESR of 12mΩ."

The plots before and after can be seen in **Figures 1** and **2** where a very pronounced reduction in phase noise in the area 30–200kHz either side of the carrier, and beyond is visible, ie just outside the loop filter bandwidth. The improvement is so great it makes me wonder if some of my previous synthesiser designs such as the LMX2541 might also benefit from such cleaning-up. Since that article, Brian has done some further work on lowering phase noise from these modules. Details can be found at [3].

## References

- [1] [www.analog.com/media/en/technical-documentation/data-sheets/ADF5355.pdf](http://www.analog.com/media/en/technical-documentation/data-sheets/ADF5355.pdf)
- [2] [www.microwavers.org - Scatterpoint](http://www.microwavers.org - Scatterpoint)
- [3] <https://gm8bjf.joomla.com/2-uncategorised/15-reducing-phase-noise-pn-on-chinese-adf5355-boards>

Andy Talbot, G4JNT  
andy.g4jnt@gmail.com



# Churches & Chapels on the Air 2018

**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 2018, the event took place on 8 September.

Many radio clubs activate special event stations on the same day that churches put on events for the public to raise funds and their profile.

## GB900PC Peterborough Cathedral

The first of Peterborough & District ARC's autumn events was CHOTA. This year we were lucky enough to set up our station in the Cloisters area of Peterborough Cathedral. This is a special year for the Cathedral because it is 900 years old, so we requested (and were given) GB900PC. We set up an offset dipole for HF and a white stick vertical for VHF. We were very much shielded by the massive size and height of the Cathedral, so contacts in certain directions were almost impossible. However, we persevered and made over 50 contacts in nine countries on 40 and 80m, with just a few on VHF. We had a lot of interest from the public plus the space capsule that Tim Peake used was inside the Cathedral, which brought extra people toward our radio station. A great day and good PR for the hobby.

Tony King, G0IAG

## GB0LOW, St. Martins, Lowthorpe

The tower at Lowthorpe makes a good aerial mast. I fastened the centre of my 60m long doublet to one of the pinnacles and the ends to trees in the churchyard. This antenna worked well on 80, 40 and 20m with OWF down the tower to a 4:1 balun and coax to the Kenwood TS-450 transceiver. 40m was useless for inter G working, fortunately 80m was in good shape. The case has often been the reverse in previous years. I was delighted to work 17 churches out of about 30 active. A total of 41 QSOs were made, including USA on 20m. DX always impresses the visitors even though it was a contest. Looking



GB900BC, a special year for Peterborough cathedral because it is 900 years old.

forward to next year, which will be on Saturday 14 September 2019.

John Wresdell, G3XYF

## GB5SH, St Hilda's, Hartlepool

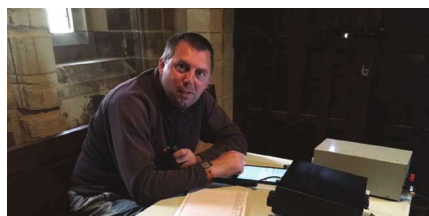
On HF we made 73 contacts, including two CW, and nine that were with other CHOTA stations (GB0LOW, GB0SLE, GB1SKC, GB1SMB,

GB2ASF, GB2STC, GB4DCF, GB4SBC, GB8CSM). We used an W3DZZ trap dipole in inverted V configuration with an IC-7300 and a KW Z-Match. On VHF/UHF we made 23 contacts using a VHF/UHF collinear and an FT-900R/E. The operating team were GOKVL, G4DXP, G4GTX, M6OEQ, M6TJI, 2E0HPI and G8DST (who masterminded the antennas and took the photographs).

John Hogg, G3NUA



GB0LOW on the air from St Martins church in Lowthorpe.



GB5SH from St Hilda's Church, Hartlepool.



GOSJB relocated to the car due to the weather.

### GOSJB, St John the Baptist, Wantisden

The morning was grey as I set up outside Wantisden Church – a remote church with no houses or cottages within 3 miles – and only a single-way track leading to it, more suitable for walkers than motor vehicles. I was using my FT-450D and an Atas mobile whip. I had decided against climbing the crumbling tower, for this truly is a church in advanced stages of decay. I sat on a chair beside the car, with all the gear on a small table, and that was roughly the time that the drizzle began. Not wanting to get the little radio too wet, I hastily dismantled everything and reinstalled it all inside the car. Band conditions were...interesting. We've had several months when all bands have been quiet – or totally dead – and I'd wondered if I would make any contacts at all. Sadly, I subsequently learned that one of the major opened bands was 80m and the Atas aerial covers all bands – except 80m. I managed contacts on 20m and 40m. I had volunteered to be the church representative if we had any visitors on the Suffolk Ride and Stride day – folk get sponsored for each church they visit in their area – many walk, but most come by bicycle. Over the five hours I was there, about eleven cyclists visited. At the end of the day I managed just 14 contacts – 11 different countries – with an additional ten who wanted 'outside Europe only' and wouldn't even give me a signal report. Nevertheless it was great fun and I'm already looking forward to 2019.

Steve Nicholls, G0JFM

### GBOWAC, St Mary the Virgin, Wendens Ambo

I operated GBOWAC from the porch of St Mary the Virgin church in Wendens Ambo, a small village in north west Essex. When I had got the mast



GBOWAC operated from the porch of St Mary the Virgin, Wendens Ambo in Essex.

ready to put up in the churchyard I realised that I hadn't brought my 40m dipole with me, so had to pop back home (3 minutes away, fortunately), remembering that it wasn't in my portable pack because since last year I had added traps and extensions to make it into a 40m/80m dipole. That proved to be a stroke of luck, since 80m turned out to be the band to be on. Out of 22 QSOs I tallied 12 with other churches, which was a best from here. Two QSOs were made on 40m – Dungiven Parish Church MNOGKL and the Orkney Wireless Museum GB00WM. The remainder were on 80m. Equipment in use was an FTdx1200 running about 75W and the antenna a thin-wire trap inverted V trap dipole for 40m and 80m, with the centre at about 8m. The weather was overcast, with a little rain when setting up and in the middle of the day, but otherwise dry. CHOTA coincided with Essex Ride and Stride, so I was on hand for any riders or striders – only four this year.

Robert Wilson, G3ZY0

### GB4SBC, St Barnabas Church, Franche

Having listened to the 80 and 40m bands for a few weeks before the event, I was not optimistic that we would make this year's event a success. However, having set up on Friday at 2pm, successfully hoisting the G5RV to the top of the church's flag pole, we were away.

This year we kept both ends of the aerial well away from the church building and also raised each end to about 20/25 feet above the ground, on telescopic poles. On Saturday, the station was soon making its first contact on 3.750MHz at 8am. We stayed on this frequency all day, without a break and it was good to have the support of 8 operators that made the operating so much easier.

Band conditions were far from brilliant, but I would say that GB4SBC performed successfully. It was a very happy, fun-filled-day; we made lots of contacts, all over the UK, including 19 churches



GB4SBC had a team of 8 operators in Franche.

and chapels. It was certainly the best effort we have made since embarking on CHOTA, thanks to the 8 operators, who included: Mark, G4OBC, Ann, G0BIR, Fred, G0EHQ, Tony, G4ZIB, Barry, G4CTU, John, G3SZG, James, M0IGV and Geoff, G4ACS. A very good team effort.

The transceiver used was the old faithful, FT-1000, the 200W model that performed very well, barefoot, receiving both good signal and audio reports.

We had just a few visitors during the day, including John, G4GMA and the Vicar of St Barnabas Church, Rev Bridgett, who was able to pass on a message to the vicar of Otley Church in Yorkshire at their station, GB2ASF. Total contacts made (including during set up) were 191 in eight countries.

It would be wrong to forget to say a big thank you to the Church Warden of St Barnabas Church, Barrie Lewis. Without his help we could not have put on the station.

Geoff Weale, G4ACS

radcom@rsgb.org.uk



### GB2MAG, St Magnus Church, Bessingby

Due to only having a linked dipole for 40/20m, we missed out on 80m. Consequently, on 40m only 11 stations went into the log including four churches, two in Cornwall, one in East Sussex and one in East Yorkshire. We also managed two GM, two DL, one HB, one F and a local G/MM berthed in Bridlington Harbour. We lost quite a few more due to QSB. We still enjoyed the day and will hopefully have something sorted out for 80m next year.

**Dave, GODEB**

### MNOGKL, Dungiven Parish Church

This year was a special year for CHOTA from Dungiven Parish Church, it was the 200<sup>th</sup> anniversary of the church building and Bushvalley ARC were very happy to assist and demonstrate their portable radio station from the ever popular Community Vintage Vehicle and Craft Fair. The radio club this year procured the use of an excellent radio shack, a double horse trailer and MNOGKL was well and truly aired on the day. It was especially exciting to have another Church from Co. Down on the air and we had our first 'Church to Church' QSO on VHF with St. Johns who were on the air with the call MNOVFW. On the HF bands various other CHOTA stations were added to the tally and the log was looking very healthy as mid day approached. Esther, GIOAZA, Ian, GIOAZB, Jason, MI3UIW, Steve, MIOKXT and John, MIOWJC all got involved with chatting, working and logging the V/UHF and HF contacts from around the EU, UK and Canada.

**Ian Evans, GIOAZB**

### GBOSLE St Lawrence Church, Eyam Village

Planning for GBOSLE at St Lawrence Church, Eyam Village (the "Plague Village", IO93DG, Derbyshire Dales, Peak District National Park) started in March when it was identified that CHOTA in September could be preceded with a Short Wave Workshop in August at a 'Holidays At Home' event for over 50s from the village and surrounding area. I decided to apply for an NoV for 2 days, the 7<sup>th</sup> and 8<sup>th</sup>. With the help of Colin, M5FRA, a 38m long-wire was erected, end-fed via a 9:1 un-un at 2m (with a couple of counterpoises), dog-legged in a sloping fashion via some trees in the churchyard and supported at its top end from the church tower flagpole at approx. 18m. This served as a NVIS antenna with ability to operate multi-band (if required) with a tuner. The 7<sup>th</sup> was test day but due to conditions it was decided to adopt 80m as band-of-choice. The station comprised an FT-847 transceiver, old FL-2100Z linear (400W)



GBOSLE at St Lawrence Church, Eyam Village in Derbyshire.

with manual ATU and was set up in the choir vestry. I was ably assisted by my XYL (Angela), who put up posters, signs and a 'scoreboard' to keep visitors informed of the number of churches, stations and countries worked. Over six hours leisurely operating, GBOSLE contacted 107 other amateur radio stations (with 90% on 80m and others on 40/20m) in Holland, France, Germany, Norway, Republic of Ireland, Switzerland, Italy, Belarus plus all parts of the UK, from Dumfries & Galloway, Isle of Skye and Edinburgh in the North to Cornwall, Kent, Oxford, Sussex and Essex in the South. 16 other CHOTA stations were worked and greetings were passed, along with notable information about the churches. Throughout the event there were many visitors into the church, many popping into the choir vestry to see what was going on, and all of them delighted to see activity within the church building. Another memorable visitor was an American amateur "still licensed but not transmitted for years" and who was keen to see an operating station within the church. All in all a highly enjoyable day and one that we may well look to repeat for CHOTA 2019!

**Nick Garbett, M1DDD**

### GB4DCF Driffild Christian Fellowship Church

The station was set up at Driffild Christian Fellowship Church early Saturday morning. The weather was overcast initially however it rained later in the afternoon. The station was operated by Mike, G4SMB and the equipment consisted of the IC-7000 mounted in the newly constructed 'Go Box' running around 80W into a G5RV erected in limited space down the side of the building but up around 20ft at its centre. 40m operation was the initial plan, however conditions were very poor on 40m. Moving to 80m proved to be a bit of a struggle at this QTH but was reasonably good. Six CHOTA stations were worked. The station was visited by our Pastor Mark, Steve and Kim two of the church elders, XYL Pamela and some more church folk. Many questions were asked about the station and the purpose of CHOTA. In

addition, a quick skirmish on 20m to demo CW operation netted a station in Russia and another conversation about Morse code and its characters. All in all a good day on the wireless and some long interesting conversations with visitors; much better than last year! See you next year.

**Mike, G4SMB**

### St Johns, Church of Ireland, Moira

On the 8<sup>th</sup>, Mid Ulster ARC activated a CHOTA station for the first time. During a day with difficult HF conditions, the most of our 70 contacts were on VHF & UHF. Two contacts made using a homebrew(ish) antenna. On 20m we worked OK2RZ and on 40m it was LZ1WIN. An enjoyable day and we certainly did put the Church on the Air!

**Dave, 21OSJV**

### GB1SKC, St Keverne Church, Helston

Members of Poldhu ARC had a very successful day operating GB1SKC at St Keverne Church, located on the Lizard Peninsula, Cornwall. Operators included Ivan, G4WIA, Malcolm, GMODBW and Cliff, G3UYN. The antenna was tethered between the base of the St Keverne church steeple and the sign of the Three Tuns public house, with the radio equipment in the garage of the Temperance B&B. We thank all our friends in the Three Tuns and The Temperance House (who also kept us going with great coffee), plus Ellis, MOKAV and Bob Bevan who climbed the tower to hoist the antenna. Another successful event, we worked 84 stations including 8 registered churches. Apart from our excellent operators, I put our success down to running 400W to a high dipole that was accurately resonated and needed no tuner! We found a frequency and sat on it for the day. The radio this time was an IC-7300.

**John Farrar, G3UCQ**



# nevada®



## The UK's LARGEST Ham Radio Warehouse

Over 20,000 products in stock and parking for over 15 cars!

BIGGER CHOICE • BETTER SERVICE • FAST DELIVERY • BEST UK PRICES

ICOM



**IC-7610**  
HF/50MHz 100W SDR Transceiver  
• Large 7" Widescreen display  
• Real Time Spectrum Scope  
• Dual Watch Multi-band receiver  
• Built in Automatic ATU

NOW SHIPPING - we have plenty in stock!

GENEROUS PART  
EXCHANGE DEALS  
on your old radio

£3499.99

Come & play - radio on display in our showroom!



**Icom IC-8600**  
100kHz - 3000MHz  
Decode: D-Star, NXDN,  
DPMR & APCO p25

Comms receiver  
with SDR technology

£2499.99



**Icom IC-7300**  
100W HF+6m+4m  
• RF direct sampling  
• Touch screen control

GENEROUS Part X  
CALL NOW!

£1199.95



SPECIAL  
OFFER

**ID-4100E**

• D-STAR mobile transceiver  
• Terminal & access point mode  
• Bluetooth® hands-free operation  
• Integrated GPS  
• MicroSD card slot

While stocks last!

WAS £479.95  
£299.95



**Icom IC-7100**  
Base/Mobile Transceiver  
With remote head unit  
Covers HF/6/4/2/7/0cm

RRP £1249.95 £999.95



**ID-31E**  
• Dual Band Transceiver  
• New Terminal Mode and  
Access Point Modes

£299.95 now £279.95



**Icom R30**  
Digital Multi-Mode Scanner  
Decode: D-STAR, P25, NXDN, dPMR  
digital & AM/FM/WFM modes

Now in stock! £569.95

More Icom

DS100E Standard version Dual Band D-Star ..... £574.95  
IC-2700E Dual Band Transceiver ..... £289.95  
AH-4 ..... 100W HF+6m auto antenna tuner ..... £134.95  
IN30 ..... New compact style microphone ..... £119.95  
SM50 ..... Deluxe desk microphone ..... £199.95  
SP23 ..... Deluxe extension speaker ..... £149.00  
SP38 ..... Matching speaker for IC7300 ..... £149.95  
HNA-36 ..... Standard Hand Mic ..... £48.00

COMING SOON!  
£25 deposit secures!

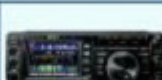


**FTDX-101D**  
High-Class HF/50MHz Transceiver with 4m built-in for UK

FTDX-101MP ..... 200W version also due ..... £25 deposit secures from first batch!

YAESU

• RF output: 100W  
• SDR Technology and  
Waterfall Display  
• Large 'Touch control'  
colour display  
• Independent Main and  
Sub receivers  
• High-Q VC Tuning Front-  
• Plus lots more



**FT-991A**  
• Covers 160m - 6m  
• Touch Screen  
• AM/FM/SSB/Data

£1189.95



**FTDX-5000**  
HF/50MHz 200W  
Premium Class  
Transceiver

2 independent receivers

£3199.95



**FTDX-3000D**  
HF/6m Transceiver  
Great receiver and  
still very popular

£1449.95



**FTM-400DXE**  
Dual Band 50W  
Mobile with GPS

£479.95



**FT-818**  
60m Band included  
9.6V 1,900mAh Battery  
Freq stability improved

£599.95



**FTDX-1200D**  
HF/6m Transceiver  
• 4.3" TFT full  
colour display

£939.95



**FT-857D**  
HF/VHF/UHF Mobile  
• Modes: AM, FM,  
LSB, USB, CW DATA

£729.95



**FT-450D**  
HF/6m Transceiver  
hurry they will not  
this cheap much  
longer!

£579.95

More Yaesu

FT-700 ..... Dual band digital TX Handheld ..... £189.95  
FT-2DE ..... C4FM/MF/M 144-430MHz digital HiH ..... £389.95  
FT-891 ..... JHF10m mobilebase TX all mode ..... £589.95  
FTM100DE ..... New C4FM 50W Dual Band mobile ..... £299.95

G5500 ..... Azimuth-elevation rotator ..... £699.95  
G1000K ..... Variable speed heavy duty rotator ..... £499.95  
G450C ..... Rotator ..... £399.95

KENWOOD



NOW IN STOCK!

**TS-890S**  
100W HF transceiver inc 4mtr with ATU  
• 7" Colour TFT display  
• Down conversion  
• Roofing Filters

£3999.95



**TS-590SGE**  
160-6M Transceiver  
with ATU. Cracking  
performance for the  
money!

£1299.95



**Kenwood TH-D74E**  
Dual Band Handheld with APRS  
and Digital (D-STAR) capability  
• Built in GPS

IN STOCK!

Soft Case ..... £29.95 £599



**Kenwood TS-480SAT**  
100W  
Mobile/Base

Still as popular as ever!

• HF + 6m • Built-in ATU, DSP

£849.95

TS-480HXE

200W version ..... £899.95



**Kenwood TS-2000**  
Complete  
"shack in a box"

All-mode HF/5/0/144/430MHz  
Built in ATU, plus lots more

£1499.95

TS-2000XE

As above plus 23cms ..... £1649.95

More Kenwood

TS-480HXE ..... 200W mobile 160-6m ..... £899.95  
TS-480SAT ..... 100W mobilebase HF-6m ..... £849.95  
MC60A ..... Classic desktop microphone ..... £122.95  
MC90M ..... Deluxe desktop microphone ..... £189.95  
HS-6M ..... Lightweight Headphones ..... £35.95  
HS-9W ..... Deluxe Headphones ..... £69.95  
SP23M ..... Mid-size external speaker ..... £68.95  
MC435 ..... Handheld Microphone - 8pin ..... £24.95

ALINCO



Professional quality DMR Digital/Analogue Handhelds

**DJ-MD5**  
Dual Band DMR with voice recorder  
• Output: 0.2, 1, 2.5, 5W  
• VFO programmable  
• Digital voice recorder  
• FM Broadcast receiver  
• Software and programming  
lead supplied

DJ-MD5 Standard H/held ..... £139.95

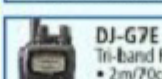
DJ-MD5 GP With GPS H/held ..... £149.95

Professional quality DMR  
Digital/Analogue Handhelds  
All DMR Tier I and Tier II

DJ-MD40 UHF ..... £129.95

DJ-AXD1 VHF ..... £109.95

DJ-AXD4 UHF ..... £109.95



**DJ-G7E**  
Tri-band Radio, die-cast chassis  
• 2m/70cms/23cms  
• 1000 memory channels  
• Full duplex  
• CTSS

£299.95



**DX-SR9**  
• 160m-10m + 5M  
• 100W SSB/CW/V  
40W in AM

£599.95



**DM-330MW MkII**  
30A Deluxe Supply  
variable voltage,  
low noise, extra filtering

£129.95



**DR-735E**  
Twin Band Mobile 'Rainbow'  
display VHF/UHF transceiver  
• Extended RX 108-174MHz  
400-475MHz

£299.95

SHOWROOM OPENING HOURS: MON - FRI 9AM - 5:30PM

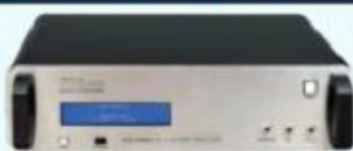
CLOSED SATURDAY

www.nevadaradio.co.uk



**GENEROUS PART EXCHANGE or CASH waiting for your used gear!**

**APACHE LABS** NEVADA - UK appointed dealer



**ANAN 8000DLE Top of the range!**  
HF & 6m 200W SDR Transceiver

- Astounding IMD performance
- Pure Signal (Prestortion) for clean TX
- Diversity reception with 2 x DDC

**£3799.95**



**ACOM ATU-04AT**  
Remote ATU - 1.5kW  
Covers 1.8-54MHz

Auto tuner and 4-way antenna switch.  
For use with A1200s & A600S only.  
Controlled via coax

**£1099**

**ACOM**

**SOLID-STATE AMPLIFIERS - NEW!**  
Acom A1200S 1.2kW (1.8-54MHz) £2895.00  
Acom A600S 600W (1.8-54MHz) £2399.95  
**VALVE AMPLIFIERS**  
Acom 1500S 1.5kW PEP (1.8-54MHz) £2999.95  
Acom 1000S 1kW PEP (1.8-30MHz) £2299.95

Full range available - see web!



**DV-1**

Decodes virtually ALL popular digital modes:  
DMR, D-STAR, Yaesu Fusion & lots more!  
• 100kHz-1300MHz Wide band reception  
• Multi-mode digital demodulation

**£1299.95**

**AOR**

**AOR AR-DV10**



Advanced Digital Handheld Scanner  
100kHz-1300kHz

**£945.00**

**AOR AR8200 MkIII**



Professional style fully featured wideband scanner/receiver

**£459.95**

**PALSTAR**

**EASY TO TUNE**

**AT-500**

- Covers 6-160m • Power 600W PEP
- 'Peak Hold' cross needle meter

**SPECIAL OFFER £599.95 £549.95**

AT-2K 2kW manual tuner 6 to 160m £599.95  
AT-5K 3.5kW manual tuner £1249.95  
AT-4K 2.5kW manual tuner £1024.95



**AT-2K**

- Covers 6-160m
- Output: 2000W PEP

**£599.95**

• Optional 4:1 Balun for balanced wire feeders

DL-1500 1500W high power dummy load £199.95  
BK4C/1:1 4kW 1:1 ratio current balun £99.95  
BK4C/4:1 4kW 4:1 ratio current balun £99.95

**DAIWA SWR Meters**



**CN-901HP**

Professional Quality Cross Needle Meter  
• 1.8-200MHz, Power 20/200/2kW  
• Reads Average & PEP power

**£129.95**



**CN-101L**

- Freq: 1.8-150MHz
- Power: 15/150/1.5kW

**£89.99**

**More Daiwa**

CN-801VN 140-525MHz 20/200W N type £119.95  
CN-103LN 140-525MHz 20/200W N type £89.99  
CN-501H 1.8-150MHz 15/150/1.5kW £89.99

**CUSHCRAFT**



**MA6B**

2 element 6 Band Beam  
• 20/17/15/12/10/6m  
• 7ft Boom  
• Power: 1.500W

**£699.95**

**HF Beams**  
A35 10/15/20m 3 el 1.5kW £629.95  
A-743 40/30m add on kit for A35 £209.95  
A3WS 12/17m 3 el 1.5kW £599.95  
A-103 30/40m add on kit A3WS £229.95  
A45 10/15/20m 4 el 1.5kW £749.95  
A-744 30/40m add on kit for A45 £219.95  
TEN-3 Stegwalker 3 el 10m 1.5kW £329.95

**PRO Antennas**



**Dual Beam Pro**

Frequency:  
20, 17, 15, 12, 11, 10 plus 6m (with a suitable ATU)  
• Power: 1kW  
• Turning radius: 2.5m

**£249.99**



**I-Pro Home**

Very efficient Vertical covering:  
20, 17, 15, 12, 11, 10 plus 6m  
• Height: 5.0m  
• Power: 1kW PEP

**£259.99**

**Anytone**



**AT-588**

50W 20MHz transceiver

- 200 memories
- DTMF microphone
- Power: 10W/20W/50W

**£159.99**

**Midland**



**CT-2000**

New 25W Dual Band Mobile  
• UHF/VHF, UHF/VHF, VHF/VHF  
• Output: 25W, 10W, 5W  
• DTMF Microphone  
• Multi-colour Display  
• USB Programmable

**£129.95**

**FlexRadio**



**NOW SHIPPING**

Both the FLEX-6600™ and FLEX-6600M™ offer the ultimate performance SDR technology and the best value for the serious HF/6m operator. The FLEX-6600 model is designed for the Ham who wants to operate the radio exclusively as a server from PC, Laptop, Maestro, Mac, or iOS clients - whether local or remote.

**World class SDR Transceiver**  
**Factory appointed dealer**

**Flex-6600M**

Top of the range for those who want absolute performance and versatility.

- 100W 1.8 - 54MHz
- 8" Touch Screen
- 4 Receivers 30kHz - 54MHz
- Spectrum Dynamic 155dB
- Contest Pre-selectors
- Diversity Reception
- Panadaptor Zoom

**£4999**

**Flex-6600**

As above but without the Maestro front panel. Control from your PC, Flex Maestro Laptop, iPad or iPhone

**£3999**



**Flex-6400**

With improved receiver performance, 2 slice receivers, a preselect & new modular design offers outstanding value for money. Control it from Flex Maestro, PC, Laptop, iPad or iPhone

- 100W 1.8 - 54MHz
- 2 Receivers 30kHz - 54MHz
- Spectrum Dynamic 144dB

**£1999.95**

**Flex-6400M**

As above but with the addition of the Maestro front panel

**£2999.00**



**Flex Maestro**

An intuitive, plug-and-play control console that directs the operation of any FLEX-60 Signature Series transceiver without need a traditional PC.

- Internal 2W mono speaker
- Display Type: Large 8.0" In Plane Switch (IPS) display with 10-point touch
- 17.3cm (H) x 35.6cm (D) x 4.5cm (D)
- Weight: Approximately 1.8kgs

**£1299**

**INRAD**

**NEW Inrad Desk Microphones**  
**Model DMS-629**

Dynamic mic gives clear well-articulated audio, tailored to match intelligibility of human voice



Supplied c/w adaptor to match radio of your choice, choose from below  
DM-629 - Icom, DM629-Yaesu 8, DM629-Kenwood, DM-629-Yaesu RJ4

**Official microphone supplier to Flex radio**

**£159**

**Morse Keys**

**Bendish**  
Bendish BY-1 £189.95  
Bendish BY-2 £239.95  
**Vibroplex Keys**  
Iambic Deluxe Single lever Chrome £239.95  
Iambic Standard Single lever Black £179.95  
Iambic Standard Paddle Black £179.95  
Iambic Code Warrior Junior Black £169.95  
Iambic Code Warrior Junior Satin £189.95  
Vibroplex Standard single lever Black £189.95  
Vibroplex Deluxe single lever Chrome £239.95  
Hand Key Standard Eco Black £179.95  
Hand Key Deluxe Chrome £229.95  
**Hi Mound**  
HK-705 Affordable Hand Key £42.95  
HK-708 Quality Hand Key £69.95  
HK-709 Deluxe Hand key with heavy base £79.95

**Cables & Wires**



**Ecoflex 15**  
per metre £6.45 price per 102m drum  
PL259 connector (part: 7350)  
N type connector (part: 7395)

**Ecoflex 10**  
per metre £3.79 price per 102m drum  
PL259 connector (part: 7378)  
N type connector (part: 7367)  
BNC type connector (part: 7379)

**Aircell 7**  
per metre £2.99 price per 102m drum  
PL259 connector (part: 7390)  
N type connector (part: 7392)  
BNC type connector (part: 7391)

**Aircell 5**  
per metre £2.75 price per 102m drum  
PL259 connector (part: 7760)  
N type connector (part: 7760)  
BNC type connector (part: 7760)

**OTHER 100M DRUMS**

**Westflex 103** Ultra low loss £1.19  
**RG-213 (Cablex)** Low loss high quality £1.19  
**RG-213U** MIL spec £1.19  
**RG-Mini 8** Super XX £1.19  
**RG58/UC** MIL spec £1.19  
**450 Ohm** Twin feeder £1.19  
**300 Ohm** Twin feeder £1.19  
**Coated flexwave** Antenna wire £1.19

**NEVADA ANTENNA WIRE**

**Nevada 28** 2.8mm 21W per metre £1.19  
**Nevada 28D** 2.8mm 21W 100m Drum £1.19  
**Nevada 32** 3.2mm 51W per metre £1.19  
**Nevada 32D** 3.2mm 51W 100m Drum £1.19

**MetroVna**

**DELUXE Network Antenna Analyser**  
with Bluetooth connectivity  
• Frequency: 1-250MHz  
• Measures: SWR, R, Z, X, phase, filters, return Loss Transmission Loss Bluetooth & USB

**£279.95**

PRO Model...Covers 1 - 180 MHz...£259.95

**nevada Telescopic Masts**

**33 ft** Aluminium 7 ft. retracted £99.95  
**26 ft** Aluminium 5.5 ft. retracted £89.95  
**20 ft** HD Fibreglass 5.5ft retracted £179.95  
**30 ft** HD Fibreglass 7.5ft retracted £249.95  
**50 ft** HD Fibreglass ...8ft retracted £349.95

**MUCH MORE ON OUR WEBSITE 24/7.....We offer 'BUY NOW - PAY LATER' finance on all our ranges**

**OPEN: Mon to Fri 9.00am - 5.30pm**  
Unit 1 Fitzherbert Spur Farlington  
Portsmouth Hampshire PO6 1TT



**023 9231 3090**





**SPECIAL OFFER  
SAVE  
£100**

## SKY SDR NEW 5W QRP Transceiver

**NOW ONLY  
£599**

Superb receiver, direct conversion, razor-sharp adjustable filters, noise reduction, noise blanker, built-in band-scope, TX speech processor, audio equalizer and hand mic supplied.

