RadCom

Radio Society of Great Britain
Advancing amateur radio since 1913

C6APY DXpedition

Testing WSPRlite in the field

0617

June 2017 ◆ Volume 93 ◆ Number 06 ◆ £4.95

NO.1 FOR ACCESSORIES

JUST THE DOBBY! ZEROTECH DOBBY-S

IN STOCK, ONLY £329.95

A small Wi-Fi (2.4/5GHz) quadcopter, controlled via your Android or Apple IOS phone, that can lift-off from your hand and land back safely. 1080p 13mp built in video/stills camera and so easy to fly in or outdoors. Brilliantly engineered and small enough to fit in your pocket. Even the rotator arms fold back in to the body when not in use!

ZEROTECH

Click! www.HamRadio.co.uk/dobby

ML&S ARE THE OFFICIAL UK IMPORTER FOR HEIL SOUND

Pro-Set 7	£249.95
Pro-Set 6	£139.95
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	£194.95
PR-40 Microphone	£299.95

Click! www.HamRadio.co.uk/heil

POWER SUPPLIES

Two-year warranty on all MyDEL PSUs

MyDEL MP-30SW1V £89.95

25Amps, 9-15V DC, super light with digital metering for Volts & Amps.

Click! www.HamRadio.co.uk/mydelmp30

MyDEL MP-50SW111

50 Amp DC power supply £125.00

50 Amp version of the MP-30SW1V.

Click! www.HamRadio.co.uk/mydelmp50

MyDEL MP-304MKII £99.95

Heavy Duty LINEAR 30Amp

Non-switching linear power supply with huge chassis mounted transformer (old style!)

Click! www.HamRadio.co.uk/mydelmp304

New! Nifty Desk-top Stand Holder for Icom ID-5100. Only £29.95

Daiwa Meters

All featuring cross needle display offering unrivalled accuracy for SWR & Power

Click! www.HamRadio.co.uk/daiwa

NEW Diawa meters in stock now.
CN-901, GFCN-501, CN-901.
See web for more info.

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-801HP	1.8-200MHz. 20/200/2kW. PEP Reading. Large display	£119.95
CN-801HP3	1.8-200MHz. 30/300/3kW. PEP Reading. Large display	£139.95
CN-801VN	140-525MHz. 20/200W. N-Type	£121.95

Messi & Paoloni

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

M&P ULTRAFLEX 13 "MOON INTERCEPTOR" COAX CABLE

Straight from their factory in Italy comes the new very high grade low loss coaxial-cable specifically designed for HF/V/U high power amplifiers and moon-bounce operation. New improved dielectric design with low attenuation even at 10GHz. Full copper 19-wire strand construction means you can use around the rotator without risk of fracture.

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

MyDEL-SF-401PLUS

MyDEL

Handheld frequency counter with a difference. 100MHz-3GHz & displays your CTCSS & DCS codes.

RRP £44.95
Special Offer £39.95

Click! www.HamRadio.co.uk/sf401plus

DX ACCESSORIES

ARRAY SOLUTIONS

For more information, prices & technical information email MicroHam@HamRadio.uk

microHAM

For the complete range of Array Solutions and microHAM

Click! www.HamRadio.co.uk/arraysolutions or /microham

TIGERTRONICS SL-USB

Tigertronics

ONLY £119.95
WITH FREE LEAD

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

Cable included - see web.

Click! www.HamRadio.co.uk/tigertronics

MORSE KEYS

CG-PK4 Pocket Keyer

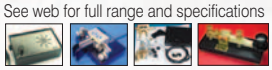
CG Antenna introduce the new pocket Electronic Memory Keyer.

Only £44.95

- 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

KENT MORSE KEYS

See web for full range and specifications



Kent Morse Practice Oscillator.	£31.95
Kent Twin Paddle Key.	£114.95
Kent Twin Paddle Key Kit.	£98.95
Kent Hand Key.	£99.95
Kent Hand Key Kit.	£86.95
Kent Single Paddle Key.	£95.95
Kent Single Paddle Key Kit.	£94.95
Kent KT-1 Professional.	£109.95
Kent Vail Lever Correspondent Replica.	£219.95

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.

RADIOSPORT

RS1OSL
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..... £129.95

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

TOUCH PADDLES

BASICOMM

Click! www.HamRadio.co.uk/basicom

MyDEL COAX SWITCHES

CO-201	COAXIAL SWITCH 2-WAY COAX SWITCH SO-239. 500W MAX	SPECIAL OFFER £19.95
CO-201N	2-WAY COAX SWITCH. N-TYPE SOCKETS. 500W MAX	SPECIAL OFFER £21.95
CO-201AM	2-WAY DELUXE HEAVY DUTY COAX SWITCH SO-239 1KW	SPECIAL OFFER £32.95
CO-201AN	2-WAY DELUXE HEAVY DUTY COAX SWITCH N-TYPE 1KW	SPECIAL OFFER £33.95
CO-301M	2-WAY DELUXE HEAVY DUTY COAX SWITCH 1KW	SPECIAL OFFER £39.95
CO-301N	2-WAY DELUXE HEAVY DUTY COAX SWITCH N-TYPE 1KW	SPECIAL OFFER £40.95

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**

DPD

Contents

June 2017

News and Reports

Regulars

Reviews

42

61

Technical Features

Features

Cover image:
Rob Chipperfield, M0VFC, hard at work on the C6APY DXpedition

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

Managing Editor: Elaine Richards, G4LFM, elaine.richards@rsgb.org.uk
Technical Editor: Giles Read, G1MFG, giles.read@rsgb.org.uk
Layout and Design: Kevin Williams, M6CYB, 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

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 July edition of *RadCom* is expected to arrive with most Members by 24 June, although this can take up to a week longer in some cases; international deliveries can take longer still.**

The online *RadCom* is at www.rsgb.org/radcom/
RadCom Plus is available to RSGB Members online at www.rsgb.org/radcom-plus
Abbreviations and acronyms we use are listed at http://tinyurl.com/RC-acronyms
RadCom Basics for Members new to the hobby can be found at www.rsgb.org/radcom-basics/

The RSGB is on Twitter @theRSGB

Find us on Facebook at www.facebook.com/theRSGB

RSGB AGM

A brief record of the 2017 AGM, held in Cardiff on 22 April, is available at http://rsgb.org/main/about-us/agm-2017/

At the meeting, Sara McGarvey, 2I0SSW, was elected to the RSGB Board of Directors. Steve Hartley, G0FUW, stood down as Chairman but has been co-opted by the Board to oversee YOTA 2017 and the introduction of our new Strategy, which was launched at the AGM.

Graham Murchie, G4FSG, was elected by the Board as their Chairman.

The Board also appointed Stephen Purser, G4SHF as Company Secretary.

Mick Senior, G4EFO was also re-elected as Regional Manager for Region 10.

New RSGB Honorary Vice President

We're delighted to announce that Peter Blair OBE, G3LTF has been elected by the Board as Honorary Vice-President, the highest award the Society can bestow.

Peter Blair is a distinguished engineer who spent 45 years in research and development in the UK electronics industry. From a student apprenticeship at Marconi's Wireless Telegraph Company, in 1962 he joined Standard Telecommunication Laboratories where he established the Defence Systems Laboratory. In 1985 he moved to Racal and managed their central R&D operation, Racal Research. His professional work has covered a very wide range including Gunn diodes, microwave links, radiating cable, GPS receivers, radar phased array antennas, adaptive antennas, signal processing and airborne satcom.

At his retirement in 2000, Peter Blair was Technical Director of Racal Defence Electronics, a Fellow of the Royal Academy of Engineering, a Fellow of the IET and a Chartered Engineer. In 1996 he was awarded the OBE for his contributions to British engineering, and in 1998, an Honorary Doctorate by the University of Surrey. After retirement he continued as a trustee / director of the Smallpeice Trust and the Arkwright Scholarship Trust, both of which are focused on encouraging young people into a career in engineering. Peter has encouraged Arkwright students to engage in amateur radio and, in recent years, an annual visit to the NRC at Bletchley Park has involved students taking the Foundation Exam.

Meanwhile, over those same years Peter was forging an equally strong 'career' within amateur radio. He has not only been consistently at the forefront of amateur radio technology but has also communicated his enthusiasm and expertise to others, becoming an inspiration to over three generations of radio amateurs.

In 1964, G3LTF was the first UK amateur to pioneer earth-moon-earth (moonbounce) communications. The 50th anniversary of this achievement was celebrated on GB2RS and RadCom in 2014.

Peter is respected highly by the world-wide moonbounce community for his consistent activity across the years and for the development of advanced techniques for moonbounce communication on our microwave bands. He has published many articles, particularly encouraging home construction of advanced UHF and microwave equipment, and has inspired audiences at many RSGB conventions from the mid-1960s to the most recent in 2016 (at the age of 80).

Satellite navigation systems were an example where the crossover between Peter Blair's professional and amateur expertise has been greatly to our advantage of amateur radio. In 2004 he was an Expert Witness (along with Professor Sir Martin Sweeting, G3YJO) to a House of Commons Select Committee. Meanwhile, as G3LTF, he also wrote a briefing paper demonstrating that the potential for interference to satellite navigation from terrestrial amateur radio is small. G3LTF's paper has since proved instrumental in defending our 23cm amateur band within the CEPT countries.

RSGB Board meeting

The RSGB Board met in March, details of which can be found on the RSGB website. Matters of particular interest to Members include Youngsters on the Air (YOTA). The Board very pleased to see so many Clubs and individual Members getting behind the event to take place in August at Gilwell Park. Of course, more support is always welcome, see www.rsgb.org/yota

The Strategy Consultation exercise was very useful, showing very strong support for the draft with a few amendments included based on Member feedback. The document was launched at the AGM and can be read at http://rsgb.org/main/about-us/board-of-directors/rsgb-strategy/

Finally, the terms of reference has been agreed so the Innovations Working Group will start work soon.

60m news

The following 60m news comes from the Branch Manager / Senior Inspector Dutch Caribbean, Agentschap Telecom in Bonaire: Recently Agentschap Telecom (AT) has updated the frequency plan for **Bonaire**, **Sint Eustatius** and **Saba** with the addition of the 60 metre band (5351.5 - 5366.5kHz) for amateur radio, this with a secondary status. This means that the band may be operated by A, B or C amateurs (full licence). The band has footnote 5.133B that limits the power in the Caribbean region of the Kingdom of the Netherlands to 25 watts EIRP (effective isotropic radiated power).

The **Malta** Communications Authority – the island's telecomms regulator – published its new National Frequency Plan (NFP) in April 2017. This includes the new WRC-15 60m amateur secondary allocation of 5351.5 to 5366.5kHz. Maximum power permitted is 15W EIRP.

Following AN Resolution No 10789-Telco of 21 December 21 2016, that appeared in the Official Gazette No 28185-A of 27 December 2016, the National Authority for Public Services (ASEP) of the **Republic of Panama** published their 2016 National Frequency Plan that contained the WRC-15 amateur secondary allocation of 5351.5 – 5366.5kHz.

Amateurs in **the United Arab Emirates** (UAE) have access to 60m. The UAE National Frequency Plan published by the national regulator, TRA – The Telecommunications Regulatory Authority, shows the WRC-15 Secondary allocation of 5351.5 to 5366.5kHz together with ITU footnote 5.133B that indicates that the maximum power permitted is 15W EIRP.

Contest trophy presentations

At the recent Blackpool Rally, Board member Len Paget, GM0ONX (left) presented two contest trophies to Lothains Radio Society. The Martlesham Trophy for VHF Field Day – winners, Restricted Section and the Cockenzie Quaich for VHF Field Day – Leading resident Scottish station – Restricted Section.

RSGB Club insurance

Affiliated club insurance has now been renewed for the year 30 April 2017 to 29 April 2018. Affiliated clubs can go to www.rsgb.org/main/clubs/club-insurance to download your certificate; please note your Membership Services login is required. Policy information will be posted to the website. Please note that this year we have changed our brokers to CaSE Insurance. Cover remains the same as in previous years but our insurer is now Aviva.

Contest report update

RSGB President, Nick Henwood, G3RWF, gave a short report at the AGM in April that can be listened to via the audio links on the AGM 2017 page on the RSGB website. The fuller written report and recommendations was prepared for the Board. It can be seen at https://thersgb.org/publications/committees/contest/reports/170503-contest-report-update.pdf

NRC volunteers sought

The RSGB is seeking additional volunteers to help with the staffing of the National Radio Centre (NRC) at Bletchley Park near Milton Keynes. As a volunteer at NRC you will enjoy the benefits provided by Bletchley Park for all its volunteers and have the satisfaction of helping to run one of the leading radio communications display areas in Europe.

We seek people living within reasonable travelling distance of Bletchley Park, who are confident HF radio operators, who are prepared to adopt the 'house style' of operating, and are comfortable representing amateur radio and radio communications to members of the public visiting the facility. You should be willing to offer one day per fortnight to this role—more if you can.

Please apply in the first instance to nrc.support@rsgb.org.uk or contact gm.dept@rsgb.org.uk to discuss the role

Help amateur radio youth activity by becoming a YOTA 2017 Supporter Today!

www.rsgb.org/yotasupporter

VHF Contesting scoring

At the QSL bureau we know only too well that many QRZ.com entries and information provided to the RSGB database is less than current. For us, checking the QSL information at QRZ.com or on our lists is frequently frustrated by neglected or out of date details and email addresses. This is particularly true for clubs that hold several callsigns, sometimes with multiple addresses, QSL routes, call holders and contact details. The problems usually stem from changes of club QSL manager over time, or where different club members hold calls at different addresses on behalf of the club, listing them only as their own call, on line and/or at the RSGB database. Every day cards arrive here as MX, GS or MC cards that cannot be easily confirmed as belonging to affiliated clubs. Simply changing a QRZ entry to read, *"QSL via Bureau or Direct to address above"* leaving out a manager/owners 'via' call sign avoids this issue. Please remember – time spent investigating your cards delays everyone's cards.

Following last month's appeal for a volunteer to manage the newly formed G4T-Z series, we have already received a number of enquiries. At the time of press no decision has been made and there is still time to email your interest to qsl@rsgb.org.uk. We hope to make an announcement next month,

Finally, we are looking for amusing, interesting or just plain brilliant examples of QSL cards for possible inclusion in next year's RSGB Yearbook, or for display purposes. This may be your own card or one you have received. If you think it may be of interest to others, please send a high resolution .jpeg image to the bureau, qsl@rsgb.org.uk If we decide to use the card, you will need to provide a permission to publish.

TX Factor

TX Factor is a series of HD TV shows dedicated entirely to amateur radio. Launched in February 2014, the episodes have been viewed over 200,000 times. Presenters explore the history of amateur radio, rigs, antennas, operating modes, propagation, sport radio, training, club news, RSGB news, world news – in fact, anything and everything! It is a professionally produced programme presented by radio amateurs for radio amateurs.

In the next episode, Mike Marsh, G1IAR will be trying out the WSPR Lite in the next episode of TX Factor, the only TV Show dedicated to all things radio. Not having a lot of real estate for antenna erection Mike uses a vertical on HF and it seems to work ok, but he is keen to find out exactly how well it performs and which directions and bands it favours. The results are quite surprising!

TX Factor Episode 16 will be available to view from 19 May at www.txfactor.co.uk and is sponsored by the Radio Society of Great Britain and ML&S.

Club of the Year Regional results

The Regional Club of the Year winners were announced at the recent RSGB AGM. The national competition winners will be decided by the Board and the top three small and large clubs will be invited to attend the presentation at the National Hamfest in Newark in September. The RSGB would like to thank Waters and Stanton for their continued support of the competition.

National Club Of The Year
Principal Sponsors
WATERS & STANTON

Region	Small club	Large club
1	*	Cockenzie & Port Seton ARC
2	Caithness ARS	*
3	*	Stockport RS
4	*	Wearside Electronics ARS
5	Staffordshire Portable ARC	Telford & DARS
6	Meirion ARC	*
7	Barry ARS	*
8	Lough Erne ARC	Mid-Ulster ARC
9	*	The Radio Society of Harrow
10	Chertsey RC	Hilderstone R&E Club
11	South Bristol ARC	Poldhu ARC
12	Norfolk Coast ARS	Loughton and Epping Forest ARS
13	South Kesteven ARS	Worksop ARS

* No entries received/awarded

President joins Dorking & District RS

Dorking and District Radio Society (DDRS) held its 70th anniversary lunch on 29 April at Denbies Wine Estate, Dorking, Surrey. Over fifty guests sat down to an excellent lunch including the RSGB President, Nick Henwood, G3RWF and Simon Ling, vice chairman of Mole Valley District Council.

Club chairman, John Kelly, opened his address by saying that the club was formed in 1947 by four recently licenced amateurs. In February 1950 the Club became a member of the Radio Society of Great Britain and holds two callsigns, G3CZU and G7DOR. Most of the members are licenced operators, operating on HF and VHF using voice, Morse and the more recently developed digital modes. Short Wave Listeners and anyone with an interest in electronics or computer sciences is welcome.

Congratulations

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

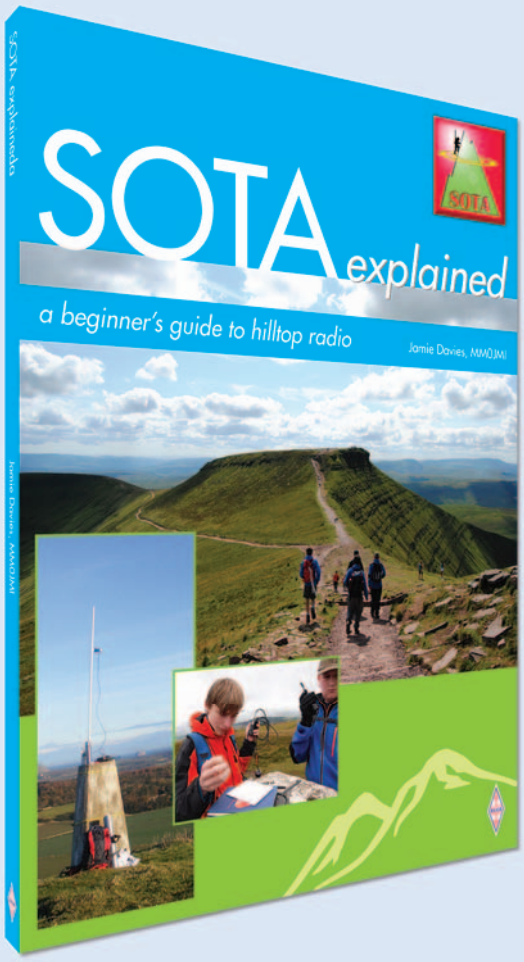
70 years
Mr J D Heys, G3BDQ
Mr G A Couzens, G3NTA
Mr R A Bravery, G3SKI
Mr A Bolton, G3BMI

60 years
Mr M Harrison, G3HKH
Mr D E Waller, G3SUL
Mr F L Wiseman, G3GRY

50 years
Mr C Smith, G3UFS
Mr P C F Dowles, G3VNP
Mr J D Heck, G3WGM
Mr J H Quarmby, G3XDY
Mr C J Coward, G3YTU
Mr R G Mason, G4YPG

Honour Roll

In the February issue we published the Honour Roll of continuous Membership up to 31 December 2016. Unfortunately there was an error and Mr C J Dodd, VK6DV was missed from the 51 year listing. He has been a Member since 1965: our apologies for this oversight.



NEW TITLE

SOTA Explained

A beginner's guide to hilltop radio

By Jamie Davies, MM0JMI

Summits on the Air (SOTA), is one of fastest developing award schemes that have come into existence in recent years. For the active hillwalker and the home based chaser of summits alike this programme offers endless fascination. *SOTA Explained* sets out to provide the essential guide to this programme, hilltop radio and much more besides.

Taking a portable radio station into the hills and operating from a summit is a fascinating and rewarding way to combine the very best aspects of walking and of amateur radio. SOTA activity is also inexpensive providing the opportunity to achieve a great deal in amateur radio. Many appreciate the freedom this sort of operation offers and the benefits of having an elevated radio station far from urban electrical interference. At altitude even modest sets can deliver astonishing performance: communication across the country and across the continent is routinely available and on many days mountain-to-mountain conversations flow across the world.

SOTA Explained provides advice for those who do not venture on to the hills but still want to participate in SOTA. There is a whole chapter dedicated to 'chasers' from the bands to choose, how propagation affects your operation, chasing DX stations and rare SOTA activations. Not only does *SOTA Explained* detail how SOTA works but there is advice on safe hillwalking, setting up simple & cheap SOTA stations and modes of operation. There is technical advice on improving your first station, the antennas to choose and how to run SOTA stations on HF.

The book is not just for those new to SOTA but the more experienced operator will find much of use too. *SOTA Explained* provides the ideal guide to the SOTA scheme and making hilltop operation easy, social, & fun.

Be warned: after reading this book, you will never see a hilltop in the same way again.

Size: 174 x 240mm, 160 pages
ISBN: 9781 9101 9336 5
Non Members' Price: £12.99
RSGB Members' Price: £11.04

Also available on amazonkindle

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

Beacon and repeater insurance

Beacon and repeater insurance has now been renewed for the year 30 April to 29 April 2018. The premium for this year remains at £10 and you may renew on the RSGB shop at rsgbshop.org/acatalog/Online_Catalogue_Insurance_34.html – please allow a couple of days after renewal for your certificate to be dispatched.

Please note that this year we have changed our brokers to CaSE Insurance. Cover remains the same as in previous years but our insurer is now Aviva.

RSGB Convention 2017

The RSGB Convention will take place at Kent's Hill Park Training and Conference Centre (Swallow House, Timbold Drive, Kents Hill Park, Milton Keynes, Buckinghamshire MK7 6BZ). The dates of the event are 13 to 15 October. There will be five streams of lectures and forums.

Some lectures have already been confirmed and these include: A talk about the current status of FUNcube satellites in orbit, upcoming launches and future satellites with Wouter Weggelaar, PA3WEG and members the FUNcube Team. Remote Amateur Stations: the next generation will look at how technology might support a remote club amateur radio station. John Regnault, G4SWX will review both the regulatory and today's technical issues highlighting some of the pitfalls. An 11-man team was active from Botswana as A25UK in April and May with five QRO stations; we'll hear more about this DXpedition from Tony Bettley, G4LDL. Dr Colin Forsyth from the Mullard Space Science Laboratory will return to the Convention this year with another of his fascinating talks on how space weather affects radio signals. On the technical side, Andy Talbot, G4JNT will be talking about his Third Method narrowband direct upconverter for the LF/MF, which has become a popular read in *RadCom Plus* and earned him the prestigious RSGB Wortley-Talbot trophy.

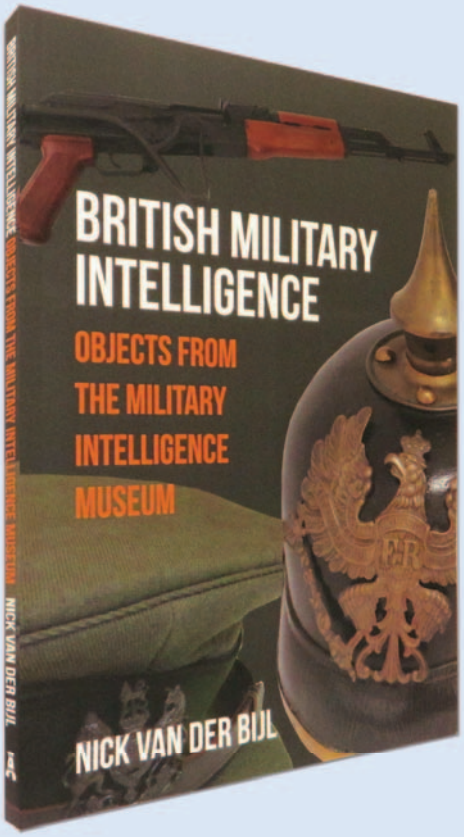
The RSGB would like to welcome to the RSGB family the following new Members who have joined their voice to ours and are helping to keep the RSGB strong.

Mr M Keilty, 2E0AAN
Mr K Hale, 2E0KHI
Mr P Newbery, 2E0OMO
Mr J Campion, 2E0VWL
Mr P Fletcher, 2E1BUV
Mr S Ittner, DO5CO
Mr J Abbruscato, G0AOH
Mr R J Blackmoore, G0CYN
Mr S Vickery, G0FXM
Mr B Hallard, G1YMW
Mr M Herring, G3VHU
Mr A Scott-Green, G4GWR
Mr S Stephens, G4SDM
Mr D Shipman, G7UZP
Mr M Obrien, K0MYW
Mr C Dudey, K4CFD
Mr P Williams, KG4NSC
Mr A Eby, KI7G
Mr P Aasvangen, LA4WIA
Mr A Trzepietowski, M0HWI
Mr A Grffiths, M0IGX
Mr O von stein, M0IHA
Quantum AR & TS, M0ORM
Mr S O'Gorman, M1CRN
Mr P Norman, M3PHR
Mr C Ogidih, M6HHW
Mr D Jones, M6HXB
Dr D Horner, M6ITC
Mr M Whitaker, M6ITS
Mr D Oliver, M6IWH
Mr D Gilbertson, M6IWI
Mr C Hargrave, M6IWO
Mr K Boone, M6KXB
Mr S Taylor, M6LPY
Mr R Churchill, M6RTC
Mrs S Ray, M6SUA
Mr S Goring, M6VSG
Mr M Roach, M6XLT
Mr E Smith, M6XVM
Mr R Lloyd, M6YHW
Mr C Ashe, MI0IHH
Mr S B Gibson, MI6HHX
Mr A Dorman, MI6IOQ
Mr S S Hamilton, MI6TSH
Mr D McBain, MM0IGO
Professor G Woan, MM0WOA
Mr R Fletcher, MM3ZRF
Mr D Pounder, MM6VDP
Mr D K Jones, MW0IBT
Mr M Simons, MW6IOZ
Miss E Rowlands, MW6PYS
Mr W Thomas, MW6WPB
Hartlepool ARC, MX0IDZ
Mr J Kelly, N7BF
Mr G O'Gorman, RS307402
Mr S Boyce, RS309795
Mr D Batty, RS311303
Mr K Niendorf, RS312015
Mr G Bertie, RS312190
Mr I Vass, RS312362
Mr M Brookes, RS312451
Mrs K Lowe, RS312476
Mr N Vafiadis, RS312486
Mr A Cutler, RS312514
Mr F Mancktelow, RS312518
Mr J Smith, RS312534
Mr J K Slyne, RS312609
Mrs J O'Gorman, RS312635
Miss E O'Gorman, RS312636
Dr R Pediani, RS312640
Mr I , RS312648
Mr J Whyte, RS312687
Mr M Cox, RS312688
Mr R Greaves, RS312698
Mr T Hill, RS312700
Mr J Greene, RS312701
Mr C Ring, RS312704
Mr G Harrop, RS312711
Mr R Dargahi, W9TVX
Mr J Southam, ZL2UGL

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

Mr G Jones, 2E0GGO
Mrs S Hallam, 2E0RGN
Mr D Moore, 2E0XLG
Mr J Brown, 2M0JHN
Mr RM Higgins, 2W0RZL
Mr M F Warrington, G0HIO
Mr S A Ratcliffe, G0IUA
Mr A Walker, G0WDA
Mr J C Hyde G1NML
Mr T P Rawlance, G4MVN
Mr S W Heath, G6MTE
Mr A Evans, G6SJD
Mr S Birchall, G7JHU
Mr R Ray, G8CUB
Mr R Hallam, G8JGU
Mr W R Hoskins, G8SND
Mr D H Kinrade, GD4EBA
Mr D Ross, GM0IQD
Mr I W Roberts, GW0IJY
Mr B Clowes, GW4HBZ
Mr I Williams, GW4MEI
Mr R Ramirez, K0WFS
Mr J Crangle, M0BLI
Mr B Farrington, M0CFZ
Mr P D Halton, M0HPD
Mr PJW Holland, M0JAD
Mr C Cowen, M0TBZ
Mr A Glenn, M0VOX
Mr D Edwards, M1ARL
Mr K Jowett, M1KDJ
Mr D M Scott, M3UWE
Mr J M Cullen, M3WSE
Mr G Thatcher-Sharp, M3YAE
Mr D Ward, M6DWW
Master K Bates-Wilson, M6YZA
Mr J Brown, N4EO
Mr D Eaton, N7QS
Mr L Brannen, ND4XE
Mr S Stevens, RS307214
Mr C Rodriguez, SM0KCO
Mr T A Kazancioglu, TA1HZ

NEW TITLE



British Military Intelligence

Objects from the Military Intelligence Museum

By Nick van Der Bijl

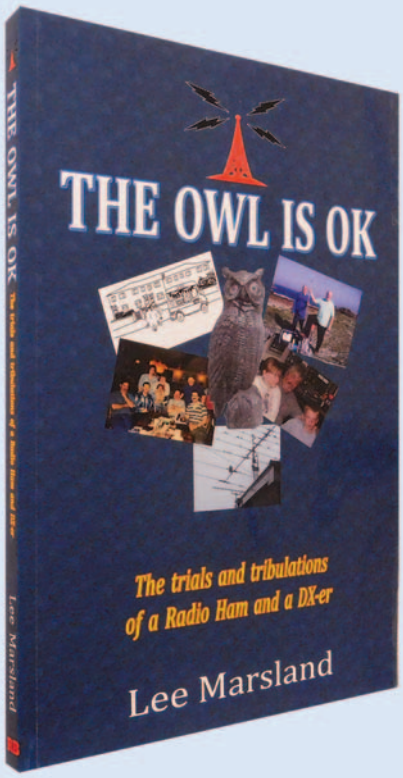
One of the little known museums of the UK is the Military Intelligence Museum at Chicksands in Bedfordshire. This museum provides a huge insight into British intelligence activity since Wellington's time and this new book provides a unique look at its fascinating collection.

Through a mix of medals, photographs and documents, the book tells the story of British military intelligence across the years. This collection includes a Boer War photographic stereoscope and uniforms worn by intelligence officers and other ranks during the First World War. Among the Second World War objects, are a highest gallantry medal awarded to a British officer by France, items that belonged to a founder of the Long Range Desert Group, an example of a pigeon coop used to deliver pigeons in Occupied Europe, a chess set used by captured Special Operations Executive operatives in Buchenwald concentration camp and copies of forged rations coupons dropped into Germany as part of Psychological Warfare Executive operations.

There are over 180 photographs and illustrations included and the varied nature of these objects illuminates a feature of British military operations that is rarely discussed, despite having been frequently proven to be crucial to their success. *British Military Intelligence* provides a great read and is thoroughly recommended to anyone interested in the UK's clandestine history.

Size: 165 x 234mm, 96 pages
ISBN: 9781 4456 6238 1
Non Members' Price: £14.99
RSGB Members' Price: £11.24

25% OFF



The Owl is OK

The trials and tribulations of a Radio Ham and a DX-er

By Lee Marsland, G0DBE

For over 30 years Lee Marsland has been a licensed radio amateur. In that time and in 'his own words', there have been plenty of 'trials and tribulations'. Lee brings to this book a light hearted look at how his hobby has become more of a way of life that defines him today.

Lee describes from his first experiences taking the Radio Amateurs Examination run by the City & Guilds through how he gained his Morse certificate, set up his stations, erected towers and even in more recent times encouraged his grandchildren to take and pass their own amateur radio examinations. The book is full of humorous anecdotes from Lee's life including the tale of the title that concerns RSPCA officer taking Lee to task about cruelty to his owl despite it being made of plastic. This book covers a great deal and there is even a chapter titled 'purple rain' that describes the advisability of putting a 57 foot antenna over the wife's washing line. There are the more usual descriptions of Lee's DX activity and the whole book is illustrated with cartoons and images.

Lee has written this book in an easy to read style that really brings over his Liverpool heritage. His tale of becoming a radio amateur and its challenges is a great read that provides many a chuckle.

Size: 150 x 229mm, 180 pages,
ISBN: 9781 9101 93372
Non Members' Price: £9.99,
RSGB Members' Price: £8.49

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

GB3HG repeater management

York Radio Club has taken over management of the GB3HG repeater. Output is 145.625MHz with the input at -600kHz and a CTCSS of 88.5Hz. The new repeater keeper is Arthur, G8IMZ who can be contacted via the York Radio Club website (www.yorkradioclub.uk/). The group would like to thank Harrogate Repeater Group for all their hard work with this repeater in the past.

Special event stations

Burnham Beeches Radio Club celebrates its 80th birthday this year. As part of the celebrations, a special event station, GB80BB, will be active on the weekend of 24/25 June. The station is being put on in collaboration with the Corporation of London at the historic Burnham Beeches woodland, located approximately 25 miles west of Central London (nearest postcode SL2 3LB). Planned interactive activities for the public involve direction finding and Morse decoding. There will be an exhibition of amateur satellite communications, historical radio equipment and an operational historic station.

On 4 June, Coventry Amateur Radio Society will be supporting Youth Aviation Day with GB4YAD at The Gliding Centre, Husbands Bosworth Airfield, Husbands Bosworth, Leicestershire LE17 6JJ.

Leicester Radio Society will be running GB0APS at Abbey Pumping Station for the museum's Leicester Vintage Festival as part of International Museums on the Air on 24 and 25 June. For anyone interested in visiting the Festival, it takes place at Corporation Road, Leicester LE4 5PX and admission is £3.50.

Mid Ulster ARC will have a demonstration station at Lurgan Agricultural Show on 3 June from 9am to 5pm. The event takes place at Lurgan Park, Windsor Avenue, Lurgan BT67 9BG.

South Essex Amateur Radio Society will be operating from The Bay Museum (Western Esplanade, Canvey Island SS8 0AY) on 18 June for Museums on the Air, and to commemorate the anniversary of the two B17s that crashed at Canvey Point in 1944. Visitors are always welcome to attend but, for various reasons, are not allowed operate their own radio equipment.

South Essex Amateur Radio Society will be attending the Paddocks Community Centre, Long Road, Canvey Island, Essex SS8 0JA for Armed Forces Day on 24 June. This year's exhibition will be WW2 based including Morse demonstrations with a display of Morse keys that the public can use, videos of aircraft and ships that used radio during the wars and information on wartime spy radios, plus a display of radios in use today, promoting amateur radio.

Shoreham National Coastwatch Institution (NCI) is involved in Lookout on the Air on 3 and 4 June. The NCI is near Shoreham Beach car park, postcode BN43 5HY. The event it to mark the work of coastal communities and GB1SCW will be operating between 11am and 4pm in the Lookout compound. Due to its beach location, access for the disabled is restricted. Shoreham Fort is also open for visitors.

Dedicated Flex display

ML&S has fitted a new dedicated Flex Radio SDR display cabinet in to their showroom. Along with Yaesu Icom & Kenwood, Martin Lynch thought it only right that Flex Radio should have their own dedicated illuminated display. When the owner of Flex, Gerald Youngblood, visited recently, he thought so too.

Unusual library

Situated in Wageningen (The Netherlands) is a circuit diagram and service manual library. This library as been active for more than 25 years now and contains more than ten thousand diagrams and service manuals ranging from simple radio amateur projects to complex commercially built equipment.

The activities of the library are not connected with any club or organisation and operates on a purely a non-profit basis. Documents are provided against postage costs and an IRC (International Reply Coupon) should be enclosed for any enquires.

If you have any unwanted/unused service manuals or diagrams that you feel would benefit the collection, they will be most welcome! The postal address is SCHEMATHEEK Wageningen, Toine Hultermans PD0MHS, Ooststeeg 3, 6708AN Wageningen, The Netherlands. For more information, go to www.schematheek.eu

Rochester Hamfest

For anyone visiting the New York area in June, the Rochester Hamfest takes place in the USA on 3 June at Walnut Hill Farm, West Bloomfield Road, Pittsford, NY 14534. The Rochester Amateur Radio Association (RARA) is one of the oldest and largest amateur radio clubs in the United States, with over 500 members. They have been sponsoring the RARA Hamfest since 1927.

VMARS at NARSA

The Vintage & Military Amateur Radio Society (VMARS) attended the Northern Amateur Radio Societies Association (NARSA) rally in Blackpool. There were many VMARS members and other visitors to the stand. They were very busy with considerable interest in the stand, hardly stopping through the day – a very worthwhile venture. There was a fine selection of vintage radio equipment on display including a very nice RCA AR88D recently donated by Ian, GM3LGU. Other equipment on display was a working Creed teleprinter, an RA-1B receiver a HB receiver designed for reception of AM signals all in modular form, the old stalwart the WS 19 and an Eddystone 730/4.

GMDX Convention

ML&S recently donated a raffle prize for the GMDX Convention that took place on 1 April in Stirling. The day included several DXpedition talks as well as one on SDR (Software Defined Radio). The ML&S raffle prize was won by Frank, MM0HST, seen here on the left. The GMDX Group aims to promote DX and other competitive HF amateur radio activity in Scotland.

GB3DW

During 2016, the GB3DW 2m repeater in Pentrefelin, Gwynedd suffered a technical problem that reduced the output power to just milliwatts. To compound problems, the Arfon Repeater Group, who operated GB3DW, was given the news that the building housing the repeater was due to be demolished and the land retuned to farming use. After careful consideration, the group decided that GB3DW could no longer operate. Four members of Meirion Amateur Radio Society established a new arm of Meirion ARS, called the Meirion Repeater Group, with their prime objective being to set up a local repeater again. To begin with, the group had no funding or experience in repeater licencing or operation, but after some time, and help from many quarters, the licence was obtained and GB3DW lives again.

GB3DW is now a fully functioning digital / analogue repeater, operating from a Yaesu Fusion DR1 X unit, with the filters from the original GB3DW (originally built, coincidentally, by a member of Meirion ARS, Pat, GW6IMS). Initial reports are very favourable, although due to the re-location of the repeater, some areas have been lost with other areas gaining coverage.

The four founders of Meirion Repeater Group thank all those involved in the project including Meirion ARS, Arfon Repeater, Brian, GW4KAZ, LAMCO, Hobby-Radio, Thomas Williams and Mark, GW7KDU. For more information visit www.meirion-ars.info

CW Boot Camp

Essex CW Club is considering hosting a CW Boot Camp later this year. Features would include Morse for the complete beginner through to the faster operator, contest techniques and programs, twin paddle operating and supervised on-air operation for the novice. The event would take place on a weekend (either Saturday or Sunday) during the last quarter of the year in Witham, Essex. In order to assess the appeal before making any final decisions, a survey is available on the Essex Ham website to gauge interest. It's free, confidential, and only takes a few minutes. You can find it at www.sxham.uk/morsecampsurvey

Visiting the National Radio Centre

If you are visiting the National Radio Centre at Bletchley Park before the 29 October, you may be interested to know that as an added treat – perhaps for the less radio-minded in your party – you can book afternoon tea in the Mansion on selected days. For full information go to the Bletchley Park website www.bletchleypark.org.uk/ and click on the 'What's On' tab.

IARU ATV contest

The IARU ATV contest will be held from 1200UTC on 10 June to 1800UTC on 11 June. Most operators do not really consider it as a contest but as an 'activity weekend' as many ATV operators are on the air from several countries, some portable. A report of the contest in 2016 can be found at www.iaru-r1.org/images/VHF/newsletters/Newsletter_70.pdf

Information about the rules and the easy Excel logsheet are available online at www.iaru-r1.org/images/VHF/atv/IARU_ATV_contest_rules_version_2015.pdf

Boy Scout camp

Garden City Amateur Radio Club (GCARC) will sponsor the Boy Scouts of America K2BSA/8 special event station at the Michigan Crossroads Council D-Bar-A scout ranch (locator EN82ix). The station will be on the air from 0300UTC on 25 June to 0500UTC on 28 June. They will start out using 14.330, 7.270 and 3.840MHz. This camp is an opportunity for older scouts to earn merit badges toward their Eagle Scout award and the radio merit badge will again be taught to Scouts who will be looking to engage in a QSO with amateurs on the air as a requirement.

Continued on page 15

radcom@rsgb.org.uk

New Products

Dual band mini mobile

Sinotel UK Ltd is stocking a new mini mobile, the TYT TH-8600 Dual Band. It is a very small 2m/70cm 25/20W radio and comes complete with programming cable and software. More details at www.sinotel.co.uk – and look for the review in the July *RadCom*.

D-STAR Gateway Version 3

D-STAR Gateway Version 3 (G3) software is now available to repeater keepers in the UK. The RS-RP3C gateway software is being rolled out across the globe and is now available from Icom UK. The new software has significant improvements over its previous version and will enable D-Star users to operate the 'Terminal ID' and 'Access Point' features for the forthcoming ID-51EPlus2 and ID-4100E D-Star radios. Those radios will function only as normal D-Star radios until this implementation occurs. The software will be provided free of charge on CD to repeater keepers with Icom repeater hardware. The software will only be provided in this way as the RS-RP3C CD's are serialised and will be registered to repeater keepers. To qualify for the free of charge software, send the repeater callsign, your name and callsign, your address including postcode and a confirmation that the software will only be used on the listed repeater (simple yes/no answer) to info@icomuk.co.uk.

For more information about D-Star, visit www.d-staruk.co.uk.

Inrad filters

Nevada, as part of the International Ham Stores Group, is now stocking the full range of Inrad Filters from the USA. These quartz crystal filters are custom designed for both communications receivers and transceivers. Initially they are carrying the popular models for both Yaesu and Elecraft radios, but special orders for other models can be taken for delivery within 14 days. The full range of stocked filters are shown on the website www.nevadaradio.co.uk

MyDEL digital SWR and power meter

A new SWR/power meter from ML&S features a large, very bright, easy to read 3" digital display that is back lit for better readability. The MyDEL DG-503 SWR/Power meter covers 1.6-525MHz at up to 200 watts. Priced at £119.99, RSGB Members can use the code RC503 at the check out to receive a discount of £20. This discount will be available until the July issue of *RadCom*. For further details see www.HamRadio.co.uk/DG503

New SteppIR Beam had 4-foot boom

SteppIR Antennas has announced a new antenna, the SteppIR UrbanBeam Yagi. It has a 4-foot boom length and turning radius of under 16 feet, but still covers the 6 to 40m bands. It weighs 40lb and can be mounted on a mast or the roof. Its elements are tunable to your operating frequency, which radiates as much of your signal as possible. Detailed specifications and ordering information is available on the SteppIR website, www.steppir.com.

HF Preselector

Cross Country Wireless has released a new HF preselector. This can be used to provide additional front end selectivity for HF and medium wave receivers, protecting the receiver from strong out of band transmissions, wideband noise and other transmitters on multi-station field days.

As the sunspot cycle declines and more listening is done on the lower HF bands with long wire antennas and strong NVIS signals then the HF preselector is an ideal accessory to aid receiver performance. It is invaluable when using simple conventional superhet or SDR receivers such as RTL-SDR dongles with upconverters or SDRPlay with large HF antennas.

It can also be used with transceivers that have sockets for a separate receiver input and receive antenna output. It also covers the medium wave broadcast band for MW DXers.

The Preselector is a passive high Q design that does not use an additional amplifier or require external power. The UK price is £60 including VAT. www.crosscountrywireless.net/preselector.htm

Antenna insulators

SOTABEAMS is stocking a new range of antenna insulators made from modern high-performance materials. Two types are available: a ribbed centre or end insulator and an open wire line insulator for high Z low-loss lines. Both are lightweight and strong (unlike difficult to find ceramic ones). They are suitable for permanent as well as temporary installations. Details at www.sotabeams.co.uk

News continued from page 13

Morsum Magnificat

The English language edition of *Morsum Magnificat*, the Morse Magazine, otherwise known as '*MM*', contained a vast amount of information and illustrations of interest to Morse operators, key collectors, historians, researchers and other Morse enthusiasts. Published in 89 issues from 1986 to 2004, with readers and contributors around the world, it covered every conceivable aspect of Morse telegraphy, past, present and future, in a truly international way. With the permission of the copyright holder, Zyg Nilski, G3OKD, this vast resource is now available for download in PDF format, free of charge, thanks to the generosity of Lynn Burlingame, N7CFO who was a reader of, and contributor to, *MM*. Included in the downloads is an updated and revised version of the *MM* 54-page *Key WT 8 Amp Worldwide Survey* which has proved to be of great interest to both users and collectors of the many versions of this famous pre-war, wartime and post-war military Morse key.

Free downloads of *MM* are available from www.n7cfo.com/tgph/Dwnlds/mm/mm.htm for personal use only.

WWI Commemoration station

To commemorate all the countries involved in the WWI Ypres battle, OP0PPY will operate from 2 to 11 June from Mesen in Belgium (locator JO10KS). It will operate from 0700 to 1600UTC. On the 2nd and 3rd there will be a wreath laying ceremony for all the solders involved. Suggested frequencies are: 3.615, 7.085, 14.285, 18.145, 21.345, 24.910 and 28.585MHz (SSB), 3.545, 7.045, 14.045, 18.085, 21.045, 24.985 and 28.045MHz (CW).

ML&S Big Summer Picnic

Once again Martin & his team open the doors of ML&S (Wessex House, Drake Avenue, Staines, Middlesex TW18 2AP) at 8am on Saturday 24 June to greet those travelling far and wide for the Big Summer Picnic. There will be freebies, food and refreshments during the day. They will be joined by the leading Japanese manufacturers. A lecture stream will be taking place throughout the day in the Ham Radio Training Academy. For more details see HamRadio.co.uk/picnic

Suffolk Red

Suffolk RED is a collaboration of amateur radio and electronics enthusiasts in the Suffolk area of the UK. RED stands for Radio and Electronics Development and the events are aimed at anyone with an interest in any aspect of electronics and radio engineering and operation. It provides an opportunity to have a informal look at the many and varied aspects of the hobby and provide contacts if there is something you might be interested in taking further.

The next Suffolk Red event is on 21 June at 7.30pm at the Hallowtree Scout Camp Site, Ipswich IP10 0JP. For details of the evening's programme of events go to www.suffolkred.co.uk

Homebrew

We have already built and tested the radio frequency (RF) and intermediate frequency (IF) bandpass and low-pass filters (LPF) for the 160m SSB/CW transceiver. Before we start building the other active circuits, we should take a look at the basic layout of the new transceiver.

In a typical SSB transceiver, several key stages will be shared between the transmitter and the receiver. This approach offers obvious savings in cost, weight and size. Sharing some of the key stages also offers some performance advantages. For example, sharing the IF carrier and local oscillators between transmitter and receiver will ensure accurate frequency netting. When was the last time you heard someone calling "CQ and tuning"?

Some stages are inherently suitable for sharing between the transmit/receive (Rx/Tx) path. Passive diode and MOSFET mixers are generally bi-directional, so the same device can be used for Rx or Tx without the need for any switches. Amplifiers generally work in a single direction, ie the output is an amplified replica of the input; the amplifier won't provide any gain when the signal path is reversed unless some form of switching is provided. Direction switching can be via a mechanical switch or relay, or by an electronic switch like a PIN diode or CMOS switch. The switching components will increase complexity and component count. The designer will sometimes have to choose between the lesser of two evils: duplication (building another stage) or providing the necessary switching to allow sharing of an existing stage. Both of these options will be employed in this project.

Figure 1 shows a simplified block diagram of the proposed layout for the 160m transceiver. As some stages have not been built yet, there may be some minor changes before the project is finished.

Following the receive signal path, the first block is an optional RF amplifier and/or attenuator. The RF unit consists of the shared RF bandpass filter (BPF) and a diode double-balanced mixer. These stages are bi-directional and are easily shared between the Rx and Tx paths. The receive IF amplifier will use a pair of AD603 ICs. Another passive mixer will be used as the Rx product detector (PD) for SSB/CW. I'm not planning to include an AM or FM detector at the moment. The IF carrier oscillator will be shared between the transmit balanced modulator and the receive PD. The receive AF amplifier will use a TDA2050 IC as used in several previous receiver projects.

The local oscillator will be controlled by a PIC microcontroller, with a rotary encoder for the VFO (variable frequency oscillator) control. I haven't yet decided whether I will use a DDS or a PLL based local oscillator.

Mixers

The standard diode balanced or double-balanced mixer is still a very attractive choice for use as a mixer or modulator at frequencies from LF to VHF. Commercially made mixers are available in tin-can or plastic packages. Home made mixers can offer similar performance at much lower cost. I will use a home made double-balanced mixer (DBM) shared as the main Rx/Tx mixer. An identical mixer unit will be used as the receive PD and another as the transmit balanced modulator. It would be relatively easy to use the same mixer as the PD and balanced mixer (BM), but I have decided to use separate units to simplify switching and to improve isolation between the oscillators and the receive IF amplifier stages.

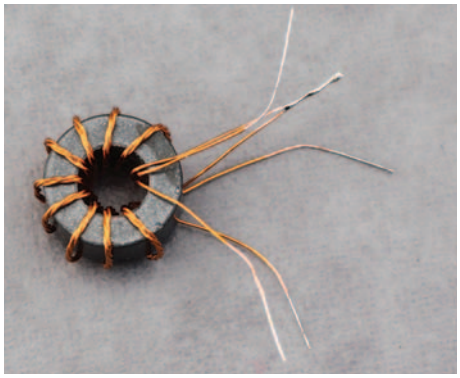


PHOTO 1: One of the mixer balun transformers.

The mixers are based on a ring of four Schottky diodes. I used the 1N5711 in my prototype. I have also seen good results from the BAT43 (Maplin VR19V) in this application. If Schottky diodes are not available, you can use ordinary 1N4148 switching diodes with little or no reduction in performance.

The transformers are each 10 turns, trifilar wound, on an FT37-43 or similar toroid core. I used three lengths of 0.375mm enamelled copper (Maplin YN86T) twisted together. Wire diameter is not particularly important in this application. **Photo 1** shows one of the mixer balun transformers. Use the mixer schematics as a guide to connecting the wires for correct phase. The ideal solution is to use three lengths of wire with different coloured enamel so that the wires are easily identified. As this option wasn't available to me, I used the continuity 'beep' function of a digital

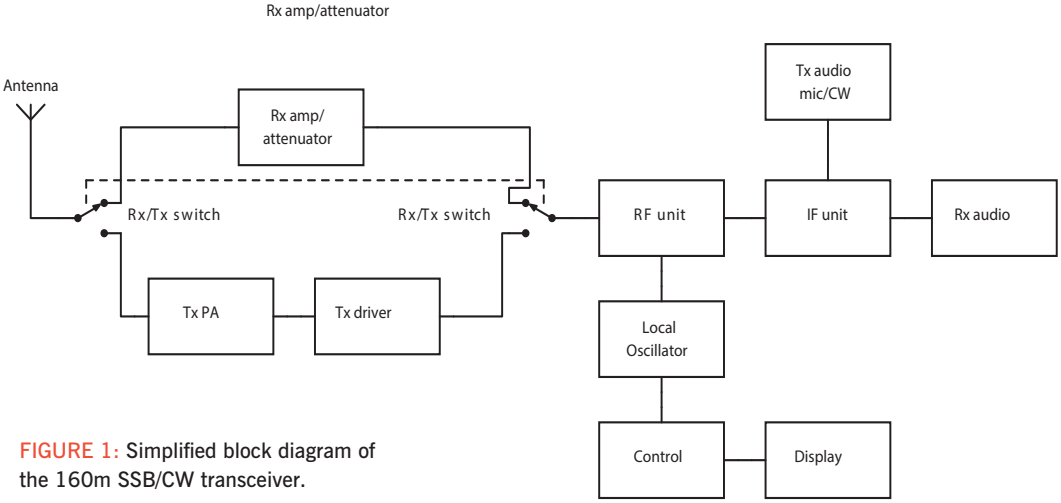


FIGURE 1: Simplified block diagram of the 160m SSB/CW transceiver.

PHOTO 2: The assembled oscillator unit.

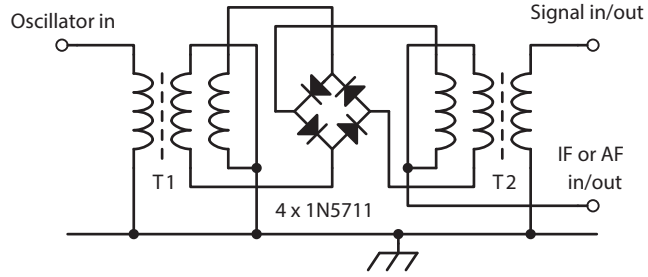


FIGURE 2: Circuit diagram of the diode double-balanced mixer.

multimeter for checking continuity/isolation of the windings. The schematic of the diode DBM is shown in **Figure 2**.

IF carrier oscillators

For lower sideband operation, only one IF carrier oscillator frequency will be required. To allow switching to upper sideband, it will be necessary to change the carrier frequency to the opposite slope of the IF filter passband. Some transceiver designs provide for three IF carrier frequencies, one each for upper sideband (USB), lower sideband (LSB) and continuous wave (CW). By convention, only LSB is used for phone operation on 160m, but it is nice to have the option to listen on the other side.

There are two methods of IF carrier frequency selection in common use. The first is to use a single oscillator and select the required crystal using a switch. I have chosen to use the alternative arrangement of building a separate oscillator for each crystal. Frequency selection is by switching the DC supply to the required oscillator. This adds some complexity, but the required components are small and of very low cost. The big advantage of this approach is that all switching is at DC, so there is less risk of IF leakage from the switch wiring. Another advantage is that the switch is not connected directly to the crystal or other frequency-critical components that might adversely affect the stability of the oscillator. The oscillator and buffer amplifier is shown in **Figure 3**.

Construction

The oscillator was built on a strip of PCB (printed circuit board) laminate. The chosen component values should work well with any of the common IFs in the 9-12MHz range and construction is not particularly critical. The transistors are MPSH10 NPN types. For typical high frequency (HF) IFs, the choice of transistor is not that critical and any similar HF NPN transistor should make a good substitute.

The DC supply to the oscillator is provided by a standard 8V regulator. If additional oscillators are used, a switch will be required to supply power to the wanted one.

Where multiple oscillators are used, isolation is improved by placing a diode in series with each oscillator output. The diode for the selected oscillator will be forward biased, the other diodes will be reverse biased and appear as a high resistance. As suitable PIN diodes were not to hand, I used ordinary 1N4148 switching diodes.

For best stability, the capacitors in the oscillator should be temperature stable types like NPO ceramic or polystyrene. Low cost plastic trimmer capacitors may provide acceptable performance for carrier frequency adjustment. High quality air-spaced piston trimmer capacitors offer better stability and much easier adjustment. The capacitor values in the schematic are suitable for typical IF carrier crystals. You may need to change the value of the 18pF fixed capacitor to suit your individual crystal. A frequency counter or well calibrated HF receiver is useful for setting up the carrier oscillators. As a rough rule of thumb, filter centre frequency ±1.5kHz is a good carrier frequency starting point for SSB. Final tweaking of the carrier frequency can be done at the on-air testing stage.

All resistors are standard 0.25W types. 1% or 5% tolerance is acceptable. If a 7.5Ω resistor is not available, you can use a parallel pair of 15Ω resistors instead. The transformer in the buffer amplifier is 10 turns (T), bifilar wound (two wires), on an FT37-43 or similar ferrite toroid. The 835nH inductor in the output LPF is 14T of 0.5mm enamelled copper on a T50-6 (yellow) powdered iron toroid. The required 320pF capacitors are made up from parallel pairs of standard values (eg 220pF + 100pF).

The LPF component values were calculated using the filter design tool in *QUCS* **[1]**. The initial values were tweaked by making small changes to the passband ripple. A 0.133dB ripple value results in a convenient 320pF for the capacitors. The output is split two ways using a resistive splitter/divider. While testing the transmitter circuits, the unused output for the Rx PD was terminated by a 50Ω load made from a parallel pair of 100Ω resistors.