- Modes: LSB, USB, CW, AM, FM, DIGI
- Covers 160m - 6m (including 60m)
- 7 Low Pass Filters & 7 Bandpass Filters
- CW: Built in Electronic key
- Size: 147 x 60 x 107mm
- Weight: 580g

# nevada®

**BIGGER CHOICE • BETTER SERVICE • FAST DELIVERY • BEST UK PRICES**

## steppIR

**VERTICALS** The only true 1/4 wave continuous coverage for the HF bands

**Big IR Mk IV**  
40m-6m continuous coverage  
Length: 10.05m • Power: 3kW  
SDA 100 controller included

**£1249.95**

Optional 80m Coil £459.95

**CRANK IR**  
An extremely portable vertical  
40m-6m continuous coverage  
Power: 1.5kW  
16 ft fiberglass pole (2ft collapsed)

**£429.95**

**Small IR MK III**  
20m - 6m continuous coverage  
Length: 5.4m • Power: 3kW

**£999.95**

Optional coils available for 80m/40m



**UrbanBeam**  
Covers:  
40 to 6m

- 20m-6m 2 element beam, 40/30m rotary dipole
- Small footprint: 15.5ft turning radius, 4ft boom
- Supplied with the SDA-100 controller
- 180-degree direction change, bi-directional mode
- Full element retraction for stormy weather

**£1869**

### More SteppIR

Dipole.....	(20 - 6m) with controller ..	£1099.95
2 Element Yagi.....	(20 - 6m) 3kW .....	£1549.95
2 Element Yagi.....	(40 - 6m) 3kW .....	£2024.95
3 Element Yagi.....	(20 - 6m) 3kW .....	£2174.95
3 Element Yagi.....	(40 - 6m) 3kW .....	£2899.90
DB-18 Yagi.....	(40 - 6m) reduced size .....	£3424.95
DB-18E Yagi.....	(40 - 6m) 3 loops .....	£3924.95
DB-36 Yagi.....	(40 - 6m) 3 loops .....	£5499.95
DB-42 Monster IR.....	(40 - 6m) .....	£7249.95



### CAA-500 MkII Antenna Analyser

- Measures SWR and Impedance
- Covers: 1.8-500 MHz
- Colour TFT LCD Display
- Auto Sweep Mode
- Power: 6 x AA cells (not included)

**£389.95**

### HF BASE ANTENNAS

H-422.....	Trap Vee Dipole 7/14/21/28MHz .....	£289.95
CHA-250BX11.....	3.5 - 57MHz (RX: 2.0 - 90MHz) .....	£349.00
CWA-1000.....	Multi Band dipole 3.5/7/14/21/28MHz .....	£124.95
<b>VHF/UHF FIBREGLASS BASE ANTENNAS</b>		
GP-15N.....	50/144/430MHz, length 2.4m N type .....	£99.95
GP-1M.....	144/430MHz length 1.2m (SO239) .....	£49.95
GP-3M.....	144/430MHz, SO-239 Lgth 1.78m (SO239) .....	£59.95
GP-6M.....	144/430MHz, SO-239 Lgth 3.07m (SO239) .....	£99.95
GP-93N.....	144/430/1200MHz, Length 1.78m N Type .....	£99.99
GP-9M.....	144/430MHz SO-239 Lgth 5.15m (SO239) .....	£149.95

### VHF/UHF BEAMS

CYA-1216E.....	6 Element 1200MHz, N Type.....	£99.95
CA-52HB.....	2 Element HB9CV for 50MHz .....	£79.95
CA-52HB4.....	4 Element HB9CV for 50MHz .....	£129.95

### ANTENNA TUNER

CAT-300.....	1.8-56MHz, 300W (PEP).....	£199.95
--------------	----------------------------	---------

### BALUNS

CBL-1000.....	1.7-30MHz, 1kW/CW.....	£34.95
CBL-2500.....	1.8-56MHz, 2.5kW/CW.....	£39.95

### LOW PASS FILTERS

CF-30MR.....	1.8 - 32MHz, 1kW/CW.....	£59.95
CF-50MR.....	1.8 - 57MHz, 1kW/CW.....	£59.95

### DUPLEXERS

CF-360A.....	1.3-30/49-470MHz 2xleads SO239 socket .....	£49.95
CF-4160B.....	1.3-170/350-540MHz SO239 N type, SO239 .....	£39.95
CF-416A.....	1.3-170/350-540MHz SO239 + 2 x PL259 leads .....	£39.95

CF-416B.....	SO239 + 1 x PL259/N leads .....	£39.95
CF-503C.....	1.3-90/125-470MHz, PL259 lead, 2xSO239 .....	£49.95
CF-530.....	1.3-90/125-470MHz, 2x SO239, PL259 lead .....	£49.95
CF-530C.....	1.3-90/125-470MHz, SO239 2 x PL259 lead .....	£49.95
CF-706.....	1.3-57/75-550MHz, SO239, 2 x PL259 leads .....	£49.95
CF-706N.....	1.3-57/75-550MHz, SO239 N type, PL259 leads .....	£49.95

CMX-200.....	1.8-200MHz, 30/300/3k.....	£79.95
CMX-400.....	140-525MHz, 30/60/300W.....	£89.95

### CROSS NEEDLE SWR/POWER METERS

CMX-200.....	1.8-200MHz, 30/300/3k.....	£79.95
CMX-400.....	140-525MHz, 30/60/300W.....	£89.95

## 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-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



**PS-30M Linear**  
• 30A (max) with meter  
• Voltage: 3.0-15V DC  
• Cigar adaptor output

**£99.95**

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

## 1kW End Fed 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**

**Both 1kW power rated!**

## SPIDERBEAM

### Antennas & Telescopic Masts

<b>UL-404L Ultra-lite Expedition antenna</b>		
Dipole covers: 40, 20, 17, 15, 12, 10.6m.....		£109.00
<b>Fibreglass Telescopic Poles</b>		
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
<b>Aluminium Telescopic masts</b>		
10 metre Standard (1.35m retracted).....		£299.95
10 metre Heavy Duty (1.7m retracted).....		£325.00
12.5 metre (1.65m retracted).....		£329.95
14.5 metre Heavy Duty (2m retracted).....		£425.00
15 metre standard (2m retracted).....		£399.95

## HEIL Headsets & Mics



**Pro-Set 7**  
Extreme comfort  
with passive sound  
reduction

**£229.95**

### Headset Microphones

Pro-Set 7 IC.....	for Icom Black.....	£259.95
Pro-Set 6.....	.....	£134.95
Pro-Set 6 IC.....	for Icom.....	£169.95
Pro-Set Elite 6.....	.....	£169.95
Pro-Set Elite IC.....	for Icom radios.....	£199.95
PMS-6 Pro Micro.....	Single headset.....	£85.95
PMS-6 Pro Micro.....	Double headset.....	£99.95

**Full range of leads and mounts in stock!**



**PR-40**  
Commercial broadcast Mic with  
wide frequency range

**£289.95**

### Microphones

ICM.....	Quality mic for Icom radios.....	£123.95
PR-35.....	Studio & commercial broadcast.....	£279.95
PR-781.....	Commercial broadcast.....	£178.95
Heil PR-781G.....	Gold Studio/Broadcast.....	£197.95
Heil PR-40 BG.....	Black/Gold Studio/Broadcast.....	£295.95
Heil PL2-T.....	Balanced Boom for Studio mics.....	£138.95
Heil SM-1.....	Shock mount for studio mics.....	£63.95
Heil PRSM.....	Shock mount for PR40, PR30.....	£106.95

## MFJ

**We hold HUGE STOCKS!** If you don't see it in the list below, visit our web site for lots more!



**MFJ-998RT**  
1.5kW remote  
weatherproof  
Auto ATU

**£848.95**

225.....	1-180MHz graphic analyser.....	£349.95
226.....	Graphic analyser (1-230) MHz.....	£399.95
259C.....	HF/VHF portable antenna analyser.....	£329.95
266C.....	New style HF/VHF/UHF analyser.....	£424.95
269C.....	HF/VHF Digital Analyser.....	£399.95
385B.....	Deluxe Comms. Speaker.....	£47.95
407B.....	Deluxe CW Keyer.....	£88.95
461.....	Morse Reader-pocket sized.....	£99.95
492-X.....	CW Memory Keyer.....	£148.95
550.....	Popular Morse code practice key.....	£19.95
557.....	Morse code key with oscillator.....	£47.95
826B.....	Digital SWR/Wattmeter.....	£198.95
912.....	Remote 4:1 balun box.....	£77.95
921.....	2m Antenna Tuner.....	£99.95



**MFJ-1836H**  
6 Band Cobweb  
20m-6m 1.5kW

**£269.95**

MFJ-1836.....	Cobweb 20m-6m 300W.....	£229.95
MFJ-1838.....	Cobweb 40-6m 1.5kW.....	£419.95
923.....	2m Tuner & SWR/Power.....	£219.95
931.....	Artificial ground unit.....	£121.95
934.....	300W Tuner + artificial ground.....	£231.95
941E.....	300 Watts max Versa Tuner II.....	£159.95
945E.....	1.8-60MHz 300W manual tuner.....	£145.95
948.....	300W PEP reading antenna tuner.....	£187.95
949E.....	300W tuner + Dummy load.....	£199.95
959C.....	Receive antenna tuner + pre-amp.....	£145.95
969.....	300W tuner 160-6m.....	£253.95
971.....	Portable Ant. tuner 1.8-30MHz.....	£143.95
986.....	1.5kW HF tuner.....	£399.95
989D.....	1.5kW HF tuner.....	£451.95
993B.....	Auto Tuner 150W/300W.....	£297.95
9948RT.....	600W remote Auto Tuner.....	£440.95

998.....	1.5kW Auto Tuner 1.8-30MHz.....	£771.95
998RT.....	1.5kW remote Auto ATU.....	£848.95
1020C.....	Tunable Active Antenna.....	£110.95
1025.....	Noise canceller/signal enhancer.....	£199.95
1026.....	QRM eliminator + active antenna.....	£220.95
1118.....	High Current DC Multi outlet.....	£94.95
1700C.....	6 Way coax switch.....	£132.95
1701.....	6 Way coax switch 2kW (SO239).....	£89.95
1704 (P).....	4 way coax switch 2.5kW (SO239).....	£94.95
1704 (N).....	4 way coax switch 2.5kW (N type).....	£99.00
1705H.....	RF By-pass switch.....	£32.95
1707.....	Auto RF sensing Ant switch.....	£99.95
1708.....	RF Sensing T/R Switch.....	£89.95
1708SDR.....	Transceiver SDR switch.....	£89.95
1763.....	3 Element 2m beam.....	£60.95
1775.....	Rotary dipole 6 band.....	£275.95
1782X.....	Super Loop 10-30 MHz.....	£479.95
1786X.....	Loop (10-30)MHz 3ft dia.....	£529.95
1788X.....	Loop (7-21)MHz 3ft dia.....	£589.95
1789.....	Rotary dipole 9 bands.....	£399.00
1799X.....	9 Band vertical.....	£440.95
1848.....	Hexbeam 40-6m 1.5kW.....	£699.95
1868.....	Discone antenna with cable.....	£79.95

## SDRplay



**RSP-Duo**  
Dual Tuner Wideband SDR  
Receives:  
1kHz to 2GHz, with no gaps

2 Tuners with individual Antennas inputs  
Ideal for: • Direction-finding, diversity and  
noise reduction applications

- Cross band full-duplex reception, e.g. HF + VHF or VHF + UHF
- VHF ATC reception
- Simultaneous monitoring and recording of 2 bands

**£239.00**



**SDRplay RSP-1A**  
HF/VHF SDR Receiver  
New entry level model with  
great performance  
1 kHz-2GHz

**£89.95**

SDRplay RSP2 ..1kHz - 2GHz 2 antennas.....£156  
SDRplay RSP2 ..Pro as above w/Steel case.....£189.95  
Free Delivery (UK Mainland)

## SDR Receivers



**AIRSPY HF+**  
HF/VHF SDR Receiver  
One of the very best for weak  
signal reception and strong  
signal handling  
• 9kHz- 13MHz  
• 60 MHz - 260MHz

**£229.95**



**AIRSPY Mini**  
High performance miniature  
SDR Dongle  
• Covers: 24-1800MHz  
• Use for monitoring, real  
time spectrum analyser,  
plus lots more!

Free Delivery (UK Mainland) **£119.99**

## SIRIO Antennas



**SY50-5**  
5 element  
50MHz 10.5 dBi

**£129.95**

### HF/VHF/UHF Beams

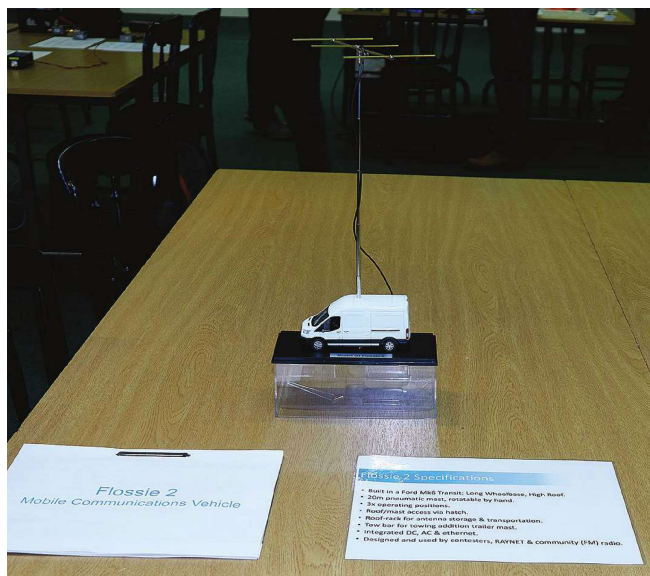
SY50-3.....	3 el 50MHz 8.5dBi.....	£99.95
SY68-3.....	3 el 70MHz 7dBi.....	£79.95
SY27-3.....	3 el (26-28)MHz 10.65 dBi.....	£84.95
SY27-4.....	3 el (26-28)MHz 13.15 dBi.....	£99.95
SY400.....	6 el 70cms (wide band) 11.0 dBi.....	£79.95
WY-140.....	3 el 144MHz (wide band) 10.5 dBi.....	£89.95

**PRICE PLEDGE WE ALWAYS AIM TO BE COMPETITIVE - SEEN IT CHEAPER? LET US KNOW!**

# www.nevadaradio.co.uk



# RSGB Convention 2018



Two of the entrants to the annual RSGB Construction Competition.

Left: the model of Flossie 2 showing the fitting out of the vehicle. Above: A 5W linear amplifier.



**The RSGB Convention took place over the weekend of 12 to 14 October and over 600 visitors attended the many lectures, demonstrations, award presentations and social gatherings.**

The RSGB would like to thank Martin Lynch & Sons, who were the principal sponsor again this year, for their continue support of this event. AMSAT UK again joined the event with a complete lecture steam devoted to all matters space and amateur radio.

Over the weekend there were more than 50 unique lectures, some via Skype, covering HF, VHF, space, technical matters on all levels and DXpeditions. Regardless of your level of expertise or interest there was something for everyone and that includes a Buildathon too in 2018 (more on that later).

## Lecture videos

Over the year, many of the lectures will be available to RSGB Members to view via the RSGB website. The 2017 lectures are being made available to non-Members via the

RSGB's YouTube channel. So far this year, the 'keynote' lecture from Tim Duffy, K3LR and the lecture from Don Beattie, G3BJ, President of IARU Region 1 are available on the YouTube channel. Tim is amongst the leaders, if not *the* leader, in the contesting field. He talks about his contest station but also, as he puts it, focusing on 'keeping ham radio fun and alive'. The lecture is called *The K3LR Super Station*.

Don's talk *So what has the IARU ever done for us?* describes what the IARU is doing, how the challenges of representing amateur radio globally are changing, and what the world would be like without IARU.

On the RSGB Members' website you can find *FT8 Performance Secrets* by Neil Smith, *G4DBN and Microwave Engineering – From Death Rays to Dinner*, by William Eustace, MOWJE.

You will find all of our videos at [www.rsgb.org/videos/](http://www.rsgb.org/videos/) Follow the links to RSGB Convention lectures and then 2018 for the latest ones, with more to follow.

## Lectures

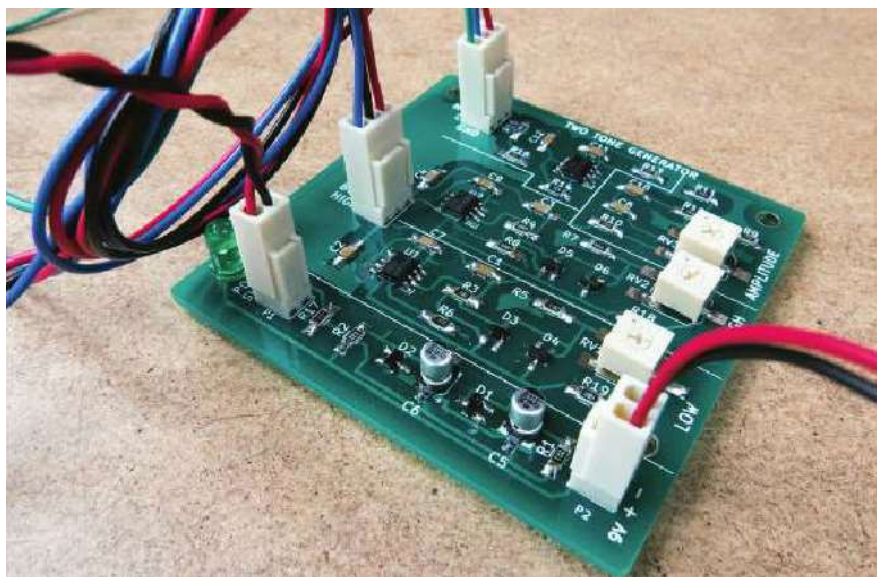
In the space available here it is only possible to outline a few of the lectures that took place. Those visiting the Convention know the dilemma of trying to choose which ones to attend, which is why it is fortunate to have so many released on the website over the year. Thanks to those who have given me an insight into the lectures they attended.

James Patterson, M1DST gave a very informative presentation with lots of practical advice to help people getting started with 3D printing. In addition to the various printer types, James provided lots of useful information on 3D printing materials explaining their characteristics, how to use them and how to get the best prices.

John Regnault, G4SWX has spent over 45 years chasing DX on 144MHz and is now one of the few stations in the world to have worked over 150 DXCC countries on the band. In his talk, *Beyond 150 Countries on 144MHz – the science of extreme VHF DXing*, he addressed the range of key technical issues that are important to working 144MHz DX, ranging from how to select the right equipment and antennas, through to understanding your site, to tools and operating techniques for both terrestrial modes and Moonbounce.

John Worsnop, G4BAO gave an impassioned presentation to encourage the audience to join in the Wednesday night microwave digital modes activity sessions. John explained that many of our higher frequency bands are under severe threat by commercial demands for more bandwidth. John very clearly explained that we will lose these bands if we don't start using them. The wide bandwidths available on microwave frequencies gives us the freedom to experiment with many wide-band digital modes that are not usable on the lower bands.

Bo Hansen, OZ2M's presentation on Digital Modes for Beacons explained the



The successful Buildathon project, the two tone tester kit from Kanga UK.

background behind the initiative to change to digital mode beacons. Bo demonstrated how the PI4 digital mode is ideal for use with beacons and explained very clearly the many benefits.

The Farnham WebSDR – DC to Microwaves on your Smartphone by Noel Matthews, G8GTZ gave an overview of the Farnham WebSDR [<http://farnham-sdr.com>] that currently covers the LF bands through to 10GHz. He described the system architecture and antennas currently used on each band and how the team has used RTL dongle receivers, available for under £10, to give good RF performance on all bands from DC to 10GHz.

Jenny Bailey, GOVQH works for Ofcom and provided a comprehensive view of the requirements for operating drones in the UK, complete with the training and licensing

requirements. Jenny also had several large drones on display and gave a detailed description of how Ofcom use drones to measure antenna radiation patterns. In addition to providing an insight into Ofcom's work with drones the presentation gave lots of useful information for amateurs that may want to use consumer grade drones for antenna measurement.

The RSGB Board held a session to introduce who they are and what they do, providing an opportunity to ask them questions about their roles, the important challenges faced by amateur radio and how they are tackling them with the projects underpinning Strategy 2022.

Heather Lomond, MOHMO provided a useful overview of GNU Radio showing how radio devices can be created using visual programming. The audience was also

introduced to the use of functional blocks and flow charts to create receivers and other RF devices.

Jim Bacon, G3YLA, as well as being a regular weather presenter on Look East, always has sound theories about Sporadic-E propagation particularly in the light of this year's superb conditions on 6m over to North America, Caribbean, South America and Japan/Far East.

70cm is still a haven for constructors, particularly in the high performance transverter area. Sam Jewell, G4DDK has spent considerable time developing transverter kits for 70cm, with the latest in the family, ICENI, that exhibits exceptional strong signal performance together with high sensitivity. ICENI can be built from scratch, with the support of a professional PCB, or from a kit. Sam described the latest upgrades that mean that the receive converter side of the transverter has exceptional strong signal performance together with high sensitivity. The transmit converter side features high spectral purity and the ability to frequency lock the transverter for high stability makes it perfect for both digital and analogue operation.

## Awards

Two prestigious awards are presented at the RSGB Convention each year. The ROTAB trophy went to Paul Simmons, G4CCZ for his outstanding and consistent DX work. The G5RP trophy went to William Eustace, MOWJE. His lecture, Microwave engineering – from death rays to dinner, is available on the RSGB website.

## Exams

As usual there were several candidates for the various levels of amateur radio exam at the Convention. Both those sitting the Foundation exam passed, as did the Intermediate candidate. Of the six sitting the Advanced exam there were four passes. Well done to all that achieved their goals.

Amongst the people sitting their exams over the weekend was Eliot Mansfield who sat, and passed, both his Foundation and Intermediate exam. He first got interested in radio in late 2015, when he bought a cheap RTLSDR and worked his way through the various things you can do with them, such as listening to amateur and the air band but also DMR, PSK31, digital taxi data, weather satellites and ADSB – he then lost interest



Martin Lynch & Sons, the principal sponsor, saw brisk business over the weekend.

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





Victor Brand, G3JNB receives his Yaesu from Paul, G3WYW.



Peter Day, G3PHO receives his Icom prize from John, G0KFO.

once he'd gone as far as he could with receiving. He listened to the ICQ Amateur Radio Podcast, run by a former work colleague Martin Butler, M1MRB. Episode 271 featured Network Radios where Martin interviewed Ian, G3ZHI. It was a fascinating conversation. It spurred him on to getting licensed. Thanks to the efforts of Bedford and District ARC and the online course run by Essex Hams he started studying. He would like to thank the team behind network radios (Ian, Karl, Hairy Paul etc) and Bedford and District ARC – Glen, G0GBI, Rob, M5RPT, Wayne, Marc, 2E0YWO and his assessor Mark, M0MYG for their help and support.

### ISS contact

Astronaut Serena Aunon-Chancellor, KG5TMT, currently one of the three crew members on board the International Space Station, has been delighting radio amateurs all over the world by activating NA1SS to make random contacts between the ISS and amateurs on earth. These activations occur only when the crew have the space in their schedule and have been relatively rare in recent times. As a result, they usually cause a pileup as radio amateurs attempt to get the NA1SS callsign in their log book.

With the full ARISS ground station assembled and in use during the Convention, Ciaran, M0XTD, the ARISS UK Operations Team Lead was aware that opportunities existed over the course of the weekend for such a random contact. After one unsuccessful attempt on the 13<sup>th</sup>, Serena surprised those present by returning the GB4AUK call on Sunday afternoon, just as the Convention was drawing to a close. After a brief exchange, greetings were passed to Serena, Alexander Gerst, KF5ONO and Sergei Propoyev and Serena was free to fulfil many other amateurs' wish of a random contact.

The full Convention-to-spacecraft exchange was recorded by Steve Thomas, M1ACB and is posted on the RSGB YouTube channel at [www.youtube.com/watch?v=H4eWKusIVBs](http://www.youtube.com/watch?v=H4eWKusIVBs)

### Buildathon

This year's Buildathon was different in a number of ways. First, it took place on the Saturday evening so no-one had to miss any of the excellent lectures, and secondly it used a kit to introduce builders to surface mount devices (SMD). The Two Tone Tester kit from Kanga UK has been developed specifically to use the larger SMDs and to



William Eustace, M0WJE was presented with the G5RP trophy.

have plenty of room between the devices making it ideal to try SMD construction for the first time.

Seven delegates took part in the workshop. In terms of knowledge and experience, they ranged from Foundation to long-standing Full licence holders, and from one who had never built a solder project before to those who had lots of soldering experience but who had only dabbled with SMD. Steve, G0FUW, and Lewis, G4YTN, who have run over twenty Buildathon events, provided guidance and support throughout the evening. Dennis, G6YBC, from Kanga UK also chipped in with help until he was required elsewhere. Many thanks to Dennis who also donated some SMD tools to the RSGB Loan Tool Kit.

They used the RSGB Loan Tool Kit for the build (see *RadCom* October) so most of the work was done with conventional soldering irons and head-set magnifiers and tweezers. Steve also brought along his hot air solder station and a tube of solder paste. This technique proved very popular with most of the builders saying that was a quicker and easier method.

# Book Review

## Test Equipment for the Radio Amateur

By Philip Lawson, G4FCL

First published in 1974 when penned by Clive Smith, GM4FZH, *Test Equipment for the Radio Amateur* has been periodically updated to reflect the changes in technology, practices and availability. Clive has retired as an author and Philip Lawson, G4FCL has taken up the baton. He has thoroughly revised the book and brought it right up to date.

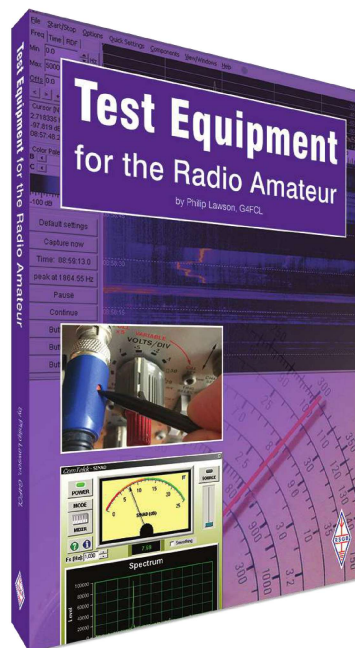
Starting with some very useful safety advice and suggested basic tools, Philip soon moves on to actual test equipment, starting with the relatively simple and low cost 'essentials' such as a multimeter, component tester, logic and RF diode probes. Next comes the oscilloscope, which is discussed in some depth to aid an understanding of what it can and (more importantly perhaps) can't do, along with a look at traditional CRT vs LCD (digital) and various PC-based alternatives. The book continues in a similar vein, examining myriad device classes including spectrum analysers, AF/RF signal generators, counters, frequency standards, power and SWR meters, antenna system analysers, current probes, field strength meters, RF bridges, samplers and couplers, network analysers (including the wobbulator – a word I love), noise figure meters, modulation analysers, signal injectors & tracers, PSUs and more.

Next, we look at practical measurements, eg of transmitted power and frequency, and the linearity of power amplifiers. Receivers are examined too, with critical features such as sensitivity, selectivity, noise figure and intermodulation distortion just some of the topics under the microscope.

My favourite chapter covers test equipment and ancillary items you can make for yourself. This is a mix of small practical projects that you can construct from the information presented, supplemented by well-researched call-outs to other resources such as pertinent *RadCom* articles and various internet resources.

Appendices cover the detailed workings of various types of meter (moving-coil, moving-iron etc), the fascinating subject of noise, a quantity of useful reference data carried over from previous editions and, very importantly, PCB and component layouts for many of the practical projects described in the text.

This is a very good book that covers an extremely wide subject particularly well. As a good, all-round description of an extensive subject area, supplemented by a large number of intelligently chosen external references, I have no hesitation in recommending this book to the beginner and more-experienced amateur alike.



Size: 174x240mm, 192 pages, ISBN: 9781 9101 9365 6

Non Members' Price: £14.99

RSGB Members' Price: £12.74

## Bluffer's Guide to Social Media

By Susie Boniface

So you're looking for an enlightening (and amusing) Christmas present for a friend, colleague or partner? Perhaps you (or they) have been left behind in the wake of recent advances in online communications, or feel excluded from the barely disguised self-promotion on LinkedIn or spats on the Twittersphere. Even 'normal' conversation today is peppered with references to online life – and heaven help you if you know any Millennials! Feeling left out? Well, this is the book for you.

*Bluffer's Guides* are renowned for their "instant wit and wisdom" and this is no exception. It is crammed with a remarkable amount of informative facts delivered as light-hearted explanations, complete with examples of wild online successes and hilarious too-late-to-delete failures. As another reviewer put it: "This little book is the perfect guide to the pleasures and pitfalls of our brave new world."

Susie Boniface instantly makes the subject accessible and invites you in. Social media is not to be feared if you follow her rule of thumb – behave online in the same way you would at a bus stop, no worse; and only put up with the same, "not an insult more". She offers more fine advice throughout in the form of *Bluffer's Tips*, all neatly interwoven and signposted at just the apposite moment. For example, after a light examination of current and past social web phenomena (remember MySpace, Bebo or Friends Reunited?) she cautions: "If the product is free, you are the thing on sale." How true! There's a handy (though disappointingly brief) glossary, and lots of tiny revelations to add to your arsenal of understanding, such as the difference between a tweet and a dweet.

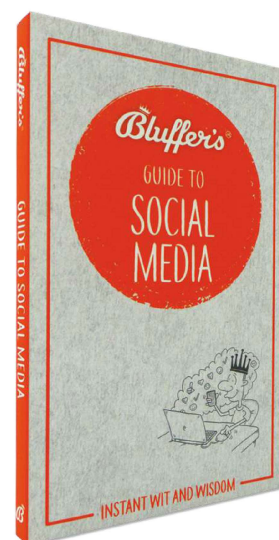
Whether digested in one go, or dipped into by topic or chapter, the guide is full of succinct and pithy observations that ring true and are bound to both enlighten and amuse. This is testament to the acumen of the author, a well-known journalist who herself has a substantial social media following. She really does know what she's talking about. I am glad I read her counsel and caveats before taking another step through the eye-poppingly hazardous but potentially rewarding social mediascape.

If any of this strikes a chord, then this book is for you, in time for Christmas, to gift or keep.

Size: 178x110mm, 128 pages, ISBN: 9781 7852 1229 1

Non Members' Price: £6.99

RSGB Members' Price: £4.68 (33% OFF)



Giles Read, G1MFG  
Jonathan Andrews  
radcom@rsgb.org.uk



# QRP – devoted to low power

It's been a while since the last QRP column. The gap has been as a result of Reverend George Dobbs, G3RJV, becoming unwell. George continues as Secretary to the G-QRP Club but he is still quite poorly and we all wish him well. I took on the role of Club Chairman earlier this year and am grateful to the RadCom team for agreeing to a return for the occasional QRP page. We hope to bring you some new QRP projects and maybe some kit reviews in future QRP columns but this time we are going to take a look at the G-QRP Club Convention, which included building a brand new kit.

## G-QRP Buildathon

The G-QRP Club has been hosting an annual convention since 1989. At first they were held in George's church facilities in Rochdale, then later at Rishworth School near Halifax. In 2017 the venue changed to co-locate with the Telford Hamfest and it was there again this year. We have included a Buildathon every year for the last decade and a different kit has been used every time; transmitters, receivers, an ATU and a power meter have all featured. This year the kit was dubbed the 'HF Swiss Army Knife' designed by Heather Lomond, MOHMO.

'The Knife' is an all-in-one test set covering voltage, resistance, frequency, power, SWR measurements as well as showing the current UTC time, and Maidenhead Locator, all displayed on a small TFT screen. The processing is carried out by an Arduino Nano with firmware that provides for calibration of the power/SWR readings, which are accurate right across the HF spectrum and usable up to 50MHz.

The current consumption is quite high for portable use, with a standard 9V battery being drained quite quickly. The GPS module needs a good view of the sky to provide the necessary data to the Nano. It will be interesting to see what kind of power solutions users come up with.

The instructions provided at the Buildathon showed good identification of parts and the screen print on the board helped to ensure the right parts went in the right holes. All of the parts are traditional through-hole components, with the trickiest part being the sensing coil for the SWR bridge. That is formed from a short length of RG58 coax and a coil wound on a T-50-43 toroid. Most of the builders at the Buildathon completed the project in about four hours, more or less.

The initial feedback was that most builders found 'The Knife' a bit of a challenge but everyone enjoyed it. Out of the twenty kits Heather made available, only a handful needed some fault finding attention to get them working. It is worth



PHOTO 1: Heads down at the Buildathon.

noting that the RSGB's Legacy-funded loan tool kit was used to provide all builders with their own soldering, meter, etc.

## G-QRP Convention at Telford

The Buildathon was on the Saturday evening and the Telford Hamfest followed on the Sunday. We had three talks as part of the Convention. The first one, by Barry Cook, G8PHG, was entitled *The Flying Laptop* and gave a great insight into building a satellite – one that is now in orbit and sending back useful research data. The laptop reference was nothing to do with the on-board computer but the unfolding solar panels, which look very much like a laptop screen being opened. It was fascinating to hear about such a large scale 'homebrew' project.

Vic Winton, GW4JUN, then looked back at the achievements of the late George Burt, GM3OXX, famous for working over 300 countries with no more than one watt. The G-QRP Club is running a challenge to commemorate George's work. The idea is to do something with one watt before the end of March 2019 and send details to Vic via email to [gw4jun@gmail.com](mailto:gw4jun@gmail.com). Every entry will receive a certificate and the entry judged to be best will receive a wee trophy.

The final 'talk' of the Convention was a real

**Steve Hartley, G0FUW**  
[g0fuw@tiscali.co.uk](mailto:g0fuw@tiscali.co.uk)

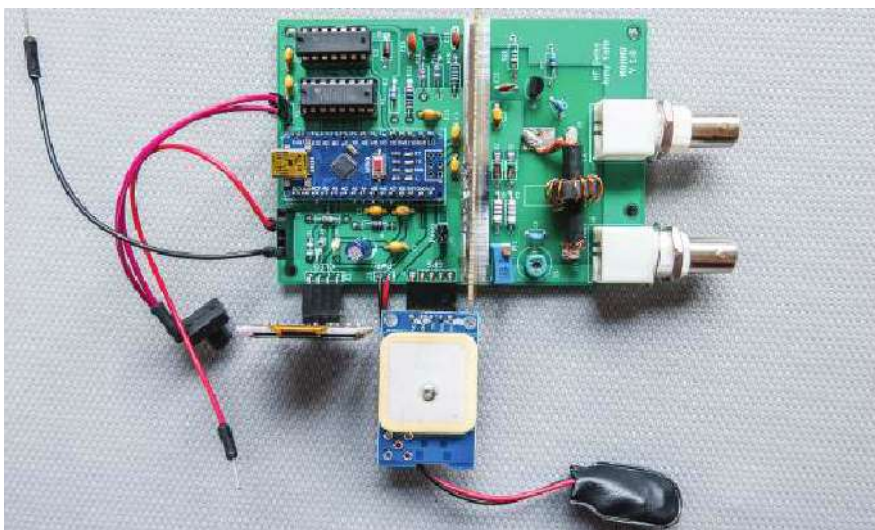


PHOTO 2: The HF 'Swiss Army Knife' project.





PHOTO 3: Vic Winton, GW4JUN, presenting on the QRP work of GM3OXX.

treat in that Telford was linked with Washington DC and Newbury Park in California for a live episode of the Soldersmoke podcast. Bill Meara, N2CQR and Pete Juliano, N6QW talked about the influence of the G-QRP Club and the quarterly journal *SPRAT* on their amateur radio experience. They also paid tribute to the technical and spiritual guidance provided by George, G3RJY. There was a short Q&A session with sagely advice from the Soldersmoke team and I challenged them to take part in the GM3OXX Challenge. Will they join in?

Several QRP-friendly traders were selling their wares at the Hamfest and a good time was had by all, judging by the comments on social media. If QRP is your thing, pencil it in your 2019 diary now: Buildathon Saturday 31 August, Telford Hamfest Sunday 1 September.



PHOTO 4: Soldersmoke live on screen at the GQRP Convention.

#### Websearch

G-QRP Club: [www.gqrp.com](http://www.gqrp.com)

Telford Hamfest: [www.telfordhamfest.org.uk/](http://www.telfordhamfest.org.uk/)

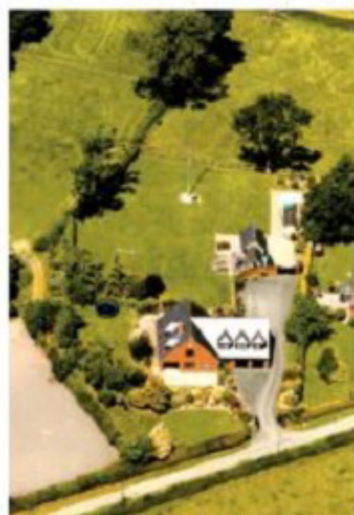
The Flying Laptop: <https://earth.esa.int/web/eoportal/satellite-missions/f/flying-laptop>

Soldersmoke podcast: <http://soldersmoke.blogspot.com/>

## MW0EDX / MW5R Dream DX & SO2R Contesting QTH for sale.

Offered chain free, modern designer built in 2000, 4 bedrooms and 3 reception rooms modern property on 1 acre plot, with a massive 350m<sup>2</sup> of living space. QTH LOC IOB2 KR. Rural yet within minutes from the A458. The property post code is SY22 6QL.

Planning permission and consents for an EXTRA heavy duty mast with various types of aerials, including the Steppir DB42 80-6m yagi. Currently installed is the Mosley Pro-96B "BIG GUN" 40-10m yagi and wire verticals for 80 and 160m.



A dedicated shack is located away from the main house, allowing a cosy full-time DXing and Contesting, including multi-op entries.

A full-time entry in a major contest often results in the 1st place or a World Record (CQ WW, CQ WPX etc – see my QRZ.COM entry for a full list of the contents won).

VK and JA can be worked from my QTH on 160m. NA on 160m is a daily occasion in the winter months.

The price is £600,000 to include the mast and the beam.

Enquiries to Anton Koval, MW0EDX / MW5R, [m0edx@yahoo.com](mailto:m0edx@yahoo.com) or 07791145923 to arrange a viewing (or via the [www.RightMove.co.uk](http://www.RightMove.co.uk) web-site)

## SDR-Kits

Chosen by discerning Radio Amateurs Universities and Professionals Worldwide



### Vector Network Analyzer DG8SAQ VNWA 3EC/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

New! VNWA BNC Conversion Kit

- 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: [www.sdr-kits.net](http://www.sdr-kits.net) - Software and Documentation Page

VNWA 3 with 3pcs Male Amphenol Calibration Kit  
RG223 Coax Cable + USB Lead £422.40 + p&p  
VNWA 3EC in Presentation Case + 4pcs Calibration  
Kit with 12 GHz SMA parts £570.00 + p&p

New! FA-VA5 Vector Antenna Analyzer Kit  
High precision 600 MHz device for measurements  
of antennas, cables and other one port devices

- Covers 10 kHz to 600 MHz
- Fully portable – large display
- USB Interface
- Supported by DG8SAQ VNWA Software

Complete Kit supplied £175.00 + p&p

New! RSPduo 2 Independent Tuners £237.60

SDRplay RSP1A 1 kHz-2 GHz SDR RX  
Performance and Value! £89.95 + p&p

- 1 kHz to 2000 MHz continuous coverage
- 14-bit ADC silicon technology
- 11 high-selectivity front-end preselection filters
- RF shielding layer inside case

RSP2: 3 switchable Antenna inputs £149.95 + p&p

RSP2pro: Fitted in sturdy metal case for £174.95 + p&p  
improved RF Screening

[www.SDR-Kits.net](http://www.SDR-Kits.net)

Webshop Orders only – Paypal or Pro-Forma Invoice  
e-mail: [info@sd-kits.net](mailto:info@sd-kits.net) Prices shown incl VAT - p&p  
SDR-Kits Office 11, Hampton Park West, Melksham, SN12 6LH UK VAT reg GB97977642  
VNWA 3EC/3 – HupRF Pat Kits - Silicon Labs Si570 - RF Transistors – DG8 Preamp Kit

### GPS Disciplined Reference Oscillator



Precision Frequency Clock  
for the VNWA3EC, RSP2  
and many other Shack  
Applications

- Programmable Freq 450Hz-800MHz
- Stability 1 ppb 1E-9
- <60 sec after GPS Lock
- Light & Portable

2 Port: £150.00 + p&p

1 Port: £100.50 + p&p

1.540 GHz Antenna £12.00

SiLabs Si570CAG £12.00

R3500D ARDF Rx Kit £30.00

QRP 2000 Synth Kit from £10.00

Mitsubishi RD16HMF1 E4.00

HupRF PAT Boards and

DG8 144 MHz PreAmp

Short-kit – in stock!





# RADIOWORLD

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

## YAESU

Yaesu Ft-Dx3000Mp 4.00W Transmission Power - £9,599.95 free gift: Puma Vortice Headphones



Yaesu Ftdx5000 Limited - £3,199.96 plus free UK delivery and a free Tt-100Rr Handheld Scanner Receiver 65Mhz - 174 Mhz



Yaesu Ftdx3000 Hf Transceiver £90 Cash Back - £1,449.95 plus free UK delivery and free Puma Vortice Headphones



Yaesu Ft-891A £1,189.00 plus free UK delivery and free Puma Vortice Headphones



Yaesu Ftdx1200 30 KHz To 66 Mhz - £520.00 plus free UK delivery and free Puma Vortice Headphones



Yaesu Ft-818 Portable Transceiver - £599.95 plus free UK delivery



Yaesu Ft-891 Mode Mobile Transceiver - £589.95 free UK delivery

Yaesu Ft-450D Hf/6M Multimode Base Transceiver - £559.00



Yaesu Ft-817Nd - Portable Hf/Vhf-Uhf Radio Transceiver - £499.96



Yaesu Ftm-400Xde - £459.95

### Yaesu Handhelds



Yaesu Fd20a Dual Band Digital Handheld Transceiver - £379.96 Plus Free UK delivery



Yaesu Ft-700r/Dc C4Fm/Fm 2M/700m Dual Band Handheld - £179.95 plus free UK delivery

Yaesu Vx-6E Dual Band Handheld Transceiver - £159.95

## bhi

Bhi Dual In-Line Dop Noise Cancelling Module - £199.99

Bhi Paraprop Eq20 Equaliser Series - £159.95

Bhi Anem Mli Noise Away Amplified Dop Noise Module - £199.95

Bhi Noise Eliminating Dopkr - Quality Amplified Dop Noise Cancellation Speaker - £139.95

Bhi Noise Cancelling Speaker Neo102Mk3 Dop - £99.95  
More Bhi Products available

## DIAMOND

Diamond X-7000 In 2M/700m Vertical Colinear - £279.95

Diamond HfV40 Rotary Dipole - £259.95

Diamond Am600 Portable Telescopic Antenna Mast - £199.95

Diamond Rhm-10 Wide Band Portable Antenna - £199.95

Diamond X-7000 2M/700m/230m Fixed Station Vertical - £164.95

Diamond X8000: 144/430/1200Mhz (2M/700m/230m) - £164.95

Diamond Hf-70x Multiband Hf/Vhf/Uhf Mobile Antenna - £154.95

Diamond Cp-62 50 Mhz 6 Metre Base Antenna - £145.00

Diamond Se-100 2M 700m Vhf/Uhf And Marine Antenna - £139.95

Diamond Se-50 2M 700m Vhf/Uhf And Marine Antenna - £130.00

Diamond D-3000N Super Discone Antenna - £119.95

Diamond X-5000 2M/700m/230m Fixed Station Vertical - £119.95

Diamond D-130M Discone Antenna - £119.95

More products available

## ICOM

Icom Ic-7851 - Hf Transceiver Hf/6M - £9,999.99

Icom Ic-7810 Sdr Hf/50Mhz Transceiver - £3,499.99  
Free UK delivery and a free Tt-100Rr Handheld Scanner Receiver 65Mhz - 174 Mhz



Icom Ic-8100 Hf/Vhf/Uhf Transceiver - £2,799.95 Plus Free Puma Vortice Headphones

Icom Ic-7300 - £1,199.95  
Free UK delivery and a free Tt-100Rr Handheld Scanner Receiver 65Mhz - 174 Mhz



Icom Ic-7100 Hf/Vhf/Uhf Transceiver - £999.95  
Free UK delivery and free Puma Vortice Headphones



Icom Ic-5100 Vhf/Uhf D-Star Mobile Transceiver Deluxe - £799.99

Icom Ic-718 Hf Transceiver - £579.99

### Icom Handhelds

Icom Ic-R30 Communications Receiver - £575.95

Icom Ic-51 Plus2 Dual Band D-Star Digital Transceiver - £379.95  
Free UK delivery

Icom Ic-51A/E Plus D-Star Handheld - £259.95  
Free UK delivery

Icom Ic-R6 Handheld Communications Receiver - £199.95

## Begali Keys

### Begali Morse Keys



Pearl Stainless Steel Limited Edition Eclipse 2016 - £519.95

Begali Magnum Dual Paddle Key - £549.95

Begali Sculpture Janus Dual Paddle Morse Key - £519.95

Begali Sculpture Swing Morse Key - £439.95

Begali 60th Anniversary Special Edition Key - £499.95

Begali Stealth Dual Paddle Morse Key - £489.95

Begali Intrepid Morse Key - £454.95

Begali Sculpture Dual Paddle Morse Key - £419.95

Begali Sculpture Arrow Straight Key - £399.00

Begali Graciele Jr Dual Paddle Morse Key - £319.95

Begali Pearl Dual Paddle Morse Key - £269.95

Begali Traveler Light Morse Key - £261.95

Begali Caribou Dual Paddle Key - £259.99

Begali Signature Dual Paddle Key - £259.95

Begali Magnetic Pro Dual Paddle Key - £259.95

Begali Expedition Dual Paddle Morse Key - £249.95

Begali Adventure Dual Paddle Morse Key - £247.99

Begali Hot Single Lever Key Mail - £239.95

Begali Magnetic Classic Dual Paddle Key - £219.95

Begali Simplex Professional Key - £199.95

Begali Simplex Mono Morse Keys - £149.95

Begali Simplex Dual Paddle Morse Key - £139.95

Begali Simplex Basic Morse Key - £119.99

Many more Begali morse keys

TRUSTPILOT



KENWOOD

YAESU

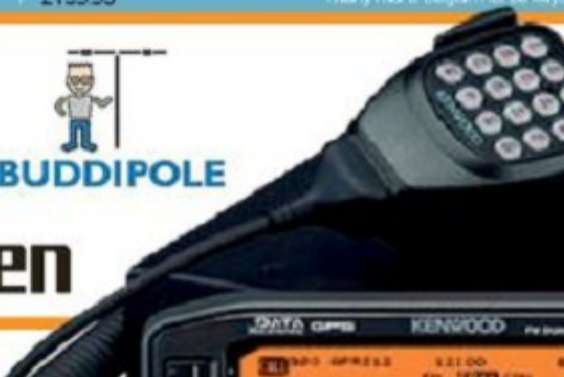


BUDDIPOLE



ICOM

uniden





STORE OPENING HOURS:  
**Monday - Friday 9am til 5pm**  
**Saturday 9.30am til 4pm**

## PART EXCHANGE & FINANCE

263 Walsall Road  
 Grest Wyrley  
 Walsall WS6 6DL



## KENWOOD

- Kenwood Ts-990G HF Base Station Transceiver - £5,995.00  
 Plus free Puma Vortice Headphones
- Kenwood Ts-830 HF/50MHz/70MHz Transceiver - £3,955.96  
 Plus free Puma Vortice Headphones
- Kenwood Ts-590G Special Black Edition 70th Anniversary -  
 £1,699.96 Free UK delivery plus free Puma Vortice Headphones



- Kenwood Ts-2000X All Mode Multi-Band Transceiver 230m Fitted -  
 £1,649.95 plus free Puma Vortice Headphones
- Kenwood Ts-2000 All Mode Multi-Band Transceiver - £1,499.00  
 plus free Puma Vortice Headphones



- Kenwood Ts-590B - £1,289.00 plus free Puma Vortice Headphones
- Kenwood Ts-480H 200W Transceiver - £899.95 plus free Puma Vortice Headphones
- Kenwood Ts-480Set Transceiver - £849.95 plus free Puma Vortice Headphones
- Kenwood TS-690 HF/50MHz/70MHz Transceiver - £3,955.96 Free UK delivery plus free gift



- Kenwood Tr-D710G - Dual Band Mobile With Built-In Gps/Aps/ Echolink - £549.95  
 Free UK delivery



- Kenwood Tr-D710E - Vhf/Uhf Dual Band Mobile Transceiver -  
 £419.95
- Kenwood Tr-281E Vhf Mono Band Fm Mobile Transceiver -  
 £149.95
- Kenwood Handhelds
- Kenwood Th-D74E Digital (D-Star) Capability On 2M and  
 70cm - £499.96
- Kenwood Th-77E Dualband Handheld With Gps - £399.95
- Kenwood Th-K4CE 700m Fm 5W Handheld - £119.95
- Kenwood Th-K2CE Vhf Fm Portable Transceiver with  
 Keypad - £119.95

## MFJ

### Meters

- Mfj-828 Swr/Wattmeter/Frequency Counter - £253.96
- Mfj-874Hb 6-160 Metres Balanced Line Antenna Tuner -  
 £253.96
- Mfj-868 Giant Digital Swr/Wattmeter, Automatic - £242.95
- Mfj-826B - High Accuracy Digital Swr/Wattmeter, 1.8-60 Mhz -  
 £198.95
- Mfj-835 Balanced Line Rf Ammeter - £143.95
- Mfj-854 Rf Current Meter - £132.95

### Analyzers

- Mfj-225 Analyzer - £472.95
- Mfj-269C-Pro Hf/Vhf/Uhf Swr Analyzer - £489.00
- Mfj-269C Antenna Analyzer 230Mhz And 415-470Mhz -  
 £429.95
- Mfj-226 Antenna Analyzer-Covers 1 To 230 Mhz, 1Hz Resolution -  
 £429.95
- Mfj-259Cm Hf/Vhf/220 Mhz,470-840 Khz,1-230 Mhz, Swr  
 Analyzer - £395.00
- Mfj-227 Antenna Analyzer - £269.95
- Mfj-223 Color Graphic Vna Antenna Analyzer 1-60Mhz - £349.96  
 Free UK Delivery



### Tuners

- Mfj-996Rt Remote Auto Tuner, 1.5Kw, 1.8-30 Mhz - £848.95
- Mfj-996Z Antenna Tuner - £771.95
- Mfj-976 Balanced Line Antenna Tuner - £550.96
- Mfj-989D 1500W Antenna Tuner - £451.94
- Mfj-986 2Kw Antenna Tuner - £409.96
- Mfj-994B 600 Watt Intellituner Automatic Antenna Tuner -  
 £365.95
- Mfj-926B - Automatic Antenna Tuner For HF Ssb - £230.95
- Mfj-994 Automatic Atu 1.8-30Mhz 600W Ssb 300W Cw -  
 £319.94
- Mfj-993B Automatic Antenna Tuner - £237.95
- Mfj-927 200 Watt Automatic Antenna Tuner-Weather Protection -  
 £286.96
- Mfj-999 Antenna Tuner - £269.95
- Mfj-991B Automatic Tuner - £253.95
- Mfj-974Hb 6-160 Metres Balanced Line Antenna Tuner -  
 £253.96



More Mfj products online and in store

## HEIL

- Heil Pro 7 Headset - £239.95  
 Free UK delivery
- Heil Pro-Set-Elite-1c  
 Headset For Icom Using Heil  
 Hc-6 Element - £189.95
- Heil Pro-Set-Elite-6 Headset  
 Using Heil Hc-6 Element -  
 £169.94
- Heil Pro-Set-1c Heil Large Dual  
 Headphones, Boom Mic With  
 Ic Insert - £164.95
- Heil Bm-101c Heil Lightweight  
 Dual Headsetboom Mic -  
 £144.95
- Heil Pro-Set-6 Heil Large Dual  
 Headphones, Boom Mic With  
 Hc-6 Insert - £134.95
- Heil Bm-10 Headset Dynamic  
 - £122.99

More Heil available

## LDG

- Ldg Ae-1000ProII HF6M  
 Automatic Antenna Tuner -  
 £319.95
- Ldg Rt-600 Automatic  
 Outdoor Antenna Tuner With  
 Rt-600 Controller - £425.95
- Ldg Ae-600ProII Automatic  
 Antenna Tuner - £359.95
- Ldg Ae-200 ProII Auto Antenn  
 Tuner - £259.95
- Ldg Rt-100/Rt-100 100W  
 Coax In/Out Remote Tuner  
 Controller - £239.95
- Ldg Ae-100ProII Automatic  
 Antenna Tuner - £229.95
- Ldg K-100 Tuner For  
 Kenwood Radios - £189.95
- Ldg Yt-100 Auto Atu For Ft  
 857, Ft-897 And Rt-100 -  
 £189.95
- Ldg Ae-897 Plus Autotuner  
 Continuous Coverage 1.8 To  
 34 Mhz - £189.95
- Ldg Lt-100 Auto Tuner For  
 Icom Transceivers - £179.95
- Ldg Z-11 ProII Automatic  
 Antenna Tuning Unit - £167.95
- Ldg Z-100 Plus Automatic At  
 - £159.95

**www.radioworld.co.uk**  
 or call **01922 414796**





# EMC

## VDSL2 noise?

A Member reports that a number of radio amateurs local to her have noticed considerable broadband noise, raising the noise floor on reception of amateur band signals and that a suspected cause is that some of their neighbours have had Sky Q boxes installed. She wonders how this is possible because the satellite signal will be in the UHF region and wonders whether it could be something to do with the power supply, especially if it is a switching power supply.

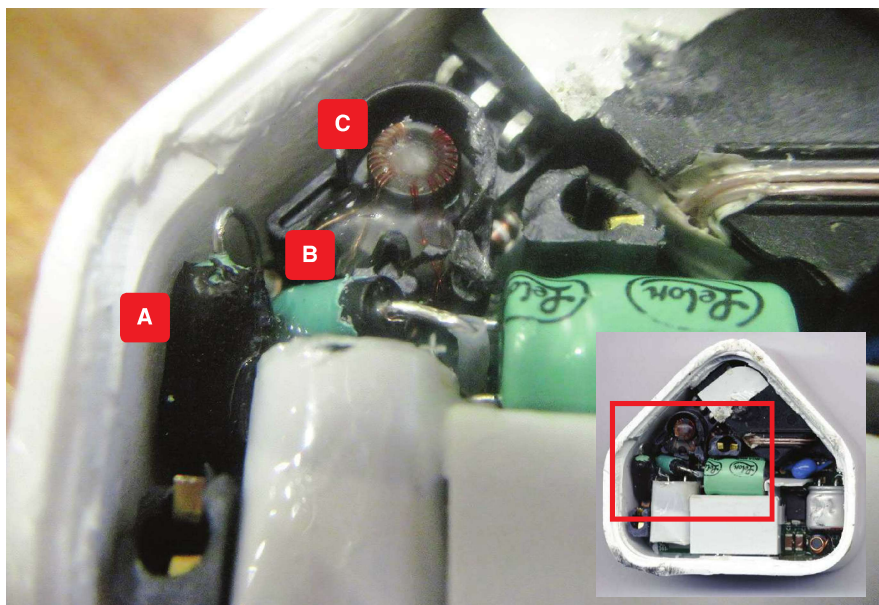
The first thing to note in this type of situation is that while you may suspect that a particular piece of electronic equipment is the source of some new interference, the only way to prove conclusively whether the source has been correctly identified is to switch off the equipment in question (and also other associated equipment) to see whether the interference goes away. Clearly this isn't always easy to do in practice so identification may be difficult.

Another consideration is that modern satellite receiving systems are connected to other associated equipment and networks that may radiate interference in the amateur bands. Users can receive 'off-air' TV signals via a satellite dish and they can also stream TV programmes or video via the internet. This in turn requires a broadband internet connection. Sky is one of a number of communications providers that provide a broadband internet service that uses a VDSL2 service provided by BT/Openreach. VDSL2 networks can radiate noise-like signals on some amateur bands, particularly if the phone wiring is overhead. Another issue is that most VDSL2 installations are 'self-install' so any issues of poor RF balance in legacy indoor telephone extension wiring may not be resolved.

Although VDSL2 noise has similar characteristics to natural 'white' noise, VDSL2 noise does have certain unique characteristics that can be identified using software that has been developed by the RSGB EMC Committee Chair for this specific purpose [1].

VDSL2 noise on its own normally has noise 'steps' at certain frequencies, as has been reported elsewhere. It sounds like a steady hiss when received using an AM detector (or any other type). If there is a 100Hz buzz when listening on an AM detector then there is some other type of interference present although there may also be VDSL2 noise underneath.

Another consideration is how the internet data gets from the VDSL2 modem/router to the satellite TV box, if these are separate. A direct cable connection using an Ethernet network cable is one possibility and wireless local area networking (LAN) at 2.4GHz (or 5.1-5.7GHz) is another. A third



**PHOTO 1:** A genuine Apple iPhone charger dismantled, showing (A, B, C) some radio interference filtering components – see text.

possibility is powerline networking, where data is sent via mains wiring. Although Sky Q boxes have the capability for powerline networking built in, it is understood that this capability is not actually being used at present. Nevertheless, separate stand-alone powerline networking adaptors (PLAs) are available and these are sometimes used with VDSL2 broadband internet services provided by any communications provider.

Frequencies used by PLAs *should* have all the HF amateur radio bands 'notched', plus the 50MHz and 70MHz VHF amateur bands, although the EMC Committee is aware of PLAs that do not appear to have 'notches' at VHF. Interference from powerline networking generally has very different characteristics from VDSL2 noise. PLA interference typically consists of regular clicking for 'polling' and this changes to longer bursts or continuous interference when video or other data is being streamed via PLAs. As it is transmitted via the mains it is generally modulated with a 100Hz buzz when received with an AM detector.

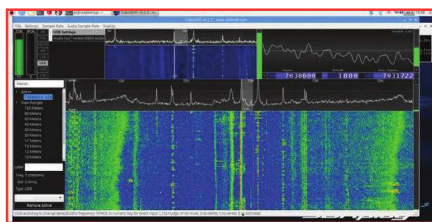
We would be interested to hear from any members who have their own Sky Q boxes about whether these are 'quiet' in amateur bands.

## Electric Trains

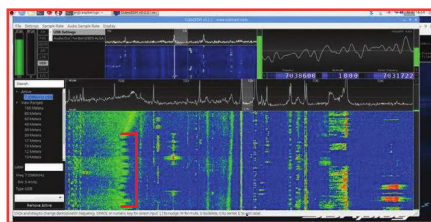
According to BBC News [2], new trains planned for the East Coast mainline do not work properly with track-side equipment. It is reported that the

'Azuma' trains cause electromagnetic interference to older signals and points in the north of England. The trains can run on diesel or electricity but until the issue is resolved, they will only run on diesel, travelling much more slowly than their promised speed.

According to other sources, the issue appears to be a matter of what EMC standards the train should meet for emissions and what EMC standards the signalling equipment should meet for immunity. European Norms EN50121, EN50126 and EN 50128 are important in the rail industry but it appears that most of the signalling on the East Coast Main Line north of Colton Junction was installed before the European EMC Directive – and just before electrification. A lot has changed since then. UK overhead electric catenary systems have always been fed by 50Hz AC power but in the past, this was transformed down and rectified on board the train; the traction motors were powered by DC. More recently, AC traction motors have been used with high power electronic inverters to produce variable frequency AC drive. These inverters use switching techniques and they also require high current filtering circuits to reduce the amount of switching frequency that is fed back via the overhead electric line (and also via the running rails that form the return path for the current). A nine-car Class 800 Intercity Express (IEP) train would have five powered vehicles with a total of 10 powered bogies and 20 traction motors plus traction inverters.



**FIGURE 1:** An SDR waterfall display showing a source of interference with unstable frequency.



**FIGURE 2:** Waterfall display showing an interference source with frequency steps (peaks within I mark).

It has been reported that discussions are taking place between Network Rail and the train manufacturer to find a long-term solution. It would appear that either the immunity of the signalling equipment needs to be increased or the emissions from the trains need to be reduced, or possibly a combination of measures could be applied. According to a recent article in *New Civil Engineer* magazine, Network Rail is said to be putting 'electrical earmuffs' on lineside equipment to combat the electrical interference from the new trains.

The electromagnetic interference to the signalling system is likely to be below radio frequencies but we would be interested to receive any reports of about any RF emissions from the Class 800 trains when running on electricity.