Testing

The oscillator starts reliably and produces a stable output of 2Vpp (+10dBm) at each of the 50Ω outputs. Apart from trimming the frequency, no other adjustment is required. Check the 8VDC voltage to the oscillator stage is correct. The assembled oscillator unit is shown in **Photo 2**.

Microphone amplifier

The microphone amplifier was built in the usual fashion on a strip of PCB laminate. If a PCB is required, a very similar amplifier was used for a Homebrew project in the August 2006 *RadCom*. PCB artwork for this amplifier is available from **[2]**.

Eamon Skelton, EI9GQ
hbradio@eircom.net

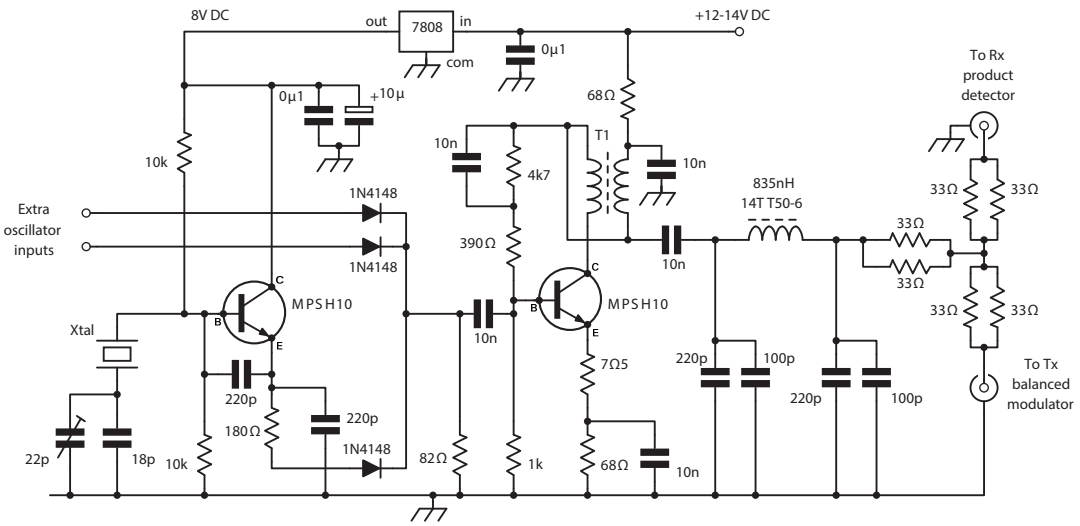


FIGURE 3: Crystal oscillator and buffer amplifier.

The amplifier schematic is shown in **Figure 4**. The first stage is a simple inverting amplifier with a voltage gain of 10 (20dB). If mic gain adjustment is required, you can replace the 100k fixed resistor with a panel-mounted 220k pot. The 1nF capacitor at the input acts as a LPF to keep transmitter RF away from the sensitive opamp input. The second stage is an active audio LPF with a cutoff frequency of around 3kHz. Component were simulated on *QUCS* before building the physical circuit. A *QUCS* plot of output voltage vs frequency for this stage is shown in **Figure 5**. As this is a low frequency amplifier with relatively low gain, the choice of opamp is not particularly critical. Any low-noise, 8 pin, dual opamp should work well in this circuit. I used the NE5532N (Maplin UH35Q) in my prototype.

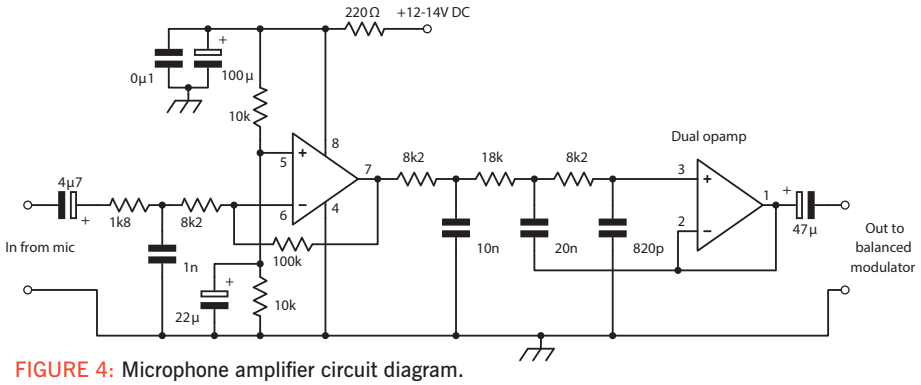


FIGURE 4: Microphone amplifier circuit diagram.

Testing

I used a DBM of the type shown in Figure 2 as the balanced modulator. This type of mixer gives excellent carrier suppression when used as a balanced mixer, typically 50-60dB, so that no manual adjustment of carrier balance will be required. The BM configuration is shown in **Figure 6**. A simple resistor - capacitor (RC) circuit provides something approximating a proper termination for both the mixer port and the microphone amplifier.

Note that there is great potential for confusion regarding the conventional port names. The 10MHz carrier from the oscillator unit was fed to the mixer's local oscillator port. In our application, the AF (audio frequncy) signal from the microphone amplifier was fed to the mixer IF port. Note that the IF is the only DC-coupled port. The double sideband (DSB) signal is extracted from the RF (or signal) port.

The suppressed-carrier, double-sideband output at the RF signal port was monitored on my shack receiver. The RF port was terminated by a 50Ω load for this test. Audio quality was excellent and the output signal is spectrally clean, apart from the unwanted upper sideband, which will be removed by the IF filter in the completed transceiver.

Next month we'll start on the receiver stages.

Websearch

[1] *Quite Universal Circuit Simulator:* http://qucs.sourceforge.net/
[2] http://homepage.eircom.net/~ei9gq/art.html

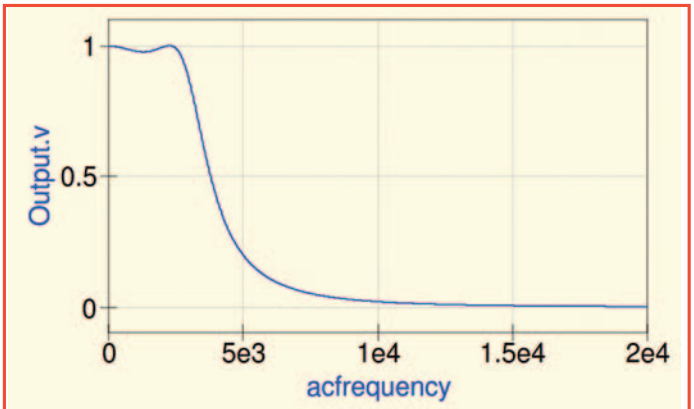


FIGURE 5: Simulated plot of the microphone amplifier response.

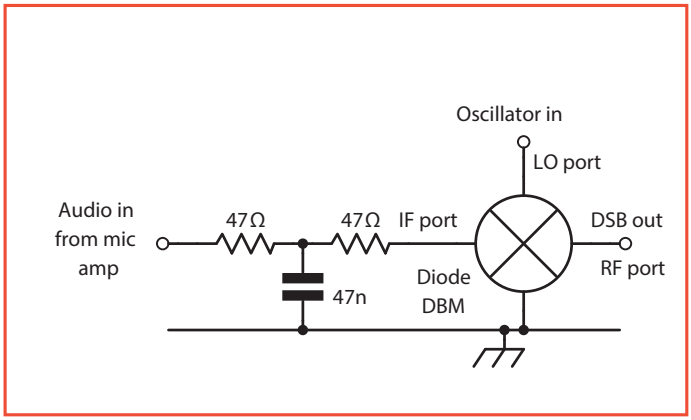


FIGURE 6: Balanced modulator configuration (see text).

The radio... YAESU

HF Excitement
Seeking the Best Performance in All areas of Transceiver Design

Photo shows the FTDX9000D

HF/50 MHz Transceiver
FT DX 9000MP
400 W / Class-A 100 W

HF/50 MHz Transceiver
FT DX 9000D
200 W / Class-A 75 W

The Best of the Best
- Built-in three μ-Tuning modules*1 (Excellent suppression of out-of-band interference)
- Enhanced Operation (DMU : Data Management Unit included)
- Built-in Automatic Antenna Tuner

*1 FTDX9000MP: Optional

HF/50 MHz Transceiver
FT DX 5000MP Limited
200 W / Class-A 75 W

Best Performance for the Serious DX'er
- 9 MHz Down Conversion receiver construction
- Equipped with Extra Sharp Crystal Roofing Filters (300 Hz, 600 Hz and 3 kHz)
- Built-in Automatic Antenna Tuner

HF/50 MHz Transceiver
FT DX 3000D 100 W

Pursuing the Highest Ideal of HF Transceivers
- 9 MHz Down Conversion receiver construction
- Equipped with Extra Sharp Crystal Roofing Filters (600 Hz and 3 kHz)
- Built-in Automatic Antenna Tuner

HF/50 MHz Transceiver
FT DX 1200 100 W

Best in Class Performance and Supreme Operability
- 3 kHz, 6 kHz and 15 kHz Roofing Filters included (Effective interference attenuation)
- Built-in Automatic Antenna Tuner

HF/50 MHz Transceiver
FT-450D 100 W

The Ultimate Compact HF Base Station
- Proven performance with unique Yaesu IF DSP
- Built-in Automatic Antenna Tuner

HF/50 MHz Transceiver
FT-891 100 W

Exciting Yaesu HF Field Gear
- Ultra Compact (W/H/D: 155 x 52 x 218 mm)
- SSB/CW/AM/FM Modes Available

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

MOONRAKER

Radio Communications Manufacturer and Reseller

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

Sales line 01908 281705
E-mail sales@moonraker.eu Web www.moonraker.eu

Postage (UK Mainland Only):
Small items just £2.99
Medium items just £4.99
Maximum charge just £7.99

PayPal VISA MasterCard

If you are looking for an accessory for your latest rig – then check out our "Real-Time" stock website – we carry a full range of ICOM, KENWOOD & YAESU branded products ready for same day despatch

WOUXUN

Authorised dealer

Mobiles

KG-UV950P 10/6/2/70cm transceiver **£239.95**
KG-UV950PL 6/4/2/70cm transceiver **£289.95**
WO/PC0-003 software for mobile **£19.95**

Handhelds

KG-UV9D 2/70cm Handie **£129.95**
KG-UV9D PRO PACK 2/70 Handie + accessory pack **£154.95**
WO/PS0-110 software for handhelds **£20.50**

KENWOOD

Authorised dealer

Base

TS-990 All mode flagship HF transceiver **£5099.95**
TS-2000X All mode HF transceiver upto 23cm **£1469.00**
TS-2000E All mode HF transceiver upto 70cm **£1270.00**
TS-590SG All mode HF transceiver **£1199.00**
TS-480HX inc ATU HF to 6M HF transceiver **£719.00**
TS-480SAT HF to 6M HF transceiver **£659.00**

Mobile

TM-D710GE Dual band transceiver with APRS **£479.00**
TM-V71E Dual band transceiver with Ecolink **£299.95**
TM-281E 65W 2M Transceiver **£169.95**

Handheld

TH-D74E Dual band with APRS & D-star transceiver **£599.00**
TH-D72E Dual band with GPS transceiver **£379.95**
TH-K20E 2m 5.5w FM transceiver **£119.95**
TH-K40E 70cm 5w FM Transceiver **£119.95**

Accessories

MC-90 Desk microphone **£189.95**
MC-60A Desk microphone **£129.95**
HS-5 Deluxe headphones **£56.95**
HS-6 Lightweight headphones **£37.95**
SP-23M Mid size external speaker **£74.95**
KES-3 Mobile speaker **£29.95**

ICOM

Authorised dealer

Base

IC-7851 HF/50MHz transceiver **£9999.95**
IC-7700 HF/50MHz with PSU & ATU **£4999.95**
IC-9100 HF/VHF/UHF SSB, CW,AM & FM **£2799.95**
IC-7600 HF/50MHz transceiver **£2399.95**
IC-7410 HF/50MHz transceiver **£1499.95**
IC-7300 New HF/50/70MHz Transceiver **£1199.95**
IC-7200 HF/50 rugged transceiver **£829.95**

Mobile/Portable

IC-7100 HF/6/4/2/70cm transceiver **£1199.00**
ID-5100E Dual band with D-star **£575.00**
ID-5100E Deluxe inc accessory pack **£729.95**
IC-2730 Dual band transceiver **£299.95**

Handhelds

ID-51E Plus 2 Dual band D-STAR **£449.95**

Accessories

AH-4 Automatic antenna tuner **£339.00**
SP-23 Base speaker with filters **£279.00**
SP-38 Base speaker for IC-7300 ..... **£149.95**
SP-33 Base speaker **£129.95**
SM-50 Desktop microphone **£249.95**
SM-30 Desktop microphone **£129.95**

YAESU

Authorised dealer

Base

FT-DX9000MP HF/50MHz 400W Elite Transceive **£9599.99**
FT-DX9000D HF/50MHz 200W Elite Transceiver **£8799.95**
FT-DX5000MP HF/50MHz 200W (inc SM-5000 ..... **£3699.00**
FT-DX5000MP LTD HF/50MHz 200W (without SM-5000) **£3399.00**
FT-DX3000 HF/50MHz 100W Transceiver **£1429.95**
FT-DX1200 HF/50MHz 100W Transceiver **£999.95**
FT-991A HF/50/144/430 MHz All mode field transceiver **£1299.00**
FT-991 HF/50/144/430 MHz All mode field transceiver **£999.95**
FT-450D HF/50MHz entry level transceiver **£599.95**

Mobile/Portable

FT-857D HF/VHF/UHF 100W portable transceiver **£699.00**
FT-891 HF/50MHz 100W all mode transceiver **£599.95**
FT-817ND HF/VHF/UHF 5W backpack transceiver **£549.00**
FTM-400XDE Dual band digital transceiver **£519.00**
FTM-100DE Dual band digital transceiver **£299.00**
FT-8900 Quad band 10/6/2/70cm transceiver **£319.00**
FT-8800 Dual band 2/70 transceiver **£249.00**
FT-7900 Dual band 2/70 transceiver **£249.00**
FTM-3200DE 2m digital transceiver **£189.00**
FTM-3100DE 2m digital transceiver **£129.00**

Handheld

FT-2DE Dual band digital transceiver **£399.00**
FT-1XDE Dual band digital transceiver **£329.00**
VX-8DE Triband 6/2/70 transceiver **£229.00**
VX-6E Dual band transceiver **£189.00**
VX-3E Dual band mini transceiver **£159.00**
FT-60 Dual band entry level transceiver **£119.00**

Desk Microphone

M-1 Ultimate desktop base microphone **£599.00**
MD-200A8X Ultra desktop base microphone **£249.95**
MD-100A8X Desktop microphone **£109.95**

Speakers

SP-2000 External speaker **£159.95**
SP-8 Base speaker **£159.95**
MLS-100 Mobile speaker **£29.95**
MLS-200 Mobile speaker **£26.95**

Antennas

ATAS-120A Active motorised antenna **£349.95**
ATAS-25 Manual tuning antenna **£229.95**
ATBK-100 Counterpoise for ATAS antennas **£89.95**
YA-30 Broadband HF antenna **£249.95**

Antenna Tuning Unit

FC-50 Automatic tuner for FT-891 ..... **£249.95**
FC-40 Automatic tuner for wire antennas **£249.95**
FC-30 Automatic tuner for FT-857D **£279.95**

Power Supply Unit

FP-30 Internal PSU for FT-897 (last one) **£229.95**

Filters

XF-126CN CW Narrow roofing filte **£149.95**
XF-127CN CW Narrow crystal filter **£139.95**
YF-122C Collins CW filter **£139.95**
YF-122CN Collins CN narrow filter **£139.95**
YF-122S Collins SSB filter **£139.95**

Cases

CSC-83 soft case for FT-817ND **£19.95**
CSC-97 soft case for FT-1DE **£12.95**
SHC-24 soft case for FT-2DE **£12.95**

All Yaesu accessories in stock on line at www.moonraker.eu

ALINCO

Base

DX-SR9 HF 100W Transceiver with SDR **£599.95**

Mobile

DR-735E Dual band 2/70 transceiver **£299.95**
DR-638H Dual band 2/70 transceiver **£249.95**
DR-B185HE 2m 85W transceiver **£169.95**
DR-138HE 2m 60W transceiver **£169.95**
DR-135UK 10m 25W transceiver **£159.95**

Handheld

DJ-G7E Tri-band 2/70/23cm transceiver **£299.95**
DJ-MD40 UHF 400-480MHz digital transceiver **£179.95**
DJ-V57E Dual band 2/70 transceiver **£129.95**
DJ-175EUK 2m 5w transceiver **£109.95**
DJ-500 Dual band 2/70 transceiver **£99.95**
DJ-A10S 2m 5w transceiver **£89.95**

Accessories

EXD-2 Auto long wire antenna tuner **£299.95**
EMS-14 Deluxe desk microphone **£69.95**
DM-330MW MK2 30 switch mode PSU **£129.95**
DM-330FXE 30 amp switch mode PSU **£119.95**

PICO APRS Mini Transceiver

"Worlds smallest APRS transceiver with TNC" offers many applications. Matchbox-sized, built-in GPS receiver.

The Matchbox-sized, transceiver with GPS receiver, is an APRS tracker, receives APRS data, and a TNC (KISS protocol) for computer. The OLED display (128x64px) shows received APRS packet of position, APRS messages and status information. Received packets have distance and cardinal direction displayed, with data for the four most recent stations, saved retrievable via menu. Your own GPS coordinates are also shown so, the PicoAPRS can be used as a GPS receiver, say for Geo Caching. **£189.95**

MOONRAKER

Mobile

MT-270 25W Dual band 2/70 transceiver **£79.95**

Accessories

MT-RM Spare microphone for MT-270 ..... **£12.95**
MT-SC Programming cable for MT-270 ..... **£9.95**

LEXION

VV-898S Dual Band Mobile Transceiver
New VV-898 "S" version now with 25W as standard – comes complete with keypad microphone, radio bracket all in a compact size with an a amazing compact price of just £69.95!

BAOFENG 寶鋒

Authorised dealer

Handheld

GT-3 136-174/400-480MHz transceiver **£44.95**
GT-5 136-174/400-520MHz transceiver **£39.95**
UV-5RC 136-174/400-480MHz transceiver **£29.95**
BF-888S 400-470MHz transceiver **£14.95**

Accessories

Speaker microphone **£9.95**
Software cable **£9.95**

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

WANT A NEW RADIO AND GET SOME MONEY BACK FOR YOUR OLD ONE?

TURN THIS INTO THIS

DON'T WANT THE HASSLE OF SELLING, QUEUING AT THE POST OFFICE OR PAYING ONLINE FEES?

Part Exchange the easy way with 5 simple steps at Moonraker

1 Choose your desired rig, scanner or even accessory
2 Call or email what you would like to part exchange
3 We will be give you the best deal and agree the balance owed
4 Pack your equipment securely and wait for the door bell
5 Swap your old gear for shiny new with the delivery driver and enjoy!

.....it's that simple

MOONRAKER

Yagi Antennas

All Yagis have high quality gamma match fittings with stainless steel fixings! (excluding YG4-2C)

YG27-35 Dual band 3/5 element 3.5/12.5 dBd gain with one feed! **£79.95**
YG4-2C 2 metre 4 Element (Boom 48") (Gain 7dBd) **£29.95**
YG5-2 2 metre 5 Element (Boom 63") (Gain 10dBd) **£69.95**
YG8-2 2 metre 8 Element (Boom 125") (Gain 12dBd) **£99.95**
YG3-4 4 metre 3 Element (Boom 45") (Gain 8dBd) **£79.95**
YG5-4 4 metre 5 Element (Boom 104") (Gain 10dBd) **£99.95**
YG3-6 6 metre 3 Element (Boom 72") (Gain 7.5dBd) **£99.95**
YG5-6 6 metre 5 Element (Boom 142") (Gain 9.5dBd) **£119.95**

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!

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

HB9CV

Brilliant 2 element beams … ideal for portable use

HB9-70 70cm (Boom 12") **£24.95**
HB9-2 2 metre (Boom 20") **£29.95**
HB9-4 4 metre (Boom 23") **£39.95**
HB9-6 6 metre (Boom 33") **£49.95**

Halo Loops

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

HLP-2 2 metre (size approx 300mm square) **£24.95**
HLP-4 4 metre (size approx 600mm square) **£39.95**
HLP-6 6 metre (size approx 800mm square) **£44.95**

MOONRAKER

QRP Antennas

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

Whizz Whip HF/VHF/UHF portable antenna with telescopic whip - ideal for any situation where a long wore 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**

MD-7400 40-70cm Multiband Mobile Antenna at a new lower price !
This is a wideband mobile whip that is manually tuned by sliding the telescoping coil at the base. The telescopic whip may also be adjusted for fine tuning and optimizing the VHF/UHF performance. Maximum length of the antenna is 1.77m and maximum power handling is 130W
One antenna HF/VHF & UHF and one amazing new low price £79.95

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

bhi

Noise cancelling products

Bhi NES10-2 Noise eliminating speaker **£99.95**
Bhi DSPKR Amplified DSP noise cancelling speaker **£129.95**
Bhi Desktop speaker **£179.95**
Bhi Dual in-line noise cancelling unit **£179.95**
Bhi NEIM1031 MKII noise eliminating inline module **£149.95**
Bhi Radiomate compact keyboard for FT-817/857/897 ..... **£89.95**

hy-gain

Hy-gain Antennas

AV-18VS 10-80m 5.48m 1500W **£164.95**
AV-12AVQ 10-20m 4.1m 1500W **£199.95**
AV-14AVQ 10-40m 5.5m 1500W **£269.95**
AV-18AVQ11 10-80m 5.48m 1500W **£359.95**
AV-620 6-20m 7m 1500W **£459.95**
AV-181TTJR 10-80m 11.88m 5000W **£479.95**
DX-88 10-80m 7.54m 250-1500W **£489.95**
AV-6160 6-160m 13.1m 1500W **£519.95**
DX-774 10-40m 8.8m 1500W **£579.95**
AV-18HT 10-80M 16.13m 1500W **£1399.95**

MOONRAKER

Mobile Antenna Mounts

TRIMAG-S Triple magnetic mount with SO239 antenna fitting with 4m RG58 and PL259 fitted – ideal for those larger antennas ..... **just £39.95**
TURBO-S single 170mm magnetic mount with SO239 antenna fitting with 4m RG58 and PL259 fitted – will suit most antennas upto 5ft **£19.95**
HKITHD-SO Heavy duty hatch back mount with SO239 antenna fitting with 4m RG58 and PL259 fitted **£32.95**
HKITM-S Mini hatch back mount with SO239 antenna fitting with 4m RG58 and PL259 fitted **£32.95**

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

SPX-100 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! **£44.95**
SPX-200S 6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, PL259 fitting **£44.95**
SPX-300S 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W,PL259 fitting **£59.95**

MOONRAKER

VHF/UHF Mobiles

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

TA TARHEEL ANTENNAS

Tarheel Antennas

Baby Tarheel 7.54MHz 200W **£399.95**
Little Tarheel II 3.5-54MHz 200W **£449.95**
Little Tarheel II-HP 7-54MHz 500W **£449.95**
Tarheel 40A-HP 7-32MHz 1500W **£499.95**
Tarheel 75A 3.3-30MHz 250W **£499.95**
Tarheel M100A-HP 3.2-29MHz 1500W **£529.95**
Tarheel M200A-HP 3.2-26MHz 1500W **£529.95**
Tarheel M300A 1.7-28MHz 250W **£529.95**
Tarheel M400A 1.6-26MHz 250W **£529.95**

Acceessories

MT-1 Antenna mount for 100,200,300,400 mobiles **£149.95**
LTMT-1 Antenna mount for LT-II **£119.95**

MOONRAKER

Single, Dual, Triple and Quadband Verticals - we have the lot

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

SQBM100P 2/70cm 3.00/6.00dBd, RX 25-2000MHz, Length 100cm SO239 ..... ~~£49.95~~ **special offer £39.95**
SQBM200P 2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, SO239 ..... ~~£54.95~~ **special offer £44.95**
SQBM500P 2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, SO239 ..... ~~£74.95~~ **special offer £69.95**
SQBM800N 2/70cm, Gain 8.5/12.5dBd, RX 25-2000MHz, Length 520cm, N-Type ..... ~~£139.95~~ **special offer £99.95**
SQBM1000P 6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, SO239 ..... **£84.95**
SQBM223N 2/70/23cm, Gain 4.5/7.5/12.5dBd, RX 25-2000MHz, Length 155cm, N-Type **£79.95**
SQBM4010P Quadband 10/4/2/70cm Gain 2.5/3.2/3.6/5.5dBi Length 120cm **£69.95**
SQBM6010P Quadband 10/6/2/70cm Gain 2.5/3.0/3.6/5.5dBi Length 120cm **£69.95**

MOONRAKER

HF Wire Antennas

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

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

MOONRAKER

HF Mobiles

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

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

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

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

OPEN NOW

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.

Annual RSGB trophy presentations

At the AGM, the President, Nick Henwood, G3RWF, presented the major Society trophies for 2016.

The Founders Trophy is awarded for outstanding services to the Society. It was awarded to **Steve Nichols, G0KYA** for his work on the Propagation Studies Committee, *RadCom Basics*, books and the narrated PowerPoint/Q&A sessions. This will be presented to Steve at a later date.

The Courtenay-Price Trophy is awarded for the most outstanding published technical contribution to amateur radio in 2016. It was presented to **Alwyn Seeds, G8DOH** for his article on High Performance VHF UHF Contest Stations in *RadCom* March 2016. He has also lectured on this subject at the RSGB Convention.

The Norman Keith Adams prize is awarded for the most original article published in *RadCom* in 2016. It was awarded to **Dr Michael Butler, G4OCR** for his article Getting started with NOAA polar orbiting environmental satellites in *RadCom* November 2016. This will be presented at the 2017 RSGB Convention in October.

The Ostermeyer Trophy is awarded for the most meritorious description of a piece of home constructed or electronic equipment published in *RadCom*. It was awarded to **Clemens Verstappen, DL3ETW** for the *RadCom Plus* article on a 70cm handheld using the DRA18U module.

The RAYNET Trophy is awarded for outstanding service to the radio amateurs' emergency network. It was presented to **Peter Thomson, GM1XEA and Cathy Clark, G1GQJ** for their work in facilitating the reunification of amateur radio emergency communications to form RAYNET UK.

The Bennet Prize is awarded for a significant contribution or innovation that furthers the art of radio communications. It was won by **Dave Gordon-Smith, G3UUR** for this article on Ground Radials in *RadCom* December 2016. He was unable to attend the AGM but his prize, a *Times Atlas*, has been sent to him.

The Wortley-Talbot Trophy is awarded for the most outstanding experimental work in amateur radio. It was presented to **Andy Talbot, G4JNT** for this article in *RadCom Plus* on A Third Method Narrowband Direct Upconverter for the LF/MF bands. He received his trophy at the recent Martlesham Microwave Round Table.

Alwyn Seeds, G8DOH was awarded the Courtenay-Price trophy.

Peter Thomson, GM1XEA and Cathy Clark, G1GQJ were awarded the RAYNET trophy.

Andy Talbot, G4JNT was presented with the Wortley-Talbot trophy at the Microwave Roundtable.

Simon Watts, G3XXH was awarded the Kenwood trophy.

The Kenwood Trophy is awarded for a significant contribution to training and development in amateur radio within the UK. It was awarded to **Simon Watts, G3XXH** for 10 years of service as Exam Standards Committee Chair.

The Harold Rose Plate is awarded for an outstanding contribution to 50MHz. It was won **Jim Kennedy KH6/K6MIO** for his extensive knowledge of the solar cycle and veritable expertise in the whys and wherefores of propagation on the 6m band. Jim, who had travelled from Hawaii, gave a short talk on his work on 6m in the afternoon session.

The Don Cameron Award is presented for an outstanding contribution to low power amateur radio communication. It was awarded to **Tony Fishpool, G4WIF** who is a long-time QRP devotee and avid builder. He has been G QRP membership secretary for more than 15 years and provided a foundation for QRP operators globally.

The Louis Varney Cup is awarded for advances in space communication. It went to **Ciaran Morgan, M0XTD and the ARISS-UK Team** in recognition of their contribution to the Tim Peake Principia Mission. Ciaran was unable to attend the AGM but three of the ARISS-UK team were present.

The Fraser Shepherd Award is for research into microwave applications for radio communication. It was awarded to **Roger Ray, G8CUB and Chris Whitmarsh, G0FDZ** for establishing the first UK communications on 122 and 241GHz; and their associated skills in construction, synthesisers and transverters for that and other millimetre wave bands, where they had made major contributions. It was presented at the recent Martlesham Microwave Round Table.

The 1962 Committee Cup is awarded for outstanding amateur development at VHF/UHF. It was presented to **Noel Matthews, G8GTZ** for championing Reduced Bandwidth Digital Amateur Television (RB-DATV) in the UK; including 146MHz that has been a great example of delivering innovation and has been accompanied by PR and outreach to a wider amateur audience and to Ofcom.

The Jock Kyle Memorial trophy, awarded to the Scottish club, society or RSGB Member thought to have done the most in Scotland in the field of VHF in the past year. It was presented to

Jim Kennedy, KH6/K6MIO received the Harold-Rose plate, He'd travelled from Hawaii.

Tony Fishpool, G4WIF received the Don Cameron award.

Some of the ARISS-UK team who were awarded the Louis Varney cup.

Roger Ray, G8CUB (right) and Chris Whitmarsh, G0FDZ, presented by Graham, G4FSG (centre).

Noel Matthews, G8GTZ was awarded the 1962 Committee Cup.

Martin Hall, GM8IEM received the Jock Kyle Memorial trophy at the GMDX Convention.

Colin McGowan, MM0NDX was awarded the Jack Wylie trophy at the GMDX Convention.

Bob Whelan, G3PJT was presented with the Calcutta Key.

Peter Blair, G3TLF was awarded an Honorary Vice Presidency.

Martin Hall, GM8IEM. Despite the remoteness of his location in the North West of Scotland, martin is one of the most active and respected VHF operators in Scotland. He has been a past winner of the RSGB Four Metres and Down Supreme Award and has been a major driving force in encouraging activity and experimentation at VHF and above in Scotland. The trophy was presented at the GMDX Convention in Scotland.

The Jack Wylie Trophy is awarded to the Scottish club, society or RSGB Member thought to have done the most for amateur radio in Scotland during the past year. It was presented to **Colin McGowan, MM0NDX**, a founder member and organiser of DX-World.net that promotes DXers and contesters throughout the world. An accomplished DXpeditioner, he has helped activate many islands, several for the first time, including A91HI, S79C, ZF2CI, PJ7PK and HP0INT. He has also helped raise the profile of IOTA, particularly in Scotland. The trophy was presented to the GMDX Convention in Scotland.

The Calcutta Key is one of the Society's most prestigious trophies. It is awarded for outstanding service to international friendship. It was presented to **Bob Whelan, G3PJT** for his world in supporting the Commonwealth Contest into its 80th year, a milestone that was recognised by our Patron, HRH The Prince Philip, Duke of Edinburgh, KG, KT.

The RSGB Board would like to thank and award a Certificate of Appreciation to **Chris Deacon, G4IFX** for this work supporting the RSGB strategy review. He was unable to attend the AGM but it has been sent on to him.

An RSGB Special Award was given to **Lisa Leenders, PA2LS**, IARU Region 1 Youth Working Group Chair, for her tireless work in putting youngsters on the air via the IARU YOTA programme. This will be presented to Lisa at the amateur radio show in Freidrichshafen.

The presentations were concluded when the RSGB Board recognised an outstanding contribution to amateur radio, with the highest honour the Society can bestow, an Honorary Vice Presidency It was awarded to a Member whose work in radio and electronics, both as an amateur and a professional, and his continuing work promoting science and engineering via the Smallpiece and Arkwright Trusts – **Peter Blair, G3LTF.** In 1964, G3LTF was the first UK amateur to pioneer earth-moon-earth (moonbounce) communications. Peter is respected highly by the world-wide moonbounce community for his consistent activity and the development of advanced techniques on the microwave bands. He has published many articles, particularly encouraging home construction, and has inspired audiences at many RSGB Conventions from the mid-1960s to the most recent in 2016 (at the age of 80).

In accepting the award, Peter paid tribute to those who had inspired him such as G3FZL, G6JP amongst others. He went on to say that inspiring the next generation is essential and was delighted that the RSGB is committed to this work.

Antennas

This month, we take a look at the off-centre fed dipole multi-band antenna. This is an antenna that does not need to use traps, loading coils or similar techniques to enable operation on several bands.

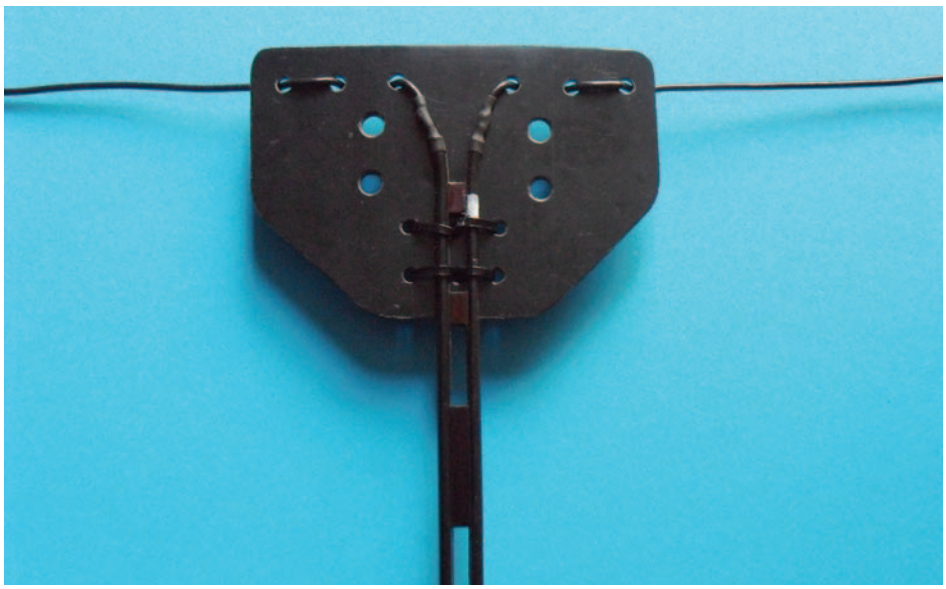


PHOTO 1: **The feed point centre used for the OCFD antenna (the white mark denotes the longer wire leg's connection).**

Overview of the off centre fed dipole

A centrally fed electrically half wavelength dipole has a feed point impedance of around 50 to 70Ω, allowing a reasonable match to be obtained to a 50Ω feeder cable. The actual feed point impedance is influenced by the height of the antenna above the ground, by any close objects and, to some extent, by the gauge of the wire used. A half wavelength dipole also presents the relatively low impedance of around 120Ω when operated on its third harmonic, allowing the antenna to be used on two bands. However, when operated on its third harmonic, the SWR is typically about 2.5:1 on a 50Ω system and good practice is to use an antenna tuning unit (ATU) to tune out the mismatch. An example of this technique is a 7MHz dipole when used on the 21MHz band in its third harmonic mode **[1]**.

The centre fed dipole's impedance is relatively low at its midpoint, however the impedance rises to around 5kΩ at its ends. This is because the RF voltage rises, while the RF current decreases, as the feed point is moved away from the antenna's centre. Essentially, the antenna could be fed at any point away from its midpoint provided you can match to the impedance seen at that point. An extreme example of this situation is the end-fed half wavelength Zepp antenna, where the feed point is located at one end of the wire span **[2]**.

The off centre fed dipole (OCFD) is a multi-band antenna whose wire-span is also an electrical half wavelength long at its lowest frequency of operation which we'll call f (MHz). However, the OCFD's feed point is located one third of the way along the wire-span from one end [1] **[3]**. At this point, the feed point's impedance is around 150 to 200Ω at the lowest frequency of operation, although the height of the antenna above the ground and the proximity of any close objects will also have an effect on the antenna's impedance **[4]**.

When the OFCD is fed with a signal that is the second harmonic of the lowest operational frequency (ie 2f), the impedance at the feed point continues to be around 100 to 200Ω. Similarly, if the applied signal is the fourth (4f) or the eighth harmonic (8f), then the feed point's impedance continues to be around 100 to 200Ω.

An explanation why a half-wavelength antenna performs in this way is illustrated in **Figure 1** for f, 2f and 4f. The current SWR distribution (standing wave ratio) along the wire span is shown in Figure 1(a), while the voltage SWR distribution is shown in Figure 1(b). The blue curve represents the SWR at f MHz and is typical of the current and voltage SWR distributions for a half wavelength antenna. Superimposed on both the diagrams are the current and voltage SWR distributions at 2f MHz (red) and 4f MHz (green). At a third of the length along the wire span the curves all cross (ie at 60°) and there is a similar point when the length becomes two thirds (ie at 120°). This implies that the impedance at these points is the same at all three frequencies, as indicated by the vertical broken lines. Therefore, a feeder cable could be connected to a feed point located at one third of the length from the wire-span's end enabling the antenna to be operated at these frequencies with a reasonably low SWR.

If a 300Ω ladder line twin cable is connected to the antenna's feed point and terminated with a 4:1 matching transformer, then the SWR seen at the transformer's input can be expected to be around 2:1 to 3:1 at frequencies f, 2f and 4f referred to 50Ω (and 8f, 16f and so on). This allows the antenna to be within the tuning range of most commercial ATUs and auto-ATUs. The concept of an OFCD fed using 300Ω ladder line is illustrated in **Figure 2**.

The OCFD antenna is inherently unbalanced because the feeder cable is not placed symmetrically with respect to the antenna's radiated field. Secondly, the antenna's legs, being of different lengths, present slightly unequal impedances. The effect of these is to cause common mode currents to flow on the feeder line. However, this is not always a disadvantage because radiation from the feeder cable can help to improve the radiation pattern by reducing any null points present **[5]**.

Table 1 summarises the suggested OCFD antenna element lengths for the HF bands, from 160m upwards.

OFCD model and radiation pattern

To obtain an indication of the performance of an OCFD antenna covering the 40m, 20m and 10m bands, a *MMANA-GAL* **[6]** antenna model was constructed. This model comprised a 21m wire span fed at one third of its length using an 8m long balanced line. The model was run with the antenna at around 8.25m above the ground.

Figure 3 illustrates the predicted radiation patterns obtained from the model, where the patterns have been given different colours

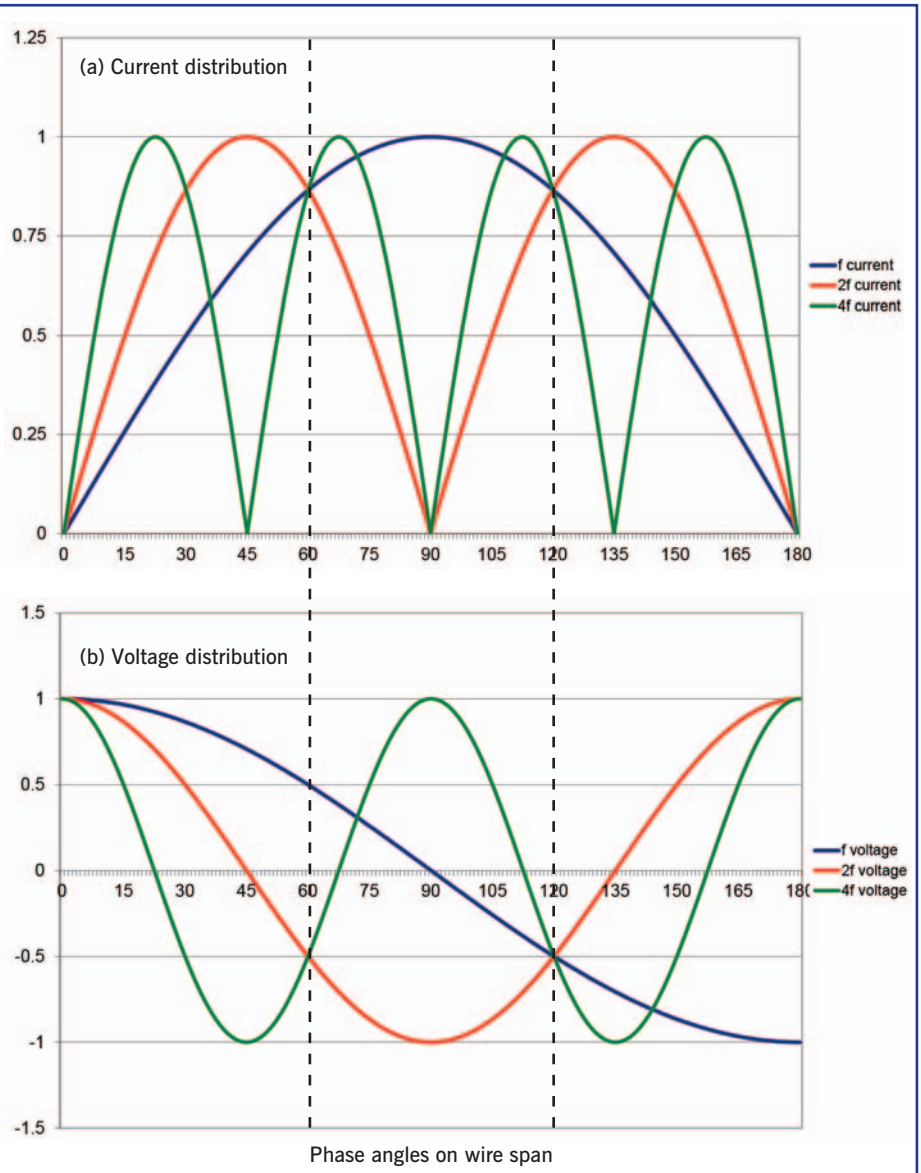


FIGURE 1: SWR current (a) and voltage (b) distributions along a λ/2 wire at the resonant frequency f, 2nd harmonic 2f and 4th harmonic 4f.

for ease of viewing. The horizontal radiation pattern is shown as Figure 3(a) and the vertical radiation pattern as Figure 3(b). Referring to these diagrams, at:

40m (blue): the horizontal pattern is close to omnidirectional and indicates reasonable coverage in all directions. However, the vertical pattern indicates most of the radiation goes skyward above an angle of 40°, indicating a more localised 'skip' radius (typically up to around 800km). However, occasionally DX contacts are possible because *some* lower angle radiation occurs from 15° to 30°.

20m (red): the horizontal pattern shows null points and the radiation is not uniform in all directions. The vertical pattern indicates most of the radiation is at a low angle to the horizon, allowing the possibility of a reasonable performance for DX contacts.

10m (green): the horizontal pattern shows several nulls and there is evidence of some directivity. The vertical pattern predicts low angle radiation lobes and a significant skyward lobe. This indicates the antenna should have an acceptable performance for DX (long distance) contacts in some directions and be reasonable for more localised contacts as could be expected during the Sporadic-E season (typically up to around an 2,000km radius).

Example HF OFCD

An OCFD was constructed for use on the 40m, 20m and 10m bands using 21m of 0.7mm stranded plastic insulated wire. The wire span was installed at around 8m above the ground, using dog-bone insulators at each end that were fastened to anchor points using nylon twine. The wire span's feed point was located 7m from one end. A sheet of PVC plastic was used for the feed point centre. This was cut to shape, then a series of holes drilled to secure each side of the wire span and to hold the ladder line feeder in position using cables ties. The ladder line was soldered to each wire span leg and PTFE tape was then wrapped around each joint. Finally, this arrangement was weatherproofed using heatshrink sleeving shrunk over the joints. **Photo 1** illustrates the feed point centre used for the OFCD.

8m of 300Ω ladder line was connected to the feedpoint to serve as the feeder. The ladder line feeder was brought straight down from the feed point into the shack and was terminated on the balanced 4:1 balun of a transmatch ATU.

The antenna performed very well on the 40m band, enabling good contacts to be made across the UK and Europe. On 20m the antenna also worked well, with the first DX contact being into Florida (KE5EE). On 10m the antenna has enabled some European Sporadic-E season contacts to be made, although the lower MUF during this part of the current solar cycle has not permitted longer distances to be worked at the time of writing.

The antenna was also tried on 80m, 60m, 17m, 15m and 12m using the ATU to tune out the high reactive impedances encountered on these bands. The antenna worked surprisingly well on 80m and 60m, allowing many UK and near-continental stations to be worked. The performance on 17m was also good, with the first contact being into North Carolina (N4LA), then on 15m to Saudi Arabia (HZ1BL) and on 12m to Israel (4Z5LA), although the conditions were not good on higher bands. These antenna tests were made using up to 100W SSB/CW.

Historical perspective

The OFCD has its origins in the Windom antenna devised by Loren Windom, W8GZ, in the 1920s. This is a half wavelength antenna, fed with a single wire connected about 36% of the way along its length. However, unlike the OFCD, the Windom antenna is worked against earth. Another similar antenna, dating from around 1950, is the Carolina Windom that is fed by means of a 4:1 balun and coaxial cable. The OCFD design dates to the 1940s, although Dr Fritz Spillner, DJ2KY, improved the design in the

Mike Parkin, G0JMI
email2mikeparkin@gmail.com

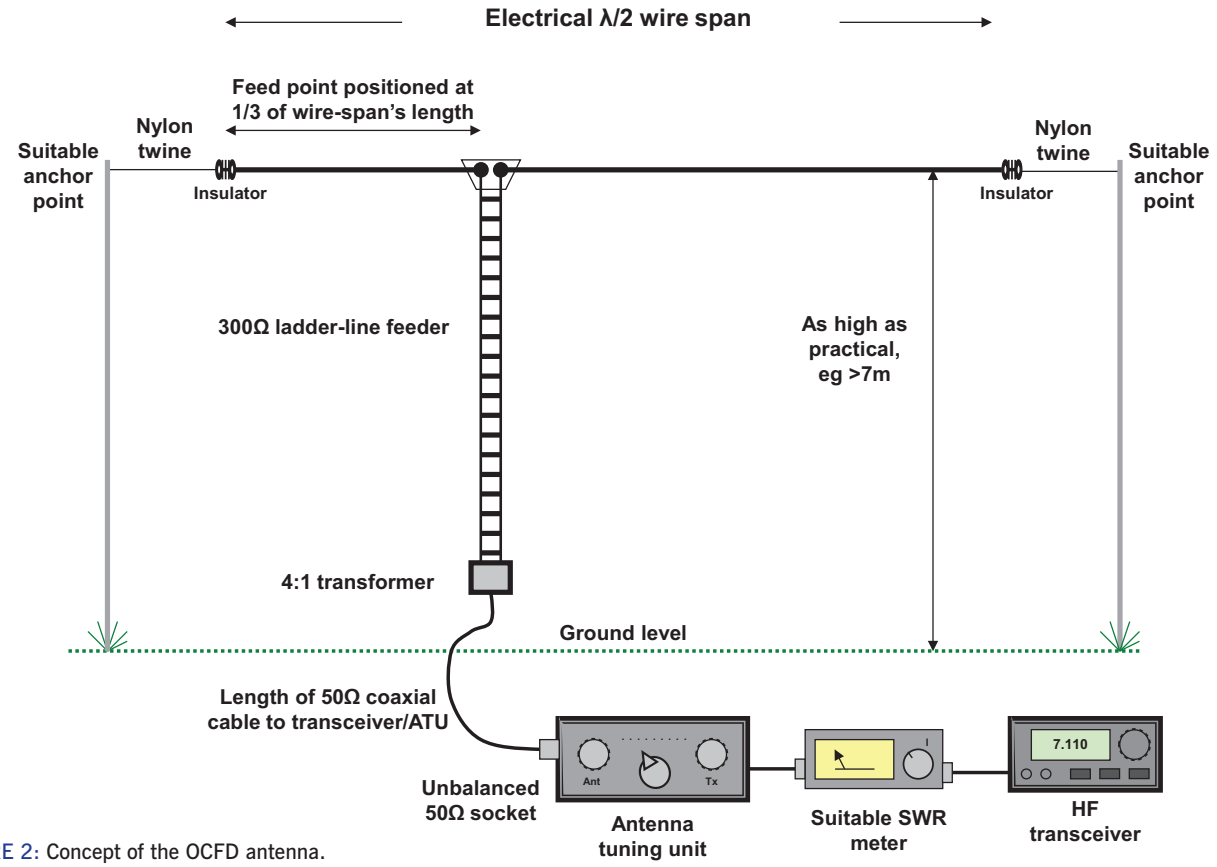


FIGURE 2: Concept of the OCFD antenna.

1970s during the development of the FD4 version of the antenna [4] **[7]**.

Conclusion

I hope the OFCD antenna designed has provided something to think about, especially if you are considering multi-band working without having to install several separate antennas and their feeder cables.

References

[1] *RSGB Radio Communication Handbook,* 13th edition, edited by Mike Browne, G3DIH, Section 15, Practical HF Antennas, pages 15.4 and 15.11

[2] RSGB *Antennas Mastered,* compiled by Peter Dodd, G3LDO, page 24

[3] RSGB *HF Antennas for Everyone,* edited by Giles Read, G1MFG, Chapter 1, Horizontal Antennas, pages 77 to 80

[4] *RadCom,* Antennas, June 2006

[5] *The ARRL Antenna Handbook for Radio Communications,* 23rd edition, edited by H Ward Silver, N0AX, Section 10, Multi-band HF Antennas, pages 10.8 to 10.9

[6] *MMANA-GAL* basic V3.0.0.31, freeware antenna analysing application. Original code by Makoto Mori, JE3HHT. *MMANA-GAL* basic and *MMANA-GAL* Pro by Alex Schewelew, DL1PBD and Igor Gontcharenko, DL2KQ, 1999 onwards.

[7] *RadCom,* Antennas, March 2006

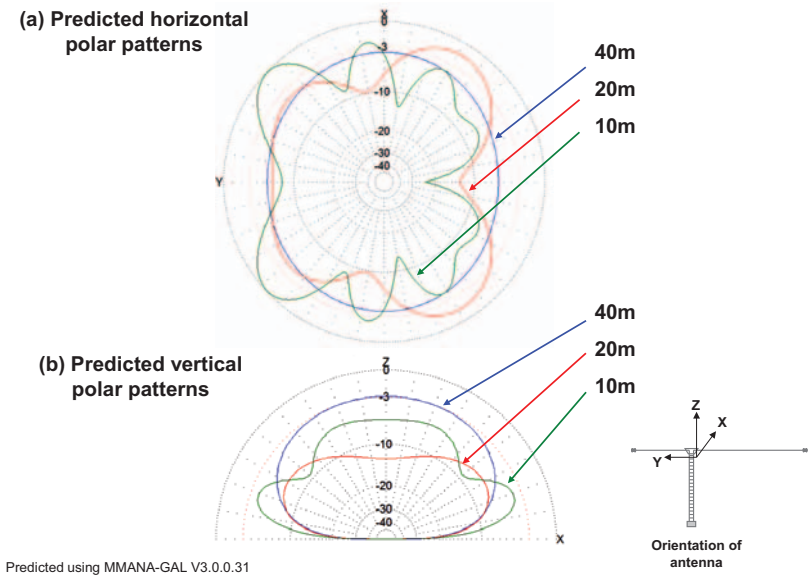
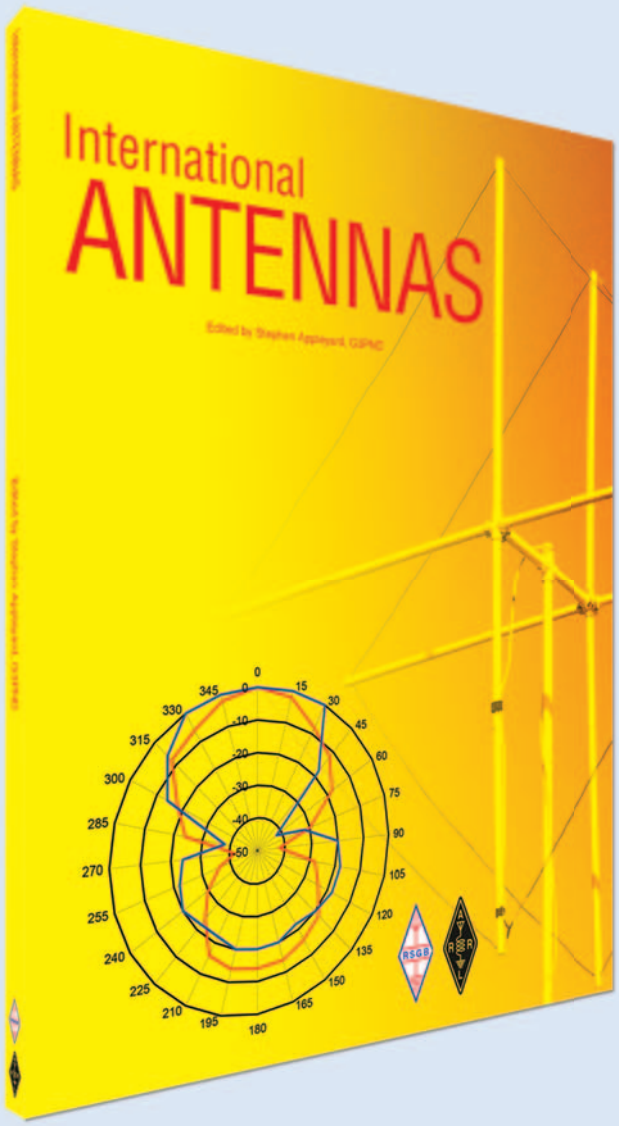


FIGURE 3: Predicted radiation patterns for the 40m, 20m and 10m OCFD antenna.

TABLE 1: Suggested OFCD antenna element lengths.

Resonant bands covered	Shorter element	Longer element
160, 80, 40, 20, 10m	28m	56m
80, 40, 20 & 10m	14m	28m
40m, 20m & 10m	7m	14m
20m & 10m	3.5m	7m

NEW TITLE



International Antennas

Edited by Stephen Appleyard, G3PND

Much is published across the world about amateur radio antennas. *International Antennas* brings together some of the very best material that has been published in recent years. There are over 50 articles included, with authors from Australia, Scandinavia, South Africa, United Kingdom, USA and more.

International Antennas has an emphasis on practical rather than theoretical. You will find descriptions of the construction and performance of antennas, enabling the reader to build their own versions. These articles have been written by experienced radio amateurs who have been so pleased with the performance of their particular antenna, that they have been moved to put pen to paper to share this experience.

There is a huge range of antennas included in this book, covering 17 bands from VLF through to 70cm. You will find articles covering the 'stealthy' antennas through to novel approaches and classic antennas. There are verticals, loops, beams and a host of unusual designs. There is so much in fact that the editor has provided a cross reference to see at a glance the bands antennas are designed for, and if they are intended for fixed use or mobile/portable operation.

International Antennas is a fabulous collection of antenna articles from around the world. It is intended for everyone who is interested in amateur radio antenna design or is just looking for practical antennas to study and build.

Size: 200 x 279mm, 176 pages
ISBN: 9781 9101 9335 8
Non Members' Price: £14.99
RSGB Members' Price: £12.74

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

Design Notes

SMT semiconductors

Back in days of yore when we used wire-ended semiconductors, we were accustomed to always having to look up the pin-outs for any new device. Bipolars could be Emitter-Base-Collector, or B-C-E or, B-E-C when looking at the bottom of the device. Field-effect transistors (FET) were Source-Gate-Drain or D-G-S (although rarely S-G-D).