### Mobile phone chargers

The subject of electrical safety of cheap imitation mobile phone chargers has been in the news again with an item on the BBC *Rip off Britain* TV series episode 3 (29 August 2018). Further information about unsafe phone chargers is also available on the Electrical Safety First website [3]. According to Electrical Safety First, counterfeit chargers normally have a number of components missing and some are also electrically unsafe.

Based on EMC Committee tests, some radio interference filtering components are likely to be missing (either deliberately not designed-in or simply not fitted). Presumably the designers thought that as the charger will still work without the interference filtering components, no-one would notice if they didn't fit them. Radio users do notice however and imitation chargers can advertise their presence by radiating interference across the short wave radio spectrum, particularly at the lower frequency end up to a few MHz.

An example of what components should be fitted is shown in **Photo 1**. This is a genuine Apple iPhone charger with the lid removed to reveal the circuitry inside. Although the DC output power is only 5W, even a low power charger like this needs adequate RF interference filtering to comply with EN55022 Class 'B' conducted emission limits. There are *three* inductive RF interference filtering components visible plus some filtering capacitors that are not visible. 'A' and 'B' are two RF chokes, each inside a ferrite tube with a green coating that has been partially removed from 'B' to show what is inside. There

also a miniature ferrite ring core 'C' with two windings that acts as a common-mode choke.

Mobile phone chargers that are not genuine may have no RF filtering inductors at all or at most one inductor but no ferrite ring core with two windings. These missing components will cause much higher levels of RF interference compared to the well-designed genuine item. This provides a simple way to identify a suspected fake charger if a genuine type is available for comparison. If anyone has a fake or suspected fake iPhone charger then I would be very interested in borrowing it for EMC testing to compare with the genuine item and to evaluate the effectiveness of EMC testing as a way to spot fake mobile phone chargers.

### 7MHz mystery

Further to the item in October EMC Column about a 50MHz mystery, a Member reports a 7MHz mystery in the form of interference that also comes in on the mains supply and overhead telephone lines, which makes direction finding very difficult. Our Member's current interest is in WSPR on 40m, hence the frequencies of interest are centred around 7.040MHz. The 'main' source of interference "wafts around", ie the frequency drifts.

In order to obtain more information about the source, our Member analysed the interference using an SDR Play RSP1 with Cubic SDR software to show spectrum plots and a waterfall display. He also set up automatic captures of still screen images at 600 x 300 resolution that were used to create a time-lapse video. This proved to be a powerful technique for visualising the time-varying characteristics of an interference source.

Capturing a screen image every five minutes over a period of nearly five days gave a total of 1259 frames. As each frame is almost completely different from the previous frame and the next frame, commonly used video compression CODECs such as MPEG are not suitable and Motion JPEG Video (MJPEG) was used instead. The video lasted 2 minutes 5 seconds at 10 frames per second.

Two frames from the video are shown in **Figure 1** and **Figure 2**. The WSPR direct conversion receiver local oscillator at 7.0386MHz can be seen as a straight line in the centre of the screen. As these were automatically captured and saved as JPEG, no higher resolution image

is available but in Figure 1, two broad wavy green lines are clearly visible. These are two drifting harmonics of the interference source and the frequency difference between these lines corresponds to the fundamental frequency. This suggests that the source is some sort of switching power supply unit or LED light driver but it doesn't give any other clues about the source.

In Figure 2, only one wavy green line of interference is visible but this has an interesting characteristic that was only recorded occasionally during the five days. There is a stepped effect like a castle wall on its side (in the I mark) and this indicates that the frequency of the harmonic is shifting slightly in a regular manner. A likely cause is that the load is being switched on and off, which is characteristic of some types of battery charger. This could be for a mobile phone, laptop computer, cordless power tool or other battery powered equipment and it could be a replacement charger not the original. Another possibility is an uninterruptable power supply (UPS) or emergency light where the battery has failed so that the charger keeps trying to charge it.

### Noise cancellation

The Member who reports the 7MHz mystery above has designed a partial solution to the problem of unstable frequency until the mystery is solved and the source is identified. He has designed a passive noise canceller using two antennas with switched attenuation/phase steps to achieve a null. This method of noise cancellation is well established when used with manual tuning but as this particular interference source drifts around, the settings on the noise canceller would need to be adjusted frequently. The solution is a fully automated and adaptive noise canceller for which further details have been provided and which merits publication in its own right. This is reported to give a noise reduction that is most welcome, up to 20dB or so. Nevertheless, it should be noted that creating a null in a certain direction is also likely to reject any wanted signals that arrive from that direction or from the opposite direction.

### Websearch

- [1] VDSL radiation and its signal characterisation, *RadCom* November 2018 pp 28-31
- [2] East Coast Azuma trains thwarted by Northern track – [www.bbc.co.uk/news/uk-england-tyne-45435683](http://www.bbc.co.uk/news/uk-england-tyne-45435683)
- [3] Buying chargers – [www.electricalsafetyfirst.org.uk/guides-and-advice/electrical-items/chargers/](http://www.electricalsafetyfirst.org.uk/guides-and-advice/electrical-items/chargers/)

**Dr David Lauder, G0SNO**  
emc.radcom@rsgb.org.uk



# Index 2018

## Antennas

10m vertical antenna (Antennas)	22 May
30-minute J-Pole, Mark Hales, 2EOERX	82 Dec
6m vertical antenna (Antennas)	40 Jun
80m/40m loaded dipole (Antennas)	16 Dec
Antenna measurement (Antennas)	18 Oct
Antenna reciprocity (Antennas)	15 Nov
Common modes currents (Antennas)	40 Aug
Compact multiband dipole, Brian Austin, GOGSF	26 Mar
Current chokes (Antennas)	40 Aug
Dual-band 6m/4m Yagi (Antennas)	16 Sep
Low band DX with a G5RV, Tony Preedy, G3LNP	74 Jun
Multiband dipole feeder section, Bruce Sutherland, MOCVP	31 Mar
Multi-band HF wire dipole (Antennas)	30 Jul
NCARS' big antenna test, Steve Appleyard, G3PND	16 Apr
New look at Dipole variables, Tom Harrison, GM3NHQ	32 Aug
Practical Guide to Smith Charts (Antennas)	24 Apr
QRM eliminating antenna, Tony Preedy, G3LNP	18 Nov
Smith Charts, an overview (Antennas)	16 Mar
T-antenna (Antennas)	40 Feb
Vertical antenna overview (Antennas)	22 May
VHF vertical antennas (Antennas)	40 Jun
Virtual earth 160m antenna, David Sylvester G3RED	16 Feb
When is a transmission line an antenna (Antennas)	16 Dec

## Construction & Technical

180° hybrid RF network (Design Notes)	46 Sep
433MHz door bells (EMC)	33 Feb
472kHz (and other bands) the lazy way, Roger Lapthorn, G3XBM	32 May
6cm ATV using cheap 5.8GHz drone equipment, Dave Crump, G8GKQ	75 Feb
71MHz DATV (ATV)	78 Sep
80/40m SO2R high power LPF, Bob Titterington, G3ORY	20 Nov
Adding a TFT colour display to your projects, Jack Purdum, W8TEE, Dennis Kidder, W6DQ & Al Peter, AC8GY	38 Mar
CCTV systems (EMC)	63 Oct
Charging lithium batteries (Design Notes)	83 Oct
Cleaning up the ADF5355 synthesiser (Design Notes)	54 Dec
Data modes direct from synthesisers (Data)	22 Jun
Digital ATV transmission via SDRs (ATV)	38 Jul
Digital TV interference (EMC)	80 Jun
Directional couplers (Design Notes)	46 Jan
Distance & bearing software (Design Notes)	46 Nov
DSP – magic or mathematics? Andrew Barron, ZL3DW	76 Nov
Enclosure tips & tricks (Homebrew)	18 Jan
External soundcards and USB noise (Data)	80 Feb
Fractional synthesisers revisited (Design Notes)	54 Dec
FT8 – can we predict openings and paths? Steve Nichols, GOKYA	26 May
GENIE microcontroller shack alarm, Robert Coombes, G4ZEJ	44 Jun
Getting onto amateur satellites, Mark Sanderson, MOIEO & Nigel Newman, MOICH	22 Aug
GNSS time & frequency standard (Homebrew)	19 Jan
GNU Radio Companion (Data)	34 Dec
GPS message structure (Data)	50 Apr
High definition ATV (ATV)	75 May
HVDC consultation (EMC)	81 Apr
Icom CAT interface (Design Notes)	62 Jun
Induction cooking appliances (EMC)	80 Jun
LED driver SMPSU interference (EMC)	62 Oct

LED floodlights (EMC)	80 Apr
Magnetic components and inductors (Design Notes)	30 Apr
Matching impedances (Design Notes)	30 May
Mobile phone chargers (EMC)	76 Aug
Mobile phone chargers (EMC)	70 Dec
Mount for radios with bottom fire speakers, Klaus Spies, WB9YBM	34 Jun
Multi-mode diode tester, Dave Ellis, G4AJY	74 Dec
Network Radio – what's it all about, Chris Rolinson, G7DDN	16 Jul
New version of WSQ (Data)	22 Jun
Noise from voltage regulators (Design Notes)	76 Mar
Phase noise in synthesisers (Design Notes)	47 Sep
Plug-in Chargers (EMC)	32 Feb
Powerline communications (EMC)	76 Aug
RF low power meter using an Arduino and visual display, Andy Nehan, G4HUE	76 Dec
SA3000 100kHz to 3GHz spectrum analyser, Rubens Fernandes, VK5FE	14 Aug
Satellite TV breakthrough (EMC)	77 Aug
Simple quadrature network (Design Notes)	62 Feb
Simple Switcher SMPSU devices (Design Notes)	82 Oct
Simple up/down converter for datamode testing, Andy Talbot, G4JNT	72 Jul
Software Defined Radio – a window to the world, Andrew Barron, ZL3DW	70 Oct
Tilting stand for homebrew bench equipment, Peter Swallow, G8EZE	54 Nov
Time Difference of Arrival direction finding antenna, Peter Barnes, MOSWN	32 Jun
Using MOSFETs as switches (Design Notes)	24 Aug
VDSL2 noise (EMC)	70 Dec
VDSL2 radiation and its signal characterisation, Dr Martin Sach, G8KDF	28 Nov
Vibroplex Twin-Paddle Square Racer Modification, Terry Grice, GM4PSL	38 May
Weak signal modes (Data)	50 Apr
Weather reporting via APRS, Dr Michael K Butler, G4OCR	84 Apr
Wideband noise as a test source (Design Notes)	66 Jul
Wilkinson splitter (Design Notes)	25 Aug
WSPR Tx/Rx system using Raspberry Pi 3, Bob Cowdery, G3UKB	40 May

## Features

10th Anniversary National Hamfest	75 Jul
2017 RSGB IOTA Contest, Mike Franklin, G3VYI	22 Mar
2018-2019 Super League Preview, Steve White, G3ZWW	58 Oct
81st Commonwealth Contest, Bob Whelan, G3PJT	20 Jul
An Unexpected Visitor (planning), Stephen Purser, GW4SHF	82 Mar
Annual RSGB AGM trophy presentations	60 Jun
APRS: 6228 miles from Idaho to Istria, Conor O'Brein, MOZCO	54 Jun
ARISS contact at YOTA 2017, Ciaran Morgan, MOXTD	16 May
Autumn dates for your diary	64 May
Back to the Future – RSGB Legacy Fund, Nick Henwood, G3RWF	82 Jun
Bridging the Atlantic, Dr Bruce Taylor, HB9ANY	68 May
Churches & Chapels on the Air	56 Dec
Circuit Competition Results	61 Feb
Club Field Day, Nigel Newman, MOICH	56 Nov
Club of the Year 2016 – 2nd place large club	60 Apr
Club of the Year 2016 – 2nd place small club	75 Mar
Club of the Year 2016 – 3rd place small club	83 Feb
Club of the Year 2016 – overall winners	30 Jun
Club of the Year 2016 – 1st place large club	80 May

# KENWOOD

## Performance Exceeding Expectations



The most rewarding results often take place when faced with the harshest and most challenging conditions. There are enthusiasts who know this all too well because of their love of HF. KENWOOD has the answer. Achieve results through certainty and not circumstance. Delivered through the impeccable receiver and audio performance. This is our offering to you.

HF/6m & 4m TRANSCEIVER

# TS-890S

NEW

### Top-class basic receiving performance

3 kinds of dynamic range make for top-class performance.

- ▶ Third order intermodulation Dynamic Range (3<sup>rd</sup> IMDR) 110dB\*
- ▶ Reciprocal Mixing Dynamic Range (RMDR) 114dB\*
- ▶ Blocking Dynamic Range (BDR) 150dB\*

\*Values are measured examples. (3kHz spacing 14.1 MHz CW, BW 500 Hz, Pre Amp OFF)

- ▶ Full Down Conversion RX
- ▶ High Carrier to Noise Ratio 1<sup>st</sup> LO
- ▶ H-mode mixer

### 4 kinds of built-in roofing filters

500Hz / 2.7kHz / 6kHz / 15kHz (270Hz Option)

### 7 inch Color TFT Display

- ▶ Roofing frequency sampling band scope
- ▶ Band scope auto-scroll mode
- ▶ Multi-information display including filter scope

### Clean and tough 100W\* output

\*50W/70MHz

### Built-in high-speed automatic antenna tuner

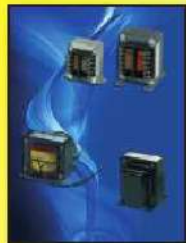
### 32-bit floating-point DSP for RX/TX and Bandscope



Convention update	21 Jun	VK9AR OC-216: Ashmoor Reef, Craig Edwards, VK5CE	46 Mar
Dayton 2018, John Crabtree, KCOG	76 Jul	Voluntary Interceptors tribute at the National Radio Centre, John Swartz, WA9AQN	80 Sep
Easter Island DXpedition 2018, Werner Hasemann, XROYD	18 Sep	Volunteer leadership, Nick Henwood, G3RWF	15 Apr
Enigma Reloaded, Giles Read, G1MFG	32 Nov	Who invented Morse code, David Thomas, G4OGW	27 Aug
Experiences with FT8, Roger Laphorn, G3XBM	78 Nov	YOTA month – December 2017	72 Mar
Friedrichshafen Ham Radio 2018, Steve Telenius-Lowe, PJ4DX	54 Aug	Youngsters on the Air 2018 – South Africa, Peter Barnes MOSWN & Nathan Prentice, MIONPR	42 Nov
FUNcube Project - five years since launch, Graham Shirville, G3VZV	22 Dec	ZD7BR mini-DXpedition by air to St Helena, Bill Rothwell, GOVDE	12 Jul
GNU radio companion course, John Worsnop, G4BAO	20 Dec		
H44R & H40D from Russell & Duff Islands, Cezar Trifu, VE3LYC	44 Oct		
HF CW Field Day, Mike Franklin, G3VYI	54 Sep		
How True Are the Whispers? John Seager, G0UCP	40 Oct		
Index 2018	72 Dec		
International British ARDF 2018 Championships, Bob Titterington, G3ORY	68 Jul		
International Lighthouses & Lightships on the Air weekend	80 Nov		
International Marconi Day	40 Jul		
Last Man of Spark, Giles Read, G1MFG	46 May		
Licence Training IS Fun... Lin Allen, MOTCF	76 May		
Lightning strikes at MOMCX, Callum McCormick, MOMCX	52 Apr		
Making an impact: TEC & Youth Committee outreach, Paul Whatton, G4DCV & Derek Hughes, G7LFC	76 Sep		
Marine Mobile WSPR Pole to Pole, Gwyn Griffiths, G3ZIL & Mike Gloistein, GMOHCQ	38 Sep		
Mills on the Air 2018	80 Aug		
Museums on the Air	60 Feb		
Museums on the Air 2018, Jonathan Andrews	72 Sep		
National Club of the Year 2017, Giles Read, G1MFG	24 Nov		
National Hamfest	68 Sep		
National Hamfest	83 Aug		
National Hamfest 10th Anniversary Show	22 Oct		
National Hamfest 2018	68 Nov		
National Physical Laboratory Open Day, Giles Read, G1MFG	42 Jul		
New VOACAP tool, Steve Nichols, GOKYA	12 Oct		
Ofcom's Online Licensing Portal, Fraser Murrey	56 Feb		
Old Timers' Honour Roll	14 Feb		
RAYNET – a really useful service, Julia Hardy MOJHD	53 Mar		
Remap – volunteers adapting technologies, David Martin	44 Sep		
Resistor polyhedra puzzles, Dr Mark Foreman, G7LSZ / SA6BID	44 Dec		
RSGB 2017 Committee Reports	38 Apr		
RSGB 2018 AGM Annual Report	49 Apr		
RSGB 2018 AGM elections	22 Apr		
RSGB 2018 Convention	24 Sep		
RSGB Band Plan 2018	44 Feb		
RSGB Convention	62 Dec		
RSGB Convention	74 Jul		
RSGB Convention	82 Aug		
RSGB Convention & Programme	54 Oct		
RSGB Loanable tool kit, Steve Hartley, G0FUW	76 Oct		
RSGB report and financial statements 2017	70 Apr		
RSGB Trophies Move Home, Jacqui Goodey, G6XSY	16 Oct		
RSGB VHF National Field Day	66 Oct		
Sandringham School C5DX DXpedition 2018, Alan Gray, G4DJX	44 Aug		
The 'Windy Isle', Bernard Naylor, G3SHF	90 Apr		
The Voices (from Sept 2000)	28 Apr		
Tuning at the Dawn of Radio, Dr Bruce Taylor, HB9ANY	28 Sep		
UK to Newfoundland 1901 style, David Sumner, G3PVH	44 Jul		
Using the Reverse Beacon Network to test antennas, Steve Appleyard, G3PND	24 Jun		
VHF National Field Day, Ian Pawson, G0FCT	28 Feb		
		<b>Reviews</b>	
		Aerial-51 SKY-SDR HF & 6m QRP transceiver, Andy Talbot, G4JNT	60 Aug
		Airspy HF+ SDR receiver, Mike Richards, G4WNC	20 Feb
		American Morse Equipment Porta Paddle-II Kit, Martin D Waller, GOPJO	66 May
		FA-VA5 Vector Antenna Analyser, Mike Richards, G4WNC	20 Sep
		Icom IC-7610 HF & 50MHz transceiver, Peter Hart, G3SJX	14 Jun
		Inrico T320 Network Radio, Giles Read, G1MFG	26 Jul
		Micsig tBook mini oscilloscope, Mike Richards, G4WNC	66 Mar
		Nissei power supplies, Steve White, G3ZVW	54 Feb
		Red Pitaya STEMLab oscilloscope, Ian Poole, G3YWX	80 Oct
		SDRplay RSPduo, Mike Richards, G4WNC	80 Jul
		Xiegu X5105 HF-6m QRP transceiver, Steve White, G3ZVW	38 Nov
		<b>Book Reviews</b>	
		50 Projects for Radio Amateurs	81 Mar
		60 Antennas you will want to build	83 May
		A Mind at Play	56 Jun
		AMSATS & HAMSATS	83 May
		ARRL Handbook 2019	83 Nov
		ARRL's Best of The Doctor Is In vol 1	81 Feb
		ARRL's Hands-on Radio Experiments vol 3	81 Mar
		Deluxe Logbook & Diary 2019	83 Sep
		Get on the Air with HF Digital	56 Jun
		Operation LENA and Hitler's plots to blow up Britain	56 Aug
		Portable Operating for Amateur Radio	64 Jul
		Power Supplies Explained	64 Oct
		RadCom 2017 CD and USB stick	81 Feb
		Receiving Antennas for the Radio Amateur	82 May
		Robot Wars: Build Your Own Robot	83 Nov
		RSGB Callseeker Plus 2019	82 Sep
		RSGB European Locator Map	83 Nov
		RSGB T-shirts	64 Oct
		RSGB Yearbook 2019	82 Sep
		The Full Licence Manual for Radio Amateurs	83 Sep
		The Future of Violence	82 May
		The Pentagon's Brain	91 Apr
		The Voices	91 Apr
		Time in Powers of Ten	81 Feb
		Zapped	64 Oct
		<b>Regulars</b>	
		Antennas, Mike Parkin, G0JMI	
		ATV, Dave Crump, G8GKQ	
		Data, Andy Talbot, G4JNT	
		Design Notes, Andy Talbot, G4JNT	
		EMC, Dr David Lauder, G0SNO	
		GHz Bands, Dr John Worsnop, G4BAO	
		HF Layer Propagation Predictions, Gwyn Williams, G4FKH	
		HF, Martin Atherton, G3ZAY	
		Sport Radio, Steve White, G3ZVW	
		VHF / UHF, Richard Staples, G4HGI	



A huge range of transformers and chokes,  
aluminium, metal and plastic enclosures  
for the radio enthusiast



Visit our web site for technical data,  
drawings, PDF catalogues  
and a list of stocking distributors  
— or contact us direct

01256 812812

sales@hammond-electronics.co.uk

www.hammondmfg.com

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 micro-  
phones. 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.



W2IHY Technologies Inc.

19 Vanessa Lane, Staatsburg, NY 12580

845-889-4253 • email: julius@w2ihy.com

order online at www.w2ihy.com

**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

Email: info@rfparts.com

435 South Pacific Street  
San Marcos, California 92078 U.S.A.

www.upshot-uk.com

**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...

**VERSATOWER Cables & Spares**

Upgraded Cable Sets for P60 and P80

Cables made to your specification

See website for details



Please contact James Pickance

for further details on

01590 670845 or email

james.pickance@upshot-uk.com

260 Bentley Way, Ampress Park, Lymington, Hampshire, SO41 8JW.



At under £100, the RSP1A  
makes a perfect gift

### SDRplay RSP SDR Receivers

- Continuous SDR receiver coverage from 1kHz to 2GHz (NO GAPS!)
- Now includes the RSPduo 14-bit Dual-Tuner SDR (July RadCom review)
- RSPduo can simultaneously receive on two totally independent 2MHz spectrum windows anywhere between 1kHz and 2GHz
- All RSPs can receive, monitor and record up to 10MHz spectrum at a time
- Visualise all the signals in multiple bands simultaneously
- S/W pre-sets for all the amateur bands from the new LF2200m to 23cm
- Excellent dynamic range for challenging reception conditions
- Use as a stand-alone general coverage receiver, or as a high resolution pandapter
- SDRuno Windows SDR software provided free-of-charge
- Also works with other platforms and popular SDR Software
- RSP1A is a perfect gift for newcomers and returners to the radio hobby
- Calibrated S meter/ RF power and SNR measurement with SDRuno
- Only needs a computer and an antenna
- Built-in High performance Front-end Filters
- Backed by the biggest and best SDR support community
- Compare SDR reviews on eHam (Google "SDRplay eHam reviews")
- Designed and manufactured in the UK
- Excellent value starting at under £100 including VAT

www.SDRplay.com





# RF meter for low power using an Arduino and LCD

I really enjoy making things but as I have gotten older I find that smaller projects have become more appealing. Sometime after article [1] was published I came across the SV1AFN website [2] that has a number of interesting goodies – not least of which are fully populated power meter PCBs. I have purchased a number of items from SV1AFN and found him to be reliable and, for the items I have purchased, his products do what they say on the tin. I particularly liked the look of the AD8307 module. It cost approximately €12 plus VAT and postage. I had also been enjoying my first usage of modern credit card sized computers, in this instance an Arduino Uno. I had purchased “The Arduino Starter Kit”, then available from the now-defunct Maplin but still offered by other sources. It comes complete with various experiments, and I used the Arduino and the 2 row x 16 column LCD display from that kit in this project. Interfacing the display with the Arduino is covered in [3].

The application notes for the AD8307 [4] covers some 24 pages and shows that the device is quite linear for any particular given frequency – probably more than good enough for most amateur needs. Clearly if one wants the last word in accuracy then the answer is to spend lots of money and buy a used but recently calibrated HP or similar power meter. However, I guess most of us want something that gives a reasonably good indication of power and, for a given frequency (or small range thereof) a very good relative measurement from one power level to another, without the professional-quality absolute accuracy – or cost! Anyway, there is much detail in the datasheet about the workings of the IC but the information of most use to us is the linearity, the slope of the linearity, the impact of frequency and the offset (ie the output voltage when no input is applied).

Figure 1 shows that over a range of frequencies of 10MHz to 300MHz the error in the reading is in the region of 4dB, with higher frequencies reading lower than expected.

There are various kinds of AD8307 power detector modules available on eBay and elsewhere. The notes here refer specifically to the module offered by SV1AFN, which



PHOTO 1: General view of the completed unit.

has features not found on the cheaper alternatives. You may well be able to adapt my suggestions to suit another module if you so choose.

The SV1AFN module has three outputs. Output O1 is 100mV per dBm, O2 gives 50mV per dBm and O3 is the direct output of the AD8307, 25mV per dBm. Using output O1 there is very good linearity over the range of at least -60dBm to 0dBm (1mW), sitting on top of an offset voltage of approximately 200mV. With a supply of 5V one is limited to a range of less than 40dB (allowing for some room to spare – if lower sensitivities are selected using pin O2 or O1 then the range will be greater but one must sacrifice granularity of measurement due to the limited number of bits in the Arduino ADC).

Setting up the board is easy. All that is required is that the supply jumper is set for 5V and that three connections are made: 9V (supply), 0V (ground) and output (marked as O3). The interconnections between the

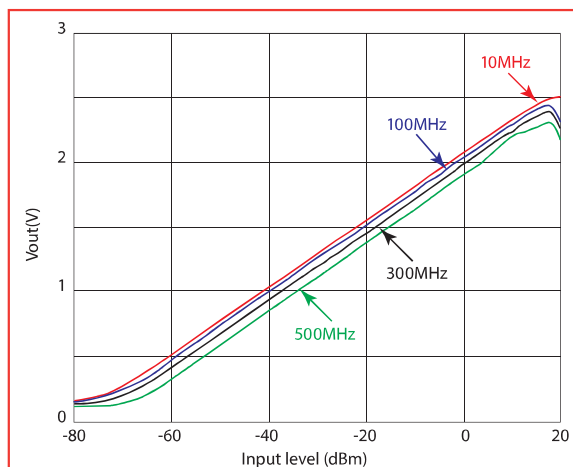


FIGURE 1: Typical AD8307 responses at different frequencies. Adapted from [4].

sensor board, Arduino and LCD are shown in Figure 2.

I used an Arduino type 9V wall wart to provide power. It plugs into the socket on the Arduino board, which is also the take-off point for the 9V supply to the SV1AFN AD8307 module. The LCD was an industry-standard 16x2 module with a blue backlight (in fact a WINGONEER 5V 1602 but

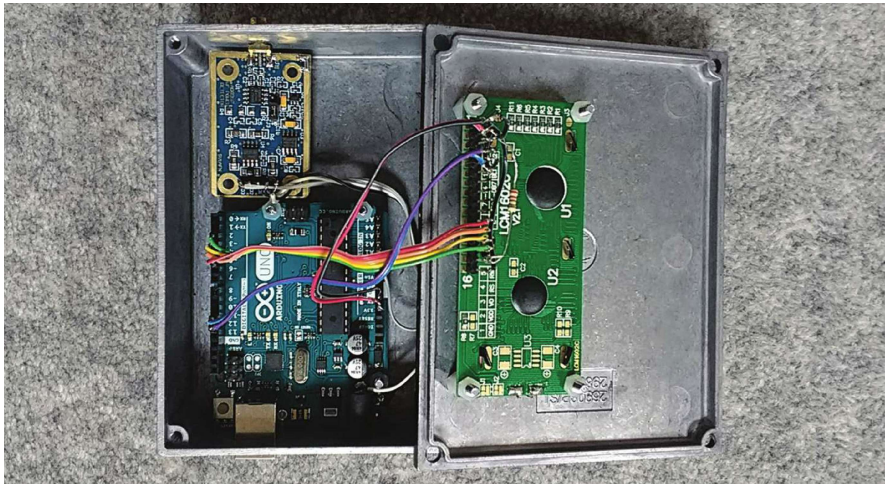
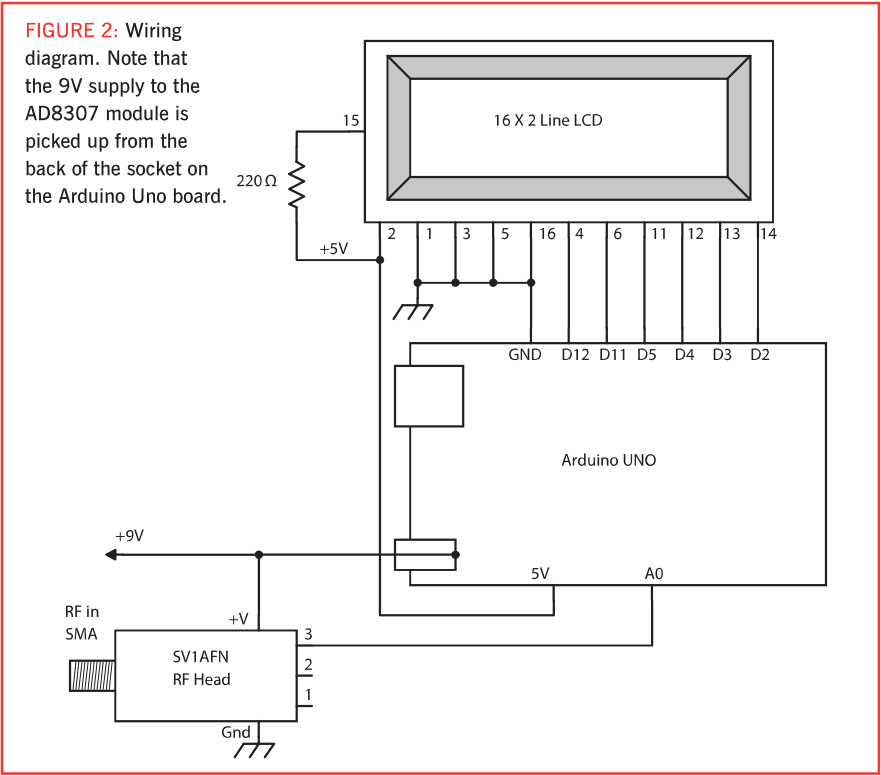


PHOTO 2: Inside the device.



essentially all 16x2 modules compatible with the Hitachi HD44780 have the same pinout and software commands).

Software

Now I had put together the hardware I had to think about software. The Arduino Uno analogue to digital converter (ADC) has 10-bit resolution, so it represents the incoming voltage as one of 1024 discrete levels. This information can be processed by the Arduino to generate a relevant display. I chose to display power in dBm but once one

has the raw data then the Arduino code can manipulate it as desired.

I learnt to code in 1969 and I was aware then, as indeed I am now, that coding is not something that everyone takes to! Most of my colleagues (we were all studying Chemistry at the time) thought it both terminally frustrating and a total waste of time. The code required for an Arduino is not that complex for a simple task such as this. Considered opinion and best practice is that one starts with the simplest aspect of the task and once that is proven to work as anticipated one adds additional complexity as required, so

that was the approach I adopted. My code is reproduced here in the box on page 89. I have added comments in red to assist the reader to make changes of their own.

Calibration

One needs a known source of *low* power at not less than 10MHz. I used my transceiver as a source and a Telepost LP-100A digital vector RF wattmeter as my calibration reference, but a Bird Thruline meter or other well calibrated device may be used to calibrate from a known reference. SMA attenuators were then used to reduce the power into the AD8307 and verify that the readings on the display were as expected.

Once one has suitable levels of power (say 0dBm and -40dBm), measure the output of the AD8307 on your selected pin (in my case pin 03). I found that 0dBm gave 1.835V and -40dBm gave 0.810V. Therefore, a 40dB change in signal levels gave rise to a change of 1.025V, NOT 1V as thought. Similarly 0dBm gave 1.835V and NOT >2V as expected. So I had to factor these into the equations. I was expecting a 40dB change would give 1V but it gave 1.025V so we need to multiply the voltage change not by 40 but by (40/1.025), or 39. Running the calculations manually shows that we need an adjustment of 71.6 to bring the display into line with the power. I have included these correction factors into the Arduino sketch presented here. When you check your meter you may find you have to calculate different calibration factors (but they shouldn't be too far adrift from mine – or indeed the 'perfect' answers).

The final step is to vary the input power and check that the display responds accordingly.

Further work

The software I've written only has a single display mode. If you add a pushbutton to the circuit you can arrange all sorts of options – changing units, displaying the raw ADC count (for diagnosis) and all sorts of other possibilities. An output to a buzzer could be used to sound when the power is above (or below) a certain threshold. I leave it to you to experiment: the nice thing about the Arduino is that it is designed to make it easy to try out different experiments.

Continued on page 91

Andy Nehan, G4HUE  
andy.nehan@btinternet.com



# Christmas Gifts for

## 60 Antennas you will want to build!



## 60 Antennas you will want to build!

Edited by Giles Read,  
G1MFG

Whatever the type of antenna, there is always a genuine sense of achievement when you build one yourself and it provides great results. This book sets out to provide a huge array of designs that the home constructor can attempt and more importantly will want to build.

Unlike many other antenna books this book starts with the premise that it will provide all the information needed to construct the antenna so it is at your fingertips when you start. Broken into sections 60 Antennas provides designs from the simple to the complex but still achievable for the home constructor.

There is not enough space here to list all the antennas or their variations are included in 60 Antennas. Selected from around the amateur radio World and from some of the great names of antenna design there is much here that will inspire 'You to want build!' your next antenna.

Size 174x240mm, 288 pages  
ISBN: 9781 9101 9355 6  
**Non Members' Price £14.99**  
**RSGB Members' Price £12.74**

## 50 Projects for Radio Amateurs



## 50 Projects for Radio Amateurs

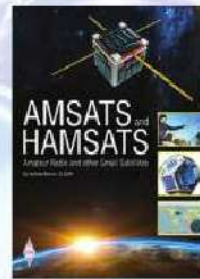
Edited by Mike  
Browne, G3DIH

Many radio amateurs love to design and construct electronic projects from the very simple right through to the very complex. 50 Projects for Radio Amateurs draws together a wide array of projects that the Radio Society of Great Britain (RSGB) has published. You will find projects as diverse as antennas, simple test equipment through to 70cm handhelds and much besides.

50 Projects for Radio Amateurs is broken sections that cover Measurement & Filters, Morse, Antennas and large section covering useful station accessories, peripherals and other diverse projects. The projects included range from complex DIY antenna analysers through to a simple electronic keyer and builds on simple strip board.

All the projects included in 50 Projects for Radio Amateurs are selected to stimulate and inspire you to get out the soldering iron and get building an array of useful tools, interesting antennas and much more.

Size 174x240mm, 256pages  
ISBN: 9781 9101 9352 5  
**Non Members' Price £14.99**  
**RSGB Members' Price £12.74**



## Amsats and Hamsats

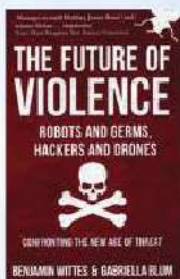
by Andrew Barron,  
ZL3DW

This book is simply the most comprehensive guide available on how you communicate through amateur radio satellites and how to receive signals from other small satellites and 'weather' satellites. Written by best-selling amateur radio author Andrew Barron, ZL3DW, this is the answer to everything you wanted to know about this exciting world of satellites.

Amsats and Hamsats begins by answering questions like, 'how do satellites stay in orbit' and 'why are they so expensive to launch?' before moving onto sections about the history of amateur radio satellites, the mathematics governing orbits, different types of satellite and their orbits. It covers the equipment you need, to track and use the amateur satellites and some of the satellite tracking software that is available.

Amsats and Hamsats, provides within its impressive 368 pages a great value guide to this stimulating and challenging area of amateur radio activity.

Size 174x240mm, 368 pages  
ISBN: 9781 9101 9354 9  
**Non Members' Price £14.99**  
**RSGB Members' Price £12.74**



## The Future of Violence

By Benjamin Wittes  
& Gabriella Blum

From drones to digital spying, governments have harnessed the power of technology. But what happens when ordinary people have the same tools. Cyber technology, biotechnology and robotics mean that more people than ever before have access to potentially dangerous technologies, which could be used to attack states and citizens. The Future of Violence, details the possibilities, and risks, present in the modern world, and argues that if our governments can no longer protect, they will lose their legitimacy. The book also explains how governments, companies and citizens must rethink their efforts to protect our lives and liberty.

ISBN 9781 4456 6668 6  
Size 129x199mm, 336 pages  
**Non Member's Price £10.99**  
**RSGB Member's Price £7.99 (28% OFF)**



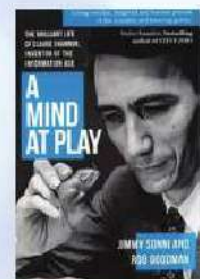
## Operation Lena and Hitler's Plots To Blow Up Britain

By Bernard  
O'Connor

'The couple were found to be carrying forged identity and ration cards, a wireless transmitter and receiver set, a torch with 'Made in Bohemia' on it, a revolver, ammunition, a coding device, graph paper, about £400 and a half eaten German sausage. Given the evidence they were arrested and escorted to London for interrogation'

Few are aware of the extent of the German spy network in WWII. This book sets out to describe their activities, with sometimes comical outcomes, and Allied counter espionage.

Size 156x234mm, 320 pages, Hardback  
ISBN 9781 4456 6963 2  
**Non Member's Price £20.00**  
**RSGB Member's £14.99 (25% OFF)**



## A Mind at Play

By Jimmy Sonni  
& Rob Goodman

A biography of one of the foremost intellects of the twentieth century: Claude Shannon, the unsung architect of the information age.

This is the story of the little-known man who influenced every computer built, email sent, video streamed, and webpage loaded. He wrote the seminal text of the digital revolution, which has been called 'the Magna Carta of the Information Age.' His discoveries would lead contemporaries to compare him to Albert Einstein and Isaac Newton. His work anticipated by decades the world we live in today and gave mathematicians and engineers the tools to create the digital technology we rely on.

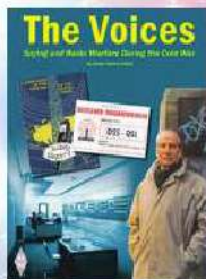
Size: 156x233mm, 384 pages  
ISBN 9781 4456 8277 8  
**Non Member's Price £16.99**  
**RSGB Member's Price £11.99 (£5.00 OFF)**

FROM **FREE P&P**

Order on the internet at [www.rsgbshop.org](http://www.rsgbshop.org) or you can order by post making cheques and postal orders crossed and made payable to Radio Society of Great Britain or telephone your credit card order to 01234 832 700. Open 8.30-4.30 (Mon-Fri). Send no cash. Post & Packing: Standard Delivery - 2nd Class Post (4-9 Days). For one item £1.95. For two or more items: £3.50. For orders over £30.00 standard delivery is FREE. Priority Delivery - 1st Class Post (2-4 Days). For one item £2.95. For two items: £4.95. For three or more items: £5.95. Overseas: Worldwide Surface Delivery. For one item: £3.00. For two items: £5.00. Extra items: £1.00 per item. Worldwide Air Delivery: For one item: £9.00. For two items: £15.00. Extra items: £3.00 per item.



# Radio Amateurs



## The Voices

Many are aware of the spying activity that took place following WWII until the demise of the Soviet Union in 1991. Few though are aware of the radio jamming, broadcasts of encrypted messages or any of the other electronic

skulduggery that took place during this time. This book shines a light on these activities that range from the extraordinary to the most mundane but most disruptive imaginable.

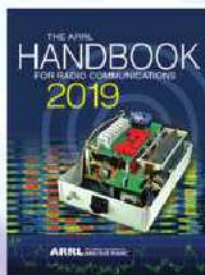
Produced as a tribute to the late, Gordon Adams, G3LEQ this book is based on series of articles first published in *RadCom* in 2000-2001 and a fond remembrance of someone whose tireless efforts influenced the RSGB for many years. This book has edited from those articles and expanded with new pictures and small amounts of material omitted from that series.

*The Voices* is a truly eye-opening read.

Size 174x240mm, 120 pages  
ISBN: 9781 9101 9353 2

**Non Members' Price £9.99**

**RSGB Members' Price £8.49**



## ARRL Handbook 2019

Now in its 96th edition the *ARRL Handbook 2019* continues to advance the pursuit of experimentation and innovation by radio amateurs.

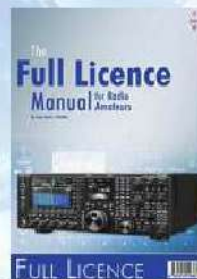
The key topics covered by this edition of the *ARRL Handbook 2019* are Radio electronics theory and principles, Circuit design and equipment, Radio signal transmission and propagation, Digital and analogue modulation and protocols, Antennas and transmission lines and Construction practices. There is much packed into the impressive 1280 pages of the Handbook and as always much has been updated and revised.

This book now comes with a download suite of a fully searchable eBook digital edition of the printed book, as well as expanded supplemental content, software, PC board templates, and other support files.

Size 208x274mm, 1280 pages,  
ISBN: 97816259 5088 8

**Non Members' Price £49.99**

**RSGB Members' Price £42.29**



## The Full Licence Manual for the Radio Amateur

by Alan Betts, G0HIQ

Syllabus 2019 Edition  
- for exams from July 2019 onwards

This book is the third course-book in the RSGB series for those interested in obtaining an amateur radio licence. In line with the progressive three-tier UK licence structure *The Full Licence Manual* completes the natural progression from *Intermediate* and *Foundation Licence Now!*

Fully revised to reflect the changes introduced in Syllabus 2019 the *Full Licence Manual* contains all of the information required to move to the final stage of amateur radio licensing. The book is broken down into logical sections. Licence conditions are covered in detail as are operating techniques and amateur radio safety.

Size: 210x297 mm, 104 pages,  
ISBN 9781 9101 9361 7

**Non Members' Price £11.99**

**RSGB Members' Price (25% OFF) £8.99**

## Perfect Christmas Gifts

### RSGB T-Shirts

**Want to show your appreciation of CW?**

As a user of Morse code there has never been a better way to express your appreciation as never before with these new RSGB T-shirts. Our new 'May the Morse be with you' T-shirt has proved a real hit with RSGB members. Produced as a special edition and only available for a short period these t-shirts make a real statement.

**Be quick when they are gone, they are gone!**

All shirts are available in M, L, XL and XXL and are made from 100% cotton.

**Only £4.99 each**



### RSGB Poloshirt

The ideal gift for a supporter of the RSGB. This range of top quality poloshirts are not only stylish but hardwearing. Available in Classic Black, Ash Grey or a new fashionable Desert Sand and Carolina Blue.

- RSGB logo embroidered to left breast
- Quality Heavy Weight 100% Cotton
- Stylish three buttons design and taped collar

Available to RSGB Members only

NOTE: not all colour and size combinations are available

**Price: £12.99**



### RSGB Embroidered Baseball Cap

High Fashion Navy RSGB Baseball Cap

- Luxury low profile design
- Quality 100% Cotton
- Red trim and stripe on peak
- Red inset panels
- Classic Navy colour
- Embroidered colour logo
- Structured 6 panel, low profile cap
- Quality metal buckle

Available to RSGB Members only

**Price: £6.49**





# The latest Amate

## ANTENNA BOOKS

AN60	60 Antennas	£14.99	<b>£12.74</b>
RANT	ARRL Receiving Antennas	£27.99	<b>£23.79</b>
MFAN	Antennas for MF and Above	£11.99	<b>£10.19</b>
INAN	International Antennas	£14.99	<b>£12.74</b>
SAS2	ARRL Small Antennas for Small Spaces 2 <sup>nd</sup> Ed	£22.99	<b>£19.54</b>
RAWK	ARRL The Radio Amateur's Workshop	£22.99	<b>£19.54</b>
APHY	ARRL Antenna Physics: An Introduction	£29.99	<b>£25.49</b>
POAC	ARRL Portable Antenna Classics	£19.99	<b>£16.99</b>
AB23	ARRL Antenna Book 23 <sup>rd</sup> Ed	£49.99	<b>£42.49</b>
NOVA	Novel Antennas	£14.99	<b>£12.74</b>
STL2	Stealth Antennas 2	£14.99	<b>£12.74</b>
AMAS	Antennas Mastered	£14.99	<b>£12.74</b>
ITAM	Introduction to Antenna Modelling	£9.99	<b>£8.49</b>
WAC3	ARRL Even More Wire Antenna Classics Vol3	£22.99	<b>£19.54</b>
SUWA	Successful Wire Antennas	£13.99	<b>£11.89</b>
HFAE	HF Antennas for Everyone	£14.99	<b>£12.74</b>
AGAT	ARRL Guide to Antenna Tuners	£22.99	<b>£19.59</b>
ATRA	ARRL Antenna Towers for Radio Amateurs	£34.99	<b>£29.74</b>
ADNB	ARRL Antenna Designer's Notebook	£34.99	<b>£29.74</b>
AFVA	Antennas for VHF and above	£12.99	<b>£11.04</b>
UBAN	ARRL Basic Antennas	£29.99	<b>£25.49</b>
BSHA	Building Successful HF Antennas	£14.99	<b>£12.74</b>
MVAC	ARRL More Vertical Antenna Classics	£17.99	<b>£15.29</b>
INAC	International Antenna Collection	£14.99	<b>£12.74</b>
INA2	International Antenna Collection 2	£14.99	<b>£12.74</b>
BKYA	Backyard Antennas	£18.99	<b>£16.14</b>
NACO	HF Antenna Collection	£19.99	<b>£16.99</b>
HFAL	HF Antennas for all Locations	£19.99	<b>£16.99</b>
SAFA	ARRL Simple & Fun Antennas for Hams	£22.99	<b>£19.59</b>
YAAC	ARRL Yagi Antenna Classics	£17.99	<b>£15.29</b>
ACV1	ARRL Antenna Compendium VOL 1	£19.99	<b>£16.99</b>
ACV2	ARRL Antenna Compendium VOL 2	£13.99	<b>£11.89</b>
ACV3	ARRL Antenna Compendium VOL 3	£13.99	<b>£11.89</b>
ACV4	ARRL Antenna Compendium VOL 4	£19.99	<b>£16.99</b>
ACV5	ARRL Antenna Compendium VOL 5	£19.99	<b>£16.99</b>
ACV6	ARRL Antenna Compendium VOL 6	£22.99	<b>£19.59</b>
ACV7	ARRL Antenna Compendium VOL 7	£24.99	<b>£21.24</b>
ACV8	ARRL Antenna Compendium VOL 8	£24.99	<b>£21.24</b>
WACS	ARRL Wire Antenna Classics	£13.99	<b>£11.89</b>
MWAC	ARRL More Wire Antenna Classics VOL 2	£19.99	<b>£16.99</b>
VACS	ARRL Vertical Antenna Classics	£17.99	<b>£15.29</b>

## CALLBOOKS

CB19	RSGB Yearbook 2019 Edition	£17.99	<b>£15.29</b>
CS19	Callseeker Plus 2019 (CD)	£16.99	<b>£14.44</b>
MS19	Callseeker Plus 2019 Memory Stick	£16.99	<b>£14.44</b>

## EMC & RFI

RFI3	ARRL RFI Book 3 <sup>rd</sup> Ed	£29.99	<b>£25.49</b>
FRIN	Single Ferrite Ring	£2.25	<b>£1.91</b>
FL15	Filter 15	£10.00	<b>£8.50</b>

## VHF/UHF BOOKS

SIX4	Six and Four	£13.99	<b>£11.89</b>
VHF2	VHF/UHF Handbook	£14.99	<b>£12.74</b>
YGVU	Guide to VHF/UHF	£8.99	<b>£7.64</b>

## SPACE & SATELLITES

ASAT	AMSATS and HAMSATS	£14.99	<b>£12.74</b>
HSAT	HAMSAT - Amateur Radio Satellites Explained	£9.99	<b>£8.49</b>
ARA2	Amateur Radio Astronomy - 2 <sup>nd</sup> Ed	£16.99	<b>£14.44</b>

## TECHNICAL BOOKS

TEQ5	Test Equipment for the Radio Amateur	£14.99	<b>£12.74</b>
AH19	ARRL Handbook 2019	£49.99	<b>£42.29</b>
PORT	Portable Operating for Amateur Radio	£22.99	<b>£19.54</b>
PR50	50 Projects for Radio Amateurs	£14.99	<b>£12.74</b>
HOR3	ARRL Hands-On Radio Experiments 3	£22.99	<b>£19.54</b>
ADIN	ARRL The Doctor Is In	£22.99	<b>£19.54</b>
VAEX	Valve Amplifiers Explained	£14.99	<b>£12.74</b>
GBRA	ARRL Grounding and Bonding for the RA	£22.99	<b>£19.54</b>
RH13	RSGB Radio Communication Handbook	£29.99	<b>£24.99</b>
RORS	Restoring Old Radio Sets	£8.99	<b>£7.64</b>
ELE2	Elimination of Electrical Noise 2 <sup>nd</sup> Ed	£6.99	<b>£5.94</b>
VWJT	ARRL Work the World with JT65 and JT9	£17.99	<b>£15.29</b>
HAR2	Hart Reviews	£12.99	<b>£11.04</b>
AMPS	Amplifiers	£30.00	<b>£25.50</b>
BATR	Building A Transceiver	£12.99	<b>£11.04</b>
SWRE	SWR Explained	£7.99	<b>£6.79</b>
AYFR	ARRL Your First Amateur Radio HF Station	£22.99	<b>£19.54</b>
ACSA	ARRL Circuit Simulation and Analysis	£27.99	<b>£23.79</b>
HK18	ARRL Hints & Kinks for the Radio Amateur	£22.99	<b>£19.54</b>
EPR2	ARRL Emergency Power for Radio Comms 2 <sup>nd</sup> Ed	£23.99	<b>£20.39</b>
VARV	Valves Revisited	£16.99	<b>£14.44</b>
UNB2	ARRL Understanding Basic Electronics	£29.99	<b>£25.49</b>
HORE	ARRL Hands-On Radio Experiments	£19.99	<b>£16.99</b>
WEEK	Weekend Projects	£13.99	<b>£11.89</b>
RADN	Radio Nature	£16.99	<b>£14.44</b>
HF2A	HF Amateur Radio	£12.99	<b>£11.04</b>
RFDB	RF Design Basics	£17.99	<b>£15.29</b>
LPAR	ARRL Low Profile Amateur Radio	£14.99	<b>£12.74</b>
PSHB	Power Supply Handbook	£15.99	<b>£13.59</b>
PCIB	Pic Basics	£16.99	<b>£14.44</b>
CIRO	Circuit Overload	£14.99	<b>£12.74</b>
ARES	Amateur Radio Essentials	£15.99	<b>£13.59</b>
HART	25 years of Hart Reviews	£14.99	<b>£12.74</b>
DMFO	Digital Modes for all Occasions	£16.99	<b>£14.44</b>
TTSB2	Technical Topics Scrapbook 1990-94	£13.99	<b>£11.89</b>
IRFD	Introduction to Radio Frequency Design	£29.99	<b>£25.99</b>

## OPERATING & DX

SOTE	SOTA Explained	£12.99	<b>£11.04</b>
VRIG	The Vintage Rig Guide (including p&p)		<b>£5.99</b>
RIG8	The Rig Guide 8 <sup>th</sup> Ed (including p&p)		<b>£5.99</b>
PR12	RSGB Prefix Guide 12 <sup>th</sup> Ed	£9.99	<b>£8.49</b>
HFDX	HF SSB DX Basics	£8.99	<b>£7.64</b>
OPM8	RSGB Operating Manual 8 <sup>th</sup> Ed	£16.99	<b>£14.44</b>
ARSH	ARRL Amateur Radio Public Service Hbk	£38.99	<b>£33.14</b>
LXD5	ARRL Low Band Dxing - 5 <sup>th</sup> Ed	£44.99	<b>£38.24</b>
HBCB	Homebrew Cookbook	£12.99	<b>£11.04</b>
ROAR	ARRL Remote Operating for Amateur Radio	£21.99	<b>£18.69</b>
SSAR	Storm Spotting for Radio Amateurs	£19.99	<b>£16.99</b>
WLOD	World Licensing and Operating Directory	£12.99	<b>£11.04</b>
RADO	Radio Orienteering - ARDF Handbook	£9.99	<b>£8.49</b>
MOVE	ARRL's Amateur Radio on the Move	£19.99	<b>£16.99</b>
WHOS	Who's who in Amateur Radio	£14.99	<b>£12.74</b>

## Software Defined Radio

By Andrew Barron, ZL3DW

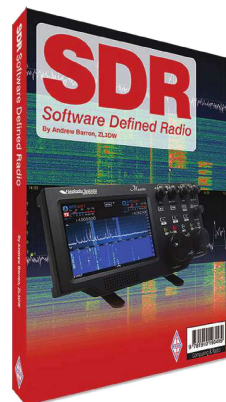
Everyone is talking about software defined radio (SDR) but is SDR right for you? *Software Defined Radio* sets out to explain the basics without getting too technical and is written to help you to get the most out of your SDR.

*Software Defined Radio* covers a huge range of material. The use of SDR by radio amateurs is growing rapidly in popularity as they become aware of the great features and performance on offer. This book covers how SDR works, and also details the different types of software available, what is different about them and even what is better. There are guides to using SDR with CW, Digital Modes, Contesting, EME, Microwaves, Satellites and much more. You will find information on over 60 SDR radios that you can buy today featuring leading brands.

*Software Defined Radio* is intended for radio amateurs, short wave listeners or anyone interested in radio technology. Thoroughly recommended reading.

Size 174x240mm, 304 pages, ISBN: 9781 9101 9349 5

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





# ur Radio titles



## COMPUTING & RADIO

HFD2	ARRL Get on the Air with HF Digital - 2 <sup>nd</sup> Ed	£22.99	<b>£19.54</b>
SDRB	Software Defined Radio	£12.99	<b>£11.04</b>
MAPR	More Arduino Projects for Ham Radio	£39.99	<b>£33.99</b>
AFHR	ARRL Arduino for Ham Radio	£29.99	<b>£25.49</b>
HMAD	ARRL Ham Radio for Arduino and PICAXE	£29.99	<b>£25.49</b>
RTT2	RTTY/PSK31 for Radio Amateur - 2 <sup>nd</sup> Ed	£7.99	<b>£6.79</b>
CIA2	Computers in Amateur Radio - 2 <sup>nd</sup> Ed	£14.99	<b>£12.74</b>
VOIP	ARRL VoIP Internet Linking for Radio Amateurs	£21.99	<b>£18.69</b>
COMM	CoMmand	£16.99	<b>£14.44</b>

## MAPS

LOCM	European Locator Map	£8.99	<b>£6.74</b>
RAMW	Radio Amateur's Map of the World	£6.99	<b>£5.94</b>

## RADCOM

RC17	RadCom 2017 Archive CD-Rom	£14.99	<b>£12.74</b>
MR17	RadCom 2017 Archive USB Memory Stick	£14.99	<b>£12.74</b>
ORCB	RadCom Back Issues		<b>£4.95</b>
EAZI	RadCom Easi-Binder		<b>£9.99</b>
RC16	Radcom Single Year CDs 2001-2016	£14.99	<b>£12.74</b>
MR**	Radcom Single Year USB Sticks 2014-2016	£14.99	<b>£12.74</b>

## RADCOM CD-ROM ARCHIVES

RC9600	RadCom 1996-00	£19.99	<b>£16.99</b>
RC9195	RadCom 1991-95	£19.99	<b>£16.99</b>
RC8690	RadCom 1986-90	£19.99	<b>£16.99</b>
RC8185	RadCom 1981-85	£19.99	<b>£16.99</b>
RC7680	RadCom 1976-80	£19.99	<b>£16.99</b>
RC7075	RadCom 1970-75	£19.99	<b>£16.99</b>
RC6469	RadCom 1964-69	£19.99	<b>£16.99</b>
RC5463	RadCom 1954-63	£19.99	<b>£16.99</b>
RC3953	RadCom 1939-53	£19.99	<b>£16.99</b>

## IOTA

ID17	IOTA Directory 17 <sup>th</sup> Ed	£11.99	<b>£10.19</b>
IFVR	Island Fever	£19.99	<b>£12.99</b>

## MONTHLY PUBLICATIONS

QST1	ARRL Subscription 1 Year		<b>£55.50</b>
QST2	ARRL Subscription 2 Year		<b>£107.00</b>
QST3	ARRL Subscription 3 Year		<b>£158.50</b>
QSTC	ARRL Subscription Digital only 1 Year		<b>£43.00</b>
QSTC2	ARRL Subscription Digital only 2 Years		<b>£83.00</b>
QSTC3	ARRL Subscription Digital only 3 Years		<b>£123.00</b>

## LOW POWER (QRP)

SPTB	Low Power Spratbook	£14.99	<b>£12.74</b>
QRP2	QRP Basics (2nd edition)	£14.99	<b>£12.74</b>
LPS4	ARRL Low Power Communication	£24.99	<b>£21.24</b>
INQC	International QRP Collection	£12.99	<b>£11.04</b>
MQRP	More QRP Power	£16.99	<b>£14.44</b>

## LOGGING

DL19	Deluxe Log Book & Diary 2019	£4.99	<b>£4.24</b>
LBAR	Log Book - Transmitting	£4.99	<b>£4.24</b>
LBXR	Log Book - Receiving	£4.99	<b>£4.24</b>

## MICROWAVES

MKHW	Microwave Know How	£12.99	<b>£11.04</b>
IMH2	International Microwave Handbook 2	£16.99	<b>£14.44</b>
MICP	Microwave Projects 1	£16.99	<b>£14.44</b>
MIP2	Microwave Projects 2	£16.99	<b>£14.44</b>

## PROPAGATION

RPEX	Radio Propagation Explained	£12.99	<b>£11.04</b>
PRSS	ARRL Propagation and Radio Science	£27.99	<b>£23.79</b>
RDAU	Radio Auroras	£6.99	<b>£5.94</b>

## MORSE CODE

MC12	Morse Code for Radio Amateurs 12 <sup>th</sup> Ed	£8.99	<b>£7.64</b>
------	---	-------	--------------

## GENERAL BOOKS

BLUF	Bluffer's Guide to Social Media	£6.99	<b>£4.68</b>
HROB	Haynes Build Your Own Robot	£22.99	<b>£13.79</b>
OPLN	Operation Lena Hitler's Plots	£20.00	<b>£14.99</b>
MIND	A Mind at Play	£16.99	<b>£11.99</b>
VOIC	The Voices	£9.99	<b>£8.49</b>
SAGL	The Spies of Gilnahirk	£12.99	<b>£11.04</b>
DDDP	3D Printing for Dummies	£21.99	<b>£16.49</b>
BOFF	Boffin	£12.99	<b>£11.04</b>
THR2	Haynes Thunderbirds Maual 50 <sup>th</sup> Anniversary	£12.99	<b>£8.99</b>
FORT	Fort Bridgewoods	£11.99	<b>£10.19</b>
CRSI	Covert Radar & Signals Interception	£19.99	<b>£14.99</b>
CBL2	The Cable - the wire that changed the world	£9.99	<b>£7.49</b>
TDLB	The Three Dimensions of John Logie Baird	£16.99	<b>£14.44</b>
BBR2	The Birth of British Radar	£12.99	<b>£11.04</b>
INEG	Inside Enigma	£14.99	<b>£12.74</b>
IMAS	Images Across Space	£19.99	<b>£14.99</b>
H109	Haynes Manual for Messerschmitt Bf109	£17.99	<b>£15.29</b>
FCIR	Full Circle: A Dream Denied, A Vision Fulfilled	£10.99	<b>£9.34</b>
ABOC	A Bit of Controversy	£13.99	<b>£11.89</b>
TCCD	Perera's Telegraph Collectors CD	£9.99	<b>£8.49</b>
BOXS	1940s Amateur Radio Collection	£15.99	<b>£13.59</b>

## SHORTWAVE LISTENING

VREX	Virtual Radar Explained	£6.99	<b>£5.94</b>
------	-------------------------	-------	--------------

## TRAINING

FMAN	The Full Licence Manual	£11.99	<b>£8.99</b>
EXSE	Amateur Radio Exam Secrets	£12.99	<b>£9.74</b>
FNOW	Foundation Licence - NOW!	£4.99	<b>£3.74</b>
IMD6	Intermediate Licence Book	£6.99	<b>£5.24</b>
ADVA	Advance! The Full Licence Manual	£11.99	<b>£8.99</b>
IEXM	International Amateur Radio Exam Manual	£14.99	<b>£11.24</b>

## LOW FREQUENCY

LFT3	LF Today 3 <sup>rd</sup> Ed	£13.99	<b>£11.89</b>
------	-----------------------------	--------	---------------

25%  
OFF

RSGB Members' Prices displayed **BOLD** New books displayed **RED**

## RSGB Shop Order Form

PLEASE PRINT ALL

NAME	CALLSIGN
ADDRESS	
POSTCODE	TELEPHONE
E-MAIL	

QUANTITY	CODE	DESCRIPTION/TITLE	PRICE	TOTAL

PLEASE CHARGE MY CREDIT/DEBIT CARD	P&P	
EXPIRY DATE	TOTAL	
*3 DIGIT CODE FROM THE BACK OF YOUR CARD		

SIGNATURE	DATE
-----------	------



# 30 minute J-pole

## What is it?

The J-pole antenna, more properly known as the J antenna, was first invented by Hans Beggerow in 1909 for use in Zeppelin airships. It consisted of a single element, one half wavelength long radiator with a quarter wave parallel feedline tuning stub. This was typically trailed behind the aircraft (for HF: no VHF back then!).