When surface mount technology (SMT) packages, particularly SOT23 ones, came along things seemed a lot simpler. Bipolars were always B-C-E (see **Figure 1**) and MOSFETs were always G-D-S. So when I used a MMBR-J310 (an SOT23 packaged J310) for the first time I just assumed it would be the same and laid out the PCB accordingly. Unmitigated failure! The VCXO (for that is what it was) didn't work. Checking DC levels on the J-FET showed something very wrong. Looking at the data sheet (eventually) revealed all. The connections were S-G-D. Mentioning this on the RSGBTech Yahoo Group, others replied they had discovered the same with different type numbered SMT packaged J-FETs – and had made similar mistakes, sometimes going into large scale production! It appears that the MMBF versions of the 2N5484/85/86 and the 2N4416 all have the same pin configuration.

Fortunately the tabs of the SOT23 are almost on an equilateral triangle, so rotating and flipping the device then bending the tabs up (= down) made for a fully functioning unit, even if the FET mounted upside down and at 120 degrees did look a bit odd.

Working with Fractional-N synthesisers

We looked at Fractional-N synthesisers back in the April and November 2012 Design Notes. This synthesiser technology offers a small tuning step while keeping a wide phase-locked loop (PLL) loop bandwidth and high comparison frequency, lowering phase noise and spurii. **Figure 2** shows the block diagram of the Fract-N synthesis technique, giving all the essential dividers and registers that define the output frequency to be generated.

Since that original description several modules have appeared on eBay using the ADF4351 device, already mounted on a PCB, for constructors to drop into their own applications. A picture of one of these modules with a reference oscillator on-board was shown in the March Design Notes; another version, for use only with an external reference, appears in **Photo 1**. The ADF4351 is a complete Fractional-N synthesis chip, with integral voltage controlled oscillator (VCO) and dividers to allow any frequency to be generated from 35MHz to 4400MHz. However, although all the RF paths are present on the module to give a standalone VHF to microwave frequency source, it does need an additional controller to send the right frequency-generation information to the registers in the chip that control the dividers and other things. Digital words are sent to the chip along a three wire serial peripheral interface (SPI) bus. The three wires are serial data, clock and load-enable. The contents of all the chip's registers are sent as six individual 32 bit words.

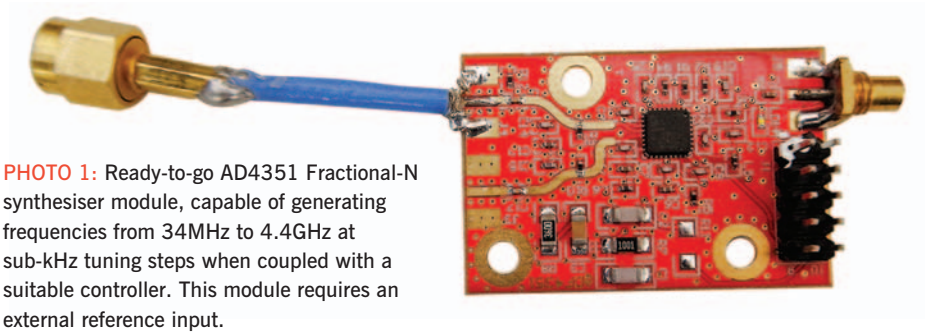


PHOTO 1: **Ready-to-go AD4351 Fractional-N synthesiser module, capable of generating frequencies from 34MHz to 4.4GHz at sub-kHz tuning steps when coupled with a suitable controller. This module requires an external reference input.**

PICs, Arduinos, PICAXEs (see last month), Raspberry Pis and a myriad of other microprocessors and controllers have all been pressed into service and for many constructors an off-the-shelf solution may suffice. But being able to control the chip, just how you want, using your own controller is surely a better way. So here we look at how to calculate the register settings to send to a Fract-N synthesiser.

ADF4351 register values

The VCO within the ADF4351 tunes over 2200 to 4400MHz (actually it works a few percent either side of this range perfectly well, but the data sheet does state 2.2 to 4.4GHz). There is an output divider that can be set to binary multiples 1, 2, 4... up to 64. This divides the VCO down to generate the final output. In **Figure 2**, the output divider is the block labelled M. So the combination of full octave coverage in the VCO and binary values of division makes for an unambiguous setting of VCO frequency and output divider that can generate any frequency within the range 4400 to 35MHz. The lowest frequency is the VCO lower limit of 2200MHz divided by the highest output divider setting of 64.

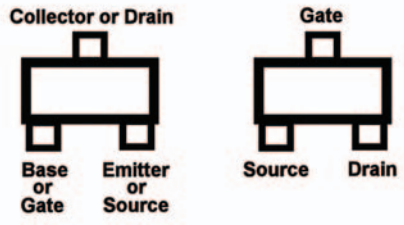


FIGURE 1: **Pin-outs of several SMT components – (left): bipolar and MOSFETs, eg BC846, 2N7002; (right): J-FET connections, eg J310, 2N5484.**

The next step is to choose a comparison, or reference frequency, to feed the phase detector. Back in the old days of simple integer synthesisers, the comparison frequency had to be the fundamental step size, so 25kHz or 12.5kHz for FM radios, 9kHz for broadcast AM etc. 100Hz steps or lower for SSB tuning had to be done in other more complicated ways. This lead to compromised synthesiser performance and low loop bandwidths until the Fract-N approach came along, having potentially very low step sizes governed by the denominator (D value in **Figure 2**). So now phase detector input frequency is no longer constrained by channel step and can be made as high as you like. In fact for Fract-N synthesis to work properly, it has to be high – several MHz is normal. If a 10MHz master reference is being used as an input, then there is no immediate reason not to make F_{COMP} equal to 10MHz. The chip itself is perfectly happy with phase detector inputs up to many tens of MHz. Other popular references are 12.8MHz (mostly historical dating from fixed channel operation) and 13MHz (reference sources from in the mobile phone industry). If this approach is taken, it means the reference divider, R can be set to a value of one.

The next stage is to decide on

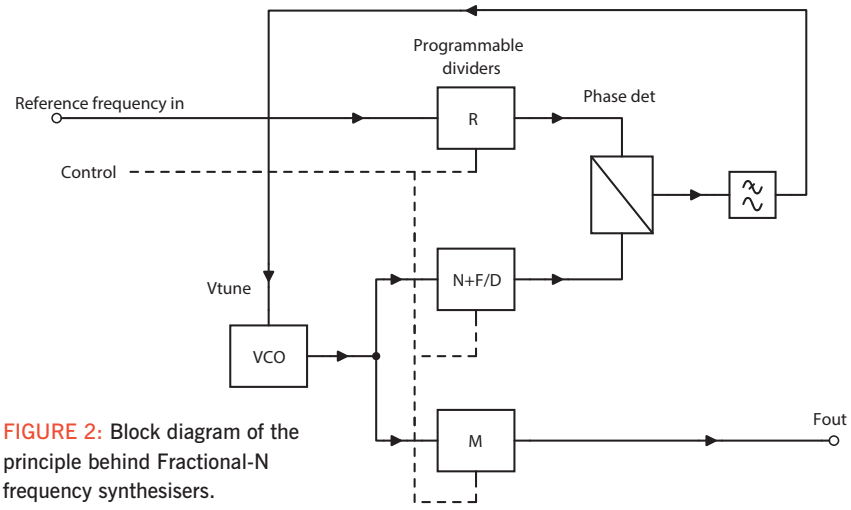


FIGURE 2: Block diagram of the principle behind Fractional-N frequency synthesisers.

our tuning step, or frequency grid. Looking at the Fractional-N equation $F_{OUT} = F_{REF} / R * (N + F / D) / M$ (1) if we fix R at 1 then the tuning step at the output is given by $F_{REF} / (D * M)$, so we choose D to give us a tuning step we can use – something convenient like 100Hz or 1kHz, say. Or even lower – 1Hz perhaps.

This is where the ADF4351 leaves something to be desired compared with other manufacturers' products. The maximum allowed value for D is just 4095, so with a 10MHz comparison frequency the minimum step size is around 2.5kHz at 2.2GHz output, or around 40Hz when the output frequency is below 68MHz with M = 64. At a lower comparison frequency smaller steps can be achieved but possibly at the expense of phase noise and spurii. Compare this with the LMX family of Fract-N synthesisers whose maximum D is 2^{21}, or around 2 million. Using the same 10MHz reference, steps as low as 5Hz (at the highest output of 4GHz) are possible with that chip – which amounts to near-enough fully continuous tuning for all practical purposes. At M = 64 this results in tuning steps of less than 0.1Hz.

For any wanted output frequency and tuning step, we now have the values for output divider M and fractional denominator D. We also have F_{VCO}, the frequency the VCO is running at. To get the other two values needed, the fractional F divider and integer divide portion N, we go back to equation (1). For R = 1, the divider N is simply given by the integer portion of F_{VCO} / F_{REF}, or $N = INT(F_{OUT} * M / F_{REF})$

The fractional part of the division, when multiplied by D, gives us the value for F.

Worked Example

We want to generate 144.123MHz from a 10MHz reference input, using the maximum possible phase detector comparison frequency and a step size suitable for SSB tuning.

First calculate the output divider M by multiplying the wanted frequency repeatedly by 2 until it falls into the allowed VCO tuning range of 2.2 to 4.4GHz.

This happens at M = 16, so
$F_{VCO} = 16 * 144.123 = 2305.968MHz$

With M = 16, the minimum possible tuning step is 10MHz / 16 / 4095 = 153Hz, so to keep numbers simple, let's use a 200Hz tuning step. That means D = 3125. (If we really wanted a 100Hz tuning step, we could make R = 2 and use a 5MHz input to the phase detector, but we'll stay with 200Hz steps and R = 1 for now).

N = INT(2305.968MHz / 10MHz) = 230

The fractional residue from the calculation is 0.5968 so F is obtained by multiplying this residue by D: F = 0.5968 * 3125 = 1865. So we now have R = 1, N = 230, F = 1865, D = 3125, M = 16. To check:

$F_{OUT} = 10MHz * (230 + 1865 / 3125) / 16 = 144.123MHz$

These register values now need to be placed in the appropriate places in the six 32 bits words to be sent to the chip and loaded in. Look at the chip datasheet **[1]** to see exact serial programming and word formatting details. The ADF4351 will now start outputting the wanted frequency. Several other values also have to be programmed in to set the chip functions, but for most purposes once determined for a particular hardware configuration they can remain fixed. In practice this means they will be defined as constants and merged with the calculated values.

Integer sums

Calculating the fraction residue is all very well if we use floating point arithmetic that can handle decimal values. But in many microcontrollers, only integer (whole number) arithmetic is allowed, or at least is to be preferred on the grounds of calculation speed. So a slightly different set of calculation steps are needed. First we have to define what the integers actually mean. Representing the frequency in units of 1Hz keeps things straightforward and, at least up to 4.29GHz, means only 32 bit values (4 bytes) are needed to represent any frequency. Units of 10Hz or 100Hz, or 0.1Hz or whatever are equally valid, provided they are used consistently throughout.

M, D and N can all be derived as before, since only integer multiplication and division is required here. But getting the fractional part is now different. Integer division leaves a remainder instead of a fraction. In the example above, with frequencies in Hz, the division is 2305968000 / 10000000 that gives N = 230 as before, but now a remainder of 5968000. With a bit of juggling of the Fract-N equation, we find that dividing this remainder by the step size and then the output divider M gives us F; all using integer division. With the step size of 200Hz and M = 16: 5968000 / 200 / 16 = 1865. The only proviso is that we must have pre-calculated the step size, given by $F_{REF} / D / M$, which itself may involve another division process that has to be performed if we want to tune over a wide range.

Integer division of 32 bit values is straightforward in PIC code (even in pure assembler language) and very much faster than the 'classic' floating point route in any controller likely to be used with such a synthesiser.

The ADF4351, with its octave coverage and binary stepped output dividers, results in a simple calculation. Things are more complicated with the LMX2541 device, which has a VCO with a lower tuning range but a wider choice of output divider settings, anything from 1 to 64. For a given variant of the device, some demanded frequencies, typically above 500MHz, have gaps where they cannot be generated. Conversely, lower frequencies may allow for several output divider values and a choice must be made. An algorithm for determining the register settings for the LMX2541 device using pure integer arithmetic can be found at **[2]**.

Websearch

[1] ADF4351 datasheet: www.analog.com then search for ADF4351

[2] Calculating LMX2541 register values: www.g4jnt.com/CAT_Controlled_Synth.pdf

Andy Talbot, G4JNT
andy.g4jnt@gmail.com

The Portsdown digital ATV transmitter

Amateur television (ATV) has seen many changes over the last 20 years, particularly with the introduction of digital transmission and the availability of the 146MHz band. The Portsdown transmitter is designed as a project for newcomers and those who were active on 70cm ATV in the 1980 and 1990s and are now looking to return to the hobby.

Analogue methods of sending fast-scan TV require up to some 20MHz of bandwidth for a standard definition signal. Digital compression techniques can reduce this to less than 500kHz with acceptable results, opening up the possibility of operating on bands that were traditionally too narrow for amateur television (ATV).

The Portsdown project

The aim of the Portsdown digital ATV (DATV) transmitter project is to enable an amateur radio operator with little or no knowledge of DATV to construct the hardware elements, load and configure the software and use the system to send live digital ATV signals across town on existing aerials.

The outline specification is as follows:

- Frequency coverage of the 71MHz, 146MHz, 437MHz and 23cm ATV bands
- Cost-effective stand-alone (not PC based) DATV transmit solution
- Wide range of Symbol rates from 125ksps (kilosymbols per second) to 4Msps (megasymbols per second) covering reduced bandwidth TV (RBTV) and DATV modes
- Modular construction enabling a step-by-step system build and easy troubleshooting
- Designed to encourage home construction requiring an average skill level
- Fully documented and supported including easy software installation and upgrades.

The project, initiated by the British Amateur Television Club (BATC) involves some basic construction and is based around a Raspberry Pi 3 and other readily available components plus a custom designed filter modulator card. This card is available to BATC members from the BATC shop [1] as a ready built board or as components for DIY assembly. *[For complicated tax reasons, the BATC shop can only sell to BATC members, however BATC membership starts at just £8 per year – Ed].*

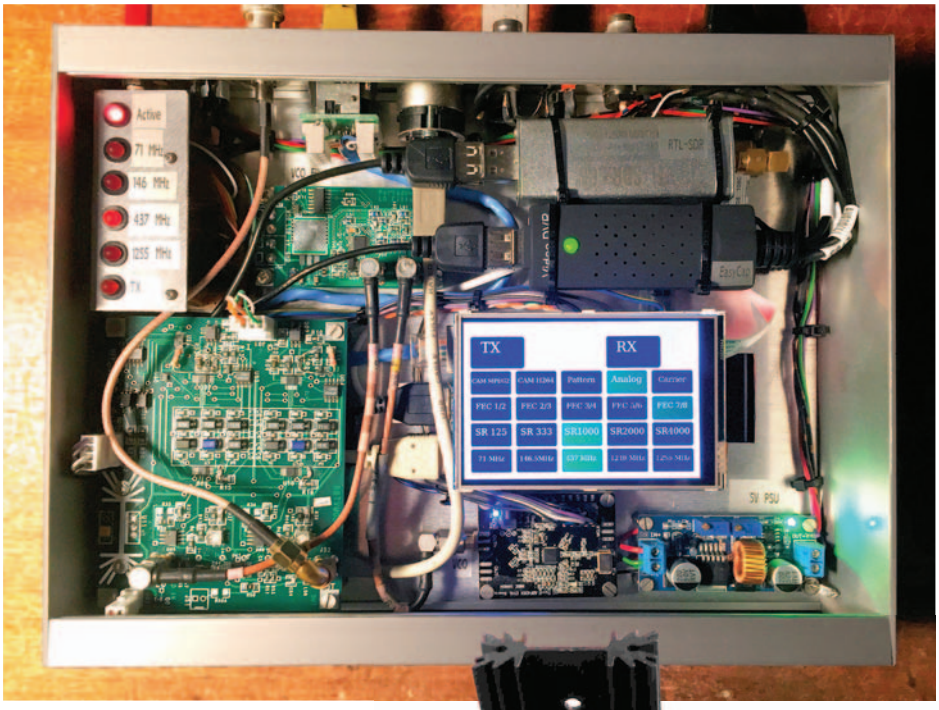


PHOTO 1: **General view inside the Portsdown transmitter. The Raspberry Pi 3 and GPIO board are hidden beneath the screen.**

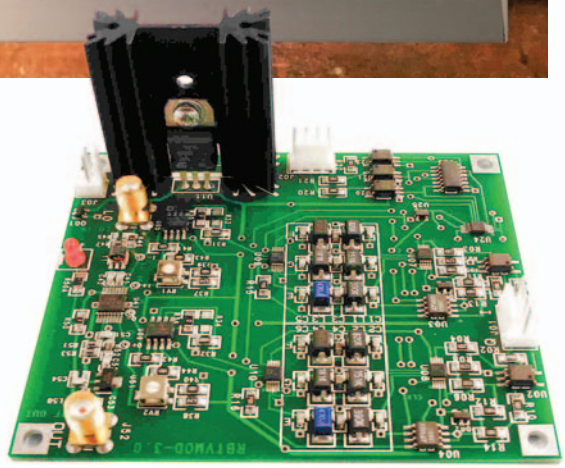


PHOTO 2: **Portsdown filter modulator card.**

Digital ATV bands and modes

Until recently digital amateur TV has been transmitted on the 70cm band and above and, in the UK, we have adopted the DVB-S digital standard using quadrature phase shift keying (QPSK) modulation. This has the benefit of variable bandwidth depending on the bit rate or symbol rate used for the video transmission. Transmissions on these bands would normally use 2 or 4 Msps using a bandwidth of approximately 2.5 or 4.5MHz respectively.

However, when access to the 71 and 146MHz bands was made available in the UK, Ofcom made it clear that they wanted to see the additional spectrum used for experimentation rather than just more FM channels. As a result the ATV community has been experimenting with transmitting DATV signals using very narrow bandwidth, 'Reduced Bandwidth Television' (RBTV), in approximately 500kHz. The experiments have been very successful, with several stations achieving greater than 200km on 146MHz using the very modest 25 watt effective radiated power (ERP) limit (which has recently been increased to 50W).

There are considerable technical challenges to reduce the transmitted bandwidth of a digital TV signal to below 1MHz, as it impacts on several areas of DATV equipment design, but the Portsdown transmitter has been designed to do both RBTV and the normal wider DATV modes.

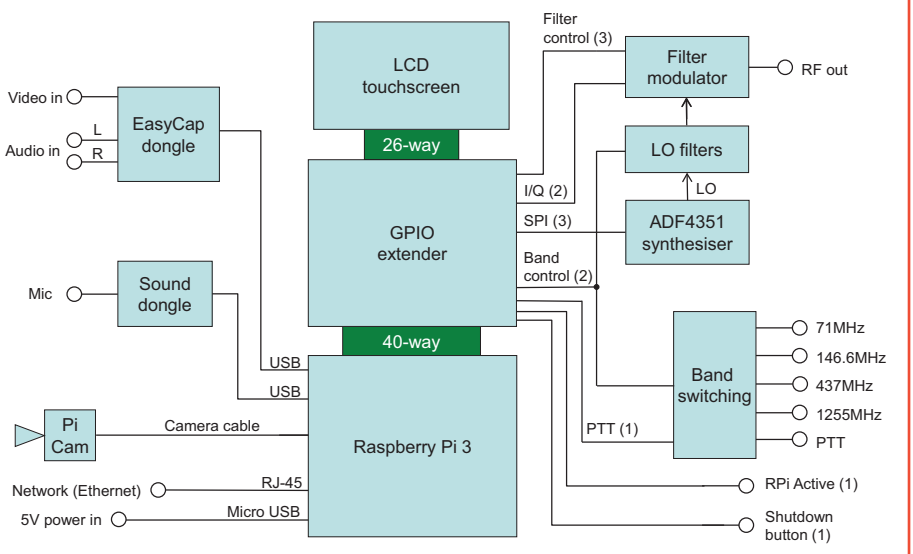


FIGURE 1: Block diagram of the Portsdown transmitter.

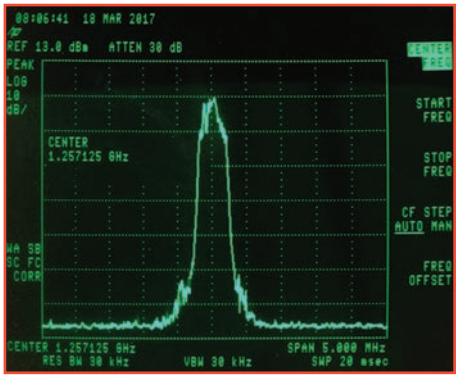


FIGURE 2: Portsdown spectrum output at 1255MHz at 333ks/s.

FIGURE 3: G8GKQ/P using a Portsdown Tx on 146MHz over a 60km path, received via MiniTiouner.

The Portsdown project

The project provides an easy way to get 'on the air' with DATV at a relatively low cost (approximately £250) and is capable of all of the commonly used DATV bands and modes, enabling it to be used for cross town QSOs, accessing ATV repeaters and for working the DX using RBTV modes.

BATC decided to give the name Portsdown to this significant project in order to recognise the valuable contribution that the BATC's previous President, the late Peter Blakeborough, G3PYB played in bringing DATV and RBTV to the ATV community. In particular, it was at his QTH on the side of Portsdown Hill in Hampshire that a meeting was held in Spring 2015 to define the standards for RBTV.

The Portsdown DATV transmitter

A DATV transmit system is made up of a number of key elements:

- Video encoder, to digitise and compress the video and audio signals
- Digital processor to a convert the video and audio data to a 'transport stream' (TS) and add error correction
- A QPSK modulator to modulate the carrier frequency with the bit stream from the encoder
- Digital-capable linear RF filters and amplifiers.

At the heart of the Portsdown project transmitter is a Raspberry Pi (RPi) version 3 computer running a BATC-customised version of the F5OEO *rpidatv* software. The choice of the RPi is primarily due to the fact that it has an on-board MPEG-4 (H264) encoder and versatile hardware interface (GPIO) capabilities. **Figure 1** shows the block diagram of the Portsdown transmitter and **Photo 1** the general appearance of the complete unit.

Whilst an external PC is required to initially configure the system, the Waveshare touch screen module seen prominently in Photo 1 enables the system to be used without the need to connect up a keyboard and mouse, making it ideal for portable operation. Alternatively, the system can be controlled in 'console mode' using an external PC connected over a wired or Wi-Fi network.

The Portsdown transmitter will take video inputs from the RPi camera or an analogue video input using an Easycap type USB capture device (available from the BATC shop), seen in Photo 1 with a green LED glowing. Audio input is provided by a USB sound dongle and the unit can also play video files and test pattern JPEGs directly from the RPi SD card.

Local oscillator

A local oscillator signal on the required output frequency is generated by a separate module. Whilst any clean oscillator can be used, the Portsdown RPi software is capable of controlling off the shelf ADF4351 modules, currently available for around £20, to give an output for 71, 146MHz, 437MHz and 23cm.

Digital modulator

The RPi is used to generate the MPEG bit-stream and the IQ signals, which are sent via the GPIO port to the Filter Modulator card. This was developed by Colin, G4KLB and John O'Loughlin, and is capable of the wide symbol rate range required. This card has been specifically designed for the Portsdown project and both blank and assembled PCBs are available from the BATC shop.

Table 1 shows the typical output levels from the modulator card. The output is at a relatively low level, +5 to +10dBm depending on frequency and symbol rate (SR), and provides a useable output from 71MHz to 1300MHz. The performance above 1300MHz is not guaranteed but could prove very useful as the driver for an Eshailsat 2 uplink station on 2400MHz.

Figure 2 shows the Portsdown spectrum output at 1255MHz when running at 333ks/s.

As well as the main, filtered output discussed in the next paragraph, the Portsdown software has an 'ugly' QPSKRF (quadrature shift keying radio frequency) test mode that directly generates a DATV signal on 437MHz using the internal RPi clocks. This facility is very useful for initial across-the-shack testing but has limited functionality and, as its name implies, is absolutely not suitable for putting directly on air.

Although there is some basic filtering, the main output will require subsequent filters and amplifiers, depending on the band and power output level required. Many designs have previously been published and, whilst they will not form part of the Portsdown project, there are links to them on the BATC wiki [2].

Noel Matthews, G8GTZ
chair@batc.tv

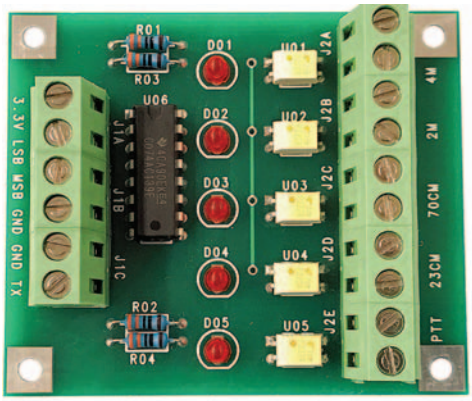


PHOTO 3: Band decoder card.

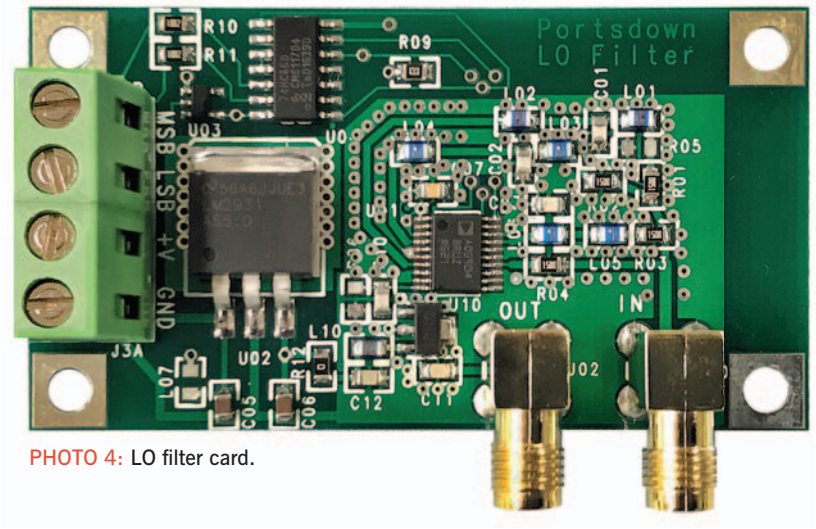


PHOTO 4: LO filter card.

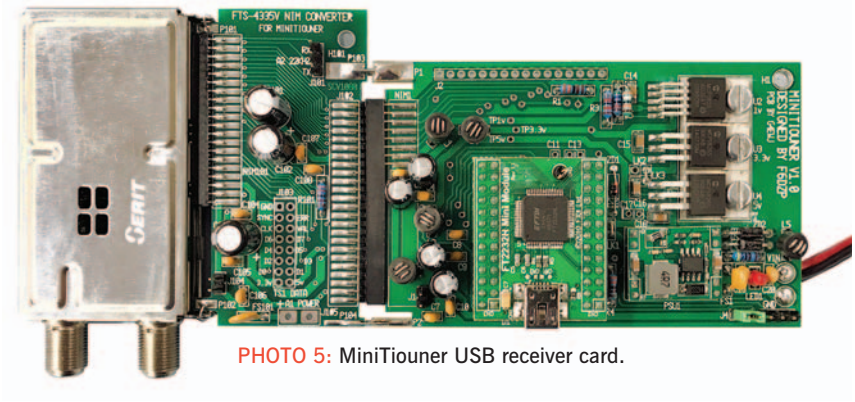


PHOTO 5: MiniTiouner USB receiver card.

PTT and power amplifier control

A number of ancillary boards have been developed for use with the Portsdown transmitter including a 4 band PTT control card (**Photo 3**) and a local oscillator filter (**Photo 4**). Blank PCBs for all are available from the BATC shop and, whilst they all use surface mount components, they are designed for home construction.

Receiving Portsdown

Receiving normal bandwidth DATV is surprisingly easy, particularly on the 23cm band, as it does not require any external frequency converters. The Portsdown transmitter, which uses the DVB-S standard, can be received on any Free to Air satellite set top box, including Freesat boxes. The Freesat V7 is a particular favourite.

To receive the RBTV transmissions you will need the special MiniTiouner USB receiver developed by F6DZP (**Photo 5**). The hardware is simple to build and the software is downloaded from F6DZP's site. Full details are available on the BATC wiki **[3]** and all the hard-to-get parts are available from the BATC shop. The MiniTiouner receiver also covers 140 – 2450MHz and thus does not require any external converters to receive 146, 437 and 2400MHz ATV signals.

On the air

The Portsdown transmitter has been used to transmit full resolution digital TV pictures via TV repeaters and also been used when portable to make RBTV contacts on 146MHz in recent BATC activity days (**Figure 3**).

Next steps

This article is just an overview of the project. For more details visit the BATC wiki pages and start reading the user guide or take a look at episode 15 of Tx Factor **[4]**, which has a feature on ATV and the Portsdown project.

The BATC wiki provides all the information about the project and practical help is at hand from the BATC forum **[5]**, which has a dedicated Portsdown topic.

Then I suggest you add a Raspberry Pi version 3, camera, touch screen LCD and ADF 4351 module to your shopping list and keep a watch on the BATC forum / wiki for updates. If you already have a MiniTiouner, download the latest version of the Portsdown software and experiment with the QPSKRF or 'ugly' test mode across the shack.

Finally

Over 130 sets of parts were bought by stations around the world in the first two months after the project was released and there is an active community of users who offer support and exchange ideas on the Portsdown users' forum [5].

The Portsdown project aims to condense many recent RBTV and DATV initiatives into one, easy-to-build and get on air project. It aims to bring DATV and RBTV within the grasp of the average operator who still values some basic hands-on construction and is looking for a project that will deliver the capability to operate on all the commonly used DATV and RBTV modes at a reasonable cost.

Websearch

[1] https://batc.org.uk/shop/portsdowntc
[2] https://wiki.batc.tv/The_Portsdown_Transmitter
[3] https://wiki.batc.tv/MiniTioune
[4] www.txfilms.co.uk/txfactor/current-show.html
[5] www.batc.org.uk/forum/viewforum.php?f=103

TABLE 1: Transmitter performance and receive modulation error rate (MER).

Frequency	Symbol rate	Output level	MER from MiniTioune v0.5a
71MHz	333k	9.6dBm	25dB
146.5MHz	333k	10.1dBm	26dB
437MHz	333k	9.2dBm	26dB
437MHz	1M	9.0dBm	26dB
1255MHz	333k	5.0dBm	26dB
1255MHz	1M	5.0dBm	26dB
2400MHz	333k	-7.0dBm	25dB
2400MHz	1M	-7.0dBm	25dB

WATERS & STANTON
EUROPE'S HAM STORE

'Antenna installation and maintenance season is coming up on us fast and at W&S we hold more brands of antennas than anyone else in addition to manufacturing antennas ourselves too! If you want advice on what you need or what would be best for your environment, call me and I will help you decide the best route for you.'

Justin G0KSC

ELECRAFT® W&S the ONLY UK Official Dealer

KX2

Go wherever your imagination takes you thanks to its compact construction, it's only 5.8 x 2.8 x 1.5" making it the smallest full-featured HF radio on the planet. Yet it puts out up to 10 Watts, covers 9 bands and shares many features with the KX3.

To maximise your freedom outfit your KX2 with an internal 2.6 amp hour Li-ion battery (KXBT2) yielding up to 8 hours of typical operation on a single battery charge. There's also an internal automatic antenna tuner module (KXAT2), which can tune a random wire, dipole or whip on multiple bands.

The KX2 can even be used as a hand-held. It includes a built-in mic for HT-style operation.

KX2 £859.95

KX2 ACCESSORIES

CS40	Small compact carry case for KX2, and small accessories	**£38.95**
CS60	Large compact carry case for KX2 & MH3 mic plus more accessories	**£54.95**
KXAT2	Internal ATU to tune even non-resonant 'random' wire antenna	**£219.95**
KXBT2	Internal battery gives up to 8 hours operation from a single charge	**£69.95**

K3S

The new K3S transceiver features a number of improvements and additions. These include:

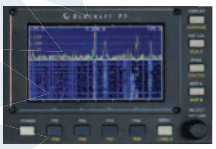
• New synth board for lower Tx/Rx phase noise • IF interface board • 12m-6m low noise pre-amp • USB interface that carries data and audio • New 10W driver board • New motherboard layout for reduced noise • 100W PA upgrade • New Rx Speaker Amplifier.

K3S/100-F £2999.95
K3S/10-F £2449.95
K3S/100-K £2849.95
K3S/10-K £2299.95

K3S ACCESSORIES

SP3	High performance matching speaker with two switchable inputs	**£219.95**
KAT3A	Internal 100W ATU with a second antenna jack	**£449.95**
KDVR3	Digital voice recorder	**£179.95**
K144XV	Internal 2m 10 Watt option	**£449.95**
K-POD	External VFO knob with essential controls for faster access	**£299.95**
KFL3AA	Range of roofing filters with different frequencies and poles	

ELECRAFT® ACCESSORIES • UK's Official Dealer



P3 PANADAPTER

Panadapter display adds a visual element to signal hunting with fast real time spectrum and waterfall.

Perfect for K3 and K3S with fast set up.

Kit: £819.95
Full: £859.95

KPA500

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

Kit: £2449.95
Ready Built: £2649.95

KPA1500

- 1500W
- Very compact design
- Fast, silent PIN diode T/R switching
- Built-in Antenna Tuner with dual antenna jacks
- Compatible with nearly any transceiver 160-6 meters

Price: TBA

IHS™
INTERNATIONAL HAM STORES GROUP

The sign that means a GREAT DEAL!

Three of the UKs leading Ham Radio Retailers (Waters and Stanton, Nevada and Innovantennas) have combined and operate from a combined distribution centre and showroom in Farlington, Portsmouth. The new facility forms the largest ham radio warehouse and distribution centre in the country housing a wider selection of products than any other UK based company.

IHSG are hiring!

If you believe you have value you can add to our expanding team, mail us! **justin@ihsg.co.uk**

call: **01702 204965** email: **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

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

BEKO IHSG APPOINTED SOLE UK DISTRIBUTORS

INTRODUCTORY OFFER FREE SHIPPING on all BEKO products

All models available call for details

HLV-2000 2 Amp

A compact solid state, high efficiency 2kW amplifier providing exceptional performance on 144/148MHz with single input and single output.

£4299.00

HLV-950-FLEX 6m/4m Amp

HVL-950-FLEX is a version of the HLV-950 designed to accept the 0dBm input on 4m from the Flex 6500/6700 and give up to 700W out on 4m, 1kW on 6m. Use your 6500/6700 on a dualband Yagi with this amplifier in place!

£2749.00

HLV-770 70cms Amp

A compact solid state, 770W high efficiency amplifier providing exceptional performance on 430/440MHz with single input and single output.

£2550.00

KENT MORSE KEYS

Standard Brass Straight Morse Key

Standard Brass Straight Morse Key built from solid brass on a beautiful wooden plinth. **HKA/K**

Built: **£98.95** Kit: **£85.95**

Twin Paddle Brass Morse Key Assembled

Twin Paddle Brass Morse Key Assembled. Ideal for those who prefer to use an electronic keyer. **TPKA/K**

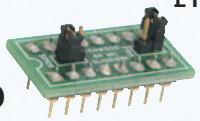
Built: **£112.95** Kit: **£96.95**

TIGERTRONICS

SL-USB

SignalLink USB sound card radio interface with CD available for a wide range of transceivers and microphones.

£119.95



SL-MOD

Plug and play jumper module for use with the SL-USB to allow you to change which radios and mics the SL-USB will work with.

£9.95

SL-CAB

Extra radio cables for the SignalLink available in various versions.

£22.95

CABLE

RG-58

50 Ohms coax with an outer diameter of 4.95mm

RG-58.....(Per Meter).....£0.70
DRG-58-50.....(50m Drum).....£23.95
DRG-58.....(100m Drum).....£45.95

50 Ohms coax with an overall diameter of 6.1mm

Mini-RG8.....(Per Meter).....£1.00
DR-Mini-RG8-50..(50m Drum).....£39.95
DR-Mini-RG8.....(100m Drum).....£79.95

RG-213

50 Ohms low loss coax and a diameter of 6.1mm

RG-213.....(Per Meter).....£1.50
DRG-213-50.....(50m Drum).....£69.95
DRG-213.....(100m Drum).....£139.95

W-103

50 Ohm low loss coaxial cable - ideal for UHF/VHF or HF

W-103.....(Per Meter).....£1.50
DR-W103.....(100m Drum).....£139.95

300 Ohms Slotted Ribbon cable

300-S

300-S.....(per meter)....£1.00
DR-300S.....100m Drum).....£85.95

450 Ohms low loss ladder line

450-S

450-S.....(Per Meter)....£1.20
DR-450S.....(100m Drum).....£89.95

FLEX RADIO

FLEX-6300

Entry point SDR transceiver, but no slouch!

- All modes including digital
- Covers: 160m-6m
- 100W output

£2499.95

Flex-6500 with 4 slice RX.....£4049.95
Flex-6700 with 8 slice RX.....£7199.95

TOWERS and TRAILER TOWERS from stock

Now stocking Acom amplifiers
Call for best prices!

MFJ

MFJ-1835..... Cobweb HF antenna £239.95
MFJ-1835H..... 1.5kW version of above..... £269.95
MFJ-226..... Antenna analyser 1-230MHz..£339.95

MFJ-939
Auto ATU 200W Y/K/I.. £169.95

MFJ-939..... Auto ATU 200W Y/K/I.....£169.95
MFJ-994BRT..... Remote antenna tuner.....£459.95

MFJ-949E
Auto ATU 300 Watts.... £194.95

MFJ-557
Practice Morse key..... £54.95

call: **01702 204965** email: **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!

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

KENWOOD ACCESSORIES

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

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

MC-90
Desk mic for DSP transceivers.... **£204.95**

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

HS-5W
High quality deluxe headphones.. **£56.95**

NEW LICENCE DEAL CALL FOR DETAILS

TS-590SG

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

Call for best prices

FREE SPEAKER

LAST FEW AT W&S SPECIAL PRICE

TS-990S

HF/6m 200W transceiver with dual TFT display with a dynamic power supply that means no external unit is required.

£4999.95

ICOM DEALS

OFFICIAL RE-SELLER

IC-7300

HF/6m/4m transceiver with integrated SDR and built-in wide frequency automatic antenna tuner, ideal for field operation. Operate with 100 Watts on HF/50MHz and 50W on 70MHz.

£1199.95

SP-38

Matching speaker designed specifically for the IC-7300 improving sound quality and experience. **£129.95**

COMING SOON!

IC-7610

Successor to the IC-7600 and will be a dual-watch capable HF+50MHz 100W base station with built-in antenna tuner. The LCD will be touch screen and you will be able to connect an external display. The radio will be based on SDR technology, similar to the very popular IC-7300.

£3599.95

£20.00 secures one of our first batch!

ID-51E-PLUS2

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

Call to Pre-Order yours now

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

WE ARE SDR SPECIALISTS

WHERE WE OFFER EXPERT AND IMPARTIAL ADVICE

YAESU DEALS

OFFICIAL RE-SELLER

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.

Call for best price

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

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.

Call for best price

FT-857

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

Call for best price

FT-450D

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

Call for best price

FT-DX1200

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

Call for best price

FT-817ND

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

YAESU ACCESSORIES

MD-100A8X
Desk mic with PTT..... **£119.95**

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

FC-30
External ATU for FT-897 and FT-857 .....**£56.95**

Coming Soon!

Pre-Order now

FT-65E
2m/70cm Handheld Transceiver variable 5W output

FT-25E
2m Monoband Handheld Transceiver with variable 5W output

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

WATSON

BASE STATION VERTICALS

Colinear (fibreglass) with 2" mast fittings

W-30
45 Amp variable voltage switched mode power supply with 'noise shift' feature.
.....£54.95

W-50
2m/70cm, 4.5/7.2dB gain and 1.8 meters long.
.....£64.95

W-300
2m/70cm, 6.5/9dB gain and 3.1 meters long.
.....£104.95

W-2000
6m/2m/70cm, 2.15/6.2/8.4dB gain and 3.1meters long.
.....£104.95

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.
.....£28.95

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

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

DON'T SEE WHAT YOU NEED?

Call or visit our website, we have over 7000 products available?

HANDHELD ANTENNAS

Flexible handheld air band receiving/scanning antenna.
W-901 BNC connector.....£19.95
WSMA-901 SMA Male.....£21.95

2m/70cm flexible handheld antenna.
WHXX-270 BNC connector.....£21.95
WHSM-270 SMA Male.....£21.95

ATX-MkII
Portable 80m-6m antenna with 3/8, PL259 and BNC connectors for scanners etc.
.....£104.95

W-2000
6m/2m/70cm, 2.15/6.2/8.4dB gain and 3.1meters long.
.....£54.95

ATX-WBN
Portable 80-6m antenna with BNC connector only for scanners etc. Max. length 32cms.
.....£46.95

ATX-WPL
Portable loaded whip 80m-6m with multiple tap points BNC fi tting suit FT 817 & scanners.
.....£46.95

WHF- Range
Mobile antennas with 3/8 stud mount, available for 20m to 2m.
..... From £19.95 to 59.95

W-627
6m/2m/70cms Triband mobile whip PL 259 base, 2.15/4.8/7.2dB and 1.62 meters long.
.....£44.95

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

WATSON BALUNS

400 Watts weighing 200 grams with SO-239 base connector and hook loops for mounting.
WB-1 1:1 Balun rating.....£29.95
WB-4 4:1 Balun rating.....£29.95
WB-6 6:1 Balun rating.....£29.95

G5RV ANTENNAS

Full Sized
31m long (102ft) 80m-10m with 300 Ohm ribbon feeder, super budget HF multi-bander!
.....£35.95

Half Sized
16m long (51ft) 40m-10m with 300 Ohm ribbon feeder, small garden HF multi-bander.
.....£24.95

DUMMY LOAD

DM-15WN
20 Watt Dummy Load (4 seconds 50 Watts) to 800MHz with N-type male.
.....£21.95

DM-200N
100 Watt Dummy Load (5 seconds 200 Watts) to 3GHz with N-type.
.....£64.95

DM-150
100 Watt Dummy Load (10 seconds 150 Watts) to 1GHz with PL PL259.
.....£44.95

WATSON MULTI-RANGER

Multi-Ranger-9
HF-UHF Mobile antenna fitted with PL259 1.9m long rated to 120 Watts.
.....£59.95

Multi-Ranger-200
HF-VHF Mobile antenna fitted with PL259 1.6m long up to 200 Watts input!
.....£79.95

MULTI-PROG

No need for dozens of separate cables for all your radios with this one programming cable and interchangeable adapters works with most manufactures.
.....£19.95

POPULAR WEATHER STATIONS

W-8681-ProII
Professional grade wireless weather station with in and out door sensors, colour display.
..... £219.95

W-8682-MkII
Budget weather station with in and out door sensors, mono display at a bargain price.
.....£64.95

W-8684
Compact inside / outside thermometer combines temperature information, with a bedside clock.
.....£14.95

W-8685
Wireless linked Indoor / Outdoor Thermometer, plus alarm clock & rolling date.
.....£9.95

W-8683
A complete weather forecaster and weather station in one very compact and portable package.
.....£29.95

W-8681-Solar
This product will power all the sensors connected to it and transmit the data to the main unit.
..... £104.95

STATION ACCESSORIES

SP-350V
Static Discharge connect to ground and install within your coax line for protection SO-239.
.....£21.95

SP-350VNS
Static Discharge connect ground connector as above with N-type connectors each end.
.....£25.95

WM-S
Gooseneck Mobile Microphone clips to sun visor for easy install. PTT box supplied.
.....£59.95

call: 01702 204965 email: 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

HEIL THE UK'S OFFICIAL DISTRIBUTOR

HM-12
Designed specifically for ham radio use its high output range works with low impedance radios
£79.95

PR-30
Large Diaphragm Dynamic Studio and Broadcast Microphone in Champagne for Ham Radio and Studio Recording **£299.95**

HTH I/K/Y
Headphone w/PTT and Mic

Single sided, lightweight headset, which is hands free and provides high quality discreet two way communications. **£38.95**

HMM
Clam Shell Mic

Microphone element within a clamshell design giving superior sound.
£94.95

PRO-7
Professional Boom Mic Headset

Bringing new technology the Pro-7 provides extreme comfort and amazing sound. **£259.95**
Icom model including lead **£79.95**

All HEIL Parts and Accessories are available through us.
Call us for details

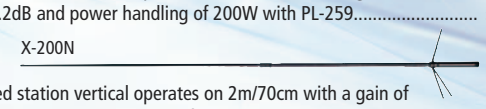
CABLES
Required for most products
To find which cable/adaptor you will need please give us a call on
01702 206835

DIAMOND

V-2000
Triband base antenna operating on frequency bands 6m/2m/70cm utilises a linear phase shift design
..... **£99.95**

CR-8900 4 band mobile whip antenna that was designed with the FT-8900 quad band mobile in mind but works with over radios..... **£89.95**
X-30 Fixed station vertical operates on 2m/70cm with a gain of 3/5.5dB and power handling of 150W with PL-259..... **£48.95**
X-50 Fixed station vertical operates on 2m/70cm with a gain of 4/7.2dB and power handling of 200W with PL-259..... **£59.95**

X-200N



X-200N Fixed station vertical operates on 2m/70cm with a gain of 6/8dB and power handling of 200W with N-Type..... **£84.95**
X-300 Fixed station vertical operates on 2m/70cm with a gain of 6.5/9dB and power handling of 200W with PL-259..... **£89.95**
SRH-701 SMA 2m/70cm Dualband Telescopic Whip with power handling of 10W and 19cm long..... **£14.95**
SRH-771 SMA 2m/70cm flexible Whip antenna with power handling of 10W and 40cm long..... **£14.95**

SRH-815

SRH-815 High gain 15cm antenna for 2m/70cm/23cm power handling of 6W with SMA plug..... **£27.95**
SRH-999 6m/2m/70cm/23cm Quad band HT Antenna that is of high quality and high gain..... **£35.95**

WANT TO BUY MORSE?
Call us, visit us online or instore for a wide range of Morse products

MFJ'S ONLY OFFICIAL IMPORTER IN THE UK

MFJ-1835


This five-band (20, 17, 15, 12, 10 Meters) half-wave open-loop is perfect for restricted space or portable operation. **£209.95**

MFJ-949E


Full 1.8-30MHz operation 300W antenna tuner with peak cross meter. **£199.95**

MFJ-974HB


Fully balanced true balanced line antenna tuner. **£229.95**

MFJ-266


HF/VHF/UHF antenna analyser with all RF-diagnostic functions you need. **£389.95**

MFJ-1788X


MFJ's tiny 36 inch diameter loop antenna lets you operate 10 through 40MHz continuously- including the WARC bands! Ideal for limited space. **£389.95**

MFJ-1886X
0.5MHz-30MHz receiving loop for massive reduction in receiving noise and those with limited space.
£269.95

MFJ-259C
HF/VHF/220MHz, 0.53-230MHz, SWR Analyser.
£279.95

MFJ-993B


300/150W Dual power ATU 1.8-30MHz.
£299.95

MFJ-991B
HF 300/150W Dual Power ATU.
£279.95

YRC-1X


Yaesu Rotator Controller with USB port for remote control, Graphic LCD screen, userprogrammable callsign, 9/16" antenna direction display and more.
£369.95

MFJ-16010
200W variable random wire antenna tune capable of matching almost any length wire from 160-10m.
£79.95

AL-811XCE
Linear Amplifier 160-10m 600W 3 x 811A.
£949.95

MFJ-969


HF+6m 300W antenna tuner with roller, antenna switch and XMTR. **£249.95**

MFJ-998


ATU with full 1500 Watts SSB/CW Digital & Analog SWR/WattMeter. 1.8-30MHz.
£729.95

MFJ-269C
HF/VHF/UHF SWR Analyser.
£369.95

MFJ-226
VNA Antenna Analyzer covers 1-230MHz, 1Hz resolution.
~~£359.95~~ **£339.95**

MFJ-461


Pocket size morse code reader no cables or extras needed.
£99.95

MFJ-926B


Remote 200W ATU can cover the entire HF band.
£319.95

MFJ-994BRT


Heavy Duty remote 600W ATU 1.8-30MHz.
£459.95

MFJ-557


Deluxe Morse Code Practice Oscillator with a straight key on a non-skid heavy steel base.
£54.95

INTERNATIONAL HAM STORES GROUP

Reserve yours for £50
- very limited quantities!
Arriving Summer 2017
GENEROUS PART EXCHANGE
on your old radio
£3599.95

IC-7610

- HF/50MHz 100W SDR Transceiver
- With Dual receivers
- Dual band display spectrum scope
- Dual watch function

ALINCO

Alinco DX-SR9
HF Transceiver + SDR capability
- Receiver 150kHz-30MHz
- 3 Ceramic Filters • Built-in CW Keyer

SPECIAL LIMITED OFFER!
~~£599.95~~ **£499.95**

STEPPIR Antennas

2 Element Yagi	20-6m 3kW	£1549.95
3 Element Yagi	40-6 m 3kW	£2174.95
4 Element Yagi	40-6m 3kW	£3199.95
DB18 3El Yagi	(40-6)m 3kW	£3424.95
DB18E 3El Yagi	(40-6)m 3kW	£3924.95
DB36 4El Yagi	(40-6)m 3kW	£5499.95
DB42 Monster IR	(80-6)m 1.5/3 kW	£7249.95
Small IR Vertical	(20-6)m 1/4 wave	£999.95
Big IR Vertical	(40-6)m 1/4 wave	£1249.95
Crank IR Vertical	(40-2)m Vertical	£429.95

CREATE Japanese High Quality!

Rotators

RC5-1
Medium Duty
£509.95

Rotators

RC5-3	Medium Duty Plus	£609.95
RC5-B3	Heavy Duty	£1244.95

Log Periodic

CLP-5130-1N	21 elements (50-1300)MHz	£419.95
CLP-5130-2N	17 el. (105-1300)MHz	£279.95

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 7dB	£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
SY-400	6 el 70cms (wide band) 11.0 dBi	£79.95
WY-140	3 el 144MHz (wide band) 10.5 dBi	£89.95

Base Antennas

SA-270LN	Dual Band 5.35/7.95 dBi 2.79m	£99.95

Mobiles

HP-2070R	Dual Band 1.00m	£34.95
HP-2070H	Dual Band 1.08m	£36.95

MASTRANT ANTENNA GUYING

Quality guy ropes and accessories
Full range in stock

P type general polyester Guy ropes

P2..2mm 100kg B/s	£14.95
P3..3mm 200kg B/s	£21.95
P4..4mm 400kg B/s	£29.95

M type Thinner higher performance with Dyneema

M2 ..2mm 240kg B/s	£31.95
M3 ..3mm 100m 390kg	£49.95
M4 ..4mm 900kg B/s	£119.95

Full range of Pulleys, clamps and fittings in stock

spiderbeam

Antennas, Telescopic Poles, Aluminium Masts

UL-404L Ultra-lite Dxpedition antenna
Dipole covers: 40, 20, 17, 15, 12, 10.6m..... £109.00

Fibreglass Telescopic Poles

12mtr Heavy Duty	£99.00
18mtr Standard	£299.00
22m 'Long John' **NEW**	£399.95
26mtr Standard	£499.95
Base Plate for Fibreglass Poles	£28.95

Aluminium Telescopic masts

10.metre Standard	£279.95
10 metre Heavy Duty	£299.95
12.5 metre	£319.95
14.5 metre Heavy Duty	£399.95

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

Also see our web for Spiderbeam masts and Mastrant guys and fittings

BEKO

Amps below in stock for immediate delivery!

HLV-950
Dual Band solid state amplifier
- Covers 50MHz & 70MHz
- Output 1kW for input from 1W to 25W

£2549.95

HLV-1000-10
1kW solid state amplifier
144MHz, Input: 10W max
£2495.00

HLV-770	770W 70cms	£2550

Amps below available to order (4 weeks delivery)

HLV-1950	2kW 4m	£4,395
HLV-2000	2kW 2m	£4,299
HLV-1100	1kW 70cms	£3,699
HLV-350	350W 23cms	£2,595
HLV-550	550W 70cms	£2,349
HPP-144	2.5kW low noise 144MHz Pre-amp	£649.95

MOSLEY Antennas

New shipment just arrived!

TA-33MWSP	5 Band 4 element Beam	£859.95
TA53MSP	5 band 4 element Beam	£1049.95
TA31JR	Rotary dipole (14,21,28MHz)	£299.95
TA32JR	2 el. Beam (14,21,28MHz)	£399.95
TA33JR	3 el. Beam (14,21,28MHz)	£549.95
Mini 33AW	Compact 5 Band Beam	£699.95
RV-6C	6 band Vertical (40-10m)	£499.95

AMERITRON Remote Ant Switches

RCS-4X	4 Way 2.5kW SO239 100MHz..	£174.95
RCS-4LX	4 Way 2.5kW SO239 100MHz..	£219.95
RCS-8VX	5 Way 5 kW SO239 250MHz	£189.95
RCS-8VNLX	5 Way 5kW N type 250MHz	£239.95
RCS-10X	8 Way 5kW SO239 100MHz	£194.95

nevada QUALITY POWER SUPPLIES

2 YEAR WARRANTY!

PS-40M Linear
- 40A (max) with meter
- Voltage: 1.5-15V DC
- Cigar adaptor output

£129.95

PS-30M Linear
- 30A (max) with meter
- Voltage: 3.0-15V DC
- Cigar adaptor output

£99.95

PSW-50 Switch Mode
- 50A (max) with meter
- Voltage: 9.0-15V DC
- Cigar adaptor output

£129.95

PSW-30 Switch Mode
- 30A (max) with meter
- Voltage: 9.0-15V DC
- Cigar adaptor output

£79.95

PSW-30H Switch Mode
- 30A (max) with meter
- Voltage: 9.0-15V DC
- Cigar adaptor output

£69.95

PS23-SW1 Switch Mode
- 23A (max)
- Voltage: 13.8V DC
- Lightweight: 1.6kg

£59.95

PSW-07	7A (max) 13.8V DC switch mode.. £29.95
PSW-04	5A (max) 13.8V DC switch mode.. £24.95

ACOM

NEW ACOM A600S - Just Arrived!
- 600W solid state amplifier
- Covers 1.8-54MHz
- Ideal for portable or travel use
- Weighs just 12kg

£2399.95

A1200S..1.2kW 1.8-54MHz arrives soon.. £2999.95

ALINCO

DJ-G7E
Tri-band Radio, die-cast chassis
- 2m/70cms/23cms
- 1000 memory channels
- Full duplex
- 39 CTCSS and 104 DCS encode/decode

£299.95

DX-R8E
HF communications receiver - top seller!
- Frequency range: 150kHz-34.999MHz
- Modes: AM/FM/LW /MW/CW/LSB/USB
- Power 11.7 - 15.8V DC (not supplied)

£469.95

DR-735E
Twin Band Mobile 'Rainbow' display

Full featured VHF/UHF transceiver
- Extended RX 108-174MHz, 400-479MHz
- Power 50/20/5w output
- Computer programmable

£299.95

DR-638HE
Twinband
VHF/UHF 50/40W
- 144-146 / 430-440MHz (2m + 70cms)
- 50W on 145MHz / 40W on 433MHz
- EMS-77 multi-function DTMF hand mic included

£249.95

DM-330FXE
Communications grade
30A Power Supply
Standard version
- Low Noise - Switch Mode
- Patent noise offset circuit
- Voltage & Current meter
- Variable Voltage output
- Car Cigar socket output
- 2.5kg (with AC lead)

£119.95

DM-330MWMkII
Deluxe version
Spec as above with extra filtering

£129.95

NEW

DM-30E
Lightweight
Switch mode
power supply
- Output: 9-15 Volts
- Digital Volt/Amp meter
- Noise offset circuit
- Triple protection circuits
- Weight 1.6kg

£89.95

More Alinco

DR-138HE	VHF/FM mob TX 144-148MHz	£169.95
DR-185H	VHF/FM TX 136-174MHz	£169.95

ELECRAFT

ELECRAFT
Full range now available!

K3S
The new version HF+6m transceiver with many improvements

K3S/100-F	100W (Assembled)	£2999.95
K3S/10-F	10W (Assembled)	£2449.95
K3S/10-K	10W (Kit)	£2299.95
K3S/100-K	100W (Kit)	£2849.95

KX3
160-6m
All modes + DSP

KX3-K	(Kit)	£999.95
KX3-F	(Fully assembled)	£1079.95
KX2	80-10m 10W (Assembled)	£859.95

KPA-500
160-6m
500W Amplifier

KPA-500	(Kit)	£2449.95
KPA-500	(Assembled)	£2649.95

Call for other Elecraft accessories

ALINCO

NEW

DJ-MD40
Digital/Analogue UHF Handheld
- DMR tier 1 & II
- Power: 5/2.5/1/0.2W
- 1000 memory channels

- Voice recorder • Call logs • Text messages
- Scan facilities • IP54 Commercial Grade
- Free programming for your area...plus lots more!

£179.95

DJ-V57
VHF/UHF Handy
- IPX7 waterproof
- Computer programmable
- Tough case
- Fully featured

£129.95

INRAD

Full range of INRAD filters for Elecraft and Yaesu - **NOW IN STOCK**

YAESU

705F	500Hz CW	£159.95
712F	300Hz CW	£159.95
717F	2.3kHz SSB Collins	£179.95
720F	2.0kHz SSB	£179.95
726F	2.9kHz SSB	£179.95

ELECRAFT

708L	250Hz CW	£159.95
701L	400Hz CW	£159.95
711L	1.8kHz SSB	£159.95
716L	2.8kHz SSB	£159.95

LOTS MORE on our WEBSITE!

Morse Keys

Bencher BY-1

Vibroplex Iambic Standard

Bencher BY-1		£189.95
Bencher BY-2		£239.95

Vibroplex Keys

Iambic Deluxe Paddle	Chrome	£239.95
Iambic Standard Paddle	Black	£169.95
Code Warrior Jr		£169.95
Standard Vibrokeyer	Black	£189.95
Deluxe Vibrokeyer		£239.95
Standard Straight Key		£189.95
Deluxe Straight Key		£239.95

MUCH MORE ON OUR WEBSITE 24/7.....SHOWROOM OPENING HOURS: MON - FRI 9AM - 5:30PM CLOSED SATURDAY

OPEN: Mon to Fri 9.00am - 5.30pm
Unit 1 Fitzherbert Spur Farlington
Portsmouth Hampshire PO6 1TT

www.nevadaradio.co.uk

ICOM

IC-7300
100W HF+6m+4m
- RF direct sampling
- Touch screen control

GENEROUS Part X CALL NOW!

£1199.95

Purchase with the INRAD RX-7300 2nd RX antenna option at £49.95 and we will fit FREE OF CHARGE!

IC-718..... 100W 160-10m base/portable..... £589.95
IC-7100..... HF/VHF/UHF 4m (70MHz) touchscreen. £999.95
IC-7200..... HF+6m rugged style transceiver..... £829.95
IC-7410..... HF+6m 100W DSP Base TX + ATU.£1449.95
IC-7600..... HF+6m twin DSP base transceiver.. £2399.00
IC-7851..... HF/6m all mode, output: 5-200W... £9999.95
IC-9100..... HF+VHF+UHF transceiver..... £2699.00
IC-2730E... 145/433MHz large screen..... £269.95
ID51EPlus 2. Dual Band Handheld D-Star..... £449.95
ID5100E.... Standard version Dual Band D-Star.. £574.95
AH-4..... Automatic antenna tuner 120W..... £333.95
UT123..... Digital/GPS unit E2820 etc..... £249.95
SM50..... Top of the range desktop microphone.. £249.95
SM30..... New compact style microphone..... £119.95
SP23..... Deluxe extension speaker..... £249.00
SP38..... Matching speaker for IC7300 ..... £149.95
SP34..... Filtered speaker 7800/7700 etc..... £239.95
IC-R6..... 1300 ch H/H scanner 1-1300MHz.... £209.95
HM151..... Multi-function hand microphone..... £49.95

INRAD RX-7300

New 2nd receiver socket option for the Icom IC-7300

Easy to install plug-in mod. requires no soldering, simple to install and easily reversible. Can be used for the insertion of accessory items into the receiver chain, like receive-only bandpass filters, low noise preamps, etc

Kit only..... £49.95
Fully Fitted by Nevada..... £99.95

PALSTAR

HF-Auto 1.5kW fully auto antenna tuner

Covers 6-160m
Output power: 2-1800W
Display: 4 line large print

£1599.95

AT-2K 2kW manual antenna tuner

Covers 6-160m
Output: 2000W PEP
Metering: Active cross needle

£599.95

AT-500 600W PEP manual antenna tuner

SAVE £30

Covers 6-160m
Built in 4:1 balun

SPECIAL OFFER!
~~£529.95~~ **£499.95**

AT-5K..... 3.5kW manual tuner..... £1249.95
AT-4K..... 2.5kW manual tuner..... £1024.95
AT-2KD..... 2kW Differential manual tuner.. £599.95
DL-1500... 1500W high power dummy load..£199.95
BK4C/1:1.. 4kW 1:1 ratio current balun..... £99.95
BK4C/4:1.. 4kW 4:1 ratio current balun..... £99.95

LDG

Z11-Pro2
(160-6m) 125W

£167.95

IT-100..... For Icom IC-7100, IC-7000.. £209.95
KT-100..... For Kenwood 125W HF+6m..£209.95
YT-100..... For Yaesu 125W HF+6m..... £199.95
Z-100 Plus.... Economy tuner..... £169.95
AT-100 Pro II.....125W HF+6m..... £244.95
AT-200 Pro II.....200W HF+6m..... £259.95
AT-600 Pro II.....600W HF+6m..... £395.95
AT-1000 Pro II...1kW peak HF+6m..... £519.95
AT-897 Plus...For Yaesu FT-897..... £209.95
Z-817..... For Yaesu FT-817..... £129.95
M-600..... Large display meter..... £129.95
M-1000..... Extra-large meter..... £139.95
RT/RC-100..... Remote tuner + DC feed..... £249.95
RT-600..... Remote tuner 600W peak... £429.95

CUSHCRAFT Antennas

A50-5S
5 Element 50MHz Yagi

£259.95

A-3WS..... 12/17m 3 element Yagi..... £599.95
R-9..... 9 Band Vertical..... £779.95
AV18S..... 18ft Vertical 80 - 10 m..... £164.95
MA5-VA.... Vertical 10,12,15,17,20m, 2m.. £379.95
ARX-2..... Ringo Ranger 2m Vertical..... £104.95
AR-270..... Ringo Ranger 2/70cm..... £164.95
AR-6..... 6m Ringo Ranger vertical..... £129.95

YAESU

FT-991A + SP10 Speaker
- Coverage: 160-6m, 145/433MHz
- All modes AM/FM/SSB/Data
- 100W HF/6m-50W 145/433MHz
- NEW colour waterfall display

SEE WEB FOR BEST UK PRICE!

FTDX5000MP..... £3399.00
FT991A..... 160-6m Transceiver £1299.95
FT857D..... Multiband HF/VHF/UHF mobile..... £699.95
FT817ND..... All mode multiband portable..... £529.95
FT450D..... 100W all mode HF/6m+ATU..... £599.95
FT891..... Mobile..... £599.95
FT7900E..... Twinband 145/433MHz mobile.... £229.95
FT1DE..... Ipx5 digital handy..... £269.95
FT2DE..... C4FM/FM 144/430MHz digital H/H. £399.95
FTM400XDE.. Twinband digital/analogue mobile.... £499.95
FTM100DE.... New C4FM 50W Dual Band mobile... £299.99
FTDX3000D.. 100W HF/6m all mode TX..... £1429.95
FTDX1200D.. 100W HF/6m all mode TX..... £999.95
VX6E..... Submersible 145/433MHz handy.. £159.95
G2800DXC... Extra heavy duty rotator..... £899.95
G5500..... Azimuth/elevation rotator..... £644.95
G1000DXC... Varispeed heavy duty rotator..... £489.95
G450C..... Rotator + 25m cable kit..... £389.95
STA77..... Stereo headphones..... £79.95

Yaesu FTDX5000 MP
200W HF/50MHz Premium Class Transceiver with 2 independent receivers, plus many options

SEE WEB FOR BEST UK PRICE!

DAIWA SWR Meters

CN-901HP
Professional grade with extra large display
- Freq: 1.8-200 MHz
- Power: 20/200/2kW

£129.95

CN-101L
- Freq: 1.8-150MHz
- Power: 15/150/1.5kW

£89.99

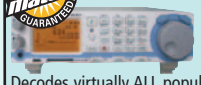
CN-801S11... 0.9-2.5GHz 0.2/2/20W..... £199.00
CN-901HP3... 1.8-200MHz 30/300/3kW..... £139.95
CN-901VN..... 140-525MHz 20/200W N type.. £119.95
CN-801VN..... 140-525MHz 20/200W N type.. £119.95
CN-103LN..... 140-525MHz 20/200W N type.... £89.99
CN-501H..... 1.8-150MHz 15/150/1.5kW..... £89.99
CN-501H2..... 1.8-150MHz 20/200/2kW..... £89.99
CN-501VN..... 140-525MHz 20/200W N type.... £89.99

TYT - UHF DMR Radio!

MD-380
- 70cm UHF band
- 1W or 5W output
- 1,700 mAh Li-ion battery
- Easy to programme
- Includes **FREE** lead and software

~~£149.95~~ **£129.95**

AOR



AOR AR-DV1
Analogue/Digital Voice Receiver

Decodes virtually ALL popular digital modes: DMR, D-STAR, Yaesu Fusion & lots more
- 100kHz-1300MHz Wide band reception

4GB SD CARD included

£1299.95

Digital Scanning Receiver

NEW

WHISTLER TRX-1
Adaptive digital trunking scanner
- 25-1300MHz with gaps
- DMR
- Hytera XPT
- MotoTRBO. Cap. Plus
- MotoTRBO. Con. Plus
- MotoTRBO.

£419.95

KENWOOD

NEW

Kenwood TH-D74E
Dual Band Handheld with APRS and Digital (D-STAR) capability
- Built in GPS
- Wide band receive: HF, VHF, UHF
- IF filtering / DSP

Soft Case for D74E £29.95 **£599**

TS-2000X....Allbander classic includes 23cms.. £1469.00
TS-480SAT.. 100W mobile/base HF/6m ATU/DSP. £659.95
TS-480HXE. 200W DSP mobile/base HF/6m..... £719.95
TS-590SGE..100W DSP HF/6m all mode TX..... £1159.95
TS-2000E.... HF 50/144/430MHZ transceiver..... £1279.95
TM-V71E.... Twinband 145/433MHz with APRS..£299.95
TM-281E.....High power 2m 145MHz mobile..... £169.95
TMD-710GE.Twinband VHF/UHF/APRS/TNC/GPS. £479.95
TH-D72E..... VHF/UHF handheld GPS/TNC/APRS. £399.95
MC60A..... Classic style desktop microphone..... £122.95

Kenwood TS-990S
HF/6m Radio

Generous Part X
2 Year Warranty

£5099.95

Network Antenna Analysers

NEW

MetroVna DELUXE
with Bluetooth connectivity
- Covers up to 250 MHz
- Same spec as Pro below

FREE DELIVERY £299.95

MetroVna Pro Model
with Bluetooth connectivity

Phone not included

- Touch Screen - colour
- Freq coverage: 1-180MHz
- Measures: SWR, R, Z, X, phase, filters, Return Loss Transmission Loss
- Link by Bluetooth or USB

FREE DELIVERY £259.95

ANTEX Soldering Irons

760RWK..... Complete temp control station..... £249.95
690D..... Digital 50W solder station..... £179.95
TCS..... 50W digital iron + temp control..... £69.95
XS25/S..... 25W w/ burn proof silicone cable... £29.95
XS25..... 25W with PVC mains cable..... £24.95
Gascat 75P.. 75W gas powered..... £39.99

MFJ

NEW

MFJ-1835
5 Band Cobweb Antenna

£239.95

225..... 1-180MHz graphic analyser..... £429.95
226..... Graphic analyser (1-230) MHz..... £359.95
259C..... HF/VHF portable antenna analyser.... £299.95
266..... New style HF/VHF/UHF analyser..... £349.95
269C..... HF/VHF Digital Analyser..... £369.95
385B..... Deluxe Comms. Speaker..... £54.95
407D..... Deluxe CW Keyer..... £99.95
461..... Morse Reader-pocket sized..... £99.95
492-X..... CW Memory Keyer..... £164.95
550..... Popular Morse code practice key..... £19.95
557..... Morse code key with oscillator..... £46.95
826B..... Digital SWR/Wattmeter..... £209.95
901B..... Versa Tuner 200W HF..... £119.95
912..... Remote 4:1 balun box..... £84.95
921..... 2m Antenna Tuner..... £114.95
923..... 2m Tuner & SWR/Power..... £249.95
931..... Artificial ground unit..... £114.95
934..... 300W Tuner + artificial ground..... £219.95
941E..... 300 Watts max Versa Tuner II..... £164.95
945E..... 1.8-60MHz 300W manual tuner..... £149.95
948..... 300W PEP reading antenna tuner..... £174.95
949E..... 300W tuner + Dummy load..... £199.95
959C..... Receive antenna tuner + pre-amp..... £145.95
969..... 300W tuner 160-6m..... £229.95
971..... Portable Ant. tuner 1.8-30MHz..... £139.95
986..... 1.5kW HF tuner..... £369.95
989D..... 1.5kW HF tuner..... £399.95
993B..... Auto Tuner 150W/300W..... £309.95
994BRT..... 600W remote Auto Tuner..... £409.95
998..... 1.5kW Auto Tuner 1.8-30MHz..... £719.95
998RT..... 1.5kW remote Auto ATU..... £779.95
1020C..... Tunable Active Antenna..... £129.95
1025..... Noise canceller/signal enhancer..... £209.95
1026..... QRM eliminator + active antenna..... £214.95
1118..... High Current DC Multi outlet..... £94.95
1700C..... 6 Way coax switch..... £144.95
1701..... 6 Way coax switch 2kW (SO239)..... £89.95
1704 (P)..... 4 way coax switch 2.5kW (SO239)..... £84.95
1704 (N)..... 4 way coax switch 2.5kW (N type)..... £95.00
1705H..... RF By-pass switch..... £38.95
1707..... Auto RF sensing Ant switch..... £109.95
1708..... RF Sensing T/R Switch..... £94.95
1763..... 3 Element 2m beam..... £74.95
1786X..... Loop (10-30)MHz 3ft dia..... £479.95
1788X..... Loop (7-21)MHz 3ft dia..... £529.95
1779B..... 80/40m Dipole..... £64.95
1799X..... 9 Band vertical..... £479.95
1868..... Discone antenna with cable..... £94.95
2980..... Wire vertical (40m-6m)..... £99.95
4416B..... Super battery booster..... £174.95

ANYTONE

AT-588
70MHz (4m) 50W FM Transceiver
Fully featured classic mobile for 4M
- Covers: 66-88MHz
- Memories: 200
- CTCSS/DCS/DTMF

£159.95

PC-588 Programming software & lead..... £19.95

SDRplay

NEW

RSP-2
Enhanced SDR receiver
- Covers: 1kHz (VLF)-2GHz
- Supports HF & VHF antennas simultaneously
- Includes SDRuno software
- Software upgradeable

£156

RSP-2 Pro As above but in a rugged steel case

£189.95

RSP-1
Powerful wideband SDR
- Covers: 10kHz-2GHz
- Built-in filters
- Low noise floor
- USB interface
- Works with popular SDR software (HDSDR, SDR Console, Cubic SDR, SDRuno)

£119.95

1kW - End Fed Wire Antennas

MyAnt EFW 80-10
Resonant on 80/40/30/20/17/15/10m
NO ANTENNA TUNER REQUIRED!
Length: 130ft

MyAnt EFW 40-10
Resonant on 40/20/15/10 + WARC with tuner Length: 63ft

£159.95

£149.95

PRO-ANTENNAS – British Made!

I-Pro Home
Very efficient Vertical covering: 20, 17 ,15, 12, 11, 10 plus 6m (with suitable ATU)
- Height: 5.0m
- Span of end elements: 2.5m

£259.99

Headphones

Kenwood HS5
Communications Headphones

£59.95

Yaesu STA77
Stereo Headphones

£79.95

Kenwood HS6.....lightweight style.....£35.95

COMET

H-422
Rotary Dipole covers: 7, 14, 21, 28MHz

£289.95

HF Antenna
CWA-1000.. 5 band trapped dipole 19.9m long..£124.95
VHF/UHF Antennas
GP1-M..... 145/433MHz length 1.25m..... £59.95
GP3-M..... 145/433MHz length 1.78m..... £69.95
GP6-M..... 145/433MHz length 3.07m..... £99.95
GP9-M..... 145/433MHz length 5.15m..... £149.95
GP15N..... 50/145/433MHz length 2.42m..... £119.95
GP93N..... 145/433MHz+23cms length 1.78m.. £99.95
GP98..... 145/433/1200MHz length 2.94m.. £119.95
50MHz Antennas
CA52HB..... 2 element Yagi..... £79.95
CA52-HB4...4 element Yagi..... £129.95
Quad Band Mobile for FT-8900
UHV-4..... Mobile whip 4-Bands 10/6/2/70cms. £89.95
Antenna Tuners
CAT-10..... 10W 3.5-50MHz Manual Tuner..... £99.00
CAT-300..... 300W 1.8-60MHz Cross Needle..... £199.95
Accessories
CBL-2500....Balun 2.5kW (CW) 1.8-56MHz..... £44.95
CBL-1000....Balun 1kW (CW) 1.7-30MHz..... £39.95
CF-30MR.... Low Pass Filter 1.8-30MHz 1kW CW.£59.95
CF-360A..... Duplexer 1.3-30/49-470MHz..... £49.95
CF-4160B....Duplexer 1.3-170/350-540MHz..... £39.95
CF-416A..... Duplexer 1.3-170/350-540MHz..... £39.95
CF-530..... Duplexer 1.3-90/125-174MHz..... £49.95

LOTS MORE on our WEBSITE!

PRICE PLEDGE WE ALWAYS AIM TO BE COMPETITIVE - SEEN IT CHEAPER? LET US KNOW!

PART EXCHANGE or CASH WAITING for your used gear!

023 9231 3090

nevada®

EMC

This month's EMC focuses on possible EMC implications of the UK leaving the EU and identifying sources of interference using Software Defined Radio (SDR).

EMC post 'Brexit'

On 30 March 2017, the Government published a White Paper on the forthcoming 'Great Repeal Bill' related to the UK leaving the EU. The situation should become clearer when the actual Bill is introduced in the next parliamentary session. The Bill will have implications for EMC in several areas, including the UK EMC Regulations and the Radio and Telecommunications Terminal Equipment Regulations, which will soon become the Radio Equipment Regulations. The information in this article is based on information provided to the RSGB EMC Committee by a well informed source but it is not an authoritative view.

The current UK EMC Regulations and RTTE Regulations are derived from their respective EU Directives. These were brought into UK law as required through secondary legislation (Statutory Instruments, SIs) under the European Communities Act 1972. That was the usual mechanism for implementing EU Directives in UK and it allows for Parliamentary scrutiny as MPs can call for a debate, otherwise the SI becomes law after 28 days of laying before Parliament. This mechanism saves time whereas the full process of a Bill for each Directive would demand huge amounts of already pressurised Parliamentary time.

The main aim of the so-called Great Reform Act, as set out in the White Paper, is to give businesses and individuals some certainty as the 'Brexit' process unrolls. On the day UK leaves the EU, in some two years' time, the European Communities Act 1972 will have to be repealed – but that would leave a massive hole in the laws of the UK across a huge raft of issues. The point of the Great Reform Act will be to take out references to the EU, its Treaties, Directives, Regulations and Recommendations, but to leave the legislation to have the same effect for now. The law will be UK law with Parliament as sovereign, rather than EU law transposed into UK law. There will be provision for ex-EU legislation to be amended if required, at a later date.

The UK EMC Regulations and RTTE (RED) Regulations are likely to continue as now but with references to the EU taken out. It is considered very likely that the Essential Requirements will remain the same and that for EMC purposes these will still be satisfied by the compilation of a Technical Assessment that relies in whole or in part on the use of a recognised Standard. The existing term 'Harmonised Standard' is likely to go (as that is an EU concept) but the same standards are likely to apply, especially where these are derived from CISPR standards. These may well revert to being BS standards, rather than BS/EN standards.

The CE Marking Directives will need to be covered in the scope of the Great Repeal Bill so the requirement for CE marking within the UK is likely to be removed. The CE Mark not only relates to EMC but also a wide range of areas including safety, health or environmental requirements. It remains to be seen whether the CE Mark will be replaced by a UK marking requirement in due course and if so, to what extent its scope will include EMC. In practice, anyone selling to the EU/EEA will still need to apply the CE mark just as they do the FCC mark for the USA and marking and conformity requirements for other countries so it is likely that most products from UK and Europe will still be CE marked although this will no longer be compulsory. For goods imported into the UK from outside the EU, the removal of the need for a CE mark could have implications for EMC characteristics of imported products and it remains to be seen what happens.

USB chargers

Brian, G3OYU reports that he found S9+ noise right across the 3.5MHz band. He checked other frequencies and found the same noise on the medium wave broadcast band, 1.8MHz, 3.5MHz and 7MHz amateur bands and a limited amount on 14MHz and 24MHz.

The interference was very intermittent and he only listened around the bands during the mornings. The first thing to check was whether the source was in his own home, so he switched off the mains to the bungalow – and the noise disappeared.

Brian then used a Sony all-band portable receiver to search for the source and found that it was the charger unit for his iPad. This was not a genuine Apple charger but a cheap import from a well known online auction site. It has two outlets, one capable of a 1A charge and the other 2.1A. It does not have a CE mark and very little in the way of identification. Brian has offered to donate it for EMC testing and he plans to replace it with a genuine Apple unit.

Tracing RF interference sources

The RSGB EMC Committee has a web page on interference to amateur radio reception (see Websearch). This considers potential sources of interference to low-level radio signals, particularly in the urban and suburban environment.

A Member recently asked for advice about strong interference on the 3.5MHz amateur band, having tried to identify the source but without success. His setup is an Icom IC-7300 and a 31m doublet at about 7m above ground level, fed via an MFJ Auto Tuner. He has tried various arrangements with feeding the antenna but the noise remains at the same strength. He has also walked around the local area using a portable radio on the 3.5MHz band and the noise seems consistent. He can operate on the band but struggles with signals even at S9 strength.

The Member started by eliminating his own electrical equipment as a possible source. He reports that there are three solar photovoltaic (PV) roof panels within 100m and also high power grid line approximately 1km away. He sent a screen shot of a spectrum trace that has a lot of 'spikes' around the S9 level. He said that he would appreciate any comments/suggestions we might have.

EMC Leaflet 4, *Locating Sources of Interference to Amateur Radio Reception* gives some advice in cases like this. First, it can be difficult to locate a source of interference on the 3.5MHz band because interference can travel some distance along power lines, especially if overhead. The first thing to try is to move up to the highest frequency on which the radio frequency interference (RFI) is detectable, but you need to be sure that it is the same source not something else. Another thing to try is to take a portable receiver and drive around in a car (preferably, for safety, get someone else to drive you around). This can give a clear indication when you pass a point where the interference peaks or you pass under an overhead power cable or phone line.

It should be noted that if interference is being radiated by an overhead phone line then the source could be something connected to the phone line, but it could also be some other mains powered device that is getting coupled *onto* the phone line. If RFI is being conducted along overhead cables, there may

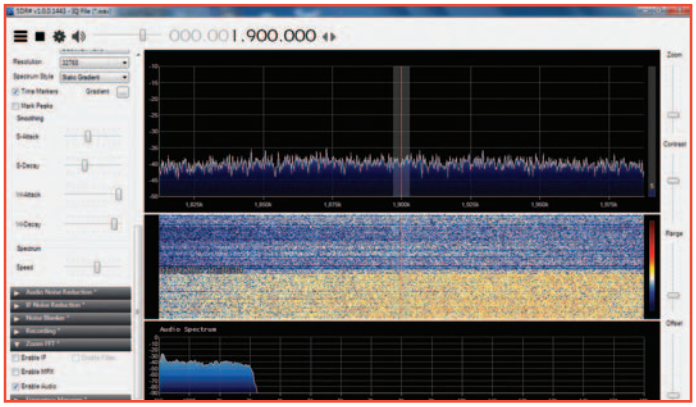


FIGURE 1: An SDR plot centred on 1.9MHz.

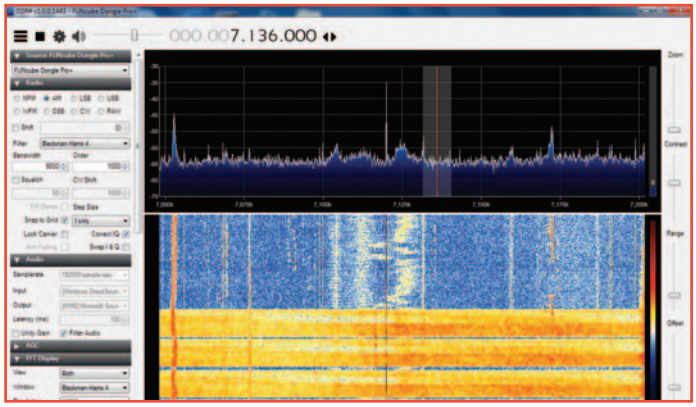


FIGURE 2: An SDR plot centred on 7.125MHz.

be standing waves so you might find more than one peak.

For the possible sources that the Member mentioned, any RFI from solar PV systems is likely to vary depending on the amount of sunlight. If the RFI appears to be conducted along overhead power lines then walking or driving nearby should give a clue about whether this is the source. A faulty insulator is one possibility and an article on tracing RFI from overhead power lines was published in the March 2016 *RadCom*.

RFI and SDR

The increasing availability of software defined radio (SDR) hardware and software can help to identify a likely source of interference based on its characteristics. Members sometimes send such plots and ask what it might be but it is sometimes necessary to ask for further information.

The first thing to check with any SDR device is to make sure that it is not being overloaded by strong signals such as local medium wave (MW) broadcast signals. Signs of overloading include any signals that carry modulation from one or more local AM (amplitude modulation) broadcast stations but are on frequencies outside the broadcast bands. You might find what appears to be a harmonic of a local broadcast but this does not necessarily exist as an off-air signal that is being picked up by the antenna; it could be generated in the receiver. Check the fundamental frequencies of all local broadcasts and make sure that they are all below 0dB full scale (FS), which means that they are not approaching full scale on the analogue to digital converters (ADCs) in the SDR. (Hitting full scale on an ADC can result in instantaneous extreme distortion).

Using a portable tuned loop antenna when searching for a source of RFI has two advantages. First, the loop can be used for direction finding and secondly it improves rejection of signals away from the frequency of interest so that overloading on local MW broadcasts is less likely.

For a base station antenna, an antenna that is sharply tuned with an antenna tuning unit (ATU) can help to reduce overloading of a broadband SDR device by strong local broadcast signals. If a tuned antenna does not provide sufficient rejection of local broadcast stations, then the most effective solution is not to connect the SDR device directly to an antenna but instead to connect it to the first IF (intermediate frequency) output of an amateur transceiver. In this case, the SDR has the benefit of front-end filtering of the HF transceiver but with the limitation of only covering a limited bandwidth, usually a few kHz.

SDR can provide three types of plot that can help to identify a source of interference. These are the spectrum plot, the waterfall display and the audio spectrum.

Figure 1 is centred on 1.9MHz and it shows emissions from a wind farm or an associated high voltage direct current (HVDC) converter station. It shows a screen capture that was obtained using an SDR Play RSP1 and *SDR Uno* software to record an I/Q file while making on-site measurements. The I/Q file was replayed and analysed later using *SDR Sharp* software.

The top section is the spectrum display. With the particular settings used, this interference looks rather like random noise. It can be seen that there is some reduction at the sides due to the limited bandwidth of the 1m diameter tuned loop antenna that was used. Using a tuned loop antenna prevented the RSP1 from being overloaded by local MW broadcast signals.

The centre section is the waterfall display. This shows how the signal strength varies with time. Blue represents a weaker signal strength and yellow is stronger. It can be seen that the signal level fluctuates every few seconds. There is also a horizontal line structure, which is unusual and indicates amplitude modulation at about 10Hz.

The lower section is the audio spectrum. Although the frequency scale is not ideal, it can be seen that there is a peak at 100Hz. This indicates that the source is derived from 50Hz mains. AM demodulation should be used, not SSB, in order to see these low audio frequencies.

Figure 2 was obtained with a FUNcube Dongle Pro+ and *SDR Sharp* software. The trace is centred on 7.125MHz. It shows emissions from a battery charger in an emergency lighting fitting with battery back-up. The top spectrum display section shows the 7MHz amateur band when the interference is not present. In the centre waterfall section, blue represents a weaker signal strength and yellow or orange is stronger. The horizontal yellow/orange bars show bursts of interference that had occurred a few seconds before the trace was captured. Various other types of battery charger may do this, charging in bursts and pausing.

Driverless LED lights

Further to the item in the April EMC column about driverless LED lights, a Member reports that he bought a V-TAC VT-8010 12W LED Oval Ceiling Light that is absolutely quiet at RF. It rectifies the mains input using a full wave bridge rectifier and smoothing capacitor in the usual way and this DC voltage drives a chain of 28 LEDs with BP5131D active linear current source dropper devices. The voltage across each LED is 10V and the chain current is 27mA. This gives about 280V across the chain and about 35V dropped across the current source, meaning the BP5131D dissipates about a watt (about 8% of the total).

Websearch

RSGB EMC Committee web page on interference to amateur radio reception: http://rsgb.org/main/technical/emc/i-am-experiencing-interference/

Dr David Lauder, G0SNO
emc.radcom@rsgb.org.uk

WSPRlite from SOTABeams

The WSPRlite from SOTABeams is an ingenious solution to a problem that you never realised existed. That is, is it possible to package a transmitter and hardware/software into a tiny pocketable package that allows you to put out a WSPR signal (Weak Signal Propagation Reporter) wherever you are in the world?

The tiny WSPRLite transmitter.

The WSPRlite transmitter is just that and so incredibly small, measuring just 40 x 50 x 10mm, it can easily fit in the palm of your hand.

The WSPRlite is powered by a 5V USB supply, using a current of about 150mA maximum. This means that you can power it from a Powerbank-type 5V rechargeable battery for many hours, if not days. One thing to watch out for is make sure the Powerbank doesn't switch itself off if it detects low or no current. I have a number of these, collected as free corporate gifts over the years, and one was found to be unsuitable for this reason.

The frequency range of the WSPRlite is 160m to 20m, although an external low-pass filter is recommended for use below 10MHz. Note that 60m is not currently supported. SOTAbeams, which manufactures and markets the WSPRlite, offers a suitable low-pass filter kit for 40, 80 and 160m for £24.50 inc. VAT. The company, which specialises in equipment for Summits on the Air (SOTA) and QRP enthusiasts, also has a selection of leads and adapters suitable for the WSPRlite, including the micro USB lead that you will need to program it.

The real power of WSPRlite comes when it is paired with SOTAbeam's online data analysis system called DXplorer.net, which allows you to compare and graph different WSPR signals. But more of that later.

What is WSPR?

So, firstly for new amateurs, what is WSPR, or Weak Signal Propagation Reporter?

WSPR (pronounced 'whisper') is a Frequency Shift Keying (FSK) mode that uses software designed by Joe Taylor, K1JT, a Nobel Prize-winning Princeton physicist and originator of the WSJT and JT65 weak signal software.

First released in April 2008, WSPR uses a transmission mode called MEPT-JT – the MEPT standing for Manned Experimental Propagation Transmitter.

WSPR uses FSK with a very small shift (you can *just* detect a slight 'warble') and occupies a bandwidth of about 6Hz. This means that many stations can be fitted into the 200Hz WSPR window.

Stations running WSPR automatically send out a beacon signal on a given frequency. Each transmission lasts for just under two minutes.

When your usual WSPR system with your transceiver is not transmitting it is actually listening for these WSPR beacon signals. If it hears one it logs it and sends the details via the internet to http://wsprnet.org/

WSPRnet then logs your information and even displays it on a map, with a line showing the paths between the transmitting and receiving stations. It also logs the received signal/noise ratio, any drift, the grid locators of the transmitter and receiver and calculates the bearing and distance between the two stations.

WSPR isn't a two-way communication mode as such in that you don't hold conventional QSOs. It is a beacon system for low-power transmitters.

The only problem is that to use WSPR you normally have to tie up your radio transceiver and a computer running the WSPR software. WSPRlite gets around this by combining a 5-200mW transmitter and the digital hardware in a single lightweight package.

How do you use it?

Using a simple USB computer interface, you program the WSPRlite box with your callsign, QTH locator (just four digits, not six), band, percentage time it will transmit (it defaults to 20%) and power level. It also automatically generates a URL link to your data on the DXplorer.net site.

The configuration software is downloadable from www.DXplorer.net and versions are available for Windows Vista, 7, 8 and 10. It won't run on Windows XP or Mac OS. A Linux version is said to be coming.

Once programmed, the WSPRlite no longer needs the computer to operate. Just disconnect it from the computer and connect it to a USB power supply (eg 5V Powerbank), press the 'sync' button two seconds past the start of any even minute, and off it goes.

Note that some users warn against using a mobile phone charger as your 5V supply as this can introduce ripple into your transmission.

WSPRlite will then make regular transmissions that are automatically received by stations around the world. These stations send their reports to the central WSPRnet.org website where you can see where your signals are reaching within seconds.

The unit only has two connections – a female SMA for the antenna and a USB

Steve Nichols, G0KYA
infotechcomms@googlemail.com

A DXplorer.net map comparing signals from two stations.

Comparing the distances covered by an antenna at G0KYA and another at G4ZAY.

A WSPRlite unit showing DXplorer.net working on a tablet. Courtesy SOTAbeams.

socket for the power. It also has a red/green status LED (light emitting diode) that can tell you various things, such as when it is transmitting, when it is about to transmit and whether you need to program it. A single button is used with an accurate clock to synchronise the transmissions so that they occur on the even minute.

Please note that you must have an antenna that has a standing wave ratio (SWR) match below 3:1, and preferably better than 2:1. The unit's power output is so low that it won't trigger an automatic ATU (antenna tuning unit), so it is best to match the antenna with your normal radio and ATU first – or make sure you are using a resonant antenna with a low SWR.

One issue was that 20m propagation was so bad during the test period that I wasn't being picked up anywhere at first!

But after a couple of cycles, lo and behold I was picked up in Madrid, Spain by EA1CDV, a total of 1412km, and by UB1NDF in Russia, at 2265km, both on 200mW. Then I was picked up in Sweden by SA2BRJ and EB5DQ in Valencia.

But this is just the start. The DXplorer.net software (which is free to use for 12 months after you have bought a WSPRlite, and £19.95 per annum thereafter) can help with a lot of analyses.

For example, you can plot the maximum mean (average) distance you are being heard against time for periods from one hour to 30 days. Or you can view this information in a table.

You can also plot the stations that have heard you on a great circle map with your QTH (location) at the centre. It can also compare your results with any other station. Hovering over the colour-coded spots tells you the received signal-to-noise ratio and the distance.

As someone who has used WSPR extensively to test antennas you can quickly see the benefits of DXplorer.net. Transmitting for 15 minutes with one antenna and then switching to another will give you some graphs of their relative performance and directionality. You can, of course, do this with the raw data from WSPRnet.org, but DXplorer.net makes it quicker and easier to accomplish.

Uses

The uses of WSPRlite and DXplorer.net are only limited by your imagination. Antenna comparisons are an obvious one, but they can also be used for propagation studies. The small size of the unit means you can set up a WSPR beacon anywhere in the world.

Or you can leave it running in the shack and spot short-lived HF openings that you

might otherwise miss. A whole Facebook group (with more than 600 members) has evolved that is devoted to uses for WSPRlite and DXplorer.net.

Above all, the WSPRlite transmitter means that you don't need to tie up a computer to run a WSPR beacon. Once programmed, the WSPRlite unit is totally self contained.

TX Factor and YouTube

Mike Marsh, G1IAR tries out the WSPRlite in episode 16 of TX Factor, the only TV show dedicated to all things radio. Not having a lot of real estate for antenna erection Mike uses a vertical on HF and it seems to work OK, but he is keen to find out exactly how well it performs and which directions and bands it favours. Find out how easy Mike found the WSPRlite to get up and running and just how far the 200mW signal gets from Mike's East Devon QTH. Is his antenna really any good for DX? The results are quite surprising!

TX Factor Episode 16 will be available to view from 19 May at www.txfactor.co.uk TX Factor is sponsored by the RSGB and ML&S.

Michael, G0POT has produced a 13-minute YouTube video that explains the WSPRlite very well indeed. If you are interested in buying one after reading this feature it is worth watching the video to get a better idea of what it is and what you can do with it.

Other amateurs are using it to test antennas and better understand propagation, such as the C6APY DXpedition mentioned in the box below.

The WSPRlite costs £59.95 including VAT, and includes a one-year subscription to DXplorer Premium worth £19.95. It can be bought direct from www.sotabeams.co.uk or call SOTAbeams on 07976 688 359.

Our thanks to Richard, G3CWI at SOTAbeams for the loan of the review model.

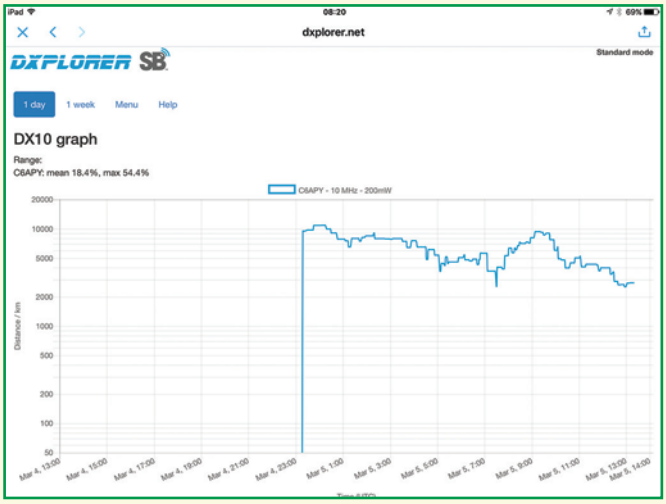
C6APY DXpedition

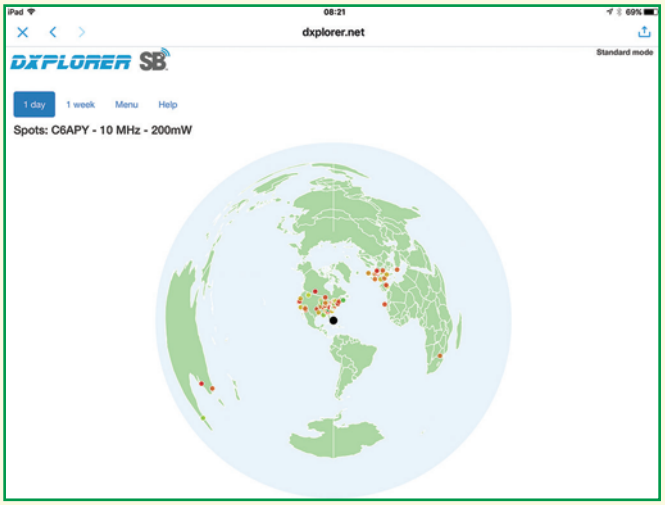
The C6APY DXpedition to the Berry Islands, NA-054, in March (M0IDA, M0VFC & M1ACB) used a WSPRlite to monitor band conditions in a very effective and efficient way to plan band changes while keeping their three radios fully active on the open bands. The WSPRlite was powered by a small USB battery, which ran for at least two days before needing a charge, and was easily moved to different bands and antennas during the island activation.

The pictures below show DXplorer.net screenshots from C6APY showing WSPR spots and 10MHz band (30m) WSPR activity using a quarter wave vertical with elevated radials close to the beach.

The seven day DXpedition worked a total of 9072 QSOs, 6110 of which were unique callsigns. The breakdown over the bands they used was 177 QSOs on 80m, 1091 on 40m, 1345 on 30m, 4563 on 20m, 1513 on 17m, 360 on 15m and 23 QSOs on 12m. Other interesting statistics show that most contacts were with North America (5177 QSOs) followed by Europe (3587 QSOs), there were much fewer contacts with South America (137 QSOs), Africa (116 QSOs), Oceania (30 QSOs) and Asia (25 QSOs).

Just as an aside, the DXpedition made 40-odd QSOs using the FO-29, SO-50 and AO-85 satellites. They used handhelds with Arrow portable antennas for the FM satellites. On FO-20 they used an unusual setup with an Elecraft K3 and 2m transverter for the uplink and a FUNcube dongle for the downlink, both with separate Arrow antennas and separate operators.





Safety distances for small HF loop antennas

The RF fields near small HF transmitting loops can be surprisingly strong. Even at remarkably low operating power they may exceed safe exposure limits.

You can use a simple formula to calculate safety distances for most amateur radio antennas, but this calculation underestimates the safe distances for loops [1] [2] [3]. So, I used an NEC antenna model to calculate near fields around a small loop and compared them to safety limits.

A safety distance extends to the farthest point from the loop where the RF field strength is at the limit allowed by safety standards. In the UK, RF exposure limits are set by the Health Protection Agency based on standards developed by the International Commission for Non-Ionizing Radiation Protection (ICNIRP) [4]. An ICNIRP project group is revising the HF standards and hopes to have the public consultation document out before the end of 2017 [5].

Average Power

RF exposure limits depend on the average power into the antenna, taking into account the duty cycle of the mode, Tx/Rx time and transmission line losses. The Tx/Rx time is the worst-case percentage of time you are on the air in any six-minute period. Usually, it's advisable to assume 100% transmit time to allow for a long transmission. For example, conversational CW (40% mode duty cycle) with 10 watts peak power, 100% transmit time, and no line loss, has an estimated average power of 4 watts.

My NEC calculations account for the power lost because of resistance in the copper loop. They do not include losses in the capacitor and in the ground beneath the loop, both of which can be significant. These losses, which depend on the loop construction and location, lower the antenna Q and the field strengths. Excluding them is a conservative assumption that increases safety distances.

NEC model

The most popular type of small loop for amateur radio is a vertical loop with a tuning capacitor connected across a gap in the conductor. Changing frequency involves adjusting the capacitor for maximum received noise and then fine-tuning for best SWR while transmitting with low power.

The NEC model is for a 1 metre diameter loop of 10mm copper tubing in free space. To account for the effect of ground currents induced by the near fields, I increased the input power in the calculations by the factor 2.56 used in US FCC safety distance calculations [1] [2]. This conservative assumption corresponds to a near field factor of 1.6.

Dr Kai Siwiak, KE4PT, sent some examples of FCC safety distances he calculated using analytic formulas for the near fields [6]. These served as a gold standard for checking the accuracy of the NEC model.

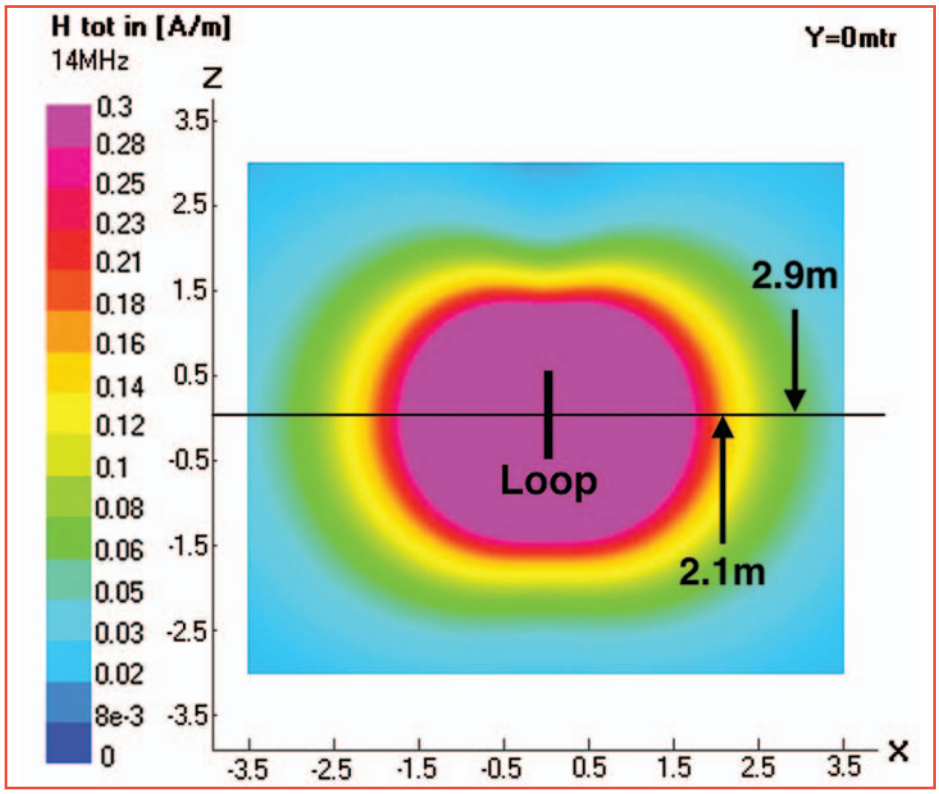


FIGURE 1: Contour plot of magnetic induction H for 10 watts at 14MHz. Occupational and public safety distances are indicated on the perpendicular axis of the loop.

Safety distances

Table 1 shows calculated ICNIRP safety distances when the loop is fed with 10 watts average power. Distances are measured from the centre of the loop. Occupational exposure limits apply to amateur radio operators, whereas lower limits apply in General Public areas.

Tables 2 and 3 are for average power of 100 watts and 400 watts, respectively.

While the *far field* pattern has nulls in both directions along the loop axis perpendicular to the plane of the loop, there are strong *near* fields on the axis. Almost all of the distances in the tables are determined by the RF magnetic field on the perpendicular axis. In a few cases (indicated in the tables) electric fields around the tuning gap determine the most conservative safety distance [7].

Figure 1 is a *4nec2* program contour plot of total magnetic induction H [A/m] for 10 watts average power at 14MHz. The occupational safety distance (2.1 m) and the public distance (2.9 m) are indicated on the perpendicular axis of the loop.

Low power operation

Safety distances move closer to the loop as you lower the power, but not as much as you might expect. Tables 1 and 2 show that occupational safety distances at 10 watts are around 60% of the 100 watt distances, although that's only 10% of the power.

Kai Siwiak, KE4PT warns about over-exposure to RF from a pedestrian mobile or backpack loop **[8]**: "Because this is not a case of 'whole body' exposure to a plane wave field, we would need to measure the specific absorption rate (SAR) to determine compliance. As a matter of interest, however, if the head is 10cm in front of, and in line with, the loop conductor, power levels of just 7.6mW, 7.2mW, 14mW and 27mW at 7, 14, 21, and 28MHz respectively will immerse the whole head, neck, and upper torso in magnetic field at a level that exceeds the far-field whole body limit." His figures are based on FCC standards. The ICNIRP safety standards are generally more conservative [3], so the power limits in that case are even lower.

Other hazards

The RF magnetic fields from small loops can induce significant currents in conductors. Also, small loops can couple strongly to nearby ferromagnetic materials that concentrate RF magnetic field lines, making the field stronger.

The ICNIRP guidelines include warnings about sparks, shocks, and burns from induced currents. Other possible risks include interference with cardiac pacemakers, detonation of electro-explosive devices (detonators) and ignition of flammable materials [4].

Conclusions

Intense reactive near fields surround a small transmitting loop in all directions. Even at low power the near-fields exceed the ICNIRP maximum permissible exposures. The RF magnetic field is usually strongest along the axis perpendicular to the loop. Depending on the power and frequency, safety distances are sometimes determined by strong electric fields in the region above the tuning gap.

W1RFI, author of *RF Exposure and You*, advises amateurs to err on the side of caution when they establish safety perimeters around antennas [2].

Acknowledgment

My thanks to Kai Siwiak, KE4PT, for very helpful answers to my questions.

References

[1] Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, *OET Bulletin 65b* (1977). Accessible at https://transition.fcc.gov/bureaus/oet/info/documents/bulletins/oet65/oet65b.pdf

[2] *RF Exposure and You,* Ed Hare, W1RFI, ARRL, 1998

[3] RF Exposure Safety with HF Antennas, P DeNeef, AE7PD, *RadCom* September 2015

[4] ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields, *Health Physics* 74(4) 494-522 1998. Accessible at www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf

[5] Email, February 27, 2017, R Croft, Chairman of the ICNIRP project group revising HF guidelines. Updates are posted at www.icnirp.org.

[6] *Radiowave Propagation and Antennas for Personal Communications,* K Siwiak and Y Bahreini, Artech House, Norwood MA 2007

[7] Ionospherica, K Siwiak, KE4PT, *The QRP Quarterly* Fall 2014, accessible at www.qsl.net/k4fk/presentations/QQ1014_24-25-Siwiak-Ionospherica-IV-Loop-nearfield.pdf

[8] Technical correspondence, K Siwiak, KE4PT, *QST* March 2012

TABLE 1: ICNIRP safety distances for a 1.0m loop with P = 10 watts.

Frequency	Occupational safety distance	General Public safety distance
7MHz	2.1m	2.9m
14MHz	2.1m	2.9m
18MHz	1.9m	2.7m
21MHz	1.8m	2.5m
28MHz	1.5m	2.1m

TABLE 2: ICNIRP safety distances for a 1.0m loop with P = 100 watts.

Frequency	Occupational safety distance	General Public safety distance
7MHz	3.3m	4.3m
14MHz	3.4m	4.7m
18MHz	3.1m	4.4m
21MHz	2.9m	4.2m
28MHz	2.5m	3.9m*

*Electric field limit

TABLE 3: ICNIRP safety distances for a 1.0m loop with P = 400 watts.

Frequency	Occupational safety distance	General Public safety distance
7MHz	4.2m	5.7m
14MHz	4.5m	6.5m
18MHz	4.2m	6.9m*
21MHz	4.0m	7.1m*
28MHz	3.7m*	7.3m*

*Electric field limit

Dr Peter DeNeef, AE7PD
HamRadioAndVision@gmail.com

Feature

Why not write for *RadCom*?

We welcome all sorts of articles – technical or features – from established or brand-new writers. There's nothing quite like seeing your name in print for the first time! And, best of all, we pay for the articles we publish.

It has never been easier to share your enthusiasm for your new project or favourite part of amateur radio, and getting your work published in *RadCom* or *RadCom Plus* might be easier than you think.

Timescales and practical notes

It's well worth phoning for a chat before starting so that we can talk about what you're thinking of doing. This is particularly important if your article is time-sensitive, eg about a forthcoming event. Publishing delays mean we normally need to agree feature articles at least three months before publication and receive the finished text two months before the cover date.

We can provide a lot of help with 'polishing' your work. We 'sub-edit' everything in the magazine (even the regular columns) and most drawings are re-drawn by our illustrator.

We need your text as a plain Word document, with illustrations sent separately. Information on sending photos and drawings is at http://tinyurl.com/RadComPix

Feature articles are often published quite quickly. Technical articles are 'peer reviewed' by a member of the Technical Panel, then published when space becomes available.

Contact us

We're always happy discuss possibilities and help any way we can. Call 01234 832 700, option 8, or email radcom@rsgb.org.uk

Data

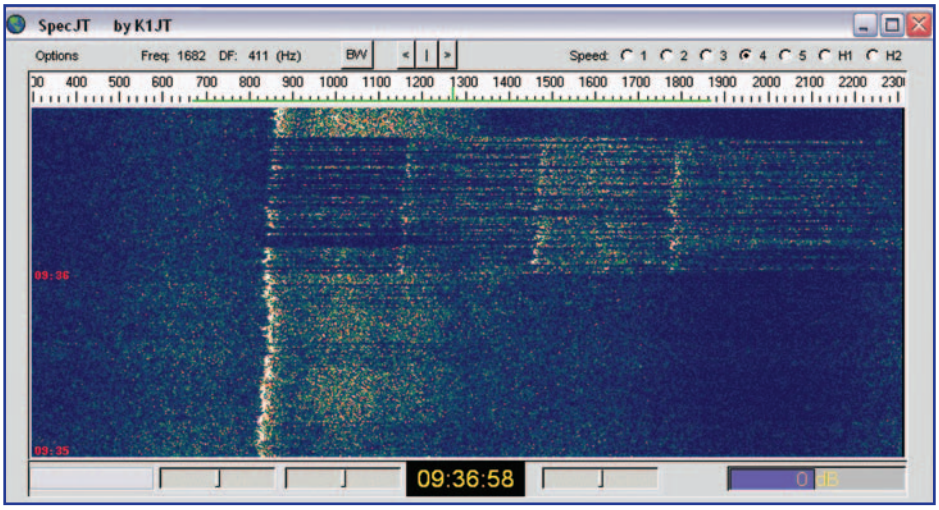


FIGURE 1: **Reception of the GB3SCX 10GHz beacon under serious rainscatter. In spite of the JT4-G tones beginning to merge, the WSJT decoder worked well. But at the still-higher millimetric bands wider shift data modes will be needed to exploit the huge signal enhancements that rain and other scattering mechanisms can offer.**

Morse is NOT a data mode

A statement that will surely raise a few hackles, but I am saying it as a result of two completely separate conversations recently that suggest Morse is being treated as such. One group (who had better remain nameless) organised two teams to enter an HF CW contest. One team was made up of experienced CW ops who did moderately well using their ears. The other called itself the "Digital Team" and was made up of ops who couldn't read Morse by ear. They used software such as *CW Skimmer* to decode off-air along with computer generated Morse on transmit. The Digital Team didn't do very well at all and, after the event, were bemoaning the inability of the software to decode anything other than perfectly formed computer generated Morse from other stations.

On radio links, Morse code was always meant to be read by ear. As a fallback from SSB voice, it can offer typically up to 15dB signal to noise improvement (depending on the operator's abilities), but a data mode it certainly isn't. Sent manually – and that includes by a 'bug' keyer – its timing is arbitrary. In other words, the start of letters and even the individual symbols (the dots and dashes) do not start at precisely timed multiples of a common clock. Humans have no trouble understanding this. After all, look at how we cope with different pronunciation and accents and the speed of word delivery. Morse timing is no different: the brain just copes. Computers, however, need to know exactly the start and stop of each symbol to determine whether it is a dot, dash or space in order to best reconstruct the letter. If timing is continually changing, it has to do a lot of searching for edges of the symbols. Throw in noise, interference and co-channel signals and it's hardly surprising that even after four decades of effort, computer decoding of CW is still not working all that well.

The one exception is computer generated Morse, whose timing is perfect. Dots, dashes and spaces all start and stop on precisely timed intervals. So, if the exact speed is also known then decoding software will always be able to reconstruct symbol timing, possibly from quite weak and noisy signals by using correlation techniques. Since in such software CW speed is probably defined using a number of fixed speed options, not much searching will be needed to determine the correct setting.