**Figure 1** shows the basic way the antenna is configured. In effect, we have an end-fed omnidirectional half-wave antenna that is matched to the feedline by a quarter wave parallel transmission line stub. Being a half-wave antenna, it provides a small gain over a quarter-wave ground-plane antenna, typically 2.2dBi. Interestingly, the 2m J pole will work effectively on 70cm!

The J-Pole is very sensitive to conductive support structures and will achieve best performance with no electrical bonding between antenna conductors and the mounting structure. It is influenced by outside factors so should be kept away from other conductors including drain pipes, metal window frames, flashing, etc by a distance of two to three times the spacing between the parallel stub conductors. **DO NOT USE A METAL MAST.**

## Feeder

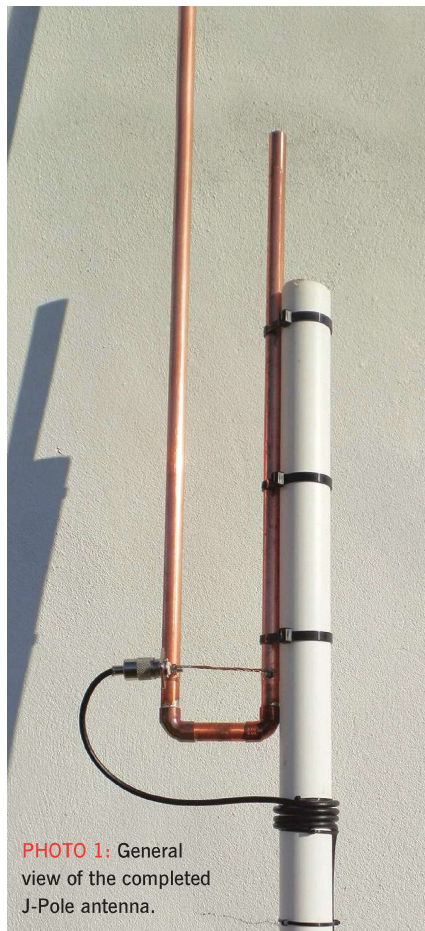
The J-pole antenna and its variations may be fed with a balanced line or coax feeder. If a coax feed line is used it can be beneficial to include a means to suppress feedline RF currents. Generally, three to six turns of the coax feeder close wound either on a former or air wound will work. In **Photo 1** you can see how I used the 40mm plastic pipe 'mast' as the former for the feeder choke.

The feed point of the J-pole is somewhere between the closed low-impedance bottom and open high-impedance top of the J stub. Between these two extremes exists a match to any impedance between the low to high impedance points. However, you must consider that this will have to be matched at the radio end to 50Ω.

## Construction

**Photo 2** shows the main parts I used for the prototype – 15mm copper pipe, a pair of right angle elbows (Yorkshire or plain type), two copper saddle clamps (for fixing the feed points), two 5mm bolts, nuts and washers, plus a SO239 socket.

As you will have noted from Figure 1, all the dimensions are calculated as fractions of a wavelength for the frequency of interest. The bandwidth of the antenna is reasonably broad but, as most vertically polarised operation takes place in the upper 1MHz of the 2m band, we'll choose 145.500MHz as the design centre frequency. But – and it's an important but – the simple calculation doesn't



**PHOTO 1:** General view of the completed J-Pole antenna.

take into account velocity factor and any odd 'strays' so I recommend you add 5-10mm or so to the dimensions you calculate. It's easy enough to trim a bit off later if necessary but the converse is not true.

For the radiator section we need  $\frac{1}{2} + \frac{1}{4}$  wavelength at 145.500MHz, which is 1485mm. The matching stub section is  $\frac{1}{4}$  wavelength at 145.500MHz, which is 495mm. The element spacing is about 45mm, but this is not critical.

As mentioned earlier, the feed point can match to just about anything you want. However, the 50Ω point is about 49mm from the base. The construction method described here allows for the feed point to be adjusted for best match. The only thing worthy of note at this stage is that the braid and centre should each be at the same height from the base.

The neatest way to cut copper pipe is with a proper pipe cutter [1]. These are small hand-operated devices that have a sharp wheel and adjustable jaw grips. These are used by rotating it around the pipe and repeatedly tightening it until it cuts all of the way through. They are inexpensive, starting at about £3. The alternative is to use a hacksaw or, if you

have the facility, a metal-cutting bandsaw or similar. Whatever method you use, take all necessary safety precautions.

Cut 1490mm of 15mm copper pipe to form the radiator section, 500mm for the matching stub and 30mm for the bottom section. (Remember that the elbows will add a bit to each of these lengths). Clean the ends with emery paper or wire wool to remove any oxidation, leaving bright shiny copper. The radiator and matching stub will need at least 75mm or so cleaned up, not only so that they will solder cleanly but also to ensure a good electrical connection to the saddle clamps.

I assume that anyone building this 'plumber's delight' will be reasonably familiar with soldering copper pipe to elbows using a blowtorch or similar but is important to point out that of you're using Yorkshire (pre-soldered) fittings, the ends need to be smeared with a little flux to help the solder flow inside the joint. Failure to do so will result in a mechanically weak joint.

Assemble the three pipes and elbows on a fire resistant surface and heat the pipes and fittings evenly. They do not need to be cherry red, but just to the point where the copper starts to 'rainbow'. If using Yorkshire joints and flux, you should see the solder appear as a ring. At this point remove the heat and allow the assembly to cool. **DO NOT MOVE ANYTHING WHILST IT IS HOT** or you'll result in mechanically weak joints.

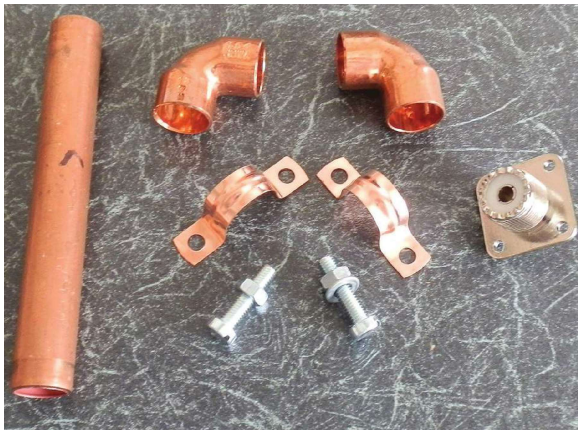
If using non pre-soldered joints, heat as before and, when the joints are hot enough, apply electrical solder to the joint and as it melts you'll see the solder sucked in by capillary action. As previously noted, allow the joints to cool before moving the assembly.

Whilst waiting for it to cool, use emery paper or wire wool to clean the copper saddles. It's particularly important that the inside should be clean, as this will be making contact with the elements.

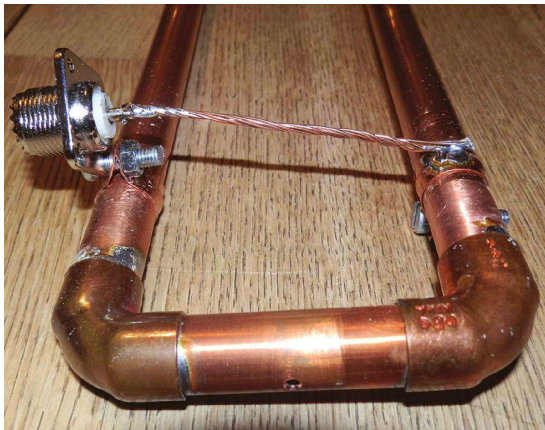
Once the pipes are cold enough to handle, slide the saddles onto the radiator and stub. Wrap the ends round so that the holes line up – this will take some force. Use the 5mm bolts through the holes, position the saddles 49mm from the base of the tube, then tighten the nuts just sufficiently that they won't slide whilst testing. It will likely be necessary to move them a bit for best match so there's no point doing them up tight yet. **Photo 3** shows the general arrangement.

Now it's time to measure the radiator and stub and cut to final lengths. Place the base of the antenna on a flat surface and measure 1485mm for the radiator and 495mm for the stub. Trim the pipes to length. A couple of mm either way is close enough.

The final steps are down to you to decide. In the example shown in **Photo 3**, I mounted



**PHOTO 2:** Main parts used to make the J-Pole antenna. You will, of course, need rather more copper tube than is shown here.



**PHOTO 3:** Completed base section and feed. Note the drain hole drilled in the bottom of the spacer.

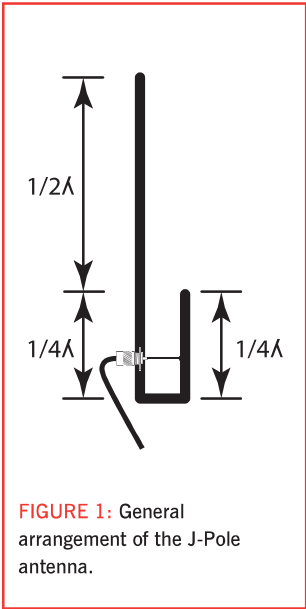


**PHOTO 4:** Version built for 70cm.

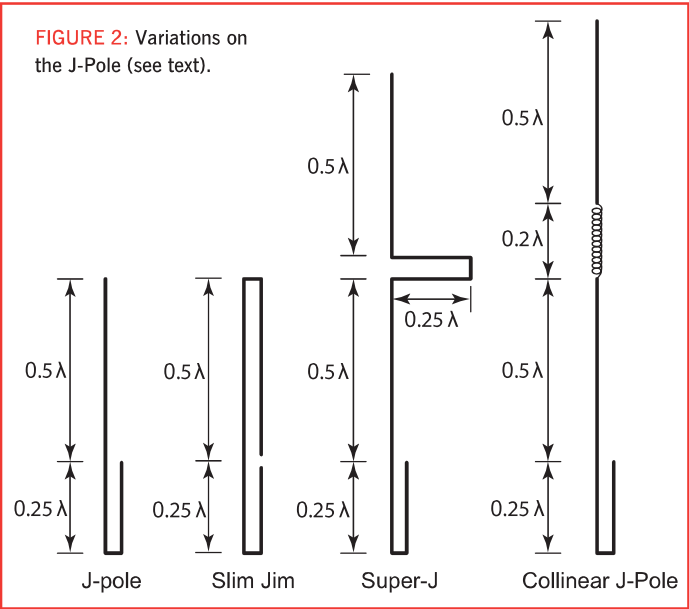
a SO239 socket to one saddle clamp, with a wire extending to the other saddle clamp. Alternatively, the coax or balanced feeder can be soldered directly to the saddle clamps, which is what I did with my experimental 70cm version, seen in **Photo 4**.

Drill a hole of about 3mm in the base cross pipe (see Photo 3). Even if you cap the ends, capillary action will still 'wick' moisture into the pipework.

How you attach the aerial to the mast is again left to you. As you can see from Photo 1 I simply cable-tied the stub to the plastic mounting pole, which worked well enough.



**FIGURE 1:** General arrangement of the J-Pole antenna.



**FIGURE 2:** Variations on the J-Pole (see text).

### Final tuning

There are many variables at this point depending on where the J pole is mounted. If you set it up in the shack or workshop and then install in its final place, I can guarantee that re-tuning will be necessary. But, in its final place it's just a case of moving the clamps up or down the pipes until you have a best match at 145.500MHz, then tightening the nuts.

I do suggest you add a choke to the feeder at the antenna end to suppress feeder RF currents. As mentioned earlier, three to six turns of coax will suffice. And, once again, only use a PLASTIC mast.

### The weather

I haven't mentioned anything about waterproofing. If you mount the antenna in a sheltered position (eg in a loft) this obviously won't be a problem. Another straightforward

possibility is to mount the assembly inside a larger diameter pipe, ideally with a cap to keep the rain out, if you can contrive an arrangement that's not too heavy. Otherwise, simple measures like a good coat of paint over the saddle clamps, joints and electrical connections (including the back of the SO239 socket) will provide quite a lot of protection. So-called 'liquid electrical tape' is even better still. Don't forget to put something like self-amalgamating tape over the PL359 plug too, because otherwise moisture will definitely get into the coax over time.

### Variations

The J Pole has many 'cousins', which opens up a rich vein of avenues for the intrepid antenna experimenter to explore. **Figure 2** shows some of the common types. From left to right we have the J-pole we've built here,

the co-called Slim Jim, which has similarities to a folded dipole. The Super-J increases gain by adding a further half-wave radiating section above the main radiator, phased using the 2 x 0.25 wavelength 'kink'. Finally, the collinear J-Pole achieves a similar effect by means of a phasing coil and physically separating the elements. There is a more detailed discussion of these alternative types at [2].

### Websearch

- [1] eg [www.screwfix.com/p/3-28mm-manual-multi-material-pipe-cutter/49428](http://www.screwfix.com/p/3-28mm-manual-multi-material-pipe-cutter/49428)
- [2] [https://en.wikipedia.org/wiki/J-pole\\_antenna](https://en.wikipedia.org/wiki/J-pole_antenna)

**Mark Hales, 2E0ERX**  
waxinglyrical28@gmail.com



Please send news reports to 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 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, talk on Meerkat Farming, Phil, G9ABC. We normally acknowledge all submissions within 3 working days: if you don't hear from us, please phone. We don't normally include 'closed', 'TBA' or 'every Tuesday'-type entries. **The deadline for the January issue is 21 November and for February it's 19 December.** For GB2RS, the deadline is 10am Thursday before broadcast.

## CLUB EVENTS CALENDAR

### INTERNATIONAL

#### Pafos Radio Club, Cyprus

Richard, 5B4AJG, 00 357 97 857 891, 5b4ajg@gmail.com www.cyhams.org  
Meets 3rd Thursdays at the Hole in the Wall Restaurant, Coral Bay, 6 for 6.30. Visitors welcome.

International Federation of Railway Radio Amateurs (FIRAC) www.firac.org.uk  
Nets Sun 14.320MHz at 0830UTC, Wed 21.3MHz at 1430UTC. g4gnq@hotmail.co.uk.

### NATIONAL

Amateur Radio Caravan & Camping Club, membership@arcc.org.uk  
www.arcc.org.uk

AMSAT-UK – http://amsat-uk.org/  
Open net every Sunday, 10am, 3.780MHz (±)

British Railways ARS  
Ian, G4EAN, www.brars.info  
Nets: Tuesday 7pm on 3.68MHz, Friday 4pm on 3.685MHz

British Young Ladies Amateur Radio Association  
www.bylara.org.uk  
Net Thurs, 3.688MHz±, 6.30pm. All YLs welcome.

Civil Service Amateur Radio Society  
Weekly net every Tuesday, 8pm, 3.763MHz

CDXC – The UK DX Foundation – cdx.org.uk  
For all interested in HF DX and contesting

Radio Amateur Old Timers' Association  
MemSec@RAOTA.org, www.RAOTA.org  
Diamond Jubilee year. Nets: see website

Worked All Britain Awards Group  
www.worked-all-britain.org.uk  
Nets most evenings, 3.760MHz±, time variable with propagation. Non-members welcome.

### REGION 1: SCOTLAND SOUTH & WESTERN ISLES

RR: Anthony Miles, MM0TMZ, RR1@rsgb.org.uk

#### Ayr ARG

Derek, MM0OVD, 0744 793 1941  
1 Christmas dinner  
7, 21 Pre-loved sale / quiz night

#### Cockenzie & Port Seton ARC

Bob, GM4UYZ, 01875 811 723  
7 Club night

#### Kilmarnock & Loudoun ARC

Len, GM00NX, klarcinfo@gmail.com  
4 Training/construction night  
11 Club meeting

#### Livingston & District ARS

Cathie, 2MODIB, 01506 433 846  
4, 18 Operating & training / social evening  
11 AGM

#### Lothians RS

Mike, MM0MLB, secretary@lothiansradiosociety.com  
12 Christmas curry night

#### Mid Lanarkshire ARS

Joseph, 2MOJHY, mlarsclub@gmail.com  
7, 14, 21, 28 Club night and tuition

#### West of Scotland (Glasgow) ARS

Jack, GM4COX, www.wosars.org.uk  
5, 12, 19, 26 Solder Group, 6.30pm  
7 Winter programme discussion  
14 Christmas social  
21, 28 Closed

### REGION 2: SCOTLAND NORTH & NORTHERN ISLES

RR: Andrew Burns, MM0CXA, RR2@rsgb.org.uk

#### Dundee ARC

Martin, 2M0KAU, 0776 370 8933  
4 Foundation training  
11, 18 Christmas meal / club night

#### Inverness & District ARS

John, GM00TI, 01463 791 444  
5 Club net, 8pm, 145.575MHz & GB7BI slot 1  
12 Christmas party

### REGION 3: NORTH WEST

RR: Kath Wilson, M1CNY, RR3@rsgb.org.uk

#### Bolton Wireless Club

boltonwireless@gmail.com  
10 Open evening and table top sale  
24 Closed

#### Bury Radio Club

Laurence, G4KLT, radioG4KLT@gmail.co  
4, 11, 18 Club night  
22 AGM

#### Central Lancs ARC

Peter, G3UCA, g3uca@blueyonder.co.uk  
1 Club meeting, 11am  
2, 9, 16 FM Top Band net, 1.940MHz, 11am  
3, 10, 17 Net, 8pm, 70.425-70.475MHz FM

#### Chester & District RS

Bruce, M0CVP, 01244 343 825  
4 Christmas social at Cheshire View  
11, 25 Committee Meeting / No meeting  
18 Bring and tell with festive mince pies and sherry

#### Macclesfield & District RS

Greg, M0TXX, info@gx4mws.com  
3 On the air  
10, 17 Christmas party / social evening  
24, 31 Closed

#### Oldham Radio Club

Mike, M1CVL, 0740 276 3203  
2, 16, 30 C4FM net, 9.30am, FCS004-55  
5, 12, 19, 26 2m FM net, 8pm  
6, 13, 20 Club night, committee meeting on 6th  
9, 23 D-Star net, 9.30am, REF 14B

#### Rochdale & District ARS

Robert, M0NVQ, 0777 811 3333  
5 Club night and AGM, 7.30pm

#### South Manchester R&CC

Ron, G3SVW, 01619 693 999  
6 The Weather, part IX, Peter, G3XGE  
13 Christmas party  
20 Another Christmas party  
27 Closed

#### Stockport Radio Society

Heather, M6HNS, 0750 690 4422  
3 Advanced exam  
4, 11 Society meeting / radio night  
13 Net, 7.30pm, 145.375MHz FM  
18 AGM  
27 Christmas New Year's club meeting

#### Thornton Cleveleys ARS

John, G4FRK, 01253 862 810  
3 Natter night/practical/club on air  
10 Auction / table top sale  
13, 17 Christmas meal / Christmas party & games  
20, 27 No meeting

#### Wirral ARS

Bill, G4YWD, 0780 488 4245  
4, 11, 18 Natter night,  
Intermediate course continues  
5 HF propagation video with Skype link  
6, 13, 20 G3NWR ATV, 144.750MHz talkback  
12 Club station on the air  
19 Christmas party

### REGION 4: NORTH EAST

RR: Ian Douglas, G7MFN, RR4@rsgb.org.uk

#### Denby Dale RC

Darran, G0BWB, 0797 442 3227  
2, 9, 16, 23, 30 Club net, 10.30am, via GB3HD  
5 Christmas meal at Yorkshire White Rose  
19 Film night, *The development of the DX Commander*

#### Durham & District ARS

Michael, G7TWX, 0782 692 4192  
5, 12, 19 Club night

#### Hambleton ARS

John, M6BHP, 0798 000 3293  
12 Christmas quiz night

#### Hartlepool ARC

Stan, G7VGM, stan.g7vgm@gmail.com  
7 Club night, Foundation/Intermediate training  
14 Coaxial cable & connectors, Neil, G4SHJ  
21 Club Christmas party  
28 Plan for club AGM

#### Hornsea ARC

Gordon, G3W0V, 01377 240 573  
5, 21 Committee meeting / admin clean up  
12 Christmas party

#### Ripon & District ARS

David, G3UNA, 01423 860 778  
6, 13 Club night  
20 Christmas quiz night

#### Sheffield & District Wireless Society

Krystyna, 2E0KSH, 0788 406 5375  
5 Datamodes, Peter Watts, G0FQB  
12 Alternative date for Christmas dinner  
19 Christmas dinner  
26 No meeting

#### Sheffield ARC

David, G6DCT, littlewood20@btinternet.com  
3, 17 Talk / Club night  
10 Shack night Operating GX3RCM  
24, 31 Closed

#### Spen Valley ARS

Russell, G0FOI, 01274 875 038  
6 Shack meeting  
20 Shack meeting/on the air

#### Tynemouth ARC

mail@g0nwm.com, www.g0nwm.com  
7, 28 No meeting  
14, 21 Christmas party / Club night

The January deadline is 21 November  
and for February it's 19 December

The radio... **YAESU**

# *True RF Legend* *True Performance*

## *FT DX 5000MP Limited*



RF  $\mu$ -Tuning Unit  
(Optional)

- Provides ultra-high-Q RF preselection selectivity

### *Congratulations*



*We congratulate WRTC 2018 Y81N Winning Team from Lithuania*

The winners of the World Radio Team Championship 2018  
Gedas Lucinskas (LY9A) and Mindis Jukna (LY4L)

Rig used: 2 x FTDX5000MP



**YAESU**  
The radio

**YAESU UK Ltd**  
Unit 12 Sun Valley Business Park, Winnall Close  
Winchester, Hampshire SO23 0LB

For the latest Yaesu News, visit us on the internet at [www.yaesu.co.uk](http://www.yaesu.co.uk)

Specifications subject to change without notice. Some accessories and/or options may only be standard in some areas.  
Check with your local Yaesu Dealer for specific details.



## York Radio Club

www.yorkradioclub.uk

- 2 Breakfast meeting, 10am
- 5, 12, 19, 26 Club net, 8pm, 145.450MHz
- 6, 13, 20 Club night

## REGION 5: WEST MIDLANDS

RR: Martyn Vincent, G3UKV, RR5@rsgb.org.uk

### Bromsgrove & District ARC

John, G4OJS, 0788 967 8303

- 7, 14, 21 Club night

### Burton ARC

Rob, G6EIH, 0781 214 6333

- 2, 9, 16, 23, 30 Net, 10am, 145.575MHz
- 5, 12, 19, 26 Club night, non-members welcome
- 6, 13, 20, 27 Open net, 8pm, 145.575MHz

### Coventry ARS

John, G8SEQ, 0795 877 7363

- 7 Further reflections on Iceland
- 14 Project 2019 introduction & video night
- 21 Christmas social evening
- 28 Open net, 145.375MHz, instead of meeting

### Gloucester AR&ES

Anne, 2E1GKY, 01242 699 595 daytime

- 3, 17 Informal activities/ Christmas raffle
- 5, 12, 19, 26 Club net, 7.30pm, 145.475MHz FM
- 6, 13, 20, 27 Club net, 7.30pm, 145.475MHz, then moving to 80m SSB
- 7, 14, 21, 28 Club net, 7.30pm, 432.220MHz SSB
- 10 Christmas meal, informal activities for those not attending
- 24, 31 No meeting, venue closed

### Malvern Hills RAC

Dave, G4IDF, 01905 351 568

- 11 Christmas meeting
- 25 No meeting

### Midland ARS

Norman, G8BHE, 0780 807 8003

- 5 Open meeting, shack on the air & training classes
- 12 Club Christmas party
- 19, 26 No meeting

### Mid-Warwickshire ARS

midwarwicks@gmail.com

- 11 Christmas meeting

### Rugby ATS

Steve, G8LYB, 01788 578 940

- 1 Antenna discussion, HF & VHF shack OTA
- 2 Hut maintenance & committee meeting, 2pm
- 4, 11, 18 UKAC, CW practice & training, radio & projects
- 8, 15, 22, 25 HF & VHF shack on the air
- 29 What did Santa bring?

### Salop ARS

Eamonn, M0MEB, salopamateurradio@gmail.com

- 4, 11, 18, 25 Club CW net, 4pm, 144.070MHz
- 5, 12, 19, 26 Club net, 8.30pm, GB3LH
- 6 Natter night / committee meeting
- 13 Mince pie/Christmasraffle evening

### Solihull ARS

Roger, G4BBT, 0121 743 7277

- 6, 13, 27 Net, 8pm, 145.450MHz
- 20 Christmas party

### South Birmingham RS

Gemma, M6GKG, gemmagordon.m6gkg@gmail.com

- 3, 28 Work / meeting in the shack
- 4, 11, 18 Coffee morning, 11am visitors welcome
- 7 Planning the Christmas party
- 14 Christmas party
- 21 Sorting rallies and visits for 2019

### Stratford upon Avon & District RS

Clive, G0CHO, 01608 664 488

- 3, 17 Club net, 8pm, 145.275MHz FM
- 10 Quiz, Ron, 2E0EKW
- 25 Christmas greetings on the air from 10.30am
- 145.275MHz FM

### Sutton Coldfield ARS

Robert, rob2e0zap@gmail.com

- 3, 17 Open net, 7.30pm,  $\pm$ 145.250MHz
- 10 Club meeting and Christmas party
- 11 Open net, 7.30pm, 70.475MHz

### Telford & District ARS

John, M0JZH, 0782 473 7716

- 5 Committee meeting
- 12 Christmas meal
- 19 Mulled wine & mince pie social
- 26 Club net for meeting on the air

### Wythall Radio Club

Chris, G0EYO, 0771 041 2819

- 1 MLS Hog Roast trip
- 2, 9, 16, 23, 30 Club net, 8pm, 145.225MHz or GB3WL
- 4, 11, 18 Morse class eith G0HVN, 7.30pm
- 4 Free & easy social evening
- 11 Antennas for tricky Locations, G0HVN
- 18 Christmasclub contest briefing
- 27 Christmas fox hunt

## REGION 6: NORTH WALES

RR: John Pritchard, MW0JWP

RR6@rsgb.org.uk

### Dragon ARC

John, MW0JWP, 0751 503 1025

- 3 Natter night
- 17 Christmas get-together

### North Wales Radio Society

Liz, GW0ETU, 0776 019 0355

- 6 Night on air
- 13 Quiz and buffet
- 20, 27 Closed

### Porthmadog & District ARS

Peter, GW0DFK, 0773 177 1319

- 20 Christmas party

## REGION 7: SOUTH WALES

RR: Glyn Jones, GW0ANA, RR7@rsgb.org.uk

### Aberystwyth & District ARS

Ray, GW7AGG, 01970 611 853

- 1, 27 Club net, 145.500 then 145.550MHz
- 13 Quiz night

### Blackwood & District ARS

Rob, MW0CVT, 0797 471 7152

- 1 Start of Pixie Challenge, see www.gw6gw.co.uk

### Llanelli ARS

Steve, MW6CCG, 0787 849 4337

- 3 Closed (Christmas dinner)
- 10 Social evening
- 17 Christmas party, club raffle & auction
- 24, 31 Closed (Christmas holidays)

## REGION 8: NORTHERN IRELAND

RR: Philip Hosey, M10MSO, RR8@rsgb.org.uk

### Bangor & District ARS

Harry, G14JTF, 0289 042 2762

- 6 Amateur TV, John Gaunt

### West Tyrone ARC

Philip, M10MSO, 0784 902 5760

- 8 Christmas dinner
- 12 Meeting night

## REGION 9: LONDON & THAMES VALLEY

RR: Tom O'Reilly, G0NSY, RR9@rsgb.org.uk

### Aylesbury Vale RS

avrs@rakewell.com

- 12 Christmas get-together hosted by G3MEH

### Bracknell ARC

David, MOXDF, MOXDF@alphadene.co.uk

- 5, 19, 26 Open net, 8pm, 145.375MHz
- 12 Christmas social

### Chesham & District ARS

Terry, G0VFW, 01442 831 491

- 5 Informal Christmas get-together
- 19 No meeting

### Edgware & District RS

Mike, G4RNW, 020 8950 0658

- 13 Christmas fish and chip supper

### Hammersmith ARS

Selim, MOXTA, MOXHS@outlook.com

- 6, 13, 20 Club net, 8pm, 144.700MHz FM
- 14 General club night with radio operations
- 28 Closed

### Harwell ARS

John, G6LNU, 01235 223 250

- 13 AGM

### Newbury & District ARS

Rob, G4LMW, 0797 088 5614

- 12 Christmas dinner

### Radio Society of Harrow

Linda, G7RJL, lcasey100@outlook.com

- 2 Club shack 10am-3pm
- 2, 9, 16, 23, 30 Club net, 1938kHz LSB, 12 noon
- 3, 10, 17, 24, 31 Net, 8.15pm, 145.500MHz / 145.35MHz FM
- 7 Construction contest, Blackwell Hall, 8pm
- 14 Christmas Social, Club Shack, 8pm

### Reading & District ARC

Laurence, G2DD, 0758 470 6625

- 13 AGM

### Shefford & District ARS

David, G8UOD, 01234 742 757

- 6 Antique and unusual electrical equipment – bring yours in!
- 13 Club mince pie evening

### Silverthorn Radio Club

Robbie, M0HVC, 0742 913 1105

- 7, 14, 21, 28 Club night, 7.30pm

### Southgate ARC

Keith, G8RPA, g8rpa@arri.net

- 13 AGM

### Verulam ARC

Greg, M0PPG, 01582 413 345

- 11 Annual Bun Fight, 8pm

### Whitton ARG

Ian, G00FN, 0795 620 3495

- 7 Club night, HF / VHF on the air
- 14 30th Anniversary Christmas dinner, 7.30pm
- 21, 21 Social meeting (in the bar), 8pm