The other conversation was at a Microwave Round Table when one G8 asked "why could no-one come up with some software to read Morse". On the microwave bands, where SSB is quite widespread, it is quite normal to drop into CW if the signal is weak. In such cases the Morse is often hand keyed [1]. On explaining the aforementioned comments, the G8 realised the problems and said he wished he'd learnt Morse in earlier days.

But if computer generated Morse is going to be read by a computer as if it were a datamode, and you're going to have PCs in use at each end, why use Morse at all? As an on-off keyed (OOK) data mode it is not very efficient; there are better ways to use OOK with fewer symbols and better error correction: *Opera* [2] is one such OOK mode. But why not use a good, popular, proper data mode? There are many weak signal ones to choose from and whatever frequency band or propagation medium is in use, there will be something suitable for the job.

Datamodes for the millimetre bands

Operating at bands of 76GHz and higher, transmit signals are rarely generated by transverter / mixing techniques because that results in very low power. Instead, direct generation via frequency multiplication is the norm and restricts modulation types to frequency or phase shifting, or on-off modulation. For voice, frequency modulation is often used but FM is poor in weak signal conditions. AM generated by direct pulse width modulation of the transmitter has proved successful. Who *cares* about the wide clock-signal sidebands spreading a few hundred kHz either side when you're the only signal there with a few hundred microwatts up at 134GHz?

Data modes such as JT4G are just about possible if a fractional-N synthesiser is used as the source, although even an LMX2541 with its minimum step size of around 5Hz at 3GHz (see this month's Design Notes) is of limited use here. Signal spreading on the more 'ambitious' paths could be too high even for JT4G. As low as 10GHz, extreme rainscatter can spread the signal comparable to JT4G's tone spacing – although experience has shown it holds up extremely well in such conditions. **Figure 1** shows an example of heavy rainscatter at 10GHz.

So we need a new datamode for the mm-wave bands. Perhaps fast on-off keyed with heavy error correction, even if that seems a backwards step, may be the way to go. Perhaps wide shift FSK received semi-coherently. Or just wider variants of JT4 – like JT4-H or JT4-I at, say 630 and 945Hz tone spacing. Four tones spaced at 945Hz will just about fit inside the wider SSB bandwidths now available on modern SDR based radios.

And to throw in a final idea… quadrature mixing [3] of the baseband modulation before frequency multiplication means a fractional-N synthesiser with tiny frequency steps is no longer needed. Constant amplitude modulation is essential due to the frequency multiplication process, but we already use such modes anyway – just a thought.

References

[1] One memorable 10GHz QSO by yours truly involved generating Morse by waving a hand in front of the transmitting horn. The transmitter had been designed purely as a beacon and was incapable of being modulated externally. It worked.
[2] More on the *Opera* OOK datamode can be found at www.qsl.net/g0hdi/opera.htm. *Opera* was described in depth in the April and June 2012 Data columns.
[3] See Design Notes, *RadCom* April 2017.

Andy Talbot, G4JNT
andy.g4jnt@gmail.com

ML&S NO.1 FOR YAESU - OFFICIAL UK DEALER

YAESU FT-70DE

NEW PRODUCT COMING SOON!

Yaesu announce the FT-70DE During 2017, Yaesu are introducing more C4FM System Fusion transceivers as the digital mode proves to offer higher quality voice communication. The FT-70DE is a 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.

Click! www.HamRadio.co.uk/ft70de

NEW YAESU FT-991A + SP-10 SPEAKER

Compact base station radio with beautiful touch-screen display & 160-70cm coverage

Click! www.HamRadio.co.uk/ft991a

AFTER £85 CASH BACK ONLY £1314.95

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.

FT-991 HARDWARE UPGRADE KIT *This Upgrade kit allows Yaesu Musen Distributors and Repair Service Centres to add the following advanced features of the FT-991a to the original FT-991: Real-Time Spectrum Scope, Multi-Colour Waterfall Display, Select from Seven Spectrum Scope Display Colours & Select from Seven Display Colours or Multi-Colour Waterfall Display. The kit can only be fitted by our workshop.* ***ML&S ONLY £480.***

YAESU FTdx3000 ML&S: £1429.95

Click! www.HamRadio.co.uk/ftdx3000

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

HF/6m Base Station

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

YAESU FTdx5000MP Ltd

Click! www.HamRadio.co.uk/ftdx5000mp

The FTdx5000MP HF/50MHz 200W Transceiver twin RX.

AFTER £170 CASH BACK ONLY £3229.95

FT-450D WITH MyDEL MP-30 & YAESU MD-100 MICROPHONE

ML&S: £699.95

Click! www.HamRadio.co.uk/ft450d

YAESU FTdx1200

AFTER £45 CASH BACK £899

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.

See ML&S video review www.HamRadio.co.uk/ftdx1200video

Click! www.HamRadio.co.uk/ftdx1200

YAESU FT-891

Click! www.HamRadio.co.uk/ft891

HF/6m Base/Mobile

AFTER £45 CASH BACK £554.95

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!

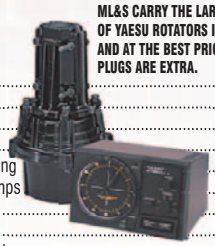
M-1 REFERENCE MICROPHONE

- 9 Band Graphic Equaliser
- Two microphone inserts
- Treble Boost Cowling
- Recording & Playback facility
- Limited Edition 60th Anniversary with Gold Band

IN STOCK NOW: £595.00

YAESU ROTATORS

ML&S CARRY THE LARGEST STOCK OF YAESU ROTATORS IN THE UK AND AT THE BEST PRICES. CABLE & PLUGS ARE EXTRA.



G-450C	£319.95
G-1000DXC	£499.95
G-5500	£654.95
G-2800DXC	£929.95
GS-065 Mast bearing	£54.95
GC-038 Lower clamps	£29.95
Rotator cable 25m	£69.95
Rotator cable 40m	£99.95
Rotator connector plugs	£26.95

YAESU The radio

YAESU FTdx9000 SERIES Yaesu Flagship Champion! **ML&S: Starting at £7499.95**

YAESU FT-817ND The Worlds Only All Band Portable! **ML&S: £529.95**

YAESU FTM-3100 65W FM with AMS. **ML&S: £129.95**

YAESU FTM-3200E Latest 2m Mobile with new digital C4FM (Fusion). **ML&S: After £17 Cash Back £172.95**

YAESU FT-857D Includes YSK-857 Remote Head Kit. **ML&S: £699.95**

YAESU FTM-400DXE Four modes of transmission. Large colour touch screen display. **With FREE Snapshot Microphone (MH-85A11U) worth £99.95! ML&S: £519.95**

NIFTY DESK-TOP STAND For Yaesu FTM-400 series. **ML&S: £29.95**

ATAS-120A ATAS-120A Auto Mobile 40m-2m Antenna for FT-857/897/450/991. **ML&S: £299.95**

YAESU FT-8900E **With FREE YSK-8900 Remote Kit**. High-power FM on 10m, 6m, 2m & 70cm. When your local repeater is busy, slip onto 10m & work DX! **ML&S: £269.95**

YAESU FT-2D C4FM/FM 2/70 Dual band Handie. **ML&S: £399.95**

YAESU VX-3E Micro Handie 2/70 with scanner. **ML&S: £159.95**

YAESU FT-60E TWIN BAND HANDIE **ML&S: £104.95**

YAESU FT-1DXE Dual Band Full Digital Handie. **ML&S: After £35 Cash Back only £244.95**

YAESU VX-6E 2/70 handie. **ML&S: £159.95**

YAESU VX-8DE Triple Band 6/2/70 with enhanced APRS. **ML&S: £259.95**

YAESU VR-160 Miniature communications receiver. **ML&S: £149.95**

MD-100A8X Base Station Microphone. **ML&S: £109.95**

MD-200A8X Elite Deluxe base Station Microphone. **ML&S: £229.95**

YAESU DR-1XE 2/70 C4FM + advanced mixed-mode repeater. **ML&S: £1099.95 but with £400 CASHBACK from Yaesu until 30th June.**

THE VERY BEST ADVICE, PRICE AND AFTERSALES SERVICE @ ML&S

YAESU FT-2DE HANDHELD ML&S: £399.95

Click! www.HamRadio.co.uk/ft2de

Advanced FT-2DE C4FM/FM 144/430MHz Dual Band Digital Handie with large LCD display. FREE SHC-24 CARRY CASE.

NEW! ADMS SOFTWARE FROM RT SYSTEMS

Click! www.HamRadio.co.uk/rtsystems

Rather than fiddle about programming your rig with the small buttons on the front panel, a far easier method is to use specifically written software & programming lead from RT Systems.

In stock for Yaesu, Icom & Kenwood products.

FT-65E VHF/UHF 2M/70CM DUAL BAND FM HANDHELD ML&S: £129.95

ORDER NOW for May delivery.

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.

Click! www.HamRadio.co.uk/ft65e

NEW! MyDEL RADIO DUST COVERS ML&S: £29.95

Beautifully crafted and hand stitched. Soft liner to deter from scratching radio. Most types in stock at only £29.95.

Click! www.HamRadio.co.uk/covers

Sport Radio

Once again it's a busy month for contests and, this year, one in particular has significant changes to the rules.

CW National Field Day (NFD) takes place for 24 hours over the weekend of 3rd-4th. Participation in this contest has been declining for decades, but in a bid to turn this around there are major changes to the rules this year. Firstly, multipliers for DXCC entities are being introduced. Secondly, in comes a section for fixed stations. Fixed stations may only work portables for QSO points, but can work other fixed stations for multipliers. Portable stations can work everybody. All sections are now 24 hours in duration, with a separate Assisted section. 160m QSOs are no longer scored double points. After NFD it's back to the 80m Club Championships, with datamodes on the 5th, CW on the 14th and SSB on the 22nd.

The 2m Activity Contests take place on the 6th, the FMAC first, followed immediately by the UKAC. The 6m UKAC takes place two days later, on the 8th. The second in this year's series of 2m Backpacker contests is on the morning of the 11th. Then it's back to the Activity Contests, with the 70cm FMAC and UKAC on the 13th, and the 4m FMAC and UKAC on the 15th. The longest VHF contest of the month is the 6m Trophy, which runs for 24 hours over the weekend of the 17-18th. There are 6-hour sections for those who don't want to do the full 24. This contest often enjoys some enhanced propagation and runs concurrently with all or part of an IARU co-ordinated contest. UK & CD (United Kingdom and Crown Dependencies) entrants who make all their QSOs using SSB, CW or FM will be submitted to the IARU event unless they opt out. After the 23cm UKAC on the 20th we have two short contests on the 25th. The 6m CW Contest runs for 3 hours in the morning and the fourth session of the 4m Cumulatives in the afternoon. The last one of the month is the SHF UKAC on the 27th.

FIGURE 1: CQ map with the SEANET zones highlighted.

The UK Six Metre Group's Summer Marathon continues all month. Simply work as many Locator squares as you can, when you can. The SEANET (South East Asia NETwork) Contest takes place for 24 hours on the weekend of 3-4 June. From the UK you only want to work the SEANET area (see **Figure 1**). The UK Microwave Group (UKuG) has a Low Band contest on the 4th.

Now, a new one. The IARU ATV contest takes place for 30 hours over the weekend of the 10th-11th. Activity is on analogue and digital TV. Over the same weekend we have the REF (French) DDFM 6m Contest. Activity is on SSB, CW and FM. On the 11th the *Practical Wireless* 2m QRP Contest runs for 7 hours. This year the power limit has been increased to 5 watts. The CW leg of the All Asian Contest runs for the entire 48 hours of the weekend 17-18th. On the 18th the UKuG High Band contest runs for 8 hours and the Worked All Britain 6m Phone contest runs for 6 hours. Finally, the UKuG have a 5.7/10GHz contest on the 25th.

Steve White, G3ZVW
steve.g3zvw@gmail.com

RSGB HF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Sat-Sun 3-4 Jun	CW National Field Day	1500-1500	CW	1.8-28	RST + SN
Mon 5 Jun	80m Club Championships	1900-2030	Data	3.5	RST + SN
Wed 14 Jun	80m Club Championships	1900-2030	CW	3.5	RST + SN
Thu 22 Jun	80m Club Championships	1900-2030	SSB	3.5	RS + SN

RSGB VHF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Tue 6 Jun	144MHz FMAC	1800-1900	FM	144	RS(T) + SN + Locator
Tue 6 Jun	144MHz UKAC	1900-2130	All	144	RS(T) + SN + Locator
Thu 8 Jun	50MHz UKAC	1900-2130	All	50	RS(T) + SN + Locator
Sun 11 Jun	144MHz Backpackers #2	0900-1300	All	144	RS(T) + SN + Locator
Tue 13 Jun	432MHz FMAC	1800-1900	FM	432	RS(T) + SN + Locator
Tue 13 Jun	432MHz UKAC	1900-2130	All	432	RS(T) + SN + Locator
Thu 15 Jun	70MHz FMAC	1800-1900	FM	70	RS(T) + SN + Locator
Thu 15 Jun	70MHz UKAC	1900-2130	All	70	RS(T) + SN + Locator
Sat-Sun 17-18 Jun	50MHz Trophy +	1400-1400	All	50	RS(T) + SN + Locator
Tue 20 Jun	1.3GHz UKAC	1900-2130	All	1.3	RS(T) + SN + Locator
Sun 25 Jun	50MHz CW Δ	0900-1200	CW	50	RST + SN + Locator
Sun 25 Jun	70MHz Cumulative #4	1400-1600	All	70	RS(T) + SN + Locator
Tue 27 Jun	SHF UKAC	1900-2130 ~	All	2.3-10G	RS(T) + SN + Locator

Best of the Rest Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange (info)
Sat 6 May - Sun 6 Aug	UKSMG Summer Marathon	All	All	50	Locator (first 4 digits)
Sat-Sun 3-4 Jun	SEANET	1200-1200	CW, SSB	3.5-28	RS(T) + SN
Sat-Sun 3-4 Jun	UKSMG Summer E's	1300-1300	All	50	RS(T) + SN + Locator + Member Number
Sun 4 Jun	UKuG Low Band	1000-1600	All	1.3/2.3/3.4G	RS(T) + SN + Locator
Sat-Sun 10-11 Jun	IARU ATV	1200-1800	TV	432 & up	P# + SN + 4-digit code + Locator
Sat-Sun 10-11 Jun	REF DDFM 6m	1600-1600	SSB, CW, FM	50	RS(T) + SN + Locator (first 4 digits)
Sun 11 Jun	*PW* 2m QRP	0900-1600	All	144	RS(T) + SN + Locator (5W max)
Sat-Sun 17-18 Jun	All Asian DX	0000-2359	CW	1.8-28	RST + age
Sun 18 Jun	UKuG High Band	0900-1700	All	24-248G	RS(T) + SN + Locator
Sun 18 Jun	WAB 6m Phone	0900-1500	Phone	50	RS + SN + WAB square
Sun 25 Jun	UKuG	0600-1800	All	5.7/10G	RS(T) + SN + Locator

+ VHF Championship event Δ VHF CW Championship event ~ Different bands start at different times For all the latest RSGB contest information and results, visit www.rsgbcc.org

Small station
2m and 23cm EME

This article is about the true spirit of amateur radio, self-training and development, setting yourself a goal and progressively working to achieve it. The challenge is Earth Moon Earth (EME) operation on 2m and 23cm using a small station that practically any radio amateur could build if they wanted to.

PHOTO 1: A small 23cm EME installation as described in the text. Note the 2m Yagi above the dish.

I define a 'small' EME station on 2m as using a single or pair of medium size Yagis; and on 23cm, as a station with less than a 2m dish. Technical 'how to' articles can be found on the web: use your favourite search engine and spend as many happy hours as you like dreaming of what you might do – or be practical: download WSJT10 or WSJT-X and listen on moon rise (MR) / moon set (MS) (and learn).

The perhaps surprising fact is that I achieved WAC (Worked All Continents) in less than five months on 2m EME with a single Yagi – definitely a 'small' station.

History

The story begins in 1979 / 1980 with the encouragement of Doug, G4DZU (then a keen 2m EME operator). We thought that it would be possible for a single-Yagi 2m station to contact one of the larger EME stations via the moon. 4-Yagi to 4-Yagi CW EME QSOs were possible, so why not a one-Yagi to 16-Yagi EME QSO? The link budget is fundamentally the same: as the advert says, you do the maths.

After a few failed skeds, on 23 November 1980 a CW contact and valid QSO was made with Dave, K1WHS, with his monster antenna array in Maine. At the time this was an achievement in itself – and probably the first 2m single-Yagi EME QSO from England. I was using a FT-200 connected to a homebrew 28 to 144MHz transverter, a homebrew 2 x 4CX250B amplifier with 400W output and a BFT66 preamp … those were the days!

Some 32 years later, after working most of the available Tropo / MS / AuR DX on 6m, 2m, 70cm and 23cm from my location 350m above sea level (ASL) atop the Pennines near Huddersfield (IO93bp), I retired from a senior global management role and wanted a technical and developmental challenge. The EME bug started all over again.

Back to the moon

I found my old 1.7m solid aluminium Andrew dish (once used as a play sand pit for the children), got the old 23cm 2C39A amplifier working, borrowed a VE4MA feed, built a G4DDK preamp, homebrewed an AZ / EL system driven by *Moonsked* and an ERC-M controller by DF9GR and thus engineered a 23cm small EME station (see **Photo 1**).

With 30W I worked several 23cm EME stations using K1JT's excellent WSJT JT65C mode. Around a year later I upgraded the system by expanding the dish to 2.4m and added a YD1336 amplifier, giving 300W at the antenna. I have had lots of JT65C and some CW EME contacts. Like all activities I progressively developed my system to be able to work more DX, leading to dual receive using WSJT and MAP65, so enabling parallel narrow band (3kHz) and wideband (90kHz) waterfall displays and decoding. Echo test in WSJT, Ian GM3SEK's excellent system analysis spreadsheet and the late VK3UM's EME program suite gave me a clue as to what to try next, and more importantly assess did it work as planned, always being driven to work more DX, continents and countries.

The 23cm station is still in use and has now been upgraded to a 3m dish and OK1DFC feed BUT I have not, as yet, worked VK and ZL, because the house and tower are in the way for an easy EME window and I cannot reposition the dish. A solution recommended by a helpful VK EME station wasn't very practical: knock the house down and he would then be able to work me!

More recently using VK3UM's planner I have found a 20 minute window for VK on 23cm EME, a balance between house/tower position versus moon azimuth, elevation and declination – and sensible operating time for both stations! It's yet to be proved, but hopefully will be in 2017 (see **Figure 1**).

Local conditions

Around this time I became frustrated with the level of crud on 2m. Well, I do live on the top of a hill, have four commercial VHF / UHF masts on the same hill, am just 14km line of sight to the Emley Moor TV / VHF tower, 12km from the Holme Moss VHF Tx and the Moorside Edge 200kW Medium Wave (MW) Tx is just 2km away. Keeping literally volts of MW RF out of my coax, control and DC feeds up the tower and to the dish was yet another challenge. My MGF1302 2m GaAsFET preamp was not up to that VHF RF environment challenge. It had a third-order input intercept point (IIP3) of -8dBm, so I needed tight (narrow) filtering before the preamp for it to survive, together with a good filter before the main Rx AND – most importantly – a good balance of gain in each stage of the Rx chain. Of course any loss

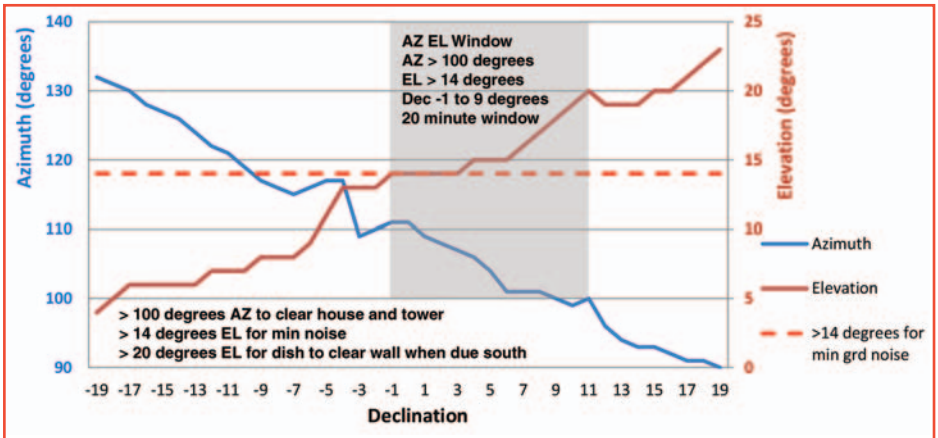


FIGURE 1: Declination v G4IDR to VK common 23cm window. Values are based on max elevation for each declination angle (see text).

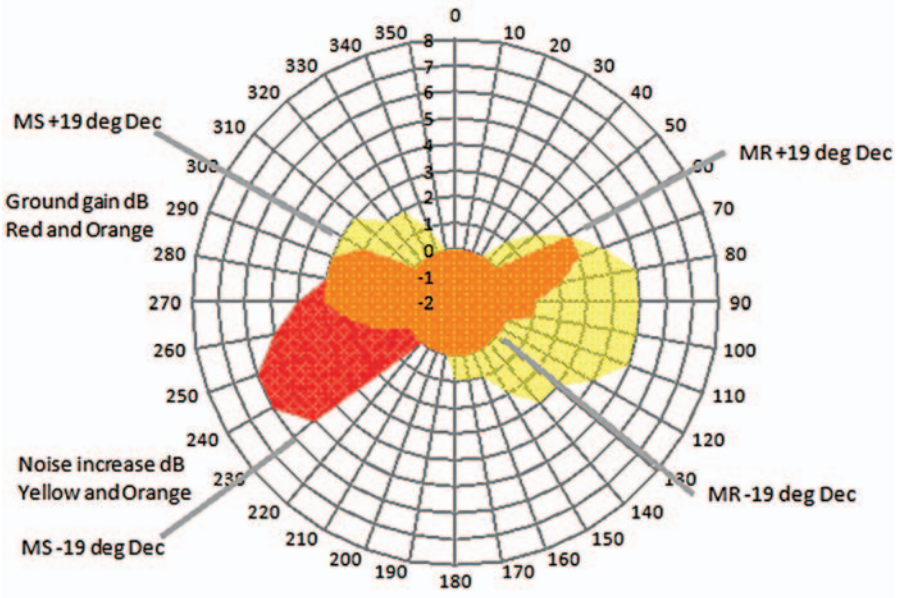


FIGURE 2: Ground gain (GG) in dB calculated using ON4KHG's spreadsheet at moon rise (MR) and moon set (MS) (red and orange respectively) compared with noise floor increase (dB) (yellow and orange) over a full range of declinations (Dec).

before the first RF stage adds directly to your noise figure (NF) and too much system gain is always a bad thing. Other preamps with better IIP3, such as Sam, G4DDK's PGA144 (device +5dBm) reduced the intermodulation distortions (intermods) but I probably need a preamp with an IIP3 of better than +20dBm to eliminate them completely. Today this is technically possible (a project for another day).

These days 2m is definitely noisier than it was 20 years ago. It's interesting to plot noise level in dB versus antenna azimuth (Az) position around 360 degrees, with and without a preamp and with differing filter and gain distribution combinations. *Spectraview* and *MAP65* are very useful tools for this as you can not only see the noise floor change but also how the intermods change. For example **Figure 2** shows ground gain (GG) (in dB) calculated with ON4KHG's spreadsheet at MR and MS (red and orange) compared with noise floor increase (dB) (yellow and orange) and over a full range of declinations (Dec). Clearly negative to zero declination at MS gives highest GG and lowest noise floor increase and so should be best. This is also found in practice.

Whilst not completely satisfied with the RX system, I rebuilt my (now 35 year old) 2x4CX250B amplifier high voltage power supply and control unit, added extra protection circuits. I added a 'suck' fan atop the valve air exit to help it cope with the higher duty cycle of JT65B and a homebrew low pass filter as per the G4SWX design. I also modified my 11-ele Loop Fed Array (LFA) antenna to have a 1/4 wave sleeve balun, then thought: "why not 2m EME?"

2m EME

WSJT JT65B was now available and being used very successfully. A single Yagi on JT65B would have at least 10dB advantage over the same station using CW, so I didn't need 4 Yagis. (I have wind gusts up to 100mph at this location and I hate luffing over the tower). I again used VK3UM software to show that a single Yagi was able to work 4-Yagi 2m JT65B EME stations, probably able to work 2-Yagi stations but possibly not single-Yagi stations unless the preamp was at the antenna.

Where does that 10+dB advantage come from? Well JT65 modes decode signals in the noise down to the equivalent of around -27dB signal to noise ratio in a 2500Hz bandwidth. A JT65B signal is around 215Hz wide, while JT65C is 431Hz between the sync and widest tone. The WSJT reporting system refers the FFT decodes to a 2500Hz level (typical SSB audio bandwidth). Switching from SSB in a 2500Hz bandwidth to CW in 250Hz gives you a 10dB advantage and if your ears are trained properly then you can gain some further advantage so let's say you could copy CW signals down to around -13 / -17dB referred to 2500Hz. JT65 is some 10dB better than that!

These numbers are not exact but are 'directionally OK' and again shows part of my philosophy: don't spend hours doing the maths and not working the DX, just do a quick and dirty calculation, test if is directionally correct, ask if it feels right and if the answer is yes then try it and go from there.

In July 2014, I started to work 2m EME on MR and MS using the tower mounted 11-ele LFA Yagi. Later a now very obvious thought hit me: if I use the 23cm dish AZ / EL system and mount a 2m Yagi a metre above the top of the dish (thus around 3.6m AGL), I will be pointing to a quieter RF environment (sky noise); if the Yagi side and rear lobe suppression are OK I should have a far more constant AND lower noise floor.

I found my old DJ9BV 12-ele 2m Yagi, a classic in its time. Yes, there are better Yagi designs today for side / rear lobe suppression and g/T performance, but after a day's work to repair it plus another day to mount it above the dish and pull some cable through the underground pipe to the dish I was now in a position to try 2m EME from MR to MS.

Dave Redman, G4DIR
davidredmang4idr@gmail.com

PHOTO 2: My 2m WAC certificate.

The tower mounted 11-ele Yagi gets ground gain on Moonrise and Moonset, the 12-ele AZ/ EL mounted Yagi would not benefit from much ground gain given its much lower height and local garden obstructions, but I would see lower sky noise with no or little ground noise (ie a lower noise floor) and no intermods, particularly at higher elevations … which would win?

Initially I repeated the noise floor versus AZ tests comparing my best optimised RX system on the 11-ele fixed Yagi with the 12-ele AZ/EL mounted Yagi; not unsurprisingly, above 20 to 30 degree elevation the 12-ele Yagi was best, with practically no crud / intermods / sprogs (call it what you will) and a lower consistent noise floor (5dB better at best), but at lower elevations little ground gain. Moonset from 240 to 270 degrees AZ on the tower mounted 11-ele fixed Yagi up 20m AGL is impressive, averaging around 5 to 6dB ground gain. A decent coax switch was mounted in the shack to select between the two Yagis and the preamp retained in the shack (and yes I know it's better at the antenna but for now it allowed apples to apples comparisons).

On 13 July 2014 I had my first 2m EME QSO using JT65B with Gennadi, ES3RF (-20dB report both ways). Then followed Dan, HB9Q at -16dB; Frank, W6BBS at -20dB; Marshal, K5QE at -19dB, all on the tower mounted 11-ele Yagi. Not only were these larger-antenna EME stations clearly visible on the WSJT waterfall, I could just detect them on the earphones over the noise of the 2x4CX250B blowers and my tinnitus. This was fun: my non-optimal system worked! So, If I could work the larger stations, how about 2-Yagi stations?

Smaller targets

Bob, ZL1RS mounted a well-publicised 2m EME DXpedition to American Samoa as KH2/ZL1RS. He was using 2x 9-ele Yagis and around 800W. Initially I heard nothing, then on 21 July 2014, as my beam started to come into Moonset ground gain, I got robust decodes from Bob as he worked several EU stations. The pile up was big: even on my single Yagi I noticed at least 8 stations calling him over a 2kHz segment in the *Spectran* waterfall, so probably lots more stations were also calling that I was not seeing with my small station. Yes I was hearing him, but could I work him. There appeared to be a gap on the waterfall, so I placed my Tx frequency there (allowing for mutual Doppler) and started to call. After several minutes, no success, but I kept going. Then, as the moonset to EU stations to the East of me it reduced the size of the pileup (and as my Yagi rotated into the ground gain sweet spot) I nearly fell of my chair when I received G4IDR KH2/ZL1RS OOO at -27dB then RRR and 73s. A QSO. I later checked online and yes I was in the log (one of just six single-Yagi stations to work him out of his 250+ EME QSOs) and QSL cards were exchanged.

Wow, by the end of July 2014 I had 6 countries and 3 continents worked. In August 2014 I worked Dave, W5UN at -18dB, who I had worked with a single Yagi on 2m CW EME way back in the 1980s.

By the end of November 2014 I had even more QSOs, 20 countries and the 6 continents for 2m EME WAC (see **Table 1**). By the time QSL cards arrived and I decided to submit my WAC claim, my certificate arrived in February 2017 (**Photo 2**) thanks to the excellent efforts of the RSGB Awards Manager Chris, G3SJJ.

To date I have worked over 38 countries with my small station using the single Yagi 2m EME and 35 countries on 23cm EME. I regard every EME QSO as a success: not all calls result in a successful QSO, but some 2m completed EME QSOs jump out with a wow factor. These include PY1EME, Bruce at -26dB – my first single Yagi to single Yagi QSO, plus JE1TNL, ZL2ADU (Harry, sadly now SK), VK5FA, FW5JJ, 7Q7EME, C6ANS, EA8DBM, EA6VQ, VP8DQE, TO2EME, PJ7/PE1L and P40MB, etc etc. Some of these QSOs would be impressive on our HF bands, let alone 2m.

All my recent 2m EME QSOs have been using JT65B. On 23cm, both JT65C and CW QSOs are in the log. I have also had a few 6m EME JT65A QSOs on my tower mounted homebrew 6-ele LFA and, many years ago, a few 70cm CW EME QSOs – but that's another story.

On 2m I have just improved the dish-mounted 12-ele to a 14-ele Yagi (0.7dB improvement on Rx and Tx) and on 23cm upgraded from the 2.4m dish shown in the photo to a 3m dish, now with a homebrew OK1DFC square septum feed (+1.8dB on Rx and Tx). Both are working very well.

Antenna Choices

On 2m if you have an existing medium sized Yagi, horizontally polarised – fine, try it on EME. If you're starting a new setup then seriously consider a cross polarised Yagi (with switchable horizontal and vertical beams). This allows you to better compensate for Faraday rotation and hence a higher probability of EME contacts. Whilst you can use a linearly polarised Yagi on 23cm you lose 3dB on Tx and Rx as the standard is circular polarisation (CP), so a small dish with a CP feed and a low noise preamp (per G4DDK's design) mounted at the feed is the best approach.

The future

There are a wide range of possibilities in all aspects of amateur radio. EME is no exception, and my next steps include:

- New, lower noise, better IIP3 2m preamp, from 1.2dB NF on the MGF1302 to around 0.4dB and >+15dB IIP3, based on the VE3KH design and, once proven, mount it at the antennas
- Test if I could hear my 2m CW echoes using WSJT Echo mode and have a 2m EME CW QSO with some of the bigger 2m EME stations (a reminder of 1980!)
- Try the new WSJT-X suite and QRA64 mode (potentially +2dB advantage over JT65B / JT65C once it's finally proven and released)
- Switch to Linrad to drive MAP65 on both 2m and 23cm EME (in development)
- Work more DX on 2m and 23cm EME (how about DXCC, WAS or whatever)
- Try the 3m dish on 70cm EME (a bit marginal but possible with the larger EME stations) and could I mount a 70cm feed around the OK1DFC 23cm feed? another challenge…
- Build my 4m G4DDK transverter and amplifier.

In the shack

For those interested in the equipment used, I have an FT-2000 plus homebrew transverters or a TS-790E supported by a SDR-IQ and RTL

TABLE 1: My 2m EME WAC claim.

	QSO station	QSO date
North America	KB8RQ	30814
South America	PY1EME	20814
Oceania	KH8/ZL1RS	210714
Asia	JE1TNL	130814
Europe	HB9Q	190714
Africa	ZS6WAB	291114

dongle, homebrew preamps, homebrew valve amplifiers for 6m to 23cm with up to 400W output when required.

Outside, the antennas are 6-ele on 6m, 3-ele on 4m, 11-ele and 14-ele on 2m, 22-ele on 70cm, and for 23cm there's a choice of a 55-ele Yagi or the 3m dish with OK1DFC feed.

Help received

I haven't done all this on my own. Doug, G4DZU and John, G3TSA (both members of the Spen Valley Radio Club), Sam, G4DDK, John, G4SWX and Peter, G3LTF (to name but a few) have been great help with sound advice, as have the wider global 2m and 23cm EME community. When you ask a 'daft' question and get sensible answers, it encourages you to continually develop and optimise your station.

I think that should apply to all aspects of amateur radio, whether you want to work DX or just chat across town on the local repeater.

I generally keep away from the various divisions in amateur radio (eg CW versus WSJT for EME, use of Deep Search, and so on). Frankly I don't care: I enjoy what I do and spend my time on amateur radio improving the station and working DX. I'll leave others to waste their time on internet chats arguing X versus Y.

Other stations

There are now several stations attempting single Yagi EME on 2m, 70cm and even 23cm, so have a go yourself and see if the bug bites. Make sure you synchronise your computer time with a decent program (I use *Dimension 4*), listen on moonrise / moonset to get used to how WSJT / WSJT-X work, then have a go with one of the larger EME stations, looking on the N0UK, Live CQ or HB9Q loggers to see who is active on the moon. If you want to do it the hard way without chatroom support and/or on CW, then that's fine by me too. On 2m no elevation is not too much of a disadvantage for a beginner and you should get some ground gain at MR and MS. On 23cm you really need elevation to reduce ground noise and to listen with a decent preamp (<0.5dB NF) into the quieter parts of the sky (down to 3K).

My thanks go to the larger EME stations that persevere to work smaller stations such as myself. Finally if I can work this 2m or 23cm EME DX, then so can you, but most important whatever you do have fun with amateur radio and join your local radio club to learn from others and to help other fellow and potentially new radio amateurs.

Feature

Get the best from RSGB publications

Clubs and other organisations are welcome to publicise their events through the pages of *RadCom*, GB2RS, RSGB website and social media. Here are some simple tips to getting the best results.

Club Events Calendar and GB2RS

A single database is used to produce the entries in Club Calendar and Local News for GB2RS broadcasts and online news. All entries should be sent by email to radcom@rsgb.org.uk – please DON'T copy or duplicate (CC) the information to other editorial or HQ addresses, because this leads to duplication of effort and, occasionally, entries falling through the cracks.

Your Regional Manager may also like to know what you're planning but is not obliged to pass on the information so *make sure you send it to us*, via radcom@rsgb.org.uk.

At the start of your email, please put the FULL club name (NOT just initials) and your RSGB Region. Keep your Calendar entries simple and short. Remember to include contact details explicitly: don't just assume we know that you (or Fred) are the club contact. Always include the club contact's name, callsign, email and phone number.

An ideal calendar email is along these lines:

Fraser Road Radio Club, RSGB Region 9
Contact: Steve Thomas, M1ACB, 01234 832 700, email gm.dept@rsgb.org.uk
February 2017 club programme
3 Club night in shack
12 Club net, 145.525MHz, 8pm
23 My Pet Aardvark, talk by Phil, G9ABC

Events Roundup

Keep your news item concise, no more than 175 words about each event. If you think you'll need more space for something major please talk to us *well* in advance – by the time you receive your *RadCom* we have already allocated all the pages in the next edition.

Send all submissions for Events Roundup to radcom@rsgb.org.uk and, like Club Calendar, please DON'T duplicate (CC) your email to any other editorial or HQ addresses.

Photographs

Photos submitted for Around Your Region must be *at least* 1024x768 pixels (higher res is better), in sharp focus and must be adequately lit. There are useful hints and tips on taking good photos for publication at http://tinyurl.com/RadComPix

When you send a photo, please make sure to attach it to your email as a separate jpg – *never* embedded in a Word document or the email body. Try and avoid lines of people, including those holding certificates. Pictures of people taking part in radio activities are always more interesting to everyone.

We cannot print every photo we receive within the 3 pages available to Around Your Region, so preference is given to high quality, interesting images of club activities.

You must be the originator, copyright owner, or have the written permission of the copyright owner for all images that are sent for publication. If photos include identifiable children you MUST make sure you have the parent or legal guardian's permission before submitting their likeness for publication.

Deadlines

You will always find the deadlines for the next two editions in the red bar at the very start of the Club Events Calendar. If you can send your information well before the deadline, it's much appreciated. The deadline for GB2RS News is normally 10am on the Thursday before broadcast.

Finally

We're always happy to help any way we can. If you have any questions about material for *RadCom* or GB2RS please don't hesitate to ask us, either by email to radcom@rsgb.org.uk or by phone on 01234 832 700, option 8.

- Want to write for *RadCom* and get paid? See page 47.

radcom@rsgb.org.uk

The British ARDF Championships 2017

David, M3WDD (left) receives the 3.5MHz trophy from Bob, G3ORY (Chair of ARDF Committee).

Robin, RS213497, the planner for Day 3, checks, in the early morning mist at Hambleden, that the 2m transmitters he deployed the previous day have 'woken up' and are operating correctly.

This year, the RSGB welcomed visiting competitors from Bulgaria, the Czech Republic and Germany. The weekend of 8 and 9 April had wall to wall sunshine and temperatures up to 24°C. When pressed, the Bulgarian contingent admitted it was warmer here than it was in Sofia.

The event returned to the south of England in 2017 and we enjoyed some of the finest terrain in that part of the country. There is a small 'window' in the spring when the temperatures are rising yet the undergrowth (nettles, bracken etc) is only just beginning to emerge, meaning that the woods are at their most runnable. In fact, the final day of the competition had the start located in a wonderful British bluebell wood that was just coming into bloom.

A sprint race in the grounds of Wycombe Abbey School opened the competition on the Friday evening. With twelve transmitters placed around the grounds by planner Jillian, M0JIN to be found, it was, as usual, a fast and furious competition. Each transmitter sends for just 12 seconds in the sprint format and five of them operate in a one minute cycle. Having 'bagged' the first five transmitters, competitors changed frequency to punch the 'half way' beacon and then hunted another five hidden transmitters and the finish beacon.

Andrew, G4KWQ raced around this course to find all the transmitters in just over 21 minutes. He thus retained the RSGB Sprint Trophy that he won last year.

We were able to obtain permission from the Crown Estates to use Swinley Forest at Bracknell for the 3.5MHz competition on the Saturday. It was a delight to be able to return to this forest after an interval of a few years. It did not disappoint with the lovely pine forest at its very best. Svet, RS214021 planned the 3.5MHz course and competitors in the different age classes were assigned an appropriate number of transmitters to find.

Fastest of the day to find all of the transmitters was visitor Tsenko Tsenkov, an M21 (man aged 21-39) from Bulgaria. He was followed in, just over a minute later, by David, M3WDD who therefore took the British 3.5MHz title. In fact, the top three RSGB competitors were all back in a 2½ minute window, showing just how competitive the race turned out to be.

For the last day of the competition we were very privileged to be able to use the lovely Chiltern beech woods on the Hambleden Estate at Henley-on-Thames. This was courtesy of the Estate and the Thames Valley Orienteering Club who were running a major orienteering event there. The area did not disappoint and Robin, RS213497 set a very well judged course that allowed the deep valleys and huge spurs to generate much 'interesting' multi-path propagation to challenge the competitors. It was truly an area and courses worthy of a National Championship.

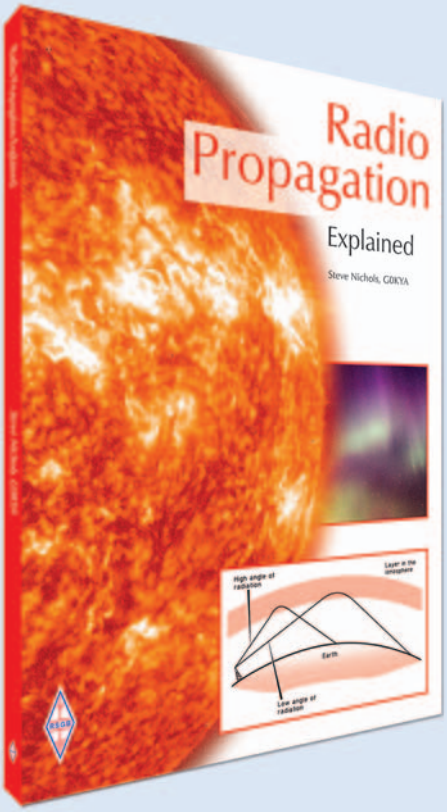
It was Andrew, G4KWQ who came home first, beating not only the domestic opposition but all of the visitors as well. He retained the 144MHz Plate for his efforts.

It was a most excellent weekend of radio sport and made all the better by the presence of our visitors and friends from other European countries. We all gathered together on the Saturday evening for a mini hamfest where the stories of the day could be recounted and the triumphs and tribulations 'raked over' in equal measure.

The visitors from Bulgaria. Left to right: Vlad, 2E0VLB (UK host), Patritsia, Viktor, LZ3NN and Tsenko.

Bob Titterington, G3ORY
g3ory@lineone.net

NEW TITLES



Radio Propagation Explained

Steve Nichols, G0KYA

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

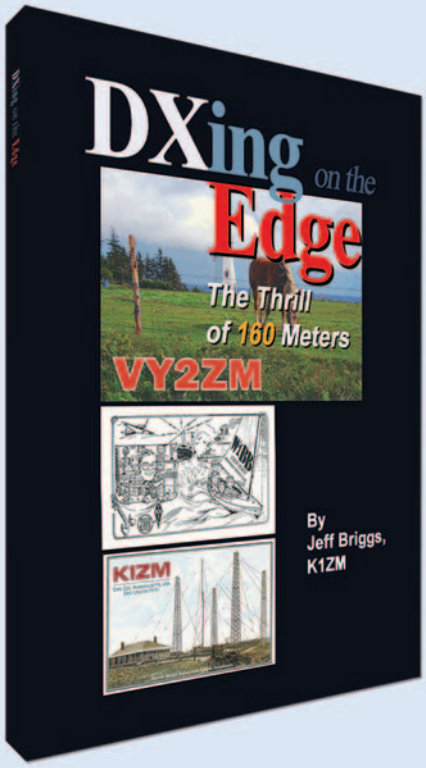
Looking at HF to VHF, UHF and beyond, *Radio Propagation Explained* provides a practical understanding of radio propagation. It looks at the Sun, sunspots, ionospheric propagation, ionospheric storms and aurora, tropospheric propagation, meteor scatter and space communications, including satellites and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

Radio Propagation Explained draws on material from the hugely popular *Radio Propagation Principles & Practice*, and enhances it with the latest advances in the field of propagation. Steve shows how radio amateurs can, by studying propagation, gain a more rewarding experience.

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

Size: 240x174mm, 128 pages,
ISBN: 9781 9101 9328 0
Non Members' Price: £12.99
RSGB Members' Price: £11.04

Also available on amazonkindle



Dxing on the Edge

The Thrill of 160 Meters

Jeff Briggs, K1ZM

For many radio amateurs operating on TopBand or 160m is endlessly challenging, exciting and intriguing. Building on the success of his first edition, author Jeff Briggs, K1ZM, well known as a TopBand expert, has extended a book that will appeal to all who operate TopBand or are just wondering what is possible on this fascinating band.

This is a specially produced RSGB edition of a US classic that brings the best of 160m operating experience to everyone. The book covers how the chronology of DXing on 160m across the years and the personalities involved. Aside from detailed historical information, the author describes many practical antennas and operating techniques that can lead to success on TopBand. Successful DXing can though be accomplished even from the trickiest environment and the book includes lots of neat tricks and hints that will help you work the rare ones In the 42 page colour section are new chapters for 'Modern "Off the Shelf" Transmit Solutions', 'Modern Receive Solutions for Smaller Properties' and more.

Beware though. TopBand can be addictive and as a true-blue 160m fan you might well find yourself actually enjoying listening to static crashes, waking up just before dawn for three months just trying to make that seemingly impossible TopBand DX QSO. K1ZM has written this book for anyone interested in the history and practice and most of all the enjoyment to be found on 160m.

Size: 222 x 286mm, 256 pages,
ISBN: 9781 9101 9333 4
Non Members' Price: £15.99,
RSGB Members' Price: £13.59

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

RSGB 2017 Convention

The RSGB Convention packs in a full weekend of the very best amateur radio lectures from around the world. With five streams, there is "Something for Everyone". Join hundreds of others at the RSGB Convention 13th to 16th October for one of the best social events in amateur radio.

BOOKING NOW OPEN

- DXpedition Lectures
- Technical Lectures
- DXCC Card Checking
- UK and FCC exams
- IOTA Sessions
- VHF Lectures
- VHF Contesting
- VHF & HF Trophy Presentations
- HF Forum
- HF Lectures
- Construction Competition

LECTURES FOR 2017

- Botswana, A25UK 2017
- How Space Weather Affects Radio Signals
- AMSAT - Current status of FUNcube satellites
- Remote Amateur Stations: - the next generation
- World Radiosport Team Championship 2018

ANY MANY MORE TO COME

www.rsgb.org/convention

Kents Hill Park Training & Conference Centre
Milton Keynes, MK7 6BZ

National Hamfest

Friday 29th September & Saturday 30th September 2017

Britain's BIGGEST amateur radio event!

Show Highlights

- RSGB book stand
- RSGB committee stands
- Free parking
- Manufacturers stands
- International traders
- Club stands
- Special Interest Groups
- "Bring and Buy" stand
- Amateur radio car boot

Organised by

www.nationalhamfest.org.uk

George Stephenson Pavilion, Newark & Nottingham Showground, Lincoln Road, Winthorpe, Newark NG24 2NY

International Marconi Day April 2017

Rodney, G0CBO and Kim, G4WUG use Morse code from GB0CMS at Caister Lifeboat.

Robin, G0OSG and Dave, M0IKT operating from Marconi's Workshop.

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

GB0CMS

Amateurs at the Caister Lifeboat Visitor Centre in Norfolk managed to contact 193 other radio amateurs in 35 different countries on 22 April when they took part in the annual International Marconi Day. Using GB0CMS and a mixture of Morse code, telephony and data, contacts were made across the UK, Europe, Australia and the USA. Notable contacts were with other special Marconi stations in the UK, Italy, and Ireland.

Norfolk ARC ran the all-day special event station at Caister Lifeboat to commemorate the village's original Marconi Wireless Station, which was established at Caister in 1900. Visitors to the station including many other local radio amateurs and members of the public. Conditions weren't brilliant due to a solar disturbance, but their first contact was Ian, VK3MO, an amateur near Melbourne, Australia. The equipment used was 100W from an Icom IC-756 Pro 3 (30/20m) and an Icom IC-7300 (40m). Antennas were a W5GI dipole on 40m and G0KYA-designed monoband end-fed half-wave verticals for HF.

Thanks go to Caister Lifeboat for letting us set up the station.

Steve, G0KYA

Club members Mark and Tom operating during the event at Wrexhm ARS.

GW4WXM

On 22/23 April, to mark International Marconi Day, members of Wrexham ARS held their annual outing to Dave, GW6NNB's home in the beautiful Welsh countryside. An enjoyable weekend with excellent weather but the radio conditions were not as had been hoped – but that's the current state of propagation for you. They still managed four Stateside contacts as well as many European stations using the club call of GW4WXM. The equipment used was a Crushcraft HF vertical antenna into a Kenwood transceiver using 100W.

Eifion Parry

GB5LT

On 21 April, a team from Waterside New Forest Radio Club moved into the Cadland Manor Estate to set up the aerial. Bob, 2E0CZK transported the aerial masts and Tim, G4YVY, Tony, G6MNL and Robin, G0OSG collaborated in erecting the masts and G5RV aerial. Rod, G6LVJ laid a protective covering on the table in Marconi's Workshop and put on display a framed A4-sized photo of Maldwin Drummond, who, sadly, passed away in February this year. It was Maldwin who first enabled the club to set up GB5LT in Marconi's Workshop, in 2011, and they wished to honour him for his kindness to the club. Nowadays, it is Maldwin's son, Aldred and his wife Fiona, who kindly allow them to continue with this tradition.

On the 22nd, Tony, G6MNL set up his transceiver equipment. They found that radio conditions on all HF bands were poor, but went ahead anyway, calling CQ enthusiastically. The day's efforts resulted in 51 contacts, five of them being Marconi Day stations and one of these was DA0IMD on Borkum Island. Another island contact, and quite unusual, was Grahame, OZ1W, on Falster Island. They had many contacts in Europe, including Switzerland, Denmark, Germany and Italy. The general feeling in the team was that, given the poor HF conditions, they had done well.

Rod, G6LVJ

Elaine Richards, G4LFM
radcom@sgb.org.uk

YOTA 2017

YOTA 2017 is now fast approaching and there are lots of plans in place that will make 5 to 12 August extra special for youth activity in the UK. Some of finer details are still to be finalised but we are planning Special Event Stations, SOTA activations, trips to London and Bletchley Park and even a visit to the Ofcom listening station at Baldock. Delegates will also be participating in ARDF, radio construction, antenna erection and, if all goes well, even a contact with the International Space station.

YOTA update

Ciaran Morgan, M0XTD has confirmed that the plans are in place for an ARISS contact with the International Space Station during YOTA 2017 week in August. He will be visiting Gilwell Park soon as part of the preparations and the ARISS team from the Principia mission will be available to run the contact in August.

YOTA 2017 Award

As announced previously there is going to be an RSGB Award connected to YOTA 2017. Award certificates will be issued to those who log calls with the Special Event Stations that will be operating for the duration of YOTA 2017. Two awards will be available that have the following requirements:

YOTA Award – 3 contacts on 3 bands, any mode made between 5 and 12 August.

YOTA Special Award – 1 CW contact made on the 18MHz (17m) band to a delegate using the transceivers they will have made during the event.

The latter award is designed to encourage the use of special 17m CW transceiver designed by QSL Labs that delegates will make and take home after the event. The details of how to claim an award will be published closer to the event. An example of the special YOTA 2017 Award certificate is shown here.

YOTA Volunteers

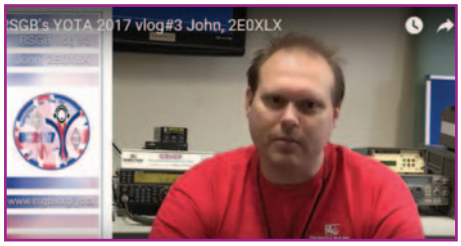
We are still finalising our needs for volunteers and would like to thank those who have already agreed to help. However, we are still looking for more people who can spare some time during the 5 to 12 August period. In particular we have a need for people who live in the SE of England (preferably) who are experienced in SOTA. If you are able to offer your services during the event we would love to hear from you via email to yota@rsgb.org.uk

YOTA vlogs

There are two new vlogs to watch. Peter Barnes, 2E0UAR is 19 and a member of the Thornbury and South Gloucestershire ARC. He is one of the three young radio amateurs who will make up the UK's YOTA 2017 team. Peter filmed not only his piece to camera but a host of other footage of him doing amateur radio activities and he's edited it all together to create some fantastic content for this vlog – do take the time to watch it and share it across your own networks: http://rsgb.org/main/about-us/yota-2017/watch-our-vlogs/

John Gascoigne, 2E0XLX is part of the GB2GP radio team at Gilwell Park, which is hosting the YOTA 2017 event in August. Watch it via the RSGB website www.rsgb.org/yota and, while you're there, why not take a look at all the other YOTA 2017 information and updates you'll find in those web pages.

Peter, 2E0UAR YOTA 2017 vlog



John, 2E0XLX YOTA 2017 vlog

And thanks to...

Super supporters

Supporters plus

Individual Supporters

Martin Atherton, G3ZAY
Fred Handscombe, G4BWP
Kenneth Holloway, M0SHK
Dominic Smith, M0BLF
Yutaka Sakurai, JQ2GYU
J Fletcher, G4EDX
Steve Hartley, G0FUW
Mike Harriman, G4SJX
M Harper, MW1MDH
Martyn Preston, G0THY
B. Rimmer, G0JCQ
K Senior, 2E1XDJ
Philip Hewitt, M0KPH
Alan Jones. M0OLT
Graham Cowan, G7LMF
T. Buckle, G0EWV
Nigel Bazley, GD6AFB
Stuart Roy, M0SAR
Mark Allgar, M1MPA
Helen Jones
Alan Messenger, G0TLK
Phillip Gardiner, G8YLX
Doug Vickers, G4SEQ
Richard Price, M6ICE
Robin Sykes, G3NFV
David Wright, M3TZX
Michael Bryans, 2E0UMB
Steve Thomas, M1ACB
M Street, G3JKX
Michael Worsford, G4PRJ
David Smith, M0OSA
Gary Stanley, M0XGS
Keith Holman, M0KNH
Graham Boor, G8NWC
Nick Henwood, G3RWF
Rob Barnard, M0HVC
Peter Storton, RS195255
Tony Bettley, G4LDL
Ian Douglas, G7MKN
Rob Chipperfield, M0VFC
Chris Dennis, 2E0XJP
Glyn Jones, GW0ANA
Mr W Marshall, G4IOD
Mrs J Marshall, G4KFP
Murray Niman, G6JYB
John Rogers, G3PQA
Dr David Hutchinson, GI4FUM
John Rogers, M0JAV
Ian Pawson, G0FCT
Stewart Bryant, G3YSX
Ian Shepherd, G4EVK
Nick Totterdell, G4FAL
Mike Jones, 2E0MLJ
Philip Willis, M0PHI
Mr I Bowman, G7ESY
Philip Hosey, MI0MSO
Graham Murchie, G4FSG
Mike Senior, G4EFO
William Little, 2M0WML
Mr T Maslin
Derek Hughes, G7LFC
Alistair Hunter, MI0RWY
Bill Davies, G4YWD
Sharon Lewis, 2I0SHZ
Paul Lewis, MI1AIB
Kath Wilson, M1CNY
Robert Bagwell, G4HZV
Michael Briggs, G4SMB
Dr Kevin Jennings M0KSJ
Martin Cox, G2UG
Don Beattie, G3BJ
Hillary Claytonsmith, G4JKS
Mark Jones, G0MGX
Kenneth Dyer, GW0RHC

Clubs

Reading & District ARC
Echelford ARS
BARTG
GMDX Group
Wearside E & ARS
Weston-super-Mare ARS
Thurrock Acorns ARC
Torbay ARS
North Cheshire RC
Hambleton ARS
Cheltenham ARA
Bishop Auckland RAC
Braintree & District ARS
Bristol RSGB Group
Exeter ARS
Chelmsford ARS
Medway AR&TS
Conwy Valley ARC
Tamworth ARS
Telford & District ARS
Isle of Man ARS
Dartmoor Radio Club

And a number of anonymous donors

www.rsgb.org/yotasupporter

01922 414796 sales@radioworld.co.uk

RADIOWORLD

TRUSTPILOT

Opening Hours: Mon - Fri 9.00am - 5.00pm Sat - 9.30am - 4.00pm

WORLDWIDE DELIVERY UNBEATABLE PRICES FINANCE AVAILABLE

ICOM IC-7300
£1,199.00

Aesthetically, attractive looking base station, features a 4.3 inch touch screen colour TFT LCD screen with a high performance real time band scope.

FREE UK DELIVERY WHEN ORDERING THIS PRODUCT

Yaesu FT-991-A Transceiver
£1,299.00

"Purchase the FT-991-A + SP-10 together and get a cash back entitlement - £85.00"

FREE UK DELIVERY WHEN ORDERING THIS PRODUCT

FREE UK DELIVERY ON SELECTED PRODUCTS

New Yaesu Products Coming June 2017

Yaesu FT-70DE
C4FM/FM 2m/70cm
Dual Band Handheld
£189.95

Yaesu FT-65E
VHF/UHF 2m/70cm
Dual Band FM
Handheld
£129.95

Yaesu FT-25E
2m Mono
Band FT Handheld
£89.95

Kenwood TS-480HX 200w
£699.95

TS-480HX HF/50MHz All-Mode Transceiver DX Distinction Creative Concept,Elegant Engineering,Tailor-made for DX' ing, the new TS-480HX HF transceiver raises the bar on portable performance. Despite its compact dimensions, it delivers an astonishing punch: 200W with a DC 13.8V supply.

Free Rock Jaw Over Ear Headphones Acero - Steel/Ebony Worth £49.96

Available Now!

Icom ID-51 PLUS2 Dual Band D-STAR Digital Transceiver

£449.95

The Icom ID-51A PLUS 2 is the third generation of the successful D-Star HT. Like the original ID-51A, it covers 2 meters and 440 MHz and receives two bands simultaneously (V/V, U/U & V/U). Output power is 5, 2.5, 1.0, 0.5 or 0.1 Watts. It is IPX7 waterproof and features a built-in GPS! The large 128x104 dot-matrix display is impressive. This radio has an astounding 1304 channel alphanumeric memory system.

www.radioworld.co.uk

YAESU K-PO RigExpert WHISTLER YUPITERU Uniden TONNA ELECTRONIQUE

Begali Keys www.i2rtf.com - pibegali@tin.it BAOFENG DIAMOND ANTENNA ALBRECHT KENWOOD

WATSON ICOM West Mountain RADIO TECSUN MFJ ...America's Best! TEN-TEC

LawMate UK ELECRAFT Cobra AnyTone and many more....

Part Exchange Buy In's Live Chat Blog Updates

Our Latest Used Equiptment

Icom IC-736 HF Transceiver With Auto ATU £599.00
Kenwood TS-850SAT HF Base Transceiver with ATU £699.00
Icom IC-775DSP HF Transceiver £1,399.00
Kenwood TS-570DG/E HF Transceiver £500.00
Kenwood TS-850SAT HF Transceiver £699.00
Alinco DX-70TH HF & 6m transceiver £399.00
Kenwood TS-870SAT HF Transceiver £799.00
Yaesu FT-990AC HF Base Station Transceiver £799.00
Icom IC-729 HF & 6m Transceiver £399.00
Yaesu FT-1000MP Mark 5 Field £1,299.00
Icom IC-7400 HF, 6m & 2m Transceiver £899.00
Icom IC-775DSP HF Base Transceiver £1,299.00
Yaesu FT-1000 200 Watt HF Transceiver £899.00
Yaesu FT-900AT HF Transceiver £549.00
Second Hand Icom IC-718 HF SSB CW Transceiver £439.00
Icom IC-718 HF All Band Transceiver £499.00
Kenwood TS-570DG/E HF Transceiver £539.00
Yaesu FT-897D Multiband Portable Transceiver £599.00
Icom IC-781 Multimode HF Transceiver £2,499.00

Kenwood TS-430S HF Transceiver £399.00
Kenwood TS-870SAT DSP HF Transceiver £799.00
Kenwood TS-570DG/E HF Transceiver £500.00
Alinco DX-77E HF Transceiver £399.00
Icom IC-7700 HF Transceiver with Built In Bandscope £3,995.00
Yaesu FT-950 HF Transceiver £799.00
Yaesu FT-450 HF Transceiver Without Antenna Tuner £399.00
Yaesu FT-450D HF/6m Transceiver With Antenna Tuner £449.00
Alinco DX-SR8 HF transceiver HF, 100W all mode £429.00
TS-590S Base Station HF DSP Audio Transceiver £899.00
IC-7410 HF/6M Ham Base Station Transceiver £949.00
Kenwood TS-990 Flagship Transceiver £4,395.00
Icom IC-7100 All Band All Mode Transceiver £799.00
Icom IC-7000 Multi Band Multimode Transceiver £699.00
Yaesu SM-5000 Band Scope £349.00
Icom IC-7410 HF Base Transceiver £949.00
Yaesu FT-950 HF Transceiver £829.00
Yaesu FT-857D Multi Band Mobile Transceiver £499.00
Yaesu FT-817ND All Mode All Band QRP Transceiver £449.00

All of our Used Equipment is tested and sealed with 3 months warranty for your piece of mind. We Part exchange and buy in your used equipment for cash. To find out how much your used equipment is worth please email sales@radioworld.co.uk with information of the item/s you have with the condition and photos so we can give you an accurate quote.

Yaesu FT-857D
Now comes with Separation Kit as standard
£689.00
Why not add a TX Modification for an extra £12.00.

www.radioworld.co.uk

LF

US LF/MF came a step closer when the FCC released document FCC 17-33 in which the rules to be adopted for the Amateur Service in the 135.7 to 137.8kHz and 472 to 479kHz bands are laid out.

They make much of preventing interference to power line communication (PLC) systems used by electricity utility companies – specifying a 'Separation Distance' between an amateur station and the nearest PLC-carrying power line. The distance quoted in the document is 1km for both the 136kHz and the 472kHz bands. One concession in favour of amateurs is that if a power company seeks to deploy PLC on a power line closer than 1km from a previously permitted amateur station then they must choose a frequency that is not likely to be interfered with by the amateur activity.

The permitted power is to be 1W effective isotropic radiated power (EIRP) on 136kHz and 5W EIRP on 472kHz. Interestingly they will also retain the normal US transmitter power limit of 1.5kW for 136kHz and a new 500W transmitter limit on 472kHz. There is also a 60m height limit for aerials on these bands; one has to wonder why as they have already specified EIRP limits!

There are many experimental licences already issued for these bands, some with higher power limits. These stations will not be allowed to communicate with amateurs operating under the new rules. I wonder if they'll be allowed to give them a WSPR (Weak Signal Propagation Reporter) report?

The document was released on 29 March so there's a chance that the new rules will be in force by the time you read this.

136kHz DX

Mike, G3XDV has been off the air for a while following Storm Doris. Doris didn't blow Mike's aerial down (as he'd lowered it in readiness), but as Mike was away on holiday for some time after that the aerial had to wait. Whilst still recovering from a subsequent back problem that caused another delay, the aerial work finally started in mid April. There were some inevitable snags with recalcitrant pulleys etc but after they had been taken care of the multi-wire top was back up to its former glory. Mike reckons his effective radiated power (ERP) should be around half a watt until the trees get into full leaf, which will absorb a little of the power. On his first period of operation, Mike's *Opera* signals were decoded at N1BUG in Maine so the aerial was working well.

Ron, WH2XND holding an 8ft fluorescent tube at the base of his 137kHz aerial.

Meanwhile, Chris, 2E0ILY has been working on his transmitter and is now using a U3S exciter from QRP Labs, which is proving more reliable than his previous rather complicated system based on a TS-590. His most recent successes have been reports from N1BUG, Asiatic Russia, Greece and Finland.

I tend to concentrate on trans-Atlantic DX but it's worth remembering that the distance across the USA from East to West at its widest is as far as from Maine to Wales. Coupled with the fact that an East-West path is 100% over land it makes it all the more remarkable that Ron, WH2XND near Pheonix, Arizona regularly gets spotted by N1BUG in Maine. Most recently Ron was using WSPR2 and his Tx aerial is an impressive 95ft high with a two-wire 220ft top-loading capacity hat.

More Ultra Low Frequency tests

ULF is the spectrum from 300Hz to 3kHz that is not used for much except submarine comms and possibly mining. Its propagation over the Earth's surface is not very well understood but some frequencies may work better than others due to absorption effects etc. Stefan, DK7FC has tried 2.97kHz that worked reasonably well, reaching 500km (five wavelengths!), but his greatest challenge yet is 970Hz. In his last experiment he made it to 3.5km, now he has doubled that to 7.2km but with a very good signal-to-noise ratio of 30dB in 424μHz.

Jim, AA5BW makes the following observations:

1. Propagation should be much more predictable at 970Hz than at 2970Hz, especially at ranges less than 2000km, perhaps making experiments easier to design with reasonable confidence.
2. Propagation should be significantly more stable over minutes, hours, and day-to-day at 970Hz than at 2.9kHz – 30kHz, especially at ranges less than 2000km.
3. Path loss at 970Hz may be ~ 2/3 of path loss at 2970Hz (in dB/m); still high compared to 9kHz (but natural noise attenuation is correspondingly high).
4. Rock, fresh water and even seawater penetration at 970Hz is good compared to 2970Hz and very good compared to 10kHz. At 970Hz, roughly 10dB loss at 10m in sea water, 10dB loss at 100m in some common types of rock and fresh water. The rock and water examples are more interesting when considering that natural and some cultural noises attenuate about as much as the desired signal at depth, so at depth a very sensitive receiver could be fully effective even with little or no electronic cancellation of natural and cultural noises. With a 1 $f_T/\sqrt{Hz}$ receiver, a signal barely detectable on the surface without natural noise cancellation might still be detectable at 100 – 200m penetration (or depth) in caverns, valleys, canyons etc.

This all looks very interesting but to investigate further Stefan will need to start winding a very, very large loading coil.

Meanwhile on VLF

Joe, VO1NA has been setting up to transmit on 8.27kHz. So far he's managed to burn up one loading coil. If he manages to generate a reasonable ERP then he's ideally placed to make the first amateur VLF crossing of the Atlantic.

Dave Pick, G3YXM
daveyxm@gmail.com

NO.1 FOR AMPLIFIERS & AUTO TUNERS

HUGE CHOICE OF HF LINEAR AMPLIFIERS & ML&S

SPE 1.3K-FA. Latest 160m-4m 1.5kW (700W on 4m) lightweight Solid State amplifier with built-in PSU. **£2599.95** or **£3529.95** with Auto ATU.

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

Click! www.HamRadio.co.uk/spe

Acom 2000A. Fully automatic 2kW 160-10m HF Amplifier with built-in Auto-ATU. **£4999.00**

Acom 1500. 160-6m 1.5kW Amplifier using 4CX1000A/8168. Easy to use bar graph tuning display. **£2899.95**

Acom 1000. 160-6m 1kW Amplifier. Easy to operate with LCD message display. Acom's best seller. **£2399.95**

Acom 1010. 160m-10m 700W HF Amplifier using 4CX800A (GU74B) tetrode. **£1699.95**

Click! www.HamRadio.co.uk/acom

OM2000A+

2kW Fully Automatic HF+6m Amplifier. Compact and powerful without the worry of solid state PA's. **£4499.95**

Click! www.HamRadio.co.uk/ompower

MICROSET DUMMY LOADS AND PREAMPLIFIERS

Click! www.HamRadio.co.uk/microset

Microset CF-30 50 Ohm 30W Dummy Load N-Type, Range DC - 850MHz - Power 15W/30W -VSWR 1.1:1 (1-500MHz), 1.5:1 (500-850MHz). **£49.95**

Microset CF-300 50 Ohm 300W Dummy Load N-Type, Range DC - 1.2GHz - Power 300W - VSWR 1.1:1 (1-500MHz), 1.3:1 (500MHz-1.2GHz). **£129.95**

Microset SR-100 100W Linear Amplifier 144-148MHz, FM, SSB, CW. Input power of 4-25W gives 100W out. Pre-amp gain 18d. **£244.95**

Microset PR-145A
VHF MAST ANTENNA PREAMPLIFIER 144-148MHz, low noise. Automatic antenna switch & P.T.T. facility, **£129.95**

Microset PRH-145A VHF MAST ANTENNA PREAMPLIFIER 500W throughput 144-148MHz, low noise. Automatic antenna switch, P.T.T. facility, 140-152MHz. **£219.95**

Microset PR-430A UHF MAST ANTENNA PREAMPLIFIER 430-440MHz, low noise. Automatic antenna switch & P.T.T. facility, Limit of band 420-450MHz. **£169.95**

Microset PRH-430A
UHF MAST ANTENNA PREAMPLIFIER 430-440MHz, 500W throughput, low noise, automatic antenna switch, P.T.T. facility, limit of band 420-450MHz. **£239.95**

Microset SR-200
144MHz 200W Linear Amplifier. 8-50W input, 200W out. Pre-amp Gain 18dB. SO239 sockets. **£409.95**

Microset PT-135
Heavy duty 35A 13.5V PSU. **£264.95**

Microset PR-2B
DUAL BAND VHF-UHF MAST ANTENNA PREAMPLIFIER with low noise. Automatic band selection. Usable with dual band antenna. **£229.95**

MFJ PRODUCTS - Lots more MFJ stocked!

Click! www.HamRadio.co.uk/mfj

MFJ-939	Plug & Play 200W ATU, you won't even know it's there!	£179.95
MFJ-974HB	Manual ATU for balanced line antennas, 160-10m	£259.95
MFJ-974	as above but without 160m	£234.95
MFJ-16010	Random Wire ATU 160-10M	£79.95
MFJ-949E	Manual ATU metered, Dummy Load, 1.8-30MHz, 300W	£199.95
MFJ-901B	Manual Mini ATU 1.8-30MHz, 200W	£119.95
MFJ-971	Manual ATU metered, 1.8-30MHz, 200W	£139.95
MFJ-904H	Manual ATU, metered, inc balanced, 1.8-30MHz 150W	£184.95
MFJ-969	Manual Roller ATU Metered 1.8-54MHz, 300W	£249.95
MFJ-993B	Auto ATU Metered 1.8-30MHz, 300W	£309.95
MFJ-1786X	Magnetic Loop 10-30MHz, 150W re-built & re-aligned by ML&S	£699.95
MFJ-1788X	Magnetic Loop 7-22MHz, 150W re-built & re-aligned by ML&S	£699.95
MFJ-259C	Antenna Analyser 530kHz-230MHz	£299.95
MFJ-266	V/U Portable Antenna Analyser 1.5-185MHz + 300-490MHz	£389.95
MFJ-269C	530KHz-230MHz, 415-470MHz Analyser	£369.95
MFJ-260C	Dummy Load 300W SO-239	£48.95

MyDEL CG-3000R Antenna Tuner

The best value remote wire antenna tuner now with remote control included. NOW ONLY £249.95

Click! www.HamRadio.co.uk/mydelcg3000r

PALSTAR ATUs & DUMMY LOADS

Palstar

Click! www.HamRadio.co.uk/palstar

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	£1599.95
AT-500	600W PEP Antenna Tuner	£529.95
AT-2K	2000W PEP Antenna Tuner	£604.95
AT-2KD	Differential 2kW PEP Antenna Tuner	£604.95
AT-4K	2.5kW PEP Antenna Tuner	£1049.95
AT-5K	3.5kW PEP Antenna Tuner	£1249.95
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.**

LDG AUTO TUNER RANGE

Factory appointed distributor

LDG

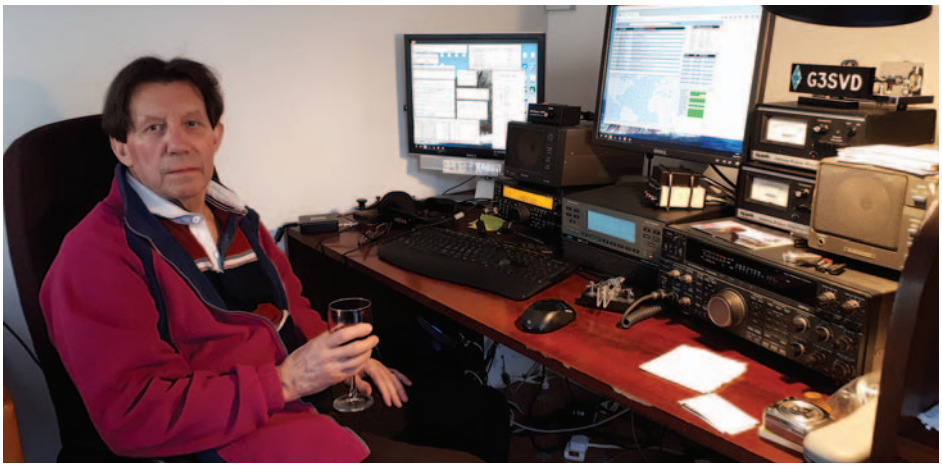
Click! www.HamRadio.co.uk/ldg

RT/RC-100	100W Weather proof remote Auto ATU	£249.95
AT-1000pro11	1kw Flagship Auto ATU. Separate external head-up large format meter	£519.95
M-1000	Large Analogue meter for the new AT-1000Pro11	£139.95
M-600	Optional 4.5" meter for the AT-600Pro11	£129.95
YT-1200	(formally AT-450) for ALL Yaesu HF Transceivers	£244.95
AT-600pro11	NEW MODEL 600W pep, Optional external 4.5" Meter	£395.95
AT-200pro11	Designed for new generation of rigs	£259.95
AT-897Plus	Bolt-on Alternative Auto Tuner for the FT-897	£209.95
IT-100	New version of the AT-7000	£179.95
YT-100	AUTO ATU for FT-897/857 or FT-100 with additional Cat Port Control	£199.95
Z-817	Ultimate autotuner for QRP radios, including the Yaesu FT-817D	£129.95
Z-100Plus	Ultimate autotuner for Yaesu FT-817D	£169.95
Z-11ProII	Portable compact & tunes 100mW to 125W	£179.95
KT-100	Dedicated tuner for Kenwood radios	£209.95
RBA-1:1	Probably the best 1:1balun out there	£32.95
RBA 4:1	Probably the best 4:1 balun out there	£34.95
FT-Meter	Neat Analogue back-lit Meter for FT-897/857. S-meter, TX Pwr, ALC Etc	£62.95
FTL- Meter	Jumbo version of the famous FT-Meter	£85.95

Now Available! RT-600 The RT-600 is a 600 watt PEP coax in / coax out remote tuner designed to be placed near the feedpoint of the antenna.Place the RT-600 near the feedpoint and the virtually eliminate all feedline loss due to SWR. DC powered over the coax by the RC-600 control unit (included). **See web for price.**

HF

Propagation will be heading into the summer doldrums about now but things picked up at the end of April in time for the A25UK expedition.



Andy, G3SVD in his shack.

With a few days still to go G4CCZ was at the top of the British Isles A25UK Leaderboard with 20 slots and the team had made around 26,000 QSOs on all bands from 160 to 10m. Sporadic-E should liven up the higher bands from time to time during the summer so keep checking for openings.

The 2016 Cass Award for the single operator DXpedition working the largest number of unique callsigns went to Jeff Martin, K5WE for his XR0YS DXpedition to Easter Island with 7040 uniques. The Intrepid Spirit Award, organised by the Intrepid-DX Group in memory of James MacLaughlin, WA2EWE who was killed in Afghanistan in 2011, went to Sebastien Poulenard, F5UFX for his leadership of the recent Tromelin and Juan de Nova DXpeditions.

A few weeks ago the ARRL announced that Club Log had become the first logging service to achieve Trusted Partner status for Logbook of the World (LoTW). This means that people can sign and upload QSOs, or download LoTW matches directly from server to server. Click 'LoTW Sync' in the left hand margin of the Club Log home page for detailed instructions.

An interesting callsign BW/G4TDS has been popping up on the cluster and has been worked on a number of occasions from the UK (including by G5LP, G4DJX, G3YYD and M0BPQ). This is Peter (aka Jim), formerly 9H1RN, who is now living permanently in Taiwan, his XYL's home country. There is no formal reciprocal licensing agreement with the UK or Malta but thanks to the Taichung Radio Club and its President BX4AG, he has been allowed to use the BW prefix until he passes the local exams (in Mandarin Chinese!). Peter and his wife (XYL) Yvonne have set up a small bakery manufacturing English style bread and he doubles as a part-time English teacher. His radio is an elderly FT-990 feeding various roof-level wires around his apartment. He is a CW enthusiast and often referred to as a 'Morse machine' due to his rapid and accurate sending – disrupted only occasionally when one of his cats decides to take over the key.

DXCC expeditions

Janusz, SP9FIH expects to be active as E44WE from Palestine on 16-30 May. Activity will be limited to 17, 10 and 6 and maybe 20m on SSB and RTTY.

Zorro, JH1AJT will visit Eritrea again from 19-29 May. He will be joined by Franz, DJ9ZB, Champ, E21EIC and Dima, RA9USU with planned activity as E31AA on 160-10 metres CW, SSB, RTTY.

IOTA

R2DG, R7AA and UA6EX will be active as RI0LI from the Medvezh'i Islands (AS-022) during the last week of July. It will be followed by a short operation as RA70AA from Gusmp Island (AS-070). See www.ri0li.com for info.

The RI0Z team will be on the air from the Komandorsky Islands (AS-039) around 5-14 July. They will have an Icom-7000 and Yaesu FT-100D, linear amplifiers, and various vertical and wire antennas. See www.ri0z.com/en/ for more details.

A DXpedition is being planned for the super-rare Saint Iony Island (AS-069) in the Okhotsk Sea. The last operation was by UA9OBA 27 years ago and used the callsign EK0AC. This year R7AL, RA1ZZ, RW5D and RK8A hope to be active from 18-22 July with two or three stations running high power to vertical antennas. See www.iony2017.com/eng. The RSGB HF Expeditions Fund has made a grant to this expedition.

A large team will be active as RI1F from Victoriya Island (EU-190, a new one for IOTA) in Franz Josef Land starting around 26 September.

Eric, KV1J will be active as FP/KV1J from Miquelon Island (NA-032) on 4-18 July. He will be focussed on HF but will also be keeping an eye on 6m. See www.kv1j.com/fp/July17.html for more information. Later in the year a large team from the Cambridge University Wireless Society is planning a visit to St Pierre from 18-22 September.

Keith, GM4YXI and Chris, GM3WOJ will be active again as VK9CZ (callsign to be confirmed) from Cocos-Keeling (OC-003) from 23 October to 6 November, including a Multi-2 entry in the CQ WW DX SSB Contest.

N7QT and SM5AQD are hoping to activate Mellish Reef (OC-072) in November with up to eight operators on 160-10 metres CW, SSB and RTTY.

Geoff, G8OFQ is planning another three month visit to Isabela Island in the Galapagos where he will be working with the Galapagos National Park Tortoise Breeding Centre. Probable dates are 1 August to 31 October. He's planning to take a KX3 and Expert 1.3K amplifier, with a vertical, an end-fed long wire and possibly a kite hoisted long wire. A lot of his activity will be /MM from an anchorage in the islands and he will also be transmitting (QRV) en-route.

Zorro, JH1AJT plans to be QRV as E39DI from the Dahlak Archipelago (AF-038) for a few days in late May. This IOTA group was last activated in 1999.

Four Belgian ops are planning to activate OJ0V from Market Reef (EU-053) from 1 to 7 July. They will have two TS-480HX rigs and two linear amplifiers and will be QRV on 3.5 to 50MHz on SSB and CW. According to early reports they will not be using LoTW or Club Log.

Husband and wife team ZL2QT and ZL2DX will be living on the Chatham Islands (OC-038) for the next three years or so. Look for them with their ZL7 calls any day now. Although this

Peter, BW/G4TDS in his shack.

Gordon, G3PXT at his operating position.

area is a long way away, propagation can be surprisingly good thanks to antipodal focussing. They expect to have a linear and beam on HF.

John, AD8J plans to be active from NA-057 as AD8J/HR9 until 27 May.

A team of five operators is planning to be active for 3-4 days from Baiyah Island (AF-111 new) off Liberia later this year.

Craig, VK5CE has been authorised to operate from Ashmore Reef (OC-216) from dawn to dusk, ie from 2100UTC to 1000UTC and plans to be active as VK5CE/9 for four days between 6 and 12 November on 40-15m, mainly SSB. See ashmorereef.wordpress.com for more information. On 12-16 October he will be active as VK5CE/8 from North Island (OC-198) as a practice run for OC-216.

Cezar, VE3LYC should now be QRV from Pukapuka (OC-098) as E51LYC. Check out e51lyc.weebly.com for updates. Best times are likely to be around 0800 and 1800 on 20m.

Timings for the VK9MAV (OC-267) operation are uncertain following the devastation caused by Cyclone Debbie.

There will be a team of operators on Charlton Island (NA-173) from 28-30 July using the call VA2NDX/VY0 (or VY0/VA2NDX).

ZA/IK7JWX will be QRV from Sazan Island (EU-169) from 10-20 June with a team of operators.

TABLE 1: 2017 Worked DXCC Entities (ranked by All). Showing Top 3 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	162	185	22	232
G4PTJ	183	86	0	231
M0IKW	133	69	35	225
G3SVD	121	126	28	190
G3PXT	78	100	140	177
GI4DOH	158	4	54	161
G4XEX	70	88	97	154
G4IDL	150	0	21	153
G3HQT	151	0	0	151
CT7AGZ	137	0	1	137
G3SVK	88	0	0	88

Correspondence

Tom, G4IDL took a two week holiday but still managed to work: 15m – 9Q6BB, JT1CO, RI1ANO, A25UK, 5R8M, RTTY – AH2P; 17m – 5Z4/DL2RLM, KP4JRS, VP2V/N2IEN, SU9JG, 5V7B, RTTY – CU3EM, A25UK; 20m – CN8KD, HL4RBC, 8Q7VB, YB8TK, A25UK, JW2US, 5K3MDC, RTTY – DS1JFY; 30m – OY/MM0ZBH, RTTY – CT3MD, EA8PT.

Andy, G3SVD wrote in with a report of his progress in the CDXC annual marathon and noted that antenna problems forced him to focus on the LF bands at the start of the year. Having fixed the HF antenna he worked T2AQ on 20m SSB, AH2P on 15m RTTY, 3D2SE on 20m CW, YJ0YM on 20m SSB and 3D2AG/P (Rotuma) on 20m CW. He also found LU5YS on 80m CW down in Patagonia, RI1ANO South Shetlands and E51DWC both on 20m RTTY. And, on the 21st, H44MS answered his CQ on 17m. Of last month's DXpeditions he picked up 5V7P, HK0/OZ1AA, 5A5A, Vlad UA4WHX in 4S7 on the 4th and again on the 27th when he was weaker and signing /P.

TABLE 2: Forthcoming DX activity.

Until 19 May	VU7 operation
Until 23 May	E51LYC
Until 27 May	AD8J/HR9 (NA-057)
Late May	E39DI (AF-038)
May or June?	VK9MAV (OC-267)
16-30 May	E44WE
19-29 May	E31AA
1-6 June	HB0/GM4UYE
10-20 June	ZA/IK7JWX (EU-169)
1-7 July	OJ0V
4-18 July	FP/KV1J
5-14 July	RI0Z (AS-039)
18-22 July	RI0C (AS-069)
28-30 July	VA2NDX/VY0 (NA-173)
End July	RI0LI (AS-022)
End July	RA70AA (AS-070)
1 Aug – 31 Nov	HC8/G8OFQ
18-22 Sept	FP by CUWS ops
26-30 Sept?	RI1F (EU-190)
12-16 October	VK5CE/8 (OC-198)
23 Oct – 6 Nov	VK9CZ
November	Mellish Reef?
6-12 Nov	OC-216 by VK5CE
10-20 March 2018	9M0W Spratly

Ken, CT7AGZ was in the UK for most of last month but when down in Portugal he worked: 15m – A25UK, 5V7P; 17m – A25UK, E51DWC, HH2AA; 40m – 5V7P, 5A5A, NP4AW; 80m – 5V7P.

Peter, G4XEX continues to use his ground mounted Hexbeam and he reckons he is bouncing signals off his neighbour's house to work South America. He found: 20m data – PS7DX, HS7BHX, 9M6XRO, YB6DE, HP3SS, YB5BOY, JAs, HI8MU, E21YDP, VU2NKS, 5H3MB; 20m CW – A25UK, HS3XVP, 5T0ITU, 8Q7VB, 9Q6BB, JW2US, ZD7B, J68HZ, VU2TMP; 20m SSB – V51WW, YI3WHR, J5W, S79Z.

Peter, G3HQT says the outstanding signal of the month was from DU1IST who had an amazingly strong signal. But DU1IST also has some amazingly big antennas including a 5 element 40m Yagi on a 23m boom. Peter found: 15m – A25UK; 17m – FY5KE; 20m – TZ5XR, 5H3MB, 9Q6BB, 4M5CW, SU9VB, 4S7VBG, BV1EL, 3D2AG/P; 30m – 5Z4/DL2RMC, 5V7P, 4W/N1YC, S79Z, DU1IST; 40m – J68HZ, 8Q7VB.

Chris, G8APB had a quiet month but found a few interesting stations on 20m including: HZ1SK, J5B, S79Z, A25UK and 5V7P.

Gordon, G3PXT made 800 QSOs last month including: 15m – JT1CO, JAs; 17m – YB3LZ, PY5EJ, JAs, 9G1SD, 7Z1JA, 5A1AL; 20m – ZB2TT/P, ZA1F, YVs, YBs, Ws, VUs, VK6SMK, VK3s, VA7QI, PZ5RA, JAs, HL4RBR, HI8CSS, FS/W7NZJ, E23NE, BY7KJ, 3V8CB, 5C12SIA. He experimented with SSTV and asked me to remind *RadCom* readers to try to keep the 14230 area clear for that mode. He found a useful website at www.qsl.net/s/sv2roc/sstv20m/CAM that gives a real time view of SSTV signals received on 20m.

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

Martin Atherton, G3ZAY
g3zay@btinternet.com

VHF/UHF

The EI0SIX beacon antenna on test at EI7BMB.

After a slow start to the year, April usually starts the DX year on VHF/UHF and can really throw up some surprises. 2017 was no exception with meteor scatter, auroral and Sporadic-E propagation in evidence.

Spanning the weekend dates of 20-24 April, the peak of the April Lyrids also coincided with high geomagnetic activity with high latitude visual observers seeing both Northern Lights and Lyrids at the same time. Conditions were also excellent on moonbounce (EME) especially at the end of the month. Frank, DH7FB and Bernd, DF2ZC (The X Team) were on the air (QRV) from Cape Verde as D44TU as a mini EME (moonbounce) DXpedition taking advantage of the good EME conditions.

This year the Lyrid meteor shower peaked during the early hours of 22 April and with clear skies can provide an excellent visual show as well as good radio reflections. An excellent time to view is just before dawn. Generally, Lyrid meteors are quite fast and bright and are one of the oldest known meteor showers. The Lyrid's are named as such because they appear to radiate from the constellation Lyra, originating from Comet Thatcher that was discovered in 1861. It has always been a reliable radio event with a slow steady build up and decline either side of the peak.

Throughout April there were numerous low latitude aurora alerts received through DX Robot **[1]**, particularly over the weekend 22/23 April. A significant coronal mass ejection (CME) that left the Sun on 19 April was initially forecasted to miss the Earth, however it delivered a side swipe blow and initiated G2 geomagnetic storms which continued as the earth moved through the CME's magnetic trail. Coincidentally, this event occurred on Earth Day, Saturday 22 April. Sadly radio conditions were not too special but GM4VVX (IO78) was heard making numerous 2m QSOs on Morse (CW) at very strong signals.

The final week of April also saw the start of some 6m Sporadic-E. Fleeting in its appearance, the indications that the season is underway is welcomed by many itching to get some DX in their logs. Through May and into the June prime time, operators eagerly await this phenomena that, as its name suggests, can be quite sporadic and spectacular at the same time.

Band Reports

Lyn, GW8JLY (IO81) made 2m SSB aurora contacts on 27 March and worked five stations – GI6ATZ (IO74AJ), GI4OWA (IO64IX), GM7EEY (IO86JC), GM4FVM (IO85WU) and GM4JJJ (IO86GB). He couldn't hear any of the long DX being worked on CW by stations further north from his location in Cardiff. SSB tropo conditions on 2m were good on 8 April, with contacts being made into Germany, notably DL6YBF (JO31OX), again from his home station. As there was a chance of working greater DX from his portable location in IO81LS, Lyn packed his car ready for the trip to Blorenge mountain near Abergavenny. This location is 550m ASL. However, after setting up and tuning the band, he found absolute silence apart from some of the continental beacons, some of which were quite strong. A CQ call however, raised DX from F, ON, PA and DL in the following locators – JO00, JO10, JO21, JO30, JO31, JO32, JO33, JO41 and JO61.

Best DX (ODX) was to DL1PZ in JO41TH at 879km and to DL4DWA in JO61QH at 1138km. Also heard DL1VPL in JO61UA but could not complete a QSO (contact). After an hour or two, conditions were going down fast so Lyn packed up the station and headed home. A worthwhile chance to work some further DX that would be possible at his home QTH.

Gordon, G3PXT (JO02) is still busy on 6m. His log increases with some excellent multi mode contacts on 6m. Stations in the log include (on CW) UX2SB, SM0EPM, SM6OEF, OH3JR, OG55W and SM6CVX. Using SSB, Gordon worked ON8DM, G8VPE, G4HVC and G3RED. The continuing increase in the use of MSK144 generally on 6 and 4m has enabled Gordon to log the following: SM5EPO, EI3KD, SK0TM, S51AT, PA0TCA, IN3FFN, I6WJB, HB9SHD, F4BGD, DL5FD and 9A4ZM. Gordon's tally on 6m this year so far has reached 20 DXCCs (award scheme www.arrl.org/dxcc) and 41 Locator squares in the year to date.

MSHV by LZ2HV

In last month's column I highlighted the use of the software package, MSHV (lz2hv.org/mshv), developed by Christo, LZ2HV and its ongoing developments. The latest version, at the time of writing, is 1.39 shows a number of upgrades even in just a few weeks. Having spent a month or so using the software it is clear how, with the feedback from other amateurs, the software is becoming an excellent platform to work meteor scatter (MS), Tropo and EME. One item I highlighted last month was the fact that only one window makes operation a breeze with any adjustments being made instantly without having to close the program down and re-launch. It is clear that despite the 'minimum' requirements to run the MSHV software the specification doesn't take into account all the other programs that now run on an average shack PC. Critically a good time standard software needs to keep the PC clock exact, especially when running MSK144 at 15 second periods. Looking at additional programs running like ON4KST, MDC plus the logging program of your choice, the resources of an average PC are soon under pressure, particularly when MSHV starts to decode. The PC in my shack at the moment is a dual core Pentium 4 with 2GB RAM running on Windows XP. I'm staying with XP because the PC would come under further resource strain if it was running Windows 7, 8/ or 10. With running programs set to a minimum the CPU approaches 90-95% on one of the cores during decode. Luckily, I never use the shack PC for general internet use, only pure radio applications. Still, it takes quite a bit of processing power to achieve a good decode.

MSHV Forum

To keep up to date with developments of the program a messaging group has been created where an exchange of ideas and possible changes to the software can be made **[2]**. As more users come on board with the software then this would be an excellent resource to make suggestions and confer with others to help improve this already excellent software.

Calling frequencies

One thing that is obvious is that with the increase of activity on both 6 and 4m in meteor scatter operation using WSJT and MSHV, has created an operational problem. It would seem that 50.280 and 70.280MHz have been established as the calling frequencies on each band however, unlike MS operation on 2m, there doesn't seem to be much in the way of working on a split frequency. Comments made on the ON4KST Low Band Chat indicated a frustration in tying up the calling frequencies when making QSOs. Nothing wrong with that in theory but a more efficient way of making QSOs would be to call CQ and work split with a QSY frequency sent in the CQ call. This wouldn't keep the calling frequency tied up and give more stations the ability to use it. The MSHV software has a 'box' to enter your favourite QSY frequency. This frequency could be one that is actually free from QRN as at this QTH, the QRN is so high on both 6 and 4 that both calling frequencies have terrible birdies on them. It's easy then to choose a noise free frequency to receive on. Practice should be that when a station receives a CQ 267 for example then the reply should be on that frequency as the transmitting station won't be listening on 280. It's a great way to maximise QSOs on a noisy band.

50MHz beacon from EI

The EI0SIX beacon became active again from IO63ve on 29 April running 30W to an omnidirectional horizontal antenna. The beacon has been programmed to transmit for 60 seconds every 5 minutes, starting on the hour. EI0SIX transmits on 50.005MHz in two digital modes PI4 and also CW, the original digital mode *[but see this month's Data column – Ed]*. To decode PI4 you will need to tune your receiver 50004.2 and download the PI-RX software that has been developed over the last few years by Bo, OZ2M **[3]**. During the summer DX season reports on the DX cluster are keenly looked for by the beacon keeper Tony, EI7BMB. Big thanks also go to Tom, EI4DQ who was the constructor of the hardware and then tested and deployed by Tony. As soon as the beacon was QRV, reports on the DX Cluster we coming in via various propagation media. In the case of this QTH the tropo signal was excellent at strength S4-5 even over a 230km path. Once again this shows how much time and effort is taken up by beacon keepers for the benefit of all radio amateurs. For further information on the beacon's development search for EI0SIX on QRZ.com **[4]**.

UKSMG Summer Marathon & Contest

The UK Six Metre Group have two activity periods scheduled during the months of potentially summer excellent propagation. The objective of the Summer marathon is to work as many grid squares as possible between the first Saturday of May (7 May at 0000UTC) and the first Sunday of August (6 Aug ending at 2359UTC) on the six metre band. The Summer Marathon is open to *all* amateur radio operators world-wide. (UKSMG membership is *not* required). There is no restriction on mode etc as long as all contacts are made via terrestrial propagation. Through this Summer Marathon, the UKSMG aims to promote and encourage activity on the six metre band. Also from UKSMG is their 6m contest where again the objective is to work as many stations as possible between Saturday 3 June at 1300UTC and Sunday 4 June 1300UTC. Again membership of the UKSMG is not required and this contest always attracts stations in rare grid squares around the world, as many portable stations in the HF Field Day contests use this as an ideal opportunity to activate six metres as an extra band. The UKSMG website is a mine of information for all things 6m **[5]**.

Sign Off

Please send as many reports on all VHF/UHF bands by 3rd weekend in the month or indeed any news is always welcome anytime. Good DX!

Websearch

[1] www.gooddx.net
[2] https://groups.io/g/mshv
[3] www.rudius.net/oz2m/software/pi-rx/index.htm
[4] www.qrz.com/ search EI0SIX
[5] http://uksmg.org/landing.php

Richard Staples, G4HGI
g4hgi@live.com

GHz Bands

Where am I?

Of questions I get asked by beginners, one is "how can I accurately measure my GHz-band frequency?" Another is "how can I generate an accurate signal marker?" Often, they are couched in terms such as "where can I buy a frequency counter that works at 10GHz?" and, "where can I buy a 10GHz signal generator?" These are the 'wrong questions': I'll explain why.

GHz band frequency measurement

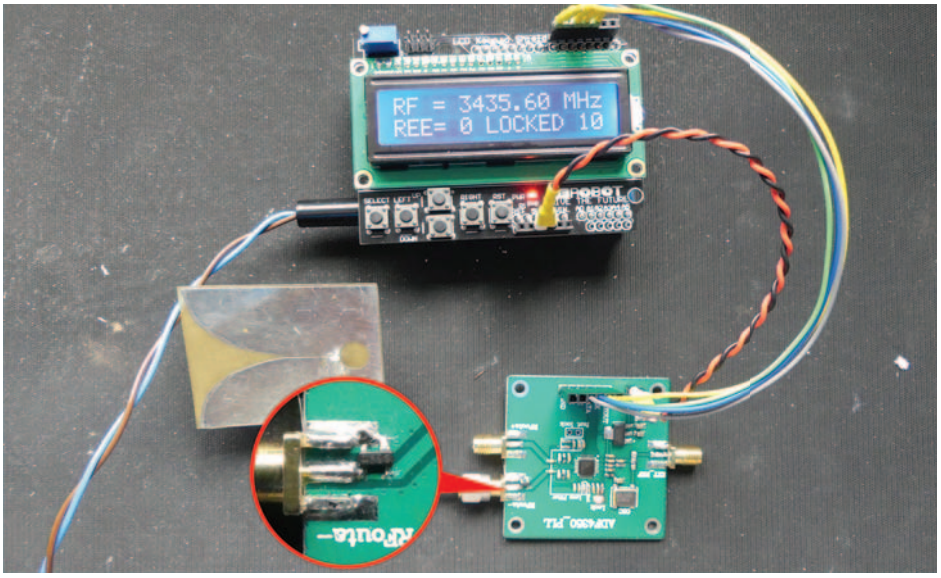
I can reliably check my own frequency on 24GHz to a few tens of Hz, but I don't own or need an expensive 26GHz frequency counter. All I need is an accurate low frequency reference – and arithmetic. GHz band signals are usually generated with transverters using the superhet technique, or by direct multiplication from a lower frequency. Transverters mix a low frequency modulated signal from an HF or VHF rig with a fixed frequency local oscillator and select the sum or difference to get a GHz band signal.

23cm transverter example

As an example, take a 144MHz driver rig and mix it with an 1152MHz local oscillator (LO) signal to produce the sum, ie 1296MHz. Change the rig frequency to 144.001MHz and the sum becomes 1296.001MHz. Any change in driver frequency is unchanged at the final frequency and the accuracy of the GHz signal is the same as that of the driver rig.

The GHz LO may not be fixed and accurate, for example it might be on 1152.001MHz. Add that to 144.000 and you end up with 1296.001; the LO error gets transferred to the wanted GHz band signal. Once you are happy with the accuracy of the drive signal (most modern HF or VHF rigs can be set up to be within a few 100Hz using just your local beacon), the final accuracy comes down to how accurate your GHz LO is.

GHz LOs use multiplication techniques either using synthesis from a low frequency reference or from a VHF crystal. Back to our 23cm transverter example, assume the LO uses a 96MHz crystal multiplied by 12 to 1152MHz **[1]**. If the crystal is 100Hz high, the LO will be 1.2kHz high (100Hz x 12). To avoid this we must set the 96MHz LO accurately with a good VHF counter and put the crystal in a temperature controlled environment, usually referred to as a 'crystal oven'. Better still, we could lock the 96MHz oscillator to a very stable source such as a GPS disciplined oscillator.



The F1CJN VHF to microwave source (and, inset: simple multiplier diode mod). Image: G4BAO.

Higher in frequency

When transverting to 24,048MHz, we'd need an LO source at 23,904MHz from x192 multiplication from a 124.5MHz crystal. A 100Hz source error would produce a 19.2kHz error at 24,048MHz. Yet if the 144MHz driver was 100Hz out, this would still only produce a 100Hz error at 24,048MHz. So, it's all down to how accurate your reference signal is. All you need to measure is a VHF signal. A 26GHz counter is not needed and, as most 26GHz counters use a superhet downconverter, they are only as accurate as their built-in reference anyway.

Inexpensive GHz band signal source

It's very useful to be able to generator a 'marker' signal when setting up receivers. There's an easy to build and inexpensive design for a signal source up to 4.4GHz **[2]** using an Arduino and LCD shield **[3]**, free source code and an ADF4350 or 43501 synthesiser board **[4]**. Most of these synths can be locked to an external 10MHz reference – and need to be, as their crystals are usually off frequency and not very stable. To generate a marker for the higher bands you can solder an antiparallel Schottky diode pair such as from an old LNB across one of the output connectors (see photo) that will generate harmonics. The 7th harmonic, at 24048.01MHz, was -55dBm. Feeding the small Vivaldi antenna in the photo was enough to be received on my 24GHz system from across the garden. Remember, the accuracy is set by the synthesiser reference source, so get *that* correct and your marker will be where you expect it to be.

So – where am I now?

The answer to both questions therefore is "get yourself an accurate reference and lock together as much of your station and test equipment to it as you can." This can be an accurate 10MHz OCXO such as **[5]**, a GPS disciplined oscillator **[6]** or a surplus rubidium source **[7]**. The links are just representative of what's available, not recommendations. At G4BAO I lock everything to a G3RUH 10MHz GPS disciplined oscillator.

Finally

No activity news this month as, due to holidays, I wrote the column at the start of April, but you can keep in touch with activity on the internet and the ukmicrowaves reflector. Keep reports and technical snippets coming in to me by email.

Websearch

[1] www.g4ddk.com/2001.pdf
[2] http://bit.ly/2opBFZ2
[3] Example – http://ebay.eu/2ntlvco
[4] Example – http://ebay.eu/2nLcmOn
[5] Example – http://ebay.eu/2opCJML
[6] Example – http://ebay.eu/2nKXZcn
[7] Example – http://ebay.eu/2oxaOXL

John C Worsnop
PhD CEng MIET, G4BAO
john@g4bao.com

YAESU
The radio

High Performance Commercial Grade Specifications

High Performance with Many Supportive Features Packaged in a Compact Body

《Actual Size》

- **Commercial Grade Specifications compact, rugged construction** (IP-54/MIL-STD-810C, D and E)
- **Large Front Speaker One Full Watt of Crisp, Clear Audio**
- **5 Watts of Reliable RF Power, Three Selectable TX Power Settings** (5 W /2.5 W /0.5 W)
- **QRK** (Quick Recall Key) : **Four User Programmable Keys provide Quick Access to favorite functions**
- **Included 1,950mAh Li-ion Battery Pack capable of over 9 hours of operation**
- **VOX Operation Available with the optional Earpiece Microphone**
- **Emergency Signaling : Bright white LED Flashlight, Audible Alarm and Immediate HOME Channel Access**

VHF 5W Single Band FM Handheld Transceiver

FT-25E

VHF / UHF 5W Dual Band FM Handheld Transceiver

FT-65E

Useful Features:

- Versatile scanning capabilities
- FM Broadcast Receiver
- PC Programming
- Transceiver-to-Transceiver Cloning

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

Building a reproduction Paraset

I had been contemplating building a simple valve regen receiver and, maybe, a matching transmitter for some time. Research on the internet and reading various magazine articles, such as borrowed copies of *SPRAT* etc had been done. Then, at the Blackpool Norbreck rally, I saw a reproduction Paraset and thought that was something I could have a go at.

The Paraset in its current state, looking just like the ones used by the SOE.

The Paraset was so called as it was dropped by parachute in to France and the Low Countries for use by Special Operations Executive (SOE) during World War II. It's also known as the Whaddon Mk VII as it was built at Whaddon Hall in Buckinghamshire.

Acquiring the bits

After trawling the internet, which has some great information on the build of these little radios, I had made up my mind and wanted to build one as faithful to the originals as possible. I didn't realise that I had set myself a bit of a challenge, thinking, how hard could it be as I have a reasonably well stocked 'junk box'.

It took two years of searching a great number of rallies, the internet, as well as some donations and the junk box, to get it to the current stage.

I'm not too great at metal bashing and luckily a high street electronics store still had some suitable metal boxes available. Some borrowed 'Q Max' punches and an evening got the metalwork done. Halfords stocked a shade of paint that I was happy with and the internet provided the soak-on transfers.

I found the correct valve bases thanks to Mike Lewis at the Dunstable Downs Rally, who always has a great range of old components on his stall and tells me that they were from a stripped down Murphy radio, which sounds about right. The power plugs and sockets were sourced new from the internet as I really could not find old ones, but they are faithful copies.

Interestingly the original radio had the male pins live, but many builders change these to keep it more to current safety standards. After having a lifetime of the current Health and Safety procedures, I threw caution to the wind and made it as it was originally. (It's only me it will bite, but I always advise others to be more safety conscious).

The last thing to source was the crystal (XTAL) and aerial sockets; luckily at Hack Green four turned up in a box of bits.

Construction

The actual construction did not take too long and was completed over the Christmas break.

After looking at various suitcases at car boot saless etc, I finally found one in a local antiques shop – for a bargain price as it was so ropey, but it was just what I was after. (The originals would also have been battered so as to not attract the attention of the Gestapo). My father (who is much better at joinery than myself) knocked up a suitable wooden case.

A friend very generously donated a pair of high impedance SG Browns headphones that were new in their box as he had the foresight to buy five pairs many years ago – these were the last he had to give away.

It's still a work in progress, I have not found the correct knob for the Morse key yet, so am using an external key for now.

Crystals turn up on eBay and rallies occasionally on the correct frequencies for 80 and 40m. So far I have around 10 units and have made adapters out of old crystals to plug different sized ones in.

One crystal I obtained would not oscillate, I opened it up and found someone had done the old trick of rubbing graphite from a pencil on to the quartz slab to lower the frequency. After some cleaning with isopropyl alcohol (IPA) it worked well when reassembled. I also have a crystal on 3.500MHz, which I fancy rubbing down on a carborundum stone to see if I can get it up a couple of kHz.

I've made a mains power supply unit (PSU) for the unit and have a small mains inverter for portable use, but have since obtained a small dynomotor and a vibrator pack, both of which I would like to try for portable use.

The aerial for display purposes is some old cotton-covered rubber-insulated wire that certainly looks quite authentic, but seems very inefficient. An inverted V on a fishing pole works much better, but would not have been very practical for SOE purposes.

In operation

Depending on the HT (high tension) voltage and frequency, the output power is from two to five watts and /p operation is certainly

A homemade wooden box and paint job gives an authentic look.

Plug-in components.

preferred. The receiver (Rx) is certainly sensitive enough, but tuning is a bit critical on 40m.

Having a separate Rx and Tx means you need to 'net' them and I use an FT-817 to listen to the transmit (Tx) frequency and then tune the receiver until I hear the tone from the regen oscillator on the same frequency. I've nothing but admiration for the operators who used these simple sets under such adverse conditions.

It's often said they were discovered after radio direction finding (RDF) of the oscillation of the regen receiver. After doing some tests, I found that this could not be heard more than say ¼ mile away and it's more likely many operators were captured for other reasons. One of them was being forced to stay on the same frequency for too long.

So far I've only had a few inter-G contacts with the radio as I must admit I'm more of a tinkerer than an operator, but when we finally get some fine weather and I'm free I'll be off to the hills with it again.

Nick Gregory G0HIK
nickg0hik@googlemail.com

Rallies & Events continued from page 95

There are disabled facilities. Doors open from 11am to 3pm and admission is £2, with children under 14 free. There will be trade and individual stalls as well as club stands, including the RSGB and G QRP. There will be a Bring & Buy. Catering is available on site. Some tables are available at £8 but please book early. Contact Les Jackson, G4HZJ on 01942 870 634 or email g4hzj@ntlworld.com.

10 JUNE
ANTRIM & DARS BRING & BUY SURPLUS SALE
Muckamore Community Centre, Ballycraigy Road, Antrim, Co Antrim, BT41 2DH.
Doors open 12.30, with sellers gaining access from 12 noon. Entry is £2 for buyers and a table charge for sellers is £5. Refreshments available to purchase and a raffle will be drawn.

11 JUNE
JUNCTION 28 AMATEUR RADIO RALLY
Bowls Hall Alfreton Leisure Centre, Church Street, Alfreton DE55 7BD.
Contact rally secretary for further details on 01159 307 322.

11 JUNE
EAST SUFFOLK WIRELESS REVIVAL (Ipswich Radio Rally) (NEW VENUE)
Kirton Recreation Ground, Back Road, Kirton, IP10 0PW, just off the A14.
Doors open at 9.30, there is free car parking and entry is £2. There will be trade stands, car boot sale, Bring & Buy, special interests groups, GB4SWR HF station and an RSGB bookstall. Catering is available on site. Contact Kevin, G8MXV, on 0771 0046 846. [www.eswr.org.uk].

17 JUNE
SOUTH LANCS ARC SUMMER RALLY
Bickershaw Village Community Club, Bickershaw Lane, Bickershaw, Wigan WN2 5TE.
There is car parking on site. Doors open 9am for the public and 7.30am for traders. Entry is £2.50. There are a limited number of pitches available. There will be a Bring & Buy, special interest groups and trade stands. Catering is available on site. To book call Jason, G0IZR on 01942 735 828.

18 JUNE
30th NEWBURY RADIO RALLY
Newbury Showground, next to M4 junction 13, Berkshire.
There is free parking on site and entry is £2.50 or £12.30 for those in the car boot area. There will be a display area of an amateur radio station, exhibits, special interest groups, clubs and societies. There is on site catering and disabled facilities. Open to sellers at 8am for setup and to the public from 9am. Advance bookings (with discount) can be made via www.nadars.org.uk/rally.asp.

25 JUNE
WEST OF ENGLAND RADIO RALLY
Cheese & Grain, Market Yard, Bridge Street, Frome, Somerset BA11 1BE.
Doors open from 10am to 2pm with admission £3 for adults and children under 14 free. There will be inside & outside traders, free car parking, café, RSGB bookstall, accessible & facilities for disabled. Details from Shaun, G8VPG on 01225 873 098. [www.westrally.org.uk].