## REGION 10: SOUTH & SOUTH EAST

RR: Keith Bird, G4JED, RR10@rsgb.org.uk

### Bromley & District ARS

Andy, G4WGG, 01689 878 089

- 5, 12, 19, 26 Net, 9pm, 145.500MHz and QSY
- 18 Christmas quiz & mince pies

**Chippenham & District ARC**  
secretary@g3vre.org.uk  
4, 11, 18 Club night  
25 Closed

**Crawley ARC**  
John, G3VLH, 01342 714 402  
21 Fish and chip supper

**Cray Valley RS**  
Dave, G8ZZK, 0773 954 9822  
6 Broadcast radio, Pete Sipple, MOPsx  
20 Christmas buffet

**Crystal Palace R&EC**  
Bob, G30OU, 01737 552 170  
5, 12, 19 Net, 8pm, 145.525MHz ± QRM  
7 Christmas social evening

**Darenth Valley RS**  
Mike, G8AXA, 0788 415 7776  
12 Quiz plus fish 'n chips

**Farnborough & District RS**  
Mel, MOJMR, sec@farnboroughradio.org.uk  
12 Christmas dinner  
26 No meeting

**Hilderstone R&EC**  
Ian, 2E0DUE, secretary@g0hrs.org  
1, 8 YOTA (TBC) – Wellesley House School  
13 Club meal

**Hog's Back ARC**  
Ray, G4LUA, 0118 981 4174  
10 Natter night and mince pies etc  
24 No meeting

**Horndean & District ARC**  
Stuart, G0FYX, 02392 472 846  
7 Quiz night plus mince pies  
14 Christmas meal at The Crofton  
21 No meeting

**Mid Sussex ARS**  
Peter, G4AKG, 01444 239 371  
7 Christmas dinner  
14 Christmas quiz  
21, 28 Closed

**North Kent Radio Society**  
Stephen, G8JZT, 0798 575 3370  
4 Musical Keyboard, Robin Gilbert, MORJT  
18 Christmas EGM with mince pies

**Surrey Radio Contact Club**  
John, G3MCX, 020 8688 3322  
2, 9, 16, 23, 30 Net, 1905kHz, 9.30am  
3 Construction Contest  
6, 13, 20, 27 Net, 8pm, 70.300MHz  
7, 14, 21, 28 Net, 8pm, 145.350MHz  
17 Pre-Christmas social

## REGION 11: SOUTH WEST & CHANNEL ISLES

RR: Martin Sables, G7NTY, RR11@rsgb.org.uk

**Callington ARS**  
John, G4PBN, 01822 835 834  
5 Club night

**Cornish RAC**  
Steve, G7VOH, 01209 844 939  
6 Main meeting  
20 Social evening

**Exmouth ARC**  
Mike, G1GZG, 01395 274 172  
5 HF & VHF night & computers explained  
19 Christmas party

**Mid Somerset ARC**  
David, G8BFV, 01749 670 085  
10 Equipment sale & Christmas supper

**Newquay & District ARS**  
Terry, 2E0XTM, 01841 540 142  
5, 19 Club night

**North Bristol ARC**  
Mat, G7FBD, g7fbd@gb3bs.com  
7 Relax & chat, operating, committee  
21 Relax & chat, operating  
14 Christmas party  
28 45-minute video

**Poldhu ARC**  
Keith, G0WYS, 01326 574 441  
11 Christmas 'bring a plate' evening

**Riviera ARC**  
rivieraarc@gmail.com  
6 Christmas social / meal at the Ship Inn  
20 Club night (last of 2018)

**Saltash & District ARC**  
Mark, M0WMB, 0781 054 8445  
6 Open meeting, all welcome  
20 No meeting

**South Bristol ARC**  
Andy, G7KNA, 0783 869 5471  
6 Table top sale, 8pm  
13 Christmas social  
20 Open house and on air night  
27 No meeting

**Torbay ARS**  
John, G4VUD@tars.org.uk  
7, 14, 21, 28 Club night  
28 Club night with speaker

**Weston Super Mare RS**  
Martin, G7UWI, g7uwip@googlemail.co.uk  
3, 10 Construction, Morse tuition & operating  
17 Christmas party

**Yeovil ARC**  
Bob, G8UED, 01963 440167  
6 Fictitious radio antennas, G3MYM  
7, 21 Sparkford on air and various practices  
13 Christmas lecture: Smith charts, G8UED  
20 Mince pies  
27 Morse practice  
28 2nd annual table top sale

## REGION 12: EAST & EAST ANGLIA

RR: Peter Onion, G0DZB, RR12@rsgb.org.uk

**Braintree & District ARS**  
Edwin, G0LPO, 01376 324 031  
4, 18 Club net, 8pm, 145.375MHz  
11 Christmas social  
25 Natter night

**Cambridge & District ARC**  
Richard, G4AWP, 0770 229 5300  
14 Christmas Social, coffee, mince pies & quiz  
28 No meeting

**Colchester Radio Amateurs**  
Garry, M0MGP, 0774 031 8521  
2 Net, 7pm, 50.225MHz LSB  
4, 11, 18, 25 Net, 7pm 433.425MHz;  
7.45pm 1.925MHz LSB  
5, 12, 19, 26 Net, 7pm, 145.350MHz  
6, 13 Net, 7pm, 3.685MHz LSB  
20 Christmas party

**Essex Ham**  
Pete, MOPsx, news@essexham.co.uk  
1 Essex YL Net on GB3DA, 8pm  
2 Start of online Foundation course  
(www.hamtrain.co.uk)  
3, 10, 17, 24, 31 Net on GB3DA, 8pm,  
with chatroom at www.essexham.net

**Felixstowe & District ARS**  
Paul, G4YQC, pjw@btinternet.com  
10 Christmas noggin, video & mince pies  
24 No meeting

**Great Yarmouth RC**  
Simon, M0TRJ, g3yrc.radioclub@gmail.com  
14 Club night & radio operation, 7.30pm

**Harwich ARIG**  
Kevan, 2E0WMG, 0749 352 1049  
12 AGM & Christmas social

**Huntingdonshire ARS**  
David, M0VTG, secretary@hunts-hams.co.uk  
6 HARS Christmas dinner – Buckden  
13 Mince pies and chat night

**Loughton & Epping Forest ARS**  
Dave, M0MBD, 0798 016 5172  
6, 13, 20 Net, 8pm, 144.725MHz

**Lowestoft District & Pye ARC**  
secretary@ldparc.co.uk  
6, 20, 27 club evening  
10, 24 Informal/operating evening  
13 Talk / film

**Norfolk ARC**  
Chris, G0DWV, 01603 898 308  
5 Clublog, Michael Wells, G7VJR  
12 Christmas party

**Peterborough & District ARC**  
Alan, G8XLH, secretary@padarc.co.uk  
3, 10, 17, 24, 31 Club net, 8pm, 1.980MHz  
4, 18 Club net, 8pm, 145.400MHz  
12 Christmas social

**South Essex ARS**  
Terry, G1FBW, 0798 607 0040  
11 Christmas social

**Thames ARG**  
Patrick, G8JLM, 01621 855 461  
7 Christmas social

## REGION 13: EAST MIDLANDS

Regional Manager: Jim Stevenson, G0EJQ  
RR13@rsgb.org.uk

**Leicester RS**  
Sandra, G0MCV, 0793 027 4044  
3 Open meeting  
10 Morse practice & committee meeting  
17 Christmas party  
24 No meeting

**Loughborough & District ARC**  
Chris, G1ETZ, 01509 504 319  
4 Valve principles, Ian, G8SNF  
11 Open forum on fox hunting – 2m & 160m DFs  
18 Christmas fun night  
25 no meeting

**Melton Mowbray ARS**  
Phil, G4LWB, 01664 567 972  
8 Christmas dinner  
21 Christmas raffle etc

**Nunsfield House ARG**  
Paul, G1SGZ, pr@nharg.org.uk  
3, 10, 17, 24, 31 Shack night  
6, 13, 20, 27 Club net, 8pm, 145.325MHz  
7 QSL Bureau, Ken, G3OCA & Stefan, 2E0VKM  
14 Committee meeting / shack night  
21 Mince pie evening  
28 Natter night

**RAF Waddington ARC**  
Bob, G3VCA, 0797 116 6250  
3, 10, 17, 24, 31 Club net, 8pm, 145.325MHz  
7, 28 Club night  
13 Christmas dinner  
21 First nibbles night



## REGION 3: NORTH WEST

In early October, **Furness ARS** put on a special station, GB9SL, to celebrate the life of Stan Laurel (of Laurel and Hardy fame) – arguably one of the area's most famous sons. The event was to help celebrate the 30th annual Oliver Hardy Festival in Harlem, Georgia, USA (the birthplace of Oliver Hardy). A team of American radio amateurs from the Amateur Radio Club of Columbia County made contact with Furness ARS to see if they would put on a companion station in the UK. What better location than the beautiful Gleaston Water Mill to use for this special event? It's just a few miles away from Stan's birth town of Ulverston, in South Cumbria. Furness ARS set up a hex beam antenna and their IC-7300 plus a club member's Elecraft linear for 400W output. Band conditions were not fantastic, but perseverance on both 20m and 30m resulted in QSOs from South America, North America and all over Europe. Best of all the team at GB9SL were able to make contact with the US team (W4O) in Georgia during the festival to pass messages to each other to celebrate Laurel and Hardy.



## REGION 5: WEST MIDLANDS

A Foundation licence course will be run by **Cheltenham ARA** over the weekend of 19 and 20 January 2019, followed by the exam on Sunday 27 January. For further details please contact Barry via [training@g5bk.uk](mailto:training@g5bk.uk)

Several hundred participants recently explored the thrills of undertaking a Mud Run on the Land Rover test tracks, based in the grounds of Eastnor Castle near Ledbury. RAYNET was asked to provide communications safety cover on the estate in association with the medical services due to the terrain and extremely poor mobile coverage. Despite various minor injuries and a few runners who completely got immersed in the 'swamp', all survived to tell the tale. The group is always looking for new members, and contact details can be found at [www.msvraynet.co.uk/](http://www.msvraynet.co.uk/)



## REGION 8: NORTHERN ISLAND

**Bangor & District ARS Rally** was very well attended last July. The door reported over 100 people through and trade was brisk. In addition they had an excellent demonstration of digital amateur television from Richard White, G14DOH, which can be transmitted and received on the 70cm band. The photograph below depicts Paul Abram, G16KJC (left) and David Best, M100BC (right) enjoying the event. Next meeting is on 6 December.



## REGION 11: SOUTH WEST & CHANNEL ISLES

**Torbay ARS'** monthly meeting started out with Jeff, the club chairman, welcoming everybody in Croatian, the native tongue of the subject that night – Nikola Tesla. Alec, G8GON showed a video of the life of Tesla who was born in 1856 in Croatia where he was educated. He showed a flair for inventions from a very early age and in 1884 he was asked by Eddison to work for him but he soon left. Working on his own he came up with over 700 inventions. His ultimate goal was to transmit electricity through the air, something that is still being experimented on today. Alec, ably assisted by his wife, displayed and explained in detail the Tesla machines, many of which he had built himself. The sparks certainly flew when the spark generated made a fluorescent tube glow with the plasma. Whilst the members sat spellbound, many ideas were shown culminating with two machines; one sending a spark two feet or so between two globes and the other playing music when the spark hit the air. A very enlightening evening for us all.

**Newquay & District ARS** will now be meeting on alternate Wednesdays rather than Thursdays. The venue and time, 7pm, remains the same: Treviglas Community College just off Porth Bean Road, TR7 3JA.

**Yeovil ARC** will be holding its 2nd Table Top Rally on 28 December in Sparkford Village Hall, Church Road, Sparkford, Somerset BA22 7JN. This is on the A303 north of Yeovil. There will be light refreshments available and the venue has adequate off road parking. Admission is £2 and doors are open 10am to 3pm. More from Bob Harris on 01963 440 167 or by email to [wjh069@gmail.co.uk](mailto:wjh069@gmail.co.uk)



An RT Systems  
Programming  
kit makes a  
great stocking  
stuffer... be  
sure to tell  
Santa.



*Happy  
Holidays!*

Sending Peace, Hope and Love  
for the New Year.

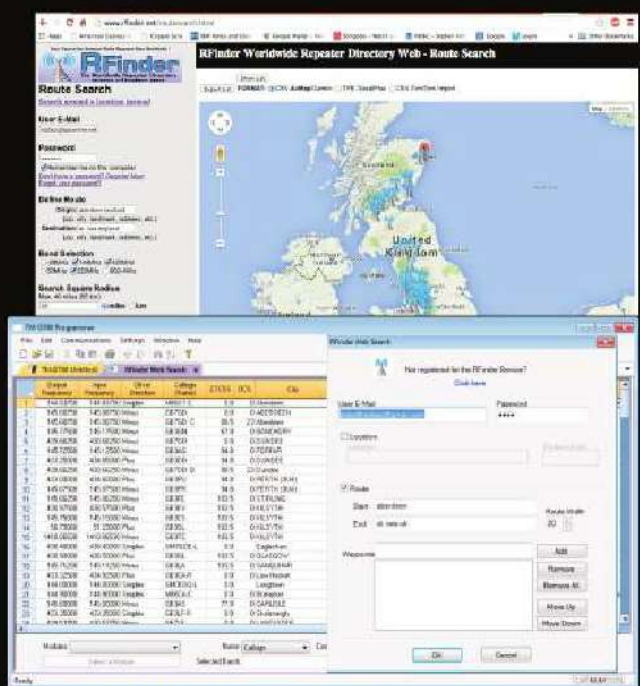
379  
366 unique radio Programmers...  
Check for your radio model at:  
[www.rtsystems.com](http://www.rtsystems.com)

rt SYSTEMS

# RFinder - The World Wide Repeater Directory

## The official repeater directory APP of RSGB!

RFinder - The World Wide Repeater Directory now finds repeaters over routes worldwide using RT Systems! Support RSGB by choosing RFinder as your repeater directory. Whether you use Android, iOS, Web, RT Systems, CHIRP or RadioBuddy, access 50.000+ repeaters in 170+ countries worldwide with just one annual subscription of only ~£10! Fully integrated with UKRepeaters and BrandMeister. Find RFinder in Google Play or The Apple App Store. If you don't have a smart device, subscribe at [www.rfinder.net](http://www.rfinder.net).



[www.rfinder.net](http://www.rfinder.net) - +44 (0) 1234 923 021 - +81 3457 95839 - +1 631 610 5120 - [w2cyk@rfinder.net](mailto:w2cyk@rfinder.net)



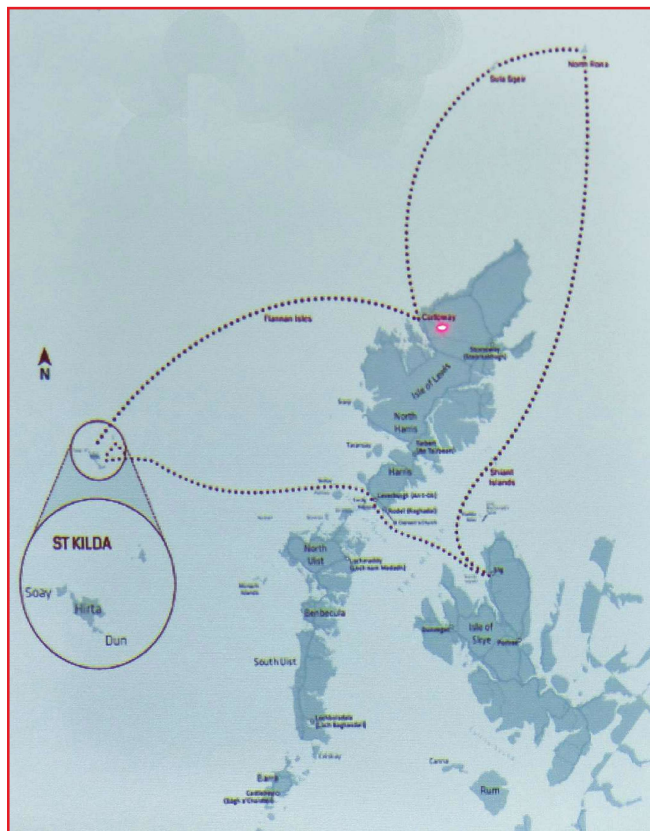
## REGION 12: EAST & EAST ANGLIA

**Cambridge & District ARC** entered the RSGB DX Contest on Sunday 7 October using the club's FT-2000, a DX Commander fan vertical and 140 foot doublet. G4AWP, G0LRD and G8CRB managed to activate GX2XV for the best part of 18 hours, making 110 QSOs.

The main September meeting of **Peterborough & District ARC** was a talk by club member, Derek G3KHZ, on his DXpedition to Bangladesh last year. The station was set on two rare islands, Bhala Island, IOTA AS-140 and St Martins Island, AS-127 respectively. Derek was accompanied by SM6CVX, G4EDG, DL6KWA. Local amateurs S21ED and S21TV helped with officialdom and local arrangements as well as taking part in the DXpedition. The two islands had not been activated for many years and the callsigns used were S21ZDC, S21ED and S21TV. Derek said the DXpedition was a huge success and he is grateful to all those involved. Details of the equipment used and contacts made can be found at <http://s21iota.weebly.com/> Derek's next DXpedition will be to Papua New Guinea in 2019.

Conveying a sense of enthusiasm is the key to any good talk – as demonstrated by club member Gary, M6GPM when he gave a presentation and demonstration of DMR at the October club meeting of Thurrock Acorns ARC. He brought two hand-helds and a hotspot connected to his mobile phone, from which those present were able to listen in to a conversation with a station from America in Grays, Essex. The hands-on demo was followed by a YouTube video covering the more technical aspects of Talk-Groups, Time Slots and Code Plugs. A useful encouragement into this aspect of the hobby.

What a year it has been for **Colchester Radio Amateurs**. A full monthly meeting calendar has included talks on remote operation, aircraft scatter, the internet, contesting and many other interesting subjects. The new assessors and trainers this year have also taught and, more importantly, successfully assisted many Foundation and Intermediate candidates through their exams, with only one person needing a retake. Another Fast Track Advanced course is in full flight. The club has also seen an increase in the number of people supporting the outside events, which take amateur radio to the public. Special event stations GB6WLB (raising awareness of the work that Walton and other Lifeboats do around the coastline) and GB6NT (to raise the awareness of Lighthouses & Lightships) were really well supported and saw a couple of new Foundation candidates. A field day for members only was held on one of the hottest days but still had many members set up in the farm field to either test their equipment or have a good old rag chew while the main CRA tent was set up to give a chance to operate on a larger setup. GOVHF/P was on site, which gave members a chance to see a top-flight contesting station in operation. The club has also been fortunate this year in attracting good media coverage with the surprise visits (organised by members of the committee) of the local radio station Dream 100 on their Sunday morning Quest program and Anglia Television doing a live broadcast during the ILLW weekend. This type of exposure was very positive for the club and amateur radio and it gave members a chance to check out Barry and Liana's equipment in the radio car. The committee is now gearing up for the season's festivities at the December meeting and planning next year's events.



John, G4LTH, Vice-Chair of Thurrock Acorns ARC, gave a presentation on his experiences of operating /P from remote islands in Scotland, starting and finishing at the Isle of Skye, including the Isle of Lewis and St Kilda. His objective was to activate rare squares for Worked All Britain (WAB) members. He used an Elecraft KS2 transceiver running 5W phone, a Spiderbeam aerial 51, model 404-UL and long lasting light-weight lithium ion battery that lasted all week on a single charge – after all, there is no mains to plug in for a top up.



**REGION 13: EAST MIDLANDS**

Jim, G0EJQ (RR13) and Graham, G8NWC (DR135) supported the Fishermen's mission special event station GB4RNF with RSGB promotional material and answering questions on the Society's role in amateur radio. The photo (right) shows the town Mayor sending her name in Morse, showing a big interest in disaster relief, highlighting that we provide communication support for many events, disasters not only in the UK but worldwide, and the recent flooding problems on the east coast and amateur radios involvement.



Spalding & District ARS supported the charity tandem bike ride from Whitby to Boston for The Fishermen's Mission, using GB4RNF raising awareness of the Fishermen's Mission and provide a fundraising opportunity to support vital work along the Yorkshire and Lincolnshire coasts. visitors to the event were able to learn of Amateur radio, send their name in Morse code, and take away promotional material of the club and RSGB.

**RF meter for low power using an Arduino and LCD, continued from page 77**

**PHOTO 3:** Picking up the +9V supply from the socket on the Arduino circuit board. Be careful not to use too much heat or you risk damaging the socket. It may be better to pick up the supply from where the terminal is soldered on the other side of the board.

**Websearch**

- [1] Design Notes, *RadCom*, May 2015
- [2] [www.sv1afn.com](http://www.sv1afn.com)
- [3] The many sources include [www.instructables.com/id/How-to-use-an-LCD-displays-Arduino-Tutorial/](http://www.instructables.com/id/How-to-use-an-LCD-displays-Arduino-Tutorial/) and [www.arduino.cc/en/Tutorial/HelloWorld](http://www.arduino.cc/en/Tutorial/HelloWorld) (amongst others)
- [4] [www.analog.com/media/en/technical-documentation/data-sheets/AD8307.pdf](http://www.analog.com/media/en/technical-documentation/data-sheets/AD8307.pdf)

**Arduino sketch**

The explanatory notes in red are not part of the Arduino sketch.

The lines of code down to `// power in` setup the Arduino so that it knows what it is connected to and on what pins to expect an input voltage

// include the library code:

`#include <LiquidCrystal.h>`

This tells the system that a liquid crystal display is connected

// initialize the library with the numbers of the interface pins

`LiquidCrystal lcd(12, 11, 5, 4, 3, 2);`

This tells the Arduino which pin numbers are connected to the display. I used the same pinout as the Starter Kit.

//pwr sensor stuff

`const int sensorpin = A0;`

Pin A0 is set to expect an input

`void setup() {`

// set up the number of columns and rows on the LCD

`lcd.begin(16, 2);`

// Print a message to the LCD.

Tells the Arduino that the display has 2 rows of 16 characters

`}`

`void loop() {`

// power in

`int sensorval = analogRead(sensorpin);`

Read the input from the AD8307 on A0 (which I have named sensorpin)

`float voltage = (sensorval/1024.0) * 5.0;`

Convert to 1024 levels referenced to 5V – which is the Arduino input voltage limit. So a 2.5 V input becomes 512 (half of 1024) etc. When divided by 1024 and multiplied by 5, this gets us back to 2.5 – so we now have the input voltage again.

`float pwr = ((voltage * 39) – 71.6;`

39 and 71.6 as discussed in the 'Calibration' section

`delay(1000);`

update the display every second

`lcd.setCursor(0,0);`

`lcd.print("Pwr ");`

`lcd.print(pwr, 1);`

`lcd.print("dBm");`

`lcd.setCursor(0,1);`

`}`

Print the results on the LCD along with the text



## 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 for Xiegu, TYT & Baofeng. HF & mobile transceivers, handhelds, 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)

### LINEAR AMP SWITCHING (PTT) CABLES

Faster, safer Tx/Rx switching for your amplifier. For all common transceivers from only £12.99 + postage. Multi-band VHF/UHF version for FT-847, FT-736R or TS-2000. Selected cables with opto-isolation. Buy direct from our web shop at [technofix.uk](http://technofix.uk) or [www.technofix.co.uk](http://www.technofix.co.uk)

**QRP CW X-TALS 60FF** - 3.55, 3.56, 7.02, 7.03, 21.06, 28.06MHz £2.55. 5.262MHz £1/unit Freepost UK. [vojako@gmail.com](mailto:vojako@gmail.com)

### DX COMMANDER MULTIBAND VERTICALS

Best price / performance of any commercial HF vertical. See [www.m0mcx.co.uk](http://www.m0mcx.co.uk) and check out DX Commander on YouTube. [qrz@m0mcx.co.uk](mailto:qrz@m0mcx.co.uk)

## Wanted

**VINTAGE RADIO & VALVES WANTED** national cash settlement for silent key, shack clearouts 07552 678725, [vintageradio@btinternet.com](mailto:vintageradio@btinternet.com)

## 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)

## Aerials

### MOCVO ANTENNAS

For quality HF Wire antennas, BALUNS, UNUNs, VHF/UHF base or mobile antennas, all made in England, for QRP to QRO. Also available accessories and kits for home builders. At a price to suit your pocket. [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

### NEW ANYTONE ATD868UV 2/70 DMR + ANA-

LOGUE handheld radio, 4000 channels, built in GPS. Multiple DMR ID's, inc charger, program lead, handbook etc £139.95, QYT KT8900D 2/70 25/20w mobile only £79.95 ea, Mirfield Electronics 07825549430 [www.mirfield-electronics.co.uk](http://www.mirfield-electronics.co.uk)

### HAMTENNA UK

Manufacturers of Antennas, Baluns, Ununs and suppliers of antenna wire and accessories. Checkout [www.Hamtenna.co.uk](http://www.Hamtenna.co.uk)

### COMMERCIAL BALUNS

Professionally made commercial baluns and matching transformers, multicore Mil spec, resin potted, IP68, custom made by Geoff Brown G4ICD. [www.rfcomms.co.uk](http://www.rfcomms.co.uk)

### PRO ANTENNAS

Christmas deals for the acclaimed I-Pro Home. I-Pro Traveller and Dual Beam Pro. Visit [www.proantennas.co.uk](http://www.proantennas.co.uk) for details.

## 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 0730-0830 on 3.747 MHz +/- QRM and, again, at 14.00-15.00 on 7.147 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 UK Local times. 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

## Cards & Design

### LOW COST AND HIGH QUALITY QSL CARDS

By LZ1JZ QSL PRINT [www.LZ1JZ.com](http://www.LZ1JZ.com)

## Computer Software

### SD CONTEST LOGGER, €10 - EI5DI.COM

Fast efficient logging and rig-control for Windows, Linux and Raspberry Pi.

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)



# This year's HOG ROAST takes place on Saturday December 1st!

Now in its 29th year, Martin & his gang put on a show in store offering unprintable prices across their product range. Representatives from Yaesu, Icom, Kenwood, BHi, RSGB and more are on site with the FAMOUS HOG ROAST kindly sponsored by Icom & Kenwood. Doors open at 8am and close at 4pm.

**Martin Lynch & Sons Ltd.** Wessex House, Drake Avenue, Staines, Middlesex TW18 2AP.  
Tel: 0345 2300 599 E-mail: [sales@hamradio.co.uk](mailto:sales@hamradio.co.uk) Web: [www.HamRadio.co.uk](http://www.HamRadio.co.uk)

## 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)

*We are passionate about Radio*

**WWW.KW-ELECTRONICS.COM**

*Visit our web site and become a member*

**COMMUNICATIONS LTD**

**USED EQUIPMENT WANTED**

**[www.g3rcq.com](http://www.g3rcq.com)**

**RIGOL**

**WWW.RIGOL-UK.CO.UK**

**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 MW0JZE on - 01554 785 002

**UK'S MOST EXPERIENCED SERVICE CENTRE**

**Castle Electronics**

Unit 2 Village Workshops, Talerddig Road,  
Llanerfyl, Nr Welshpool, Powys, SY21 0AS

We have a comprehensive workshop, fully equipped with modern radio test sets and spectrum analysers, along with 25 years experience in all the main manufacturers.

**Telephone/ Fax 01938 820880**  
PLEASE RING US FOR YOUR SERVICE & REPAIR NEEDS

**BALINCO ICOM YAESU KENWOOD**

**Begali Keys** The Sound of CW

**Begali Keys**

[www.feritf.com](http://www.feritf.com) [www.radioworld.co.uk](http://www.radioworld.co.uk)  
ITALY UNITED KINGDOM

**Rig Expert**

**www.mixw.co.uk**

80m ARDF receiver

NEW  
FoxRex-3500 ARDF rx  
FoxRex-144 ARDF rx  
RigExpert AA-1400  
RigExpert AA-1000  
RigExpert AA-600  
RigExpert AA-230zoom  
RigExpert AA-55zoom  
RigExpert AA-35zoom  
RigExpert TI-5000  
RigExpert TI-8  
RigExpert Tiny

for commercial radio  
Antenna analyzer till 1400 MHz  
Antennas  
Cavity duplexer

[mixw@mixw.co.uk](mailto:mixw@mixw.co.uk)  
Tel: 0208 591 2527  
KIMM UK Limited  
OFFICIAL DISTRIBUTOR UK & EUROPE

## Advertisers Index

Anton Koval MWOEDX	67
bhi	47
Hammond Enclosures	75
ICOM UK Ltd	33
JVC Kenwood	73
KMK Ltd	93
LAM Communications	99
Martin Lynch & Sons	2, 3, 4, 49, 50 51, 52, 53, 92, 100
Moonraker	28, 29
Nevada	59, 60, 61
Peak Electronics	25
Radioworld	68, 69
RFinder	89
RF Parts Company	75
RT Systems Inc	89
RSGB	9, 13, 23, 41, 74, 75, 79
SDR-kits	67
SDRplay	75
SOTabeams	25
Upshot UK Ltd	75
W2IHY Technologies	75
Waters & Stanton	35, 36, 37, 38, 39
Yaesu UK Ltd	17, 85

To Advertise in

**RadCom**

the UK's Premier  
Amateur Radio Journal, Call

**danby advertising**  
on 01603 898678  
or email [adsales@rsqb.org.uk](mailto:adsales@rsqb.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://see.tinyurl.com/MemAdsInfo)). Please note we can no longer accept ads by post or phone.

## FOR SALE



**EDDYSTONE 668(?)**, circular loudspeaker, 7" diameter case, black crackle finish, matches Eddystone 640/740 sets. Microwave Modules Morse Talker MMS1, portable Morse tutor, 2-20 wpm, key socket, instructions and diagram, good condx, working order. Each item £50, carriage extra or collect. Carl, G3XGK, 01502 564 160, [carl.langley@talktalk.net](mailto:carl.langley@talktalk.net) (Lowestoft, Suffolk).



**ENHANCED VISION MERLIN DESKTOP MAGNIFIER** for reading/viewing pictures with impaired sight, macular degeneration, etc. Extremely flexible user modes. Like new with stand, one third of new price for quick sale, £500. Can deliver and demonstrate for cost of fuel. Steve, G0FUW, [g0fuw@tiscali.co.uk](mailto:g0fuw@tiscali.co.uk) (Bath).

**HEATHKIT IO-12U OSCILLOSCOPE** for spares. Mains transformer missing. Offers. Buyer collects. Richard, G0FXIm, 0117 963 6981 (Bristol).



**HF TRI-BAND ANTENNA**, Force 12 C-3SS 6-ele Yagi, 10, 15 & 20m. All parts refurbished ready for assembly. 20m elements linear-loaded, small footprint, very robust antenna with easy

on-mast mounting, £450. See reviews online. Transport to be agreed, or collect. Tony, G3KAG, 01335 324 393, [g3kagston@yahoo.co.uk](mailto:g3kagston@yahoo.co.uk) (Roston, Derbyshire).