1 JULY – **BANGOR & DARS ANNUAL RALLY**
1 JULY – **1st HOUGHTON LE SPRING ARC RALLY**
2 JULY – **BARFORD NORFOLK RADIO RALLY**
2 JULY – **LAMFEST (in aid of Yorks. Air Ambulance)**
8 JULY – **STOCKPORT RADIO SOCIETY RALLY**
9 JULY – **CORNISH RAC RALLY**
8/9 JULY – **2017 uWAVE ROUND TABLE**
14-16 JULY – **HAM RADIO, FRIEDRICHSHAFEN**
16 JULY – **MCMICHAEL RALLY**
23 JULY – **FINNINGLEY ARS RALLY**
30 JULY – **CHIPPENHAM & DARC RALLY**
6 AUG – **GREAT EASTERN RADIO RALLY**
6 AUG – **LORN RADIO RALLY**
11 AUG – **24th ANNUAL MINI RALLY NIGHT**
13 AUG – **FLIGHT REFUELLING ARS HAMFEST**
20 AUG – **RUGBY ATS ANNUAL RADIO RALLY**
27 AUG – **MILTON KEYNES ARS RALLY**
28 AUG – **HUNTINGDONSHIRE ARS RALLY**
2-3 SEP – **TELFORD HAMFEST & G-QRP CONVENTION**
9 SEP – **CAISTER LIFEBOAT RALLY**
9 & 10 SEP – **BATC CONVENTION (CAT 17)**
10 SEP – **TORBAY COMMS FAIR**
17 SEP – **WESTON-SUPER-MARE RALLY**
22-24 SEP – **WACRAL CONFERENCE WEEKEND**
24 SEP – **PENCOED ARC TABLE TOP SALE**
29-30 SEP – **NATIONAL HAMFEST**
1 OCT – **HACK GREEN HANGAR SALE**
8 OCT **(NEW DATE)** – **BLACKWOOD ARS RALLY**
13-16 OCT – **RSGB CONVENTION**
15 OCT – **HOLSWORTHY ARC RALLY**
15 OCT – **HORNSEA AMATEUR RADIO RALLY**
22 OCT – **GALASHIELS RALLY**

The latest Amate

ANTENNA BOOKS

INAN	International Antennas	£14.99	**£12.74**
SAS2	ARRL Small Antennas for Small Spaces 2nd Ed	£22.99	**£19.54**
RAWK	ARRL The Radio Amateur's Workshop	£22.99	**£19.54**
APHY	ARRL Antenna Physics: An Introduction	£26.99	**£22.94**
POAC	ARRL Portable Antenna Classics	£19.99	**£16.99**
AB23	ARRL Antenna Book 23rd Ed	£46.99	**£39.94**
NOVA	Novel Antennas	£14.99	**£12.74**
STL2	Stealth Antennas 2	£14.99	**£12.74**
AMAS	Antennas Mastered	£14.99	**£12.74**
ITAM	Introduction to Antenna Modelling	£9.99	**£8.49**
WAC3	ARRL Even More Wire Antenna Classics Vol3	£22.99	**£19.54**
AMFB	ARRL Antenna Modelling for Beginners	£37.99	**£31.91**
SUWA	Successful Wire Antennas	£13.99	**£11.89**
HFAE	HF Antennas for Everyone	£14.99	**£12.74**
AGAT	ARRL Guide to Antenna Tuners	£22.99	**£19.59**
ATRA	ARRL Antenna Towers for Radio Amateurs	£34.99	**£29.74**
ADNB	ARRL Antenna Designer's Notebook	£34.99	**£29.74**
AFVA	Antennas for VHF and above	£12.99	**£11.04**
UBAN	ARRL Basic Antennas	£29.99	**£25.49**
BSHA	Building Successful HF Antennas	£14.99	**£12.74**
MVAC	ARRL More Vertical Antenna Classics	£17.99	**£15.29**
PWA2	Practical Wire Antennas 2	£11.99	**£10.19**
INAC	International Antenna Collection	£14.99	**£12.74**
INA2	International Antenna Collection 2	£14.99	**£12.74**
ANTO	Antenna Topics	£18.99	**£16.14**
BKYA	Backyard Antennas	£18.99	**£16.14**
NACO	HF Antenna Collection	£19.99	**£16.99**
HFAL	HF Antennas for all Locations	£19.99	**£16.99**
SAFA	ARRL Simple & Fun Antennas for Hams	£22.99	**£19.59**
YAAC	ARRL Yagi Antenna Classics	£17.99	**£15.29**
ACV1	ARRL Antenna Compendium VOL 1	£19.99	**£16.99**
ACV2	ARRL Antenna Compendium VOL 2	£13.99	**£11.89**
ACV3	ARRL Antenna Compendium VOL 3	£13.99	**£11.89**
ACV4	ARRL Antenna Compendium VOL 4	£19.99	**£16.99**
ACV5	ARRL Antenna Compendium VOL 5	£19.99	**£16.99**
ACV6	ARRL Antenna Compendium VOL 6	£22.99	**£19.59**
ACV7	ARRL Antenna Compendium VOL 7	£24.99	**£21.24**
ACV8	ARRL Antenna Compendium VOL 8	£24.99	**£21.24**
WACS	ARRL Wire Antenna Classics	£13.99	**£11.89**
MWAC	ARRL More Wire Antenna Classics VOL 2	£17.99	**£15.29**
VACS	ARRL Vertical Antenna Classics	£11.99	**£10.19**

CALLBOOKS

WC17	Pegasus World Callbook Winter17 (CD+USB Stick)	£44.99	**£38.24**
CB17	RSGB Yearbook 2017 Edition	£19.99	**£16.99**
CS17	Callseeker Plus 2017 (CD)	£16.99	**£14.44**
MS17	Callseeker Plus 2017 Memory Stick	£16.99	**£14.44**

EMC & RFI

RFI3	ARRL RFI Book 3rd Ed	£23.99	**£20.39**
FRIN	Single Ferrite Ring	£2.25	**£1.91**
FIL7	Filter 7	£10.00	**£8.50**
FL15	Filter 15	£10.00	**£8.50**

VHF/UHF BOOKS

SIX4	Six and Four	£13.99	**£11.89**
VHF2	VHF/UHF Handbook	£14.99	**£12.74**
YGVU	Guide to VHF/UHF	£8.99	**£7.64**

SPACE & SATELLITES

HSAT	HAMSAT - Amateur Radio Satellities Explained	£9.99	**£8.49**
ARA2	Amateur Radio Astronomy - 2nd Ed	£16.99	**£14.44**
SAT2	ARRL Satellite Handbook	£19.99	**£16.99**

TECHNICAL BOOKS

RH13	RSGB Radio Communication Handbook	£32.99	**£27.99**
AH17	ARRL Handbook 2017	£46.99	**£39.94**
RORS	Restoring Old Radio Sets	£8.99	**£7.64**
ELE2	Elimination of Electrical Noise 2nd Ed	£6.99	**£5.94**
WWJT	ARRL Work the World with JT65 and JT9	£17.99	**£15.29**
HAR2	Hart Reviews	£12.99	**£11.04**
AMPS	Amplifiers	£30.00	**£25.50**
BATR	Building A Transceiver	£12.99	**£11.04**
SWRE	SWR Explained	£7.99	**£6.79**
AYFR	ARRL Your First Amateur Radio HF Station	£22.99	**£19.54**
ACSA	ARRL Circuit Simulation and Analysis	£27.99	**£23.79**
HK18	ARRL Hints & Kinks for the Radio Amateur	£18.99	**£16.14**
EPR2	ARRL Emergency Power for Radio Comms 2nd Ed	£23.99	**£20.39**
TEQP	Test Equipment for the Radio Amateur	£14.99	**£12.74**
VARV	Valves Revisited	£16.99	**£14.44**
UNB2	ARRL Understanding Basic Electronics	£26.99	**£22.94**
HORE	ARRL Hands-On Radio Experiments	£14.99	**£12.74**
WEEK	Weekend Projects	£13.99	**£11.89**
RADN	Radio Nature	£16.99	**£14.44**
HFA2	HF Amateur Radio	£12.99	**£11.04**
RFDB	RF Design Basics	£17.99	**£15.29**
LPAR	ARRL Low Profile Amateur Radio	£14.99	**£12.74**
PSHB	Power Supply Handbook	£15.99	**£13.59**
PICB	Pic Basics	£16.99	**£14.44**
CIRO	Circuit Overload	£14.99	**£12.74**
ARES	Amateur Radio Essentials	£15.99	**£13.59**
HART	25 years of Hart Reviews	£14.99	**£12.74**
DMFO	Digital Modes for all Occasions	£16.99	**£14.44**
TTSB2	Technical Topics Scrapbook 1990-94	£13.99	**£11.89**
IRFD	Introduction to Radio Frequency Design	£29.99	**£25.99**

OPERATING & DX

SOTE	SOTA Explained	£12.99	**£11.04**
VRIG	The Vintage Rig Guide (including p&p)		**£5.99**
RIG8	The Rig Guide 8th Ed (including p&p)		**£5.99**
PR12	RSGB Prefix Guide 12th Ed	£9.99	**£8.49**
HFDX	HF SSB DX Basics	£8.99	**£7.64**
OPM8	RSGB Operating Manual 8th Ed	£16.99	**£14.44**
ARSH	ARRL Amateur Radio Public Service Hbk	£28.99	**£26.64**
LDX5	ARRL Low Band Dxing - 5th Ed	£34.99	**£29.74**
HBCB	Homebrew Cookbook	£12.99	**£11.04**
ROAR	ARRL Remote Operating for Amateur Radio	£19.99	**£16.99**
SSAR	Storm Spotting for Radio Amateurs	£19.99	**£16.99**
WLOD	World Licensing and Operating Directory	£12.99	**£11.04**
RADO	Radio Orienteering – ARDF Handbook	£9.99	**£8.49**
MOVE	ARRL's Amateur Radio on the Move	£14.99	**£12.74**
WHOS	Who's who in Amateur Radio	£14.99	**£12.74**

RadCom 2016 Archive

RadCom is for many an invaluable archive that is looked back over many times. So why not have all this information in a searchable format by purchasing the *RadCom 2016 Archive*. Every page of the very best amateur radio information that *RadCom* produced in 2016 is included and that is over 1200 pages. In 2016 *RadCom* published over 80 Construction & Technical Features along with 35 Antenna Articles, 24 Equipment Reviews and over 75 other Feature articles. The equipment reviews covered major equipment releases such as the Icom 7300, Yaesu FT-991, the Flexradio Maestro console, Elecraft K3S and much else besides. You will also find all the host of regular columns that RadCom features, from Antennas to VHF/UHF. Simply everything printed in *RadCom* in 2016 is included, even the adverts are provided. Presented in the easy to use and fully searchable PDF format this is the easy way look back over this mass of information form the twelve *RadCom* editions produced in 2016.

CD & USB Options

The *RadCom Archive 2016* is available as either the traditional CD version or in the USB Memory Stick version. Both versions are easy to use and contain the mass of material *RadCom* produced in 2016 along with all the bonus material provided.

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

FROM **FREE P&P**

Order on the internet at www.rsgbshop.org or you can order by post making cheques and postal orders crossed and made payable to Radio Society of Great Britain or telephone your credit card order to 01234 832 700. Open 8.30-4.30 (Mon-Fri). Send no cash. Post & Packing: Standard Delivery - 2nd Class Post (4-9 Days), For one item £1.95, For two or more items: £3.50, For orders over £30.00 standard delivery is FREE. Priority Delivery - 1st Class Post (2-4 Days), For one item £2.95, For two items: £4.95 , For three or more items: £5.95. Overseas: Worldwide Surface Delivery, For one item: £3.00, For two items: £5.00, Extra items: £1.00 per item. Worldwide Air Delivery: For one item: £9.00, For two items: £15.00, Extra items: £3.00 per item.

ur Radio titles

RSGB SHOP

COMPUTING & RADIO			
AFHR	ARRL Arduino for Ham Radio	£28.99	**£24.64**
HMAD	ARRL Ham Radio for Arduino and PICAXE	£27.99	**£23.79**
RTT2	RTTY/PSK31 for Radio Amateur - 2nd Ed	£7.99	**£6.79**
CIA2	Computers in Amateur Radio - 2nd Ed	£14.99	**£12.74**
HFDG	ARRL Get on the Air with HF Digital	£21.99	**£18.69**
VOIP	ARRL VoIP Internet Linking for Radio Amateurs	£15.99	**£13.59**
COMM	CoMmand	£16.99	**£14.44**
MAPS			
RAMW	Radio Amateur's Map of the World	£6.99	**£5.94**
RADCOM			
RC16	RadCom 2016 Archive CD-Rom	£14.99	**£12.74**
MR16	RadCom 2016 Archive USB Memory Stick	£14.99	**£12.74**
0RCB	RadCom Back Issues		**£4.95**
EAZI	RadCom Easi-Binder		**£9.99**
RC**	Radcom Single Year CDs 1996-2016	£14.99	**£12.74**
MR**	Radcom Single Year USB Sticks 2014-2016	£14.99	**£12.74**
RADCOM CD-ROM ARCHIVES			
RC9195	RadCom 1991-95	£19.99	**£16.99**
RC8690	RadCom 1986-90	£19.99	**£16.99**
RC8185	RadCom 1981-85	£19.99	**£16.99**
RC7680	RadCom 1976-80	£19.99	**£16.99**
RC7075	RadCom 1970-75	£19.99	**£16.99**
RC6469	RadCom 1964-69	£19.99	**£16.99**
RC5463	RadCom 1954-63	£19.99	**£16.99**
RC3953	RadCom 1939-53	£19.99	**£16.99**
IOTA			
ID17	IOTA Directory 17th Ed	£11.99	**£10.19**
IFVR	Island Fever	£19.99	**£12.99**
MONTHLY PUBLICATIONS			
QST1	ARRL Subscription 1 Year		**£51.00**
QST2	ARRL Subscription 2 Year		**£98.00**
QST3	ARRL Subscription 3 Year		**£145.00**
QSTC	ARRL Subscription Digital only 1 Year		**£33.00**
QSTC2	ARRL Subscription Digital only 2 Years		**£63.50**
QSTC3	ARRL Subscription Digital only 3 Years		**£93.50**
LOW POWER (QRP)			
SPTB	Low Power Spratbook	£14.99	**£12.74**
QRP2	QRP Basics (2nd edition)	£14.99	**£12.74**
LPS4	ARRL Low Power Communication	£22.99	**£19.54**
INQC	International QRP Collection	£12.99	**£11.04**
MQRP	More QRP Power	£16.99	**£14.44**
LOGGING			
DL17	Deluxe Log Book 2017	£4.99	**£4.24**
LBAR	Log Book - Transmitting	£4.99	**£4.24**
LBRX	Log Book - Receiving	£4.99	**£4.24**
MICROWAVES			
MKHW	Microwave Know How	£12.99	**£11.04**
IMH2	International Microwave Handbook 2	£16.99	**£14.44**
MICP	Microwave Projects 1	£16.99	**£14.44**
MIP2	Microwave Projects 2	£16.99	**£14.44**

PROPAGATION			
RPEX	Radio Propagation Explained	£12.99	**£11.04**
PRSS	ARRL Propagation and Radio Science	£27.99	**£23.79**
RDAU	Radio Auroras	£6.99	**£5.94**
MORSE CODE			
MC12	Morse Code for Radio Amateurs 12th Ed	£8.99	**£7.64**
GENERAL BOOKS			
BMIL	British Military Intelligence	£14.99	**£11.24**
LPUK	Launch Pad UK	£14.99	**£11.24**
SAGL	The Spies of Gilnahirk	£12.99	**£11.04**
CMSA	Churchill's Most Secret Airfield	£12.99	**£9.74**
CVYR	The Cray Valley Years	£14.99	**£12.74**
DDDP	3D Printing for Dummies	£21.99	**£16.49**
OBIG	Operation Big	£20.00	**£15.00**
BOF	Boffin	£12.99	**£11.04**
MFAL	Haynes Millennium Falcon Manual	£16.99	**£6.99**
THR2	Haynes Thunderbirds Maual 50th Anniversary	£12.99	**£8.99**
FORT	Fort Bridgewoods	£11.99	**£10.19**
HSOY	Haynes Soyuz Manual	£21.99	**£16.49**
CRSI	Covert Radar & Signals Interception	£19.99	**£14.99**
CBL2	The Cable - the wire that changed the world	£9.99	**£7.49**
PGMS	Pigeon Guided Missiles	£12.99	**£9.74**
TDLB	The Three Dimensions of John Logie Baird	£16.99	**£14.44**
BBR2	The Birth of British Radar	£12.99	**£11.04**
INEG	Inside Enigma	£14.99	**£12.74**
IMAS	Images Across Space	£19.99	**£14.99**
H109	Haynes Manual for Messerschmitt Bf109	£17.99	**£15.29**
FCIR	Full Circle: A Dream Denied, A Vision Fulfilled	£10.99	**£9.34**
ABOC	A Bit of Controversy	£13.99	**£11.89**
TSOE	The Story of Enigma (CD)	£9.99	**£8.49**
TCCD	Perera's Telegraph Collectors CD	£9.99	**£8.49**
BOXS	1940s Amateur Radio Collection	£15.99	**£13.59**
SHORTWAVE LISTENING			
VREX	Virtual Radar Explained	£6.99	**£5.94**
TRAINING			
EXSE	Amateur Radio Exam Secrets	£12.99	**£9.74**
FNOW	Foundation Licence - NOW!	£4.99	**£3.74**
IMD6	Intermediate Licence Book	£6.99	**£5.24**
ADVA	Advance! The Full Licence Manual	£11.99	**£8.99**
IEXM	International Amateur Radio Exam Manual	£14.99	**£11.24**
LOW FREQUENCY			
LFT3	LF Today 3rd Ed	£13.99	**£11.89**

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

P&P

TOTAL

PLEASE CHARGE MY CREDIT/DEBIT CARD | | | | | | | | | | | | | | | | | | | | | | | | |

EXPIRY DATE | | | | | START DATE | | | | | CVV2* | | | | ISSUE NUMBER | | |

*3 DIGIT CODE FROM THE BACK OF YOUR CARD

SIGNATURE DATE | | | | | | | | |

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

World Thinking Day on the Air 2017

The 17th A Leigh-on-Sea Brownies who took part in Thinking Day on the Air 2017.

Thinking Day on the Air (TDOTA) is an opportunity for the members of Girlguiding from the youngest Rainbow to the oldest Trefoil Guild member to talk to other members of the World Association of Girl Guides and Girl Scouts all over the world via amateur radio.

The event takes place annually on the third weekend in February, close to 22 February, the birthday of Lord Robert Baden-Powell, the founder of the Scout and Guide movements, and his wife Olave, who was the first World Chief Guide.

This year was the first TDOTA in which the 1st Montgomery Guide Unit had participated. The girls activated the special event callsign GB8MG (Montgomery Guides) on 18 February, making contacts all over Europe on the 15, 20, and 40m bands. Sadly, conditions within the UK were poor, so no other Guide units were contacted.

All Guides passed messages, filled in the log book and plotted their QSOs on a wall map with coloured dots. They all achieved their Communicator and On the Air badges by the end of the day. Operator Jon Kempster, M5AEO was awarded his badges along with the Guides' Medal of Friendship – a great and rare honour.

Eric Fairbrother, the Mayor of Montgomery, passed a message to a station in France, which received local press coverage. Some older Guides from the Trefoil Guild visited and got on the air. The youngest broadcaster was 10 and the oldest 76.

The operation ended with VHF FM contacts via the local repeater, GB3PW, in Newtown.

The technical details: IC-7400 HF transceiver, FT-897 transceiver, Windom antenna at 5m above ground level (AGL), 100 watts RF output.

Unit leader Cath Wilkins, a former BBC World Service producer, was overjoyed with the result and hopes this will be the first of many TDOTA activities in Montgomery, Powys.

Jon, M5AEO

In support of TDOTA, Rainbows, Brownies and Girl Guides from the 17th A Leigh-on-Sea unit took part in an evening dedicated to radio in Hadleigh, Essex. The event was coordinated by Essex Ham, and included a presentation on Tim Peake's mission to the ISS and the importance of radio in our daily lives. Over twenty Brownies, Guides, Trefoil Guild and team leaders sent greetings messages to Essex Ham members in other parts of the county, so that the youngsters could get their first taste of radio, as well as getting their On The Air communicators badges.

Pete, M0PSX

Kathryn (aged 9), with Sarah, M6PSK operating the TDOTA station.

Jon Kempster, M5AEO (right) with a young Guide ready to operate GB8MG.

Elaine Richards, G4LFM
radcom@rsgb.org.uk

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!

- ***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!***

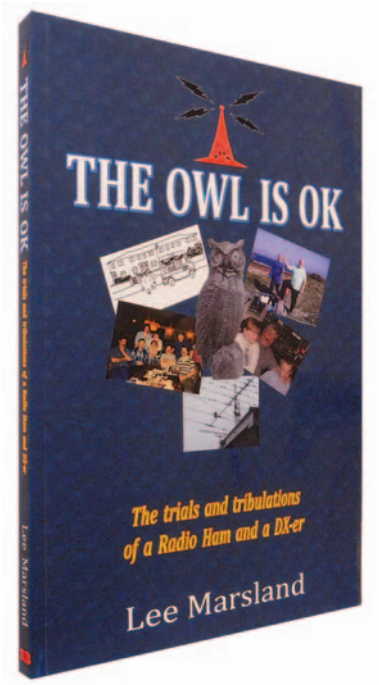
ICOM-UK
Blacksole House, Altira Park, Herne Bay, Kent CT6 6GZ. UK. Telephone: +44 (0)1227 741741. Fax: +44 (0)1227 741742.
e-mail: info@icomuk.co.uk website: www.icomuk.co.uk

Count on us!

Book Review

The Owl is OK

by Lee Marsland, G0DBE



I must admit that when I saw the cover of this book I presumed it would relate to a certain owl of yesteryear, boiled at midnight and accompanied by secret rituals, but there is a far more pragmatic reason. Amidst a host of other amateur radio anecdotes in this humorous book, Lee Marsland explains to us that the title was inspired by a run-in with an RSPCA inspector. The event, which gets a chapter all to itself, was all down to keen neighbours noticing an owl staying stationary some seventy feet up the mast and expressing concern to the RSPCA that it was perhaps injured. A letter purporting to be from the RSPB contained suggestions that the bird had been cruelly trained to stay perched on the antenna day and night for weeks at a stretch. The truth was that the owl was indeed OK – and made of very convincing plastic.

The book is enlivened by numerous black and white photos and line-drawn cartoons, all of which serve to illustrate various points. Perhaps one of the most enduring images is the author's legs dappled with coloured nail varnish to lessen the irritation of chigger bites…

This is an interesting, personal memoir and covers many years of Lee's life. The thing that comes through most clearly is his dedication to, and love of, amateur radio. It's an entertaining read. The author's writing style is quite direct and good-natured, although there are occasional forthright strongly worded bits. A great read.

Size: 150 x 229mm, 180 pages, ISBN: 9781 9101 93372
Non-Members' Price: £9.99, Members' Price: £8.49

Giles Read, G1MFG
giles.read@rsgb.org.uk

HF F-Layer Propagation Predictions for June 2017

Compiled by Gwyn Williams, G4FKH

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe								
Moscow	42.....145	65321.113466	554333234566	225544455562	.1122112332.	...111.1111.	.....	.....
*** Asia								
Yakutsk	.....	11.1..1...11	1112111..122	...2222.....	.....	.....	.....	.....
Tokyo	.....	.....	.....121..	.....11211.	.....	.....	.....	.....
Singapore	.....22.	3321	.....232.2	.....11..1	.....	.....	.....	.....
Hyderabad	233	2.....3444	2.....23444	23211	.....	.....	.....	.....
Tel Aviv	53.....55	552.....2455	35421.134555	.143333453.	..111..123..	.....1..	.....	.....
*** Oceania								
Wellington	.....	.....	.....	.....	.....	.....	.....	.....
Well (ZL) (LP)	.1.....	341.....133	342.....144	22.....33	12	.....	.....	.....
Perth	.....11.	3323	.....22.3	1	.....	.....	.....	.....
Sydney	.....1..	.....24..	.....1331.	.....112.	.....	.....	.....	.....
Melbourne (LP)	.....	223.....	323.....1	212.....2	1	.....	.....	.....
Honolulu	.....	.....	.....	...11.....	.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....	.....1...	.....	.....	.....
W. Samoa	.....	.....	.....	...11.....	.....	.....	.....	.....
*** Africa								
Mauritius	2.....222	1.....3332	.....1321.	.....11...	.....	.....	.....	.....
Johanesburg	22.....122	12.....2222	.....21..	.....11...	.....1....	.....	.....	.....
Ibadan	542.....245	5541....2455	51431..13555	..4321124532	..141111145..	...1....23..	.....1..	.....
Nairobi	33.....233	44.....1344	142.....3444	..3111.1342.	.....1..31..	.....	.....	.....
Canary Isles	664.....156	66531...1466	666532234566	326532225566	1.2532335552	..1321223521	...11111221.	...1....12..
*** S. America								
Buenos Aires	22.....	443.....24	332.....34	1.....233	221	.....11.	.....	.....
Rio de Janeiro	33.....2	441.....45	43.....344	1.....343	1331	.....21.	.....1..	.....
Lima	221.....	433.....14	3231.....33	32	.....1.	.....	.....	.....
Caracas	332.....3	4432.....14	32321.....24	....1....132	.....1.	.....	.....	.....
*** N. America								
Guatemala	131.....	343.....2	333.....3	12	.....	.....	.....	.....
New Orleans	231.....	3331.....	32.....1	.....	.....	.....	.....	.....
Washington	3421.....1	44321.....12	441.211..123	1111223	.....	.....	.....	.....
Quebec	242.....	4432.....2	32111...1.13	21	.....	.....	.....	.....
Anchorage	.....	.....	.....	.....	.....	.....	.....	.....
Vancouver	.....	.....	.11.....	.....	.....	.....	.....	.....
San Francisco	.....	.22.....	122.....	.....	.....	.....	.....	.....
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. 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 July, August & September are respectively (SIDC classical method – Waldmeier's standard) 19, 18 & 17 and (combined method) 28, 29 & 30. The provisional mean sunspot number for April was 32.6. The daily maximum / minimum numbers were 100 on 3 April and 0 on 8, 15-17 April.

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, On the Air. We normally acknowledge all submissions within 3 working days: if you don't hear from us, please phone. We don't normally include 'closed', 'TBA' or 'every Tuesday'-type entries. The deadline for the July issue is 25 May and for August it's 22 June. For GB2RS, the deadline is 10am on the Thursday of the week of broadcast.

CLUB EVENTS CALENDAR

INTERNATIONAL

Pafos Radio Club, Cyprus
Richard, 5B4AJG, 00 357 97 857 891, 5b4ajg@gmail.com www.cyhams.org
Meets 3rd Thursday at DT's Bar. Visitors and holidaymakers welcome.

International Federation of Railway Radio Amateurs. (FIRAC) www.firac.org.uk
Nets Sun 14.320MHz at 0830UTC Wed 1430UTC 21.3MHz g4gnq@hotmail.co.uk

NATIONAL

Amateur Radio Caravan and Camping Club
membership@arcc.org.uk, www.arcc.org.uk
Caravan Rallies June: Hendra, Newquay

AMSAT-UK, http://amsat-uk.org/
Open net every Sunday, 10am, 3.780MHz (±)

British Railways Amateur Radio Society
m0zaa@brars.info, www.brars.info
Net Friday 1600 on 3.685MHz

Civil Service Amateur Radio Society
Weekly net every Tuesday, 8pm, 3.763MHz.

Radio Amateur Old Timers' Association
MemSec@RAOTA.org, www.RAOTA.org
Nets: Wed 3.763MHz 1000, 1.963MHz 2100, Thurs 7.163MHz, 1100, 3.763MHz 1930 Sun 3.763MHz 1000.

REGION 1: SCOTLAND SOUTH & WESTERN ISLES

Regional Manager: Marcus Hazel-Mcgown, MM0ZIF, RM1@rsgb.org.uk

Ayr ARG
Charlie, MM0GNS, 01563 551 704
9 AGM
17 80th Anniversary dinner
24 Drop-in day special event

Cockenzie & Port Seton ARC
Bob, GM4UYZ, 01875 811 723
2 Club night
17 GB2MOF for Museums on the Air

Livingston & District ARS
Cathie, 2M0DIB, 01506 433 846
6, 20, 27 Training and operating
13 Talk

Stirling & District ARS
Lyndsay, MM6KEO, 07786 885 566
1, 8, 15, 22, 29 Amateur radio shenanigans

West of Scotland (Glasgow) ARS
wosars@gmail.com
2, 9, 16, 23, 30 Club night, 8pm

Wigtownshire ARC
Lance, 2M0HEO, lancedavisedmonds@gmail.com
1, 8, 22, 29 Club night
15 C4FM and D-Star talk

REGION 2: SCOTLAND NORTH & NORTHERN ISLES

Regional Manager: Andrew Burns, MM0CXA RM2@rsgb.org.uk

Aberdeen ARS
Fred, GM3ALZ, 01975 651 365
1 Junk sale
8 N1MM+ and Morse Runner, MM0JOM
22 Frequency counting, GM4GVK & GM4HTU
29 Construction and on the air

Dundee ARC
Martin, 2M0KAU, 0776 370 8933
3-4 Scottish DX contest / NFD
6,13, 20 VHF radio hands on / practical /activity
27 James Bowman Lindsay (local hero) and dipoles

Inverness & District ARS
John, GM0OTI 01463 791 444
7 Club net, 8pm, 145.575MHz & GB3BI
14, 28 Club night

REGION 3: NORTH WEST

Regional Manager: Kath Wilson, M1CNY, RM3@rsgb.org.uk

Bolton Wireless Club
boltonwireless@gmail.com
12 NOAA Weather Satellites and ARISS, G4OCR

Chester & District RS
Bruce, M0CVP, 01244 343 825
6 Field day and contest planning
13, 27 Committee / Operating
20 Project update, CW xcvr kit, Phil, G4FVZ

Macclesfield & District RS
Greg, M0TXX, Info@gx4mws.com
5 Film night – radio related
12 ECG machines, M6HQV
19, 26 Shack on the air / equipment night

Mid-Cheshire ARS
Peter, G8HAV, 0791 931 5547
7 Committee meeting and NFD planning
14 Test all NFD kit
21 Repair/replace any faulty equipment
28 Pack NFD equipment for transport

South Manchester R&CC
Ron, G3SVW, 01619 693 999
1 History of film projection, Ray, G6OCW
8 Adjusting the AMU
15, 29 PC clinic / New club strategy
22 Weather or not, part 4, Peter, G3XGE

Stockport Radio Society
Heather, M6HNS, 07506 904 422
6 Society meeting
13 Club net, 7.30pm, start 51.550MHz FM
15 Club net, 7.30pm, 145.375MHz
20, 27 Radio night/Skills night
29 Advanced Tutorial Primer 2, 7pm

Thornton Cleveleys ARS
John, G4FRK, 01253 862 810
3-4 HF NFD
5 Natter night/practical/club on air
12 VHF NFD discussion
19 Technical video
29 Fox hunt

REGION 4: NORTH EAST

Regional Manager: Ian Douglas, G7MFN, RM4@rsgb.org.uk

Angel of the North ARC
Nancy, G7UUR, 01914 770 036
5 Securing your internet connection, G7SPN
12, 19, 26 Advanced course,M0PGX; on air
17-19 Museums on the Air, Bowes Railway

Blyth Radio Club
John, 2E0DCV, 0191 237 1729
7 Club night

Denby Dale RC
Darran, G0BWB, 07974 423 227
7, 21 Club night
14, 28 Club net

Durham & District ARS
Michael, G7TWX, dadars@dmx.com
7, 14, 21, 28 Club night
8, 15, 22, 29 Net, 7.30pm, 145.475MHz

Ripon & District ARS
David, G3UNA, 01423 860 778
1, 8, 15, 22, 29 Club night

Sheffield & District Wireless Society
Krystyna, 2E0KSH, 0788 406 5375
7, 21 Awards night / Bring & Buy
14, 28 Training, social or technical night

Sheffield ARC
David, G6DCT, littlewood20@btinternet.com
5, 12, 26 Shack night / club night
19 Remote lock, John, 2E0WLJ

Spen Valley ARS
Russell, G0FOI, 01274 875 038
1 Appraisal of club equipment
15 On the air

REGION 5: WEST MIDLANDS

Regional Manager: Martyn Vincent, G3UKV RM5@rsgb.org.uk

Burton ARC
Mike, 2E0EZG, info@Burton-ARC.co.uk
1, 8, 15, 22, 29 Club net, 8pm, 145.575MHz
4, 11, 18, 25 Club net, 10am, 145.575MHz
7, 14, 21, 28 Club night

Cheltenham ARA
Derek, G3NKS, 01242 241 099
4, 11, 18, 25 Net, 8.30am, 50.220MHz USB
6, 13, 20, 27 QRS CW, 3540-3550kHz, 8pm
15, 20 Constructional projects / lunch

Coventry ARS
John, G8SEQ, 07958 777 363
1, 8, 15, 22, 26 Net, 8pm, 50.175MHz SSB
2 Balloons, Ian, G7III
5, 12, 19 Net, 8pm, 145.375MHz FM/7.16MHz SSB
9, 10-11 Astley Castle / GB4CTM
16 G4ZMC portable competition Trophy
23 Portable challenge
30 No meeting: open net, 145.375 MHz FM

Dudley & District ARS
Graham, 2E0GIJ, 0783 120 1407
6 Barbecue
8 Open day

The next three deadlines are 25 May, 22 June and 27 July

Gloucester AR&ES
Anne, 2E1GKY, 01242 699 595, daytime
5 Antenna rigging, Ray Pennington
12 Committee, informal & general operating
15, 17 G4BGLM at Gloucester Life Museum
19 Picnic and grand draw at the school
26 Informal evening/general operating

Malvern Hills RAC
Dave, G4IDF, 01905 351 568
13 RSGB presentation, Martyn G3UKV RM5
27 Informal meeting

Midland ARS
Norman, G8BHE, 07808 078 003
7 Open meeting, ragchew and training classes
14 Committee meeting and training classes
21 Shack on the air, training classes
28 Review of social events, BBQ and training

Mid-Warwickshire ARS
Don, G4CYG, 01926 424 465
13, 27 Technical topics / Picnic, Bidford on Avon

Nuneaton & District ARC
Neil, M0NKE, info@ndarc.co.uk
1, 8, 15, 22, 29 Net, 145.475MHz, 9.30pm
2 Pint & chat, 7.30pm, The Harvester
6, 8, 13 UKAC
16 VHF NFD planning & Minos demo

Rugby ATS
Steve, G8LYB, 01788 578 940
3 My new Antenna, part 2
6, 13, 20 UKAC
10 Practical DIY SMD soldering
17, 27 HF & VHF shack on the air, project activities
24, 30 VHF NFD prep/setup

Solihull ARS
SolihullRadioClub@gmail.com
1, 8, 22, 29 Club net, 145.450MHz, 8pm
15 Club night

South Birmingham RS
Gemma, M6GKG, gemmagordon.m6gkg@gmail.com
1, 8, 15, 22, 29 Training classes with G8OWL
2, 12 Sorting stock for the next rally
6, 13, 20, 27 Coffee morning 11am
16, 23 Checking club equipment and aerials
26 Open meeting and rag chew
30 Discussion our next Rally visits

Staffordshire Portable ARC
Lynn, M6LIN, 0192 244 9668
5-9 Beaches on the Air, Tenby
13, 27 Club meeting
17-18, 24-25 Amerton Railway/Cheddleton Mill

Stratford upon Avon & District RS
Clive, G0CHO, 01608 664 488
5, 19 Club net, 145.275MHz FM, 8pm
12 RSGB Propagation video + Skype Q&A
26 Medium wave listening, Keith, G8FRS

Sutton Coldfield ARS
Robert Bird, rob2e0zap@gmail.com
5, 19 Open net, 7.30pm, 145.250MHz
12, 26 Club meeting
13 Open net, 7.30pm, 70.475MHz FM
17 Water Orton Carnival
27 DMR open net, 7.30pm, GB7FW slot/local2

Tamworth ARS
Richard, 2E0LLE, 0787 521 7124
1 Committee meeting & club night
7, 14, 21, 18 Club net via GB3TA
8, 22, 28 Club night
15 Amateur satellite communications, G4DPZ

Telford & DARS
John, M0JZH, 07824 737 716
7 Club call GX3ZME OTA, committee meeting
14 DMR talk, G4VZO
17-18 50MHz Trophy from IO82NN
21 SOTA, M0PLA and M0JZH; prep for VHF FD
28 BBQ on the field

Wythall Radio Club
Chris, G0EYO, 07710 412 819
2, 9, 16, 23, 30 Nibbles night in the shack,
4, 11, 18, 25 Net, 145.225MHz or GB3WL, 8pm
6, 20, 27 Morse class and club night
11 Plug and play day from 10am
13 Morse class, club night and committee
25 Radio comms for Wythall Fun Run, 8am
26 Curry night

REGION 6: NORTH WALES

Regional Manager: Ceri Lloyd Jones, 2W0LJC
RM6@rsgb.org.uk

Dragon ARC
Stewart, GW0ETF, 07833 620 733
5 Marine Comms & Intro to VHF contesting
19 DF hunt and Intro to VHF contesting

North Wales Radio Society
Liz, GW0ETU, 0776 019 0355
1, 22 General meeting/ Discussion night
8, 15 Technical topic / Surplus equipment sale
29 Operating on the Prom or Deganwy

Wrexham ARS
Eifion Parry, mw6eyu@gmail.com
6 Talk by Mark Harper, MW0MDH
20 HF & broadcast bands guide, MW0ARL

REGION 7: SOUTH WALES

Regional Manager: Glyn Jones, GW0ANA,
RM7@rsgb.org.uk

Aberkenfig Radio Club
Ian, 2W0ITT, 01639 617 439
1, 8, 15, 22 Club meeting, 7.30pm
21 Western Valleys RAYNET meeting, 7pm
29 Club raffle

Aberystwyth & District ARS
Ray, GW7AGG, 01970 611 853
8 Visit to Museum of Internal Fire
29 Net on 145.500 then 145.550MHz

REGION 8: NORTHERN IRELAND

Regional Manager: Philip Hosey, MI0MSO
RM8@rsgb.org.uk

Antrim & District ARS
Robert, MI0GDO, robertrobinson2btinternet.com
10 Bring & buy sale, 12.30pm, Muckamore Community Centre, BT41 2DH

Bangor & DARS
Norman, GI3YMY, norman.newell@yahoo.com
1 Barbecue at Drumawhey Model Railway

REGION 9: LONDON & THAMES VALLEY

Regional Manager: Tom O'Reilly, G0NSY
RM9@rsgb.org.uk

Aylesbury Vale RS
vic@rakewell.com
7 Barbecue at G7VFV QTH, 7.30pm

Bracknell ARC
David, M0XDF, M0XDF@Alphadene.co.uk
7, 21, 28 Open net, 8pm, 145.375MHz
14 Talk, Don Field, G3XTT

Burnham Beeches RC
Charles, G0SKA, 01753 647 101
5 Quiz, by Steve Venner of MLS
19 Club 2m fox hunt, 7.30pm, Upton Court Car Park
24, 25 Club 80th Anniversary GB80BB

Chertsey Radio Club
James, M6FLT, chertseyradioclub@hotmail.com
6 Social online gathering

Chesham & District ARS
Terry, G0VFW, g0vfw@thirlwell.me.uk
7 Luton VHF Group IOTA trip to Holy Island, G4UEM

Edgware & District RS
Mike, G4RNW, 02089 500 658
8 No meeting due to General Election
22 Table top sale

Newbury & District ARS
Rob, G4LMW, 01635 862 737
18 Newbury Radio Rally at Newbury Show Ground
28 System Fusion, Paul, G3WYW

Radio Society of Harrow
Linda, G7RJL, lcasey@imperial.ac.uk
2, 16 Club night activity or talk
4, 11, 18, 25 Club net, 1938kHz LSB, 12 noon
5, 12, 19, 26 Net, 145.5/145.35MHz FM, 8.15pm
25 Outdoor event, 2-5pm, Old Redding car park

Reading & District ARC
Laurence, G2DD, 0758 470 6625
8 Signals analysis of MH370, Alan Schuster Bruce
22 The intricacies of DMR, Denis, G0OLX

Southgate ARC
Keith, G8RPA, g8rpa@arrl.net
15 Experiments with wire in the Spinney (Thurs)
23-25 MOTA from Whitewebbs Museum

Verulam ARC
Greg, M0PPG, 01582 413 345
8 Social with GB3VH Repeater Group
20 Antenna shootout

REGION 10: SOUTH & SOUTH EAST

Regional Manager: Michael Senior, G4EFO
RM10@rsgb.org.uk

Bromley & District ARS
Andy, G4WGZ, 01689 878 089
7, 14, 21, 28 Net, 145.400MHz, 9pm
20 Direction finding evening, Steve, 2E0DIZ

Coulsdon ATS
Andy, G0KZT, secretary@catsradio.org
4, 11, 18, 25 Nets: 11am, 145.4, 5pm, 3.7MHz
7, 14, 21, 28 Club net, 9pm, 70.425MHz

Crawley ARC
Richard, G3ZIY, 01342 843 545
28 Talk by RSGB President Nick, G3RWF

Crystal Palace R&EC
Bob, G3OOU, 01737 552 170
7, 14, 21, 28 Net, 8pm, 145.525MHz ± QRM

Darenth Valley Radio Society
Mike, G8AXA, 0788 415 7776
10, 17 Foundation course, 9am-5pm
14 Natter night
28 Fix the club antenna & Field Day prep

Dorking & District RS
David, M6DJB, djb.abraxas@btinternet.com
27 My early wireless days, Ken, M3CFC

Hastings E&RC
Gordon, 01424 431 909
28 Talk by Rodney

Hilderstone R&EC
Ian, 2E0DUE, secretary@g0hrs.org
2, 8 Club night
17-18, 24-25 GB1MSM, Manston Spitfire Museum

Horndean & District ARC
Stuart, G0FYX, 02392 472 846
2 Natter night/social evening
16 Amateur astronomy, Ken Lindsay, G0JWL

KENWOOD

Be witness to the evolution of KENWOOD's pride
and joy - the TS-590S HF transceiver - pushing performance
and technology to its utmost limit,
with the receiver configured to capitalize on roofing filter performance
and IF AGC controlled through advanced DSP technology.
Enter the TS-590SG. A new generation of high performance transceiver,
with the type of high level response to meet DX'ers needs.

A Proven Pedigree in Performance
The TS-590SG

Exceptional receive performance as supported by the Sherwood Engineering data measurements:
No 100 watt rig has a better performing receiver in the table for the price!

Have you thought about remote operating?
Used with software packages like 'Remote Ham Radio', the TS-590SG is a plug and play transceiver with its USB port on the rear panel! This feature allows you to power up and use your transceiver over the Internet from anywhere in the world!

HF/50MHz TRANSCEIVER
TS-590SG

< Main functions of the TS-590SG >

- An even higher performance receiver with superior adjacent dynamic range.
- Advanced AGC control through digital signal processing from the IF stage.
- Highly reliable TX outputs high-quality TX signal.
- New morse code decoder. Scroll display on 13-segment display unit. Characters shown in dedicated window on ARCP-590G.
- MULTI/CH knob (with push-switch) and RIT/XIT/CL key also configurable in addition to existing PF A and PF B programmable functions.
- New Split function (TS-990S-style) enabling quick configuration added in addition to existing Split setting.
- Transceiver equalizer configurable by mode.
- FIL A/B configurable independently with VFO A/B (convenient during Split operation).

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

www.kenwoodcommunications.co.uk

Horsham ARC
Alistair G3ZBU, 07855 268 666
1 DMR, Dennis, G0OLX
15 Social at The Frog and Nightgown
29 Fox hunt

Mid-Sussex ARS
Dennis, M0YDC, 0747 630 1044
2 Construction contest

Southdown ARS
John, G3DQY, 01424 424 319
5 Glyn Evans of Polegate Model Engineering Society
7 Hailsham shack meeting, 10.30am,
7, 14, 21, 28 Cafe meeting, 12.30pm

Surrey Radio Contact Club
John, G3MCX, 020 8688 3322
1, 8, 15, 22, 29 Net 70.300MHz, 8pm
2, 9, 16, 23, 30 Net 145.350MHz, 8pm
4, 11, 18, 25 Net 1905kHz, 9.30am
5 Low cost digital storage scopes, G4FDN
19 Chat and fix-it, John, G8MNY

Sutton & Cheam RS
John, G0BWV, 0208 644 9945
15 Space weather & radio signals, Dr Colin Forsyth

West Kent ARS
Keith, G4JED, info@wkars.org.uk
12 RF test equipment demo, Bob, G3OOU

Worthing & District ARC
Al, M0OAL, information@wadarc.org.uk
4 Sunday breakfast, 9am
7, 14 Tea and chat night / lecture
21 Outside on the air event
28 Practical evening or workshop demo

REGION 11: SOUTH WEST & CHANNEL ISLES

Regional Manager: Pam Helliwell, G7SME
RM11@rsgb.org.uk

Callington ARS
John, G4PBN, 01822 835 834
7 Club night

Cornish Radio Amateur Club
Steve, G7VOH, 01209 844 939
1, 15 Main meeting/ Social evening
7 Committee meeting

Exeter ARS
Nick, M0NRJ, 01363 775 756
6 Club net, GB3EX, 7.45pm
13, 20, 27 Club net, GB3EW, 7.45pm
14 Workshop on HF antennas
28 How to build a repeater

Flight Refuelling ARS
John, G4POF, 0758 250 6336
4, 7 Committee meeting / VHF activity evening
11 HF & VHF shacks open, newcomers welcome
18 Homebrewing beer
21, 25 Videos and social evening / VHF NFD prep

Mid-Somerset ARC
David, G8BFV, 01749 670 085
12 Social evening, note new venue and date

North Bristol ARC
Mat, G7FBD, g7fbd@gb3bs.com
2 Software defined radio, G7NSY and G8YMM
9, 30 Relax and chat, operating and training
16 DXpedition to Seawalls (Durham Downs)
23 Preparation for Westrally plus relax and chat

Plymouth Radio Club
David, 2E0DTC, d.beck123@btinternet.com
13 Club night

Saltash & District ARC
Mark, M0WMB, 0781 054 8445
1, 15 Club night, all welcome

South Bristol ARC
Andrew, G7KNA, 07838 695 471
1 2m collaborative fox hunt
8, 29 VHF National Field Day prep / briefing
15 Table top sale
22 Open house and on the air

Thornbury & South Gloucestershire ARC
Mark, 2E0RKM, 0777 629 2813
2, 9, 16, 23, 30 VHF net
7 Fox hunt using DF antenna built in club
14, 21 Club on air (M6 night) / on the air
17-18, 24-25 Museums on the Air
28 Club on the air testing new antenna systems

Torbay ARS
John, G4VUD@TARS.ORG.UK
2, 16, 23 Operating night
9 Business meeting
30 Show and tell

Weston Super Mare RS
Martin, G7UWI, 01934 613 094
5, 12, 26 Construction, operating & natter night
19 DF hunt

Yeovil ARC
Rodney, M0RGE, 01935 825 791
15 Fox hunt, 7.30pm
22 Morse practice by G3MYM
29 Problem solving and committee

REGION 12: EAST & EAST ANGLIA

Regional Manager: Keith Haynes, G3WRO
RM12@rsgb.org.uk

Braintree & District ARS
Edwin, G0LPO, 01376 324 031
6, 20 Club net, 8pm, 145.375MHz
13, 27 Construction evening / Club BBQ

Chelmsford ARS
secretary@g0mwt.org.uk
6 Table top sale
19 Skills night at Danbury Village Hall

Essex Ham
Pete, M0PSX, news@essexham.co.uk
3 Essex YL net, GB3DA, 8pm
4 Online Foundation course
5, 12, 26 GB3DA net, 8pm, www.essexham.net
19 Getting Started table at Essex Skills Night

Felixstowe & District ARS
Paul, G4YQC, pjw@btinternet.com
5 ESWR planning
11 ESWR rally (new venue)
19 The Aurora, Paul, G4YQC

Huntingdonshire ARS
Phil, G7KJW, 01487 832 937
8 Natter night
22 Dayton Hamvention report
24-25 GB2RRM, Ramsay Rural Museum

Leiston ARC
John, G4XVE, secretary@larc.org.uk
13 Foxhunt on foot
27 VHF/UHF activity contest

Norfolk ARC
Chris, G0DWV, 01603 898 308
7 Fox hunt
14 28 Informal/Bright Sparks
21 Kites for Antennas, Roger, G3ROJ

Norfolk Coast ARS
Steve, G3PND, info@norfolkcoastamateurs.co.uk
1 Antenna testing on the beach
8 Improving your CW
15 More tests on the end fed half wave
29 VHF contesting

South Essex ARS
Terry, G1FBW, 07986 070 040
13 Talk by Tim Wander of Sandford Mill
18 GB2BM at Bay Museum, Canvey Island,
24 Armed Forces Day at the Paddocks
25 GB2BOX at RAF Boxted for MOTA

Thames ARG
Patrick, G8JLM, 01621 855 461
2 At Crowsheath
9 HF Comms with Concord & Ongar Radio Station, Tony, G8YTG
10-11 GB2HBT Memorial SES
25 Operating stand at Hadleigh Country Park

Thurrock Acorns ARC
Gordon, 2E0ELI, acorns@taarc.co.uk
1, 8, 15, 22, 29 Open 2m FM net, 7.30pm
6 2m SSTV open net, 144.500MHz, 7.30pm
20 Summer social evening
24 Horndon Feast and Fayre, 9am-5pm

REGION 13: EAST MIDLANDS

Regional Manager: Jim Stevenson, G0EJQ
RM13@rsgb.org.uk

Derby & District ARS
Richard Buckby, radio@dadars.org.uk
6, 13 Junk sale / committee meeting
20 405 line TV night, John Gregory
27 Closed

Grantham Amateur Radio Club
Kevin, G6SSN, 07793 142 483
6 Radio astronomy, WOW and SETI, Prof Paris
13, 20, 27 Shack night

Leicester RS
Sandra, G0MCV, 0793 027 4044
5, 12, 26 Morse class, games, committee, n the air
19 Morse class, talk on logging by Phil, M0VSE
24-25 Museums on the Air GB0APS

Loughborough & District ARC
Chris, G1ETZ, 01509 504 319
6 2m portable from Markfield
13 Junk sale
20, 30 Radio ramble / Practical evening

Nunsfield House ARG
Paul, G1SGZ, pr@nharg.org.uk
1, 8, 15, 22, 29 Club net, 145.325MHz, 8pm
2 TX Factor 14 video, Paul, G1SGZ
5, 12, 19, 26 Shack night
9, 23 Programme planning / New club website
16 Rarefied AC, Tony, G3KAG
30 Talk on PSK31, 2E0OJR and 2E0VKM

South Kesteven ARS
Andrew, M0NRD, 07969 062 859
7, 14, 21, 28 Club net via GB3GR
16 Club meeting

Spalding & District ARS
Graham, G8NWC, 0775 461 9701
2 Rally prep, open night, show and tell
10 Pinchbeck carnival, exhibition station
16 Global warming, Dr A J Gilfillan, G0FVI

Welland Valley ARS
Peter, G4XEX, 01858 432 105
5 Club net, 8pm, 29.125MHz AM
19 PSK31 operating night, Paul, G1FJH

Worksop ARS
Sue, M6XAK, 01777 707 992
6, 8, 13, 15, 20, 27, 29 Club night
10 Amateur radio at Ranskill Village Festival
22 Portable in the park

REGION 1: SCOTLAND SOUTH & WESTERN ISLES

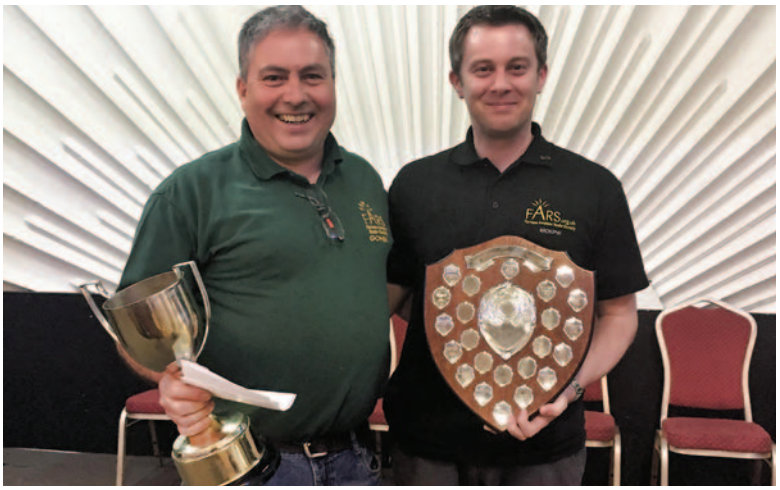
West of Scotland ARS (Glasgow) is sad to report the passing of Eric Margetts, GM4BOA. Club members' thoughts and prayers go out to all of his family; they will greatly miss him and his weekly quiz.

REGION 2: SCOTLAND NORTH & NORTHERN ISLES

Inverness & District ARS successfully participated in the Ross-Shire Science Festival – themed on Sound and Vision. The most popular part was a QRP CW link passing visitors names and school details between the main hall and another room hosting the main IDARS demonstration. The photo shows Mikey, Doug, MM6DUV and Jamie, MM6GON who did most of the operating.

REGION 3: NORTH WEST

South Manchester Radio Club celebrated the 226th birthday of Samuel Morse on 27 April with a small party and cake. The photo shows the cake, surrounded by members' Morse keys, ready to be cut by the Club Chairman G3SVW.



Furness ARS attended the NARSA Norbreck radio rally, with a club stand demonstrating projects including ARDF receivers, beacons, antennas and restoration of old equipment. Club members were pleased to win the Club Website Shield, which was collected by FARS secretary and webmaster Chris, M0KPW. Nick, G0HIK was the winner of the Bill Sparkes Construction Competition trophy, with his superbly constructed Paraset (see page 74).

REGION 6: NORTH WALES

North Wales Radio Society moved premises six months ago to the Blind Veterans UK site in Queens Road, Llandudno LL30 1UT and has settled in well. There is a station in the club room and the flexibility of using different size rooms for examinations and when larger numbers are anticipated. The station was set up and aerials erected by members for the visiting blind veterans, many of whom are radio hams, who come for respite stays or rehabilitation. Members are in the process of putting up a long wire aerial and are planning on using a drone to facilitate this, which will add more flexibility to the station. Check out the website www.blindveterans.org.uk/llandudno for more information.

REGION 7: SOUTH WALES

Blackwood Radio Club took part in promoting amateur radio at Caerphilly Library. The event was organised by Gwent Organisation of Voluntary organisations and was well attended by the public. A big attraction for visitors was sending their name in Morse code and one of Blackwood members receiving it and telling the name they sent, wihch led to them wanting to know more about amateur radio. Club members were amazed how quickly visitors learned to send Morse for the first time. Thanks to the RSGB for supplying the posters and handouts. The photo shows (l-r) Andrew, MW0HYV, Wynn, GW8UAM, Rob, MW0CVT and Tony, 2W1EUR.

REGION 8: NORTHERN IRELAND

The Bangor & District ARS annual construction competition took place in April. Many excellent items were on view from a number of inventive and competent constructors. First prize went to Norman, GI3YMY for his reflectometer. Second prize went to Jack, GI3TZB for an inductance meter and third prize also went to Norman, GI3YMY for his power supply.

REGION 9: LONDON & THAMES VALLEY

In April, Michael, G0POT did an online presentation for **Chertsey Radio Club**, sharing his experiences and expertise in SOTA activation, operation and top tips on keeping safe whilst having fun. Michael did a great write up to go with his video at http://peanutpower.co.uk/sota

At **Verulam ARC's** meeting in April, Alex, M0UKR gave a talk entitled EME - One Ham's Journey to the Moon and Back. He explained his approach to his EME project and how he addressed the technical challenges of contacting other radio amateurs using moon bounce (EME). With over 29 DXCC logged, including Japan, South Africa and USA, Alex could justifiable claim to have reached his objectives.

Chertsey Radio Club had an evening out portable at Windsor Castle, working SO-50 and FO-29 satellite passes. Ian, 2E0IPP, Bob, M6FLT and James, M0JFP worked Peter, 2E0SQL on SO-50.

REGION 10: SOUTH & SOUTH EAST

Brede Steam ARS would like to congratulate Brian, M6YBM on passing his Intermediate exam in April. Thanks to Martin, M0MJU and Steve, M0SSR and the Exam Department of the RSGB. Brian is now looking forward to moving on to the Advanced training and taking his exam. A new weekend course for the Foundation training is due to start in June, contact m0nuc.bsars@gmail.com

Horndean & District ARC ran the latest Foundation and Intermediate licence classes this Spring. In the April exams, the Foundation student and all four Intermediate students passed. Congratulations to Liam, 2E0WYY, Bill, 2E0WGK, Jean-Paul, 2E0UKB, Rob, 2E0OCS, and Simon, G0IEY. And thanks to assessors and trainers Roger, M0KWN, Simon, G0IEY, Russ, G4SAQ and Ken, G0JWL.

REGION 11: SOUTH WEST & CHANNEL ISLES

Debs Brotheridge and Stewart Harvey recently passed the Foundation exam with flying colours at **Riviera ARC** in Torquay. The club is keen on training new hams at both Foundation and Intermediate levels to bring new blood into the hobby. They are also keen in trying to encourage more YLs into the hobby. Debs' husband is Phil, 2E0WZP.

REGION 12: EAST & EAST ANGLIA

Despite being held over the Easter weekend, the Essex Skills Night was once again very busy. On display was a 10GHz demo by Graham, G8HAJ, Radio Direction Finding with Roy, G4JAC, a digital voice hotspot, **Essex CW Club** and an SWR bridge construction project made by Alan, M0IWZ. Both Chris, M6EDF and Essex Ham ran demonstrations on how to track high altitude balloons, whilst Mike, G4NVT (seen in the photo, right) and Ed, G8FAX constructed and tested a Colpitts oscillator on the back of an Easter egg packet.

In support of St George's Day, over 20 members of Essex Ham gathered in Galleywood, near Chelmsford in April. Seven stations were active using the callsign of GB1STG. The event was used as a training exercise to help several members to test out their summer portable kit, try new modes and set up different types of antenna for the first time. Several members of the public wandered over to find out what the antennas were all about. The team also made a live 2m linkup to online radio station Radio Emma Toc to promote the day's activities. The photo shows John, G4LTH, running the 80m SSB station.