**ICOM IC-706 MKIIG**, almost mint condition and fully working. Smoke free environment. 160m – 70cm (not 4m), DSP. Complete with microphone, power lead, manual and original carton. £500. Andrew Thomas, G8GNI, 0771 471 5300, [g8gni@outlook.com](mailto:g8gni@outlook.com) (Bicester, Oxon).

**KENWOOD TR-751E**, 2m multimode, GWO, £275 ono. Yaesu FTM-3200D, FM/C4FM, GWO, £125 ono. Yaesu FT-7800 2/70 FM, GWO, with YSK 7800 sep kit, £125 ono. MICROSET RV 45 2m all mode linear, GWO, £75 ono. Contact John, GONAJ, 0161 304 9327, [john.gonaj@btinternet.com](mailto:john.gonaj@btinternet.com) (nr Manchester).

**microHAM microKEYER II** including DB37 cable for Elecraft K3; DB37 cable for Yaesu FT-1000MP; iLINK cable and microphone RJ45 – Foster 8 adapter cable. Excellent condition. £185 including insured delivery. Ian, G3YUZ, 01202 767 001, [i.c.wilson@open.ac.uk](mailto:i.c.wilson@open.ac.uk) (Bournemouth, Dorset).

**PALSTAR ZM30** antenna analyser, £150. KK7UQ IMD meter for PSK, £40. Elecraft N-gen wideband noise generator, £20. Elecraft DL1 20W dummy load, £5. P&P extra at cost, or collect. Chris, MOPSK, 01568 610 186, [chrism0psk@gmail.com](mailto:chrism0psk@gmail.com) (Leominster).



**QTH DESIRABLE VILLAGE SETTING**, fields on three sides, low QRM. 3 bedroom detached bungalow, garage/workshop, garden shed, greenhouse. 2 bathrooms, lounge, large sunroom. Nearby school, medical centre, pub. Antennas optional! £245k negotiable. Email for photos & details. David, VK3DBD, 0797 441 4419 (SMS best), [david.g3scd@gmail.com](mailto:david.g3scd@gmail.com) (nr Horncastle, Lincs).

**RETIRING BARGAINS** due to my great age. FT-120DX with Watson voltage source, £475. CP6 vertical antenna with wall brackets, £125. FT-101ZD, £115. FL-2100B linear, £105. Spare valves with latter two and all with manuals. Cash only please. Harold, G3DZS, 01805 628 045, [glynisnweinand@gmail.com](mailto:glynisnweinand@gmail.com) (Devon).

**SDRplay RSP2** software defined radio receiver. Bought new earlier this year. Complete with USB cable and antenna connector. £130 inc p&p (Cost £165). John, G3EGC, 01204 301 502, [jvhoban@gmail.com](mailto:jvhoban@gmail.com) (Bolton).

**SILENT KEY SALE** (ex G4IZI). Yaesu FT-897 HF/VHF/UHF transceiver, £450. Hunter 750 linear amplifier, £500. Heathkit Decade Resistance Box, £10. CT212 signal generator, £15. VHF/UHF coaxial wave meter, £10. S Tompsett, G8LYB, 01788 578 940, [stephen@tompsett.net](mailto:stephen@tompsett.net) (Rugby).

**SK SALE** on behalf of GOETA: SG230 Smarttuner in excellent condition and working order. Hardly used, manual and boxed,



£275 post paid. Unused 2m 7-ele ZL-Special antenna from Moonraker. Original price £69.95, going for £40 + postage. Photos on request. Rob, G2BKZ, 0798 636 7537, [rob\\_g2bkz@talktalk.net](mailto:rob_g2bkz@talktalk.net) (Stevenage, Herts).

**SK SALE.** Kenwood TM-D700E, £150. Kenwood TM-G707E, £100. LDG Z817 auto ATU, £50. Signalink USB interface, £55. DV access port dongle and Shark open spot, £45. Icom ID-31E UHF h/held, no charger, £95. Miracle Whip portable antenna, £50. Chris, GORDK, [g1puvg0rdk@gmail.com](mailto:g1puvg0rdk@gmail.com) (Kingsgrove, Staffs).

**SWL SK.** JRC NRD549 Rx, £450 ono. TRIO 9R-59DS, £100. RACAL RA-17 rack mount Rx, £50. All good working condition. Buyer collects, or might be able to arrange collection in Paisley area. Stuart, GM4MTI, 01631 562 843, [dsm.spence@btinternet.com](mailto:dsm.spence@btinternet.com) (Oban).

**TENNAMAST 12m** plus tower with quad and G-1000DXC rotator. Three bedroom house and 1 bedroom gite with income or granny flat. Attached barn/garage. Very quiet location, 140m ASL in the beautiful Vienne department of South West France. Much reduced: £169,950. John Bell, F5VHC, 0033 (0) 5 4987 0544, [john.f5vhc@gmail.com](mailto:john.f5vhc@gmail.com) (Le Magnou, 86700 Romagne, La Vienne, France, JN06DG).

**YAESU FT-221R** multimode 2m transceiver. Good working order and condition. Fitted MuTek front end board plus 11 fixed channel xtals. Includes microphone, power leads and original boxes. £195. Collection, or carriage £25. Mike, G4OQG, 01249 443 037, [g4oqg@hotmail.co.uk](mailto:g4oqg@hotmail.co.uk) (Wiltshire).

**YAESU FT-450D HF/50MHz TRANSCEIVER.** Owned from new, hardly used and in good condition. Comes complete with manual, MH31 microphone, Sharron switch mode sm23 PSU, AC & DC leads, £450. No split, no offers. Buyer inspects and collects. Mick Down, G4ALR, 07851 670 629, [michaeldown95@icloud.com](mailto:michaeldown95@icloud.com) (Hitchin, Herts).

**YAESU FT-450D TRANSCEIVER.** Excellent condition. Little use and as receiver only. Boxed with manual and microphone, £395. Icom IC-R6 handheld wideband receiver, vgc, 0.1-1300MHz. 1300 memories. Box, manual and mains adapter, £95. Collection or insured postage at cost. Neil, 2E0EDG, 01472 399 830, [neil.chamberlain@btinternet.com](mailto:neil.chamberlain@btinternet.com) (NE Lincs).

**YAESU FT-817ND HF/VHF/UHF QRP** transceiver, mic, DC lead, charger, instruction manual. New battery pack. Full working order, £295. Doug, G8KOM, 01628 822 453, [satmobile@hotmail.com](mailto:satmobile@hotmail.com) (Reading, Berkshire).

## WANTED



**DAIWA CNA-2002** for spares. It is the cross needle meter that is needed. The ATU does NOT need to be working. Robert Coombes, G4ZEJ, 0773 473 4504, [g4zej@btinternet.com](mailto:g4zej@btinternet.com) (Horsham, West Sussex).

## SILENT KEYS

We regret to record the passing of the following Members.

Name, callsign	Date
Mr G C Hulme, GODLK	19/09/2018
Mr A S Pemberton, GONGH	8/2018
Mr S J Cockshoot, G1WWR	20/10/2018
Mr A D Patterson OBE, G13KYP	10/10/2018
Mr B M Johnson, G3LOX	04/07/218
Mr P J Groves, G3MWQ	10/2018
Mr I A Balloch, GM3UTQ	28/09/2018
Mr J Crabbe, G3WFM	18/10/2018
Mr J K Harding, G3XFL	9/2018
Mr R J Stacey, G4XQW	8/2018
M G P Parry, G7OSR	29/8/2018
Mr K Rothwell, G8EAP	07/09/2018
Mr G Stoddart, MMOGTG	10/2018
Mrs G H Wiles, M3GHJ	22/08/2018
Mr C J Dodd, VK6DV	03/10/2018

To notify us that a Member has passed away, email details to [sales@rsgb.org.uk](mailto:sales@rsgb.org.uk) or phone 01234 832 700, option 1. This will ensure that their Membership will be ended properly and that they appear in the Silent Keys list. We need to know the name, callsign and date of death.

Please note that Ofcom must be informed separately, on 0207 981 3131 – we are not permitted to pass on details on your behalf.

GELOSO VFO 4/104 with plastic dial, also high impedance microphone. Brendan, EI4BB, 00 353 87 250 8651, ei4bb@yahoo.ie (Dublin).

ICOM IC-2KL in clean working condition to complete vintage line up. Cash bank transfer or PayPal waiting. Can pick up or cover courier cost. Joe, MOAJO, axe.man@aol.co.uk (Watford, Herts).

QSL CARDS – silent key clear-out or just not wanted – please don't throw them away. I collect QSL cards for historic interest and research. Any date but prior to 1970 preferred. Can collect or arrange collection. Tony, G4UZN, AQuest1263@btinternet.com (Leeds).

RADIO MAST: wind-up, 30ft or more. Ted, G4MOV, 01621 853794, e.durey@sky.com (Essex).

SHELDON HANDS ELECTRONICS and Wood & Douglas – do you have any unbuilt, unfinished or even completed kits gathering dust in a cupboard

## SPECIAL EVENT STATIONS

No special event information had been received at the time this page was sent to press, but if any does arrive we will publish it on the RSGB website RadCom pages.

RSGB will do its best to publicise your special event and its callsign, but you must help us to help you. On the back of Ofcom's Special Event Station NoV application form there is a Data Protection section. Unless you specifically tick the Yes box, Ofcom cannot tell RSGB about your event, which means it won't appear here, on GB2RS, or on the RSGB website. (If you don't tick either box, it's automatically assumed to be 'no'). So please tick Yes!

Please also send advance publicity information about your special event to [radcom@rsgb.org.uk](mailto:radcom@rsgb.org.uk) so we can feature it in Club Calendar, the News pages and/or other parts of RadCom, the Newsletter and on the RSGB website.

or loft? If you do, please get in touch. Simon, M5P00, [simon@m5poo.co.uk](mailto:simon@m5poo.co.uk), 0786 089 2222 (Corbridge).

TEN-TEC ARGONAUT V transceiver in working condition. Will arrange courier if needed. Bob, MMORKT, 0754 748 3232, [mmOrkt@gmx.com](mailto:mmOrkt@gmx.com) (Hamilton, nr Glasgow).

TRANSMISSION LINE TRANSFORMER HANDBOOK by Amidon. Borrow or buy copy please. All costs met. W J Ricketts, G8LJO, 0785 445 5345 (Salisbury).

YAESU FRG-7 Rx in good condition; Drake TR4CW in v good order; Drake R4C Rx; JRC515 Rx; all from non-smoking home please. Ilan, GOUUT, [elanpaim@icloud.com](mailto:elanpaim@icloud.com) (Norfolk).

## HELPLINES

Seagulls and magpies are damaging my scaffold pole-mounted Cobweb antenna. There are 'scarers' on the market based on a flying facsimile of a kestrel etc but all involve raising another pole, above roof height, contravening my local planning restrictions. If anybody has a similar problem how did you tackle it, without using a separate pole? Any help appreciated. Paul, G3SVZ, [paul.laxton@blueyonder.co.uk](mailto:paul.laxton@blueyonder.co.uk) (Plymouth).

## RALLIES &amp; EVENTS



Members of the RSGB Regional Team will be present at the rallies this month marked with an RSGB diamond.

If your rally or event is not listed here, PLEASE SEND US FULL INFORMATION by email to [radcom@rsgb.org.uk](mailto:radcom@rsgb.org.uk)

## 1 DECEMBER 2018 SOUTH LANCASHIRE ARC WINTER RALLY

Bickershaw Village Community Club, Bickershaw Lane, Bickershaw, Wigan WN2 5TE.

Attractions include trade stands, a Bring & Buy, special interest groups, car parking, disabled facilities, catering and a licensed bar. Admission is £2.50, doors open at 9am (traders 7.30am). Jason, G0IZR, 01942 735 828.

## 28 DECEMBER 2018 YEOVIL ARC Table-top Rally

Sparkford village hall, Church Rd, Sparkford, Somerset BA22 7JN (on the A303 north of Yeovil). Off road parking, 10 tables, light refreshments, wheelchair friendly. £2 admission. 10am till 3pm. Bob Harris, G8UED, 01963 440167, [wjh069@gmail.com](mailto:wjh069@gmail.com).

29-30 DECEMBER 2018  
HAMFEST INDIA  
In association with REVA University, Bangalore. The largest gathering and festival of amateur radio operators in India. [[www.hamfestindia2018.com](http://www.hamfestindia2018.com)].

2019  
24 Feb – Rainham Radio Rally  
3 Mar – Exeter Radio & Electronics Rally  
17 Mar – Wythall Radio Club Hamfest  
24 Mar – Hamzilla Radio Fest & Electronics Fair  
24 Mar – Callington Radio Rally  
28 Apr – NARSA exhibition (Blackpool Rally)  
9 Jun – Junction 28 Radio Rally  
16 Jun – West of England Radio Rally  
28 Jul – Wiltshire Radio Rally & Electronics Fair

NOW IS THE TIME TO TELL US ABOUT  
YOUR 2019 RALLY – email details to  
[radcom@rsgb.org.uk](mailto:radcom@rsgb.org.uk) TODAY

## RSGB Convention 2018 continued from page 64

A few components were dropped onto the floor but none were lost in the carpet. One builder ran into difficulty and the problem was eventually traced to a faulty battery snap, a couple of solder joints had to be reworked and one builder managed to get one of the three integrated circuits in upside down; all fairly normal stuff for any Buildathon! The finished kits were set up using a frequency counter and an oscilloscope and demonstrated in use with a homebrew SSB transceiver. The newer licence holders were pleased to see the modulation patterns described in the training manuals actually happening in real life.

Once the build was under way an excellent buffet was served so the builders did not starve. Everyone left very happy, having learned something and having a great little kit to use afterwards. One of the builders said "This was just what I needed, someone to take me through the process and show me how to use SMD. I have been putting off for a long time but I now feel confident to give it a go."

Thanks to the RSGB Legacy Fund the workshop was filmed and the intention is to make a video available to clubs to encourage others to give SMD a try – it's not as scary as you think!

## Raffle prizes

The three main raffle prizes were donated by Icom UK, Kenwood UK and Yaesu UK – an Icom IC-7300; Kenwood TH-D74E and Yaesu FT-818ND respectively. Two of the winners were at the Convention to receive their prizes – and were popular winners too. Victor Brand, G3JNB won the Yaesu radio and said, "I have been in the RSGB since 1953 and attended HF Conventions since the days of High Wycombe this is the first time I have come up with one of the major prizes in raffle. Everything comes to he who waits!" The Icom radio was won by Peter Day, G3PHO. The Kenwood radio prize was presented separately.

And the raffle was the final event of the weekend, a successful one at that. Thank you to all those who filled out the questionnaire, the points raised will be taken into consideration when planning next year's event.



An ISS contact was completed at the Convention.



# HF F-Layer Propagation Predictions for December 2018

Compiled by Gwyn Williams, G4FKH

## RadCom

**NOTICES TO READERS.** © Radio Society of Great Britain, 2018. 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 erection 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.



Time (UTC)	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
*** Europe								
Moscow	998...	58899	64754574457	5666	2642	32	11	
*** Asia								
Yakutsk	55	6666	5					
Tokyo		5	4					
Singapore		54	4	3				
Hyderabad	5	5	4	3				
Tel Aviv	88	7888	7763	5445	3332	1		
*** Oceania								
Wellington		6664	454	3				
Well (ZL) (LP)								
Perth		5	4	23	2			
Sydney		55	454	34	2			
Melbourne (LP)			4	3				
Honolulu		4						
Honolulu (LP)								
W. Samoa		55	4					
*** Africa								
Mauritius		5						
Johannesburg	55	55	5.5					
Ibadan	7775	777	7.65	543.4	2444	322		
Nairobi	66	554	5556	3	23			
Canary Isles	8887	889	78775	45.65445.534				
*** S. America								
Buenos Aires	5	4.5	4					
Rio de Janeiro	6	5.6	5					
Lima	6		4	3	2			
Caracas		5.54						
*** N. America								
Guatemala		5						
New Orleans				3				
Washington	6765	56	3.3	3				
Quebec	7766	56	33	4	2			
Anchorage	5	5						
Vancouver	5555		3					
San Francisco		4						
San Fran (LP)								

**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. The predicted smoothed sunspot numbers for December, January 2019 & February 2019 are respectively (SIDC classical method – Waldmeier's standard) 3, 2 & 2 and (combined method) 2, 3 & 4. The provisional mean sunspot number for October was 4.9. The daily maximum / minimum numbers were 26 on 13 October and 0 on 5-10, 16, 18-20, 22-31 October.

## THE VHF & UHF BANDS

David Taylor, GM8ARV

In reply to Colin Topping's suggestion for more VHF and UHF activity, I cannot see it being sensible for the RSGB to devote any resources to this when hand-held transceivers are already available for £20 (analogue) or £70 (digital). With digital, world-wide contacts are easily made, which might encourage an interest in HF activity too. If a kit is needed, why not something that either isn't available commercially, expensive commercially, or something that might be more educational – SWR bridge perhaps?

But please, don't re-invent the wheel, and no return to fixed crystal-controlled (and off-frequency) channels!

Robert West, GM4GUF

You asked for feedback on the letter from Colin, GM6HGW. The suggestion is that we have yet another 2m FM radio as a project when what we really need is an SSB/CW/FT8 capable one.

I think that clubs running courses generally are not introducing new blood to the VHF bands. There is an over obsession with HF, particularly contesting. VHF runs the risk of dying because if someone uses a poor handheld on VHF they are likely to get bored and give it up. There is so much more to VHF than just a couple of FM channels. How about a dedicated 2m portable small SSB/CW radio, with modern design it must be possible, I wish I had that knowledge to design one.

If we actively encourage those with capability to not just look for DX on VHF but come and work folk in the far corners of the UK, then the bands will stay alive. Look north for some of those contacts too, we are there. If we don't encourage VHF activity generally then those in the extremities of the UK will end up with no-one to work.

Finally you may ask what I am doing to help. Well, I am making and giving out free antennas to new licensees as long as they promise to try and work me. So far it's working, so that's a start. How about an amnesty for all the old antennas kicking about in the back of garages and unused equipment that will never be used – get it out there and ask some of your local operators if they would like to try VHF.

## A BIG THANK YOU

Bill Jones, MOYAV

I would like to thank Yaesu UK for the fantastic prize that I was lucky enough to win at this year's National Hamfest. I would also like to extend my thanks to everyone concerned and for the generosity of everyone who donated the prizes.

I must apologise for not being there to accept the prize but my wife, Linda, 2EOYBL, has recently had a knee replacement and needed to get home after a long day.

Once again, thank you. The prizes will be a very welcome addition to the shack.

See page 11 of this edition of RadCom to see more about the winners at the National Hamfest – Ed.

## UNDERSTANDING THE LICENCE TERMS

Alaric, RS319253

I am currently studying for my Foundation licence, and I note that section 11(4) of the licence terms as issued by Ofcom forbid the transmission of messages 'for general reception' other than CQ calls, discussion in nets, and 'Messages transmitted via a mailbox or bulletin board for reception by Amateurs'.

This leads me to wonder how WSPR and APRS transmissions are permitted.

According to <https://aprs.fi/>, the UK is teeming with APRS transmissions seemingly 'for general reception'. Does the existence of digipeaters mean that the 'mailbox or bulletin board' case applies here?

However, WSPR transmissions don't seem to fit any of those cases, even weakly!

From what I have seen so far, amateur radio is dominated by well-intentioned people, and cooperation on the bands seems to be mainly down to people simply being considerate. Would I be right in inferring that, in practice, some of Ofcom's regulations are overlooked as long as no harm is done?

*WSPR can be considered to be a form of specific personal beacon transmission, so Schedule 2 of the Licence also has a bearing. A key issue is that to keep the right side of the line it should also be attended. We do occasionally receive proposals for full general unattended usage and GB3xxx Beacon NoVs can cover such requests if you are a Full License holder.*

*Whilst WSPR NoVs are rare, APRS, which has message relay and exchange, is a clearer area and ETCC regularly process NoVs for it (usually on 144.800MHz). See [www.ukrepeater.net](http://www.ukrepeater.net) Murray, G6JYB, Chair, Spectrum Forum*

## WORKSHOP WAS WORTH IT

Bob Whelan, G3PJT

I attended the GNU Radio (SDR) Workshop organised by John, G4BAO, Heather, MOHMO and Derek Kozel that took place before the RSGB Convention started in earnest. This was a truly outstanding workshop on how to use some of the latest radio design techniques typified by GNU Radio. It was one of the best and most interesting workshops I have ever attended. I understand that the RSGB Legacy Committee gave its financial support to ensure that this forward thinking, next generation event could go ahead. When my own-designed software GNU Radio received its first SSB signal yesterday morning it was a bit like the feeling I experienced when my first crystal set burst into life all those years ago. Thank you.

## IN PRAISE OF THE FMACS

Helen Melhuish, MOTMD

The stated intention of the FM Activity Contests is to attract newcomers to 'get a feel for contesting'. This certainly worked for me. Starting out with my Foundation licence, these contests have actively driven me to work portable, to build and modify my own antennas, to improve my operating and

to learn about the process of contesting. Now with a Full licence, I still enjoy working friendly regulars and newcomers alike, and each month there are usually new stations to speak to. I have often read comments from new participants, including Foundation and Intermediate licensees, saying how much they enjoyed the contest. I have had such enjoyment from these one hour challenges that I accepted the role of Contest Manager for BYLARA ([bylara.org.uk](http://bylara.org.uk)) this year, and regularly share my portable contesting adventures with members through our newsletter.

I think the idea of organised FM activity is a good thing. 4m is often 'quiet', for example, but as new equipment becomes available, more stations are looking for opportunities to use the band. Whilst some people decry the lack of FMAC entrants, I feel that to have a core of experienced participants is essential to encourage new operators. To dive straight into the often fast and furious SSB contests can be daunting and sometimes discouraging, especially to the inexperienced operator. The FMACs are actually competitive, although some appear not to treat them seriously, just 'popping on before the proper UKAC' – the points are still appreciated.

We suffer/enjoy the challenges of location, propagation, station setup and weather, just like anybody else.

I am extremely disappointed to learn that, rather than promoting and encouraging participation in the FMACs, the RSGB Contest Committee plans to 'terminate' them for 2019 in favour of proposed MGM contests. For myself, as a very busy self-employed wife and mother I'm unlikely to be able to take part in 'proper', lengthy SSB contests on a regular basis, certainly not as often as the FMACs. MGMs don't interest me at the moment, and I don't think MGM contests would have attracted me as a new licensee, either.

So, thank you for the FMACs – I will miss taking part – and thanks especially to all the stations that have encouraged us newcomers. I'm sad that others wanting to get started in contesting won't have the same opportunity.

*I'm really glad that you have found the FMACs an enjoyable introduction into contesting, and that they work for you. Our consultation exercise on rules for next year is the chance for the committee to test its ideas with the whole contesting community and to get feedback like yours. We also had a really good discussion about this topic in the forum at the RSGB Convention. As a result of that feedback and what we have seen in the written responses to the consultation, we are now looking to maintain the busiest FMACs, as well as running some MGM contests. I hope this provides the best of both worlds and that you'll be able to continue to enjoy the FMACs in 2019.*

Andy Cook, G4PIQ

Chair VHF Contest Committee

## PIRATING MY CALLSIGN

Steve Chapman, M6USB

My callsign, M6USB, is being used throughout



Letters published in 'The Last Word' do not necessarily reflect RSGB policy. 'Last Word' letters may be emailed 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.

Wiltshire by several people who are using it to chat to each other as well as other people. I have been on contact with Ofcom about this issue and they advised me to contact the RSGB to report this misuse of my callsign and have it monitored to avoid continued misuse. This misuse has been taking place on GB3WH only.

*This kind of issue is best reported to our new Operating Advisory Service, via [oas@rsgb.org.uk](mailto:oas@rsgb.org.uk). I would welcome volunteers from around the country to help with this service. For more information, please contact me via [Philip.Willis@rsgb.org.uk](mailto:Philip.Willis@rsgb.org.uk)*  
**Philip Willis, RSGB Board**

## AMATEUR RADIO SPECTRUM POLLUTION

**Carl Langley, G3XGK**

During the late 90s much research work was performed by BT Labs' Copper Access Group to design VDSL network systems for future UK deployment, including research on the effects of VDSL line transmissions (Egress) on amateur radio reception [1].

This, together with other international research, led to the formation of a specification by the European Telecommunications Standards Institute (ETSI) under TS101 270-2 [2] and in 2005 in the ITU-T G993.2 VDSL2 specification [3]. Both of these documents mention protecting the HF amateur radio bands from spectrum pollution by emissions from VDSL. The ITU-T G993 documents lists the international HF amateur bands to be protected as 160m to 10m; 60m is not shown.

The protection is by 'masking' or notching the VDSL Tx power by 20dB within the HF amateur bands. BT Labs even fought for this 20dB notching to be included in the ITU-T/ETSI specifications [4]. This level would reduce the Tx power of VDSL2 line signal in the HF amateur radio bands to 1% of that being used elsewhere in the VDSL2 HF line spectrum. For around 95% or more of those amateurs affected now, this would place the VDSL2 jamming noise below their current noise floor, ie they would not be aware of VDSL2 jamming any more.

In the ETSI TS101 270-2 spec page 27 it is stated that avoidance of emissions in the amateur radio bands is Mandatory. VDSL2 in the UK normally covers from 138kHz to 17.664MHz, shown in ITU-T Plan998 ADE17. So 'notching' would only be required in five amateur radio bands: 160, 80, 40, 30 and 20m.

Surly it cannot be asking too much for BT Openreach to comply with this Mandatory requirement, and in particular since it was BT itself who fought for VDSL2 protection notching in the first place?

[1] K T Foster and D L Standley, *A preliminary experimental study of the RF emissions from dropwires carrying pseudo-VDSL signals and the subjective effect on a nearby Amateur radio listener*, ANSI T1E1 4/96-165, April 1996

[2] ETSI TS101 270-2

[3] ITU-T G993.2 VDSL2 Specification

[4] VDSL and the Radio Spectrum workshop, K T Foster, BT Exact presentation, January 2001, DTI Conference centre, London, slide 3.

*There is a mandatory requirement in the VDSL2 specification to support notching of up to 16 arbitrary bands. However it is up to the operator to specify the notches to be applied. The amateur radio bands are given in the standard as examples of frequencies to be notched. These vary by region and I think it's clear that the intent was that the operator is supposed to apply the correct notches for their region. However this is not explicitly stated in the standard.*

*The following extracts from the VDSL2 specification Rec. ITU-T G.993.2 (01/2015) mention notches (which are otherwise referred to as stop bands). See <https://www.itu.int/rec/T-REC-G.993.2> for the full 420 page text. The wording in previous xDSL standards is very similar concerning notches.*

### 1 Scope

A requirement for downstream and upstream transmitters to notch, simultaneously, 16 arbitrary operator-defined RFI bands;

#### 7.2.1.2 Egress control

*VDSL2 transmitters shall be able to reduce the PSD of the transmitted signal to a level below -80dBm/Hz in 16 arbitrary frequency bands simultaneously. An example list of frequency bands (the amateur radio bands) is shown in Table 7-1. The value of -80dBm/Hz shall be accounted for in the determination of MREFMASK (see Tables 7-3 through 7-5).*

**Table 7-1 – Amateur radio bands**

Band start (kHz)	Band stop (kHz)
1 800	2 000
3 500	4 000
7 000	7 300
10 100	10 150
14 000	14 350
18 068	18 168
21 000	21 450
24 890	24 990
28 000	29 700

*The specific RFI bands to be notched are configured in the CO-MIB by the operator and set during the ITU-T G.994.1 handshake phase of initialization (see clause 12.3.2).*

*The egress control parameters specified in [ITU-T G.997.1] are the start and stop frequencies of each frequency band in which the transmit PSD shall be reduced to a level below -80 dBm/Hz. The PSD slopes forming the notch are vendor discretionary.*

### 10.4.1 Data subcarriers

*(Text describing the carriers omitted)*

*NOTE – The subcarriers used for data transmission depend on channel characteristics, such as loop attenuation and noise, and on the specific requirements on the PSD of the transmit signal, such as notching of amateur radio bands, PSD reduction at low frequencies to share the loop with POTS or ISDN, and others.*

**Dr Martin Sachs**

**EMC Committee Chair**



## KIRKWALL WIRELESS MUSEUM

**Tony Skaife, G4XIV**

Last month I was able to visit the Wireless Museum in Kirkwall when our cruise liner stopped for the day. The museum is small but packed with radios from a crystal set (working) to a wind up receiver. The photo shows me, G4XIV, with an R1155 receiver and above it the T1154 transmitter from an RAF Lancaster bomber of WW2 vintage. Other old radios, too many to mention, are on display also. When I mentioned I was an amateur, a QSL card was handed to me and, because the volunteer curator heard my Morse on their practice oscillator, an additional certificate was furnished. If you are in the area I would recommend you immerse yourself in radio nostalgia I don't think you'll be disappointed.

## HEARING DOGS

**Terry Rooves, G3RKF**

Some readers may remember me mentioning Connie, the Hearing Dog my wife, Caroline, and I train. Part of the training means the dog has to get used to different situations and we try and provide a wide variety. One involves visiting the North Cheshire Radio Club to get Connie, the Hearing Dog, the opportunity to deal with different people and sounds. Connie arrived after an FT8 presentation by Terry, G3RKF, with a break for a drink and a slice of cake. Not exactly the Great Radio Club Bake Off, but we do bake a very good cake. The club has complete radio stations for HF, VHF and UHF for all modes. RAE tuition is available complemented, as appropriate, by hands-on station operation.



MY FAVOURITE HAM STORE IN THE WORLD



WWW.HAMRADIO-SHOP.CO.UK | SALES@HAMRADIO-SHOP.CO.UK

**WANTED**  
**GOOD**  
**QUALITY**  
**USED GEAR**

**WE ALSO PART EXCHANGE**

**CALL OUR**

**TRADE IN HOTLINE TODAY:**

**01226 361700**

ICOM KENWOOD **YAESU** Hytera Uniden       

5 DONCASTER ROAD, BARNLEY, SOUTH YORKSHIRE S70 1TH

**RADCOM RIGCHEQUE OFFER**

GET A £10.00 **RIGCHEQUE** WHEN YOU FINANCE  
A KENWOOD, ICOM OR YAESU RADIO WITH LAMCO

**POWERED BY V12 FINANCE**

 **Retail Finance**