Keen to spread the word about amateur radio, a small team from **Essex Ham** visited Tech City-on-Sea in March, an event where technology firms showcase their latest gadgets. Later in the month, Nick, M0NFE manned the group's table at the Essex Skills Night to demonstrate data modes, RTL dongles and a Raspberry Pi video player. Congratulations to Nick, M0NFE, who has recently become engaged to fellow Essex Ham member Majbritt, M6YAX.

Members of **Colchester ARC** were treated to a very informative talk on the ARRL DX CW Contest. Jonathan, G0DVJ and Mike, W0MU were licensed in February as V31M in Belize. Their contest efforts set out to work as many US States and Canadian provinces possible over the 48 hours. There were some 2,653 contacts and they chalked up a score of some two million points! Jonathan showed the club members how the setup for the expedition worked. Liz, M0MDL said it was her furthest ever CW contact.

Members of **Braintree and District ARS** made use of the excellent kitchen facilities at their new clubhouse, St Peter's in the Fields Church Hall in Bocking, and enjoyed a sausage and mash supper. In between courses, arrangements for the club's forthcoming programme of events was discussed, including Mills on the Air, GB2AWM in May.

Thames Amateur Radio Group enjoyed a lecture from Gary, M0ICG on the subject of WSPR; Weak Signal Propagation Reporter. He set up a live feed using the SOTABEAMS WSPRlite box connected with an antenna at one end and a computer at the other. Members were able to watch contacts being logged all over the world via the large screen display. *[There's a review of the WSPRlite on page 42 of this edition — Ed.]*

On 9 April, over 1000 runners took park in the Maldon Bubble Dash, in Essex. This 5km fun run involved running through inflatable bubble stations set up along the route, raising money of Essex-based Farleigh Hospice. Radio comms for the event was handled by Essex RAYNET, who made use of a 70cm repeater for communication to seven operators around the course. The group also provided non-amateur handsets for the event organiser and the British Red Cross.

Peterborough & District ARC held its AGM in March, with a good attendance by club members. After reports from the chairman, secretary and treasurer, the committee was re-elected plus two new members – Tony, G0IAG as publicity officer and Peter, G6AYU as events controller. The AGM closed with the presentation of the Frank Brisley Trophy. This trophy was sponsored by the family of the late Frank, G4NRJ, a past secretary of Peterborough club, to the member who the committee felt had contributed most to the club in the previous year. This year there were joint winners, Peter, G6AYU, and Tony, G0IAG known as the Events Team.

REGION 13: EAST MIDLANDS

In March members of the **South Kesteven ARS** assisted cadets from the ATC Grantham (47F) during this year's Exercise Blue Ham. Members brought along various radios to supplement the existing equipment, including some military 'Clansman' radios allowing cadets, some of whom are members of SKARS and staff to take part and making numerous contacts over the weekend.

The next deadlines for Around Your Region are 25 May (July edition), 22 June (August edition) and 27 July (September edition)

Classified Ads

For Sale

FIBREGLASS TUBE
High strength tube, square box, rod, and other sections stocked in 6m lengths, can be cut. Engineered Compositions, Chester. Tel: 01244 676000 e. info@engineered-composites.co.uk www.engineered-composites.co.uk

SINOTEL UK - AUTHORISED UK
importers of Baofeng & TYT handhelds, Xiegu X108G HF transceivers. Accessories, antennas and more. www.sinotel.co.uk, 01926-460203, sales@sinotel.co.uk

CTCSS ENCODER AND DECODER KITS,
DTMF Kits and Modules, PIC Microcontroller Development Kits. www.cstech.co.uk

THE NEW N3 USB RTL-SDR from Thumbnet. Optimized for low noise. Linear regulators, better decoupling, improved heat dissipation, +/-0.5ppm TCXO, 5V input etc. For more information on this, our other SDRs and accessories go to www.technofix.co.uk or technofix.uk

LINEAR AMP CHALLENGER 1500 WATTS,
£900, ICOM 756 PRO 3, £600, Tennadyne LP8 HF BEAM £350, YAESU G650 ROTATOR £175, G1000 (FAULTY) £150, KENWOOD EXT SPEAKER £100, KENWOOD PS430 PSU£100, ALL VGC, ALL ARE OFFERS OVER. please email for massive list of gear. contact bob G3WTN 0034689291753 Email alicantebob@hotmail.com

Cards & Design

QSLERS SPECIAL OFFER
1000 full colour both sides qsl cards £45 plus postage. 07720 580968 www.QSLers.co.uk

LOW COST AND HIGH QUALITY QSL CARDS
By LZ1JZ QSL PRINT www.LZ1JZ.com

QUALITY QSL CARDS 4 colour cards from £34/1000. For samples /enquiries /easy payments contact Charles MØOXO, 60 Church Hill, Royston, Barnsley, Sth Yorks S714NG ; Tel 07900 500775 Email charles.wilmott@m0oxo.com/ Web www.ux5uoqsl.com/

Aerials

M0CVO 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

WESTERN HF 10
67ft wire dipole 160-6m, full details lookup m0bzi at: www.qrz.com buy direct: m0bzi@outlook.com or 07748331458 reviews at: 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

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
Email: martin.stokes@hotmail.com or Tel: 07825549430

NEW. QYT KT8900D 2/70 25/20w
base/mobile, 200 memories, CTCSS etc only £89.95. TYT MD380 DMR £109.95, MD380 spare Li battery £12.95, MD380 speaker mic £12.95. Free next day delivery. Mirfield Electronics, 07825549430 www.mirfield-Electronics.co.uk

HAMTENNA UK
Manufacturers of Antennas, Baluns, Ununs and suppliers of antenna wire and accessories. Checkout Hamtenna.co.uk

Wanted

VINTAGE RADIO & VALVES WANTED
national cash settlement for silent key, shack clearouts 07552 678725, vintageradio@btinternet.com

Miscellaneous

ALL UK STATIONS – CALL IN ON OUR 'M1CRA' CHRISTIAN NETS!
WACRAL welcomes all amateurs & listeners to our Sunday morning 'GOOD NEWS' nets, now at 07300-0830 on 3.747 MHz +/- QRM and, again, at 14.00-15.00 on 7.147 MHz. Our 2m SSB net at 15.00 is held on 144.205 MHz. Or, do join us on Wednesdays 07.30 3.747 MHz +/- QRM, 10.00 on 7.147 MHz (if no contact established after 5 mins QSY to 3.747 MHz and 21.30 on 3.751 MHz, for nationwide Christian fellowship and relaxed chat. All times UTC. See www.wacral.org for more net info and WACRAL details or just call Ian G4OPP on 01622 746650 or g4opp@wacral.org

VINTAGE FIREWORK COLLECTOR
will pay cash and collect from anywhere call Tony - 07956 506300 Licensed explosive storage

Equipment

REPAIRS TO RECEIVERS, TRANSMITTERS
New/Old, valve/transistor. Call 07903 023437 for details: www.kent-rigs.co.uk

RADIO REPAIRS BY M0NKL
Icom, Yaesu, Kenwood etc, plus linear amplifiers, please contact Nick on 07770 397668 or email np262@yahoo.com

Computer Software

SD CONTEST LOGGER, €20 - EI5DI.COM
Supports RSGB 2017 rules. SDX - free Special-Event logger.

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) should be sent to: Chris Danby, G0DWV, Danby Advertising, Fir Trees, Hall Rd, Hainford, Norwich, Norfolk NR10 3LX
Tel/Fax 01603 898 678
e-mail adsales@rsgb.org.uk

Business Cards

Advertisers Index

Club of the year

1st place large club winners

Trying out Morse code at GB0HL.

GB0CMS for International Marconi Day.

The six clubs that won the 1st to 3rd placing in the large and small club categories for 2015, presented at last year's National Hamfest, all showed the judges just what it takes to make a club shine. Here's the story of the first-placed large club.

Norfolk Amateur Radio Club has put 40 candidates through courses and exams at all levels in 2015 with the help of their 16-person training team. Over the year they trained and examined 24 Foundation candidates, 11 at Intermediate and held Advanced exams for 4 persons who were self-taught through distance learning.

The club also organised and hosted a Train the Trainers day for 26 trainers from many Region 12 clubs in May 2015

Special event stations were held throughout the year at many locations chosen to promote amateur radio to members of the public. Examples were when 20 club members participated in International Marconi Day from Caister on Sea Independent Lifeboat Station, Norfolk. This being the original site of an early Marconi transmitting station used for communication with the local lightships. Two stations made 240 contacts in 36 countries worldwide. During the summer, 15 club members maintained an amateur radio presence at Weeting Steam Rally, a major public event in the Norfolk calendar of public shows.

The club activated Happisburgh Lighthouse for International Lighthouse & Lightship Weekend. This is the only independent lighthouse in the UK owned and operated by a charity. Six club members operated HF and VHF making many contacts with other lighthouses and lightships. The lighthouse was also open to the public, which gave rise to interest in the amateur radio activities as they waited to climb the lighthouse.

Two major events in the year involved young people, notably working with the Norwich Schools Consortium to bid successfully for an international Space Station (ISS) link in 2016.

At GB2NSR (Norfolk Scout Radio) club members showed Scout groups how to run a Jamboree On The Air (JOTA) station, offered to train leaders (and Scouts) to be licensed and helped leaders with their Scouts complete their Communicators' badge. As you would expect, many contacts were made but the highlight was a contact on HF into Swaziland.

Continuing with the theme of encouraging young people, the club continues to run the monthly dedicated youth group BrightSparks through which youngsters aged 9 – 11 created and constructed electronic projects under supervision.

For the wider benefit of amateur radio the club decided to contribute to sponsoring the K1N Nevassa Island DXpedition 2015 (voted DXpedition of the year 2014-15). This was done to both assist with expedition costs and thus help enable amateurs worldwide to have contact with this rare location. To show the hobby benefitting the wider local community, the Club annually nominates one or more charities to receive proceeds from special promotional fund raising activities. In 2015 the chosen charity was the Norfolk Air Ambulance service that received £445. A sum of £700 was also donated in respect of the Mens' Health Movember campaign.

Formal Morse training is provided through the GB2CW Morse programme with 4 club members acting as tutors covering 3 broadcasts per week. A full weekend of concentrated Morse classes for all levels was also held for club members.

Every year, in July, NARC organises an annual Radio Rally at Barford, in Norfolk. This typically attracts around 300 visiting hobbyists to a number of trade stalls plus car boot style sales with refreshments, Bring & Buy plus other related stalls and activities.

NARC ran a 'RadioActive' event to accompany CW NFD (National Field Day) in order to attract a wider attendance of club members. This involved a series of talks, demonstrations, construction practice and social events for members and their families. Around 150 members and their families attended in addition to the 15 members operating the NFD stations.

The club also holds a monthly SSB sked with Koblenz DARC K32 Club members in Germany, the European twin city to Norwich. This sked is occasionally joined by a local Scouts group radio station operated by club members enabling some of the Scouts to make contact with Germany in the persuance of their Communicator badges. Exchange visits have been made and in 2015 several members from NARC met with Koblenz members at the Friedrichshafen Hamfest.

A construction competition entry.

Regional winners of the 2016 Club of the Year competition, kindly sponsored by Waters and Stanton, were announced at the AGM in Cardiff on 22 April. Details can be found in RSGB Matters. The top three small and large clubs will be announced later in the year.

FREE MEMBERS' ADS OF UP TO 40 WORDS

Email your Members' Ad to 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).

FOR SALE

10m ADAPTAMAST in perfect working order. Incl rotator cage & rotator, £450. Buyer collects. Steve, G0JFM, 01394 461 244 (Eyke, Suffolk).

18AVQ VERTICAL ANTENNA, five band 10, 20, 40, 80m. Used for 1week only from new. Full instructions and boxed. Sell £130. Stuart Bradshaw, G3WEJ, 0770 784 4031, bradlys@uwclub.net (Dawlish).

5 BAND COBWEBB ANTENNA. I have a 2 year old Cobwebb antenna for £75. I have dismantled and can post to UK for £12. If you wish to collect, OK. Peter Wilson, G8KEK, 0778 837 1745 (Herts).

AERIALS SALE. Sirio CX4-68 3/4 wave 4m vertical, cost £60, sell £38 plus £10 delivery. Sandpiper 70cm Slim Jim, cost £25, sell £15 plus £3 p&p. M0CVO HW-20HP off centre fed dipole. Covers 20-6m, cost £44, sell £27 plus £3 p&p. John, G3EGC, 01204 301 502, jvhoban@gmail.com (Bolton).

ALINCO DX-R8E communications receiver in very good condition. With power lead and original manual but no box. Will still be very well packaged if delivery is required. Happy for buyer to collect and/or try before purchase. £270 + postage. Andrew Lambert, G7JAF, 0778 750 2277 (Sheffield).

CLOSING DOWN. Yaesu 2000 (with 10ft cable to PC), £1,100. AMP Ranger 811H (RCA valves), £750. Both as new, with original items unused. Includes UK delivery and insurance. Many other items, list on request. Gordon, G3MDM, 01980 862215, g3mdm21a98@yahoo.co.uk (Salisbury).

COLLINS 180L-3 auto antenna tuner. Vintage aircraft ATU for end-fed antennas 2-25MHz. Remarkable components including 1000pF Jennings vacuum variable and wound silver tape motorised inductor. See G3YNH website for info. Good condition inside and out. £80. Dick, G3VKT, dick.smith@combpyne.com (London W4).

EAGLE GAP vertical antenna, complete with manual, dismantled ready for collection (you will need a roof rack), £80. George, G4EUF, 01509 550 269, george.mayo@ntlworld.com (Leicestershire).

ELECRAFT K3 100W transceiver, KPA3, KAT3 ATU, KFL3A-2.7K SSB filter, KFL3A-500 CW filter, KXV3A transverter interface, MH-1 mic, £1,850 including shipping to UK mainland. Dave, G4FRE, g4fre@g4fre.com (Malvern).

HEATHERLITE EXPLORER 1200W linear amplifier. The amplifier has just been serviced, it covers all bands from 80 - 10 inclusive. Cost £800 or near offer. Buyer must collect due to weight. C James, G0GFY, 0208 689 5149 (Croydon).

HONDA 2.8KVA LPG generator model EM3100CX, 110/230V. Ideal for powering electronic equipment. Bought for emergency use, but never required. Has only ever been test run. Might suit contest group. Space required so must sell, £300. Buyer to collect. Ray, G3NKL, 01772 784 997, ray@rayjones.me.uk (Preston, Lancashire.)

ICOM IC-202E, mint condition. Original packaging with all accessories, even the original unused batteries, plus 9 Maplin 2800mAh rechargeables (cost about £60). Even the protective plastic is in place. £250, buyer to see working and collect. Ian J McGarrigle, G4JIU, 01375 643 850, ijmcgarrigle@hotmail.co.uk (Basildon).

IC-7100 HF/VHF/UHF transceiver, mint condition, hardly used, £775 ONO. Kenwood TS-940S with extras installed, perfect condition, £475 ONO. Both with original packaging and accessories etc. G4GZS, 0785 991 7317, keith4gzs@hotmail.co.uk (Rugby).

ICOM IC-7000 used only on 2m SSB from home location, £700. Mint condition, fully working on HF into dummy load. With microphone, original manual and power lead. Prefer buyer inspects and collects, or carriage at cost. Mike, G4OQG, 01249 443 037, g4oqg@hotmail.co.uk (Wiltshire).

ICOM IC-701 transceiver with all manuals, £250. Radio Shack DX-394 receiver with copy manual, £175. Yaesu FC-301 antenna coupler with manual, £100. Hustler 5 band antenna 80-40-20-15-10 with manual, £100. Roger, M3RHL, 0772 255 6642, sandra.lookeruk@btinternet.com (Surrey).

KENPRO KP-100 electronic keyer, £70. Katsumi MK-1024 message keyer, £80. Yaesu YD-148 mic, £45. Hansen FS-710V V/U power meter, £55. Nigel, G4KZZ, 01723 890 786, nipro@btinternet.com (N Yorks).

KENWOOD TS-450 HF transceiver, tested, boxed, MC-43 mic, manual and power cable, £300. This radio is being sold on behalf of an amateur's family due to ill health by Nunsfield House Amateur Radio Group. G3EEO, 07885 430 538, sec@nharg.org.uk (collection from Derby).

KENWOOD TS-590SG, mint condition, original box and cover. Pet free/non-smoking environment. Just over year old, hardly used (4-5 hours max). Very reluctant sale, now mobile only. £750 ono. Prefer collection. Mike, 2W0SYS, 0759 092 4823, michael.k.styles@live.com (Chepstow, S Wales).

KENWOOD TS-950SDX high grade transceiver with mic and RM1 remote keyboard, £800. Kenwood MC60 desk mic, £50. Telequiment S32 'scope, £20. KW EZEE Match, £40. NCX5 project, complete, £200. Buyer collects or carriage at cost. Dale, G3XBY, 0759 044 2251, g3xby@yahoo.co.uk (Solihull).

LINEAR AMP CHALLENGER 1500W, offers over £1000. Tennadyne T8 LP beam, offers over £300. FC-102, £100. Yaesu G650, £175. All VGC. Items are in Spain, will ship on sale at cost. Bob Limehouse, G3WTN 0034 689 291 753, alicantebob@hotmail.com (Spain).

LINEAR AMP UK DISCOVERY, 2m amplifier, the GS31B version, a claimed 1.2kW maximum output from 100W drive. Only used by me to 600W. In excellent condition, original box, manual and a new boxed spare valve. Collection preferred, but I travel to Merseyside regularly so could meet. £750 ono. Andy, GD1MIP, 07624 412 711, GD1MIP@manx.net (Isle of Man).

MICROWAVE MODULES 4m Rx converter, 28MHz IF £10. LF converter 10 – 150kHz input, 10MHz IF, £10. 6m transverter, 1W o/p, 144MHz IF, £20. RF Space IQ SDR Rx, as new, boxed £100. All items plus p&p at cost. Stuart, G8CYW, 0191 413 8400, stuart.wisher@talktalk.net (Tyne & Wear).

MILITARY NO 19 SET Mk III. Circa 1942, by Northern Electric, Canada. English/Cyrillic lettering. Sender/receiver, 12/24V supply unit, variometer, carrier with safety bars, canvas cover, headphones, microphone, 12ft whip aerial in three sections, aerial mount (clamp-on). £575 ONO. Russell Tribe, G4SAQ, 01489 785 782, g4saq@sent.com (Southampton).

NAVAL WW2 RX. Impressive rare double superhet 50kc/s to 30Mc/s type DST 100 Mk 3. Full details available, £110. Collect Newquay or possibly Bournemouth. Hallicrafters SX23 Rx, complete, £35, will post. M0BGA, rcry100@yahoo.com (Newquay).

QTH SALE complete with 60' Versatower with planning permission, PST medium duty rotator and controller, 3-ele SteppIR antenna. All complete and in good working order. Proven good HF location for many years. It comes complete with a 4 bedroom semi-detached house on Thistle Grove, Welwyn Garden City, Herts. The property is in need of modernisation. Viewings welcomed and recommended. This is a silent key sale for the estate of G4LFB. Offers over £365,000. Colin White, 0786 031 9970, codicuts@hotmail.com.

R1155N (includes 160m). This was modified in the late 1960s to remove the DF circuitry and add in a PSU, output stage and S-meter. The radio works and is complete but needs restoration. Collection or maybe meet up. £50. Chris Milner, G3ZJK, 01788 810535, chrisjlm@runbox.com (Rugby).

SK SALE BY FAMILY. Yaesu FT-DX5000MP/SM5000, boxed, instructions, £2,650. FT-101E, YO-100, matching speaker, Magnum Two transverter, instructions but no mic, £330. FT-2100B HF linear, instructions, £330. Trio TS-120S plus MB-100 mobile bracket, instructions but no mic, boxed, £195. LDG AT1000-Pro auto ATU, boxed, instructions, £359. Also 4x desk microphones, 2x CW readers, PSUs, other misc station items – email for list, juliet.brough@googlemail.com. Equipment located in NE Cheshire.

TWO VHF UHF FM SCANNERS, BNC, Uniden, Realistic 400 Pro 2006, £35 each plus P&P or buyer to collect. Gordon Edge, G4PDV, 01732 605 215 (Kent).

YAESU FT-1000mp Mk5 200W HF transceiver (includes 5MHz). YF110SN and YF114SN narrow SSB filters fitted. FP29 PSU, SP8 speaker with filters, MH31 mic. Excellent condition, original boxes, manual. Prefer buyer inspects and collects; could deliver or meet part way. £995. Graham, G8BZL, 0779 931 2939 (Hove).

YAESU FT-817ND with internal bhi DSP adjustable filter and Collins YF-122C 500/2 filter, boxed, complete with case, £395. Hi-Mound HK-709 key, boxed, never used, £45. Mirage BD-35 144 / 440MHz amplifier with up to 45/35W out from 2-6W in, boxed, £80. Peter, G4RZG, 0780 192 0940, peterst.barbe@hotmail.co.uk (Kings Lynn).

YAESU FT-840 HF transceiver inc optional FM board and XF-112C CW filter, £350. Manson EP-925 25A PSU, £70. Yaesu FC-700 ATU, £100. All items VGC, boxed with manuals, clean, little used for back up, good for first station, plus post. Nigel, G0BNR, 0786 683 9751, druzhba100@hotmail.com (Huntingdon).

YAESU G1000DXC rotator, controller, rotator, cage, TA33 jr 3-ele beam, £275. Buyer collects. Graham Buttterfield, M1EEN, 01692 651 260 (Norfolk).

WANTED

70cm LINEAR AMPLIFIER, ideally 100W or more, requiring drive of no more than 20W. 50W amp also considered. Price negotiable depending on type, condition etc. Charlie, G0SKA, 0777 162 5441, email g0ska@mac.com (Slough).

COLLINS 618T-3 transceiver: any condition but hopefully complete. M0KNT, 01483 563 863, kennethgray@btinternet.com (preferred) (Guildford).

EDDYSTONE PLUG-IN CRYSTAL UNIT for Eddystone 1004 Sentinel Reserve receiver. Eddystone part number LP3329. Jonathan, M0ZGB, 0789 409 0423, m0zgb@btinternet.com (Swindon).

FOR THE CODAR CR-66 RECEIVER. I am looking for any copies of the original assembly documents, circuit diagrams, notes, etcetera for the kit version of this Rx. Dale Haines, G4IPZ, 01959 574 107, dale.haines@btinternet.com (Kent).

FOUR METRE (4m) LINEAR AMPLIFIER similar to type Pye A200E. Must be capable of 50W RF output. Also wanted, 10m, 28 ~29.7MHz all mode (FM /SSB) mobile CB-type transceiver. Brian, GW0GHF, 02920 703 429, b.williams538@gmail.com (Cardiff).

ICOM IC-DELTA100H tri-band VHF-UHF-SHF transceiver. Fair price paid for working unit in good condition. I have a UK ship-to address. VE7MM/G4EZG, 001 250 754 2021, martinmac@shaw.ca (Nanaimo, British Columbia).

MSM5524 readout/timer chip. Alan Jefferys, GU4RUK, 01481 721 009, gu4rukalan@cwgsy.net (Guernsey).

PHOENIX TELEPHONES. Anything made by this company, what have you? Godfrey, G4GLM, 020 8958 5113, cgmm2@btinternet.com (Edgware).

PLEASED TO PAY good price for Bird 43p watt meter with 2-30MHz slug. Bird H elements and Bird 43 accessories, including cases also wanted. Ross Threapleton, G4PEL, 0783 652 5824, g4.pel@virgin.net (Lincs).

VARIABLE CAPACITORS. 2x split-stator caps around 38pf+38pf each for September's *PW* Aerial Matching Unit. 1x air spaced 250pf variable cap. 1x air spaced 500pf variable cap. I will pay for the capacitors plus postage and packing costs. Brian, G8NHN, 0779 285 9886 (Manchester).

YAESU CPU2500 2m FM transceiver with keyboard mic. Must be in excellent working condition. Ray, G6AUW, 0790 9383 475, g4owy6@gmail.com (Weymouth).

YAESU SP-101B external speaker. Fair to good condition please and working. Photo via email if possible. Mick, M0GWD, 02392 366 699, m0gwd@fparc.org.uk (Portsmouth).

SPECIAL EVENT STATIONS

These callsigns are valid for use from the date given, but the period of operation may vary from 1-28 days before or after the event date. Details published here were kindly provided by Ofcom on 21/4/17.

Date	Callsign	Event Phonetics	Main Station City
01/06	GB4LL	GB4 Leasowe Lighthouse	Wirral
	GB0CRC	Castle Rising Castle	Castle Rising
	GB0ROC	Royal Observer Corps	Ballywalter
	GB4ROC	Royal Observer Corp	Brixworth
02/06	GB6GEO	Geo Park	Devon
03/06	GB4NR	Newbury Radio Rally	Thatcham
03/06	GB1SCW	Shoreham Coast Watch	West Sussex
04/06	GB1SOE	Special Operations Executive	Bletchley Park
05/06	GB2HBT	Heavenly Body II	Leigh-on-Sea
10/06	GB2CAM	Cranwell Aviation Museum	Sleaford
12/06	GB0AFD	Armed Forces Day	Bishop Auckland
13/06	GB5GFW	Gressenhall Farm Workhouse	Dereham
14/06	GB2NCM	National Coal Mining Museum	Wakefield
15/06	GB4CTM	Coventry Transport Museum	Coventry
16/06	GB1HA	Headcorn Aerodrome	Kent
	GB2SRM	Stephenson Railway Museum	North Shields
	GB0FFP	Flag Fen Peterborough	Peterborough
	GB6CHM	Golf Bravo Six Charlie Hotel Mike	Cullompton
	GB0PAM	Parham Airfeild Museum	Suffolk
17/06	GB1MSM	Manston Spitfire Museum	Ramsgate
	GB0GHM	Glenside Hospital Mesuem	Bristol
	GB2BM	Bay Museum	Canvey Island
	GB1JSS	June Summer Solstice	Chelmsford
	GB4GLM	Gloucester Life Museum	Gloucester
	GB1SOE	Special Operations Executive	Newport
	GB2KGE	Kempton Great Engines	Hanworth
	GB6AR	Amerton Railway	Stafford
	GB0PIT	Zero Papa India Tango	Manchester
19/06	GB0USR	United States rangers	Carrickfergus
20/06	GB5AFD	Five armed forces day	Lincolnshire
21/06	GB6LQK	1st Methodist Club Call	Huddersfield
22/06	GB2CS	Golf Bravo 2 Charlie Sierra	Knutsford
23/06	GB0APS	Abbey Pumping Station	Leicester
	GB2HFF	Hardon Feast and Fayre	Hordon on Hill
	GB1RAS	Robertsbridge Aviation Society	Silver Hill, Robertsbridge
24/06	GB0BCG	Barr Castle Galston	Galston
25/06	GB2HCP	Hadleigh Country Park	Hadleigh

UP FOR GRABS

FREE TO A GOOD HOME: FT101ZD. Risen from the dead! Works all bands, but could use some additional TLC. Prefer buyer collects, but will help with transport up to 40 miles. Ian Douglas, G3NID, 01480 468 693, iandouglasg3nid@aol.com (Houghton, Cambs).

SILENT KEYS

We regret to record the passing of the following Members:

Mr K A Jones, G0IUI	02/2017
Mrs B Jackson, G0NYL	04/2017
Mr J Brown, G0OGG	04/04/2017
Mr G J Chilton, G1JPS	02/2017
Mr D L J Spalding, G1JQH	24/04/2017
Mr F E Springate, G3BWV	10/04/2017
Mr G T Mortimer, G3DQG	15/03/2017
Mr J H Halman, G3JNP	26/03/2017
Mr H R Morris, G3MUJ	28/03/2017
Mr D A Darwood, G3YKO	18/03/2017
Mr B Bond, G3ZKE	02/04/2017
Mr D H Speechley, G4UVJ	04/04/2017
Mr C W Rodgers, M0BIN	30/03/2017
Mr N Graham, M3UNG	24/03/2017
Mr E Meth, VE3EI	04/04/2017

RALLIES & EVENTS

Members of the RSGB Regional Team will be present with a bookstall at the rallies this month marked with an RSGB diamond.

If *your* rally or event is not listed here,
PLEASE SEND US FULL INFORMATION
by email to radcom@rsgb.org.uk

4 JUNE
SPALDING & DARS ANNUAL RALLY

The Sir John Gleed Technology School, Halmer Gardens, Spalding, Lincs PE11 2EF. There is free car parking on site. Doors open at 10am. There will be trade stands, an outside car boot area and there is catering on site. Details from John, G4NBR on 0794 630 2815 or Graham, G8NWC 0775 461 9701, or via rally-secretary@sdars.org.uk. [www.sdars.org.uk].

4 JUNE
21st RED ROSE QRP FESTIVAL

The Rose Centre (Lowton Civic Hall), Hesketh Meadow Lane, Lowton, Warrington WA3 2AH. There is easy access from all directions M6, M61, M60 and A580. The venue has large spacious halls at ground level with free car parking.

Rallies listing continues on page 75

RSGB AGM

Rob & Mo Evans, MW0CVT & MW0TTU

After attending the AGM at The Angel Hotel in Cardiff, we would like to thank and congratulate the RSGB for a well run and friendly event. We had never visited an AGM before and was expecting it to be a little on the heavy side with a lot of legal and financial jargon; this was not the case and proceedings went very smoothly.

Lunch was excellent and the afternoon talks were a good balance.

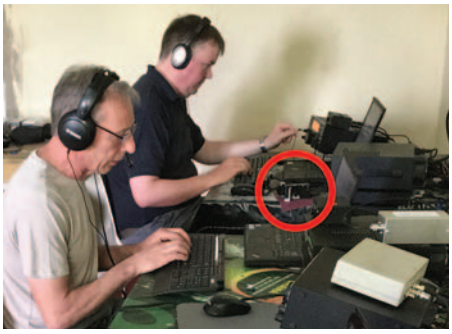
Thanks again for a good day; we will not hesitate in attending another AGM.

MORSE KEYS

Donald Radley, 5B4AGQ

How much I agree with the letter from Ray, G4OWY. You just have to look at the HF pictures on pages 54 and 56 of May *RadCom*. As they say every picture tells a story, not a Morse key in sight! After 50 years of being a radio amateur there's no key board at this station just a few Morse keys and a mic when necessary. Old fashioned, yes, but keeping up with tradition.

To set the record straight, 5B4AGN (p 56) had a twin paddle key between the radio and what looks like a PSU; when I look closely



at the original of the 9G5X photo (p 54) I think *I can see a paddle at the furthest op's position, though I wouldn't swear to that in court. It does however look very much like a black version of the paddles clearly visible on this month's cover, which shows Rob, M0VFC working on the C6APY DXpedition. That team made 2652 CW QSOs out of a total of 9072, so CW is alive and well!*

Giles Read, G1MFG

RadCom *Technical Editor*

ONE FOR THE LIST?

Peter Ball, G3HQT

In view of the downwards trend of the sunspot cycle (and in the spirit of recent letters in this column), perhaps it is time to resurrect that old acronym, used by some military radio operators, SNAFU.

It's roughly expanded as 'Signals Noisy And Frequency Unusable' – or words to that effect!

ANTENNA FAULTS

Mike Stewart, G4RNW

I recently suffered from an intermittent antenna fault. On adjusting for a minimum SWR, I found that every few seconds the meter needle would flicker; after a few seconds it would recover – for a while! I have three antennas on a common switch and as all three antennas were showing a similar fault, although much more marked on the doublet, I assumed that the problem must be in the antenna switch or the coax leads, items common to all three.

Having drawn a blank in that direction, I then resigned myself to investigating each antenna separately. I have, as stated, three antennas; a doublet fed with 300 ohm twin via a dual balun, by RG-213 coax to the rig (A comudipole, ref: G3LDO) an end fed long wire and a HyGain five band vertical. I have a common RF earth for the benefit of the long wire, the vertical, plus also my two ATUs and the rig, but of course the doublet, although it doesn't require an RF earth, it is in fact earthed, as the coax lead to it is also connected to the common earth as its final connection is unbalanced. The fault as it turned out, was a poor connection to the 'T' connection to one arm of the dipole. On fixing this item, the fault disappeared, plus it also disappeared *on the other two antennas*.

Accordingly, it would appear to me that there is some sort of interaction between the various antennas, due to their common earth. Asking around I have so far not been able to find anyone who could shed some light on this phenomenon. Not being particularly technical I am at a loss to understand what is happening. Any ideas, anyone?

PRICE DRIVEN COMPETITION

Dr M Foreman, SA6BID / G7LSZ

Regarding the letter written by Bob, G3ASE (April 2017). Years ago I had the idea that we should have a new class in radio contests: one in which the *price* of the radio equipment is limited, not the power level.

For example, a contest could have three classes: Homebrew, a £1000 class and an Unlimited class. To stop the unlimited class stations drowning out the smaller stations each HF (or VHF) band would have an area that would be off-limits to the Unlimited class stations during contests. I have no idea if £1000 is the right limit or not, maybe the limit should be set somewhere else. Another idea is that in a contest the different people make contacts and earn points, but at the end the points are divided by the cost of the rig used. Whoever gets the most points per £ in the contest would get a special prize. The person with a £100 rig who scores 100 points to me is more of a winner than the person with the £4000 rig who scores 2000 points.

MARITIME MOBILE KNOWLEDGE

Paul Heiney, M0HWV

Has anyone got any expertise in maritime mobile?

One of my pastimes is ocean sailing, to which I have recently added amateur radio by getting my Full licence thanks to the excellent service provided by Steve Hartley's gang at Bath Distance Learning. I would be interested in hearing other people's experience of amateur radio afloat, and the operating methods they use.

[Please get in touch via the RadCom *editorial address, radcom@rsgb.org.uk, and we'll pass messages on – Ed]*

OFCOM AND INTERFERENCE ISSUES!

Prof Mike Ayres

Some time ago I contacted Ofcom regarding interference I was experiencing on 144MHz, an issue which is still persisting. As instructed by Ofcom I completed a log regarding the interference. The interference indicated S9 on my S-meter, which is equivalent to about 50 microvolts at the receiver input. This level of interference is present 24 hours a day so maybe persistent? This covers the entire band and beyond. The result of my log? Case closed! Why? My log does not demonstrate harmful and persistent interference. So what *is* harmful interference? As the definition by Ofcom, because I can use another band, by their definition it is not harmful interference! Has anyone else received this sort of reply and outcome? I'm sure Ofcom receive funding from the government although not actually a government department. Now being old and stupid, I think the more cases Ofcom get and they can say case closed without doing anything the more money they get as they are doing such a great job! Cynical but I think true!

POOR HF OPERATING

Terry Steeper, G7JFI

Another weekend and yet another HF contest and yet more examples of the poor operating practices that these events seem to bring out in the operators. These people are supposed to be educated in the proper use of radio, but they have no regard whatsoever for anyone not in the contest.

As you probably know, 14.230MHz is one of the most used slow scan TV (SSTV) frequencies and there are just a *few kHz* set aside in the band plan for this mode.

Letters published in 'The Last Word' do not necessarily reflect RSGB policy. 'Last Word' letters may be emailed to radcom@rsgb.org.uk Please note that letters submitted for 'The Last Word' may not be acknowledged. The RSGB reserves the right not to publish any letter, with no reason being given. It is a condition of publication that all letters may be edited for grammar, length and / or clarity. Due to the limited space available, please keep letters as short as possible.

Most of the signals heard are analogue, not digital, meaning there is no error correction or redundancy of data. SSB voice literally just destroys the signal (and picture) in most cases. Our signals are less than 3kHz deviation, so we don't take up much space. The SSTV segment is in the band plan, in black and white. Do the 59 QRZ brigade take any notice? No. Do they even consult the band plan? Probably not. So yet another weekend of no operating for us SSTV users. Plainly there is not enough space on 20m to let any other mode have a go. I know band plans are not mandatory, but the situation is ridiculous as there seems to be some contest nearly every weekend, which means everyone else just has to QSY to WARC or switch off. The contesters certainly don't usually ask if the frequency is in use, and seem to just ignore the SSTV signals that are present. What's more, you won't hear the vast majority of these callsigns again until the next contest!

In an ideal world any station that tramples over another modes segment should be disqualified from the contest – maybe that would make them take notice? Maybe there should be a contest section in the band plans that SSB operators MUST remain within?

Please, can the RSGB take a stance on this and somehow stop the traditional bands being flooded with the 59001 QRZ nonsense so that other amateurs (the majority, I would argue) can play as well? I realise everyone has a right to use the bands, but the situation as it stands is plain ridiculous. 50 watts of SSTV stands no chance against kilowatts of SSB.

CQ TRAINING...

Dave Parkinson, 2I0SJV

I like the world of amateur radio, I like all of which that is included in amateur radio education. One of those is the Morse code. I am trying to educate myself with very little or no success. So my question is, are there any particular resources/books/apps/videos that others have found useful in order to master the art of the dits and dahs as my artwork has become more doh than anything else (!)

I observe the notion that perhaps we need more trainers in this dying skill, is there a skills gap in the teachers of Morse?

[Learning Morse is an individual learning experience and what works for one person may not work of another. Whatever method you choose to learn the basic characters, the RSGB has a service that will help with the practice – GB2CW. The RSGB GB2CW Morse scheme has been running in its present guise since 2006. Although Morse code proficiency is no longer a requirement for the amateur licence these days, radio amateurs choose to learn Morse for a variety of reasons. Some because it's the best way to work DX from a 'challenging' home station location, others for contesting and some… just because. The GB2CW timetable of suitable practice transmissions on the RSGB website at http://rsgb.org/main/operating/morse/certificate-of-competency/gb2cw-broadcast-schedule/ The whole scheme is based on volunteers and there are, at present, around 20 licensed amateurs running GB2CW Morse instruction each week. If you are interested in being a GB3CW volunter, please email Roger Cooke, G3LDI via gb2cw@rsgb.org.uk – Ed]

EMC AND STREET LIGHTING

Roger Bunney, G8ZMM

I read with interest the letter 'EMC and Street Lighting' (January 2017) from John Neary, G0NAJ and perhaps he and other readers might find my own experience of interest.

Some years ago Hampshire County Council (HCC) introduced a new street lighting system that could be remotely controlled for lighting periods and lamp intensity, both over a given area or for specific lighting columns (at a road junction for example). I live on a largish residential estate with areas constructed by different build developers – my own area was selected as the 'new technology test area'. New lighting heads would be installed that would emit a harder, brighter light, though dimming overnight.

Being near the sea I often monitor 156.600MHz, the marine band calling frequency; suddenly one day this frequency became covered with high level noise that remained both day and night. Suffering this problem for several days it was clear the problem wasn't going away and so out into the road with the scanner I went. I eventually established that each lighting column was radiating a 1 second splat – but with *all* columns *also* providing a 1 second splat the 156.400-159.710MHz provided a broad peak of noise with dropping off to ambient noise floor outside of 153.00-159.20MHz. Of course as 156.600MHz is a general calling and distress slot, it isn't good news if the new generation of lighting heads are fitted in a marine environment. The level at my home from a roof mounted discone was at S8.5 on the Icom IC-R7000.

I e-mailed (by name) to the HCC Corporate Manager of the Street Lighting Section, Environmental Department of the HCC explaining the problem of the new experimental lighting experiment, the high level RFI that it has introduced and implications of that RFI should the lighting system be introduced Hampshire-wide. I suggested that 'such interference is unacceptable and would question the EMC integrity and the lighting equipment electronics'. The response was quick and a single lighting engineer met me two days later at a nearby lighting column. He heard the noise, checked inside the column but couldn't establish the fault. A few days later the Corporate Manager and assistant arrived, heard the problem and promised a reaction. Days passed and a phone call came to advise that the lighting column would be checked at night and asking me to meet him at a T junction where three lights with new heads were happily clicking away. At about 6pm on a freezing December night I met up with a cherry picker crane, two lighting engineers and our manager – with my scanner.

They had decided that the fault lay within the head and more likely the photocell atop the head; up went the cherry picker and engineer, the photocell was removed – as was the interference. Replacing the cell and waiting a couple of minutes for the lamp itself to 'strike', the interference returned. Another photocell was fitted of the same type but of an earlier manufacture; after the lamp had 'struck' there was no interference.

The same test was carried out on a second column, confirming the photocell was at fault. Happy faces generally; I was assured that all 40 columns would have their photocells replaced as soon as new ones could be organised. About a week later, on a Saturday morning, all cells were replaced and the interference ceased. The Street Lighting Section were delighted, as finding this problem prior to fitting the systems in marine locations avoided possible serious problems. Hampshire County Council acted responsibly and were very positive throughout the whole experience. Don't deal with your local town council.

I would suggest that John pursues his county authority as I did and press for their attendance in resolving the problem ASAP. As a footnote, detailed information arrived later and it transpired this was a manufacturing problem with specific components fitted within the photocell and that EMC tests would now extend to 300MHz from the earlier 30MHz; all photocells from this manufacturer are now clean!

RADIO SOCIETY OF GREAT BRITAIN

ADVANCING AMATEUR RADIO SINCE 1913

Founded in 1913 incorporated 1926. RSGB is a trading name of Radio Society of Great Britain, a limited company registered in England and Wales with company number 00216431. Member society of the International Amateur Radio Union.

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

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

RSGB MEMBERSHIP

Annual rates from 1 January 2011
Full Membership (by Direct Debit). . . . . £47.00 (individual & club)
Family membership (by Direct Debit). £56.00

Paying other than by Direct Debit attracts a £4 premium.

Student (21-25). . . . . Free
Under 21. . . . . Free
Subscriptions include VAT where applicable.
Special arrangements exist for visually impaired persons.
Details and Membership application forms are available from RSGB HQ or see www.rsgb.org/join

YOUR RSGB

This page provides names and contact details for Board Members, Regional Managers, Committee Chairs and Honorary Officers. Members seeking advice and guidance on any aspect of amateur radio or the Society's work are free to contact the relevant person below. Before doing so, please do check the comprehensive FAQs on the RSGB website at www.rsgb.org/faq/ to see if your question is answered there.

For HQ staff, both e-mail addresses and telephone details are provided, including the option to select when dialling through the RSGB switchboard (01234 832 700).

Chairmen and Honorary Officers:
These are all volunteers and give their time freely to support the Society. Members should respect the fact that many also have full time day jobs, and so e-mail is the appropriate method of communication.

THE RSGB BOARD

Nick Henwood, G3RWF (RSGB President)
email: g3rwf@rsgb.org.uk

Graham Murchie, G4FSG (Board Chairman)
email: g4fsg@rsgb.org.uk

Stewart Bryant, G3YSX, email: g3ysx@rsgb.org.uk
Steve Hartley, G0FUW, email: g0fuw@rsgb.org.uk
Sara McGarvey, 2I0SSW email:2i0ssw@rsgb.org.uk
Alan Messenger, G0TLK, email: g0tlk@rsgb.org.uk
Graham Murchie, G4FSG, email: g4fsg@rsgb.org.uk
Len Paget, GM0ONX, email: gm0onx@rsgb.org.uk
Ian Shepherd, G4EVK, email: g4evk@rsgb.org.uk

General Manager:
Steve Thomas, M1ACB,
email: steve.thomas@rsgb.org.uk

Honorary Treasurer:
Richard Horton, G4AOJ, email: g4aoj@rsgb.org.uk

Company Secretary:
Stephen Purser, G4SHF email: g4shf@rsgb.org.uk

Note: The General Manager, Company Secretary and Honorary Treasurer are not Directors, but attend Board Meetings.

REGIONAL MANAGERS

Region 1 – M Hazel-McGown, MM0ZIF, rm1@rsgb.org.uk
Region 2 – Andrew Burns, MM0CXA, rm2@rsgb.org.uk
Region 3 – K Wilson, M1CNY, rm3@rsgb.org.uk
Region 4 – Ian Douglas, G7MFN, rm4@rsgb.org.uk
Region 5 – M Vincent, G3UKV, rm5@rsgb.org.uk
Region 6 – C Jones, 2W0LJC, rm6@rsgb.org.uk
Region 7 – Glyn Jones, GW0ANA, rm7@rsgb.org.uk
Region 8 – P Hosey, MI0MSO, rm8@rsgb.org.uk
Region 9 – T O'Reilly, G0NSY rm9@rsgb.org.uk
Region 10 – M Senior, G4EFO, rm10@rsgb.org.uk
Region 11 – Pam Helliwell, G7SME, rm11@rsgb.org.uk
Region 12 – Keith Haynes, G3WRO, rm12@rsgb.org.uk
Region 13 – Jim Stevenson, G0EJQ, rm13@rsgb.org.uk

SPECIALIST AREAS

Abuse and Poor Operating
Amateur Radio Observation Service (AROS), Mark Jones, G0MGX, AROS coordinator, email: aros@rsgb.org.uk, www.rsgb.org/aros/

Amateur Radio Direction Finding
Bob Titterington, G3ORY, Chairman, ARDF Committee, email: ardf.chairman@rsgb.org.uk, www.rsgb.org/ardf/

Awards
Chris Burbanks, G3SJJ, Awards Manager, email: awards@rsgb.org.uk, www.rsgb.org/awards/

Contests
Ian Pawson, G0FCT, Chairman, Contest Support, email: csc.chair@rsgb.org.uk, www.rsgb.org/radiosport/
Nick Totterdell, G4FAL, HF Contest Committee
email: hfcc.chair@rsgb.org.uk
Andy Cook, G4PIQ, VHF Contest Committee
email: vhfcc.chair@rsgb.org.uk

EMC
John Rogers, M0JAV, Chairman, EMC Committee, e-mail: emc.chairman@rsgb.org.uk, www.rsgb.org/emc/

General Technical Matters
Andy Talbot, G4JNT, Chairman, Technical Forum, email: tech.chair@rsgb.org.uk, www.rsgb.org/technicalmatters/

General Spectrum & Regulatory Matters
Murray Niman, G6JYB, Chairman, Spectrum Forum, email: spectrum.chairman@rsgb.org.uk
www.rsgb.org/spectrumforum/

GB2RS News Service Management
Ken Hatton, G3VBA, GB2RS Manager, email: gb2rs.manager@rsgb.org.uk
(GB2RS news items should be sent to radcom@rsgb.org.uk)

HF Matters
Ian Greenshields, G4FSU, HF Manager, email: hf.manager@rsgb.org.uk

Intruders to the Amateur Bands
email: iw@rsgb.org.uk, www.rsgb.org/intruders/

IOTA Activity Programme
Roger Balister, G3KMA, IOTA Manager, email: iota.manager@rsgb.org.uk, www.rsgbiota.org/

Microwave Matters
Barry Lewis, G4SJH, Microwave Manager, email: mw.manager@rsgb.org.uk

Planning Advice
John Mattocks, G4TEQ, Chairman, email: pac.chairman@rsgb.org.uk, www.rsgb.org/planning/

Propagation Studies
Steve Nichols, G0KYA, Chairman, Propagation Studies Committee, email: psc.chairman@rsgb.org.uk, www.rsgb.org/psc/

Repeater and Data Communications
John McCullagh, GI4BWM, Chairman, ETCC, email: etcc.chairman@rsgb.org.uk, www.ukrepeater.net

Training & Education
Philip Willis, M0PHI, Chairman, Training & Education Committee, email: tec.chair@rsgb.org.uk, www.rsgb.org/clubsandtraining/

VHF Matters
John Regnault, G4SWX, VHF Manager
email: vhf.manager@rsgb.org.uk

Youth Committee
Mike Jones, 2E0MLJ, Chairman, Youth Committee
email: youth.chairman@rsgb.org.uk
www.rsgb.org/youth-committee

Details of the Society's volunteer officers can be found in the RSGB Yearbook and on the RSGB website, www.rsgb.org

WEBSITE

Main website: www.rsgb.org
Members Pages: Log in using your callsign as the user name and your Membership number, without the leading zeros (see your *RadCom* address label) as the password. It is good practice to change your password.
If you need to update your Membership details, please log in to Membership Services at www.rsgb.org/members

HEADQUARTERS STAFF

Technical Amateur Radio Enquiries
email: AR.dept@rsgb.org.uk
Telephone: 01234 832 700, Option 4

Amateur Radio Examinations
email: exams@rsgb.org.uk
Telephone: 01234 832 700, Option 3

***RadCom* (news items, feature submissions, etc)**
Elaine Richards, G4LFM or Giles Read, G1MFG
email: radcom@rsgb.org.uk
Telephone: 01234 832 700, Option 8

GB2RS and Club News
email: radcom@rsgb.org.uk
Telephone: 01234 832 700, Option 8

Amateur Radio Licensing Enquiries
email: AR.dept@rsgb.org.uk
Telephone: 01234 832 700, Option 5

Sales department
(Membership, books and other products)
email: sales@rsgb.org.uk
Telephone: 01234 832 700, Option 1

Subscription renewals
Telephone: 01234 832 700, Option 2

IOTA
email: IOTA_HQ@rsgb.org.uk

General Manager
email: GM.dept@rsgb.org.uk
Telephone: 01234 832 700, Option 9

HEADQUARTERS AND REGISTERED OFFICE

3 Abbey Court, Fraser Road,
Priory Business Park, Bedford MK44 3WH
Telephone: 01234 832 700
Fax: 01234 831 496

QSL BUREAU ADDRESS

PO Box 5, Halifax HX1 9JR, England
Telephone: 01422 359 362
email: qsl@rsgb.org.uk, www.rsgb.org/qsl

PLAY YOUR PART IN YOUR RSGB

Have Your Say
Let us know how we're doing! Through "Have Your Say" you can let us know your views and you will receive a reply from the General Manager or a Board Member. Write to haveyoursay@rsgb.org.uk or go to www.rsgb.org/haveyoursay/

Consultations
From time to time you will find we are consulting the Membership on aspects of Society policy. You can find current consultations at www.rsgb.org/consultations/

National Radio Centre
Don't forget to tell your friends about the National Radio Centre at Bletchley Park. Full details at www.nationalradiocentre.com Members can enter Bletchley Park for free by downloading the personalised voucher available from the www.rsgb.org home page

Licensing & Special Event Stations
Licensing and Notices of Variation (NoVs) for special event stations are handled by Ofcom, 0207 981 3131, www.ofcom.org.uk, e-mail Spectrum.Licensing@ofcom.org.uk

FAQs
The RSGB has compiled the questions most frequently asked by Members at www.rsgb.org/faq/

Band Plan
The latest version of the band plan is always available on the website at www.rsgb.org/band-plans/

Good Operating Practice
The RSGB fully supports the code of conduct and encourages all amateurs to read the advice at www.rsgb.org/op-guidelines

RSGB Tech
The purpose of this service is to be the first port of call for technical queries on amateur radio matters. It is open to all radio amateurs. See http://groups.yahoo.com/group/rsgbtech/

RSGB Shop
All RSGB goods – books, filters, clothing etc – can be purchased online at www.rsgbshop.org/

Club Finder
You can use the RSGB website to find your nearest radio club and check out the facilities they have to offer. See www.rsgb.org/clubsandtraining/

LAM COMMUNICATIONS LTD

01226 361 700

YouTube lamcomms

www.hamradio-shop.co.uk

sales@hamradio-shop.co.uk

VINE antennas

LAM London 0203 432 4414 | LAMCO North East 0191 604 0255 | LAM GM 0141 530 4077

The LAMFEST

In aid of YORKSHIRE AIR AMBULANCE Registered Charity No. 1084305

Barnsley's HAM Radio Rally

Saturday 8th July 2017

Doors Open 10:00am - 4:30pm

Building 21, Elsecar Heritage Centre, Elsecar, Barnsley, S74 8HJ

Come and see ICOM KENWOOD YAESU Manufacturers

ICOM

IC-7410 HF+6M 100W £1,499.95
IC-7600 HF+6m TRX £2,399.95 Three Years Wty
IC-7700 HF+6m all mode £4999.95 Three Years Wty
IC-9100 HF+VHF+UHF transceiver £2,999.95
IC-7100 HF+VHF+UHF 4m £1,197.95
ID-5100 Standard Version £579.95
ID-5100E Fully monty £749.95
IC-7300 £1199.95

KENWOOD

TS-990S 200W Base transceiver CALL
TS-480SAT100W mobile/base HF/6m £699.95
TS-480 HXE 200W mobile/base £779.95
TS-2000X Multibander £1499.95
TS-2000E HF 50/144/430MHZ £1349.95
TS-590SG 100W DSP HF/6m £1239.95
TM-V71E VHF/UHF £299.95
TH-D74E VHF/UHF D-Star £599.95
KSC-25 LS Desktop Charger £49.95

YAESU

FT-857D Multiband HF/VHF/UHF Mobile £699.95
FT-817D All Mode Mobile £599.95
FT-450D 100W all mode HF/6m+ATU £597.95
FT-891 HF/6m Mobile £599.95
FT-7900 Multiband 145/433MHZ mobile £249.95
FT-1DE C4FM/FM Handset £289.95
FT-2DE C4FM/FM Handset £399.95
FT-70D C4FM/FM Handset £189.95
FTM400XDE C4FM/FM mobile £549.95
FTM400DE C4FM/FM mobile £489.95
FTDX3000D 100W HF/6m all mode TX £1,427.95
FTD1200D 100W HF/6m all mode TX £999.95
FT-991A HF/VHF/UHF £1,299.95
FTM100DE C4FM/FM mobile £329.95

MFJ-971.....£139.95
MFJ-949e.....£199.95
MFJ-993B.....£299.95
MFJ-945e.....£149.95
MFJ-269.....£389.95
MFJ-259B.....£299.95

MFJ

12 MONTHS WARRANTY USED ON LAMCO GEAR APPROVED

YAESU KENWOOD ICOM

exclusive LAMCO LAM COMMUNICATIONS LTD

LAMCO DU-800T 800Watts £399.95
LAMCO DU-3000T 3KW £699.95
LAMCO DU-1500T 1.5KW £499.95
LAMCO DU-1500T Differential ATU 1.5KW £499.95
LAMCO DU-1500L 1.5KW £499.95

2 year LDG Electronics warranty where applicable

LDG ELECTRONICS

LDG AT-1000 Pro.....£549.95
LDG AT-200Pro.....£259.95
LDG AT-600Pro.....£395.95
LDG Z-100.....£169.95
LDG Z-817.....£119.95
LDG Z-11Pro.....£179.95

< LDG AT-600Pro

LDG Z-100Plus >

Spiderbeam 18m Fibreglass pole £199.95
Spiderbeam HD 12m Fibreglass pole £99.95
Spiderbeam Aerial 51 404-UL £109.95

spiderbeam high performance lightweight antennas

Visit our website for a wide range of Accessories

Komunica Giving Shape to your Accessories

ORIGINAL ANTENNA

www.hamradio-shop.co.uk

bhi Noise Cancellation Products

BHI Compact In-Line noise cancelling £179.95
BHI DSPKR Noise Reduction Speaker £129.95
BHI Dual In Line Noise Cancelling Module £199.95
BHI NES 10-2 MK 3 £109.95
BHI DESKTOP Speaker £179.95
BHI NEIM-1031 MK 2 £144.95

VINE antennas

PRO.SIS.TEL. Produzione Sistemi Telecomunicazioni Antenna rotators - Towers

RCOM

Wanted! Good quality modern transceivers.

Call LAMCO Export Department

01226 361 700

We are the boys and girls in the North for HAM Radio!

MY FAVOURITE HAM STORE

Our Family Business Supporting and Supplying the Amateur Community throughout the UK, Europe and Worldwide.

LAM Communications Ltd. | 5 Doncaster Road | Barnsley | South Yorkshire | S70 1TH | UK

Shop Opening Times - Mon to Fri : 0930 hrs - 1730 hrs | Sat : 0930 hrs - 1400 hrs

E&OE